Computer Algebra Independent Integration Tests

Summer 2023 edition

8-Special-functions/206-8.4-Trig-integral-functions

Nasser M. Abbasi

September 5, 2023 Compiled on September 5, 2023 at 11:57am

Contents

CHAPTER 1

INTRODUCTION

This report gives the result of running the computer algebra independent integration test.The download section in on the main webpage contains links to download the problems in plain text format used for all CAS systems. The number of integrals in this report is [136]. This is test number [206].

1.1 Listing of CAS systems tested

The following are the CAS systems tested:

1. Mathematica 13.3.1 (August 16, 2023) on windows 10.
2. Rubi 4.16.1 (Dec 19, 2018) on Mathematica 13.3 on windows 10
3. Maple 2023.1 (July, 12, 2023) on windows 10.
4. Maxima 5.47 (June 1, 2023) using Lisp SBCL 2.3.0 on Linux via sagemath 10.1 (Aug 20, 2023).
5. FriCAS 1.3.9 (July 8, 2023) based on sbcl 2.3.0 on Linux via sagemath 10.1 (Aug 20, 2023).
6. Giac/Xcas 1.9.0-57 (June 26, 2023) on Linux via sagemath 10.1 (Aug 20, 2023).
7. Sympy 1.12 (May 10, 2023) Using Python 3.11.3 on Linux.
8. Mupad using Matlab 2021a with Symbolic Math Toolbox Version 8.7 on windows 10.

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

Sympy was run directly in Python not via sagemath.

1.2 Results

Important note: A number of problems in this test suite have no antiderivative in closed form. This means the antiderivative of these integrals can not be expressed in terms of elementary, special functions or `Hypergeometric2F1` functions. `RootSum` and `RootOf` are not allowed. If a CAS returns the above integral unevaluated within the time limit, then the result is counted as passed and assigned an A grade.

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

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

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

System	% solved	% Failed
Rubi	100.00 (136)	0.00 (0)
Mathematica	98.53 (134)	1.47 (2)
Fricas	92.65 (126)	7.35 (10)
Maple	86.76 (118)	13.24 (18)
Giac	52.21 (71)	47.79 (65)
Maxima	41.91 (57)	58.09 (79)
Sympy	38.24 (52)	61.76 (84)
Mupad	25.00 (34)	75.00 (102)

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.

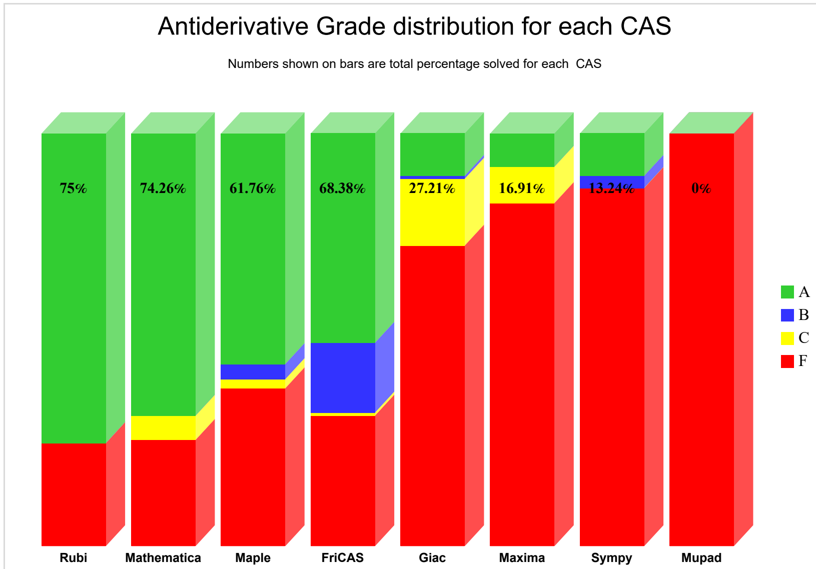
Table 1.2: Description of grading applied to integration result

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

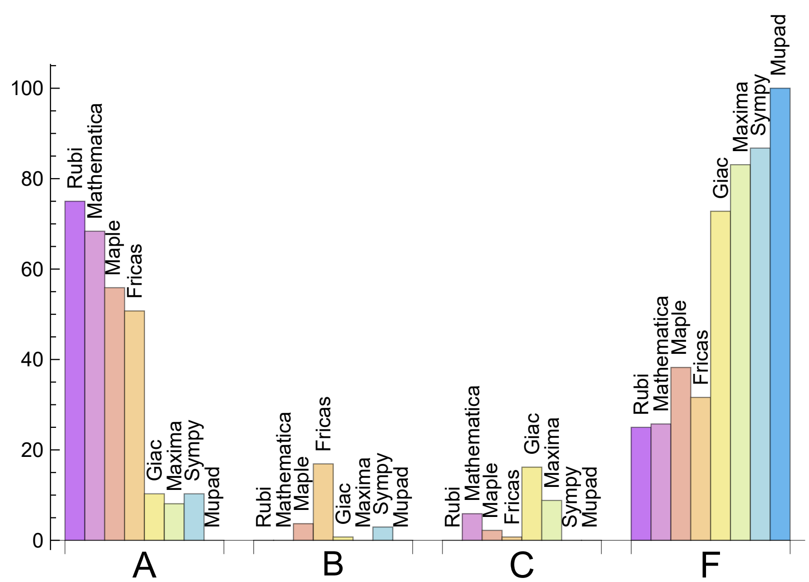
System	% A grade	% B grade	% C grade	% F grade
Rubi	75.000	0.000	0.000	25.000
Mathematica	68.382	0.000	5.882	25.735
Maple	55.882	3.676	2.206	38.235
Fricas	50.735	16.912	0.735	31.618
Giac	10.294	0.735	16.176	72.794
Sympy	10.294	2.941	0.000	86.765
Maxima	8.088	0.000	8.824	83.088
Mupad	0.000	0.000	0.000	100.000

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 grades of the CAS systems.



The following table shows the distribution of the different types of failures for each CAS. There are 3 types failures. The first is when CAS returns the input within the time limit, which means it could not solve it. This is the typical failure and given as **F**.

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

The third is due to an exception generated, indicated as **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 the CAS itself. This type of error requires more investigation to determine the cause.

System	Number failed	Percentage normal failure	Percentage timeout failure	Percentage exception failure
Rubi	0	0.00	0.00	0.00
Mathematica	2	100.00	0.00	0.00
Fricas	10	100.00	0.00	0.00
Maple	18	100.00	0.00	0.00
Giac	65	90.77	9.23	0.00
Maxima	79	100.00	0.00	0.00
Sympy	84	100.00	0.00	0.00
Mupad	102	0.00	100.00	0.00

Table 1.4: Failure statistics for each CAS

1.3 Time and leaf size Performance

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

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

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

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

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

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

System	Mean time (sec)
Rubi	0.15
Fricas	0.26
Maxima	0.30
Giac	0.43
Maple	0.78
Mathematica	0.99
Sympy	1.07
Mupad	5.39

Table 1.5: Time performance for each CAS

System	Mean size	Normalized mean	Median size	Normalized median
Mupad	14.24	1.17	14.00	1.17
Sympy	35.02	1.15	14.00	1.00
Maxima	47.95	1.27	18.00	1.17
Mathematica	66.25	0.94	44.00	0.97
Rubi	81.32	1.00	49.00	1.00
Maple	98.93	1.04	37.50	0.97
Fricas	115.02	1.49	58.00	1.17
Giac	6073.31	18.75	23.00	1.20

Table 1.6: Leaf size performance for each CAS

1.4 Performance based on number of rules Rubi used

This section shows how each CAS performed based on the number of rules Rubi needed to solve the same integral. One diagram is given for each CAS.

On the y axis is the percentage solved which Rubi itself needed the number of rules given the x axis. These plots show that as more rules are needed then most CAS system percentage of solving decreases which indicates the integral is becoming more complicated to solve.

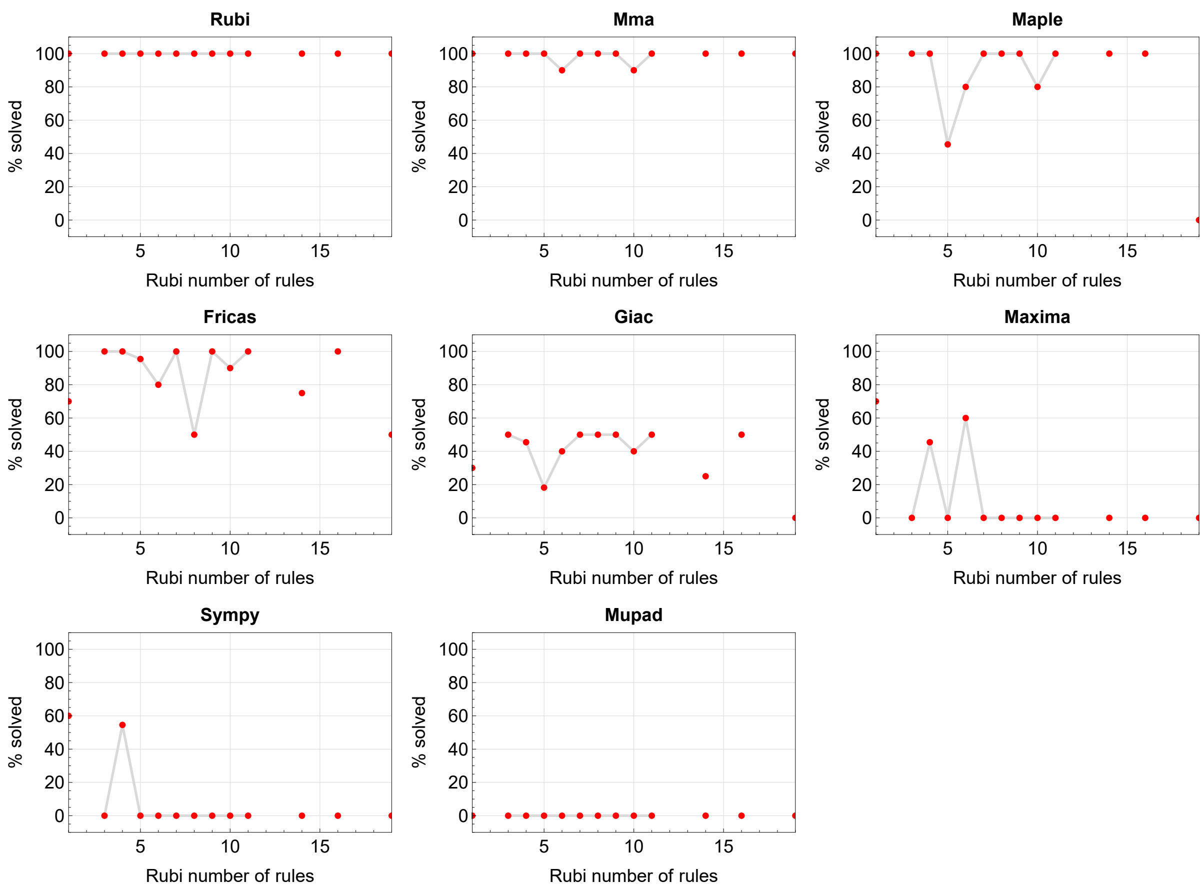


Figure 1.1: Solving statistics per number of Rubi rules used

1.5 Performance based on number of steps Rubi used

This section shows how each CAS performed based on the number of steps Rubi needed to solve the same integral. Note that the number of steps Rubi needed can be much higher than the number of rules, as the same rule could be used more than once.

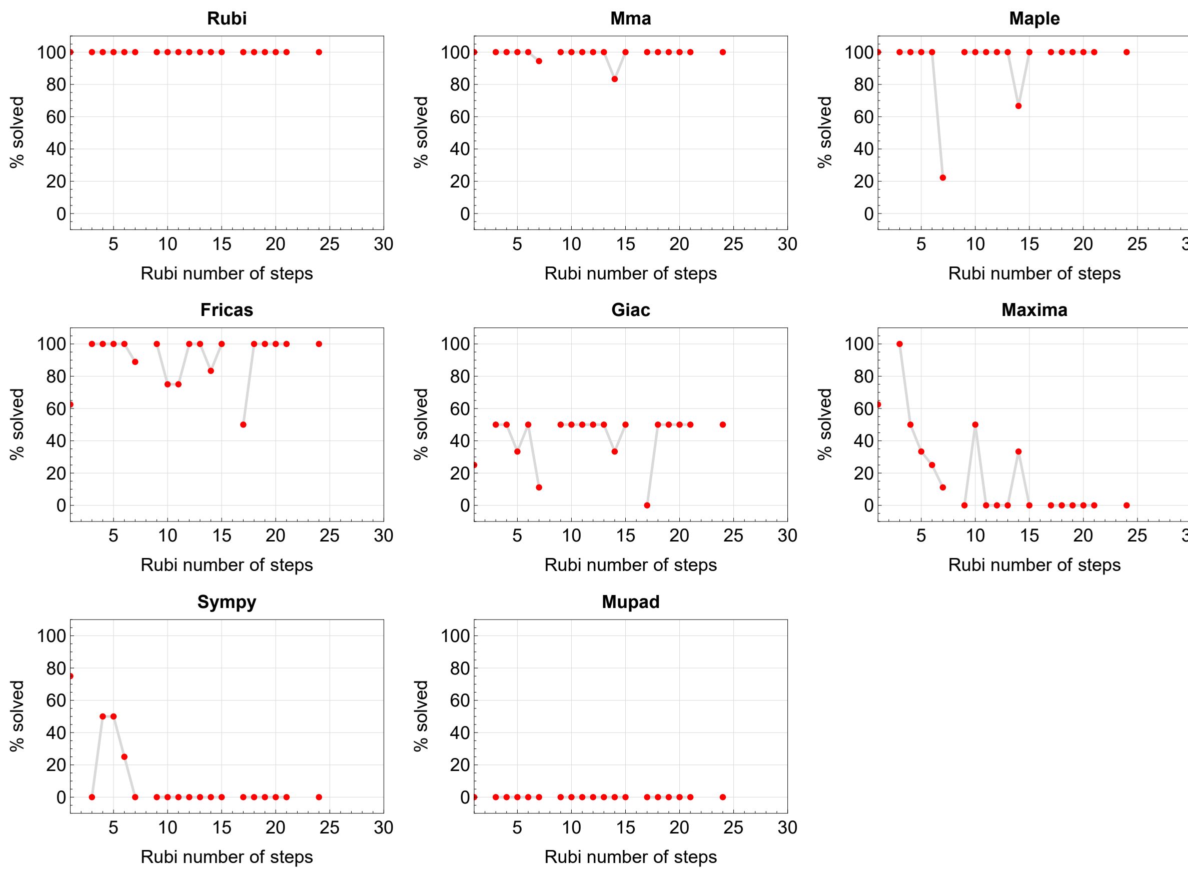


Figure 1.2: Solving statistics per number of Rubi steps used

The above diagram show that the precentage of solved intergals decreases for most CAS systems as the number of steps increases. As expected, for integrals that required less steps by Rubi, CAS systems had more success which indicates the integral was not as hard to solve. As Rubi needed more steps to solve the integral, the solved percentage decreased for most CAS systems which indicates the integral is becoming harder to solve.

1.6 Solved integrals histogram based on leaf size of result

The following shows the distribution of solved integrals for each CAS system based on leaf size of the antiderivatives produced by each CAS. It shows that most integrals solved produced leaf size less than about 100 to 150. The bin size used is 40.

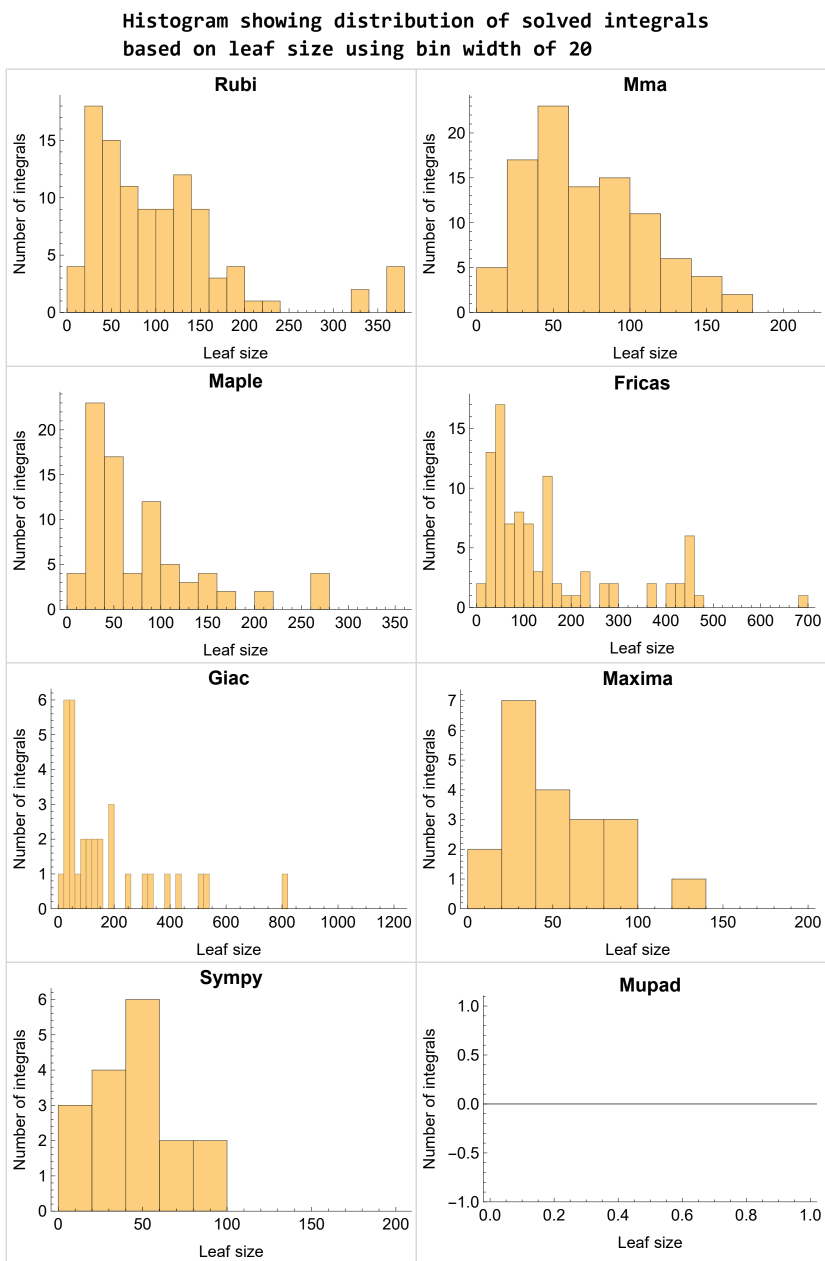


Figure 1.3: Solved integrals based on leaf size distribution

1.7 Solved integrals histogram based on CPU time used

The following shows the distribution of solved integrals for each CAS system based on CPU time used in seconds. The bin size used is 0.1 second.

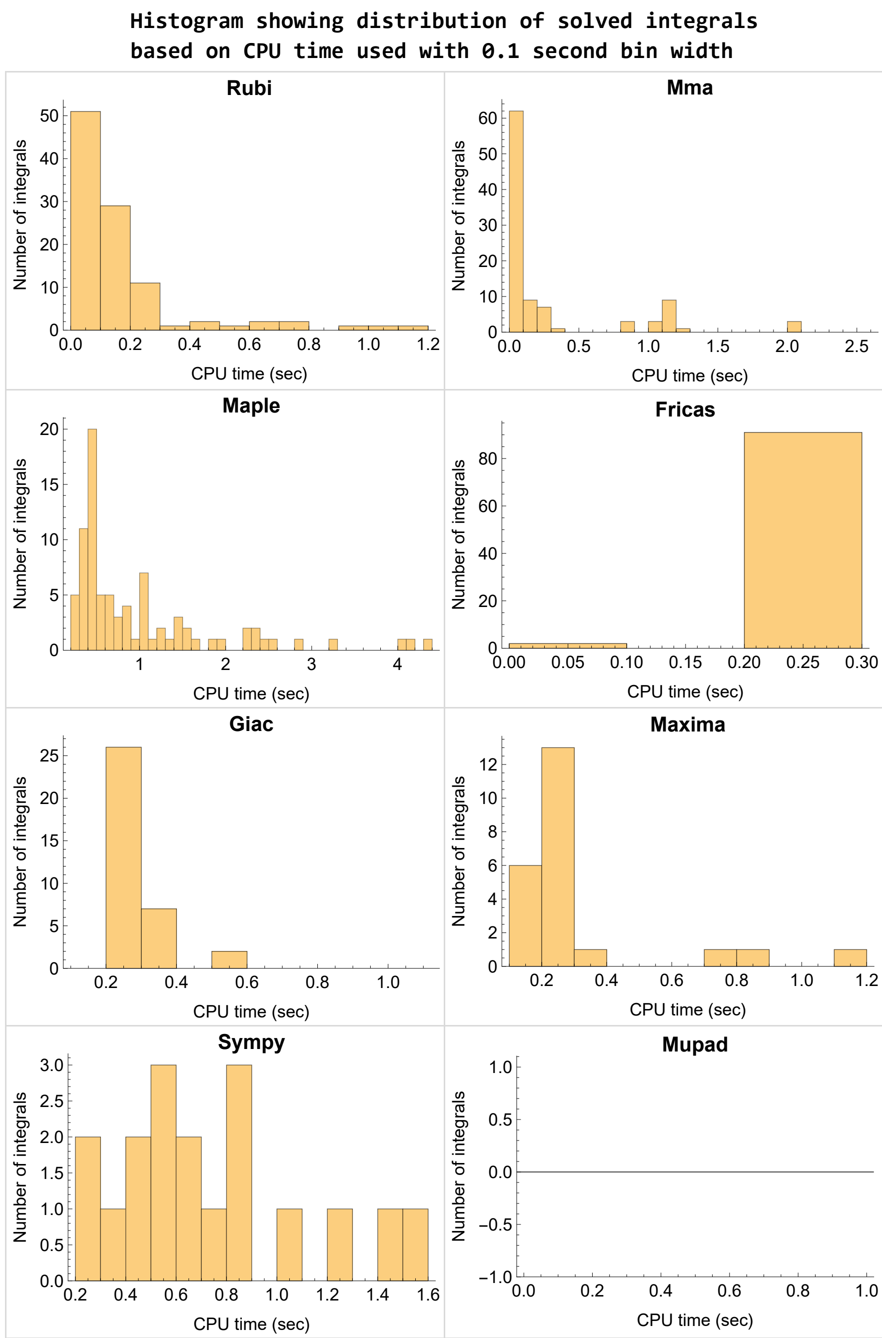


Figure 1.4: Solved integrals histogram based on CPU time used

1.8 Leaf size vs. CPU time used

The following shows the relation between the CPU time used to solve an integral and the leaf size of the antiderivative.

The result for Fricas, Maxima and Giac is shifted more to the right than the other CAS system due to the use of sagemath to call them, which causes an initial slight delay in the timing to start the integration due to overhead of starting a new process each time. This should also be taken into account when looking at the timing of these three CAS systems. Direct calls not using sagemath would result in faster timings, but current implementation uses sagemath as this makes testing much easier to do.

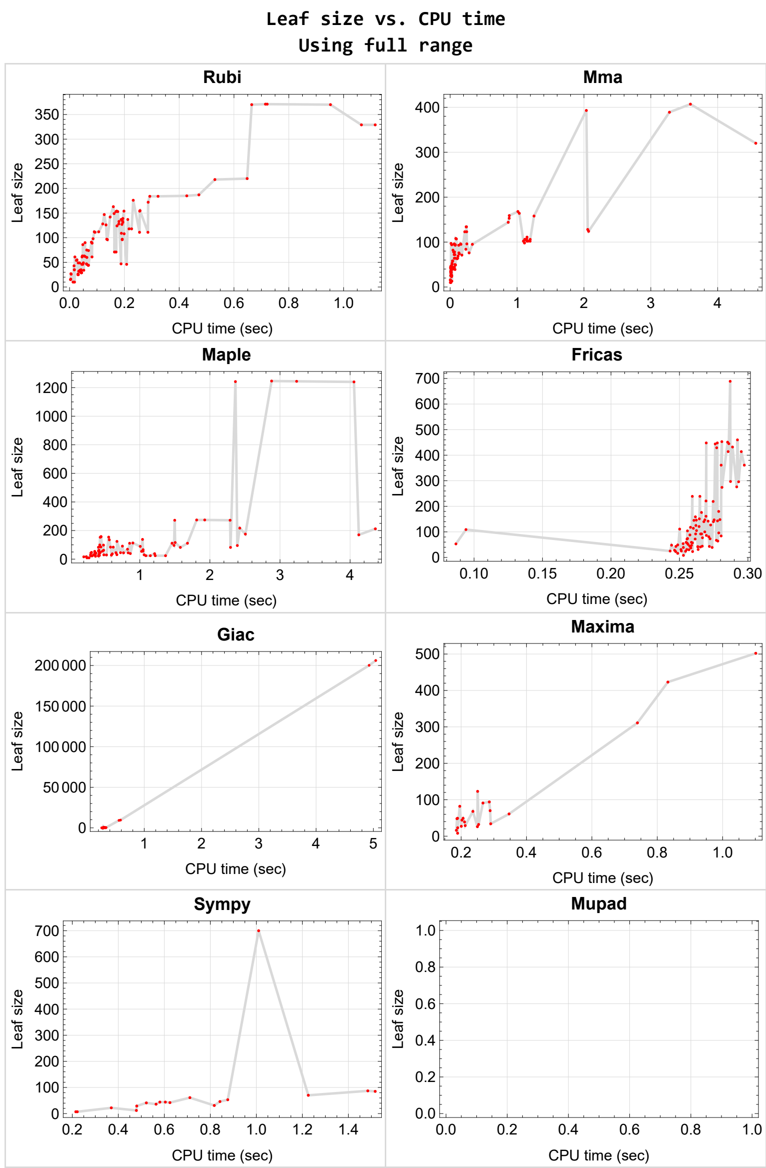


Figure 1.5: Leaf size vs. CPU time. Full range

1.9 list of integrals with no known antiderivative

$\{9, 14, 15, 16, 17, 22, 25, 29, 30, 31, 40, 46, 48, 58, 62, 65, 68, 77, 82, 83, 84, 85, 90, 93, 97, 98, 99, 107, 109, 115, 126, 130, 133, 136\}$

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

Rubi {}

Mathematica {115}

Maple {}

Maxima {}

Fricas {16}

Sympy {}

Giac {}

Mupad {}

1.11 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 necessarily mean 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 possible to do further investigation to determine why the result could not be verified.

Rubi {}

Mathematica {115}

Maple {}

Maxima Verification phase not currently implemented.

Fricas Verification phase not currently implemented.

Sympy Verification phase not currently implemented.

Giac Verification phase not currently implemented.

Mupad Verification phase not currently implemented.

1.12 Timing

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

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

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

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

1.13 Verification

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

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

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

1.14 Important notes about some of the results

Important note about Maxima results

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

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

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

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

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

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

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

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

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

Important note about FriCAS result

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

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

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

Important note about finding leaf size of antiderivative

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

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

```
def tree_size(expr):
    r"""
    Return the tree size of this expression.
    """
    if expr not in SR:
        # deal with lists, tuples, vectors
        return 1 + sum(tree_size(a) for a in expr)
    expr = SR(expr)
```

```
    x, aa = expr.operator(), expr.operands()
    if x is None:
        return 1
    else:
        return 1 + sum(tree_size(a) for a in aa)
```

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

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

  except Exception as ee:
       leafCount =1
```

Important note about Mupad results

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

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

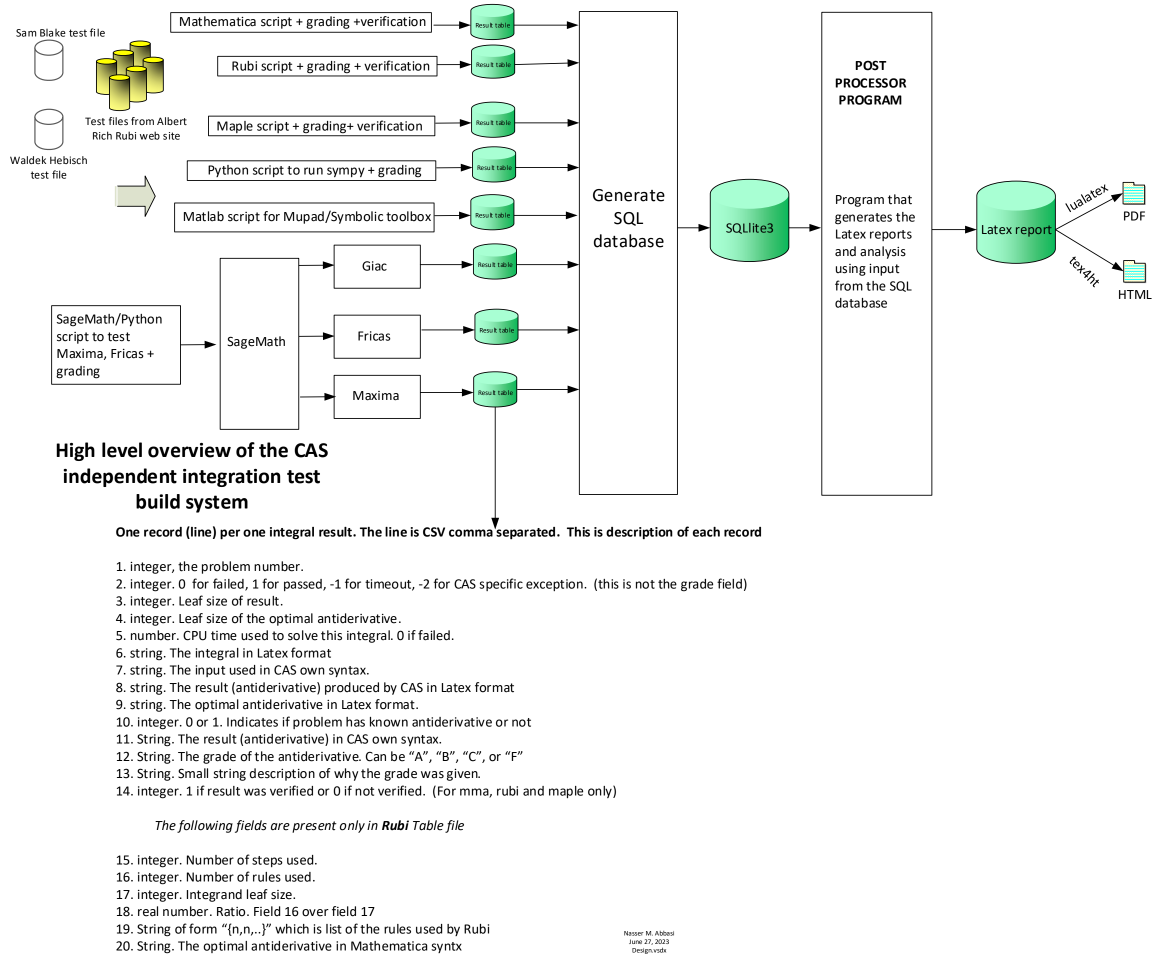
The following is an example of using Matlab's symbolic toolbox (Mupad) to solve an integral

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

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

1.15 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

Rubi

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 18, 19, 20, 21, 23, 24, 26, 27, 28, 32, 33, 34, 35, 36, 37, 38, 39, 41, 42, 43, 44, 45, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 60, 61, 63, 64, 66, 67, 69, 70, 71, 72, 73, 74, 75, 76, 78, 79, 80, 81, 86, 87, 88, 89, 91, 92, 94, 95, 96, 100, 101, 102, 103, 104, 105, 106, 108, 110, 111, 112, 113, 114, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129, 131, 132, 134, 135 }

B grade { }

C grade { }

F normal fail { }

F(-1) timedout fail { }

F(-2) exception fail { }

Mma

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 18, 19, 20, 21, 23, 24, 26, 27, 28, 32, 33, 34, 35, 36, 37, 38, 41, 42, 43, 44, 45, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 60, 61, 69, 70, 71, 72, 73, 74, 75, 76, 78, 79, 80, 81, 86, 87, 88, 89, 91, 92, 94, 95, 96, 100, 101, 102, 103, 104, 105, 106, 108, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129 }

B grade { }

C grade { 63, 64, 66, 67, 131, 132, 134, 135 }

F normal fail { 39, 47 }

F(-1) timedout fail { }

F(-2) exception fail { }

Maple

A grade { 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 18, 19, 20, 21, 23, 24, 27, 28, 35, 41, 42, 43, 44, 45, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 60, 61, 64, 67, 70, 71, 72, 73, 75, 76, 78, 79, 80, 81, 86, 87, 88, 89, 91, 92, 95, 96, 103, 110, 111, 112, 113, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129, 132, 135 }

B grade { 63, 66, 74, 131, 134 }

C grade { 1, 2, 69 }

F normal fail { 26, 32, 33, 34, 36, 37, 38, 39, 47, 94, 100, 101, 102, 104, 105, 106, 108, 114 }

F(-1) timedout fail { }

F(-2) exception fail { }

Fricas

A grade { 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 18, 19, 20, 21, 23, 24, 26, 27, 28, 32, 33, 34, 35, 36, 37, 38, 39, 41, 42, 43, 44, 45, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 60, 61, 63, 64, 66, 67, 69, 70, 71, 72, 73, 75, 76, 78, 79, 81, 86, 87, 88, 89, 96, 131, 132, 134, 135 }

B grade { 100, 101, 102, 103, 104, 105, 106, 110, 111, 112, 113, 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129 }

C grade { 16 }

F normal fail { 6, 74, 80, 91, 92, 94, 95, 108, 114, 116 }

F(-1) timedout fail { }

F(-2) exception fail { }

Maxima

A grade { 2, 3, 4, 5, 21, 35, 41, 71, 73, 89, 103 }

B grade { }

C grade { 7, 8, 18, 19, 20, 70, 72, 75, 76, 86, 87, 88 }

F normal fail { 1, 6, 10, 11, 12, 13, 23, 24, 26, 27, 28, 32, 33, 34, 36, 37, 38, 39, 42, 43, 44, 45, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 60, 61, 63, 64, 66, 67, 69, 74, 78, 79, 80, 81, 91, 92, 94, 95, 96, 100, 101, 102, 104, 105, 106, 108, 110, 111, 112, 113, 114, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129, 131, 132, 134, 135 }

F(-1) timedout fail { }

F(-2) exception fail { }

Giac

A grade { 2, 3, 4, 5, 7, 10, 12, 35, 43, 45, 49, 51, 53, 54 }

B grade { 61 }

C grade { 8, 11, 13, 18, 19, 20, 21, 23, 24, 42, 44, 50, 52, 55, 56, 57, 59, 60, 63, 64, 66, 67 }

F normal fail { 1, 6, 26, 27, 28, 39, 41, 47, 69, 70, 71, 72, 73, 74, 75, 76, 78, 79, 80, 81, 86, 87, 88, 89, 91, 92, 94, 95, 96, 100, 101, 102, 103, 104, 105, 106, 108, 110, 111, 112, 113, 114, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129, 131, 132, 134, 135 }

F(-1) timedout fail { 32, 33, 34, 36, 37, 38 }

F(-2) exception fail { }

Mupad

A grade { }

B grade { }

C grade { }

F normal fail { }

F(-1) timedout fail { 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 18, 19, 20, 21, 23, 24, 26, 27, 28, 32, 33, 34, 35, 36, 37, 38, 39, 41, 42, 43, 44, 45, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 60, 61, 63, 64, 66, 67, 69, 70, 71, 72, 73, 74, 75, 76, 78, 79, 80, 81, 86, 87, 88, 89, 91, 92, 94, 95, 96, 100, 101, 102, 103, 104, 105, 106, 108, 110, 111, 112, 113, 114, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129, 131, 132, 134, 135 }

F(-2) exception fail { }

Sympy

A grade { 1, 2, 3, 4, 5, 6, 7, 8, 41, 70, 71, 72, 74, 116 }

B grade { 69, 73, 75, 76 }

C grade { }

F normal fail { 10, 11, 12, 13, 18, 19, 20, 21, 23, 24, 26, 27, 28, 32, 33, 34, 35, 36, 37, 38, 39, 42, 43, 44, 45, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 60, 61, 63, 64, 66, 67, 78, 79, 80, 81, 86, 87, 88, 89, 91, 92, 94, 95, 96, 100, 101, 102, 103, 104, 105, 106, 108, 110, 111, 112, 113, 114, 117, 118, 119, 120, 121, 122, 123, 124, 125, 127, 128, 129, 131, 132, 134, 135 }

F(-1) timedout fail { }

F(-2) exception fail { }

2.2 Detailed conclusion table per each integral for all CAS systems

Detailed conclusion table per each integral is given by the 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 as **F**.

In this table, the column `N.S.` means **normalized size** and is defined as $\frac{\text{antiderivative leaf size}}{\text{optimal antiderivative leaf size}}$. To make the table fit the page, the name `Mathematica` was abbreviated to `MMA`.

Problem 1	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	86	86	82	37	0	53	44	0	0
N.S.	1	1.00	0.95	0.43	0.00	0.62	0.51	0.00	0.00
time (sec)	N/A	0.048	0.042	0.608	0.000	0.087	0.604	0.000	0.000

Problem 2	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	63	63	50	23	48	49	61	49	0
N.S.	1	1.00	0.79	0.37	0.76	0.78	0.97	0.78	0.00
time (sec)	N/A	0.047	0.027	0.303	0.187	0.249	0.711	0.258	0.000

Problem 3	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	49	49	41	43	39	39	46	38	0
N.S.	1	1.00	0.84	0.88	0.80	0.80	0.94	0.78	0.00
time (sec)	N/A	0.032	0.022	0.302	0.210	0.253	0.842	0.268	0.000

Problem 4	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	35	35	29	29	30	29	29	0
N.S.	1	1.00	1.00	0.83	0.83	0.86	0.83	0.83	0.00
time (sec)	N/A	0.017	0.008	0.297	0.212	0.257	0.480	0.269	0.000

Problem 5	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	15	15	15	16	16	16	12	15	0
N.S.	1	1.00	1.00	1.07	1.07	1.07	0.80	1.00	0.00
time (sec)	N/A	0.003	0.004	0.201	0.185	0.249	0.479	0.282	0.000

Problem 6	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	43	43	43	20	0	0	22	0	0
N.S.	1	1.00	1.00	0.47	0.00	0.00	0.51	0.00	0.00
time (sec)	N/A	0.016	0.005	0.368	0.000	0.000	0.370	0.000	0.000

Problem 7	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	25	25	30	26	24	36	37	0
N.S.	1	1.00	1.00	1.20	1.04	0.96	1.44	1.48	0.00
time (sec)	N/A	0.032	0.009	0.342	0.250	0.254	0.564	0.266	0.000

Problem 8	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	46	46	46	47	32	31	41	149	0
N.S.	1	1.00	1.00	1.02	0.70	0.67	0.89	3.24	0.00
time (sec)	N/A	0.044	0.011	0.311	0.253	0.255	0.522	0.272	0.000

Problem 9	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	10	10	12	10	12	12	10	12	12
N.S.	1	1.00	1.20	1.00	1.20	1.20	1.00	1.20	1.20
time (sec)	N/A	0.026	1.923	0.214	0.224	0.254	1.266	0.279	4.618

Problem 10	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	149	149	107	154	0	105	0	117	0
N.S.	1	1.00	0.72	1.03	0.00	0.70	0.00	0.79	0.00
time (sec)	N/A	0.162	0.093	0.556	0.000	0.262	0.000	0.281	0.000

Problem 11	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	112	112	78	84	0	81	0	150	0
N.S.	1	1.00	0.70	0.75	0.00	0.72	0.00	1.34	0.00
time (sec)	N/A	0.106	0.052	0.582	0.000	0.271	0.000	0.291	0.000

Problem 12	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	74	74	58	62	0	56	0	65	0
N.S.	1	1.00	0.78	0.84	0.00	0.76	0.00	0.88	0.00
time (sec)	N/A	0.069	0.039	0.484	0.000	0.256	0.000	0.280	0.000

Problem 13	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	32	32	32	32	0	31	0	49	0
N.S.	1	1.00	1.00	1.00	0.00	0.97	0.00	1.53	0.00
time (sec)	N/A	0.033	0.010	0.416	0.000	0.264	0.000	0.267	0.000

Problem 14	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	10	10	12	10	12	12	8	12	12
N.S.	1	1.00	1.20	1.00	1.20	1.20	0.80	1.20	1.20
time (sec)	N/A	0.016	0.318	0.096	0.217	0.259	0.968	0.282	4.810

Problem 15	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	10	10	12	10	12	12	10	12	12
N.S.	1	1.00	1.20	1.00	1.20	1.20	1.00	1.20	1.20
time (sec)	N/A	0.020	0.344	0.148	0.215	0.259	0.965	0.274	4.862

Problem 16	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	C	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	10	10	12	10	12	74	10	12	12
N.S.	1	1.00	1.20	1.00	1.20	7.40	1.00	1.20	1.20
time (sec)	N/A	0.019	0.363	0.149	0.211	0.256	0.950	0.279	5.077

Problem 17	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	10	10	12	10	12	12	10	12	12
N.S.	1	1.00	1.20	1.00	1.20	1.20	1.00	1.20	1.20
time (sec)	N/A	0.224	2.636	0.285	0.201	0.269	0.609	0.273	5.716

Problem 18	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	184	184	96	156	123	92	0	338	0
N.S.	1	1.00	0.52	0.85	0.67	0.50	0.00	1.84	0.00
time (sec)	N/A	0.293	0.156	0.446	0.250	0.262	0.000	0.284	0.000

Problem 19	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	118	118	63	99	91	64	0	252	0
N.S.	1	1.00	0.53	0.84	0.77	0.54	0.00	2.14	0.00
time (sec)	N/A	0.217	0.104	0.429	0.267	0.278	0.000	0.282	0.000

Problem 20	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	71	71	50	57	68	48	0	191	0
N.S.	1	1.00	0.70	0.80	0.96	0.68	0.00	2.69	0.00
time (sec)	N/A	0.164	0.072	0.410	0.236	0.244	0.000	0.291	0.000

Problem 21	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	26	41	24	23	23	0	303	0
N.S.	1	1.00	1.58	0.92	0.88	0.88	0.00	11.65	0.00
time (sec)	N/A	0.006	0.028	0.415	0.189	0.260	0.000	0.276	0.000

Problem 22	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	10	10	12	10	12	12	8	12	12
N.S.	1	1.00	1.20	1.00	1.20	1.20	0.80	1.20	1.20
time (sec)	N/A	0.022	0.388	0.243	0.371	0.255	0.320	0.282	5.121

Problem 23	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	46	46	39	46	0	39	0	181	0
N.S.	1	1.00	0.85	1.00	0.00	0.85	0.00	3.93	0.00
time (sec)	N/A	0.208	0.073	0.424	0.000	0.274	0.000	0.285	0.000

Problem 24	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	111	111	84	83	0	96	0	809	0
N.S.	1	1.00	0.76	0.75	0.00	0.86	0.00	7.29	0.00
time (sec)	N/A	0.286	0.235	0.410	0.000	0.279	0.000	0.292	0.000

Problem 25	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	12	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	1.00	1.17	1.17
time (sec)	N/A	0.037	5.468	0.249	0.245	0.270	1.143	0.335	5.454

Problem 26	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	329	329	158	0	0	151	0	0	0
N.S.	1	1.00	0.48	0.00	0.00	0.46	0.00	0.00	0.00
time (sec)	N/A	1.115	1.254	0.000	0.000	0.265	0.000	0.000	0.000

Problem 27	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	154	154	95	111	0	100	0	0	0
N.S.	1	1.00	0.62	0.72	0.00	0.65	0.00	0.00	0.00
time (sec)	N/A	0.256	0.332	0.855	0.000	0.268	0.000	0.000	0.000

Problem 28	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	49	49	43	45	0	44	0	0	0
N.S.	1	1.00	0.88	0.92	0.00	0.90	0.00	0.00	0.00
time (sec)	N/A	0.050	0.009	0.428	0.000	0.258	0.000	0.000	0.000

Problem 29	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	10	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	0.83	1.17	1.17
time (sec)	N/A	0.029	2.244	0.105	0.226	0.245	0.358	0.308	4.917

Problem 30	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	12	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	1.00	1.17	1.17
time (sec)	N/A	0.029	3.672	0.180	0.218	0.246	0.292	0.353	4.851

Problem 31	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	12	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	1.00	1.17	1.17
time (sec)	N/A	0.037	1.652	0.183	0.224	0.256	0.337	0.351	4.854

Problem 32	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	A	F	F(-1)	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	137	137	106	0	0	140	0	0	0
N.S.	1	1.00	0.77	0.00	0.00	1.02	0.00	0.00	0.00
time (sec)	N/A	0.212	1.197	0.000	0.000	0.268	0.000	0.000	0.000

Problem 33	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	A	F	F(-1)	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	137	137	106	0	0	140	0	0	0
N.S.	1	1.00	0.77	0.00	0.00	1.02	0.00	0.00	0.00
time (sec)	N/A	0.188	1.115	0.000	0.000	0.275	0.000	0.000	0.000

Problem 34	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	A	F	F(-1)	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	128	128	102	0	0	127	0	0	0
N.S.	1	1.00	0.80	0.00	0.00	0.99	0.00	0.00	0.00
time (sec)	N/A	0.180	1.095	0.000	0.000	0.273	0.000	0.000	0.000

Problem 35	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	54	54	95	54	49	57	0	59	0
N.S.	1	1.00	1.76	1.00	0.91	1.06	0.00	1.09	0.00
time (sec)	N/A	0.025	0.060	1.025	0.189	0.259	0.000	0.328	0.000

Problem 36	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	A	F	F(-1)	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	131	131	107	0	0	142	0	0	0
N.S.	1	1.00	0.82	0.00	0.00	1.08	0.00	0.00	0.00
time (sec)	N/A	0.194	1.144	0.000	0.000	0.271	0.000	0.000	0.000

Problem 37	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	A	F	F(-1)	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	139	139	111	0	0	147	0	0	0
N.S.	1	1.00	0.80	0.00	0.00	1.06	0.00	0.00	0.00
time (sec)	N/A	0.195	1.149	0.000	0.000	0.275	0.000	0.000	0.000

Problem 38	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	A	F	F(-1)	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	176	176	128	0	0	180	0	0	0
N.S.	1	1.00	0.73	0.00	0.00	1.02	0.00	0.00	0.00
time (sec)	N/A	0.232	2.057	0.000	0.000	0.279	0.000	0.000	0.000

Problem 39	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	F	F	A	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	96	96	0	0	0	72	0	0	0
N.S.	1	1.00	0.00	0.00	0.00	0.75	0.00	0.00	0.00
time (sec)	N/A	0.138	0.000	0.000	0.000	0.256	0.000	0.000	0.000

Problem 40	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	14	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	1.17	1.17	1.17
time (sec)	N/A	0.108	0.590	0.178	0.252	0.259	1.243	0.285	4.992

Problem 41	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	10	10	10	9	8	8	7	0	0
N.S.	1	1.00	1.00	0.90	0.80	0.80	0.70	0.00	0.00
time (sec)	N/A	0.013	0.011	0.247	0.189	0.253	0.222	0.000	0.000

Problem 42	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	26	26	23	0	23	0	41	0
N.S.	1	1.00	1.00	0.88	0.00	0.88	0.00	1.58	0.00
time (sec)	N/A	0.031	0.015	0.322	0.000	0.247	0.000	0.274	0.000

Problem 43	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	61	61	44	45	0	43	0	55	0
N.S.	1	1.00	0.72	0.74	0.00	0.70	0.00	0.90	0.00
time (sec)	N/A	0.082	0.062	0.659	0.000	0.272	0.000	0.287	0.000

Problem 44	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	91	91	64	69	0	67	0	138	0
N.S.	1	1.00	0.70	0.76	0.00	0.74	0.00	1.52	0.00
time (sec)	N/A	0.080	0.078	0.825	0.000	0.277	0.000	0.281	0.000

Problem 45	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	126	126	93	138	0	92	0	106	0
N.S.	1	1.00	0.74	1.10	0.00	0.73	0.00	0.84	0.00
time (sec)	N/A	0.133	0.128	1.039	0.000	0.266	0.000	0.282	0.000

Problem 46	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	14	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	1.17	1.17	1.17
time (sec)	N/A	0.130	0.593	0.191	0.291	0.250	1.796	0.274	5.289

Problem 47	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	F	F	F	A	F	F	F(-1)
verified	N/A	Yes	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	44	44	0	0	0	44	0	0	0
N.S.	1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
time (sec)	N/A	0.068	0.000	0.000	0.000	0.267	0.000	0.000	0.000

Problem 48	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	12	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	1.00	1.17	1.17
time (sec)	N/A	0.021	0.686	0.208	0.287	0.256	1.380	0.274	4.903

Problem 49	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	34	36	28	0	25	0	33	0
N.S.	1	1.00	1.06	0.82	0.00	0.74	0.00	0.97	0.00
time (sec)	N/A	0.038	0.016	0.595	0.000	0.243	0.000	0.273	0.000

Problem 50	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	61	61	42	44	0	43	0	124	0
N.S.	1	1.00	0.69	0.72	0.00	0.70	0.00	2.03	0.00
time (sec)	N/A	0.046	0.037	0.834	0.000	0.247	0.000	0.280	0.000

Problem 51	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	98	98	72	89	0	73	0	82	0
N.S.	1	1.00	0.73	0.91	0.00	0.74	0.00	0.84	0.00
time (sec)	N/A	0.086	0.071	1.006	0.000	0.272	0.000	0.290	0.000

Problem 52	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	128	128	94	111	0	92	0	180	0
N.S.	1	1.00	0.73	0.87	0.00	0.72	0.00	1.41	0.00
time (sec)	N/A	0.121	0.078	1.680	0.000	0.265	0.000	0.290	0.000

Problem 53	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	29	25	24	0	41	0	23	0
N.S.	1	1.00	0.86	0.83	0.00	1.41	0.00	0.79	0.00
time (sec)	N/A	0.043	0.023	1.220	0.000	0.265	0.000	0.278	0.000

Problem 54	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	A	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	29	25	24	0	42	0	23	0
N.S.	1	1.00	0.86	0.83	0.00	1.45	0.00	0.79	0.00
time (sec)	N/A	0.044	0.022	1.367	0.000	0.263	0.000	0.274	0.000

Problem 55	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	187	187	123	175	0	114	0	398	0
N.S.	1	1.00	0.66	0.94	0.00	0.61	0.00	2.13	0.00
time (sec)	N/A	0.472	0.247	2.506	0.000	0.260	0.000	0.334	0.000

Problem 56	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	97	97	71	82	0	72	0	507	0
N.S.	1	1.00	0.73	0.85	0.00	0.74	0.00	5.23	0.00
time (sec)	N/A	0.192	0.175	1.578	0.000	0.261	0.000	0.311	0.000

Problem 57	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	34	33	31	0	31	0	57	0
N.S.	1	1.00	0.97	0.91	0.00	0.91	0.00	1.68	0.00
time (sec)	N/A	0.052	0.014	0.673	0.000	0.251	0.000	0.301	0.000

Problem 58	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	16	18	16	18	18	15	18	18
N.S.	1	1.00	1.12	1.00	1.12	1.12	0.94	1.12	1.12
time (sec)	N/A	0.094	2.287	0.267	0.298	0.247	1.056	0.295	8.518

Problem 59	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	218	218	134	212	0	125	0	431	0
N.S.	1	1.00	0.61	0.97	0.00	0.57	0.00	1.98	0.00
time (sec)	N/A	0.530	0.240	4.360	0.000	0.262	0.000	0.315	0.000

Problem 60	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	108	108	74	95	0	77	0	528	0
N.S.	1	1.00	0.69	0.88	0.00	0.71	0.00	4.89	0.00
time (sec)	N/A	0.199	0.137	2.391	0.000	0.267	0.000	0.310	0.000

Problem 61	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	B	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	46	46	45	38	0	37	0	95	0
N.S.	1	1.00	0.98	0.83	0.00	0.80	0.00	2.07	0.00
time (sec)	N/A	0.063	0.017	1.211	0.000	0.258	0.000	0.322	0.000

Problem 62	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	16	18	16	18	18	15	18	18
N.S.	1	1.00	1.12	1.00	1.12	1.12	0.94	1.12	1.12
time (sec)	N/A	0.116	1.733	0.240	0.379	0.246	1.031	0.302	6.776

Problem 63	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	B	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	371	371	407	1246	0	432	0	200182	0
N.S.	1	1.00	1.10	3.36	0.00	1.16	0.00	539.57	0.00
time (sec)	N/A	0.715	3.592	2.880	0.000	0.289	0.000	4.926	0.000

Problem 64	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	154	154	168	274	0	146	0	9541	0
N.S.	1	1.00	1.09	1.78	0.00	0.95	0.00	61.95	0.00
time (sec)	N/A	0.198	1.013	1.811	0.000	0.262	0.000	0.586	0.000

Problem 65	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	16	18	16	18	18	15	18	18
N.S.	1	1.00	1.12	1.00	1.12	1.12	0.94	1.12	1.12
time (sec)	N/A	0.121	13.372	0.352	0.382	0.248	0.746	0.301	6.591

Problem 66	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	B	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	370	370	389	1240	0	429	0	206132	0
N.S.	1	1.00	1.05	3.35	0.00	1.16	0.00	557.11	0.00
time (sec)	N/A	0.952	3.278	4.055	0.000	0.277	0.000	5.041	0.000

Problem 67	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	A	F	A	F	C	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	153	153	164	272	0	147	0	9214	0
N.S.	1	1.00	1.07	1.78	0.00	0.96	0.00	60.22	0.00
time (sec)	N/A	0.169	1.033	2.288	0.000	0.268	0.000	0.559	0.000

Problem 68	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	16	18	16	18	18	15	18	18
N.S.	1	1.00	1.12	1.00	1.12	1.12	0.94	1.12	1.12
time (sec)	N/A	0.074	7.838	0.382	0.385	0.251	0.845	0.289	6.074

Problem 69	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	C	F	A	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	90	90	78	124	0	109	700	0	0
N.S.	1	1.00	0.87	1.38	0.00	1.21	7.78	0.00	0.00
time (sec)	N/A	0.056	0.055	0.674	0.000	0.094	1.010	0.000	0.000

Problem 70	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	63	63	53	54	94	59	85	0	0
N.S.	1	1.00	0.84	0.86	1.49	0.94	1.35	0.00	0.00
time (sec)	N/A	0.053	0.029	0.357	0.286	0.259	1.517	0.000	0.000

Problem 71	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	49	49	44	42	49	54	70	0	0
N.S.	1	1.00	0.90	0.86	1.00	1.10	1.43	0.00	0.00
time (sec)	N/A	0.037	0.020	0.373	0.206	0.253	1.226	0.000	0.000

Problem 72	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	35	35	28	70	51	53	0	0
N.S.	1	1.00	1.00	0.80	2.00	1.46	1.51	0.00	0.00
time (sec)	N/A	0.018	0.007	0.362	0.289	0.256	0.876	0.000	0.000

Problem 73	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	16	16	16	17	27	28	31	0	0
N.S.	1	1.00	1.00	1.06	1.69	1.75	1.94	0.00	0.00
time (sec)	N/A	0.004	0.004	0.238	0.200	0.246	0.817	0.000	0.000

Problem 74	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	B	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	61	61	94	158	0	0	44	0	0
N.S.	1	1.00	1.54	2.59	0.00	0.00	0.72	0.00	0.00
time (sec)	N/A	0.019	0.024	0.447	0.000	0.000	0.581	0.000	0.000

Problem 75	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	26	26	26	32	34	25	42	0	0
N.S.	1	1.00	1.00	1.23	1.31	0.96	1.62	0.00	0.00
time (sec)	N/A	0.031	0.009	0.364	0.290	0.251	0.624	0.000	0.000

Problem 76	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	B	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	46	46	46	47	61	42	87	0	0
N.S.	1	1.00	1.00	1.02	1.33	0.91	1.89	0.00	0.00
time (sec)	N/A	0.048	0.011	0.360	0.347	0.263	1.484	0.000	0.000

Problem 77	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	10	10	12	10	12	12	10	12	12
N.S.	1	1.00	1.20	1.00	1.20	1.20	1.00	1.20	1.20
time (sec)	N/A	0.023	1.938	0.224	0.230	0.256	3.591	0.265	4.893

Problem 78	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	163	163	108	135	0	118	0	0	0
N.S.	1	1.00	0.66	0.83	0.00	0.72	0.00	0.00	0.00
time (sec)	N/A	0.160	0.085	0.565	0.000	0.258	0.000	0.000	0.000

Problem 79	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	112	112	78	84	0	111	0	0	0
N.S.	1	1.00	0.70	0.75	0.00	0.99	0.00	0.00	0.00
time (sec)	N/A	0.090	0.065	0.621	0.000	0.250	0.000	0.000	0.000

Problem 80	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	75	75	58	62	0	0	0	0	0
N.S.	1	1.00	0.77	0.83	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.063	0.034	0.418	0.000	0.000	0.000	0.000	0.000

Problem 81	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	31	31	31	30	0	59	0	0	0
N.S.	1	1.00	1.00	0.97	0.00	1.90	0.00	0.00	0.00
time (sec)	N/A	0.039	0.011	0.487	0.000	0.255	0.000	0.000	0.000

Problem 82	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	10	10	12	10	12	12	8	12	12
N.S.	1	1.00	1.20	1.00	1.20	1.20	0.80	1.20	1.20
time (sec)	N/A	0.016	0.309	0.099	0.255	0.250	3.382	0.265	4.887

Problem 83	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	10	10	12	10	12	12	10	12	12
N.S.	1	1.00	1.20	1.00	1.20	1.20	1.00	1.20	1.20
time (sec)	N/A	0.018	0.334	0.158	0.239	0.254	3.371	0.268	4.863

Problem 84	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	10	10	12	10	12	12	10	12	12
N.S.	1	1.00	1.20	1.00	1.20	1.20	1.00	1.20	1.20
time (sec)	N/A	0.021	0.365	0.131	0.216	0.253	3.461	0.284	4.876

Problem 85	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	10	10	12	10	12	12	10	12	12
N.S.	1	1.00	1.20	1.00	1.20	1.20	1.00	1.20	1.20
time (sec)	N/A	0.236	2.189	0.270	0.214	0.258	0.613	0.274	5.418

Problem 86	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	184	184	95	153	502	176	0	0	0
N.S.	1	1.00	0.52	0.83	2.73	0.96	0.00	0.00	0.00
time (sec)	N/A	0.323	0.161	0.435	1.101	0.266	0.000	0.000	0.000

Problem 87	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	118	118	64	98	423	148	0	0	0
N.S.	1	1.00	0.54	0.83	3.58	1.25	0.00	0.00	0.00
time (sec)	N/A	0.226	0.112	0.482	0.833	0.280	0.000	0.000	0.000

Problem 88	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	C	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	71	71	49	56	311	104	0	0	0
N.S.	1	1.00	0.69	0.79	4.38	1.46	0.00	0.00	0.00
time (sec)	N/A	0.170	0.080	0.468	0.739	0.256	0.000	0.000	0.000

Problem 89	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	27	42	26	44	47	0	0	0
N.S.	1	1.00	1.56	0.96	1.63	1.74	0.00	0.00	0.00
time (sec)	N/A	0.005	0.026	0.424	0.202	0.259	0.000	0.000	0.000

Problem 90	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	10	10	12	10	12	12	8	12	12
N.S.	1	1.00	1.20	1.00	1.20	1.20	0.80	1.20	1.20
time (sec)	N/A	0.019	0.388	0.258	0.752	0.261	0.336	0.274	5.160

Problem 91	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	47	47	40	47	0	0	0	0	0
N.S.	1	1.00	0.85	1.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.188	0.053	0.437	0.000	0.000	0.000	0.000	0.000

Problem 92	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	111	111	76	85	0	0	0	0	0
N.S.	1	1.00	0.68	0.77	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.255	0.283	0.444	0.000	0.000	0.000	0.000	0.000

Problem 93	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	12	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	1.00	1.17	1.17
time (sec)	N/A	0.034	5.622	0.246	0.222	0.271	1.187	0.269	4.852

Problem 94	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	329	329	159	0	0	0	0	0	0
N.S.	1	1.00	0.48	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	1.065	0.884	0.000	0.000	0.000	0.000	0.000	0.000

Problem 95	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	155	155	96	113	0	0	0	0	0
N.S.	1	1.00	0.62	0.73	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.257	0.250	0.901	0.000	0.000	0.000	0.000	0.000

Problem 96	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	48	48	41	43	0	88	0	0	0
N.S.	1	1.00	0.85	0.90	0.00	1.83	0.00	0.00	0.00
time (sec)	N/A	0.050	0.009	0.429	0.000	0.258	0.000	0.000	0.000

Problem 97	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	10	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	0.83	1.17	1.17
time (sec)	N/A	0.027	0.797	0.095	0.218	0.253	0.373	0.273	4.863

Problem 98	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	12	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	1.00	1.17	1.17
time (sec)	N/A	0.028	1.391	0.176	0.224	0.255	0.293	0.263	4.954

Problem 99	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	12	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	1.00	1.17	1.17
time (sec)	N/A	0.027	1.762	0.182	0.233	0.256	0.355	0.270	4.949

Problem 100	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	133	133	102	0	0	448	0	0	0
N.S.	1	1.00	0.77	0.00	0.00	3.37	0.00	0.00	0.00
time (sec)	N/A	0.194	1.195	0.000	0.000	0.270	0.000	0.000	0.000

Problem 101	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	133	133	102	0	0	448	0	0	0
N.S.	1	1.00	0.77	0.00	0.00	3.37	0.00	0.00	0.00
time (sec)	N/A	0.180	1.149	0.000	0.000	0.278	0.000	0.000	0.000

Problem 102	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	124	124	98	0	0	445	0	0	0
N.S.	1	1.00	0.79	0.00	0.00	3.59	0.00	0.00	0.00
time (sec)	N/A	0.173	1.111	0.000	0.000	0.286	0.000	0.000	0.000

Problem 103	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	A	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	55	55	96	56	82	121	0	0	0
N.S.	1	1.00	1.75	1.02	1.49	2.20	0.00	0.00	0.00
time (sec)	N/A	0.027	0.060	1.046	0.196	0.264	0.000	0.000	0.000

Problem 104	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	127	127	102	0	0	444	0	0	0
N.S.	1	1.00	0.80	0.00	0.00	3.50	0.00	0.00	0.00
time (sec)	N/A	0.191	1.163	0.000	0.000	0.276	0.000	0.000	0.000

Problem 105	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	135	135	105	0	0	460	0	0	0
N.S.	1	1.00	0.78	0.00	0.00	3.41	0.00	0.00	0.00
time (sec)	N/A	0.192	1.131	0.000	0.000	0.292	0.000	0.000	0.000

Problem 106	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	172	172	124	0	0	689	0	0	0
N.S.	1	1.00	0.72	0.00	0.00	4.01	0.00	0.00	0.00
time (sec)	N/A	0.287	2.070	0.000	0.000	0.287	0.000	0.000	0.000

Problem 107	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	14	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	1.17	1.17	1.17
time (sec)	N/A	0.187	1.058	0.210	0.258	0.253	2.457	0.259	5.558

Problem 108	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	44	44	44	0	0	0	0	0	0
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.069	0.009	0.000	0.000	0.000	0.000	0.000	0.000

Problem 109	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	14	12	14	14	12	14	14
N.S.	1	1.00	1.17	1.00	1.17	1.17	1.00	1.17	1.17
time (sec)	N/A	0.022	1.454	0.212	0.264	0.251	2.120	0.267	5.148

Problem 110	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	35	37	29	0	145	0	0	0
N.S.	1	1.00	1.06	0.83	0.00	4.14	0.00	0.00	0.00
time (sec)	N/A	0.042	0.016	0.525	0.000	0.261	0.000	0.000	0.000

Problem 111	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	62	62	44	45	0	219	0	0	0
N.S.	1	1.00	0.71	0.73	0.00	3.53	0.00	0.00	0.00
time (sec)	N/A	0.057	0.038	0.725	0.000	0.275	0.000	0.000	0.000

Problem 112	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	111	111	72	91	0	296	0	0	0
N.S.	1	1.00	0.65	0.82	0.00	2.67	0.00	0.00	0.00
time (sec)	N/A	0.093	0.060	0.752	0.000	0.293	0.000	0.000	0.000

Problem 113	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	147	147	94	111	0	361	0	0	0
N.S.	1	1.00	0.64	0.76	0.00	2.46	0.00	0.00	0.00
time (sec)	N/A	0.127	0.074	1.460	0.000	0.297	0.000	0.000	0.000

Problem 114	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	F	F	F	F	F	F(-1)
verified	N/A	Yes	Yes	N/A	TBD	TBD	TBD	TBD	TBD
size	97	97	97	0	0	0	0	0	0
N.S.	1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
time (sec)	N/A	0.136	0.013	0.000	0.000	0.000	0.000	0.000	0.000

Problem 115	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	No	N/A	TBD	TBD	TBD	TBD	TBD
size	12	12	13	12	14	14	14	14	14
N.S.	1	1.00	1.08	1.00	1.17	1.17	1.17	1.17	1.17
time (sec)	N/A	0.073	0.026	0.215	0.292	0.265	1.973	0.286	5.382

Problem 116	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	F	A	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	10	10	10	9	0	0	7	0	0
N.S.	1	1.00	1.00	0.90	0.00	0.00	0.70	0.00	0.00
time (sec)	N/A	0.018	0.004	0.275	0.000	0.000	0.215	0.000	0.000

Problem 117	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	25	25	22	0	143	0	0	0
N.S.	1	1.00	1.00	0.88	0.00	5.72	0.00	0.00	0.00
time (sec)	N/A	0.030	0.013	0.410	0.000	0.278	0.000	0.000	0.000

Problem 118	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	60	60	42	44	0	221	0	0	0
N.S.	1	1.00	0.70	0.73	0.00	3.68	0.00	0.00	0.00
time (sec)	N/A	0.063	0.035	0.768	0.000	0.269	0.000	0.000	0.000

Problem 119	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	89	89	64	66	0	297	0	0	0
N.S.	1	1.00	0.72	0.74	0.00	3.34	0.00	0.00	0.00
time (sec)	N/A	0.082	0.063	1.047	0.000	0.287	0.000	0.000	0.000

Problem 120	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	142	142	93	116	0	361	0	0	0
N.S.	1	1.00	0.65	0.82	0.00	2.54	0.00	0.00	0.00
time (sec)	N/A	0.148	0.076	1.504	0.000	0.280	0.000	0.000	0.000

Problem 121	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	29	23	24	0	84	0	0	0
N.S.	1	1.00	0.79	0.83	0.00	2.90	0.00	0.00	0.00
time (sec)	N/A	0.044	0.020	1.087	0.000	0.280	0.000	0.000	0.000

Problem 122	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	29	27	24	0	86	0	0	0
N.S.	1	1.00	0.93	0.83	0.00	2.97	0.00	0.00	0.00
time (sec)	N/A	0.043	0.020	1.150	0.000	0.270	0.000	0.000	0.000

Problem 123	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	220	220	134	217	0	414	0	0	0
N.S.	1	1.00	0.61	0.99	0.00	1.88	0.00	0.00	0.00
time (sec)	N/A	0.648	0.244	2.426	0.000	0.295	0.000	0.000	0.000

Problem 124	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	109	109	76	96	0	274	0	0	0
N.S.	1	1.00	0.70	0.88	0.00	2.51	0.00	0.00	0.00
time (sec)	N/A	0.189	0.131	1.488	0.000	0.281	0.000	0.000	0.000

Problem 125	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	47	47	46	39	0	161	0	0	0
N.S.	1	1.00	0.98	0.83	0.00	3.43	0.00	0.00	0.00
time (sec)	N/A	0.062	0.019	0.865	0.000	0.269	0.000	0.000	0.000

Problem 126	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	16	18	16	18	18	15	18	18
N.S.	1	1.00	1.12	1.00	1.12	1.12	0.94	1.12	1.12
time (sec)	N/A	0.115	3.232	0.254	0.287	0.259	1.057	0.272	7.003

Problem 127	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	185	185	123	170	0	414	0	0	0
N.S.	1	1.00	0.66	0.92	0.00	2.24	0.00	0.00	0.00
time (sec)	N/A	0.428	0.219	4.124	0.000	0.286	0.000	0.000	0.000

Problem 128	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	96	96	69	82	0	276	0	0	0
N.S.	1	1.00	0.72	0.85	0.00	2.88	0.00	0.00	0.00
time (sec)	N/A	0.192	0.118	2.294	0.000	0.292	0.000	0.000	0.000

Problem 129	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	A	A	F	B	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	33	32	30	0	159	0	0	0
N.S.	1	1.00	0.97	0.91	0.00	4.82	0.00	0.00	0.00
time (sec)	N/A	0.042	0.017	1.062	0.000	0.262	0.000	0.000	0.000

Problem 130	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	16	18	16	18	18	15	18	18
N.S.	1	1.00	1.12	1.00	1.12	1.12	0.94	1.12	1.12
time (sec)	N/A	0.074	1.393	0.263	0.371	0.264	0.976	0.275	6.028

Problem 131	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	B	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	371	371	320	1242	0	451	0	0	0
N.S.	1	1.00	0.86	3.35	0.00	1.22	0.00	0.00	0.00
time (sec)	N/A	0.721	4.569	2.364	0.000	0.285	0.000	0.000	0.000

Problem 132	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	154	154	144	272	0	239	0	0	0
N.S.	1	1.00	0.94	1.77	0.00	1.55	0.00	0.00	0.00
time (sec)	N/A	0.172	0.868	1.498	0.000	0.259	0.000	0.000	0.000

Problem 133	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	16	18	16	18	18	15	18	18
N.S.	1	1.00	1.12	1.00	1.12	1.12	0.94	1.12	1.12
time (sec)	N/A	0.128	14.914	0.348	0.385	0.253	0.712	0.298	5.884

Problem 134	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	B	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	370	370	393	1244	0	453	0	0	0
N.S.	1	1.00	1.06	3.36	0.00	1.22	0.00	0.00	0.00
time (sec)	N/A	0.665	2.036	3.237	0.000	0.281	0.000	0.000	0.000

Problem 135	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	A	C	A	F	A	F	F	F(-1)
verified	N/A	Yes	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	153	153	153	274	0	239	0	0	0
N.S.	1	1.00	1.00	1.79	0.00	1.56	0.00	0.00	0.00
time (sec)	N/A	0.176	0.882	1.926	0.000	0.265	0.000	0.000	0.000

Problem 136	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
verified	N/A	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	16	18	16	18	18	15	18	18
N.S.	1	1.00	1.12	1.00	1.12	1.12	0.94	1.12	1.12
time (sec)	N/A	0.078	9.195	0.345	0.367	0.254	0.692	0.268	5.202

2.3 Detailed conclusion table specific for Rubi results

The following table is specific to Rubi only. 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 also given. The larger this ratio is, the harder the integral is to solve. In this test file, problem number [26] had the largest ratio of [1.58299999999999996]

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	5	4	1.00	8	0.500
2	A	6	4	1.00	8	0.500
3	A	5	4	1.00	8	0.500
4	A	4	4	1.00	6	0.667
5	A	1	1	1.00	4	0.250
6	A	1	1	1.00	8	0.125
7	A	4	4	1.00	8	0.500
8	A	5	4	1.00	8	0.500
9	N/A	0	0	1.00	10	0.000
10	A	19	11	1.00	10	1.100
11	A	15	10	1.00	10	1.000
12	A	10	8	1.00	8	1.000
13	A	6	5	1.00	6	0.833
14	N/A	0	0	1.00	10	0.000
15	N/A	0	0	1.00	10	0.000
16	N/A	0	0	1.00	10	0.000
17	N/A	0	0	1.00	10	0.000
18	A	14	6	1.00	10	0.600
19	A	10	6	1.00	10	0.600
20	A	7	6	1.00	8	0.750
21	A	1	1	1.00	6	0.167
22	N/A	0	0	1.00	10	0.000
23	A	7	5	1.00	10	0.500

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
24	A	11	6	1.00	10	0.600
25	N/A	0	0	1.00	12	0.000
26	A	39	19	1.00	12	1.583
27	A	17	14	1.00	10	1.400
28	A	5	5	1.00	8	0.625
29	N/A	0	0	1.00	12	0.000
30	N/A	0	0	1.00	12	0.000
31	N/A	0	0	1.00	12	0.000
32	A	7	5	1.00	17	0.294
33	A	7	5	1.00	15	0.333
34	A	7	5	1.00	13	0.385
35	A	3	1	1.00	17	0.059
36	A	7	5	1.00	17	0.294
37	A	7	5	1.00	17	0.294
38	A	7	5	1.00	19	0.263
39	A	14	10	1.00	12	0.833
40	N/A	0	0	1.00	12	0.000
41	A	1	1	1.00	12	0.083
42	A	5	4	1.00	9	0.444
43	A	9	7	1.00	10	0.700
44	A	14	9	1.00	12	0.750
45	A	18	10	1.00	12	0.833
46	N/A	0	0	1.00	12	0.000
47	A	7	6	1.00	12	0.500
48	N/A	0	0	1.00	12	0.000
49	A	5	4	1.00	9	0.444
50	A	9	7	1.00	10	0.700
51	A	13	9	1.00	12	0.750
52	A	20	11	1.00	12	0.917
53	A	6	4	1.00	9	0.444
54	A	6	4	1.00	9	0.444
55	A	21	16	1.00	16	1.000
56	A	11	9	1.00	14	0.643
57	A	4	4	1.00	13	0.308

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
58	N/A	0	0	1.00	16	0.000
59	A	21	14	1.00	16	0.875
60	A	12	10	1.00	14	0.714
61	A	4	3	1.00	13	0.231
62	N/A	0	0	1.00	16	0.000
63	A	24	10	1.00	14	0.714
64	A	9	5	1.00	13	0.385
65	N/A	0	0	1.00	16	0.000
66	A	24	9	1.00	14	0.643
67	A	9	5	1.00	13	0.385
68	N/A	0	0	1.00	16	0.000
69	A	5	4	1.00	8	0.500
70	A	6	4	1.00	8	0.500
71	A	5	4	1.00	8	0.500
72	A	4	4	1.00	6	0.667
73	A	1	1	1.00	4	0.250
74	A	1	1	1.00	8	0.125
75	A	4	4	1.00	8	0.500
76	A	5	4	1.00	8	0.500
77	N/A	0	0	1.00	10	0.000
78	A	19	11	1.00	10	1.100
79	A	15	10	1.00	10	1.000
80	A	10	8	1.00	8	1.000
81	A	6	5	1.00	6	0.833
82	N/A	0	0	1.00	10	0.000
83	N/A	0	0	1.00	10	0.000
84	N/A	0	0	1.00	10	0.000
85	N/A	0	0	1.00	10	0.000
86	A	14	6	1.00	10	0.600
87	A	10	6	1.00	10	0.600
88	A	7	6	1.00	8	0.750
89	A	1	1	1.00	6	0.167
90	N/A	0	0	1.00	10	0.000
91	A	7	5	1.00	10	0.500

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
92	A	11	6	1.00	10	0.600
93	N/A	0	0	1.00	12	0.000
94	A	39	19	1.00	12	1.583
95	A	17	14	1.00	10	1.400
96	A	5	5	1.00	8	0.625
97	N/A	0	0	1.00	12	0.000
98	N/A	0	0	1.00	12	0.000
99	N/A	0	0	1.00	12	0.000
100	A	7	5	1.00	17	0.294
101	A	7	5	1.00	15	0.333
102	A	7	5	1.00	13	0.385
103	A	3	1	1.00	17	0.059
104	A	7	5	1.00	17	0.294
105	A	7	5	1.00	17	0.294
106	A	7	5	1.00	19	0.263
107	N/A	0	0	1.00	12	0.000
108	A	7	6	1.00	12	0.500
109	N/A	0	0	1.00	12	0.000
110	A	5	4	1.00	9	0.444
111	A	9	7	1.00	10	0.700
112	A	13	9	1.00	12	0.750
113	A	20	11	1.00	12	0.917
114	A	14	10	1.00	12	0.833
115	N/A	0	0	1.00	12	0.000
116	A	1	1	1.00	12	0.083
117	A	5	4	1.00	9	0.444
118	A	9	7	1.00	10	0.700
119	A	14	9	1.00	12	0.750
120	A	18	10	1.00	12	0.833
121	A	6	4	1.00	9	0.444
122	A	6	4	1.00	9	0.444
123	A	21	14	1.00	16	0.875
124	A	12	10	1.00	14	0.714
125	A	4	3	1.00	13	0.231

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
126	N/A	0	0	1.00	16	0.000
127	A	21	16	1.00	16	1.000
128	A	11	9	1.00	14	0.643
129	A	4	4	1.00	13	0.308
130	N/A	0	0	1.00	16	0.000
131	A	24	9	1.00	14	0.643
132	A	9	5	1.00	13	0.385
133	N/A	0	0	1.00	16	0.000
134	A	24	10	1.00	14	0.714
135	A	9	5	1.00	13	0.385
136	N/A	0	0	1.00	16	0.000

CHAPTER 3

LISTING OF INTEGRALS

3.1 $\int x^m \mathbf{Si}(bx)\,dx$

Optimal result

Integrand size = 8, antiderivative size = 86

$$\int x^m \text{Si}(bx)\,dx = \frac{x^m(-ibx)^{-m}\Gamma(1+m,-ibx)}{2b(1+m)} + \frac{x^m(ibx)^{-m}\Gamma(1+m,ibx)}{2b(1+m)} + \frac{x^{1+m}\text{Si}(bx)}{1+m}$$

```
[Out] 1/2*x^m*GAMMA(1+m,-I*b*x)/b/(1+m)/((-I*b*x)^m)+1/2*x^m*GAMMA(1+m,I*b*x)/b/(
1+m)/((I*b*x)^m)+x^(1+m)*Si(b*x)/(1+m)
```

Rubi [A] (verified)

Time = 0.05 (sec) , antiderivative size = 86, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6638, 12, 3389, 2212}

$$\int x^m \text{Si}(bx)\,dx = \frac{x^{m+1}\text{Si}(bx)}{m+1} + \frac{x^m(-ibx)^{-m}\Gamma(m+1,-ibx)}{2b(m+1)} + \frac{x^m(ibx)^{-m}\Gamma(m+1,ibx)}{2b(m+1)}$$

```
[In] Int[x^m*SinIntegral[b*x],x]
```

```
[Out] (x^m*Gamma[1 + m, (-I)*b*x])/(2*b*(1 + m)*((-I)*b*x)^m) + (x^m*Gamma[1 + m,
 I*b*x])/(2*b*(1 + m)*(I*b*x)^m) + (x^(1 + m)*SinIntegral[b*x])/(1 + m)
```

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 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
```

```
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 3389

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Dist[I
/2, Int[(c + d*x)^m/E^(I*(e + f*x)), x], x] - Dist[I/2, Int[(c + d*x)^m*E^(
I*(e + f*x)), x], x] /; FreeQ[{c, d, e, f, m}, x]
```

Rule 6638

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

Rubi steps

$$\begin{aligned}\text{integral} &= \frac{x^{1+m}\text{Si}(bx)}{1+m} - \frac{b\int \frac{x^m \sin(bx)}{b}\,dx}{1+m}\\ &= \frac{x^{1+m}\text{Si}(bx)}{1+m} - \frac{\int x^m \sin(bx)\,dx}{1+m}\\ &= \frac{x^{1+m}\text{Si}(bx)}{1+m} - \frac{i\int e^{-ibx}x^m\,dx}{2(1+m)} + \frac{i\int e^{ibx}x^m\,dx}{2(1+m)}\\ &= \frac{x^m(-ibx)^{-m}\Gamma(1+m,-ibx)}{2b(1+m)} + \frac{x^m(ibx)^{-m}\Gamma(1+m,ibx)}{2b(1+m)} + \frac{x^{1+m}\text{Si}(bx)}{1+m}\end{aligned}$$

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.95

$$\int x^m \text{Si}(bx)\,dx = \frac{x^m(b^2x^2)^{-m}\left((ibx)^m\Gamma(1+m,-ibx) + (-ibx)^m\Gamma(1+m,ibx) + 2bx(b^2x^2)^m\,\text{Si}(bx)\right)}{2b(1+m)}$$

```
[In] Integrate[x^m*SinIntegral[b*x],x]
[Out] (x^m*((I*b*x)^m*Gamma[1 + m, (-I)*b*x] + ((-I)*b*x)^m*Gamma[1 + m, I*b*x] +
 2*b*x*(b^2*x^2)^m*SinIntegral[b*x]))/(2*b*(1 + m)*(b^2*x^2)^m)
```

Maple [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4.

Time = 0.61 (sec) , antiderivative size = 37, normalized size of antiderivative = 0.43

method	result	size
meijerg	$\frac{b\,x^{2+m}\,\text{hypergeom}\left(\left[\frac{1}{2},1+\frac{m}{2}\right],\left[\frac{3}{2},\frac{3}{2},2+\frac{m}{2}\right],-\frac{b^{2}x^{2}}{4}\right)}{2+m}$	37

```
[In] int(x^m*Si(b*x),x,method=_RETURNVERBOSE)
[Out] b/(2+m)*x^(2+m)*hypergeom([1/2,1+1/2*m],[3/2,3/2,2+1/2*m],-1/4*b^2*x^2)
```

Fricas [A] (verification not implemented)

none

Time = 0.09 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.62

$$\int x^m \text{Si}(bx)\,dx = \frac{2\,bxx^m\,\text{Si}\,(bx) + \frac{\Gamma(m+1,i\,bx)}{(i\,b)^m} + \frac{\Gamma(m+1,-i\,bx)}{(-i\,b)^m}}{2\,(bm+b)}$$

```
[In] integrate(x^m*sin_integral(b*x),x, algorithm="fricas")
[Out] 1/2*(2*b*x*x^m*sin_integral(b*x) + gamma(m + 1, I*b*x)/(I*b)^m + gamma(m +
1, -I*b*x)/(-I*b)^m)/(b*m + b)
```

Sympy [A] (verification not implemented)

Time = 0.60 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.51

$$\int x^m \text{Si}(bx)\,dx = \frac{bx^{m+2}\Gamma\left(\frac{m}{2}+1\right){}_2F_3\left(\begin{matrix}\frac{1}{2},\frac{m}{2}+1\\ \frac{3}{2},\frac{3}{2},\frac{m}{2}+2\end{matrix}\middle|\,-\frac{b^2x^2}{4}\right)}{2\Gamma\left(\frac{m}{2}+2\right)}$$

```
[In] integrate(x**m*Si(b*x),x)
[Out] b*x**(m + 2)*gamma(m/2 + 1)*hyper((1/2, m/2 + 1), (3/2, 3/2, m/2 + 2), -b**
2*x**2/4)/(2*gamma(m/2 + 2))
```

Maxima [F]

$$\int x^m \mathrm{Si}(bx)\,dx = \int x^m \,\mathrm{Si}\,(bx)\;dx$$

```
[In] integrate(x^m*sin_integral(b*x),x, algorithm="maxima")
[Out] integrate(x^m*sin_integral(b*x), x)
```

Giac [F]

$$\int x^m \mathrm{Si}(bx)\,dx = \int x^m \,\mathrm{Si}\,(bx)\;dx$$

```
[In] integrate(x^m*sin_integral(b*x),x, algorithm="giac")
[Out] integrate(x^m*sin_integral(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int x^m \mathrm{Si}(bx)\,dx = \int x^m \,\mathrm{sinint}(b\,x)\;dx$$

```
[In] int(x^m*sinint(b*x),x)
[Out] int(x^m*sinint(b*x), x)
```

3.2 $\int x^3\mathbf{Si}(bx)\,dx$

Optimal result

Integrand size = 8, antiderivative size = 63

$$\int x^3\text{Si}(bx)\,dx=-\frac{3x\cos(bx)}{2b^3}+\frac{x^3\cos(bx)}{4b}+\frac{3\sin(bx)}{2b^4}-\frac{3x^2\sin(bx)}{4b^2}+\frac{1}{4}x^4\text{Si}(bx)$$

```
[Out] -3/2*x*cos(b*x)/b^3+1/4*x^3*cos(b*x)/b+1/4*x^4*Si(b*x)+3/2*sin(b*x)/b^4-3/4
*x^2*sin(b*x)/b^2
```

Rubi [A] (verified)

Time = 0.05 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6638, 12, 3377, 2717}

$$\int x^3\text{Si}(bx)\,dx=\frac{3\sin(bx)}{2b^4}-\frac{3x\cos(bx)}{2b^3}-\frac{3x^2\sin(bx)}{4b^2}+\frac{1}{4}x^4\text{Si}(bx)+\frac{x^3\cos(bx)}{4b}$$

```
[In] Int[x^3*SinIntegral[b*x],x]
```

```
[Out] (-3*x*Cos[b*x])/(2*b^3) + (x^3*Cos[b*x])/(4*b) + (3*Sin[b*x])/(2*b^4) - (3*
x^2*Sin[b*x])/(4*b^2) + (x^4*SinIntegral[b*x])/4
```

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 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 6638

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

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{1}{4}x^4\text{Si}(bx) - \frac{1}{4}b\int \frac{x^3\sin(bx)}{b}\,dx \\
&= \frac{1}{4}x^4\text{Si}(bx) - \frac{1}{4}\int x^3\sin(bx)\,dx \\
&= \frac{x^3\cos(bx)}{4b} + \frac{1}{4}x^4\text{Si}(bx) - \frac{3\int x^2\cos(bx)\,dx}{4b} \\
&= \frac{x^3\cos(bx)}{4b} - \frac{3x^2\sin(bx)}{4b^2} + \frac{1}{4}x^4\text{Si}(bx) + \frac{3\int x\sin(bx)\,dx}{2b^2} \\
&= -\frac{3x\cos(bx)}{2b^3} + \frac{x^3\cos(bx)}{4b} - \frac{3x^2\sin(bx)}{4b^2} + \frac{1}{4}x^4\text{Si}(bx) + \frac{3\int\cos(bx)\,dx}{2b^3} \\
&= -\frac{3x\cos(bx)}{2b^3} + \frac{x^3\cos(bx)}{4b} + \frac{3\sin(bx)}{2b^4} - \frac{3x^2\sin(bx)}{4b^2} + \frac{1}{4}x^4\text{Si}(bx)
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 50, normalized size of antiderivative = 0.79

$$\int x^3\text{Si}(bx)\,dx = \frac{bx(-6+b^2x^2)\cos(bx) - 3(-2+b^2x^2)\sin(bx) + b^4x^4\text{Si}(bx)}{4b^4}$$

```
[In] Integrate[x^3*SinIntegral[b*x],x]
[Out] (b*x*(-6 + b^2*x^2)*Cos[b*x] - 3*(-2 + b^2*x^2)*Sin[b*x] + b^4*x^4*SinInteg
ral[b*x])/(4*b^4)
```

Maple [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4.

Time = 0.30 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.37

method	result	size
meijerg	$\frac{b\,x^{5}\,\mathrm{hypergeom}\left(\left[\frac{1}{2},\frac{5}{2}\right],\left[\frac{3}{2},\frac{3}{2},\frac{7}{2}\right],-\frac{b^{2}x^{2}}{4}\right)}{5}$	23
parts	$\frac{x^{4}\,\mathrm{Si}(bx)}{4}-\frac{-b^{3}x^{3}\cos(bx)+3b^{2}x^{2}\sin(bx)-6\sin(bx)+6bx\cos(bx)}{4b^{4}}$	55
derivativedivides	$\frac{\frac{b^{4}x^{4}\,\mathrm{Si}(bx)}{4}+\frac{b^{3}x^{3}\cos(bx)}{4}-\frac{3b^{2}x^{2}\sin(bx)}{4}+\frac{3\sin(bx)}{2}-\frac{3bx\cos(bx)}{2}}{b^{4}}$	56
default	$\frac{\frac{b^{4}x^{4}\,\mathrm{Si}(bx)}{4}+\frac{b^{3}x^{3}\cos(bx)}{4}-\frac{3b^{2}x^{2}\sin(bx)}{4}+\frac{3\sin(bx)}{2}-\frac{3bx\cos(bx)}{2}}{b^{4}}$	56

```
[In] int(x^3*Si(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/5*b*x^5*hypergeom([1/2,5/2],[3/2,3/2,7/2],-1/4*b^2*x^2)
```

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.78

$$\int x^3\mathrm{Si}(bx)\,dx=\frac{b^4x^4\,\mathrm{Si}\,(bx)+(b^3x^3-6\,bx)\cos{(bx)}-3\,(b^2x^2-2)\sin{(bx)}}{4\,b^4}$$

```
[In] integrate(x^3*sin_integral(b*x),x, algorithm="fricas")
```

```
[Out] 1/4*(b^4*x^4*sin_integral(b*x) + (b^3*x^3 - 6*b*x)*cos(b*x) - 3*(b^2*x^2 -
2)*sin(b*x))/b^4
```

Sympy [A] (verification not implemented)

Time = 0.71 (sec) , antiderivative size = 61, normalized size of antiderivative = 0.97

$$\int x^3\mathrm{Si}(bx)\,dx=\frac{x^4\,\mathrm{Si}\,(bx)}{4}+\frac{x^3\cos{(bx)}}{4b}-\frac{3x^2\sin{(bx)}}{4b^2}-\frac{3x\cos{(bx)}}{2b^3}+\frac{3\sin{(bx)}}{2b^4}$$

```
[In] integrate(x**3*Si(b*x),x)
```

```
[Out] x**4*Si(b*x)/4 + x**3*cos(b*x)/(4*b) - 3*x**2*sin(b*x)/(4*b**2) - 3*x*cos(b
*x)/(2*b**3) + 3*sin(b*x)/(2*b**4)
```

Maxima [A] (verification not implemented)

none

Time = 0.19 (sec) , antiderivative size = 48, normalized size of antiderivative = 0.76

$$\int x^3\mathrm{Si}(bx)\,dx = \frac{1}{4}\,x^4\,\mathrm{Si}\,(bx) + \frac{(b^3x^3 - 6\,bx)\cos{(bx)} - 3\,(b^2x^2 - 2)\sin{(bx)}}{4\,b^4}$$

```
[In] integrate(x^3*sin_integral(b*x),x, algorithm="maxima")
```

```
[Out] 1/4*x^4*sin_integral(b*x) + 1/4*((b^3*x^3 - 6*b*x)*cos(b*x) - 3*(b^2*x^2 -
2)*sin(b*x))/b^4
```

Giac [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.78

$$\int x^3\mathrm{Si}(bx)\,dx = \frac{1}{4}\,x^4\,\mathrm{Si}\,(bx) + \frac{(b^3x^3 - 6\,bx)\cos{(bx)}}{4\,b^4} - \frac{3\,(b^2x^2 - 2)\sin{(bx)}}{4\,b^4}$$

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

```
[Out] 1/4*x^4*sin_integral(b*x) + 1/4*(b^3*x^3 - 6*b*x)*cos(b*x)/b^4 - 3/4*(b^2*x
^2 - 2)*sin(b*x)/b^4
```

Mupad [F(-1)]

Timed out.

$$\int x^3\mathrm{Si}(bx)\,dx = \frac{\sin{(b\,x)}\,\left(\frac{6}{b^4} - \frac{3\,x^2}{b^2}\right)}{4} + \frac{x^4\,\mathrm{sinint}(b\,x)}{4} - \frac{\cos{(b\,x)}\,\left(\frac{6\,x}{b^3} - \frac{x^3}{b}\right)}{4}$$

```
[In] int(x^3*sinint(b*x),x)
```

```
[Out] (sin(b*x)*(6/b^4 - (3*x^2)/b^2))/4 + (x^4*sinint(b*x))/4 - (cos(b*x)*((6*x)
/b^3 - x^3/b))/4
```

3.3 $\int x^2 \mathbf{Si}(bx)\, dx$

Optimal result

Integrand size = 8, antiderivative size = 49

$$\int x^2 \mathrm{Si}(bx)\, dx = -\frac{2\cos(bx)}{3b^3} + \frac{x^2\cos(bx)}{3b} - \frac{2x\sin(bx)}{3b^2} + \frac{1}{3}x^3\mathrm{Si}(bx)$$

```
[Out] -2/3*cos(b*x)/b^3+1/3*x^2*cos(b*x)/b+1/3*x^3*Si(b*x)-2/3*x*sin(b*x)/b^2
```

Rubi [A] (verified)

Time = 0.03 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6638, 12, 3377, 2718}

$$\int x^2 \mathrm{Si}(bx)\, dx = -\frac{2\cos(bx)}{3b^3} - \frac{2x\sin(bx)}{3b^2} + \frac{1}{3}x^3\mathrm{Si}(bx) + \frac{x^2\cos(bx)}{3b}$$

```
[In] Int[x^2*SinIntegral[b*x],x]
```

```
[Out] (-2*Cos[b*x])/(3*b^3) + (x^2*Cos[b*x])/(3*b) - (2*x*Sin[b*x])/(3*b^2) + (x^
3*SinIntegral[b*x])/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 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 6638

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

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{1}{3}x^3\text{Si}(bx) - \frac{1}{3}b\int \frac{x^2\sin(bx)}{b}\,dx \\
&= \frac{1}{3}x^3\text{Si}(bx) - \frac{1}{3}\int x^2\sin(bx)\,dx \\
&= \frac{x^2\cos(bx)}{3b} + \frac{1}{3}x^3\text{Si}(bx) - \frac{2\int x\cos(bx)\,dx}{3b} \\
&= \frac{x^2\cos(bx)}{3b} - \frac{2x\sin(bx)}{3b^2} + \frac{1}{3}x^3\text{Si}(bx) + \frac{2\int \sin(bx)\,dx}{3b^2} \\
&= -\frac{2\cos(bx)}{3b^3} + \frac{x^2\cos(bx)}{3b} - \frac{2x\sin(bx)}{3b^2} + \frac{1}{3}x^3\text{Si}(bx)
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 41, normalized size of antiderivative = 0.84

$$\int x^2\text{Si}(bx)\,dx = \frac{(-2+b^2x^2)\cos(bx) - 2bx\sin(bx) + b^3x^3\text{Si}(bx)}{3b^3}$$

```
[In] Integrate[x^2*SinIntegral[b*x],x]
[Out] ((-2 + b^2*x^2)*Cos[b*x] - 2*b*x*Sin[b*x] + b^3*x^3*SinIntegral[b*x])/(3*b^
3)
```

Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.88

method	result	size
parts	$\frac{x^3 \operatorname{Si}(bx)}{3} - \frac{-b^2x^2\cos(bx)+2\cos(bx)+2bx\sin(bx)}{3b^3}$	43
derivativedivides	$\frac{\frac{b^3x^3\operatorname{Si}(bx)}{3}+\frac{b^2x^2\cos(bx)}{3}-\frac{2\cos(bx)}{3}-\frac{2bx\sin(bx)}{3}}{b^3}$	44
default	$\frac{\frac{b^3x^3\operatorname{Si}(bx)}{3}+\frac{b^2x^2\cos(bx)}{3}-\frac{2\cos(bx)}{3}-\frac{2bx\sin(bx)}{3}}{b^3}$	44
meijerg	$\frac{2\sqrt{\pi}\left(\frac{1}{3\sqrt{\pi}}-\frac{\left(-\frac{b^2x^2}{2}+1\right)\cos(bx)}{3\sqrt{\pi}}-\frac{bx\sin(bx)}{3\sqrt{\pi}}+\frac{b^3x^3\operatorname{Si}(bx)}{6\sqrt{\pi}}\right)}{b^3}$	60

```
[In] int(x^2*Si(b*x),x,method=_RETURNVERBOSE)
[Out] 1/3*x^3*Si(b*x)-1/3/b^3*(-b^2*x^2*cos(b*x)+2*cos(b*x)+2*b*x*sin(b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 39, normalized size of antiderivative = 0.80

$$\int x^2\operatorname{Si}(bx)\,dx = \frac{b^3x^3\operatorname{Si}(bx) - 2\,bx\sin(bx) + (b^2x^2-2)\cos(bx)}{3\,b^3}$$

```
[In] integrate(x^2*sin_integral(b*x),x, algorithm="fricas")
[Out] 1/3*(b^3*x^3*sin_integral(b*x) - 2*b*x*sin(b*x) + (b^2*x^2 - 2)*cos(b*x))/b
^3
```

Sympy [A] (verification not implemented)

Time = 0.84 (sec) , antiderivative size = 46, normalized size of antiderivative = 0.94

$$\int x^2\operatorname{Si}(bx)\,dx = \frac{x^3\operatorname{Si}(bx)}{3} + \frac{x^2\cos(bx)}{3b} - \frac{2x\sin(bx)}{3b^2} - \frac{2\cos(bx)}{3b^3}$$

```
[In] integrate(x**2*Si(b*x),x)
[Out] x**3*Si(b*x)/3 + x**2*cos(b*x)/(3*b) - 2*x*sin(b*x)/(3*b**2) - 2*cos(b*x)/(
3*b**3)
```

Maxima [A] (verification not implemented)

none

Time = 0.21 (sec) , antiderivative size = 39, normalized size of antiderivative = 0.80

$$\int x^2 \mathrm{Si}(bx)\,dx = \frac{1}{3}\,x^3\,\mathrm{Si}\left(bx\right) - \frac{2\,bx\sin\left(bx\right) - \left(b^2x^2 - 2\right)\cos\left(bx\right)}{3\,b^3}$$

```
[In] integrate(x^2*sin_integral(b*x),x, algorithm="maxima")
[Out] 1/3*x^3*sin_integral(b*x) - 1/3*(2*b*x*sin(b*x) - (b^2*x^2 - 2)*cos(b*x))/b
^3
```

Giac [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 38, normalized size of antiderivative = 0.78

$$\int x^2 \mathrm{Si}(bx)\,dx = \frac{1}{3}\,x^3\,\mathrm{Si}\left(bx\right) - \frac{2\,x\sin\left(bx\right)}{3\,b^2} + \frac{\left(b^2x^2 - 2\right)\cos\left(bx\right)}{3\,b^3}$$

```
[In] integrate(x^2*sin_integral(b*x),x, algorithm="giac")
[Out] 1/3*x^3*sin_integral(b*x) - 2/3*x*sin(b*x)/b^2 + 1/3*(b^2*x^2 - 2)*cos(b*x)
/b^3
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \mathrm{Si}(bx)\,dx = \frac{x^3\,\mathrm{sinint}(b\,x)}{3} - \frac{\cos\left(b\,x\right)\,\left(\frac{2}{b^3} - \frac{x^2}{b}\right)}{3} - \frac{2\,x\,\sin\left(b\,x\right)}{3\,b^2}$$

```
[In] int(x^2*sinint(b*x),x)
[Out] (x^3*sinint(b*x))/3 - (cos(b*x)*(2/b^3 - x^2/b))/3 - (2*x*sin(b*x))/(3*b^2)
```

3.4 $\int x\mathbf{Si}(bx)\,dx$

Optimal result

Integrand size = 6, antiderivative size = 35

$$\int x\mathrm{Si}(bx)\,dx = \frac{x\cos(bx)}{2b} - \frac{\sin(bx)}{2b^2} + \frac{1}{2}x^2\mathrm{Si}(bx)$$

```
[Out] 1/2*x*cos(b*x)/b+1/2*x^2*Si(b*x)-1/2*sin(b*x)/b^2
```

Rubi [A] (verified)

Time = 0.02 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.667, Rules used = {6638, 12, 3377, 2717}

$$\int x\mathrm{Si}(bx)\,dx = -\frac{\sin(bx)}{2b^2} + \frac{1}{2}x^2\mathrm{Si}(bx) + \frac{x\cos(bx)}{2b}$$

```
[In] Int[x*SinIntegral[b*x],x]
```

```
[Out] (x*Cos[b*x])/(2*b) - Sin[b*x]/(2*b^2) + (x^2*SinIntegral[b*x])/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 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 6638

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

Rubi steps

$$\begin{aligned}\text{integral} &= \frac{1}{2}x^2\text{Si}(bx) - \frac{1}{2}b\int \frac{x\sin(bx)}{b}\,dx\\ &= \frac{1}{2}x^2\text{Si}(bx) - \frac{1}{2}\int x\sin(bx)\,dx\\ &= \frac{x\cos(bx)}{2b} + \frac{1}{2}x^2\text{Si}(bx) - \frac{\int \cos(bx)\,dx}{2b}\\ &= \frac{x\cos(bx)}{2b} - \frac{\sin(bx)}{2b^2} + \frac{1}{2}x^2\text{Si}(bx)\end{aligned}$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.00

$$\int x\text{Si}(bx)\,dx = \frac{x\cos(bx)}{2b} - \frac{\sin(bx)}{2b^2} + \frac{1}{2}x^2\text{Si}(bx)$$

```
[In] Integrate[x*SinIntegral[b*x],x]
[Out] (x*Cos[b*x])/(2*b) - Sin[b*x]/(2*b^2) + (x^2*SinIntegral[b*x])/2
```

Maple [A] (verified)

Time = 0.30 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.83

method	result	size
parts	$\frac{x^2 \operatorname{Si}(bx)}{2} - \frac{\sin(bx) - bx\cos(bx)}{2b^2}$	29
derivativedivides	$\frac{\frac{b^2 x^2 \operatorname{Si}(bx)}{2} - \frac{\sin(bx)}{2} + \frac{bx\cos(bx)}{2}}{b^2}$	32
default	$\frac{\frac{b^2 x^2 \operatorname{Si}(bx)}{2} - \frac{\sin(bx)}{2} + \frac{bx\cos(bx)}{2}}{b^2}$	32
meijerg	$\frac{\sqrt{\pi}\left(\frac{bx\cos(bx)}{2\sqrt{\pi}} - \frac{\sin(bx)}{2\sqrt{\pi}} + \frac{b^2x^2\operatorname{Si}(bx)}{2\sqrt{\pi}}\right)}{b^2}$	44

```
[In] int(x*Si(b*x),x,method=_RETURNVERBOSE)
[Out] 1/2*x^2*Si(b*x)-1/2/b^2*(sin(b*x)-b*x*cos(b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.86

$$\int x\operatorname{Si}(bx)\,dx = \frac{b^2x^2\operatorname{Si}(bx) + bx\cos(bx) - \sin(bx)}{2\,b^2}$$

```
[In] integrate(x*sin_integral(b*x),x, algorithm="fricas")
[Out] 1/2*(b^2*x^2*sin_integral(b*x) + b*x*cos(b*x) - sin(b*x))/b^2
```

Sympy [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.83

$$\int x\operatorname{Si}(bx)\,dx = \frac{x^2\operatorname{Si}(bx)}{2} + \frac{x\cos(bx)}{2b} - \frac{\sin(bx)}{2b^2}$$

```
[In] integrate(x*Si(b*x),x)
[Out] x**2*Si(b*x)/2 + x*cos(b*x)/(2*b) - sin(b*x)/(2*b**2)
```

Maxima [A] (verification not implemented)

none

Time = 0.21 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.83

$$\int x\mathrm{Si}(bx)\,dx = \frac{1}{2}\,x^2\,\mathrm{Si}\,(bx) + \frac{bx\cos{(bx)} - \sin{(bx)}}{2\,b^2}$$

```
[In] integrate(x*sin_integral(b*x),x, algorithm="maxima")
[Out] 1/2*x^2*sin_integral(b*x) + 1/2*(b*x*cos(b*x) - sin(b*x))/b^2
```

Giac [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.83

$$\int x\mathrm{Si}(bx)\,dx = \frac{1}{2}\,x^2\,\mathrm{Si}\,(bx) + \frac{x\cos{(bx)}}{2\,b} - \frac{\sin{(bx)}}{2\,b^2}$$

```
[In] integrate(x*sin_integral(b*x),x, algorithm="giac")
[Out] 1/2*x^2*sin_integral(b*x) + 1/2*x*cos(b*x)/b - 1/2*sin(b*x)/b^2
```

Mupad [F(-1)]

Timed out.

$$\int x\mathrm{Si}(bx)\,dx = \frac{x^2\,\mathrm{sinint}(b\,x)}{2} - \frac{\sin{(b\,x)} - b\,x\,\cos{(b\,x)}}{2\,b^2}$$

```
[In] int(x*sinint(b*x),x)
[Out] (x^2*sinint(b*x))/2 - (sin(b*x) - b*x*cos(b*x))/(2*b^2)
```

3.5 $\int \text{Si}(bx)\,dx$

Optimal result

Integrand size = 4, antiderivative size = 15

$$\int \text{Si}(bx)\,dx = \frac{\cos(bx)}{b} + x\text{Si}(bx)$$

```
[Out] cos(b*x)/b+x*Si(b*x)
```

Rubi [A] (verified)

Time = 0.00 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {6634}

$$\int \text{Si}(bx)\,dx = x\text{Si}(bx) + \frac{\cos(bx)}{b}$$

```
[In] Int[SinIntegral[b*x],x]
```

```
[Out] Cos[b*x]/b + x*SinIntegral[b*x]
```

Rule 6634

```
Int[SinIntegral[(a_.) + (b_.)*(x_)], x_Symbol] :> Simp[(a + b*x)*(SinIntegr
al[a + b*x]/b), x] + Simp[Cos[a + b*x]/b, x] /; FreeQ[{a, b}, x]
```

Rubi steps

$$\text{integral} = \frac{\cos(bx)}{b} + x\text{Si}(bx)$$

Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \operatorname{Si}(bx)\,dx = \frac{\cos(bx)}{b} + x\operatorname{Si}(bx)$$

```
[In] Integrate[SinIntegral[b*x],x]
[Out] Cos[b*x]/b + x*SinIntegral[b*x]
```

Maple [A] (verified)

Time = 0.20 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

method	result	size
parts	$\frac{\cos(bx)}{b} + x\ \operatorname{Si}(bx)$	16
derivativedivides	$\frac{\operatorname{Si}(bx)bx+\cos(bx)}{b}$	17
default	$\frac{\operatorname{Si}(bx)bx+\cos(bx)}{b}$	17
meijerg	$\frac{\sqrt{\pi}\left(-\frac{2}{\sqrt{\pi}}+\frac{2\cos(bx)}{\sqrt{\pi}}+\frac{2bx\ \operatorname{Si}(bx)}{\sqrt{\pi}}\right)}{2b}$	35

```
[In] int(Si(b*x),x,method=_RETURNVERBOSE)
[Out] cos(b*x)/b+x*Si(b*x)
```

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

$$\int \operatorname{Si}(bx)\,dx = \frac{bx\operatorname{Si}(bx) + \cos(bx)}{b}$$

```
[In] integrate(sin_integral(b*x),x, algorithm="fricas")
[Out] (b*x*sin_integral(b*x) + cos(b*x))/b
```

Sympy [A] (verification not implemented)

Time = 0.48 (sec) , antiderivative size = 12, normalized size of antiderivative = 0.80

$$\int \mathrm{Si}(bx)\,dx = x\,\mathrm{Si}\,(bx) + \frac{\cos{(bx)}}{b}$$

```
[In] integrate(Si(b*x),x)
[Out] x*Si(b*x) + cos(b*x)/b
```

Maxima [A] (verification not implemented)

none

Time = 0.19 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.07

$$\int \mathrm{Si}(bx)\,dx = \frac{bx\,\mathrm{Si}\,(bx) + \cos{(bx)}}{b}$$

```
[In] integrate(sin_integral(b*x),x, algorithm="maxima")
[Out] (b*x*sin_integral(b*x) + cos(b*x))/b
```

Giac [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 15, normalized size of antiderivative = 1.00

$$\int \mathrm{Si}(bx)\,dx = x\,\mathrm{Si}\,(bx) + \frac{\cos{(bx)}}{b}$$

```
[In] integrate(sin_integral(b*x),x, algorithm="giac")
[Out] x*sin_integral(b*x) + cos(b*x)/b
```

Mupad [F(-1)]

Timed out.

$$\int \mathrm{Si}(bx)\,dx = x\,\mathrm{sinint}(b\,x) + \frac{\cos{(b\,x)}}{b}$$

```
[In] int(sinint(b*x),x)
[Out] x*sinint(b*x) + cos(b*x)/b
```

3.6 $\int \frac{\textbf{Si}(bx)}{x} \, dx$

Optimal result

Integrand size = 8, antiderivative size = 43

$$\int \frac{\text{Si}(bx)}{x} \, dx = \frac{1}{2} bx \, {}_3F_3(1,1,1;2,2,2;-ibx) + \frac{1}{2} bx \, {}_3F_3(1,1,1;2,2,2;ibx)$$

```
[Out] 1/2*b*x*hypergeom([1, 1, 1],[2, 2, 2],-I*b*x)+1/2*b*x*hypergeom([1, 1, 1],[
2, 2, 2],I*b*x)
```

Rubi [A] (verified)

Time = 0.02 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {6636}

$$\int \frac{\text{Si}(bx)}{x} \, dx = \frac{1}{2} bx \, {}_3F_3(1,1,1;2,2,2;-ibx) + \frac{1}{2} bx \, {}_3F_3(1,1,1;2,2,2;ibx)$$

```
[In] Int[SinIntegral[b*x]/x,x]
```

```
[Out] (b*x*HypergeometricPFQ[{1, 1, 1}, {2, 2, 2}, (-I)*b*x])/2 + (b*x*Hypergeome
tricPFQ[{1, 1, 1}, {2, 2, 2}, I*b*x])/2
```

Rule 6636

```
Int[SinIntegral[(b_.)*(x_)]/(x_), x_Symbol] :> Simp[(1/2)*b*x*Hypergeometri
cPFQ[{1, 1, 1}, {2, 2, 2}, (-I)*b*x], x] + Simp[(1/2)*b*x*HypergeometricPFQ
[{1, 1, 1}, {2, 2, 2}, I*b*x], x] /; FreeQ[b, x]
```

Rubi steps

$$\text{integral} = \frac{1}{2} bx \, {}_3F_3(1,1,1;2,2,2;-ibx) + \frac{1}{2} bx \, {}_3F_3(1,1,1;2,2,2;ibx)$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 43, normalized size of antiderivative = 1.00

$$\int \frac{\text{Si}(bx)}{x}\,dx = \frac{1}{2}bx\,{}_3F_3(1,1,1;2,2,2;-ibx) + \frac{1}{2}bx\,{}_3F_3(1,1,1;2,2,2;ibx)$$

```
[In] Integrate[SinIntegral[b*x]/x,x]
[Out] (b*x*HypergeometricPFQ[{1, 1, 1}, {2, 2, 2}, (-I)*b*x])/2 + (b*x*Hypergeome
tricPFQ[{1, 1, 1}, {2, 2, 2}, I*b*x])/2
```

Maple [A] (verified)

Time = 0.37 (sec) , antiderivative size = 20, normalized size of antiderivative = 0.47

method	result	size
meijerg	$bx \,\text{hypergeom}\left(\left[\frac{1}{2}, \frac{1}{2}\right], \left[\frac{3}{2}, \frac{3}{2}, \frac{3}{2}\right], -\frac{b^2x^2}{4}\right)$	20

```
[In] int(Si(b*x)/x,x,method=_RETURNVERBOSE)
[Out] b*x*hypergeom([1/2,1/2],[3/2,3/2,3/2],-1/4*b^2*x^2)
```

Fricas [F]

$$\int \frac{\text{Si}(bx)}{x}\,dx = \int \frac{\text{Si}\,(bx)}{x}\,dx$$

```
[In] integrate(sin_integral(b*x)/x,x, algorithm="fricas")
[Out] integral(sin_integral(b*x)/x, x)
```

Sympy [A] (verification not implemented)

Time = 0.37 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.51

$$\int \frac{\text{Si}(bx)}{x}\,dx = bx\,{}_2F_3\left(\begin{matrix} \frac{1}{2}, \frac{1}{2} \\ \frac{3}{2}, \frac{3}{2}, \frac{3}{2} \end{matrix}\middle| -\frac{b^2x^2}{4}\right)$$

```
[In] integrate(Si(b*x)/x,x)
[Out] b*x*hyper((1/2, 1/2), (3/2, 3/2, 3/2), -b**2*x**2/4)
```

Maxima [F]

$$\int \frac{\text{Si}(bx)}{x}\,dx = \int \frac{\text{Si}\,(bx)}{x}\,dx$$

```
[In] integrate(sin_integral(b*x)/x,x, algorithm="maxima")
[Out] integrate(sin_integral(b*x)/x, x)
```

Giac [F]

$$\int \frac{\text{Si}(bx)}{x}\,dx = \int \frac{\text{Si}\,(bx)}{x}\,dx$$

```
[In] integrate(sin_integral(b*x)/x,x, algorithm="giac")
[Out] integrate(sin_integral(b*x)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{Si}(bx)}{x}\,dx = \int \frac{\text{sinint}(b\,x)}{x}\,dx$$

```
[In] int(sinint(b*x)/x,x)
[Out] int(sinint(b*x)/x, x)
```

3.7 $\int \frac{\text{Si}(bx)}{x^2}\, dx$

Optimal result

Integrand size = 8, antiderivative size = 25

$$\int \frac{\text{Si}(bx)}{x^2}\, dx = b\,\text{CosIntegral}(bx) - \frac{\sin(bx)}{x} - \frac{\text{Si}(bx)}{x}$$

```
[Out] b*Ci(b*x)-Si(b*x)/x-sin(b*x)/x
```

Rubi [A] (verified)

Time = 0.03 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6638, 12, 3378, 3383}

$$\int \frac{\text{Si}(bx)}{x^2}\, dx = b\,\text{CosIntegral}(bx) - \frac{\text{Si}(bx)}{x} - \frac{\sin(bx)}{x}$$

```
[In] Int[SinIntegral[b*x]/x^2,x]
```

```
[Out] b*CosIntegral[b*x] - Sin[b*x]/x - SinIntegral[b*x]/x
```

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 3378

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(c
 + d*x)^(m + 1)*(Sin[e + f*x]/(d*(m + 1))), x] - Dist[f/(d*(m + 1)), Int[(c
 + d*x)^(m + 1)*Cos[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && LtQ[m, -1
```

```
]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 6638

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

Rubi steps

$$\begin{aligned}\text{integral} &= -\frac{\text{Si}(bx)}{x} + b\int \frac{\sin(bx)}{bx^2}\,dx\\ &= -\frac{\text{Si}(bx)}{x} + \int \frac{\sin(bx)}{x^2}\,dx\\ &= -\frac{\sin(bx)}{x} - \frac{\text{Si}(bx)}{x} + b\int \frac{\cos(bx)}{x}\,dx\\ &= b\,\text{CosIntegral}(bx) - \frac{\sin(bx)}{x} - \frac{\text{Si}(bx)}{x}\end{aligned}$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \frac{\text{Si}(bx)}{x^2}\,dx = b\,\text{CosIntegral}(bx) - \frac{\sin(bx)}{x} - \frac{\text{Si}(bx)}{x}$$

```
[In] Integrate[SinIntegral[b*x]/x^2,x]
[Out] b*CosIntegral[b*x] - Sin[b*x]/x - SinIntegral[b*x]/x
```

Maple [A] (verified)

Time = 0.34 (sec) , antiderivative size = 30, normalized size of antiderivative = 1.20

method	result	size
parts	$-\frac{\operatorname{Si}(bx)}{x}+b\left(-\frac{\sin(bx)}{bx}+\operatorname{Ci}(bx)\right)$	30
derivativedivides	$b\left(-\frac{\operatorname{Si}(bx)}{bx}-\frac{\sin(bx)}{bx}+\operatorname{Ci}(bx)\right)$	32
default	$b\left(-\frac{\operatorname{Si}(bx)}{bx}-\frac{\sin(bx)}{bx}+\operatorname{Ci}(bx)\right)$	32
meijerg	$\frac{b\sqrt{\pi}\left(-\frac{2b^2x^2\,\text{hypergeom}\left(\left[1,1,\frac{3}{2}\right],\left[2,2,\frac{5}{2},\frac{5}{2}\right],-\frac{b^2x^2}{4}\right)}{9\sqrt{\pi}}+\frac{8\gamma-16+8\ln(x)+8\ln(b)}{\sqrt{\pi}}\right)}{8}$	55

```
[In] int(Si(b*x)/x^2,x,method=_RETURNVERBOSE)
[Out] -Si(b*x)/x+b*(-sin(b*x)/b/x+Ci(b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.96

$$\int \frac{\operatorname{Si}(bx)}{x^2}\,dx=\frac{bx\operatorname{Ci}(bx)-\sin(bx)-\operatorname{Si}(bx)}{x}$$

```
[In] integrate(sin_integral(b*x)/x^2,x, algorithm="fricas")
[Out] (b*x*cos_integral(b*x) - sin(b*x) - sin_integral(b*x))/x
```

Sympy [A] (verification not implemented)

Time = 0.56 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.44

$$\int \frac{\operatorname{Si}(bx)}{x^2}\,dx=-\frac{b^3x^2{}_3F_4\left(\begin{matrix}1,1,\frac{3}{2}\\2,2,\frac{5}{2},\frac{5}{2}\end{matrix}\middle|-\frac{b^2x^2}{4}\right)}{36}+\frac{b\log(b^2x^2)}{2}$$

```
[In] integrate(Si(b*x)/x**2,x)
[Out] -b**3*x**2*hyper((1, 1, 3/2), (2, 2, 5/2, 5/2), -b**2*x**2/4)/36 + b*log(b*
*2*x**2)/2
```

Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.25 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.04

$$\int \frac{\mathrm{Si}(bx)}{x^2}\,dx = \frac{1}{2}\,b(\Gamma(-1, i\,bx) + \Gamma(-1, -i\,bx)) - \frac{\mathrm{Si}\,(bx)}{x}$$

```
[In] integrate(sin_integral(b*x)/x^2,x, algorithm="maxima")
[Out] 1/2*b*(gamma(-1, I*b*x) + gamma(-1, -I*b*x)) - sin_integral(b*x)/x
```

Giac [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.48

$$\int \frac{\mathrm{Si}(bx)}{x^2}\,dx = \frac{bx\,\mathrm{Ci}\,(bx) + bx\,\mathrm{Ci}\,(-bx) - 2\,\sin\,(bx)}{2\,x} - \frac{\mathrm{Si}\,(bx)}{x}$$

```
[In] integrate(sin_integral(b*x)/x^2,x, algorithm="giac")
[Out] 1/2*(b*x*cos_integral(b*x) + b*x*cos_integral(-b*x) - 2*sin(b*x))/x - sin_i
ntegral(b*x)/x
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\mathrm{Si}(bx)}{x^2}\,dx = b\,\mathrm{cosint}(b\,x) - \frac{\mathrm{sinint}(b\,x)}{x} - \frac{\sin\,(b\,x)}{x}$$

```
[In] int(sinint(b*x)/x^2,x)
[Out] b*cosint(b*x) - sinint(b*x)/x - sin(b*x)/x
```

3.8 $\int \frac{\mathbf{Si}(bx)}{x^3} \, dx$

Optimal result

Integrand size = 8, antiderivative size = 46

$$\int \frac{\text{Si}(bx)}{x^3} \, dx = -\frac{b\cos(bx)}{4x} - \frac{\sin(bx)}{4x^2} - \frac{1}{4}b^2\text{Si}(bx) - \frac{\text{Si}(bx)}{2x^2}$$

```
[Out] -1/4*b*cos(b*x)/x-1/4*b^2*Si(b*x)-1/2*Si(b*x)/x^2-1/4*sin(b*x)/x^2
```

Rubi [A] (verified)

Time = 0.04 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6638, 12, 3378, 3380}

$$\int \frac{\text{Si}(bx)}{x^3} \, dx = -\frac{1}{4}b^2\text{Si}(bx) - \frac{\text{Si}(bx)}{2x^2} - \frac{\sin(bx)}{4x^2} - \frac{b\cos(bx)}{4x}$$

```
[In] Int[SinIntegral[b*x]/x^3,x]
```

```
[Out] -1/4*(b*Cos[b*x])/x - Sin[b*x]/(4*x^2) - (b^2*SinIntegral[b*x])/4 - SinInte
gral[b*x]/(2*x^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 3378

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(c
 + d*x)^(m + 1)*(Sin[e + f*x]/(d*(m + 1))), x] - Dist[f/(d*(m + 1)), Int[(c
 + d*x)^(m + 1)*Cos[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && LtQ[m, -1
```

```
]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 6638

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

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{\text{Si}(bx)}{2x^2} + \frac{1}{2}b\int \frac{\sin(bx)}{bx^3}\,dx \\
&= -\frac{\text{Si}(bx)}{2x^2} + \frac{1}{2}\int \frac{\sin(bx)}{x^3}\,dx \\
&= -\frac{\sin(bx)}{4x^2} - \frac{\text{Si}(bx)}{2x^2} + \frac{1}{4}b\int \frac{\cos(bx)}{x^2}\,dx \\
&= -\frac{b\cos(bx)}{4x} - \frac{\sin(bx)}{4x^2} - \frac{\text{Si}(bx)}{2x^2} - \frac{1}{4}b^2\int \frac{\sin(bx)}{x}\,dx \\
&= -\frac{b\cos(bx)}{4x} - \frac{\sin(bx)}{4x^2} - \frac{1}{4}b^2\text{Si}(bx) - \frac{\text{Si}(bx)}{2x^2}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00

$$\int \frac{\text{Si}(bx)}{x^3}\,dx = -\frac{b\cos(bx)}{4x} - \frac{\sin(bx)}{4x^2} - \frac{1}{4}b^2\text{Si}(bx) - \frac{\text{Si}(bx)}{2x^2}$$

```
[In] Integrate[SinIntegral[b*x]/x^3,x]
[Out] -1/4*(b*Cos[b*x])/x - Sin[b*x]/(4*x^2) - (b^2*SinIntegral[b*x])/4 - SinInte
gral[b*x]/(2*x^2)
```

Maple [A] (verified)

Time = 0.31 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.02

method	result	size
parts	$-\frac{\mathrm{Si}(bx)}{2x^2}+\frac{b^2\left(-\frac{\sin(bx)}{2b^2x^2}-\frac{\cos(bx)}{2bx}-\frac{\mathrm{Si}(bx)}{2}\right)}{2}$	47
derivativedivides	$b^2\left(-\frac{\mathrm{Si}(bx)}{2b^2x^2}-\frac{\sin(bx)}{4b^2x^2}-\frac{\cos(bx)}{4bx}-\frac{\mathrm{Si}(bx)}{4}\right)$	48
default	$b^2\left(-\frac{\mathrm{Si}(bx)}{2b^2x^2}-\frac{\sin(bx)}{4b^2x^2}-\frac{\cos(bx)}{4bx}-\frac{\mathrm{Si}(bx)}{4}\right)$	48
meijerg	$\frac{\sqrt{\pi}\,b^2\left(-\frac{4\cos(bx)}{bx\sqrt{\pi}}-\frac{4\sin(bx)}{b^2x^2\sqrt{\pi}}-\frac{4\left(b^2x^2+2\right)\mathrm{Si}(bx)}{b^2x^2\sqrt{\pi}}\right)}{16}$	64

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

```
[Out] -1/2*Si(b*x)/x^2+1/2*b^2*(-1/2*sin(b*x)/b^2/x^2-1/2*cos(b*x)/b/x-1/2*Si(b*x
))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.67

$$\int \frac{\mathrm{Si}(bx)}{x^3}\,dx=-\frac{bx\cos(bx)+(b^2x^2+2)\,\mathrm{Si}(bx)+\sin(bx)}{4\,x^2}$$

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

```
[Out] -1/4*(b*x*cos(b*x) + (b^2*x^2 + 2)*sin_integral(b*x) + sin(b*x))/x^2
```

Sympy [A] (verification not implemented)

Time = 0.52 (sec) , antiderivative size = 41, normalized size of antiderivative = 0.89

$$\int \frac{\mathrm{Si}(bx)}{x^3}\,dx=-\frac{b^2\,\mathrm{Si}(bx)}{4}-\frac{b\cos(bx)}{4x}-\frac{\sin(bx)}{4x^2}-\frac{\mathrm{Si}(bx)}{2x^2}$$

```
[In] integrate(Si(b*x)/x**3,x)
```

```
[Out] -b**2*Si(b*x)/4 - b*cos(b*x)/(4*x) - sin(b*x)/(4*x**2) - Si(b*x)/(2*x**2)
```

Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.25 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.70

$$\int \frac{\text{Si}(bx)}{x^3}\,dx = -\frac{1}{4}\,b^2(-i\,\Gamma(-2,i\,bx)+i\,\Gamma(-2,-i\,bx)) - \frac{\text{Si}\,(bx)}{2\,x^2}$$

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

```
[Out] -1/4*b^2*(-I*gamma(-2, I*b*x) + I*gamma(-2, -I*b*x)) - 1/2*sin_integral(b*x
)/x^2
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.27 (sec) , antiderivative size = 149, normalized size of antiderivative = 3.24

$$\int \frac{\text{Si}(bx)}{x^3}\,dx = -\frac{b^2x^2\Im(\text{Ci}\,(bx))\tan\left(\frac{1}{2}\,bx\right)^2 - b^2x^2\Im(\text{Ci}\,(-bx))\tan\left(\frac{1}{2}\,bx\right)^2 + 2\,b^2x^2\,\text{Si}\,(bx)\tan\left(\frac{1}{2}\,bx\right)^2 + b^2x^2\Im(\text{Ci}\,(bx)) -}{8\left(x^2\tan\left(\frac{1}{2}\,bx\right)^2 + x^2\right)} - \frac{\text{Si}\,(bx)}{2\,x^2}$$

```
[In] integrate(sin_integral(b*x)/x^3,x, algorithm="giac")
```

```
[Out] -1/8*(b^2*x^2*imag_part(cos_integral(b*x))*tan(1/2*b*x)^2 - b^2*x^2*imag_pa
rt(cos_integral(-b*x))*tan(1/2*b*x)^2 + 2*b^2*x^2*sin_integral(b*x)*tan(1/2
*b*x)^2 + b^2*x^2*imag_part(cos_integral(b*x)) - b^2*x^2*imag_part(cos_inte
gral(-b*x)) + 2*b^2*x^2*sin_integral(b*x) - 2*b*x*tan(1/2*b*x)^2 + 2*b*x +
4*tan(1/2*b*x))/(x^2*tan(1/2*b*x)^2 + x^2) - 1/2*sin_integral(b*x)/x^2
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{Si}(bx)}{x^3}\,dx = -\frac{\frac{\sin(b\,x)}{2} + \frac{b\,x\,\cos(b\,x)}{2}}{2\,x^2} - \frac{b^2\,\text{sinint}(b\,x)}{4} - \frac{\text{sinint}(b\,x)}{2\,x^2}$$

```
[In] int(sinint(b*x)/x^3,x)
```

```
[Out] - (sin(b*x)/2 + (b*x*cos(b*x))/2)/(2*x^2) - (b^2*sinint(b*x))/4 - sinint(b*
x)/(2*x^2)
```

3.9 $\int x^m \mathbf{Si}(bx)^2 \, dx$

Optimal result

Integrand size = 10, antiderivative size = 10

$$\int x^m \mathrm{Si}(bx)^2 \, dx = \mathrm{Int}\left(x^m \mathrm{Si}(bx)^2, x\right)$$

```
[Out] CannotIntegrate(x^m*Si(b*x)^2,x)
```

Rubi [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int x^m \mathrm{Si}(bx)^2 \, dx = \int x^m \mathrm{Si}(bx)^2 \, dx$$

```
[In] Int[x^m*SinIntegral[b*x]^2,x]
```

```
[Out] Defer[Int][x^m*SinIntegral[b*x]^2, x]
```

Rubi steps

$$\text{integral} = \int x^m \mathrm{Si}(bx)^2 \, dx$$

Mathematica [N/A]

Not integrable

Time = 1.92 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \text{Si}(bx)^2 \, dx = \int x^m \text{Si}(bx)^2 \, dx$$

```
[In] Integrate[x^m*SinIntegral[b*x]^2,x]
[Out] Integrate[x^m*SinIntegral[b*x]^2, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.21 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int x^m \operatorname{Si}\left(bx\right)^2 dx$$

```
[In] int(x^m*Si(b*x)^2,x)
[Out] int(x^m*Si(b*x)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \text{Si}(bx)^2 \, dx = \int x^m \operatorname{Si}\left(bx\right)^2 \, dx$$

```
[In] integrate(x^m*sin_integral(b*x)^2,x, algorithm="fricas")
[Out] integral(x^m*sin_integral(b*x)^2, x)
```

Sympy [N/A]

Not integrable

Time = 1.27 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int x^m \text{Si}(bx)^2 \, dx = \int x^m \operatorname{Si}^2\left(bx\right) dx$$

```
[In] integrate(x**m*Si(b*x)**2,x)
[Out] Integral(x**m*Si(b*x)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \mathrm{Si}(bx)^2 \, dx = \int x^m \,\mathrm{Si}\,(bx)^2 \; dx$$

```
[In] integrate(x^m*sin_integral(b*x)^2,x, algorithm="maxima")
[Out] integrate(x^m*sin_integral(b*x)^2, x)
```

Giac [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \mathrm{Si}(bx)^2 \, dx = \int x^m \,\mathrm{Si}\,(bx)^2 \; dx$$

```
[In] integrate(x^m*sin_integral(b*x)^2,x, algorithm="giac")
[Out] integrate(x^m*sin_integral(b*x)^2, x)
```

Mupad [N/A]

Not integrable

Time = 4.62 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \mathrm{Si}(bx)^2 \, dx = \int x^m \,\mathrm{sinint}(b\,x)^2 \, dx$$

```
[In] int(x^m*sinint(b*x)^2,x)
[Out] int(x^m*sinint(b*x)^2, x)
```

3.10 $\int x^3\mathbf{Si}(bx)^2\,dx$

Optimal result

Integrand size = 10, antiderivative size = 149

$$\int x^3\text{Si}(bx)^2\,dx=\frac{x^2}{2b^2}+\frac{3\,\text{CosIntegral}(2bx)}{2b^4}-\frac{3\log(x)}{2b^4}-\frac{x\cos(bx)\sin(bx)}{b^3}+\frac{2\sin^2(bx)}{b^4}-\frac{x^2\sin^2(bx)}{4b^2}-\frac{3x\cos(bx)\text{Si}(bx)}{b^3}+\frac{x^3\cos(bx)\text{Si}(bx)}{2b}+\frac{3\sin(bx)\text{Si}(bx)}{b^4}-\frac{3x^2\sin(bx)\text{Si}(bx)}{2b^2}+\frac{1}{4}x^4\text{Si}(bx)^2$$

```
[Out] 1/2*x^2/b^2+3/2*Ci(2*b*x)/b^4-3/2*ln(x)/b^4-3*x*cos(b*x)*Si(b*x)/b^3+1/2*x^
3*cos(b*x)*Si(b*x)/b+1/4*x^4*Si(b*x)^2-x*cos(b*x)*sin(b*x)/b^3+3*Si(b*x)*si
n(b*x)/b^4-3/2*x^2*Si(b*x)*sin(b*x)/b^2+2*sin(b*x)^2/b^4-1/4*x^2*sin(b*x)^2
/b^2
```

Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 149, normalized size of antiderivative = 1.00, number of steps used = 19, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 1.100, Rules used = {6642, 6648, 12, 3524, 3391, 30, 6654, 2644, 6652, 3393, 3383}

$$\int x^3\text{Si}(bx)^2\,dx=\frac{3\,\text{CosIntegral}(2bx)}{2b^4}+\frac{3\text{Si}(bx)\sin(bx)}{b^4}-\frac{3\log(x)}{2b^4}+\frac{2\sin^2(bx)}{b^4}-\frac{3x\text{Si}(bx)\cos(bx)}{b^3}-\frac{x\sin(bx)\cos(bx)}{b^3}-\frac{3x^2\text{Si}(bx)\sin(bx)}{2b^2}+\frac{x^2}{2b^2}-\frac{x^2\sin^2(bx)}{4b^2}+\frac{1}{4}x^4\text{Si}(bx)^2+\frac{x^3\text{Si}(bx)\cos(bx)}{2b}$$

```
[In] Int[x^3*SinIntegral[b*x]^2,x]
```

```
[Out] x^2/(2*b^2) + (3*CosIntegral[2*b*x])/(2*b^4) - (3*Log[x])/(2*b^4) - (x*Cos[
b*x]*Sin[b*x])/b^3 + (2*Sin[b*x]^2)/b^4 - (x^2*Sin[b*x]^2)/(4*b^2) - (3*x*C
os[b*x]*SinIntegral[b*x])/b^3 + (x^3*Cos[b*x]*SinIntegral[b*x])/(2*b) + (3*
Sin[b*x]*SinIntegral[b*x])/b^4 - (3*x^2*Sin[b*x]*SinIntegral[b*x])/(2*b^2)
+ (x^4*SinIntegral[b*x]^2)/4
```

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 30

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

Rule 2644

```
Int[cos[(e_.) + (f_.)*(x_)]^(n_.)*((a_.)*sin[(e_.) + (f_.)*(x_)])^(m_.), x_
Symbol] :> Dist[1/(a*f), Subst[Int[x^m*(1 - x^2/a^2)^((n - 1)/2), x], x, a*
Sin[e + f*x]], x] /; FreeQ[{a, e, f, m}, x] && IntegerQ[(n - 1)/2] &&  !(In
tegerQ[(m - 1)/2] && LtQ[0, m, n])
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3391

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

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 3524

```
Int[Cos[(a_.) + (b_.)*(x_)^(n_.)]*(x_)^(m_.)*Sin[(a_.) + (b_.)*(x_)^(n_.)]^
(p_.), x_Symbol] :> Simp[x^(m - n + 1)*(Sin[a + b*x^n]^(p + 1)/(b*n*(p + 1)
```

```
)), x] - Dist[(m - n + 1)/(b*n*(p + 1)), Int[x^(m - n)*Sin[a + b*x^n]^(p +
1), x], x] /; FreeQ[{a, b, p}, x] && LtQ[0, n, m + 1] && NeQ[p, -1]
```

Rule 6642

```
Int[(x_)^(m_.)*SinIntegral[(b_.)*(x_)]^2, x_Symbol] :> Simp[x^(m + 1)*(SinI
ntegral[b*x]^2/(m + 1)), x] - Dist[2/(m + 1), Int[x^m*Sin[b*x]*SinIntegral[
b*x], x], x] /; FreeQ[b, x] && IGtQ[m, 0]
```

Rule 6648

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

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6654

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

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{1}{4}x^4\text{Si}(bx)^2 - \frac{1}{2}\int x^3\sin(bx)\text{Si}(bx)\,dx \\
&= \frac{x^3\cos(bx)\text{Si}(bx)}{2b} + \frac{1}{4}x^4\text{Si}(bx)^2 - \frac{1}{2}\int \frac{x^2\cos(bx)\sin(bx)}{b}\,dx - \frac{3\int x^2\cos(bx)\text{Si}(bx)\,dx}{2b} \\
&= \frac{x^3\cos(bx)\text{Si}(bx)}{2b} - \frac{3x^2\sin(bx)\text{Si}(bx)}{2b^2} + \frac{1}{4}x^4\text{Si}(bx)^2 \\
&\quad + \frac{3\int x\sin(bx)\text{Si}(bx)\,dx}{b^2} - \frac{\int x^2\cos(bx)\sin(bx)\,dx}{2b} + \frac{3\int \frac{x\sin^2(bx)}{b}\,dx}{2b} \\
&= -\frac{x^2\sin^2(bx)}{4b^2} - \frac{3x\cos(bx)\text{Si}(bx)}{b^3} + \frac{x^3\cos(bx)\text{Si}(bx)}{2b} - \frac{3x^2\sin(bx)\text{Si}(bx)}{2b^2} + \frac{1}{4}x^4\text{Si}(bx)^2 \\
&\quad + \frac{3\int\cos(bx)\text{Si}(bx)\,dx}{b^3} + \frac{\int x\sin^2(bx)\,dx}{2b^2} + \frac{3\int x\sin^2(bx)\,dx}{2b^2} + \frac{3\int \frac{\cos(bx)\sin(bx)}{b}\,dx}{b^2}
\end{aligned}$$

$$= -\frac{x\cos(bx)\sin(bx)}{b^3} + \frac{\sin^2(bx)}{2b^4} - \frac{x^2\sin^2(bx)}{4b^2} - \frac{3x\cos(bx)\text{Si}(bx)}{b^3} + \frac{x^3\cos(bx)\text{Si}(bx)}{2b} + \frac{3\sin(bx)\text{Si}(bx)}{b^4} - \frac{3x^2\sin(bx)\text{Si}(bx)}{2b^2} + \frac{1}{4}x^4\text{Si}(bx)^2 + \frac{3\int\cos(bx)\sin(bx)\,dx}{b^3} - \frac{3\int\frac{\sin^2(bx)}{bx}\,dx}{b^3} + \frac{\int x\,dx}{4b^2} + \frac{3\int x\,dx}{4b^2}$$

$$= \frac{x^2}{2b^2} - \frac{x\cos(bx)\sin(bx)}{b^3} + \frac{\sin^2(bx)}{2b^4} - \frac{x^2\sin^2(bx)}{4b^2} - \frac{3x\cos(bx)\text{Si}(bx)}{b^3} + \frac{x^3\cos(bx)\text{Si}(bx)}{2b} + \frac{3\sin(bx)\text{Si}(bx)}{b^4} - \frac{3x^2\sin(bx)\text{Si}(bx)}{2b^2} + \frac{1}{4}x^4\text{Si}(bx)^2 - \frac{3\int\frac{\sin^2(bx)}{x}\,dx}{b^4} + \frac{3\text{Subst}(\int x\,dx, x, \sin(bx))}{b^4}$$

$$= \frac{x^2}{2b^2} - \frac{x\cos(bx)\sin(bx)}{b^3} + \frac{2\sin^2(bx)}{b^4} - \frac{x^2\sin^2(bx)}{4b^2} - \frac{3x\cos(bx)\text{Si}(bx)}{b^3} + \frac{x^3\cos(bx)\text{Si}(bx)}{2b} + \frac{3\sin(bx)\text{Si}(bx)}{b^4} - \frac{3x^2\sin(bx)\text{Si}(bx)}{2b^2} + \frac{1}{4}x^4\text{Si}(bx)^2 - \frac{3\int\left(\frac{1}{2x} - \frac{\cos(2bx)}{2x}\right)dx}{b^4}$$

$$= \frac{x^2}{2b^2} - \frac{3\log(x)}{2b^4} - \frac{x\cos(bx)\sin(bx)}{b^3} + \frac{2\sin^2(bx)}{b^4} - \frac{x^2\sin^2(bx)}{4b^2} - \frac{3x\cos(bx)\text{Si}(bx)}{b^3} + \frac{x^3\cos(bx)\text{Si}(bx)}{2b} + \frac{3\sin(bx)\text{Si}(bx)}{b^4} - \frac{3x^2\sin(bx)\text{Si}(bx)}{2b^2} + \frac{1}{4}x^4\text{Si}(bx)^2 + \frac{3\int\frac{\cos(2bx)}{x}\,dx}{2b^4}$$

$$= \frac{x^2}{2b^2} + \frac{3\,\text{CosIntegral}(2bx)}{2b^4} - \frac{3\log(x)}{2b^4} - \frac{x\cos(bx)\sin(bx)}{b^3} + \frac{2\sin^2(bx)}{b^4} - \frac{x^2\sin^2(bx)}{4b^2} - \frac{3x\cos(bx)\text{Si}(bx)}{b^3} + \frac{x^3\cos(bx)\text{Si}(bx)}{2b} + \frac{3\sin(bx)\text{Si}(bx)}{b^4} - \frac{3x^2\sin(bx)\text{Si}(bx)}{2b^2} + \frac{1}{4}x^4\text{Si}(bx)^2$$

Mathematica [A] (verified)

Time = 0.09 (sec) , antiderivative size = 107, normalized size of antiderivative = 0.72

$$\int x^3\text{Si}(bx)^2\,dx = \frac{3b^2x^2 - 8\cos(2bx) + b^2x^2\cos(2bx) + 12\,\text{CosIntegral}(2bx) - 12\log(x) - 4bx\sin(2bx) + 4(bx(-6+b^2x^2)\,\text{c}}{8b^4}$$

```
[In] Integrate[x^3*SinIntegral[b*x]^2,x]
```

```
[Out] (3*b^2*x^2 - 8*Cos[2*b*x] + b^2*x^2*Cos[2*b*x] + 12*CosIntegral[2*b*x] - 12
*Log[x] - 4*b*x*Sin[2*b*x] + 4*(b*x*(-6 + b^2*x^2)*Cos[b*x] - 3*(-2 + b^2*x
^2)*Sin[b*x])*SinIntegral[b*x] + 2*b^4*x^4*SinIntegral[b*x]^2)/(8*b^4)
```

Maple [A] (verified)

Time = 0.56 (sec) , antiderivative size = 154, normalized size of antiderivative = 1.03

method	result
derivativedivides	$\frac{\frac{b^4x^4\,\mathrm{Si}(bx)^2}{4}-2\,\mathrm{Si}(bx)\left(-\frac{b^3x^3\cos(bx)}{4}+\frac{3b^2x^2\sin(bx)}{4}-\frac{3\sin(bx)}{2}+\frac{3bx\cos(bx)}{2}\right)+\frac{b^2x^2\cos(bx)^2}{4}-\frac{bx\left(\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)}{2}-\frac{b^2x\cdots}{4}}{b^4}$
default	$\frac{\frac{b^4x^4\,\mathrm{Si}(bx)^2}{4}-2\,\mathrm{Si}(bx)\left(-\frac{b^3x^3\cos(bx)}{4}+\frac{3b^2x^2\sin(bx)}{4}-\frac{3\sin(bx)}{2}+\frac{3bx\cos(bx)}{2}\right)+\frac{b^2x^2\cos(bx)^2}{4}-\frac{bx\left(\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)}{2}-\frac{b^2x\cdots}{4}}{b^4}$

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

```
[Out] 1/b^4*(1/4*b^4*x^4*Si(b*x)^2-2*Si(b*x)*(-1/4*b^3*x^3*cos(b*x)+3/4*b^2*x^2*s
in(b*x)-3/2*sin(b*x)+3/2*b*x*cos(b*x))+1/4*b^2*x^2*cos(b*x)^2-1/2*b*x*(1/2*
sin(b*x)*cos(b*x)+1/2*b*x)-1/4*b^2*x^2+1/2*sin(b*x)^2+3/2*b*x*(-1/2*sin(b*x
)*cos(b*x)+1/2*b*x)-3/2*cos(b*x)^2-3/2*ln(b*x)+3/2*Ci(2*b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 105, normalized size of antiderivative = 0.70

$$\int x^3\mathrm{Si}(bx)^2\,dx$$
$$= \frac{b^4x^4\,\mathrm{Si}\,(bx)^2 + b^2x^2 + (b^2x^2-8)\cos{(bx)}^2 + 2\,(b^3x^3-6\,bx)\cos{(bx)}\,\mathrm{Si}\,(bx) - 2\,(2\,bx\cos{(bx)} + 3\,(b^2x^2-2)\cdots}{4\,b^4}$$

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

```
[Out] 1/4*(b^4*x^4*sin_integral(b*x)^2 + b^2*x^2 + (b^2*x^2 - 8)*cos(b*x)^2 + 2*(
b^3*x^3 - 6*b*x)*cos(b*x)*sin_integral(b*x) - 2*(2*b*x*cos(b*x) + 3*(b^2*x^
2 - 2)*sin_integral(b*x))*sin(b*x) + 6*cos_integral(2*b*x) - 6*log(x))/b^4
```

Sympy [F]

$$\int x^3\mathrm{Si}(bx)^2\,dx = \int x^3\,\mathrm{Si}^2\,(bx)\,dx$$

```
[In] integrate(x**3*Si(b*x)**2,x)
```

```
[Out] Integral(x**3*Si(b*x)**2, x)
```

Maxima [F]

$$\int x^3\mathrm{Si}(bx)^2\,dx = \int x^3\,\mathrm{Si}\,(bx)^2\;dx$$

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

```
[Out] integrate(x^3*sin_integral(b*x)^2, x)
```

Giac [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 117, normalized size of antiderivative = 0.79

$$\int x^3\mathrm{Si}(bx)^2\,dx = \frac{1}{4}\,x^4\,\mathrm{Si}\,(bx)^2 + \frac{1}{2}\left(\frac{(b^3x^3 - 6\,bx)\cos{(bx)}}{b^4} - \frac{3\,(b^2x^2 - 2)\sin{(bx)}}{b^4}\right)\mathrm{Si}\,(bx) + \frac{b^2x^2\cos{(2\,bx)} + 3\,b^2x^2 - 4\,bx\sin{(2\,bx)} - 8\,\cos{(2\,bx)} + 6\,\mathrm{Ci}\,(2\,bx) + 6\,\mathrm{Ci}\,(-2\,bx) - 12\,\log{(x)}}{8\,b^4}$$

```
[In] integrate(x^3*sin_integral(b*x)^2,x, algorithm="giac")
```

```
[Out] 1/4*x^4*sin_integral(b*x)^2 + 1/2*((b^3*x^3 - 6*b*x)*cos(b*x)/b^4 - 3*(b^2*
x^2 - 2)*sin(b*x)/b^4)*sin_integral(b*x) + 1/8*(b^2*x^2*cos(2*b*x) + 3*b^2*
x^2 - 4*b*x*sin(2*b*x) - 8*cos(2*b*x) + 6*cos_integral(2*b*x) + 6*cos_integ
ral(-2*b*x) - 12*log(x))/b^4
```

Mupad [F(-1)]

Timed out.

$$\int x^3\mathrm{Si}(bx)^2\,dx = \int x^3\,\mathrm{sinint}(b\,x)^2\,dx$$

```
[In] int(x^3*sinint(b*x)^2,x)
```

```
[Out] int(x^3*sinint(b*x)^2, x)
```

3.11 $\int x^2\mathbf{Si}(bx)^2\,dx$

Optimal result

Integrand size = 10, antiderivative size = 112

$$\int x^2\mathrm{Si}(bx)^2\,dx=\frac{5x}{6b^2}-\frac{5\cos(bx)\sin(bx)}{6b^3}-\frac{x\sin^2(bx)}{3b^2}-\frac{4\cos(bx)\mathrm{Si}(bx)}{3b^3}+\frac{2x^2\cos(bx)\mathrm{Si}(bx)}{3b}-\frac{4x\sin(bx)\mathrm{Si}(bx)}{3b^2}+\frac{1}{3}x^3\mathrm{Si}(bx)^2+\frac{2\mathrm{Si}(2bx)}{3b^3}$$

```
[Out] 5/6*x/b^2-4/3*cos(b*x)*Si(b*x)/b^3+2/3*x^2*cos(b*x)*Si(b*x)/b+1/3*x^3*Si(b*
x)^2+2/3*Si(2*b*x)/b^3-5/6*cos(b*x)*sin(b*x)/b^3-4/3*x*Si(b*x)*sin(b*x)/b^2
-1/3*x*sin(b*x)^2/b^2
```

Rubi [A] (verified)

Time = 0.11 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 1.000, Rules used = {6642, 6648, 12, 3524, 2715, 8, 6654, 6646, 4491, 3380}

$$\int x^2\mathrm{Si}(bx)^2\,dx=\frac{2\mathrm{Si}(2bx)}{3b^3}-\frac{4\mathrm{Si}(bx)\cos(bx)}{3b^3}-\frac{5\sin(bx)\cos(bx)}{6b^3}-\frac{4x\mathrm{Si}(bx)\sin(bx)}{3b^2}+\frac{5x}{6b^2}-\frac{x\sin^2(bx)}{3b^2}+\frac{1}{3}x^3\mathrm{Si}(bx)^2+\frac{2x^2\mathrm{Si}(bx)\cos(bx)}{3b}$$

```
[In] Int[x^2*SinIntegral[b*x]^2,x]
```

```
[Out] (5*x)/(6*b^2) - (5*Cos[b*x]*Sin[b*x])/(6*b^3) - (x*Sin[b*x]^2)/(3*b^2) - (4
*Cos[b*x]*SinIntegral[b*x])/(3*b^3) + (2*x^2*Cos[b*x]*SinIntegral[b*x])/(3*
b) - (4*x*Sin[b*x]*SinIntegral[b*x])/(3*b^2) + (x^3*SinIntegral[b*x]^2)/3 +
 (2*SinIntegral[2*b*x])/(3*b^3)
```

Rule 8

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

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 2715

```
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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3524

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

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6642

```
Int[(x_)^(m_.)*SinIntegral[(b_.)*(x_)]^2, x_Symbol] :> Simp[x^(m + 1)*(SinI
ntegral[b*x]^2/(m + 1)), x] - Dist[2/(m + 1), Int[x^m*Sin[b*x]*SinIntegral[
b*x], x], x] /; FreeQ[b, x] && IGtQ[m, 0]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6648

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

Rule 6654

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

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{1}{3}x^3\text{Si}(bx)^2 - \frac{2}{3}\int x^2\sin(bx)\text{Si}(bx)\,dx \\
&= \frac{2x^2\cos(bx)\text{Si}(bx)}{3b} + \frac{1}{3}x^3\text{Si}(bx)^2 - \frac{2}{3}\int \frac{x\cos(bx)\sin(bx)}{b}\,dx - \frac{4\int x\cos(bx)\text{Si}(bx)\,dx}{3b} \\
&= \frac{2x^2\cos(bx)\text{Si}(bx)}{3b} - \frac{4x\sin(bx)\text{Si}(bx)}{3b^2} + \frac{1}{3}x^3\text{Si}(bx)^2 \\
&\quad + \frac{4\int \sin(bx)\text{Si}(bx)\,dx}{3b^2} - \frac{2\int x\cos(bx)\sin(bx)\,dx}{3b} + \frac{4\int \frac{\sin^2(bx)}{b}\,dx}{3b} \\
&= -\frac{x\sin^2(bx)}{3b^2} - \frac{4\cos(bx)\text{Si}(bx)}{3b^3} + \frac{2x^2\cos(bx)\text{Si}(bx)}{3b} - \frac{4x\sin(bx)\text{Si}(bx)}{3b^2} \\
&\quad + \frac{1}{3}x^3\text{Si}(bx)^2 + \frac{\int \sin^2(bx)\,dx}{3b^2} + \frac{4\int \frac{\cos(bx)\sin(bx)}{bx}\,dx}{3b^2} + \frac{4\int \sin^2(bx)\,dx}{3b^2} \\
&= -\frac{5\cos(bx)\sin(bx)}{6b^3} - \frac{x\sin^2(bx)}{3b^2} - \frac{4\cos(bx)\text{Si}(bx)}{3b^3} + \frac{2x^2\cos(bx)\text{Si}(bx)}{3b} \\
&\quad - \frac{4x\sin(bx)\text{Si}(bx)}{3b^2} + \frac{1}{3}x^3\text{Si}(bx)^2 + \frac{4\int \frac{\cos(bx)\sin(bx)}{x}\,dx}{3b^3} + \frac{\int 1\,dx}{6b^2} + \frac{2\int 1\,dx}{3b^2} \\
&= \frac{5x}{6b^2} - \frac{5\cos(bx)\sin(bx)}{6b^3} - \frac{x\sin^2(bx)}{3b^2} - \frac{4\cos(bx)\text{Si}(bx)}{3b^3} \\
&\quad + \frac{2x^2\cos(bx)\text{Si}(bx)}{3b} - \frac{4x\sin(bx)\text{Si}(bx)}{3b^2} + \frac{1}{3}x^3\text{Si}(bx)^2 + \frac{4\int \frac{\sin(2bx)}{2x}\,dx}{3b^3} \\
&= \frac{5x}{6b^2} - \frac{5\cos(bx)\sin(bx)}{6b^3} - \frac{x\sin^2(bx)}{3b^2} - \frac{4\cos(bx)\text{Si}(bx)}{3b^3} \\
&\quad + \frac{2x^2\cos(bx)\text{Si}(bx)}{3b} - \frac{4x\sin(bx)\text{Si}(bx)}{3b^2} + \frac{1}{3}x^3\text{Si}(bx)^2 + \frac{2\int \frac{\sin(2bx)}{x}\,dx}{3b^3}
\end{aligned}$$

$$= \frac{5x}{6b^2} - \frac{5\cos(bx)\sin(bx)}{6b^3} - \frac{x\sin^2(bx)}{3b^2} - \frac{4\cos(bx)\text{Si}(bx)}{3b^3} + \frac{2x^2\cos(bx)\text{Si}(bx)}{3b} - \frac{4x\sin(bx)\text{Si}(bx)}{3b^2} + \frac{1}{3}x^3\text{Si}(bx)^2 + \frac{2\text{Si}(2bx)}{3b^3}$$

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 78, normalized size of antiderivative = 0.70

$$\int x^2\text{Si}(bx)^2\,dx = \frac{8bx + 2bx\cos(2bx) - 5\sin(2bx) + 8((-2+b^2x^2)\cos(bx) - 2bx\sin(bx))\,\text{Si}(bx) + 4b^3x^3\text{Si}(bx)^2 + 8\text{Si}(2bx)}{12b^3}$$

```
[In] Integrate[x^2*SinIntegral[b*x]^2,x]
```

```
[Out] (8*b*x + 2*b*x*Cos[2*b*x] - 5*Sin[2*b*x] + 8*((-2 + b^2*x^2)*Cos[b*x] - 2*b
*x*Sin[b*x])*SinIntegral[b*x] + 4*b^3*x^3*SinIntegral[b*x]^2 + 8*SinIntegra
l[2*b*x])/(12*b^3)
```

Maple [A] (verified)

Time = 0.58 (sec) , antiderivative size = 84, normalized size of antiderivative = 0.75

method	result	size
derivativedivides	$\frac{\frac{b^3x^3\,\text{Si}(bx)^2}{3} - 2\,\text{Si}(bx)\left(-\frac{b^2x^2\cos(bx)}{3} + \frac{2\cos(bx)}{3} + \frac{2bx\sin(bx)}{3}\right) + \frac{bx\cos(bx)^2}{3} - \frac{5\sin(bx)\cos(bx)}{6} + \frac{bx}{2} + \frac{2\,\text{Si}(2bx)}{3}}{b^3}$	84
default	$\frac{\frac{b^3x^3\,\text{Si}(bx)^2}{3} - 2\,\text{Si}(bx)\left(-\frac{b^2x^2\cos(bx)}{3} + \frac{2\cos(bx)}{3} + \frac{2bx\sin(bx)}{3}\right) + \frac{bx\cos(bx)^2}{3} - \frac{5\sin(bx)\cos(bx)}{6} + \frac{bx}{2} + \frac{2\,\text{Si}(2bx)}{3}}{b^3}$	84

```
[In] int(x^2*Si(b*x)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^3*(1/3*b^3*x^3*Si(b*x)^2-2*Si(b*x)*(-1/3*b^2*x^2*cos(b*x)+2/3*cos(b*x)+
2/3*b*x*sin(b*x))+1/3*b*x*cos(b*x)^2-5/6*sin(b*x)*cos(b*x)+1/2*b*x+2/3*Si(2
*b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 81, normalized size of antiderivative = 0.72

$$\int x^2\mathrm{Si}(bx)^2\,dx$$
$$= \frac{2\,b^3x^3\,\mathrm{Si}\,(bx)^2 + 2\,bx\cos\,(bx)^2 + 4\,(b^2x^2-2)\cos\,(bx)\,\mathrm{Si}\,(bx) + 3\,bx - (8\,bx\,\mathrm{Si}\,(bx) + 5\,\cos\,(bx))\sin\,(bx) + 4}{6\,b^3}$$

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

```
[Out] 1/6*(2*b^3*x^3*sin_integral(b*x)^2 + 2*b*x*cos(b*x)^2 + 4*(b^2*x^2 - 2)*cos
(b*x)*sin_integral(b*x) + 3*b*x - (8*b*x*sin_integral(b*x) + 5*cos(b*x))*si
n(b*x) + 4*sin_integral(2*b*x))/b^3
```

Sympy [F]

$$\int x^2\mathrm{Si}(bx)^2\,dx = \int x^2\,\mathrm{Si}^2\,(bx)\,dx$$

```
[In] integrate(x**2*Si(b*x)**2,x)
```

```
[Out] Integral(x**2*Si(b*x)**2, x)
```

Maxima [F]

$$\int x^2\mathrm{Si}(bx)^2\,dx = \int x^2\,\mathrm{Si}\,(bx)^2\,dx$$

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

```
[Out] integrate(x^2*sin_integral(b*x)^2, x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.29 (sec) , antiderivative size = 150, normalized size of antiderivative = 1.34

$$\int x^2\mathrm{Si}(bx)^2\,dx = \frac{1}{3}\,x^3\,\mathrm{Si}\,(bx)^2 - \frac{2}{3}\left(\frac{2\,x\sin\,(bx)}{b^2} - \frac{(b^2x^2-2)\cos\,(bx)}{b^3}\right)\mathrm{Si}\,(bx)$$
$$+ \frac{3\,bx\tan\,(bx)^2 + 2\,\Im(\mathrm{Ci}\,(2\,bx))\tan\,(bx)^2 - 2\,\Im(\mathrm{Ci}\,(-2\,bx))\tan\,(bx)^2 + 4\,\mathrm{Si}\,(2\,bx)\tan\,(bx)^2 + 5\,bx + 2\,\Im(\mathrm{C}}{6\,(b^3\tan\,(bx)^2 + b^3)}$$

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

```
[Out] 1/3*x^3*sin_integral(b*x)^2 - 2/3*(2*x*sin(b*x)/b^2 - (b^2*x^2 - 2)*cos(b*x
)/b^3)*sin_integral(b*x) + 1/6*(3*b*x*tan(b*x)^2 + 2*imag_part(cos_integral
(2*b*x))*tan(b*x)^2 - 2*imag_part(cos_integral(-2*b*x))*tan(b*x)^2 + 4*sin_
integral(2*b*x)*tan(b*x)^2 + 5*b*x + 2*imag_part(cos_integral(2*b*x)) - 2*i
mag_part(cos_integral(-2*b*x)) + 4*sin_integral(2*b*x) - 5*tan(b*x))/(b^3*t
an(b*x)^2 + b^3)
```

Mupad [F(-1)]

Timed out.

$$\int x^2\text{Si}(bx)^2\,dx=\int x^2\,\mathrm{sinint}(b\,x)^2\,dx$$

```
[In] int(x^2*sinint(b*x)^2,x)
```

```
[Out] int(x^2*sinint(b*x)^2, x)
```

3.12 $\int x\mathbf{Si}(bx)^2\,dx$

Optimal result

Integrand size = 8, antiderivative size = 74

$$\int x\text{Si}(bx)^2\,dx=-\frac{\text{CosIntegral}(2bx)}{2b^2}+\frac{\log(x)}{2b^2}-\frac{\sin^2(bx)}{2b^2}+\frac{x\cos(bx)\text{Si}(bx)}{b}-\frac{\sin(bx)\text{Si}(bx)}{b^2}+\frac{1}{2}x^2\text{Si}(bx)^2$$

```
[Out] -1/2*Ci(2*b*x)/b^2+1/2*ln(x)/b^2+x*cos(b*x)*Si(b*x)/b+1/2*x^2*Si(b*x)^2-Si(
b*x)*sin(b*x)/b^2-1/2*sin(b*x)^2/b^2
```

Rubi [A] (verified)

Time = 0.07 (sec) , antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 1.000, Rules used = {6642, 6648, 12, 2644, 30, 6652, 3393, 3383}

$$\int x\text{Si}(bx)^2\,dx=-\frac{\text{CosIntegral}(2bx)}{2b^2}-\frac{\text{Si}(bx)\sin(bx)}{b^2}+\frac{\log(x)}{2b^2}-\frac{\sin^2(bx)}{2b^2}+\frac{1}{2}x^2\text{Si}(bx)^2+\frac{x\text{Si}(bx)\cos(bx)}{b}$$

```
[In] Int[x*SinIntegral[b*x]^2,x]
```

```
[Out] -1/2*CosIntegral[2*b*x]/b^2 + Log[x]/(2*b^2) - Sin[b*x]^2/(2*b^2) + (x*Cos[
b*x]*SinIntegral[b*x])/b - (Sin[b*x]*SinIntegral[b*x])/b^2 + (x^2*SinIntegr
al[b*x]^2)/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 30

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

Rule 2644

```
Int[cos[(e_.) + (f_.)*(x_)]^(n_.)*((a_.)*sin[(e_.) + (f_.)*(x_)])^(m_.), x_
Symbol] :> Dist[1/(a*f), Subst[Int[x^m*(1 - x^2/a^2)^((n - 1)/2), x], x, a*
Sin[e + f*x]], x] /; FreeQ[{a, e, f, m}, x] && IntegerQ[(n - 1)/2] &&  !(In
tegerQ[(m - 1)/2] && LtQ[0, m, n])
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 6642

```
Int[(x_)^(m_.)*SinIntegral[(b_.)*(x_)]^2, x_Symbol] :> Simp[x^(m + 1)*(SinI
ntegral[b*x]^2/(m + 1)), x] - Dist[2/(m + 1), Int[x^m*Sin[b*x]*SinIntegral[
b*x], x], x] /; FreeQ[b, x] && IGtQ[m, 0]
```

Rule 6648

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

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

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

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 58, normalized size of antiderivative = 0.78

$$
\int x\text{Si}(bx)^2\,dx = \frac{\cos(2bx) - 2\,\text{CosIntegral}(2bx) + 2\log(x) + 4(bx\cos(bx) - \sin(bx))\text{Si}(bx) + 2b^2x^2\text{Si}(bx)^2}{4b^2}
$$

```
[In] Integrate[x*SinIntegral[b*x]^2,x]
```

```
[Out] (Cos[2*b*x] - 2*CosIntegral[2*b*x] + 2*Log[x] + 4*(b*x*Cos[b*x] - Sin[b*x])
*SinIntegral[b*x] + 2*b^2*x^2*SinIntegral[b*x]^2)/(4*b^2)
```

Maple [A] (verified)

Time = 0.48 (sec) , antiderivative size = 62, normalized size of antiderivative = 0.84

method	result	size
derivativedivides	$\frac{\frac{b^2x^2\,\text{Si}(bx)^2}{2} - 2\,\text{Si}(bx)\left(\frac{\sin(bx)}{2} - \frac{bx\cos(bx)}{2}\right) + \frac{\cos(bx)^2}{2} + \frac{\ln(bx)}{2} - \frac{\text{Ci}(2bx)}{2}}{b^2}$	62
default	$\frac{\frac{b^2x^2\,\text{Si}(bx)^2}{2} - 2\,\text{Si}(bx)\left(\frac{\sin(bx)}{2} - \frac{bx\cos(bx)}{2}\right) + \frac{\cos(bx)^2}{2} + \frac{\ln(bx)}{2} - \frac{\text{Ci}(2bx)}{2}}{b^2}$	62

```
[In] int(x*Si(b*x)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^2*(1/2*b^2*x^2*Si(b*x)^2-2*Si(b*x)*(1/2*sin(b*x)-1/2*b*x*cos(b*x))+1/2*
cos(b*x)^2+1/2*ln(b*x)-1/2*Ci(2*b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 56, normalized size of antiderivative = 0.76

$$\int x\text{Si}(bx)^2\,dx = \frac{b^2x^2\,\text{Si}\,(bx)^2 + 2\,bx\cos{(bx)}\,\text{Si}\,(bx) + \cos{(bx)}^2 - 2\,\sin{(bx)}\,\text{Si}\,(bx) - \text{Ci}\,(2\,bx) + \log{(x)}}{2\,b^2}$$

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

```
[Out] 1/2*(b^2*x^2*sin_integral(b*x)^2 + 2*b*x*cos(b*x)*sin_integral(b*x) + cos(b
*x)^2 - 2*sin(b*x)*sin_integral(b*x) - cos_integral(2*b*x) + log(x))/b^2
```

Sympy [F]

$$\int x\text{Si}(bx)^2\,dx = \int x\,\text{Si}^2\,(bx)\,dx$$

```
[In] integrate(x*Si(b*x)**2,x)
```

```
[Out] Integral(x*Si(b*x)**2, x)
```

Maxima [F]

$$\int x\text{Si}(bx)^2\,dx = \int x\,\text{Si}\,(bx)^2\,dx$$

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

```
[Out] integrate(x*sin_integral(b*x)^2, x)
```

Giac [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 65, normalized size of antiderivative = 0.88

$$\int x\text{Si}(bx)^2\,dx = \frac{1}{2}\,x^2\,\text{Si}\,(bx)^2 + \left(\frac{x\cos\,(bx)}{b} - \frac{\sin\,(bx)}{b^2}\right)\text{Si}\,(bx) + \frac{\cos\,(2\,bx) - \text{Ci}\,(2\,bx) - \text{Ci}\,(-2\,bx) + 2\,\log\,(x)}{4\,b^2}$$

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

```
[Out] 1/2*x^2*sin_integral(b*x)^2 + (x*cos(b*x)/b - sin(b*x)/b^2)*sin_integral(b*
x) + 1/4*(cos(2*b*x) - cos_integral(2*b*x) - cos_integral(-2*b*x) + 2*log(x
))/b^2
```

Mupad [F(-1)]

Timed out.

$$\int x\text{Si}(bx)^2\,dx = \int x\,\text{sinint}(b\,x)^2\,dx$$

```
[In] int(x*sinint(b*x)^2,x)
```

```
[Out] int(x*sinint(b*x)^2, x)
```

3.13 $\int \text{Si}(bx)^2\,dx$

Optimal result

Integrand size = 6, antiderivative size = 32

$$\int \text{Si}(bx)^2\,dx = \frac{2\cos(bx)\text{Si}(bx)}{b} + x\text{Si}(bx)^2 - \frac{\text{Si}(2bx)}{b}$$

```
[Out] 2*cos(b*x)*Si(b*x)/b+x*Si(b*x)^2-Si(2*b*x)/b
```

Rubi [A] (verified)

Time = 0.03 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.833, Rules used = {6640, 6646, 12, 4491, 3380}

$$\int \text{Si}(bx)^2\,dx = x\text{Si}(bx)^2 - \frac{\text{Si}(2bx)}{b} + \frac{2\text{Si}(bx)\cos(bx)}{b}$$

```
[In] Int[SinIntegral[b*x]^2,x]
```

```
[Out] (2*Cos[b*x]*SinIntegral[b*x])/b + x*SinIntegral[b*x]^2 - SinIntegral[2*b*x]
/b
```

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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6640

```
Int[SinIntegral[(a_.) + (b_.)*(x_)]^2, x_Symbol] :> Simp[(a + b*x)*(SinInte
gral[a + b*x]^2/b), x] - Dist[2, Int[Sin[a + b*x]*SinIntegral[a + b*x], x],
 x] /; FreeQ[{a, b}, x]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= x\text{Si}(bx)^2 - 2\int \sin(bx)\text{Si}(bx)\,dx \\
&= \frac{2\cos(bx)\text{Si}(bx)}{b} + x\text{Si}(bx)^2 - 2\int \frac{\cos(bx)\sin(bx)}{bx}\,dx \\
&= \frac{2\cos(bx)\text{Si}(bx)}{b} + x\text{Si}(bx)^2 - \frac{2\int \frac{\cos(bx)\sin(bx)}{x}\,dx}{b} \\
&= \frac{2\cos(bx)\text{Si}(bx)}{b} + x\text{Si}(bx)^2 - \frac{2\int \frac{\sin(2bx)}{2x}\,dx}{b} \\
&= \frac{2\cos(bx)\text{Si}(bx)}{b} + x\text{Si}(bx)^2 - \frac{\int \frac{\sin(2bx)}{x}\,dx}{b} \\
&= \frac{2\cos(bx)\text{Si}(bx)}{b} + x\text{Si}(bx)^2 - \frac{\text{Si}(2bx)}{b}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00

$$\int \mathrm{Si}(bx)^2\,dx = \frac{2\cos(bx)\mathrm{Si}(bx)}{b} + x\mathrm{Si}(bx)^2 - \frac{\mathrm{Si}(2bx)}{b}$$

```
[In] Integrate[SinIntegral[b*x]^2,x]
[Out] (2*Cos[b*x]*SinIntegral[b*x])/b + x*SinIntegral[b*x]^2 - SinIntegral[2*b*x]
/b
```

Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.00

method	result	size
derivativedivides	$\frac{\mathrm{Si}(bx)^2 bx+2\cos(bx)\,\mathrm{Si}(bx)-\mathrm{Si}(2bx)}{b}$	32
default	$\frac{\mathrm{Si}(bx)^2 bx+2\cos(bx)\,\mathrm{Si}(bx)-\mathrm{Si}(2bx)}{b}$	32

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

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.97

$$\int \mathrm{Si}(bx)^2\,dx = \frac{bx\,\mathrm{Si}\,(bx)^2 + 2\,\cos(bx)\,\mathrm{Si}\,(bx) - \mathrm{Si}\,(2\,bx)}{b}$$

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

Sympy [F]

$$\int \operatorname{Si}(bx)^2\,dx = \int \operatorname{Si}^2(bx)\,dx$$

```
[In] integrate(Si(b*x)**2,x)
[Out] Integral(Si(b*x)**2, x)
```

Maxima [F]

$$\int \operatorname{Si}(bx)^2\,dx = \int \operatorname{Si}(bx)^2\,dx$$

```
[In] integrate(sin_integral(b*x)^2,x, algorithm="maxima")
[Out] integrate(sin_integral(b*x)^2, x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.27 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.53

$$\int \operatorname{Si}(bx)^2\,dx = x\operatorname{Si}(bx)^2 + \frac{2\cos(bx)\operatorname{Si}(bx)}{b} - \frac{\Im(\operatorname{Ci}(2bx)) - \Im(\operatorname{Ci}(-2bx)) + 2\operatorname{Si}(2bx)}{2b}$$

```
[In] integrate(sin_integral(b*x)^2,x, algorithm="giac")
[Out] x*sin_integral(b*x)^2 + 2*cos(b*x)*sin_integral(b*x)/b - 1/2*(imag_part(cos
_integral(2*b*x)) - imag_part(cos_integral(-2*b*x)) + 2*sin_integral(2*b*x)
)/b
```

Mupad [F(-1)]

Timed out.

$$\int \operatorname{Si}(bx)^2\,dx = \int \operatorname{sinint}(b\,x)^2\,dx$$

```
[In] int(sinint(b*x)^2,x)
[Out] int(sinint(b*x)^2, x)
```

3.14 $\int \frac{\mathbf{Si}(bx)^2}{x}\,dx$

Optimal result

Integrand size = 10, antiderivative size = 10

$$\int \frac{\text{Si}(bx)^2}{x}\,dx = \text{Int}\left(\frac{\text{Si}(bx)^2}{x},x\right)$$

```
[Out] CannotIntegrate(Si(b*x)^2/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\text{Si}(bx)^2}{x}\,dx = \int \frac{\text{Si}(bx)^2}{x}\,dx$$

```
[In] Int[SinIntegral[b*x]^2/x,x]
[Out] Defer[Int][SinIntegral[b*x]^2/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{Si}(bx)^2}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{Si}(bx)^2}{x} dx = \int \frac{\text{Si}(bx)^2}{x} dx$$

```
[In] Integrate[SinIntegral[b*x]^2/x,x]
[Out] Integrate[SinIntegral[b*x]^2/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.10 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\text{Si}\,(bx)^2}{x} dx$$

```
[In] int(Si(b*x)^2/x,x)
[Out] int(Si(b*x)^2/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{Si}(bx)^2}{x} dx = \int \frac{\text{Si}\,(bx)^2}{x} dx$$

```
[In] integrate(sin_integral(b*x)^2/x,x, algorithm="fricas")
[Out] integral(sin_integral(b*x)^2/x, x)
```

Sympy [N/A]

Not integrable

Time = 0.97 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.80

$$\int \frac{\text{Si}(bx)^2}{x} dx = \int \frac{\text{Si}^2\,(bx)}{x} dx$$

```
[In] integrate(Si(b*x)**2/x,x)
[Out] Integral(Si(b*x)**2/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{Si}(bx)^2}{x}\,dx = \int \frac{\text{Si}\,(bx)^2}{x}\,dx$$

```
[In] integrate(sin_integral(b*x)^2/x,x, algorithm="maxima")
[Out] integrate(sin_integral(b*x)^2/x, x)
```

Giac [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{Si}(bx)^2}{x}\,dx = \int \frac{\text{Si}\,(bx)^2}{x}\,dx$$

```
[In] integrate(sin_integral(b*x)^2/x,x, algorithm="giac")
[Out] integrate(sin_integral(b*x)^2/x, x)
```

Mupad [N/A]

Not integrable

Time = 4.81 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{Si}(bx)^2}{x}\,dx = \int \frac{\text{sinint}(b\,x)^2}{x}\,dx$$

```
[In] int(sinint(b*x)^2/x,x)
[Out] int(sinint(b*x)^2/x, x)
```

3.15 $\int \frac{\text{Si}(bx)^2}{x^2} \, dx$

Optimal result

Integrand size = 10, antiderivative size = 10

$$\int \frac{\text{Si}(bx)^2}{x^2} \, dx = \text{Int}\left(\frac{\text{Si}(bx)^2}{x^2}, x\right)$$

```
[Out] CannotIntegrate(Si(b*x)^2/x^2,x)
```

Rubi [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\text{Si}(bx)^2}{x^2} \, dx = \int \frac{\text{Si}(bx)^2}{x^2} \, dx$$

```
[In] Int[SinIntegral[b*x]^2/x^2,x]
```

```
[Out] Defer[Int][SinIntegral[b*x]^2/x^2, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{Si}(bx)^2}{x^2} \, dx$$

Mathematica [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{Si}(bx)^2}{x^2}\,dx = \int \frac{\text{Si}(bx)^2}{x^2}\,dx$$

```
[In] Integrate[SinIntegral[b*x]^2/x^2,x]
[Out] Integrate[SinIntegral[b*x]^2/x^2, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.15 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\text{Si}\left(bx\right)^2}{x^2}dx$$

```
[In] int(Si(b*x)^2/x^2,x)
[Out] int(Si(b*x)^2/x^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{Si}(bx)^2}{x^2}\,dx = \int \frac{\text{Si}\left(bx\right)^2}{x^2}\,dx$$

```
[In] integrate(sin_integral(b*x)^2/x^2,x, algorithm="fricas")
[Out] integral(sin_integral(b*x)^2/x^2, x)
```

Sympy [N/A]

Not integrable

Time = 0.96 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\text{Si}(bx)^2}{x^2}\,dx = \int \frac{\text{Si}^2\left(bx\right)}{x^2}\,dx$$

```
[In] integrate(Si(b*x)**2/x**2,x)
[Out] Integral(Si(b*x)**2/x**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\mathrm{Si}(bx)^2}{x^2}\,dx = \int \frac{\mathrm{Si}\left(bx\right)^2}{x^2}\,dx$$

```
[In] integrate(sin_integral(b*x)^2/x^2,x, algorithm="maxima")
[Out] integrate(sin_integral(b*x)^2/x^2, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\mathrm{Si}(bx)^2}{x^2}\,dx = \int \frac{\mathrm{Si}\left(bx\right)^2}{x^2}\,dx$$

```
[In] integrate(sin_integral(b*x)^2/x^2,x, algorithm="giac")
[Out] integrate(sin_integral(b*x)^2/x^2, x)
```

Mupad [N/A]

Not integrable

Time = 4.86 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\mathrm{Si}(bx)^2}{x^2}\,dx = \int \frac{\mathrm{sinint}(b\,x)^2}{x^2}\,dx$$

```
[In] int(sinint(b*x)^2/x^2,x)
[Out] int(sinint(b*x)^2/x^2, x)
```

3.16 $\int \frac{\mathbf{Si}(bx)^2}{x^3}\,dx$

Optimal result

Integrand size = 10, antiderivative size = 10

$$\int \frac{\mathrm{Si}(bx)^2}{x^3}\,dx = \mathrm{Int}\left(\frac{\mathrm{Si}(bx)^2}{x^3},x\right)$$

```
[Out] CannotIntegrate(Si(b*x)^2/x^3,x)
```

Rubi [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\mathrm{Si}(bx)^2}{x^3}\,dx = \int \frac{\mathrm{Si}(bx)^2}{x^3}\,dx$$

```
[In] Int[SinIntegral[b*x]^2/x^3,x]
```

```
[Out] Defer[Int][SinIntegral[b*x]^2/x^3, x]
```

Rubi steps

$$\text{integral} = \int \frac{\mathrm{Si}(bx)^2}{x^3}\,dx$$

Mathematica [N/A]

Not integrable

Time = 0.36 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\mathrm{Si}(bx)^2}{x^3}\,dx = \int \frac{\mathrm{Si}(bx)^2}{x^3}\,dx$$

```
[In] Integrate[SinIntegral[b*x]^2/x^3,x]
[Out] Integrate[SinIntegral[b*x]^2/x^3, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.15 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\mathrm{Si}\,(bx)^2}{x^3}dx$$

```
[In] int(Si(b*x)^2/x^3,x)
[Out] int(Si(b*x)^2/x^3,x)
```

Fricas [C] (verification not implemented)

Result contains higher order function than in optimal. Order 4 vs. order 1.

Time = 0.26 (sec) , antiderivative size = 74, normalized size of antiderivative = 7.40

$$\int \frac{\mathrm{Si}(bx)^2}{x^3}\,dx = \frac{4\,b^2x^2\,\mathrm{Ci}\,(2\,bx) - 2\,bx\cos{(bx)}\,\mathrm{Si}\,(bx) - (b^2x^2+2)\,\mathrm{Si}\,(bx)^2 + \cos{(bx)}^2 - 2\,(2\,bx\cos{(bx)} + \mathrm{Si}\,(bx))\sin{(bx)} -}{4\,x^2}$$

```
[In] integrate(sin_integral(b*x)^2/x^3,x, algorithm="fricas")
[Out] 1/4*(4*b^2*x^2*cos_integral(2*b*x) - 2*b*x*cos(b*x)*sin_integral(b*x) - (b^
2*x^2 + 2)*sin_integral(b*x)^2 + cos(b*x)^2 - 2*(2*b*x*cos(b*x) + sin_integ
ral(b*x))*sin(b*x) - 1)/x^2
```

Sympy [N/A]

Not integrable

Time = 0.95 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\text{Si}(bx)^2}{x^3} \, dx = \int \frac{\text{Si}^2(bx)}{x^3} \, dx$$

```
[In] integrate(Si(b*x)**2/x**3,x)
[Out] Integral(Si(b*x)**2/x**3, x)
```

Maxima [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{Si}(bx)^2}{x^3} \, dx = \int \frac{\text{Si}(bx)^2}{x^3} \, dx$$

```
[In] integrate(sin_integral(b*x)^2/x^3,x, algorithm="maxima")
[Out] integrate(sin_integral(b*x)^2/x^3, x)
```

Giac [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{Si}(bx)^2}{x^3} \, dx = \int \frac{\text{Si}(bx)^2}{x^3} \, dx$$

```
[In] integrate(sin_integral(b*x)^2/x^3,x, algorithm="giac")
[Out] integrate(sin_integral(b*x)^2/x^3, x)
```

Mupad [N/A]

Not integrable

Time = 5.08 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\mathrm{Si}(bx)^2}{x^3}\,dx = \int \frac{\mathrm{sinint}(b\,x)^2}{x^3}\,dx$$

```
[In] int(sinint(b*x)^2/x^3,x)
[Out] int(sinint(b*x)^2/x^3, x)
```

3.17 $\int x^m \mathbf{Si}(a+bx)\,dx$

Optimal result

Integrand size = 10, antiderivative size = 10

$$\int x^m \mathrm{Si}(a+bx)\,dx = \frac{x^{1+m}\mathrm{Si}(a+bx)}{1+m} - \frac{b\mathrm{Int}\left(\frac{x^{1+m}\sin(a+bx)}{a+bx},x\right)}{1+m}$$

```
[Out] -b*CannotIntegrate(x^(1+m)*sin(b*x+a)/(b*x+a),x)/(1+m)+x^(1+m)*Si(b*x+a)/(1
+m)
```

Rubi [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int x^m \mathrm{Si}(a+bx)\,dx = \int x^m \mathrm{Si}(a+bx)\,dx$$

```
[In] Int[x^m*SinIntegral[a + b*x],x]
```

```
[Out] (x^(1 + m)*SinIntegral[a + b*x])/(1 + m) - (b*Defer[Int][(x^(1 + m)*Sin[a +
 b*x])/(a + b*x), x])/(1 + m)
```

Rubi steps

$$\text{integral} = \frac{x^{1+m}\mathrm{Si}(a+bx)}{1+m} - \frac{b\int \frac{x^{1+m}\sin(a+bx)}{a+bx}\,dx}{1+m}$$

Mathematica [N/A]

Not integrable

Time = 2.64 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \text{Si}(a+bx)\,dx = \int x^m \text{Si}(a+bx)\,dx$$

```
[In] Integrate[x^m*SinIntegral[a + b*x],x]
[Out] Integrate[x^m*SinIntegral[a + b*x], x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.28 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int x^m \,\text{Si}\,(bx+a)\,dx$$

```
[In] int(x^m*Si(b*x+a),x)
[Out] int(x^m*Si(b*x+a),x)
```

Fricas [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \text{Si}(a+bx)\,dx = \int x^m \,\text{Si}\,(bx+a)\,\,dx$$

```
[In] integrate(x^m*sin_integral(b*x+a),x, algorithm="fricas")
[Out] integral(x^m*sin_integral(b*x + a), x)
```

Sympy [N/A]

Not integrable

Time = 0.61 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int x^m \text{Si}(a+bx)\,dx = \int x^m \,\text{Si}\,(a+bx)\,dx$$

```
[In] integrate(x**m*Si(b*x+a),x)
[Out] Integral(x**m*Si(a + b*x), x)
```

Maxima [N/A]

Not integrable

Time = 0.20 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \text{Si}(a+bx)\,dx = \int x^m \,\text{Si}\,(bx+a)\,\,dx$$

```
[In] integrate(x^m*sin_integral(b*x+a),x, algorithm="maxima")
[Out] integrate(x^m*sin_integral(b*x + a), x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \text{Si}(a+bx)\,dx = \int x^m \,\text{Si}\,(bx+a)\,\,dx$$

```
[In] integrate(x^m*sin_integral(b*x+a),x, algorithm="giac")
[Out] integrate(x^m*sin_integral(b*x + a), x)
```

Mupad [N/A]

Not integrable

Time = 5.72 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \text{Si}(a+bx)\,dx = \int x^m \,\text{sinint}(a+b\,x)\,\,dx$$

```
[In] int(x^m*sinint(a + b*x),x)
[Out] int(x^m*sinint(a + b*x), x)
```

3.18 $\int x^3\mathbf{Si}(a+bx)\,dx$

Optimal result

Integrand size = 10, antiderivative size = 184

$$\int x^3\text{Si}(a+bx)\,dx=\frac{a\cos(a+bx)}{2b^4}-\frac{a^3\cos(a+bx)}{4b^4}-\frac{3x\cos(a+bx)}{2b^3}+\frac{a^2x\cos(a+bx)}{4b^3}-\frac{ax^2\cos(a+bx)}{4b^2}+\frac{x^3\cos(a+bx)}{4b}+\frac{3\sin(a+bx)}{2b^4}-\frac{a^2\sin(a+bx)}{4b^4}+\frac{ax\sin(a+bx)}{2b^3}-\frac{3x^2\sin(a+bx)}{4b^2}-\frac{a^4\text{Si}(a+bx)}{4b^4}+\frac{1}{4}x^4\text{Si}(a+bx)$$

```
[Out] 1/2*a*cos(b*x+a)/b^4-1/4*a^3*cos(b*x+a)/b^4-3/2*x*cos(b*x+a)/b^3+1/4*a^2*x*
cos(b*x+a)/b^3-1/4*a*x^2*cos(b*x+a)/b^2+1/4*x^3*cos(b*x+a)/b-1/4*a^4*Si(b*x
+a)/b^4+1/4*x^4*Si(b*x+a)+3/2*sin(b*x+a)/b^4-1/4*a^2*sin(b*x+a)/b^4+1/2*a*x
*sin(b*x+a)/b^3-3/4*x^2*sin(b*x+a)/b^2
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 184, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.600, Rules used = {6638, 6874, 2718, 3377, 2717, 3380}

$$\int x^3\text{Si}(a+bx)\,dx=-\frac{a^4\text{Si}(a+bx)}{4b^4}-\frac{a^3\cos(a+bx)}{4b^4}-\frac{a^2\sin(a+bx)}{4b^4}+\frac{a^2x\cos(a+bx)}{4b^3}+\frac{3\sin(a+bx)}{2b^4}+\frac{a\cos(a+bx)}{2b^4}+\frac{ax\sin(a+bx)}{2b^3}-\frac{3x\cos(a+bx)}{2b^3}-\frac{3x^2\sin(a+bx)}{4b^2}-\frac{ax^2\cos(a+bx)}{4b^2}+\frac{1}{4}x^4\text{Si}(a+bx)+\frac{x^3\cos(a+bx)}{4b}$$

```
[In] Int[x^3*SinIntegral[a + b*x],x]
```

```
[Out] (a*Cos[a + b*x])/(2*b^4) - (a^3*Cos[a + b*x])/(4*b^4) - (3*x*Cos[a + b*x])/
(2*b^3) + (a^2*x*Cos[a + b*x])/(4*b^3) - (a*x^2*Cos[a + b*x])/(4*b^2) + (x^
3*Cos[a + b*x])/(4*b) + (3*Sin[a + b*x])/(2*b^4) - (a^2*Sin[a + b*x])/(4*b^
4) + (a*x*Sin[a + b*x])/(2*b^3) - (3*x^2*Sin[a + b*x])/(4*b^2) - (a^4*SinIn
tegral[a + b*x])/(4*b^4) + (x^4*SinIntegral[a + b*x])/4
```

Rule 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 6638

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}\text{integral} &= \frac{1}{4}x^4\text{Si}(a+bx) - \frac{1}{4}b\int \frac{x^4\sin(a+bx)}{a+bx}\,dx \\ &= \frac{1}{4}x^4\text{Si}(a+bx) - \frac{1}{4}b\int \left(-\frac{a^3\sin(a+bx)}{b^4} + \frac{a^2x\sin(a+bx)}{b^3} - \frac{ax^2\sin(a+bx)}{b^2} + \frac{x^3\sin(a+bx)}{b} + \frac{a^4\sin(a+bx)}{b^4(a+bx)}\right)\,dx\end{aligned}$$

$$
\begin{aligned}
&= \frac{1}{4}x^4\mathrm{Si}(a+bx) - \frac{1}{4}\int x^3\sin(a+bx)\,dx + \frac{a^3\int \sin(a+bx)\,dx}{4b^3} \\
&\quad - \frac{a^4\int \frac{\sin(a+bx)}{a+bx}\,dx}{4b^3} - \frac{a^2\int x\sin(a+bx)\,dx}{4b^2} + \frac{a\int x^2\sin(a+bx)\,dx}{4b} \\
&= -\frac{a^3\cos(a+bx)}{4b^4} + \frac{a^2x\cos(a+bx)}{4b^3} - \frac{ax^2\cos(a+bx)}{4b^2} + \frac{x^3\cos(a+bx)}{4b} - \frac{a^4\mathrm{Si}(a+bx)}{4b^4} \\
&\quad + \frac{1}{4}x^4\mathrm{Si}(a+bx) - \frac{a^2\int \cos(a+bx)\,dx}{4b^3} + \frac{a\int x\cos(a+bx)\,dx}{2b^2} - \frac{3\int x^2\cos(a+bx)\,dx}{4b} \\
&= -\frac{a^3\cos(a+bx)}{4b^4} + \frac{a^2x\cos(a+bx)}{4b^3} - \frac{ax^2\cos(a+bx)}{4b^2} + \frac{x^3\cos(a+bx)}{4b} \\
&\quad - \frac{a^2\sin(a+bx)}{4b^4} + \frac{ax\sin(a+bx)}{2b^3} - \frac{3x^2\sin(a+bx)}{4b^2} - \frac{a^4\mathrm{Si}(a+bx)}{4b^4} \\
&\quad + \frac{1}{4}x^4\mathrm{Si}(a+bx) - \frac{a\int \sin(a+bx)\,dx}{2b^3} + \frac{3\int x\sin(a+bx)\,dx}{2b^2} \\
&= \frac{a\cos(a+bx)}{2b^4} - \frac{a^3\cos(a+bx)}{4b^4} - \frac{3x\cos(a+bx)}{2b^3} + \frac{a^2x\cos(a+bx)}{4b^3} \\
&\quad - \frac{ax^2\cos(a+bx)}{4b^2} + \frac{x^3\cos(a+bx)}{4b} - \frac{a^2\sin(a+bx)}{4b^4} + \frac{ax\sin(a+bx)}{2b^3} \\
&\quad - \frac{3x^2\sin(a+bx)}{4b^2} - \frac{a^4\mathrm{Si}(a+bx)}{4b^4} + \frac{1}{4}x^4\mathrm{Si}(a+bx) + \frac{3\int \cos(a+bx)\,dx}{2b^3} \\
&= \frac{a\cos(a+bx)}{2b^4} - \frac{a^3\cos(a+bx)}{4b^4} - \frac{3x\cos(a+bx)}{2b^3} + \frac{a^2x\cos(a+bx)}{4b^3} \\
&\quad - \frac{ax^2\cos(a+bx)}{4b^2} + \frac{x^3\cos(a+bx)}{4b} + \frac{3\sin(a+bx)}{2b^4} - \frac{a^2\sin(a+bx)}{4b^4} \\
&\quad + \frac{ax\sin(a+bx)}{2b^3} - \frac{3x^2\sin(a+bx)}{4b^2} - \frac{a^4\mathrm{Si}(a+bx)}{4b^4} + \frac{1}{4}x^4\mathrm{Si}(a+bx)
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 96, normalized size of antiderivative = 0.52

$$
\int x^3\mathrm{Si}(a+bx)\,dx
$$

$$
= \frac{(2a - a^3 - 6bx + a^2bx - ab^2x^2 + b^3x^3)\cos(a+bx) - (-6 + a^2 - 2abx + 3b^2x^2)\sin(a+bx) + (-a^4 + b^4x^4}{4b^4}
$$

```
[In] Integrate[x^3*SinIntegral[a + b*x],x]
```

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

Maple [A] (verified)

Time = 0.45 (sec) , antiderivative size = 156, normalized size of antiderivative = 0.85

method	result
parts	$\frac{x^4 \operatorname{Si}(bx+a)}{4} - \frac{a^4 \operatorname{Si}(bx+a)+4a^3 \cos(bx+a)+6a^2(\sin(bx+a)-(bx+a)\cos(bx+a))-4a\left(-(bx+a)^2\cos(bx+a)+2\cos(bx}{4}$
derivativedivides	$\frac{\frac{\operatorname{Si}(bx+a)b^4x^4}{4}-\frac{a^4 \operatorname{Si}(bx+a)}{4}-a^3\cos(bx+a)-\frac{3a^2(\sin(bx+a)-(bx+a)\cos(bx+a))}{2}+a\left(-(bx+a)^2\cos(bx+a)+2\cos(bx+a)+2(b\right.}{b^4}$
default	$\frac{\frac{\operatorname{Si}(bx+a)b^4x^4}{4}-\frac{a^4 \operatorname{Si}(bx+a)}{4}-a^3\cos(bx+a)-\frac{3a^2(\sin(bx+a)-(bx+a)\cos(bx+a))}{2}+a\left(-(bx+a)^2\cos(bx+a)+2\cos(bx+a)+2(b\right.}{b^4}$

```
[In] int(x^3*Si(b*x+a),x,method=_RETURNVERBOSE)
```

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

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 92, normalized size of antiderivative = 0.50

$$\int x^3 \operatorname{Si}(a+bx)\,dx = \frac{(b^3x^3 - ab^2x^2 - a^3 + (a^2-6)bx + 2\,a)\cos{(bx+a)} - (3\,b^2x^2 - 2\,abx + a^2 - 6)\sin{(bx+a)} + (b^4x^4 - a^4)}{4\,b^4}$$

```
[In] integrate(x^3*sin_integral(b*x+a),x, algorithm="fricas")
```

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

Sympy [F]

$$\int x^3 \operatorname{Si}(a+bx)\,dx = \int x^3 \operatorname{Si}\left(a+bx\right)dx$$

```
[In] integrate(x**3*Si(b*x+a),x)
```

```
[Out] Integral(x**3*Si(a + b*x), x)
```

Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.25 (sec) , antiderivative size = 123, normalized size of antiderivative = 0.67

$$\int x^3\mathrm{Si}(a+bx)\,dx = \frac{1}{4}\,x^4\,\mathrm{Si}\,(bx+a) - \frac{a^4(-i\,\mathrm{Ei}(i\,bx+i\,a)+i\,\mathrm{Ei}(-i\,bx-i\,a))-2\left((bx+a)^3-4\,(bx+a)^2a-4\,a^3+6\,(a^2-1)(bx+a)+8\,a\right)}{8\,b^4}$$

```
[In] integrate(x^3*sin_integral(b*x+a),x, algorithm="maxima")
```

```
[Out] 1/4*x^4*sin_integral(b*x + a) - 1/8*(a^4*(-I*Ei(I*b*x + I*a) + I*Ei(-I*b*x
- I*a)) - 2*((b*x + a)^3 - 4*(b*x + a)^2*a - 4*a^3 + 6*(a^2 - 1)*(b*x + a)
+ 8*a)*cos(b*x + a) + 2*(3*(b*x + a)^2 - 8*(b*x + a)*a + 6*a^2 - 6)*sin(b*x
 + a))/b^4
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.28 (sec) , antiderivative size = 338, normalized size of antiderivative = 1.84

$$\int x^3\mathrm{Si}(a+bx)\,dx = \frac{1}{4}\,x^4\,\mathrm{Si}\,(bx+a) - \frac{\left(2\,b^3x^3\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2-2\,ab^2x^2\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2+a^4\Im(\mathrm{Ci}\,(bx+a))\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2-a^4\Im(\mathrm{Ci}\,(-bx}{}$$

```
[In] integrate(x^3*sin_integral(b*x+a),x, algorithm="giac")
```

```
[Out] 1/4*x^4*sin_integral(b*x + a) - 1/8*(2*b^3*x^3*tan(1/2*b*x + 1/2*a)^2 - 2*a
*b^2*x^2*tan(1/2*b*x + 1/2*a)^2 + a^4*imag_part(cos_integral(b*x + a))*tan(
1/2*b*x + 1/2*a)^2 - a^4*imag_part(cos_integral(-b*x - a))*tan(1/2*b*x + 1/
2*a)^2 + 2*a^4*sin_integral(b*x + a)*tan(1/2*b*x + 1/2*a)^2 - 2*b^3*x^3 + 2
*a^2*b*x*tan(1/2*b*x + 1/2*a)^2 + 2*a*b^2*x^2 + a^4*imag_part(cos_integral(
b*x + a)) - a^4*imag_part(cos_integral(-b*x - a)) + 2*a^4*sin_integral(b*x
+ a) + 12*b^2*x^2*tan(1/2*b*x + 1/2*a) - 2*a^3*tan(1/2*b*x + 1/2*a)^2 - 2*a
^2*b*x - 8*a*b*x*tan(1/2*b*x + 1/2*a) - 12*b*x*tan(1/2*b*x + 1/2*a)^2 + 2*a
^3 + 4*a^2*tan(1/2*b*x + 1/2*a) + 4*a*tan(1/2*b*x + 1/2*a)^2 + 12*b*x - 4*a
 - 24*tan(1/2*b*x + 1/2*a))*b/(b^5*tan(1/2*b*x + 1/2*a)^2 + b^5)
```

Mupad [F(-1)]

Timed out.

$$\int x^3 \text{Si}(a+bx)\,dx = \int x^3\,\text{sinint}(a+b\,x)\,dx$$

```
[In] int(x^3*sinint(a + b*x),x)
[Out] int(x^3*sinint(a + b*x), x)
```

3.19 $\int x^2\mathbf{Si}(a+bx)\,dx$

Optimal result

Integrand size = 10, antiderivative size = 118

$$\int x^2\text{Si}(a+bx)\,dx=-\frac{2\cos(a+bx)}{3b^3}+\frac{a^2\cos(a+bx)}{3b^3}-\frac{ax\cos(a+bx)}{3b^2}+\frac{x^2\cos(a+bx)}{3b}+\frac{a\sin(a+bx)}{3b^3}-\frac{2x\sin(a+bx)}{3b^2}+\frac{a^3\text{Si}(a+bx)}{3b^3}+\frac{1}{3}x^3\text{Si}(a+bx)$$

```
[Out] -2/3*cos(b*x+a)/b^3+1/3*a^2*cos(b*x+a)/b^3-1/3*a*x*cos(b*x+a)/b^2+1/3*x^2*c
os(b*x+a)/b+1/3*a^3*Si(b*x+a)/b^3+1/3*x^3*Si(b*x+a)+1/3*a*sin(b*x+a)/b^3-2/
3*x*sin(b*x+a)/b^2
```

Rubi [A] (verified)

Time = 0.22 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.600, Rules used = {6638, 6874, 2718, 3377, 2717, 3380}

$$\int x^2\text{Si}(a+bx)\,dx=\frac{a^3\text{Si}(a+bx)}{3b^3}+\frac{a^2\cos(a+bx)}{3b^3}+\frac{a\sin(a+bx)}{3b^3}-\frac{2\cos(a+bx)}{3b^3}-\frac{2x\sin(a+bx)}{3b^2}-\frac{ax\cos(a+bx)}{3b^2}+\frac{1}{3}x^3\text{Si}(a+bx)+\frac{x^2\cos(a+bx)}{3b}$$

```
[In] Int[x^2*SinIntegral[a + b*x],x]
```

```
[Out] (-2*Cos[a + b*x])/(3*b^3) + (a^2*Cos[a + b*x])/(3*b^3) - (a*x*Cos[a + b*x])
/(3*b^2) + (x^2*Cos[a + b*x])/(3*b) + (a*Sin[a + b*x])/(3*b^3) - (2*x*Sin[a
 + b*x])/(3*b^2) + (a^3*SinIntegral[a + b*x])/(3*b^3) + (x^3*SinIntegral[a
+ b*x])/3
```

Rule 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 6638

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{1}{3}x^3\text{Si}(a+bx) - \frac{1}{3}b\int \frac{x^3\sin(a+bx)}{a+bx}\,dx \\
&= \frac{1}{3}x^3\text{Si}(a+bx) \\
&\quad - \frac{1}{3}b\int \left(\frac{a^2\sin(a+bx)}{b^3} - \frac{ax\sin(a+bx)}{b^2} + \frac{x^2\sin(a+bx)}{b} - \frac{a^3\sin(a+bx)}{b^3(a+bx)}\right)dx \\
&= \frac{1}{3}x^3\text{Si}(a+bx) - \frac{1}{3}\int x^2\sin(a+bx)\,dx - \frac{a^2\int \sin(a+bx)\,dx}{3b^2} \\
&\quad + \frac{a^3\int \frac{\sin(a+bx)}{a+bx}\,dx}{3b^2} + \frac{a\int x\sin(a+bx)\,dx}{3b}
\end{aligned}$$

$$
\begin{aligned}
&= \frac{a^2\cos(a+bx)}{3b^3} - \frac{ax\cos(a+bx)}{3b^2} + \frac{x^2\cos(a+bx)}{3b} + \frac{a^3\mathrm{Si}(a+bx)}{3b^3} \\
&\quad + \frac{1}{3}x^3\mathrm{Si}(a+bx) + \frac{a\int\cos(a+bx)\,dx}{3b^2} - \frac{2\int x\cos(a+bx)\,dx}{3b} \\
&= \frac{a^2\cos(a+bx)}{3b^3} - \frac{ax\cos(a+bx)}{3b^2} + \frac{x^2\cos(a+bx)}{3b} + \frac{a\sin(a+bx)}{3b^3} \\
&\quad - \frac{2x\sin(a+bx)}{3b^2} + \frac{a^3\mathrm{Si}(a+bx)}{3b^3} + \frac{1}{3}x^3\mathrm{Si}(a+bx) + \frac{2\int\sin(a+bx)\,dx}{3b^2} \\
&= -\frac{2\cos(a+bx)}{3b^3} + \frac{a^2\cos(a+bx)}{3b^3} - \frac{ax\cos(a+bx)}{3b^2} + \frac{x^2\cos(a+bx)}{3b} \\
&\quad + \frac{a\sin(a+bx)}{3b^3} - \frac{2x\sin(a+bx)}{3b^2} + \frac{a^3\mathrm{Si}(a+bx)}{3b^3} + \frac{1}{3}x^3\mathrm{Si}(a+bx)
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.10 (sec) , antiderivative size = 63, normalized size of antiderivative = 0.53

$$
\int x^2\mathrm{Si}(a+bx)\,dx = \frac{(-2+a^2-abx+b^2x^2)\cos(a+bx)+(a-2bx)\sin(a+bx)+(a^3+b^3x^3)\,\mathrm{Si}(a+bx)}{3b^3}
$$

```
[In] Integrate[x^2*SinIntegral[a + b*x],x]
```

```
[Out] ((-2 + a^2 - a*b*x + b^2*x^2)*Cos[a + b*x] + (a - 2*b*x)*Sin[a + b*x] + (a^
3 + b^3*x^3)*SinIntegral[a + b*x])/(3*b^3)
```

Maple [A] (verified)

Time = 0.43 (sec) , antiderivative size = 99, normalized size of antiderivative = 0.84

method	result
derivativedivides	$\frac{\frac{\mathrm{Si}(bx+a)b^3x^3}{3}+\frac{a^3\,\mathrm{Si}(bx+a)}{3}+a^2\cos(bx+a)+a(\sin(bx+a)-(bx+a)\cos(bx+a))+\frac{(bx+a)^2\cos(bx+a)}{3}-\frac{2\cos(bx+a)}{3}-\frac{2(bx+a)\sin}{3}}{b^3}$
default	$\frac{\frac{\mathrm{Si}(bx+a)b^3x^3}{3}+\frac{a^3\,\mathrm{Si}(bx+a)}{3}+a^2\cos(bx+a)+a(\sin(bx+a)-(bx+a)\cos(bx+a))+\frac{(bx+a)^2\cos(bx+a)}{3}-\frac{2\cos(bx+a)}{3}-\frac{2(bx+a)\sin}{3}}{b^3}$
parts	$\frac{x^3\,\mathrm{Si}(bx+a)}{3}-\frac{-a^3\,\mathrm{Si}(bx+a)-3a^2\cos(bx+a)-3a(\sin(bx+a)-(bx+a)\cos(bx+a))-(bx+a)^2\cos(bx+a)+2\cos(bx+a)+2}{3b^3}$

```
[In] int(x^2*Si(b*x+a),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^3*(1/3*Si(b*x+a)*b^3*x^3+1/3*a^3*Si(b*x+a)+a^2*cos(b*x+a)+a*(sin(b*x+a)
-(b*x+a)*cos(b*x+a))+1/3*(b*x+a)^2*cos(b*x+a)-2/3*cos(b*x+a)-2/3*(b*x+a)*si
n(b*x+a))
```

Fricas [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 64, normalized size of antiderivative = 0.54

$$\int x^2\text{Si}(a+bx)\,dx = \frac{(b^2x^2-abx+a^2-2)\cos(bx+a)-(2\,bx-a)\sin(bx+a)+(b^3x^3+a^3)\,\text{Si}(bx+a)}{3\,b^3}$$

```
[In] integrate(x^2*sin_integral(b*x+a),x, algorithm="fricas")
[Out] 1/3*((b^2*x^2 - a*b*x + a^2 - 2)*cos(b*x + a) - (2*b*x - a)*sin(b*x + a) +
(b^3*x^3 + a^3)*sin_integral(b*x + a))/b^3
```

Sympy [F]

$$\int x^2\text{Si}(a+bx)\,dx = \int x^2\,\text{Si}\,(a+bx)\,dx$$

```
[In] integrate(x**2*Si(b*x+a),x)
[Out] Integral(x**2*Si(a + b*x), x)
```

Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.27 (sec) , antiderivative size = 91, normalized size of antiderivative = 0.77

$$\int x^2\text{Si}(a+bx)\,dx = \frac{1}{3}\,x^3\,\text{Si}\,(bx+a) - \frac{a^3(i\,\text{Ei}(i\,bx+i\,a)-i\,\text{Ei}(-i\,bx-i\,a))-2\left((bx+a)^2-3\,(bx+a)a+3\,a^2-2\right)\cos(bx+a)+2\,(2\,bx-}{6\,b^3}$$

```
[In] integrate(x^2*sin_integral(b*x+a),x, algorithm="maxima")
[Out] 1/3*x^3*sin_integral(b*x + a) - 1/6*(a^3*(I*Ei(I*b*x + I*a) - I*Ei(-I*b*x -
 I*a)) - 2*((b*x + a)^2 - 3*(b*x + a)*a + 3*a^2 - 2)*cos(b*x + a) + 2*(2*b*
x - a)*sin(b*x + a))/b^3
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.28 (sec) , antiderivative size = 252, normalized size of antiderivative = 2.14

$$\int x^2\text{Si}(a+bx)\,dx = \frac{1}{3}x^3\,\text{Si}\,(bx+a) - \frac{\left(2\,b^2x^2\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2 - a^3\Im(\text{Ci}\,(bx+a))\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2 + a^3\Im(\text{Ci}\,(-bx-a))\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2 - \right.}{}$$

```
[In] integrate(x^2*sin_integral(b*x+a),x, algorithm="giac")
```

```
[Out] 1/3*x^3*sin_integral(b*x + a) - 1/6*(2*b^2*x^2*tan(1/2*b*x + 1/2*a)^2 - a^3
*imag_part(cos_integral(b*x + a))*tan(1/2*b*x + 1/2*a)^2 + a^3*imag_part(co
s_integral(-b*x - a))*tan(1/2*b*x + 1/2*a)^2 - 2*a^3*sin_integral(b*x + a)*
tan(1/2*b*x + 1/2*a)^2 - 2*a*b*x*tan(1/2*b*x + 1/2*a)^2 - 2*b^2*x^2 - a^3*i
mag_part(cos_integral(b*x + a)) + a^3*imag_part(cos_integral(-b*x - a)) - 2
*a^3*sin_integral(b*x + a) + 2*a^2*tan(1/2*b*x + 1/2*a)^2 + 2*a*b*x + 8*b*x
*tan(1/2*b*x + 1/2*a) - 2*a^2 - 4*a*tan(1/2*b*x + 1/2*a) - 4*tan(1/2*b*x +
1/2*a)^2 + 4)*b/(b^4*tan(1/2*b*x + 1/2*a)^2 + b^4)
```

Mupad [F(-1)]

Timed out.

$$\int x^2\text{Si}(a+bx)\,dx = \int x^2\,\text{sinint}(a+b\,x)\,dx$$

```
[In] int(x^2*sinint(a + b*x),x)
```

```
[Out] int(x^2*sinint(a + b*x), x)
```

3.20 $\int x\mathbf{Si}(a+bx)\,dx$

Optimal result

Integrand size = 8, antiderivative size = 71

$$\int x\text{Si}(a+bx)\,dx = -\frac{a\cos(a+bx)}{2b^2}+\frac{x\cos(a+bx)}{2b}-\frac{\sin(a+bx)}{2b^2}-\frac{a^2\text{Si}(a+bx)}{2b^2}+\frac{1}{2}x^2\text{Si}(a+bx)$$

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

Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.750, Rules used = {6638, 6874, 2718, 3377, 2717, 3380}

$$\int x\text{Si}(a+bx)\,dx = -\frac{a^2\text{Si}(a+bx)}{2b^2}-\frac{\sin(a+bx)}{2b^2}-\frac{a\cos(a+bx)}{2b^2}+\frac{1}{2}x^2\text{Si}(a+bx)+\frac{x\cos(a+bx)}{2b}$$

```
[In] Int[x*SinIntegral[a + b*x],x]
```

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

Rule 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 6638

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

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

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 50, normalized size of antiderivative = 0.70

$$\int x\mathrm{Si}(a+bx)\,dx=\frac{(-a+bx)\cos(a+bx)-\sin(a+bx)+(-a^2+b^2x^2)\,\mathrm{Si}(a+bx)}{2b^2}$$

```
[In] Integrate[x*SinIntegral[a + b*x],x]
[Out] ((-a + b*x)*Cos[a + b*x] - Sin[a + b*x] + (-a^2 + b^2*x^2)*SinIntegral[a +
b*x])/(2*b^2)
```

Maple [A] (verified)

Time = 0.41 (sec) , antiderivative size = 57, normalized size of antiderivative = 0.80

method	result	size
parts	$\frac{x^2\,\mathrm{Si}(bx+a)}{2}-\frac{a^2\,\mathrm{Si}(bx+a)+2a\cos(bx+a)+\sin(bx+a)-(bx+a)\cos(bx+a)}{2b^2}$	57
derivativedivides	$\frac{\mathrm{Si}(bx+a)\left(-(bx+a)a+\frac{(bx+a)^2}{2}\right)-a\cos(bx+a)-\frac{\sin(bx+a)}{2}+\frac{(bx+a)\cos(bx+a)}{2}}{b^2}$	61
default	$\frac{\mathrm{Si}(bx+a)\left(-(bx+a)a+\frac{(bx+a)^2}{2}\right)-a\cos(bx+a)-\frac{\sin(bx+a)}{2}+\frac{(bx+a)\cos(bx+a)}{2}}{b^2}$	61

```
[In] int(x*Si(b*x+a),x,method=_RETURNVERBOSE)
[Out] 1/2*x^2*Si(b*x+a)-1/2/b^2*(a^2*Si(b*x+a)+2*a*cos(b*x+a)+sin(b*x+a)-(b*x+a)*
cos(b*x+a))
```

Fricas [A] (verification not implemented)

none

Time = 0.24 (sec) , antiderivative size = 48, normalized size of antiderivative = 0.68

$$\int x\mathrm{Si}(a+bx)\,dx=\frac{(bx-a)\cos(bx+a)+(b^2x^2-a^2)\,\mathrm{Si}(bx+a)-\sin(bx+a)}{2\,b^2}$$

```
[In] integrate(x*sin_integral(b*x+a),x, algorithm="fricas")
[Out] 1/2*((b*x - a)*cos(b*x + a) + (b^2*x^2 - a^2)*sin_integral(b*x + a) - sin(b
*x + a))/b^2
```

Sympy [F]

$$\int x\mathrm{Si}(a+bx)\,dx = \int x\,\mathrm{Si}\,(a+bx)\,dx$$

```
[In] integrate(x*Si(b*x+a),x)
[Out] Integral(x*Si(a + b*x), x)
```

Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.24 (sec) , antiderivative size = 68, normalized size of antiderivative = 0.96

$$\int x\mathrm{Si}(a+bx)\,dx$$
$$= \frac{1}{2}\,x^2\,\mathrm{Si}\,(bx+a)$$
$$- \frac{a^2(-i\,\mathrm{Ei}(i\,bx+i\,a)+i\,\mathrm{Ei}(-i\,bx-i\,a)) - 2\,(bx-a)\cos\,(bx+a) + 2\,\sin\,(bx+a)}{4\,b^2}$$

```
[In] integrate(x*sin_integral(b*x+a),x, algorithm="maxima")
[Out] 1/2*x^2*sin_integral(b*x + a) - 1/4*(a^2*(-I*Ei(I*b*x + I*a) + I*Ei(-I*b*x
- I*a)) - 2*(b*x - a)*cos(b*x + a) + 2*sin(b*x + a))/b^2
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.29 (sec) , antiderivative size = 191, normalized size of antiderivative = 2.69

$$\int x\mathrm{Si}(a+bx)\,dx = \frac{1}{2}\,x^2\,\mathrm{Si}\,(bx+a)$$
$$- \frac{\left(a^2\Im(\mathrm{Ci}\,(bx+a))\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2 - a^2\Im(\mathrm{Ci}\,(-bx-a))\tan\left(\frac{1}{2}\,bx+\frac{1}{2}\,a\right)^2 + 2\,a^2\,\mathrm{Si}\,(bx+a)\tan\left(\frac{1}{2}\,bx+\right.\right.}{}$$

```
[In] integrate(x*sin_integral(b*x+a),x, algorithm="giac")
[Out] 1/2*x^2*sin_integral(b*x + a) - 1/4*(a^2*imag_part(cos_integral(b*x + a))*t
an(1/2*b*x + 1/2*a)^2 - a^2*imag_part(cos_integral(-b*x - a))*tan(1/2*b*x +
 1/2*a)^2 + 2*a^2*sin_integral(b*x + a)*tan(1/2*b*x + 1/2*a)^2 + 2*b*x*tan(
1/2*b*x + 1/2*a)^2 + a^2*imag_part(cos_integral(b*x + a)) - a^2*imag_part(c
os_integral(-b*x - a)) + 2*a^2*sin_integral(b*x + a) - 2*a*tan(1/2*b*x + 1/
2*a)^2 - 2*b*x + 2*a + 4*tan(1/2*b*x + 1/2*a))*b/(b^3*tan(1/2*b*x + 1/2*a)^
2 + b^3)
```

Mupad [F(-1)]

Timed out.

$$\int x\mathrm{Si}(a+bx)\,dx = \frac{x^2\,\mathrm{sinint}(a+b\,x)}{2} - \frac{\sin(a+b\,x)+a\,\cos(a+b\,x)+a^2\,\mathrm{sinint}(a+b\,x)-b\,x\,\cos(a+b\,x)}{2\,b^2}$$

```
[In] int(x*sinint(a + b*x),x)
```

```
[Out] (x^2*sinint(a + b*x))/2 - (sin(a + b*x) + a*cos(a + b*x) + a^2*sinint(a + b
*x) - b*x*cos(a + b*x))/(2*b^2)
```

3.21 $\int \mathbf{Si}(a + bx)\,dx$

Optimal result

Integrand size = 6, antiderivative size = 26

$$\int \text{Si}(a+bx)\,dx=\frac{\cos(a+bx)}{b}+\frac{(a+bx)\text{Si}(a+bx)}{b}$$

```
[Out] cos(b*x+a)/b+(b*x+a)*Si(b*x+a)/b
```

Rubi [A] (verified)

Time = 0.01 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {6634}

$$\int \text{Si}(a+bx)\,dx=\frac{(a+bx)\text{Si}(a+bx)}{b}+\frac{\cos(a+bx)}{b}$$

```
[In] Int[SinIntegral[a + b*x],x]
```

```
[Out] Cos[a + b*x]/b + ((a + b*x)*SinIntegral[a + b*x])/b
```

Rule 6634

```
Int[SinIntegral[(a_.) + (b_.)*(x_)], x_Symbol] :> Simp[(a + b*x)*(SinIntegr
al[a + b*x]/b), x] + Simp[Cos[a + b*x]/b, x] /; FreeQ[{a, b}, x]
```

Rubi steps

$$\text{integral}=\frac{\cos(a+bx)}{b}+\frac{(a+bx)\text{Si}(a+bx)}{b}$$

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.58

$$\int \mathrm{Si}(a+bx)\,dx=\frac{\cos(a)\cos(bx)}{b}-\frac{\sin(a)\sin(bx)}{b}+\frac{a\mathrm{Si}(a+bx)}{b}+x\mathrm{Si}(a+bx)$$

```
[In] Integrate[SinIntegral[a + b*x],x]
[Out] (Cos[a]*Cos[b*x])/b - (Sin[a]*Sin[b*x])/b + (a*SinIntegral[a + b*x])/b + x*
SinIntegral[a + b*x]
```

Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.92

method	result	size
derivativedivides	$\frac{\mathrm{Si}(bx+a)(bx+a)+\cos(bx+a)}{b}$	24
default	$\frac{\mathrm{Si}(bx+a)(bx+a)+\cos(bx+a)}{b}$	24
parts	$x\ \mathrm{Si}\left(bx+a\right)-\frac{-a\ \mathrm{Si}(bx+a)-\cos(bx+a)}{b}$	33

```
[In] int(Si(b*x+a),x,method=_RETURNVERBOSE)
[Out] 1/b*(Si(b*x+a)*(b*x+a)+cos(b*x+a))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \mathrm{Si}(a+bx)\,dx=\frac{(bx+a)\,\mathrm{Si}\left(bx+a\right)+\cos\left(bx+a\right)}{b}$$

```
[In] integrate(sin_integral(b*x+a),x, algorithm="fricas")
[Out] ((b*x + a)*sin_integral(b*x + a) + cos(b*x + a))/b
```

Sympy [F]

$$\int \mathrm{Si}(a+bx)\,dx = \int \mathrm{Si}\,(a+bx)\,dx$$

```
[In] integrate(Si(b*x+a),x)
[Out] Integral(Si(a + b*x), x)
```

Maxima [A] (verification not implemented)

none

Time = 0.19 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \mathrm{Si}(a+bx)\,dx = \frac{(bx+a)\,\mathrm{Si}\,(bx+a)+\cos\,(bx+a)}{b}$$

```
[In] integrate(sin_integral(b*x+a),x, algorithm="maxima")
[Out] ((b*x + a)*sin_integral(b*x + a) + cos(b*x + a))/b
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.28 (sec) , antiderivative size = 303, normalized size of antiderivative = 11.65

$$\int \mathrm{Si}(a+bx)\,dx = x\,\mathrm{Si}\,(bx+a) + \frac{\left(a\Im(\mathrm{Ci}\,(bx+a))\tan\left(\frac{1}{2}\,bx\right)^2\tan\left(\frac{1}{2}\,a\right)^2 - a\Im(\mathrm{Ci}\,(-bx-a))\tan\left(\frac{1}{2}\,bx\right)^2\tan\left(\frac{1}{2}\,a\right)^2 + 2\,a\,\mathrm{Si}\,(bx+a)\tan\left(\right.\right.}{}$$

```
[In] integrate(sin_integral(b*x+a),x, algorithm="giac")
[Out] x*sin_integral(b*x + a) + 1/2*(a*imag_part(cos_integral(b*x + a))*tan(1/2*b
*x)^2*tan(1/2*a)^2 - a*imag_part(cos_integral(-b*x - a))*tan(1/2*b*x)^2*tan
(1/2*a)^2 + 2*a*sin_integral(b*x + a)*tan(1/2*b*x)^2*tan(1/2*a)^2 + a*imag_
part(cos_integral(b*x + a))*tan(1/2*b*x)^2 - a*imag_part(cos_integral(-b*x
- a))*tan(1/2*b*x)^2 + 2*a*sin_integral(b*x + a)*tan(1/2*b*x)^2 + a*imag_pa
rt(cos_integral(b*x + a))*tan(1/2*a)^2 - a*imag_part(cos_integral(-b*x - a)
)*tan(1/2*a)^2 + 2*a*sin_integral(b*x + a)*tan(1/2*a)^2 + 2*tan(1/2*b*x)^2*
tan(1/2*a)^2 + a*imag_part(cos_integral(b*x + a)) - a*imag_part(cos_integra
l(-b*x - a)) + 2*a*sin_integral(b*x + a) - 2*tan(1/2*b*x)^2 - 8*tan(1/2*b*x
)*tan(1/2*a) - 2*tan(1/2*a)^2 + 2)*b/(b^2*tan(1/2*b*x)^2*tan(1/2*a)^2 + b^2
*tan(1/2*b*x)^2 + b^2*tan(1/2*a)^2 + b^2)
```

Mupad [F(-1)]

Timed out.

$$\int \mathrm{Si}(a+bx)\,dx = x\,\mathrm{sinint}(a+b\,x) + \frac{\cos\left(a+b\,x\right)+a\,\mathrm{sinint}(a+b\,x)}{b}$$

```
[In] int(sinint(a + b*x),x)
[Out] x*sinint(a + b*x) + (cos(a + b*x) + a*sinint(a + b*x))/b
```

3.22 $\int \frac{\mathbf{Si}(a+bx)}{x} \, dx$

Optimal result

Integrand size = 10, antiderivative size = 10

$$\int \frac{\text{Si}(a+bx)}{x} \, dx = \text{Int}\left(\frac{\text{Si}(a+bx)}{x}, x\right)$$

```
[Out] CannotIntegrate(Si(b*x+a)/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\text{Si}(a+bx)}{x} \, dx = \int \frac{\text{Si}(a+bx)}{x} \, dx$$

```
[In] Int[SinIntegral[a + b*x]/x,x]
[Out] Defer[Int][SinIntegral[a + b*x]/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{Si}(a+bx)}{x} \, dx$$

Mathematica [N/A]

Not integrable

Time = 0.39 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\mathrm{Si}(a+bx)}{x} \, dx = \int \frac{\mathrm{Si}(a+bx)}{x} \, dx$$

```
[In] Integrate[SinIntegral[a + b*x]/x,x]
[Out] Integrate[SinIntegral[a + b*x]/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.24 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\mathrm{Si}\,(bx+a)}{x}dx$$

```
[In] int(Si(b*x+a)/x,x)
[Out] int(Si(b*x+a)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\mathrm{Si}(a+bx)}{x} \, dx = \int \frac{\mathrm{Si}\,(bx+a)}{x} \, dx$$

```
[In] integrate(sin_integral(b*x+a)/x,x, algorithm="fricas")
[Out] integral(sin_integral(b*x + a)/x, x)
```

Sympy [N/A]

Not integrable

Time = 0.32 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.80

$$\int \frac{\mathrm{Si}(a+bx)}{x} \, dx = \int \frac{\mathrm{Si}\,(a+bx)}{x} \, dx$$

```
[In] integrate(Si(b*x+a)/x,x)
[Out] Integral(Si(a + b*x)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.37 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\operatorname{Si}(a+bx)}{x}\,dx = \int \frac{\operatorname{Si}\left(bx+a\right)}{x}\,dx$$

```
[In] integrate(sin_integral(b*x+a)/x,x, algorithm="maxima")
[Out] integrate(sin_integral(b*x + a)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\operatorname{Si}(a+bx)}{x}\,dx = \int \frac{\operatorname{Si}\left(bx+a\right)}{x}\,dx$$

```
[In] integrate(sin_integral(b*x+a)/x,x, algorithm="giac")
[Out] integrate(sin_integral(b*x + a)/x, x)
```

Mupad [N/A]

Not integrable

Time = 5.12 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\operatorname{Si}(a+bx)}{x}\,dx = \int \frac{\mathrm{sinint}(a+b\,x)}{x}\,dx$$

```
[In] int(sinint(a + b*x)/x,x)
[Out] int(sinint(a + b*x)/x, x)
```

3.23 $\int \frac{\text{Si}(a+bx)}{x^2}\,dx$

Optimal result

Integrand size = 10, antiderivative size = 46

$$\int \frac{\text{Si}(a+bx)}{x^2}\,dx=\frac{b\,\text{CosIntegral}(bx)\sin(a)}{a}+\frac{b\cos(a)\text{Si}(bx)}{a}-\frac{b\text{Si}(a+bx)}{a}-\frac{\text{Si}(a+bx)}{x}$$

```
[Out] b*cos(a)*Si(b*x)/a-b*Si(b*x+a)/a-Si(b*x+a)/x+b*Ci(b*x)*sin(a)/a
```

Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6638, 6874, 3384, 3380, 3383}

$$\int \frac{\text{Si}(a+bx)}{x^2}\,dx=\frac{b\sin(a)\,\text{CosIntegral}(bx)}{a}-\frac{b\text{Si}(a+bx)}{a}-\frac{\text{Si}(a+bx)}{x}+\frac{b\cos(a)\text{Si}(bx)}{a}$$

```
[In] Int[SinIntegral[a + b*x]/x^2,x]
```

```
[Out] (b*CosIntegral[b*x]*Sin[a])/a + (b*Cos[a]*SinIntegral[b*x])/a - (b*SinInteg
ral[a + b*x])/a - SinIntegral[a + b*x]/x
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
```

```
c*f, 0]
```

Rule 3384

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Dist[Cos[(d*
e - c*f)/d], Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Dist[Sin[(d*e - c*f
)/d], Int[Cos[c*(f/d) + f*x]/(c + d*x), x], x] /; FreeQ[{c, d, e, f}, x] &&
 NeQ[d*e - c*f, 0]
```

Rule 6638

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{\text{Si}(a+bx)}{x} + b\int \frac{\sin(a+bx)}{x(a+bx)}\,dx \\
&= -\frac{\text{Si}(a+bx)}{x} + b\int \left(\frac{\sin(a+bx)}{ax} - \frac{b\sin(a+bx)}{a(a+bx)}\right)dx \\
&= -\frac{\text{Si}(a+bx)}{x} + \frac{b\int \frac{\sin(a+bx)}{x}\,dx}{a} - \frac{b^2\int \frac{\sin(a+bx)}{a+bx}\,dx}{a} \\
&= -\frac{b\text{Si}(a+bx)}{a} - \frac{\text{Si}(a+bx)}{x} + \frac{(b\cos(a))\int \frac{\sin(bx)}{x}\,dx}{a} + \frac{(b\sin(a))\int \frac{\cos(bx)}{x}\,dx}{a} \\
&= \frac{b\,\text{CosIntegral}(bx)\sin(a)}{a} + \frac{b\cos(a)\text{Si}(bx)}{a} - \frac{b\text{Si}(a+bx)}{a} - \frac{\text{Si}(a+bx)}{x}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 39, normalized size of antiderivative = 0.85

$$\int \frac{\mathrm{Si}(a+bx)}{x^2}\,dx = \frac{bx\,\mathrm{CosIntegral}(bx)\sin(a) + bx\cos(a)\mathrm{Si}(bx) - (a+bx)\mathrm{Si}(a+bx)}{ax}$$

```
[In] Integrate[SinIntegral[a + b*x]/x^2,x]
[Out] (b*x*CosIntegral[b*x]*Sin[a] + b*x*Cos[a]*SinIntegral[b*x] - (a + b*x)*SinI
ntegral[a + b*x])/(a*x)
```

Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00

method	result	size
parts	$-\frac{\mathrm{Si}(bx+a)}{x}+b\left(\frac{\mathrm{Si}(bx)\cos(a)+\mathrm{Ci}(bx)\sin(a)}{a}-\frac{\mathrm{Si}(bx+a)}{a}\right)$	46
derivativedivides	$b\left(-\frac{\mathrm{Si}(bx+a)}{bx}+\frac{\mathrm{Si}(bx)\cos(a)+\mathrm{Ci}(bx)\sin(a)}{a}-\frac{\mathrm{Si}(bx+a)}{a}\right)$	48
default	$b\left(-\frac{\mathrm{Si}(bx+a)}{bx}+\frac{\mathrm{Si}(bx)\cos(a)+\mathrm{Ci}(bx)\sin(a)}{a}-\frac{\mathrm{Si}(bx+a)}{a}\right)$	48

```
[In] int(Si(b*x+a)/x^2,x,method=_RETURNVERBOSE)
[Out] -Si(b*x+a)/x+b*(1/a*(Si(b*x)*cos(a)+Ci(b*x)*sin(a))-1/a*Si(b*x+a))
```

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 39, normalized size of antiderivative = 0.85

$$\int \frac{\mathrm{Si}(a+bx)}{x^2}\,dx = \frac{bx\,\mathrm{Ci}\,(bx)\sin\,(a) + bx\cos\,(a)\,\mathrm{Si}\,(bx) - (bx+a)\,\mathrm{Si}\,(bx+a)}{ax}$$

```
[In] integrate(sin_integral(b*x+a)/x^2,x, algorithm="fricas")
[Out] (b*x*cos_integral(b*x)*sin(a) + b*x*cos(a)*sin_integral(b*x) - (b*x + a)*si
n_integral(b*x + a))/(a*x)
```

Sympy [F]

$$\int \frac{\mathrm{Si}(a+bx)}{x^2}\,dx = \int \frac{\mathrm{Si}\,(a+bx)}{x^2}\,dx$$

```
[In] integrate(Si(b*x+a)/x**2,x)
[Out] Integral(Si(a + b*x)/x**2, x)
```

Maxima [F]

$$\int \frac{\mathrm{Si}(a+bx)}{x^2}\,dx = \int \frac{\mathrm{Si}\,(bx+a)}{x^2}\,dx$$

```
[In] integrate(sin_integral(b*x+a)/x^2,x, algorithm="maxima")
[Out] integrate(sin_integral(b*x + a)/x^2, x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.28 (sec) , antiderivative size = 181, normalized size of antiderivative = 3.93

$$\int \frac{\mathrm{Si}(a+bx)}{x^2}\,dx =$$

$$-\frac{\left(\Im(\mathrm{Ci}\,(bx+a))\tan\left(\frac{1}{2}\,a\right)^2+\Im(\mathrm{Ci}\,(bx))\tan\left(\frac{1}{2}\,a\right)^2-\Im(\mathrm{Ci}\,(-bx-a))\tan\left(\frac{1}{2}\,a\right)^2-\Im(\mathrm{Ci}\,(-bx))\tan\left(\frac{1}{2}\,a\right.\right.}{}$$

$$-\frac{\mathrm{Si}\,(bx+a)}{x}$$

```
[In] integrate(sin_integral(b*x+a)/x^2,x, algorithm="giac")
[Out] -1/2*(imag_part(cos_integral(b*x + a))*tan(1/2*a)^2 + imag_part(cos_integra
l(b*x))*tan(1/2*a)^2 - imag_part(cos_integral(-b*x - a))*tan(1/2*a)^2 - ima
g_part(cos_integral(-b*x))*tan(1/2*a)^2 + 2*sin_integral(b*x + a)*tan(1/2*a
)^2 + 2*sin_integral(b*x)*tan(1/2*a)^2 - 2*real_part(cos_integral(b*x))*tan
(1/2*a) - 2*real_part(cos_integral(-b*x))*tan(1/2*a) + imag_part(cos_integr
al(b*x + a)) - imag_part(cos_integral(b*x)) - imag_part(cos_integral(-b*x -
 a)) + imag_part(cos_integral(-b*x)) + 2*sin_integral(b*x + a) - 2*sin_inte
gral(b*x))*b/(a*tan(1/2*a)^2 + a) - sin_integral(b*x + a)/x
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\mathrm{Si}(a+bx)}{x^2}\,dx = \int \frac{\mathrm{sinint}(a+b\,x)}{x^2}\,dx$$

```
[In] int(sinint(a + b*x)/x^2,x)
[Out] int(sinint(a + b*x)/x^2, x)
```

3.24 $\int \frac{\mathbf{Si}(a+bx)}{x^3}\,dx$

Optimal result

Integrand size = 10, antiderivative size = 111

$$\int \frac{\mathrm{Si}(a+bx)}{x^3}\,dx = \frac{b^2\cos(a)\,\mathrm{CosIntegral}(bx)}{2a} - \frac{b^2\,\mathrm{CosIntegral}(bx)\sin(a)}{2a^2} - \frac{b\sin(a+bx)}{2ax} - \frac{b^2\cos(a)\mathrm{Si}(bx)}{2a^2} - \frac{b^2\sin(a)\mathrm{Si}(bx)}{2a} + \frac{b^2\mathrm{Si}(a+bx)}{2a^2} - \frac{\mathrm{Si}(a+bx)}{2x^2}$$

```
[Out] 1/2*b^2*Ci(b*x)*cos(a)/a-1/2*b^2*cos(a)*Si(b*x)/a^2+1/2*b^2*Si(b*x+a)/a^2-1
/2*Si(b*x+a)/x^2-1/2*b^2*Ci(b*x)*sin(a)/a^2-1/2*b^2*Si(b*x)*sin(a)/a-1/2*b*
sin(b*x+a)/a/x
```

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 111, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.600, Rules used = {6638, 6874, 3378, 3384, 3380, 3383}

$$\int \frac{\mathrm{Si}(a+bx)}{x^3}\,dx = -\frac{b^2\sin(a)\,\mathrm{CosIntegral}(bx)}{2a^2} + \frac{b^2\mathrm{Si}(a+bx)}{2a^2} - \frac{b^2\cos(a)\mathrm{Si}(bx)}{2a^2} + \frac{b^2\cos(a)\,\mathrm{CosIntegral}(bx)}{2a} - \frac{b^2\sin(a)\mathrm{Si}(bx)}{2a} - \frac{\mathrm{Si}(a+bx)}{2x^2} - \frac{b\sin(a+bx)}{2ax}$$

```
[In] Int[SinIntegral[a + b*x]/x^3,x]
```

```
[Out] (b^2*Cos[a]*CosIntegral[b*x])/(2*a) - (b^2*CosIntegral[b*x]*Sin[a])/(2*a^2)
 - (b*Sin[a + b*x])/(2*a*x) - (b^2*Cos[a]*SinIntegral[b*x])/(2*a^2) - (b^2*
Sin[a]*SinIntegral[b*x])/(2*a) + (b^2*SinIntegral[a + b*x])/(2*a^2) - SinIn
tegral[a + b*x]/(2*x^2)
```

Rule 3378

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(c
 + d*x)^(m + 1)*(Sin[e + f*x]/(d*(m + 1))), x] - Dist[f/(d*(m + 1)), Int[(c
 + d*x)^(m + 1)*Cos[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && LtQ[m, -1
]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3384

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Dist[Cos[(d*
e - c*f)/d], Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Dist[Sin[(d*e - c*f
)/d], Int[Cos[c*(f/d) + f*x]/(c + d*x), x], x] /; FreeQ[{c, d, e, f}, x] &&
 NeQ[d*e - c*f, 0]
```

Rule 6638

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{\text{Si}(a+bx)}{2x^2}+\frac{1}{2}b\int \frac{\sin(a+bx)}{x^2(a+bx)}\,dx \\
&= -\frac{\text{Si}(a+bx)}{2x^2}+\frac{1}{2}b\int \left(\frac{\sin(a+bx)}{ax^2}-\frac{b\sin(a+bx)}{a^2x}+\frac{b^2\sin(a+bx)}{a^2(a+bx)}\right)\,dx \\
&= -\frac{\text{Si}(a+bx)}{2x^2}+\frac{b\int \frac{\sin(a+bx)}{x^2}\,dx}{2a}-\frac{b^2\int \frac{\sin(a+bx)}{x}\,dx}{2a^2}+\frac{b^3\int \frac{\sin(a+bx)}{a+bx}\,dx}{2a^2}
\end{aligned}$$

$$= -\frac{b\sin(a+bx)}{2ax} + \frac{b^2\text{Si}(a+bx)}{2a^2} - \frac{\text{Si}(a+bx)}{2x^2} + \frac{b^2\int\frac{\cos(a+bx)}{x}dx}{2a} - \frac{(b^2\cos(a))\int\frac{\sin(bx)}{x}dx}{2a^2} - \frac{(b^2\sin(a))\int\frac{\cos(bx)}{x}dx}{2a^2}$$

$$= -\frac{b^2\,\text{CosIntegral}(bx)\sin(a)}{2a^2} - \frac{b\sin(a+bx)}{2ax} - \frac{b^2\cos(a)\text{Si}(bx)}{2a^2} + \frac{b^2\text{Si}(a+bx)}{2a^2} - \frac{\text{Si}(a+bx)}{2x^2} + \frac{(b^2\cos(a))\int\frac{\cos(bx)}{x}dx}{2a} - \frac{(b^2\sin(a))\int\frac{\sin(bx)}{x}dx}{2a}$$

$$= \frac{b^2\cos(a)\,\text{CosIntegral}(bx)}{2a} - \frac{b^2\,\text{CosIntegral}(bx)\sin(a)}{2a^2} - \frac{b\sin(a+bx)}{2ax} - \frac{b^2\cos(a)\text{Si}(bx)}{2a^2} - \frac{b^2\sin(a)\text{Si}(bx)}{2a} + \frac{b^2\text{Si}(a+bx)}{2a^2} - \frac{\text{Si}(a+bx)}{2x^2}$$

Mathematica [A] (verified)

Time = 0.23 (sec) , antiderivative size = 84, normalized size of antiderivative = 0.76

$$\int\frac{\text{Si}(a+bx)}{x^3}dx = -\frac{-b^2x^2\,\text{CosIntegral}(bx)(a\cos(a)-\sin(a)) + abx\sin(a+bx) + b^2x^2(\cos(a)+a\sin(a))\text{Si}(bx) + a^2\text{Si}(a+b}{2a^2x^2}$$

```
[In] Integrate[SinIntegral[a + b*x]/x^3,x]
```

```
[Out] -1/2*(-(b^2*x^2*CosIntegral[b*x]*(a*Cos[a] - Sin[a])) + a*b*x*Sin[a + b*x]
+ b^2*x^2*(Cos[a] + a*Sin[a])*SinIntegral[b*x] + a^2*SinIntegral[a + b*x] -
 b^2*x^2*SinIntegral[a + b*x])/(a^2*x^2)
```

Maple [A] (verified)

Time = 0.41 (sec) , antiderivative size = 83, normalized size of antiderivative = 0.75

method	result	size
parts	$-\frac{\text{Si}(bx+a)}{2x^2} + \frac{b^2\left(-\frac{\text{Si}(bx)\cos(a)+\text{Ci}(bx)\sin(a)}{a^2} + \frac{\text{Si}(bx+a)}{a^2} + \frac{-\frac{\sin(bx+a)}{bx} - \text{Si}(bx)\sin(a) + \text{Ci}(bx)\cos(a)}{a}\right)}{2}$	83
derivativedivides	$b^2\left(-\frac{\text{Si}(bx+a)}{2b^2x^2} - \frac{\text{Si}(bx)\cos(a)+\text{Ci}(bx)\sin(a)}{2a^2} + \frac{\text{Si}(bx+a)}{2a^2} + \frac{-\frac{\sin(bx+a)}{bx} - \text{Si}(bx)\sin(a) + \text{Ci}(bx)\cos(a)}{2a}\right)$	86
default	$b^2\left(-\frac{\text{Si}(bx+a)}{2b^2x^2} - \frac{\text{Si}(bx)\cos(a)+\text{Ci}(bx)\sin(a)}{2a^2} + \frac{\text{Si}(bx+a)}{2a^2} + \frac{-\frac{\sin(bx+a)}{bx} - \text{Si}(bx)\sin(a) + \text{Ci}(bx)\cos(a)}{2a}\right)$	86

```
[In] int(Si(b*x+a)/x^3,x,method=_RETURNVERBOSE)
```

```
[Out] -1/2*Si(b*x+a)/x^2+1/2*b^2*(-1/a^2*(Si(b*x)*cos(a)+Ci(b*x)*sin(a))+1/a^2*Si
(b*x+a)+1/a*(-sin(b*x+a)/b/x-Si(b*x)*sin(a)+Ci(b*x)*cos(a)))
```

Fricas [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 96, normalized size of antiderivative = 0.86

$$\int \frac{\mathrm{Si}(a+bx)}{x^3}\,dx = -\frac{abx\sin\left(bx+a\right)-\left(ab^2x^2\,\mathrm{Ci}\left(bx\right)-b^2x^2\,\mathrm{Si}\left(bx\right)\right)\cos\left(a\right)+\left(ab^2x^2\,\mathrm{Si}\left(bx\right)+b^2x^2\,\mathrm{Ci}\left(bx\right)\right)\sin\left(a\right)-(b^2x^2 -}{2\,a^2x^2}$$

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

```
[Out] -1/2*(a*b*x*sin(b*x + a) - (a*b^2*x^2*cos_integral(b*x) - b^2*x^2*sin_integ
ral(b*x))*cos(a) + (a*b^2*x^2*sin_integral(b*x) + b^2*x^2*cos_integral(b*x)
)*sin(a) - (b^2*x^2 - a^2)*sin_integral(b*x + a))/(a^2*x^2)
```

Sympy [F]

$$\int \frac{\mathrm{Si}(a+bx)}{x^3}\,dx = \int \frac{\mathrm{Si}\left(a+bx\right)}{x^3}\,dx$$

```
[In] integrate(Si(b*x+a)/x**3,x)
```

```
[Out] Integral(Si(a + b*x)/x**3, x)
```

Maxima [F]

$$\int \frac{\mathrm{Si}(a+bx)}{x^3}\,dx = \int \frac{\mathrm{Si}\left(bx+a\right)}{x^3}\,dx$$

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

```
[Out] integrate(sin_integral(b*x + a)/x^3, x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.29 (sec) , antiderivative size = 809, normalized size of antiderivative = 7.29

$$\int \frac{\mathrm{Si}(a+bx)}{x^3}\,dx = \text{Too large to display}$$

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

```
[Out] -1/4*(a*b*x*real_part(cos_integral(b*x))*tan(1/2*b*x)^2*tan(1/2*a)^2 + a*b*
x*real_part(cos_integral(-b*x))*tan(1/2*b*x)^2*tan(1/2*a)^2 + 2*a*b*x*imag_
part(cos_integral(b*x))*tan(1/2*b*x)^2*tan(1/2*a) - 2*a*b*x*imag_part(cos_i
ntegral(-b*x))*tan(1/2*b*x)^2*tan(1/2*a) + 4*a*b*x*sin_integral(b*x)*tan(1/
2*b*x)^2*tan(1/2*a) - b*x*imag_part(cos_integral(b*x + a))*tan(1/2*b*x)^2*t
an(1/2*a)^2 - b*x*imag_part(cos_integral(b*x))*tan(1/2*b*x)^2*tan(1/2*a)^2
+ b*x*imag_part(cos_integral(-b*x - a))*tan(1/2*b*x)^2*tan(1/2*a)^2 + b*x*i
mag_part(cos_integral(-b*x))*tan(1/2*b*x)^2*tan(1/2*a)^2 - 2*b*x*sin_integr
al(b*x + a)*tan(1/2*b*x)^2*tan(1/2*a)^2 - 2*b*x*sin_integral(b*x)*tan(1/2*b
*x)^2*tan(1/2*a)^2 - a*b*x*real_part(cos_integral(b*x))*tan(1/2*b*x)^2 - a*
b*x*real_part(cos_integral(-b*x))*tan(1/2*b*x)^2 + 2*b*x*real_part(cos_inte
gral(b*x))*tan(1/2*b*x)^2*tan(1/2*a) + 2*b*x*real_part(cos_integral(-b*x))*
tan(1/2*b*x)^2*tan(1/2*a) + a*b*x*real_part(cos_integral(b*x))*tan(1/2*a)^2
 + a*b*x*real_part(cos_integral(-b*x))*tan(1/2*a)^2 - b*x*imag_part(cos_int
egral(b*x + a))*tan(1/2*b*x)^2 + b*x*imag_part(cos_integral(b*x))*tan(1/2*b
*x)^2 + b*x*imag_part(cos_integral(-b*x - a))*tan(1/2*b*x)^2 - b*x*imag_par
t(cos_integral(-b*x))*tan(1/2*b*x)^2 - 2*b*x*sin_integral(b*x + a)*tan(1/2*
b*x)^2 + 2*b*x*sin_integral(b*x)*tan(1/2*b*x)^2 + 2*a*b*x*imag_part(cos_int
egral(b*x))*tan(1/2*a) - 2*a*b*x*imag_part(cos_integral(-b*x))*tan(1/2*a) +
 4*a*b*x*sin_integral(b*x)*tan(1/2*a) - b*x*imag_part(cos_integral(b*x + a)
)*tan(1/2*a)^2 - b*x*imag_part(cos_integral(b*x))*tan(1/2*a)^2 + b*x*imag_p
art(cos_integral(-b*x - a))*tan(1/2*a)^2 + b*x*imag_part(cos_integral(-b*x)
)*tan(1/2*a)^2 - 2*b*x*sin_integral(b*x + a)*tan(1/2*a)^2 - 2*b*x*sin_integ
ral(b*x)*tan(1/2*a)^2 - a*b*x*real_part(cos_integral(b*x)) - a*b*x*real_par
t(cos_integral(-b*x)) + 2*b*x*real_part(cos_integral(b*x))*tan(1/2*a) + 2*b
*x*real_part(cos_integral(-b*x))*tan(1/2*a) - 4*a*tan(1/2*b*x)^2*tan(1/2*a)
 - 4*a*tan(1/2*b*x)*tan(1/2*a)^2 - b*x*imag_part(cos_integral(b*x + a)) + b
*x*imag_part(cos_integral(b*x)) + b*x*imag_part(cos_integral(-b*x - a)) - b
*x*imag_part(cos_integral(-b*x)) - 2*b*x*sin_integral(b*x + a) + 2*b*x*sin_
integral(b*x) + 4*a*tan(1/2*b*x) + 4*a*tan(1/2*a))*b/(a^2*x*tan(1/2*b*x)^2*
tan(1/2*a)^2 + a^2*x*tan(1/2*b*x)^2 + a^2*x*tan(1/2*a)^2 + a^2*x) - 1/2*sin
_integral(b*x + a)/x^2
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{Si}(a+bx)}{x^3}\,dx=\int \frac{\mathrm{sinint}(a+b\,x)}{x^3}\,dx$$

```
[In] int(sinint(a + b*x)/x^3,x)
[Out] int(sinint(a + b*x)/x^3, x)
```

3.25 $\int x^m \mathbf{Si}(a+bx)^2 \, dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int x^m \mathrm{Si}(a+bx)^2 \, dx = \mathrm{Int}\left(x^m \mathrm{Si}(a+bx)^2, x\right)$$

```
[Out] CannotIntegrate(x^m*Si(b*x+a)^2,x)
```

Rubi [N/A]

Not integrable

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^m \mathrm{Si}(a+bx)^2 \, dx = \int x^m \mathrm{Si}(a+bx)^2 \, dx$$

```
[In] Int[x^m*SinIntegral[a + b*x]^2,x]
[Out] Defer[Int][x^m*SinIntegral[a + b*x]^2, x]
```

Rubi steps

$$\text{integral} = \int x^m \mathrm{Si}(a+bx)^2 \, dx$$

Mathematica [N/A]

Not integrable

Time = 5.47 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int x^m \mathrm{Si}(a+bx)^2 \, dx = \int x^m \mathrm{Si}(a+bx)^2 \, dx$$

```
[In] Integrate[x^m*SinIntegral[a + b*x]^2,x]
[Out] Integrate[x^m*SinIntegral[a + b*x]^2, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int x^{m} \mathrm{Si}\left(b x +a \right)^{2}d x$$

```
[In] int(x^m*Si(b*x+a)^2,x)
[Out] int(x^m*Si(b*x+a)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int x^m \mathrm{Si}(a+bx)^2 \, dx = \int x^{m} \operatorname{Si}\left(b x + a\right)^{2} \,d x$$

```
[In] integrate(x^m*sin_integral(b*x+a)^2,x, algorithm="fricas")
[Out] integral(x^m*sin_integral(b*x + a)^2, x)
```

Sympy [N/A]

Not integrable

Time = 1.14 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int x^m \mathrm{Si}(a+bx)^2 \, dx = \int x^{m} \operatorname{Si}^{2}{\left(a + b x \right)}\, dx$$

```
[In] integrate(x**m*Si(b*x+a)**2,x)
[Out] Integral(x**m*Si(a + b*x)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int x^m \text{Si}(a+bx)^2\,dx = \int x^m\,\text{Si}\,(bx+a)^2\,dx$$

```
[In] integrate(x^m*sin_integral(b*x+a)^2,x, algorithm="maxima")
[Out] integrate(x^m*sin_integral(b*x + a)^2, x)
```

Giac [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int x^m \text{Si}(a+bx)^2\,dx = \int x^m\,\text{Si}\,(bx+a)^2\,dx$$

```
[In] integrate(x^m*sin_integral(b*x+a)^2,x, algorithm="giac")
[Out] integrate(x^m*sin_integral(b*x + a)^2, x)
```

Mupad [N/A]

Not integrable

Time = 5.45 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int x^m \text{Si}(a+bx)^2\,dx = \int x^m\,\text{sinint}(a+b\,x)^2\,dx$$

```
[In] int(x^m*sinint(a + b*x)^2,x)
[Out] int(x^m*sinint(a + b*x)^2, x)
```

3.26 $\int x^2 \mathbf{Si}(a+bx)^2\,dx$

Optimal result

Integrand size = 12, antiderivative size = 329

$$\begin{aligned}\int x^2\text{Si}(a+bx)^2\,dx=&\ \frac{2x}{3b^2}-\frac{a\cos(2a+2bx)}{3b^3}+\frac{x\cos(2a+2bx)}{6b^2}+\frac{a\,\text{CosIntegral}(2a+2bx)}{b^3}\\&-\frac{a\log(a+bx)}{b^3}-\frac{2\cos(a+bx)\sin(a+bx)}{3b^3}-\frac{\sin(2a+2bx)}{12b^3}\\&-\frac{4\cos(a+bx)\text{Si}(a+bx)}{3b^3}+\frac{2a^2\cos(a+bx)\text{Si}(a+bx)}{3b^3}\\&-\frac{2ax\cos(a+bx)\text{Si}(a+bx)}{3b^2}+\frac{2x^2\cos(a+bx)\text{Si}(a+bx)}{3b}\\&+\frac{2a\sin(a+bx)\text{Si}(a+bx)}{3b^3}-\frac{4x\sin(a+bx)\text{Si}(a+bx)}{3b^2}\\&+\frac{a^2(a+bx)\text{Si}(a+bx)^2}{3b^3}-\frac{ax(a+bx)\text{Si}(a+bx)^2}{3b^2}\\&+\frac{x^2(a+bx)\text{Si}(a+bx)^2}{3b}+\frac{2\text{Si}(2a+2bx)}{3b^3}-\frac{a^2\text{Si}(2a+2bx)}{b^3}\end{aligned}$$

```
[Out] 2/3*x/b^2+a*Ci(2*b*x+2*a)/b^3-1/3*a*cos(2*b*x+2*a)/b^3+1/6*x*cos(2*b*x+2*a)
/b^2-a*ln(b*x+a)/b^3-4/3*cos(b*x+a)*Si(b*x+a)/b^3+2/3*a^2*cos(b*x+a)*Si(b*x
+a)/b^3-2/3*a*x*cos(b*x+a)*Si(b*x+a)/b^2+2/3*x^2*cos(b*x+a)*Si(b*x+a)/b+1/3
*a^2*(b*x+a)*Si(b*x+a)^2/b^3-1/3*a*x*(b*x+a)*Si(b*x+a)^2/b^2+1/3*x^2*(b*x+a
)*Si(b*x+a)^2/b+2/3*Si(2*b*x+2*a)/b^3-a^2*Si(2*b*x+2*a)/b^3-2/3*cos(b*x+a)*
sin(b*x+a)/b^3+2/3*a*Si(b*x+a)*sin(b*x+a)/b^3-4/3*x*Si(b*x+a)*sin(b*x+a)/b^
2-1/12*sin(2*b*x+2*a)/b^3
```

Rubi [A] (verified)

Time = 1.12 (sec) , antiderivative size = 329, normalized size of antiderivative = 1.00, number of steps used = 39, number of rules used = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 1.583$, Rules used = {6644, 6648, 4669, 6873, 6874, 2718, 3377, 2717, 3380, 6654, 2715, 8, 3393, 3383, 6646, 4491, 12, 6652, 6640}

$$\begin{aligned}\int x^2\text{Si}(a+bx)^2\,dx = {}& \frac{a^2(a+bx)\text{Si}(a+bx)^2}{3b^3}-\frac{a^2\text{Si}(2a+2bx)}{b^3}+\frac{2a^2\text{Si}(a+bx)\cos(a+bx)}{3b^3}\\&+\frac{a\,\text{CosIntegral}(2a+2bx)}{b^3}+\frac{2\text{Si}(2a+2bx)}{3b^3}\\&+\frac{2a\text{Si}(a+bx)\sin(a+bx)}{3b^3}-\frac{4\text{Si}(a+bx)\cos(a+bx)}{3b^3}-\frac{a\log(a+bx)}{b^3}\\&-\frac{\sin(2a+2bx)}{12b^3}-\frac{a\cos(2a+2bx)}{3b^3}-\frac{2\sin(a+bx)\cos(a+bx)}{3b^3}\\&-\frac{ax(a+bx)\text{Si}(a+bx)^2}{3b^2}-\frac{4x\text{Si}(a+bx)\sin(a+bx)}{3b^2}\\&-\frac{2ax\text{Si}(a+bx)\cos(a+bx)}{3b^2}+\frac{x\cos(2a+2bx)}{6b^2}\\&+\frac{x^2(a+bx)\text{Si}(a+bx)^2}{3b}+\frac{2x^2\text{Si}(a+bx)\cos(a+bx)}{3b}+\frac{2x}{3b^2}\end{aligned}$$

```
[In] Int[x^2*SinIntegral[a + b*x]^2,x]
```

```
[Out] (2*x)/(3*b^2) - (a*Cos[2*a + 2*b*x])/(3*b^3) + (x*Cos[2*a + 2*b*x])/(6*b^2)
 + (a*CosIntegral[2*a + 2*b*x])/b^3 - (a*Log[a + b*x])/b^3 - (2*Cos[a + b*x
]*Sin[a + b*x])/(3*b^3) - Sin[2*a + 2*b*x]/(12*b^3) - (4*Cos[a + b*x]*SinIn
tegral[a + b*x])/(3*b^3) + (2*a^2*Cos[a + b*x]*SinIntegral[a + b*x])/(3*b^3
) - (2*a*x*Cos[a + b*x]*SinIntegral[a + b*x])/(3*b^2) + (2*x^2*Cos[a + b*x]
*SinIntegral[a + b*x])/(3*b) + (2*a*Sin[a + b*x]*SinIntegral[a + b*x])/(3*b
^3) - (4*x*Sin[a + b*x]*SinIntegral[a + b*x])/(3*b^2) + (a^2*(a + b*x)*SinI
ntegral[a + b*x]^2)/(3*b^3) - (a*x*(a + b*x)*SinIntegral[a + b*x]^2)/(3*b^2
) + (x^2*(a + b*x)*SinIntegral[a + b*x]^2)/(3*b) + (2*SinIntegral[2*a + 2*b
*x])/(3*b^3) - (a^2*SinIntegral[2*a + 2*b*x])/b^3
```

Rule 8

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

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 2715

```
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 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 4669

```
Int[Cos[w_]^(p_.)*(u_.)*Sin[v_]^(p_.), x_Symbol] :> Dist[1/2^p, Int[u*Sin[2
*v]^p, x], x] /; EqQ[w, v] && IntegerQ[p]
```

Rule 6640

```
Int[SinIntegral[(a_.) + (b_.)*(x_)]^2, x_Symbol] :> Simp[(a + b*x)*(SinInte
gral[a + b*x]^2/b), x] - Dist[2, Int[Sin[a + b*x]*SinIntegral[a + b*x], x],
 x] /; FreeQ[{a, b}, x]
```

Rule 6644

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

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6648

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

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6654

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

Rule 6873

```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\text{integral} = \frac{x^2(a+bx)\text{Si}(a+bx)^2}{3b} - \frac{2}{3}\int x^2\sin(a+bx)\text{Si}(a+bx)\,dx - \frac{(2a)\int x\text{Si}(a+bx)^2\,dx}{3b}$$

$$= \frac{2x^2\cos(a+bx)\text{Si}(a+bx)}{3b} - \frac{ax(a+bx)\text{Si}(a+bx)^2}{3b^2} + \frac{x^2(a+bx)\text{Si}(a+bx)^2}{3b} - \frac{2}{3}\int\frac{x^2\cos(a+bx)\sin(a+bx)}{a+bx}\,dx + \frac{a^2\int\text{Si}(a+bx)^2\,dx}{3b^2} - \frac{4\int x\cos(a+bx)\text{Si}(a+bx)\,dx}{3b} + \frac{(2a)\int x\sin(a+bx)\text{Si}(a+bx)\,dx}{3b}$$

$$= -\frac{2ax\cos(a+bx)\text{Si}(a+bx)}{3b^2} + \frac{2x^2\cos(a+bx)\text{Si}(a+bx)}{3b} - \frac{4x\sin(a+bx)\text{Si}(a+bx)}{3b^2} + \frac{a^2(a+bx)\text{Si}(a+bx)^2}{3b^3} - \frac{ax(a+bx)\text{Si}(a+bx)^2}{3b^2} + \frac{x^2(a+bx)\text{Si}(a+bx)^2}{3b} - \frac{1}{3}\int\frac{x^2\sin(2(a+bx))}{a+bx}\,dx + \frac{4\int\sin(a+bx)\text{Si}(a+bx)\,dx}{3b^2} + \frac{(2a)\int\cos(a+bx)\text{Si}(a+bx)\,dx}{3b^2} - \frac{(2a^2)\int\sin(a+bx)\text{Si}(a+bx)\,dx}{3b^2} + \frac{4\int\frac{x\sin^2(a+bx)}{a+bx}\,dx}{3b} + \frac{(2a)\int\frac{x\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{3b}$$

$$= -\frac{4\cos(a+bx)\text{Si}(a+bx)}{3b^3} + \frac{2a^2\cos(a+bx)\text{Si}(a+bx)}{3b^3} - \frac{2ax\cos(a+bx)\text{Si}(a+bx)}{3b^2} + \frac{2x^2\cos(a+bx)\text{Si}(a+bx)}{3b} + \frac{2a\sin(a+bx)\text{Si}(a+bx)}{3b^3} - \frac{4x\sin(a+bx)\text{Si}(a+bx)}{3b^2} + \frac{a^2(a+bx)\text{Si}(a+bx)^2}{3b^3} - \frac{ax(a+bx)\text{Si}(a+bx)^2}{3b^2} + \frac{x^2(a+bx)\text{Si}(a+bx)^2}{3b} - \frac{1}{3}\int\frac{x^2\sin(2a+2bx)}{a+bx}\,dx + \frac{4\int\frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{3b^2} - \frac{(2a)\int\frac{\sin^2(a+bx)}{a+bx}\,dx}{3b^2} - \frac{(2a^2)\int\frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{3b^2} + \frac{4\int\left(\frac{\sin^2(a+bx)}{b} - \frac{a\sin^2(a+bx)}{b(a+bx)}\right)dx}{3b} + \frac{a\int\frac{x\sin(2(a+bx))}{a+bx}\,dx}{3b}$$

$$= -\frac{4\cos(a+bx)\mathrm{Si}(a+bx)}{3b^3} + \frac{2a^2\cos(a+bx)\mathrm{Si}(a+bx)}{3b^3} - \frac{2ax\cos(a+bx)\mathrm{Si}(a+bx)}{3b^2}$$
$$+ \frac{2x^2\cos(a+bx)\mathrm{Si}(a+bx)}{3b} + \frac{2a\sin(a+bx)\mathrm{Si}(a+bx)}{3b^3} - \frac{4x\sin(a+bx)\mathrm{Si}(a+bx)}{3b^2}$$
$$+ \frac{a^2(a+bx)\mathrm{Si}(a+bx)^2}{3b^3} - \frac{ax(a+bx)\mathrm{Si}(a+bx)^2}{3b^2} + \frac{x^2(a+bx)\mathrm{Si}(a+bx)^2}{3b}$$
$$- \frac{1}{3}\int \left(-\frac{a\sin(2a+2bx)}{b^2} + \frac{x\sin(2a+2bx)}{b} + \frac{a^2\sin(2a+2bx)}{b^2(a+bx)}\right) dx$$
$$+ \frac{4\int \sin^2(a+bx)\,dx}{3b^2} + \frac{4\int \frac{\sin(2a+2bx)}{2(a+bx)}\,dx}{3b^2} - \frac{(2a)\int \left(\frac{1}{2(a+bx)} - \frac{\cos(2a+2bx)}{2(a+bx)}\right) dx}{3b^2}$$
$$- \frac{(4a)\int \frac{\sin^2(a+bx)}{a+bx}\,dx}{3b^2} - \frac{(2a^2)\int \frac{\sin(2a+2bx)}{2(a+bx)}\,dx}{3b^2} + \frac{a\int \frac{x\sin(2a+2bx)}{a+bx}\,dx}{3b}$$

$$= -\frac{a\log(a+bx)}{3b^3} - \frac{2\cos(a+bx)\sin(a+bx)}{3b^3} - \frac{4\cos(a+bx)\mathrm{Si}(a+bx)}{3b^3}$$
$$+ \frac{2a^2\cos(a+bx)\mathrm{Si}(a+bx)}{3b^3} - \frac{2ax\cos(a+bx)\mathrm{Si}(a+bx)}{3b^2}$$
$$+ \frac{2x^2\cos(a+bx)\mathrm{Si}(a+bx)}{3b} + \frac{2a\sin(a+bx)\mathrm{Si}(a+bx)}{3b^3} - \frac{4x\sin(a+bx)\mathrm{Si}(a+bx)}{3b^2}$$
$$+ \frac{a^2(a+bx)\mathrm{Si}(a+bx)^2}{3b^3} - \frac{ax(a+bx)\mathrm{Si}(a+bx)^2}{3b^2} + \frac{x^2(a+bx)\mathrm{Si}(a+bx)^2}{3b}$$
$$+ \frac{2\int 1\,dx}{3b^2} + \frac{2\int \frac{\sin(2a+2bx)}{a+bx}\,dx}{3b^2} + \frac{a\int \frac{\cos(2a+2bx)}{a+bx}\,dx}{3b^2} + \frac{a\int \sin(2a+2bx)\,dx}{3b^2}$$
$$- \frac{(4a)\int \left(\frac{1}{2(a+bx)} - \frac{\cos(2a+2bx)}{2(a+bx)}\right) dx}{3b^2} - 2\frac{a^2\int \frac{\sin(2a+2bx)}{a+bx}\,dx}{3b^2}$$
$$- \frac{\int x\sin(2a+2bx)\,dx}{3b} + \frac{a\int \left(\frac{\sin(2a+2bx)}{b} + \frac{a\sin(2a+2bx)}{b(-a-bx)}\right) dx}{3b}$$

$$= \frac{2x}{3b^2} - \frac{a\cos(2a+2bx)}{6b^3} + \frac{x\cos(2a+2bx)}{6b^2} + \frac{a\,\mathrm{CosIntegral}(2a+2bx)}{3b^3}$$
$$- \frac{a\log(a+bx)}{b^3} - \frac{2\cos(a+bx)\sin(a+bx)}{3b^3} - \frac{4\cos(a+bx)\mathrm{Si}(a+bx)}{3b^3}$$
$$+ \frac{2a^2\cos(a+bx)\mathrm{Si}(a+bx)}{3b^3} - \frac{2ax\cos(a+bx)\mathrm{Si}(a+bx)}{3b^2}$$
$$+ \frac{2x^2\cos(a+bx)\mathrm{Si}(a+bx)}{3b} + \frac{2a\sin(a+bx)\mathrm{Si}(a+bx)}{3b^3} - \frac{4x\sin(a+bx)\mathrm{Si}(a+bx)}{3b^2}$$
$$+ \frac{a^2(a+bx)\mathrm{Si}(a+bx)^2}{3b^3} - \frac{ax(a+bx)\mathrm{Si}(a+bx)^2}{3b^2} + \frac{x^2(a+bx)\mathrm{Si}(a+bx)^2}{3b}$$
$$+ \frac{2\mathrm{Si}(2a+2bx)}{3b^3} - \frac{2a^2\mathrm{Si}(2a+2bx)}{3b^3} - \frac{\int \cos(2a+2bx)\,dx}{6b^2}$$
$$+ \frac{a\int \sin(2a+2bx)\,dx}{3b^2} + \frac{(2a)\int \frac{\cos(2a+2bx)}{a+bx}\,dx}{3b^2} + \frac{a^2\int \frac{\sin(2a+2bx)}{-a-bx}\,dx}{3b^2}$$

$$= \frac{2x}{3b^2} - \frac{a\cos(2a+2bx)}{3b^3} + \frac{x\cos(2a+2bx)}{6b^2} + \frac{a\,\text{CosIntegral}(2a+2bx)}{b^3} - \frac{a\log(a+bx)}{b^3} - \frac{2\cos(a+bx)\sin(a+bx)}{3b^3} - \frac{\sin(2a+2bx)}{12b^3} - \frac{4\cos(a+bx)\text{Si}(a+bx)}{3b^3} + \frac{2a^2\cos(a+bx)\text{Si}(a+bx)}{3b^3} - \frac{2ax\cos(a+bx)\text{Si}(a+bx)}{3b^2} + \frac{2x^2\cos(a+bx)\text{Si}(a+bx)}{3b} + \frac{2a\sin(a+bx)\text{Si}(a+bx)}{3b^3} - \frac{4x\sin(a+bx)\text{Si}(a+bx)}{3b^2} + \frac{a^2(a+bx)\text{Si}(a+bx)^2}{3b^3} - \frac{ax(a+bx)\text{Si}(a+bx)^2}{3b^2} + \frac{x^2(a+bx)\text{Si}(a+bx)^2}{3b} + \frac{2\text{Si}(2a+2bx)}{3b^3} - \frac{a^2\text{Si}(2a+2bx)}{b^3}$$

Mathematica [A] (verified)

Time = 1.25 (sec) , antiderivative size = 158, normalized size of antiderivative = 0.48

$$\int x^2\text{Si}(a+bx)^2\,dx = \frac{8a+8bx-4a\cos(2(a+bx))+2bx\cos(2(a+bx))+12a\,\text{CosIntegral}(2(a+bx))-12a\log(a+bx)-5\,\text{si}}{}$$

```
[In] Integrate[x^2*SinIntegral[a + b*x]^2,x]
```

```
[Out] (8*a + 8*b*x - 4*a*Cos[2*(a + b*x)] + 2*b*x*Cos[2*(a + b*x)] + 12*a*CosInte
gral[2*(a + b*x)] - 12*a*Log[a + b*x] - 5*Sin[2*(a + b*x)] + 8*((-2 + a^2 -
 a*b*x + b^2*x^2)*Cos[a + b*x] + (a - 2*b*x)*Sin[a + b*x])*SinIntegral[a +
b*x] + 4*(a^3 + b^3*x^3)*SinIntegral[a + b*x]^2 + 8*SinIntegral[2*(a + b*x)
] - 12*a^2*SinIntegral[2*(a + b*x)])/(12*b^3)
```

Maple [F]

$$\int x^2\,\text{Si}\,(bx+a)^2\,dx$$

```
[In] int(x^2*Si(b*x+a)^2,x)
```

```
[Out] int(x^2*Si(b*x+a)^2,x)
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 151, normalized size of antiderivative = 0.46

$$\int x^2 \text{Si}(a+bx)^2\, dx = \frac{2\,(bx-2\,a)\cos\left(bx+a\right)^2+4\,(b^2x^2-abx+a^2-2)\cos\left(bx+a\right)\text{Si}\left(bx+a\right)+2\,(b^3x^3+a^3)\,\text{Si}\left(bx+a\right)^2+3$$

```
[In] integrate(x^2*sin_integral(b*x+a)^2,x, algorithm="fricas")
```

```
[Out] 1/6*(2*(b*x - 2*a)*cos(b*x + a)^2 + 4*(b^2*x^2 - a*b*x + a^2 - 2)*cos(b*x +
 a)*sin_integral(b*x + a) + 2*(b^3*x^3 + a^3)*sin_integral(b*x + a)^2 + 3*b
*x + 6*a*cos_integral(2*b*x + 2*a) - 6*a*log(b*x + a) - (4*(2*b*x - a)*sin_
integral(b*x + a) + 5*cos(b*x + a))*sin(b*x + a) - 2*(3*a^2 - 2)*sin_integr
al(2*b*x + 2*a))/b^3
```

Sympy [F]

$$\int x^2 \text{Si}(a+bx)^2\, dx = \int x^2\, \text{Si}^2\left(a+bx\right) dx$$

```
[In] integrate(x**2*Si(b*x+a)**2,x)
```

```
[Out] Integral(x**2*Si(a + b*x)**2, x)
```

Maxima [F]

$$\int x^2 \text{Si}(a+bx)^2\, dx = \int x^2\, \text{Si}\left(bx+a\right)^2\, dx$$

```
[In] integrate(x^2*sin_integral(b*x+a)^2,x, algorithm="maxima")
```

```
[Out] integrate(x^2*sin_integral(b*x + a)^2, x)
```

Giac [F]

$$\int x^2 \text{Si}(a+bx)^2 \, dx = \int x^2 \, \text{Si}\left(bx+a\right)^2 \, dx$$

```
[In] integrate(x^2*sin_integral(b*x+a)^2,x, algorithm="giac")
[Out] integrate(x^2*sin_integral(b*x + a)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \text{Si}(a+bx)^2 \, dx = \int x^2 \, \text{sinint}(a+b\,x)^2 \, dx$$

```
[In] int(x^2*sinint(a + b*x)^2,x)
[Out] int(x^2*sinint(a + b*x)^2, x)
```

3.27 $\int x\mathbf{Si}(a+bx)^2\,dx$

Optimal result

Integrand size = 10, antiderivative size = 154

$$\int x\text{Si}(a+bx)^2\,dx=\frac{\cos(2a+2bx)}{4b^2}-\frac{\text{CosIntegral}(2a+2bx)}{2b^2}+\frac{\log(a+bx)}{2b^2}-\frac{a\cos(a+bx)\text{Si}(a+bx)}{b^2}+\frac{x\cos(a+bx)\text{Si}(a+bx)}{b}-\frac{\sin(a+bx)\text{Si}(a+bx)}{b^2}-\frac{a(a+bx)\text{Si}(a+bx)^2}{2b^2}+\frac{x(a+bx)\text{Si}(a+bx)^2}{2b}+\frac{a\text{Si}(2a+2bx)}{b^2}$$

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

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 17, number of rules used = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 1.400, Rules used = {6644, 6648, 4669, 6873, 6874, 2718, 3380, 6652, 3393, 3383, 6640, 6646, 4491, 12}

$$\int x\text{Si}(a+bx)^2\,dx=-\frac{\text{CosIntegral}(2a+2bx)}{2b^2}-\frac{a(a+bx)\text{Si}(a+bx)^2}{2b^2}+\frac{a\text{Si}(2a+2bx)}{b^2}-\frac{\text{Si}(a+bx)\sin(a+bx)}{b^2}-\frac{a\text{Si}(a+bx)\cos(a+bx)}{b^2}+\frac{\log(a+bx)}{2b^2}+\frac{\cos(2a+2bx)}{4b^2}+\frac{x(a+bx)\text{Si}(a+bx)^2}{2b}+\frac{x\text{Si}(a+bx)\cos(a+bx)}{b}$$

```
[In] Int[x*SinIntegral[a + b*x]^2,x]
```

```
[Out] Cos[2*a + 2*b*x]/(4*b^2) - CosIntegral[2*a + 2*b*x]/(2*b^2) + Log[a + b*x]/
(2*b^2) - (a*Cos[a + b*x]*SinIntegral[a + b*x])/b^2 + (x*Cos[a + b*x]*SinIn
tegral[a + b*x])/b - (Sin[a + b*x]*SinIntegral[a + b*x])/b^2 - (a*(a + b*x)
*SinIntegral[a + b*x]^2)/(2*b^2) + (x*(a + b*x)*SinIntegral[a + b*x]^2)/(2*
b) + (a*SinIntegral[2*a + 2*b*x])/b^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 2718

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

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 4669

```
Int[Cos[w_]^(p_.)*(u_.)*Sin[v_]^(p_.), x_Symbol] :> Dist[1/2^p, Int[u*Sin[2
*v]^p, x], x] /; EqQ[w, v] && IntegerQ[p]
```

Rule 6640

```
Int[SinIntegral[(a_.) + (b_.)*(x_)]^2, x_Symbol] :> Simp[(a + b*x)*(SinInte
gral[a + b*x]^2/b), x] - Dist[2, Int[Sin[a + b*x]*SinIntegral[a + b*x], x],
 x] /; FreeQ[{a, b}, x]
```

Rule 6644

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

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6648

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

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6873

```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\text{integral} = \frac{x(a+bx)\text{Si}(a+bx)^2}{2b} - \frac{a\int \text{Si}(a+bx)^2\,dx}{2b} - \int x\sin(a+bx)\text{Si}(a+bx)\,dx$$

$$= \frac{x\cos(a+bx)\mathrm{Si}(a+bx)}{b} - \frac{a(a+bx)\mathrm{Si}(a+bx)^2}{2b^2} + \frac{x(a+bx)\mathrm{Si}(a+bx)^2}{2b} - \frac{\int \cos(a+bx)\mathrm{Si}(a+bx)\,dx}{b} + \frac{a\int \sin(a+bx)\mathrm{Si}(a+bx)\,dx}{b} - \int \frac{x\cos(a+bx)\sin(a+bx)}{a+bx}\,dx$$

$$= -\frac{a\cos(a+bx)\mathrm{Si}(a+bx)}{b^2} + \frac{x\cos(a+bx)\mathrm{Si}(a+bx)}{b} - \frac{\sin(a+bx)\mathrm{Si}(a+bx)}{b^2} - \frac{a(a+bx)\mathrm{Si}(a+bx)^2}{2b^2} + \frac{x(a+bx)\mathrm{Si}(a+bx)^2}{2b} - \frac{1}{2}\int \frac{x\sin(2(a+bx))}{a+bx}\,dx + \frac{\int \frac{\sin^2(a+bx)}{a+bx}\,dx}{b} + \frac{a\int \frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{b}$$

$$= -\frac{a\cos(a+bx)\mathrm{Si}(a+bx)}{b^2} + \frac{x\cos(a+bx)\mathrm{Si}(a+bx)}{b} - \frac{\sin(a+bx)\mathrm{Si}(a+bx)}{b^2} - \frac{a(a+bx)\mathrm{Si}(a+bx)^2}{2b^2} + \frac{x(a+bx)\mathrm{Si}(a+bx)^2}{2b} - \frac{1}{2}\int \frac{x\sin(2a+2bx)}{a+bx}\,dx + \frac{\int \left(\frac{1}{2(a+bx)} - \frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{b} + \frac{a\int \frac{\sin(2a+2bx)}{2(a+bx)}\,dx}{b}$$

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

$$= -\frac{\mathrm{CosIntegral}(2a+2bx)}{2b^2} + \frac{\log(a+bx)}{2b^2} - \frac{a\cos(a+bx)\mathrm{Si}(a+bx)}{b^2} + \frac{x\cos(a+bx)\mathrm{Si}(a+bx)}{b} - \frac{\sin(a+bx)\mathrm{Si}(a+bx)}{b^2} - \frac{a(a+bx)\mathrm{Si}(a+bx)^2}{2b^2} + \frac{x(a+bx)\mathrm{Si}(a+bx)^2}{2b} + \frac{a\mathrm{Si}(2a+2bx)}{2b^2} - \frac{\int \sin(2a+2bx)\,dx}{2b} - \frac{a\int \frac{\sin(2a+2bx)}{-a-bx}\,dx}{2b}$$

$$= \frac{\cos(2a+2bx)}{4b^2} - \frac{\mathrm{CosIntegral}(2a+2bx)}{2b^2} + \frac{\log(a+bx)}{2b^2} - \frac{a\cos(a+bx)\mathrm{Si}(a+bx)}{b^2} + \frac{x\cos(a+bx)\mathrm{Si}(a+bx)}{b} - \frac{\sin(a+bx)\mathrm{Si}(a+bx)}{b^2} - \frac{a(a+bx)\mathrm{Si}(a+bx)^2}{2b^2} + \frac{x(a+bx)\mathrm{Si}(a+bx)^2}{2b} + \frac{a\mathrm{Si}(2a+2bx)}{b^2}$$

Mathematica [A] (verified)

Time = 0.33 (sec) , antiderivative size = 95, normalized size of antiderivative = 0.62

$$\int x\text{Si}(a+bx)^2\,dx$$
$$=\frac{\cos(2(a+bx))-2\,\text{CosIntegral}(2(a+bx))+2\log(a+bx)-4((a-bx)\cos(a+bx)+\sin(a+bx))\text{Si}(a+b}{4b^2}$$

```
[In] Integrate[x*SinIntegral[a + b*x]^2,x]
```

```
[Out] (Cos[2*(a + b*x)] - 2*CosIntegral[2*(a + b*x)] + 2*Log[a + b*x] - 4*((a - b
*x)*Cos[a + b*x] + Sin[a + b*x])*SinIntegral[a + b*x] - 2*(a^2 - b^2*x^2)*S
inIntegral[a + b*x]^2 + 4*a*SinIntegral[2*(a + b*x)])/(4*b^2)
```

Maple [A] (verified)

Time = 0.86 (sec) , antiderivative size = 111, normalized size of antiderivative = 0.72

method	result
derivativedivides	$\frac{\text{Si}(bx+a)^2\left(-(bx+a)a+\frac{(bx+a)^2}{2}\right)-2\,\text{Si}(bx+a)\left(a\cos(bx+a)+\frac{\sin(bx+a)}{2}-\frac{(bx+a)\cos(bx+a)}{2}\right)+a\,\text{Si}(2bx+2a)+\frac{\ln(bx+a)}{2}-\text{C}}{b^2}$
default	$\frac{\text{Si}(bx+a)^2\left(-(bx+a)a+\frac{(bx+a)^2}{2}\right)-2\,\text{Si}(bx+a)\left(a\cos(bx+a)+\frac{\sin(bx+a)}{2}-\frac{(bx+a)\cos(bx+a)}{2}\right)+a\,\text{Si}(2bx+2a)+\frac{\ln(bx+a)}{2}-\text{C}}{b^2}$

```
[In] int(x*Si(b*x+a)^2,x,method=_RETURNVERBOSE)
```

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

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 100, normalized size of antiderivative = 0.65

$$\int x\text{Si}(a+bx)^2\,dx$$
$$=\frac{2\,(bx-a)\cos\left(bx+a\right)\text{Si}\left(bx+a\right)+\left(b^2x^2-a^2\right)\text{Si}\left(bx+a\right)^2+\cos\left(bx+a\right)^2+2\,a\,\text{Si}\left(2\,bx+2\,a\right)-2\,\sin\left(bx\right.}{2\,b^2}$$

```
[In] integrate(x*sin_integral(b*x+a)^2,x, algorithm="fricas")
```

```
[Out] 1/2*(2*(b*x - a)*cos(b*x + a)*sin_integral(b*x + a) + (b^2*x^2 - a^2)*sin_i
ntegral(b*x + a)^2 + cos(b*x + a)^2 + 2*a*sin_integral(2*b*x + 2*a) - 2*sin
```

```
(b*x + a)*sin_integral(b*x + a) - cos_integral(2*b*x + 2*a) + log(b*x + a))
/b^2
```

Sympy [F]

$$\int x\text{Si}(a+bx)^2\,dx = \int x\,\text{Si}^2\,(a+bx)\,dx$$

```
[In] integrate(x*Si(b*x+a)**2,x)
[Out] Integral(x*Si(a + b*x)**2, x)
```

Maxima [F]

$$\int x\text{Si}(a+bx)^2\,dx = \int x\,\text{Si}\,(bx+a)^2\,dx$$

```
[In] integrate(x*sin_integral(b*x+a)^2,x, algorithm="maxima")
[Out] integrate(x*sin_integral(b*x + a)^2, x)
```

Giac [F]

$$\int x\text{Si}(a+bx)^2\,dx = \int x\,\text{Si}\,(bx+a)^2\,dx$$

```
[In] integrate(x*sin_integral(b*x+a)^2,x, algorithm="giac")
[Out] integrate(x*sin_integral(b*x + a)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int x\text{Si}(a+bx)^2\,dx = \int x\,\text{sinint}(a+b\,x)^2\,dx$$

```
[In] int(x*sinint(a + b*x)^2,x)
[Out] int(x*sinint(a + b*x)^2, x)
```

3.28 $\int \mathrm{Si}(a+bx)^2\,dx$

Optimal result

Integrand size = 8, antiderivative size = 49

$$\int \mathrm{Si}(a+bx)^2\,dx=\frac{2\cos(a+bx)\mathrm{Si}(a+bx)}{b}+\frac{(a+bx)\mathrm{Si}(a+bx)^2}{b}-\frac{\mathrm{Si}(2a+2bx)}{b}$$

```
[Out] 2*cos(b*x+a)*Si(b*x+a)/b+(b*x+a)*Si(b*x+a)^2/b-Si(2*b*x+2*a)/b
```

Rubi [A] (verified)

Time = 0.05 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {6640, 6646, 4491, 12, 3380}

$$\int \mathrm{Si}(a+bx)^2\,dx=\frac{(a+bx)\mathrm{Si}(a+bx)^2}{b}-\frac{\mathrm{Si}(2a+2bx)}{b}+\frac{2\mathrm{Si}(a+bx)\cos(a+bx)}{b}$$

```
[In] Int[SinIntegral[a + b*x]^2,x]
```

```
[Out] (2*Cos[a + b*x]*SinIntegral[a + b*x])/b + ((a + b*x)*SinIntegral[a + b*x]^2
)/b - SinIntegral[2*a + 2*b*x]/b
```

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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6640

```
Int[SinIntegral[(a_.) + (b_.)*(x_)]^2, x_Symbol] :> Simp[(a + b*x)*(SinInte
gral[a + b*x]^2/b), x] - Dist[2, Int[Sin[a + b*x]*SinIntegral[a + b*x], x],
 x] /; FreeQ[{a, b}, x]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{(a+bx)\text{Si}(a+bx)^2}{b} - 2\int \sin(a+bx)\text{Si}(a+bx)\,dx \\
&= \frac{2\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{(a+bx)\text{Si}(a+bx)^2}{b} - 2\int \frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx \\
&= \frac{2\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{(a+bx)\text{Si}(a+bx)^2}{b} - 2\int \frac{\sin(2a+2bx)}{2(a+bx)}\,dx \\
&= \frac{2\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{(a+bx)\text{Si}(a+bx)^2}{b} - \int \frac{\sin(2a+2bx)}{a+bx}\,dx \\
&= \frac{2\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{(a+bx)\text{Si}(a+bx)^2}{b} - \frac{\text{Si}(2a+2bx)}{b}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.88

$$\int \text{Si}(a+bx)^2\,dx = \frac{2\cos(a+bx)\text{Si}(a+bx) + (a+bx)\text{Si}(a+bx)^2 - \text{Si}(2(a+bx))}{b}$$

```
[In] Integrate[SinIntegral[a + b*x]^2,x]
[Out] (2*Cos[a + b*x]*SinIntegral[a + b*x] + (a + b*x)*SinIntegral[a + b*x]^2 - S
inIntegral[2*(a + b*x)])/b
```

Maple [A] (verified)

Time = 0.43 (sec) , antiderivative size = 45, normalized size of antiderivative = 0.92

method	result	size
derivativedivides	$\frac{\mathrm{Si}(bx+a)^2(bx+a)+2\cos(bx+a)\,\mathrm{Si}(bx+a)-\mathrm{Si}(2bx+2a)}{b}$	45
default	$\frac{\mathrm{Si}(bx+a)^2(bx+a)+2\cos(bx+a)\,\mathrm{Si}(bx+a)-\mathrm{Si}(2bx+2a)}{b}$	45

```
[In] int(Si(b*x+a)^2,x,method=_RETURNVERBOSE)
[Out] 1/b*(Si(b*x+a)^2*(b*x+a)+2*cos(b*x+a)*Si(b*x+a)-Si(2*b*x+2*a))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.90

$$\int \mathrm{Si}(a+bx)^2\,dx = \frac{(bx+a)\,\mathrm{Si}\,(bx+a)^2+2\,\cos\,(bx+a)\,\mathrm{Si}\,(bx+a)-\mathrm{Si}\,(2\,bx+2\,a)}{b}$$

```
[In] integrate(sin_integral(b*x+a)^2,x, algorithm="fricas")
[Out] ((b*x + a)*sin_integral(b*x + a)^2 + 2*cos(b*x + a)*sin_integral(b*x + a) -
 sin_integral(2*b*x + 2*a))/b
```

Sympy [F]

$$\int \mathrm{Si}(a+bx)^2\,dx = \int \mathrm{Si}^2\,(a+bx)\,dx$$

```
[In] integrate(Si(b*x+a)**2,x)
[Out] Integral(Si(a + b*x)**2, x)
```

Maxima [F]

$$\int \mathrm{Si}(a+bx)^2\,dx = \int \mathrm{Si}\,(bx+a)^2\,dx$$

```
[In] integrate(sin_integral(b*x+a)^2,x, algorithm="maxima")
[Out] integrate(sin_integral(b*x + a)^2, x)
```

Giac [F]

$$\int \text{Si}(a+bx)^2\,dx = \int \text{Si}\,(bx+a)^2\,dx$$

```
[In] integrate(sin_integral(b*x+a)^2,x, algorithm="giac")
[Out] integrate(sin_integral(b*x + a)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \text{Si}(a+bx)^2\,dx = \int \text{sinint}(a+b\,x)^2\,dx$$

```
[In] int(sinint(a + b*x)^2,x)
[Out] int(sinint(a + b*x)^2, x)
```

3.29 $\int \frac{\mathbf{Si}(a+bx)^2}{x}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int \frac{\operatorname{Si}(a+bx)^2}{x}\,dx = \operatorname{Int}\left(\frac{\operatorname{Si}(a+bx)^2}{x},x\right)$$

```
[Out] CannotIntegrate(Si(b*x+a)^2/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\operatorname{Si}(a+bx)^2}{x}\,dx = \int \frac{\operatorname{Si}(a+bx)^2}{x}\,dx$$

```
[In] Int[SinIntegral[a + b*x]^2/x,x]
```

```
[Out] Defer[Int][SinIntegral[a + b*x]^2/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\operatorname{Si}(a+bx)^2}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 2.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{Si}(a+bx)^2}{x}\,dx=\int \frac{\text{Si}(a+bx)^2}{x}\,dx$$

```
[In] Integrate[SinIntegral[a + b*x]^2/x,x]
[Out] Integrate[SinIntegral[a + b*x]^2/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.10 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\text{Si}\left(bx+a\right)^{2}}{x}dx$$

```
[In] int(Si(b*x+a)^2/x,x)
[Out] int(Si(b*x+a)^2/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{Si}(a+bx)^2}{x}\,dx=\int \frac{\text{Si}\left(bx+a\right)^{2}}{x}\,dx$$

```
[In] integrate(sin_integral(b*x+a)^2/x,x, algorithm="fricas")
[Out] integral(sin_integral(b*x + a)^2/x, x)
```

Sympy [N/A]

Not integrable

Time = 0.36 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \frac{\text{Si}(a+bx)^2}{x}\,dx=\int \frac{\text{Si}^{2}\left(a+bx\right)}{x}\,dx$$

```
[In] integrate(Si(b*x+a)**2/x,x)
[Out] Integral(Si(a + b*x)**2/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{Si}(a+bx)^2}{x}\,dx = \int \frac{\text{Si}\,(bx+a)^2}{x}\,dx$$

```
[In] integrate(sin_integral(b*x+a)^2/x,x, algorithm="maxima")
[Out] integrate(sin_integral(b*x + a)^2/x, x)
```

Giac [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{Si}(a+bx)^2}{x}\,dx = \int \frac{\text{Si}\,(bx+a)^2}{x}\,dx$$

```
[In] integrate(sin_integral(b*x+a)^2/x,x, algorithm="giac")
[Out] integrate(sin_integral(b*x + a)^2/x, x)
```

Mupad [N/A]

Not integrable

Time = 4.92 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{Si}(a+bx)^2}{x}\,dx = \int \frac{\text{sinint}(a+b\,x)^2}{x}\,dx$$

```
[In] int(sinint(a + b*x)^2/x,x)
[Out] int(sinint(a + b*x)^2/x, x)
```

3.30 $\int \frac{\mathbf{Si}(a+bx)^2}{x^2} dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int \frac{\text{Si}(a+bx)^2}{x^2} dx = \text{Int}\left(\frac{\text{Si}(a+bx)^2}{x^2}, x\right)$$

```
[Out] CannotIntegrate(Si(b*x+a)^2/x^2,x)
```

Rubi [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\text{Si}(a+bx)^2}{x^2} dx = \int \frac{\text{Si}(a+bx)^2}{x^2} dx$$

```
[In] Int[SinIntegral[a + b*x]^2/x^2,x]
```

```
[Out] Defer[Int][SinIntegral[a + b*x]^2/x^2, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{Si}(a+bx)^2}{x^2} dx$$

Mathematica [N/A]

Not integrable

Time = 3.67 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\mathrm{Si}(a+bx)^2}{x^2}\,dx=\int \frac{\mathrm{Si}(a+bx)^2}{x^2}\,dx$$

```
[In] Integrate[SinIntegral[a + b*x]^2/x^2,x]
[Out] Integrate[SinIntegral[a + b*x]^2/x^2, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.18 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\mathrm{Si}\left(bx+a\right)^{2}}{x^{2}}dx$$

```
[In] int(Si(b*x+a)^2/x^2,x)
[Out] int(Si(b*x+a)^2/x^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\mathrm{Si}(a+bx)^2}{x^2}\,dx=\int \frac{\mathrm{Si}\left(bx+a\right)^{2}}{x^2}\,dx$$

```
[In] integrate(sin_integral(b*x+a)^2/x^2,x, algorithm="fricas")
[Out] integral(sin_integral(b*x + a)^2/x^2, x)
```

Sympy [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\mathrm{Si}(a+bx)^2}{x^2}\,dx=\int \frac{\mathrm{Si}^{2}\left(a+bx\right)}{x^2}\,dx$$

```
[In] integrate(Si(b*x+a)**2/x**2,x)
[Out] Integral(Si(a + b*x)**2/x**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\mathrm{Si}(a+bx)^2}{x^2}\,dx = \int \frac{\mathrm{Si}\,(bx+a)^2}{x^2}\,dx$$

```
[In] integrate(sin_integral(b*x+a)^2/x^2,x, algorithm="maxima")
[Out] integrate(sin_integral(b*x + a)^2/x^2, x)
```

Giac [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\mathrm{Si}(a+bx)^2}{x^2}\,dx = \int \frac{\mathrm{Si}\,(bx+a)^2}{x^2}\,dx$$

```
[In] integrate(sin_integral(b*x+a)^2/x^2,x, algorithm="giac")
[Out] integrate(sin_integral(b*x + a)^2/x^2, x)
```

Mupad [N/A]

Not integrable

Time = 4.85 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\mathrm{Si}(a+bx)^2}{x^2}\,dx = \int \frac{\mathrm{sinint}(a+b\,x)^2}{x^2}\,dx$$

```
[In] int(sinint(a + b*x)^2/x^2,x)
[Out] int(sinint(a + b*x)^2/x^2, x)
```

3.31 $\int \frac{\mathbf{Si}(a+bx)^2}{x^3} \, dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int \frac{\text{Si}(a+bx)^2}{x^3} \, dx = \text{Int}\left(\frac{\text{Si}(a+bx)^2}{x^3}, x\right)$$

```
[Out] CannotIntegrate(Si(b*x+a)^2/x^3,x)
```

Rubi [N/A]

Not integrable

Time = 0.04 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\text{Si}(a+bx)^2}{x^3} \, dx = \int \frac{\text{Si}(a+bx)^2}{x^3} \, dx$$

```
[In] Int[SinIntegral[a + b*x]^2/x^3,x]
```

```
[Out] Defer[Int][SinIntegral[a + b*x]^2/x^3, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{Si}(a+bx)^2}{x^3} \, dx$$

Mathematica [N/A]

Not integrable

Time = 1.65 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{Si}(a+bx)^2}{x^3}\,dx=\int \frac{\text{Si}(a+bx)^2}{x^3}\,dx$$

```
[In] Integrate[SinIntegral[a + b*x]^2/x^3,x]
[Out] Integrate[SinIntegral[a + b*x]^2/x^3, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.18 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\text{Si}\left(bx+a\right)^{2}}{x^{3}}dx$$

```
[In] int(Si(b*x+a)^2/x^3,x)
[Out] int(Si(b*x+a)^2/x^3,x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{Si}(a+bx)^2}{x^3}\,dx=\int \frac{\text{Si}\left(bx+a\right)^{2}}{x^3}\,dx$$

```
[In] integrate(sin_integral(b*x+a)^2/x^3,x, algorithm="fricas")
[Out] integral(sin_integral(b*x + a)^2/x^3, x)
```

Sympy [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\text{Si}(a+bx)^2}{x^3}\,dx=\int \frac{\text{Si}^{2}\left(a+bx\right)}{x^3}\,dx$$

```
[In] integrate(Si(b*x+a)**2/x**3,x)
[Out] Integral(Si(a + b*x)**2/x**3, x)
```

Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\mathrm{Si}(a+bx)^2}{x^3}\,dx = \int \frac{\mathrm{Si}\left(bx+a\right)^2}{x^3}\,dx$$

```
[In] integrate(sin_integral(b*x+a)^2/x^3,x, algorithm="maxima")
[Out] integrate(sin_integral(b*x + a)^2/x^3, x)
```

Giac [N/A]

Not integrable

Time = 0.35 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\mathrm{Si}(a+bx)^2}{x^3}\,dx = \int \frac{\mathrm{Si}\left(bx+a\right)^2}{x^3}\,dx$$

```
[In] integrate(sin_integral(b*x+a)^2/x^3,x, algorithm="giac")
[Out] integrate(sin_integral(b*x + a)^2/x^3, x)
```

Mupad [N/A]

Not integrable

Time = 4.85 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\mathrm{Si}(a+bx)^2}{x^3}\,dx = \int \frac{\mathrm{sinint}(a+b\,x)^2}{x^3}\,dx$$

```
[In] int(sinint(a + b*x)^2/x^3,x)
[Out] int(sinint(a + b*x)^2/x^3, x)
```

3.32 $\int x^2\mathbf{Si}(d(a+b\log(cx^n)))\,dx$

Optimal result

Integrand size = 17, antiderivative size = 137

$$\int x^2\text{Si}(d(a+b\log(cx^n)))\,dx = -\frac{1}{6}ie^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\,\text{ExpIntegralEi}\left(\frac{(3-ibdn)(a+b\log(cx^n))}{bn}\right) + \frac{1}{6}ie^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\,\text{ExpIntegralEi}\left(\frac{(3+ibdn)(a+b\log(cx^n))}{bn}\right) + \frac{1}{3}x^3\text{Si}(d(a+b\log(cx^n)))$$

```
[Out] -1/6*I*x^3*Ei((3-I*b*d*n)*(a+b*ln(c*x^n))/b/n)/exp(3*a/b/n)/((c*x^n)^(3/n))
+1/6*I*x^3*Ei((3+I*b*d*n)*(a+b*ln(c*x^n))/b/n)/exp(3*a/b/n)/((c*x^n)^(3/n))
+1/3*x^3*Si(d*(a+b*ln(c*x^n)))
```

Rubi [A] (verified)

Time = 0.21 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294, Rules used = {6661, 12, 4585, 2347, 2209}

$$\int x^2\text{Si}(d(a+b\log(cx^n)))\,dx = -\frac{1}{6}ix^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\,\text{ExpIntegralEi}\left(\frac{(3-ibdn)(a+b\log(cx^n))}{bn}\right) + \frac{1}{6}ix^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\,\text{ExpIntegralEi}\left(\frac{(ibdn+3)(a+b\log(cx^n))}{bn}\right) + \frac{1}{3}x^3\text{Si}(d(a+b\log(cx^n)))$$

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

```
[Out] ((-1/6*I)*x^3*ExpIntegralEi[((3 - I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)])/(E^(
(3*a)/(b*n))*(c*x^n)^(3/n)) + ((I/6)*x^3*ExpIntegralEi[((3 + I*b*d*n)*(a +
b*Log[c*x^n]))/(b*n)])/(E^((3*a)/(b*n))*(c*x^n)^(3/n)) + (x^3*SinIntegral[d
*(a + b*Log[c*x^n])])/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 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

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

Rule 4585

```
Int[(((e_.) + Log[(g_.)*(x_)^(m_.)]*(f_.))*(h_.))^(q_.)*((i_.)*(x_))^(r_.)*
Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_Symbol] :> Dist[(I*(i*x
)^r*(1/((c*x^n)^(I*b*d)*(2*x^(r - I*b*d*n)))))/E^(I*a*d), Int[x^(r - I*b*d*
n)*(h*(e + f*Log[g*x^m]))^q, x], x] - Dist[I*E^(I*a*d)*(i*x)^r*((c*x^n)^(I*
b*d)/(2*x^(r + I*b*d*n))), Int[x^(r + I*b*d*n)*(h*(e + f*Log[g*x^m]))^q, x]
, x] /; FreeQ[{a, b, c, d, e, f, g, h, i, m, n, q, r}, x]
```

Rule 6661

```
Int[((e_.)*(x_))^(m_.)*SinIntegral[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d
_.)], x_Symbol] :> Simp[(e*x)^(m + 1)*(SinIntegral[d*(a + b*Log[c*x^n])]/(e
*(m + 1))), x] - Dist[b*d*(n/(m + 1)), Int[(e*x)^m*(Sin[d*(a + b*Log[c*x^n]
)]/(d*(a + b*Log[c*x^n]))), x], x] /; FreeQ[{a, b, c, d, e, m, n}, x] && Ne
Q[m, -1]
```

Rubi steps

$$\text{integral} = \frac{1}{3}x^3\text{Si}(d(a+b\log(cx^n))) - \frac{1}{3}(bdn)\int \frac{x^2\sin(d(a+b\log(cx^n)))}{d(a+b\log(cx^n))}\,dx$$

$$= \frac{1}{3}x^3\text{Si}(d(a+b\log(cx^n))) - \frac{1}{3}(bn)\int \frac{x^2\sin(d(a+b\log(cx^n)))}{a+b\log(cx^n)}\,dx$$

$$= \frac{1}{3}x^3\mathrm{Si}(d(a+b\log(cx^n))) - \frac{1}{6}\left(ibe^{-iad}nx^{ibdn}(cx^n)^{-ibd}\right)\int \frac{x^{2-ibdn}}{a+b\log(cx^n)}\,dx + \frac{1}{6}\left(ibe^{iad}nx^{-ibdn}(cx^n)^{ibd}\right)\int \frac{x^{2+ibdn}}{a+b\log(cx^n)}\,dx$$

$$= \frac{1}{3}x^3\mathrm{Si}(d(a+b\log(cx^n))) - \frac{1}{6}\left(ibe^{-iad}x^3(cx^n)^{-ibd-\frac{3-ibdn}{n}}\right)\mathrm{Subst}\left(\int \frac{e^{\frac{(3-ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right) + \frac{1}{6}\left(ibe^{iad}x^3(cx^n)^{ibd-\frac{3+ibdn}{n}}\right)\mathrm{Subst}\left(\int \frac{e^{\frac{(3+ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)$$

$$= -\frac{1}{6}ie^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\,\mathrm{ExpIntegralEi}\left(\frac{(3-ibdn)(a+b\log(cx^n))}{bn}\right) + \frac{1}{6}ie^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\,\mathrm{ExpIntegralEi}\left(\frac{(3+ibdn)(a+b\log(cx^n))}{bn}\right) + \frac{1}{3}x^3\mathrm{Si}(d(a+b\log(cx^n)))$$

Mathematica [A] (verified)

Time = 1.20 (sec) , antiderivative size = 106, normalized size of antiderivative = 0.77

$$\int x^2\mathrm{Si}(d(a+b\log(cx^n)))\,dx$$
$$= \frac{1}{6}x^3\left(-ie^{-\frac{3a}{bn}}(cx^n)^{-3/n}\left(\mathrm{ExpIntegralEi}\left(\frac{(3-ibdn)(a+b\log(cx^n))}{bn}\right) - \mathrm{ExpIntegralEi}\left(\frac{(3+ibdn)(a+ \right.\right.\right.$$
$$\left. + 2\mathrm{Si}(d(a+b\log(cx^n)))\right)$$

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

```
[Out] (x^3*(((-I)*(ExpIntegralEi[((3 - I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)] - ExpI
ntegralEi[((3 + I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)]))/(E^((3*a)/(b*n))*(c*x
^n)^(3/n)) + 2*SinIntegral[d*(a + b*Log[c*x^n])]))/6
```

Maple [F]

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

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

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

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.02

$$\int x^2\operatorname{Si}(d(a+b\log\left(cx^n\right)))\,dx = \frac{1}{3}\,x^3\operatorname{Si}\left(bd\log\left(cx^n\right)+ad\right) + \frac{1}{6}\left(i\operatorname{Ei}\left(\frac{i\,abdn+\left(i\,b^2dn+3\,b\right)\log\left(c\right)+\left(i\,b^2dn^2+3\,bn\right)\log\left(x\right)+3\,a}{bn}\right)-i\operatorname{Ei}\left(\frac{-i\,abdn+\left(-i\,b^2dn+3\,b\right.}{}\right.\right.$$

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

[Out] 1/3*x^3*sin_integral(b*d*log(c*x^n) + a*d) + 1/6*(I*Ei((I*a*b*d*n + (I*b^2*d*n + 3*b)*log(c) + (I*b^2*d*n^2 + 3*b*n)*log(x) + 3*a)/(b*n)) - I*Ei((-I*a*b*d*n + (-I*b^2*d*n + 3*b)*log(c) + (-I*b^2*d*n^2 + 3*b*n)*log(x) + 3*a)/(b*n)))*e^(-3*(b*log(c) + a)/(b*n))

Sympy [F]

$$\int x^2\operatorname{Si}(d(a+b\log\left(cx^n\right)))\,dx = \int x^2\operatorname{Si}\left(ad+bd\log\left(cx^n\right)\right)dx$$

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

[Out] Integral(x**2*Si(a*d + b*d*log(c*x**n)), x)

Maxima [F]

$$\int x^2\operatorname{Si}(d(a+b\log\left(cx^n\right)))\,dx = \int x^2\operatorname{Si}\left(\left(b\log\left(cx^n\right)+a\right)d\right)\,dx$$

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

[Out] integrate(x^2*sin_integral((b*log(c*x^n) + a)*d), x)

Giac [F(-1)]

Timed out.

$$\int x^2 \text{Si}(d(a+b\log(cx^n)))\,dx = \text{Timed out}$$

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

Mupad [F(-1)]

Timed out.

$$\int x^2 \text{Si}(d(a+b\log(cx^n)))\,dx = \int x^2\,\text{sinint}(d\,(a+b\,\ln(c\,x^n)))\,dx$$

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

3.33 $\int x\mathbf{Si}(d(a+b\log(cx^n)))\,dx$

Optimal result

Integrand size = 15, antiderivative size = 137

$$\begin{aligned}\int x\text{Si}(d(a+b\log(cx^n)))\,dx &= -\frac{1}{4}ie^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\text{ExpIntegralEi}\left(\frac{(2-ibdn)(a+b\log(cx^n))}{bn}\right)\\ &\quad+\frac{1}{4}ie^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\text{ExpIntegralEi}\left(\frac{(2+ibdn)(a+b\log(cx^n))}{bn}\right)\\ &\quad+\frac{1}{2}x^2\text{Si}(d(a+b\log(cx^n)))\end{aligned}$$

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

Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 137, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {6661, 12, 4585, 2347, 2209}

$$\begin{aligned}\int x\text{Si}(d(a+b\log(cx^n)))\,dx &= -\frac{1}{4}ix^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\text{ExpIntegralEi}\left(\frac{(2-ibdn)(a+b\log(cx^n))}{bn}\right)\\ &\quad+\frac{1}{4}ix^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\text{ExpIntegralEi}\left(\frac{(ibdn+2)(a+b\log(cx^n))}{bn}\right)\\ &\quad+\frac{1}{2}x^2\text{Si}(d(a+b\log(cx^n)))\end{aligned}$$

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

```
[Out] ((-1/4*I)*x^2*ExpIntegralEi[((2 - I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)])/(E^(
(2*a)/(b*n))*(c*x^n)^(2/n)) + ((I/4)*x^2*ExpIntegralEi[((2 + I*b*d*n)*(a +
b*Log[c*x^n]))/(b*n)])/(E^((2*a)/(b*n))*(c*x^n)^(2/n)) + (x^2*SinIntegral[d
*(a + b*Log[c*x^n])])/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 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

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

Rule 4585

```
Int[(((e_.) + Log[(g_.)*(x_)^(m_.)]*(f_.))*(h_.))^(q_.)*((i_.)*(x_))^(r_.)*
Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_Symbol] :> Dist[(I*(i*x
)^r*(1/((c*x^n)^(I*b*d)*(2*x^(r - I*b*d*n)))))/E^(I*a*d), Int[x^(r - I*b*d*
n)*(h*(e + f*Log[g*x^m]))^q, x], x] - Dist[I*E^(I*a*d)*(i*x)^r*((c*x^n)^(I*
b*d)/(2*x^(r + I*b*d*n))), Int[x^(r + I*b*d*n)*(h*(e + f*Log[g*x^m]))^q, x]
, x] /; FreeQ[{a, b, c, d, e, f, g, h, i, m, n, q, r}, x]
```

Rule 6661

```
Int[((e_.)*(x_))^(m_.)*SinIntegral[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d
_.)], x_Symbol] :> Simp[(e*x)^(m + 1)*(SinIntegral[d*(a + b*Log[c*x^n])]/(e
*(m + 1))), x] - Dist[b*d*(n/(m + 1)), Int[(e*x)^m*(Sin[d*(a + b*Log[c*x^n]
)]/(d*(a + b*Log[c*x^n]))), x], x] /; FreeQ[{a, b, c, d, e, m, n}, x] && Ne
Q[m, -1]
```

Rubi steps

$$\begin{aligned}\text{integral} &= \frac{1}{2}x^2\text{Si}(d(a+b\log(cx^n))) - \frac{1}{2}(bdn)\int \frac{x\sin(d(a+b\log(cx^n)))}{d(a+b\log(cx^n))}\,dx \\ &= \frac{1}{2}x^2\text{Si}(d(a+b\log(cx^n))) - \frac{1}{2}(bn)\int \frac{x\sin(d(a+b\log(cx^n)))}{a+b\log(cx^n)}\,dx\end{aligned}$$

$$
\begin{aligned}
&= \frac{1}{2}x^2\mathrm{Si}(d(a+b\log(cx^n))) - \frac{1}{4}\left(ibe^{-iad}nx^{ibdn}(cx^n)^{-ibd}\right)\int \frac{x^{1-ibdn}}{a+b\log(cx^n)}\,dx \\
&\quad + \frac{1}{4}\left(ibe^{iad}nx^{-ibdn}(cx^n)^{ibd}\right)\int \frac{x^{1+ibdn}}{a+b\log(cx^n)}\,dx \\
&= \frac{1}{2}x^2\mathrm{Si}(d(a+b\log(cx^n))) \\
&\quad - \frac{1}{4}\left(ibe^{-iad}x^2(cx^n)^{-ibd-\frac{2-ibdn}{n}}\right)\mathrm{Subst}\left(\int \frac{e^{\frac{(2-ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right) \\
&\quad + \frac{1}{4}\left(ibe^{iad}x^2(cx^n)^{ibd-\frac{2+ibdn}{n}}\right)\mathrm{Subst}\left(\int \frac{e^{\frac{(2+ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right) \\
&= -\frac{1}{4}ie^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\,\mathrm{ExpIntegralEi}\left(\frac{(2-ibdn)(a+b\log(cx^n))}{bn}\right) \\
&\quad + \frac{1}{4}ie^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\,\mathrm{ExpIntegralEi}\left(\frac{(2+ibdn)(a+b\log(cx^n))}{bn}\right) \\
&\quad + \frac{1}{2}x^2\mathrm{Si}(d(a+b\log(cx^n)))
\end{aligned}
$$

Mathematica [A] (verified)

Time = 1.12 (sec) , antiderivative size = 106, normalized size of antiderivative = 0.77

$$
\begin{aligned}
&\int x\mathrm{Si}(d(a+b\log(cx^n)))\,dx \\
&= \frac{1}{4}x^2\left(-ie^{-\frac{2a}{bn}}(cx^n)^{-2/n}\left(\mathrm{ExpIntegralEi}\left(\frac{(2-ibdn)(a+b\log(cx^n))}{bn}\right) - \mathrm{ExpIntegralEi}\left(\frac{(2+ibdn)(a+b}{bn}\right.\right.\right. \\
&\qquad + 2\mathrm{Si}(d(a+b\log(cx^n)))\Big)
\end{aligned}
$$

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

```
[Out] (x^2*(((-I)*(ExpIntegralEi[((2 - I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)] - ExpI
ntegralEi[((2 + I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)]))/(E^((2*a)/(b*n))*(c*x
^n)^(2/n)) + 2*SinIntegral[d*(a + b*Log[c*x^n])]))/4
```

Maple [F]

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

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

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 140, normalized size of antiderivative = 1.02

$$\int x\mathrm{Si}(d(a+b\log\left(cx^{n}\right)))\,dx=\frac{1}{2}\,x^{2}\operatorname{Si}\left(bd\log\left(cx^{n}\right)+ad\right)$$
$$+\frac{1}{4}\left(i\operatorname{Ei}\left(\frac{i\,abdn+\left(i\,b^{2}dn+2\,b\right)\log\left(c\right)+\left(i\,b^{2}dn^{2}+2\,bn\right)\log\left(x\right)+2\,a}{bn}\right)-i\operatorname{Ei}\left(\frac{-i\,abdn+\left(-i\,b^{2}dn+2\right.}{}\right.\right.$$

```
[In] integrate(x*sin_integral(d*(a+b*log(c*x^n))),x, algorithm="fricas")
[Out] 1/2*x^2*sin_integral(b*d*log(c*x^n) + a*d) + 1/4*(I*Ei((I*a*b*d*n + (I*b^2*
d*n + 2*b)*log(c) + (I*b^2*d*n^2 + 2*b*n)*log(x) + 2*a)/(b*n)) - I*Ei((-I*a
*b*d*n + (-I*b^2*d*n + 2*b)*log(c) + (-I*b^2*d*n^2 + 2*b*n)*log(x) + 2*a)/(
b*n)))*e^(-2*(b*log(c) + a)/(b*n))
```

Sympy [F]

$$\int x\mathrm{Si}(d(a+b\log\left(cx^{n}\right)))\,dx=\int x\operatorname{Si}\left(ad+bd\log\left(cx^{n}\right)\right)dx$$

```
[In] integrate(x*Si(d*(a+b*ln(c*x**n))),x)
[Out] Integral(x*Si(a*d + b*d*log(c*x**n)), x)
```

Maxima [F]

$$\int x\mathrm{Si}(d(a+b\log\left(cx^{n}\right)))\,dx=\int x\operatorname{Si}\left((b\log\left(cx^{n}\right)+a)d\right)\,dx$$

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

Giac [F(-1)]

Timed out.

$$\int x\text{Si}(d(a+b\log(cx^n)))\,dx = \text{Timed out}$$

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

Mupad [F(-1)]

Timed out.

$$\int x\text{Si}(d(a+b\log(cx^n)))\,dx = \int x\,\text{sinint}(d\,(a+b\,\ln(c\,x^n)))\,dx$$

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

3.34 $\int \mathbf{Si}(d(a+b\log(cx^n)))\,dx$

Optimal result

Integrand size = 13, antiderivative size = 128

$$\int \mathrm{Si}(d(a+b\log(cx^n)))\,dx = -\frac{1}{2}ie^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\mathrm{ExpIntegralEi}\left(\frac{(1-ibdn)(a+b\log(cx^n))}{bn}\right) + \frac{1}{2}ie^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\mathrm{ExpIntegralEi}\left(\frac{(1+ibdn)(a+b\log(cx^n))}{bn}\right) + x\mathrm{Si}(d(a+b\log(cx^n)))$$

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

Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 128, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.385, Rules used = {6658, 12, 4583, 2347, 2209}

$$\int \mathrm{Si}(d(a+b\log(cx^n)))\,dx = -\frac{1}{2}ixe^{-\frac{a}{bn}}(cx^n)^{-1/n}\,\mathrm{ExpIntegralEi}\left(\frac{(1-ibdn)(a+b\log(cx^n))}{bn}\right) + \frac{1}{2}ixe^{-\frac{a}{bn}}(cx^n)^{-1/n}\,\mathrm{ExpIntegralEi}\left(\frac{(ibdn+1)(a+b\log(cx^n))}{bn}\right) + x\mathrm{Si}(d(a+b\log(cx^n)))$$

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

```
[Out] ((-1/2*I)*x*ExpIntegralEi[((1 - I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)])/(E^(a/
(b*n))*(c*x^n)^n^(-1)) + ((I/2)*x*ExpIntegralEi[((1 + I*b*d*n)*(a + b*Log[c
*x^n]))/(b*n)])/(E^(a/(b*n))*(c*x^n)^n^(-1)) + x*SinIntegral[d*(a + b*Log[c
*x^n])]
```

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 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

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

Rule 4583

```
Int[(((e_.) + Log[(g_.)*(x_)^(m_.)]*(f_.))*(h_.))^(q_.)*Sin[((a_.) + Log[(c
_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_Symbol] :> Dist[(I*(1/((c*x^n)^(I*b*d)*(2/
x^(I*b*d*n)))))/E^(I*a*d), Int[(h*(e + f*Log[g*x^m]))^q/x^(I*b*d*n), x], x]
 - Dist[I*E^(I*a*d)*((c*x^n)^(I*b*d)/(2*x^(I*b*d*n))), Int[x^(I*b*d*n)*(h*(
e + f*Log[g*x^m]))^q, x], x] /; FreeQ[{a, b, c, d, e, f, g, h, m, n, q}, x]
```

Rule 6658

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

Rubi steps

$$\begin{aligned}
\text{integral} &= x\text{Si}(d(a+b\log(cx^n))) - (bdn)\int \frac{\sin(d(a+b\log(cx^n)))}{d(a+b\log(cx^n))}\,dx\\
&= x\text{Si}(d(a+b\log(cx^n))) - (bn)\int \frac{\sin(d(a+b\log(cx^n)))}{a+b\log(cx^n)}\,dx\\
&= x\text{Si}(d(a+b\log(cx^n))) - \frac{1}{2}\left(ibe^{-iad}nx^{ibdn}(cx^n)^{-ibd}\right)\int \frac{x^{-ibdn}}{a+b\log(cx^n)}\,dx\\
&\quad + \frac{1}{2}\left(ibe^{iad}nx^{-ibdn}(cx^n)^{ibd}\right)\int \frac{x^{ibdn}}{a+b\log(cx^n)}\,dx
\end{aligned}$$

$$= x\text{Si}(d(a+b\log(cx^n))) - \frac{1}{2}\left(ibe^{-iad}x(cx^n)^{-ibd-\frac{1-ibdn}{n}}\right)\text{Subst}\left(\int\frac{e^{\frac{(1-ibdn)x}{n}}}{a+bx}\,dx,x,\log(cx^n)\right) + \frac{1}{2}\left(ibe^{iad}x(cx^n)^{ibd-\frac{1+ibdn}{n}}\right)\text{Subst}\left(\int\frac{e^{\frac{(1+ibdn)x}{n}}}{a+bx}\,dx,x,\log(cx^n)\right)$$

$$= -\frac{1}{2}ie^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\text{ExpIntegralEi}\left(\frac{(1-ibdn)(a+b\log(cx^n))}{bn}\right) + \frac{1}{2}ie^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\text{ExpIntegralEi}\left(\frac{(1+ibdn)(a+b\log(cx^n))}{bn}\right) + x\text{Si}(d(a+b\log(cx^n)))$$

Mathematica [A] (verified)

Time = 1.10 (sec) , antiderivative size = 102, normalized size of antiderivative = 0.80

$$\int \text{Si}(d(a+b\log(cx^n)))\,dx = -\frac{1}{2}ie^{-\frac{a}{bn}}x(cx^n)^{-1/n}\left(\text{ExpIntegralEi}\left(\frac{(1-ibdn)(a+b\log(cx^n))}{bn}\right) - \text{ExpIntegralEi}\left(\frac{(1+ibdn)(a+b\log(cx^n))}{bn}\right)\right) + x\text{Si}(d(a+b\log(cx^n)))$$

```
[In] Integrate[SinIntegral[d*(a + b*Log[c*x^n])],x]
[Out] ((-1/2*I)*x*(ExpIntegralEi[((1 - I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)] - ExpI
ntegralEi[((1 + I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)]))/(E^(a/(b*n))*(c*x^n)^
n^(-1)) + x*SinIntegral[d*(a + b*Log[c*x^n])]
```

Maple [F]

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

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

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 127, normalized size of antiderivative = 0.99

$$
\begin{aligned}
&\int \operatorname{Si}(d(a+b\log(cx^n)))\,dx \\
&= \frac{1}{2}\left(i\operatorname{Ei}\left(\frac{i\,abdn + (i\,b^2dn + b)\log(c) + (i\,b^2dn^2 + bn)\log(x) + a}{bn}\right) - i\operatorname{Ei}\left(\frac{-i\,abdn + (-i\,b^2dn + b)\log(c)}{bn}\right.\right. \\
&\quad + x\operatorname{Si}(bd\log(cx^n) + ad)
\end{aligned}
$$

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

Sympy [F]

$$\int \operatorname{Si}(d(a+b\log(cx^n)))\,dx = \int \operatorname{Si}(d(a+b\log(cx^n)))\,dx$$

```
[In] integrate(Si(d*(a+b*ln(c*x**n))),x)
[Out] Integral(Si(d*(a + b*log(c*x**n))), x)
```

Maxima [F]

$$\int \operatorname{Si}(d(a+b\log(cx^n)))\,dx = \int \operatorname{Si}((b\log(cx^n) + a)d)\,dx$$

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

Giac [F(-1)]

Timed out.

$$\int \mathrm{Si}(d(a+b\log(cx^n)))\,dx = \text{Timed out}$$

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

Mupad [F(-1)]

Timed out.

$$\int \mathrm{Si}(d(a+b\log(cx^n)))\,dx = \int \mathrm{sinint}(d\,(a+b\,\ln(c\,x^n)))\,dx$$

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

3.35 $\int \frac{\text{Si}(d(a+b\log(cx^n)))}{x}\,dx$

Optimal result

Integrand size = 17, antiderivative size = 54

$$\int \frac{\text{Si}(d(a+b\log(cx^n)))}{x}\,dx=\frac{\cos(d(a+b\log(cx^n)))}{bdn}+\frac{(a+b\log(cx^n))\,\text{Si}(d(a+b\log(cx^n)))}{bn}$$

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

Rubi [A] (verified)

Time = 0.02 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {6634}

$$\int \frac{\text{Si}(d(a+b\log(cx^n)))}{x}\,dx=\frac{(a+b\log(cx^n))\,\text{Si}(d(a+b\log(cx^n)))}{bn}+\frac{\cos(d(a+b\log(cx^n)))}{bdn}$$

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

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

Rule 6634

```
Int[SinIntegral[(a_.) + (b_.)*(x_)], x_Symbol] :> Simp[(a + b*x)*(SinIntegr
al[a + b*x]/b), x] + Simp[Cos[a + b*x]/b, x] /; FreeQ[{a, b}, x]
```

Rubi steps

$$\begin{aligned}\text{integral} &= \frac{\text{Subst}\left(\int \text{Si}(d(a+bx))\,dx, x, \log(cx^n)\right)}{n}\\ &= \frac{\text{Subst}\left(\int \text{Si}(x)\,dx, x, ad+bd\log(cx^n)\right)}{bdn}\\ &= \frac{\cos(ad+bd\log(cx^n))}{bdn} + \frac{(a+b\log(cx^n))\,\text{Si}(ad+bd\log(cx^n))}{bn}\end{aligned}$$

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 95, normalized size of antiderivative = 1.76

$$\int \frac{\text{Si}(d(a+b\log(cx^n)))}{x}\,dx = \frac{\cos(ad)\cos(bd\log(cx^n))}{bdn} - \frac{\sin(ad)\sin(bd\log(cx^n))}{bdn} + \frac{\log(cx^n)\,\text{Si}(d(a+b\log(cx^n)))}{n} + \frac{a\text{Si}(ad+bd\log(cx^n))}{bn}$$

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

Maple [A] (verified)

Time = 1.02 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.00

method	result	size
derivativedivides	$\frac{\text{Si}(ad+bd\ln(c\,x^n))(ad+bd\ln(c\,x^n))+\cos(ad+bd\ln(c\,x^n))}{ndb}$	54
default	$\frac{\text{Si}(ad+bd\ln(c\,x^n))(ad+bd\ln(c\,x^n))+\cos(ad+bd\ln(c\,x^n))}{ndb}$	54

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

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.06

$$\int \frac{\mathrm{Si}(d(a+b\log(cx^n)))}{x}\,dx = \frac{(bdn\log(x)+bd\log(c)+ad)\,\mathrm{Si}(bd\log(cx^n)+ad)+\cos(bdn\log(x)+bd\log(c)+ad)}{bdn}$$

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

Sympy [F]

$$\int \frac{\mathrm{Si}(d(a+b\log(cx^n)))}{x}\,dx = \int \frac{\mathrm{Si}(ad+bd\log(cx^n))}{x}\,dx$$

```
[In] integrate(Si(d*(a+b*ln(c*x**n)))/x,x)
[Out] Integral(Si(a*d + b*d*log(c*x**n))/x, x)
```

Maxima [A] (verification not implemented)

none

Time = 0.19 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.91

$$\int \frac{\mathrm{Si}(d(a+b\log(cx^n)))}{x}\,dx = \frac{(b\log(cx^n)+a)d\,\mathrm{Si}((b\log(cx^n)+a)d)+\cos((b\log(cx^n)+a)d)}{bdn}$$

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

Giac [A] (verification not implemented)

none

Time = 0.33 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.09

$$\int \frac{\text{Si}(d(a+b\log(cx^n)))}{x}\,dx = \frac{(bdn\log(x)+bd\log(c)+ad)\,\text{Si}(bdn\log(x)+bd\log(c)+ad)+\cos(bdn\log(x)+bd\log(c)+ad)}{bdn}$$

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

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

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{Si}(d(a+b\log(cx^n)))}{x}\,dx = \frac{\text{sinint}(d\,(a+b\,\ln(c\,x^n)))\,\ln(c\,x^n)}{n} + \frac{a\,\text{sinint}(d\,(a+b\,\ln(c\,x^n)))}{b\,n} + \frac{\cos(d\,(a+b\,\ln(c\,x^n)))}{b\,d\,n}$$

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

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

3.36 $\int \frac{\text{Si}(d(a+b\log(cx^n)))}{x^2}\,dx$

Optimal result

Integrand size = 17, antiderivative size = 131

$$\int \frac{\text{Si}(d(a+b\log(cx^n)))}{x^2}\,dx = -\frac{ie^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\text{ExpIntegralEi}\left(-\frac{(1-ibdn)(a+b\log(cx^n))}{bn}\right)}{2x} + \frac{ie^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\text{ExpIntegralEi}\left(-\frac{(1+ibdn)(a+b\log(cx^n))}{bn}\right)}{2x} - \frac{\text{Si}(d(a+b\log(cx^n)))}{x}$$

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

Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 131, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.294$, Rules used = {6661, 12, 4585, 2347, 2209}

$$\int \frac{\text{Si}(d(a+b\log(cx^n)))}{x^2}\,dx = -\frac{ie^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\text{ExpIntegralEi}\left(-\frac{(1-ibdn)(a+b\log(cx^n))}{bn}\right)}{2x} + \frac{ie^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\text{ExpIntegralEi}\left(-\frac{(ibdn+1)(a+b\log(cx^n))}{bn}\right)}{2x} - \frac{\text{Si}(d(a+b\log(cx^n)))}{x}$$

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

```
[Out] ((-1/2*I)*E^(a/(b*n))*(c*x^n)^n^(-1)*ExpIntegralEi[-(((1 - I*b*d*n)*(a + b*
Log[c*x^n]))/(b*n))])/x + ((I/2)*E^(a/(b*n))*(c*x^n)^n^(-1)*ExpIntegralEi[-
(((1 + I*b*d*n)*(a + b*Log[c*x^n]))/(b*n))])/x - SinIntegral[d*(a + b*Log[c
*x^n])]/x
```

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 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

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

Rule 4585

```
Int[(((e_.) + Log[(g_.)*(x_)^(m_.)]*(f_.))*(h_.))^(q_.)*((i_.)*(x_))^(r_.)*
Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_Symbol] :> Dist[(I*(i*x
)^r*(1/((c*x^n)^(I*b*d)*(2*x^(r - I*b*d*n)))))/E^(I*a*d), Int[x^(r - I*b*d*
n)*(h*(e + f*Log[g*x^m]))^q, x], x] - Dist[I*E^(I*a*d)*(i*x)^r*((c*x^n)^(I*
b*d)/(2*x^(r + I*b*d*n))), Int[x^(r + I*b*d*n)*(h*(e + f*Log[g*x^m]))^q, x]
, x] /; FreeQ[{a, b, c, d, e, f, g, h, i, m, n, q, r}, x]
```

Rule 6661

```
Int[((e_.)*(x_))^(m_.)*SinIntegral[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d
_.)], x_Symbol] :> Simp[(e*x)^(m + 1)*(SinIntegral[d*(a + b*Log[c*x^n])]/(e
*(m + 1))), x] - Dist[b*d*(n/(m + 1)), Int[(e*x)^m*(Sin[d*(a + b*Log[c*x^n]
)]/(d*(a + b*Log[c*x^n]))), x], x] /; FreeQ[{a, b, c, d, e, m, n}, x] && Ne
Q[m, -1]
```

Rubi steps

$$\begin{aligned}\text{integral} &= -\frac{\text{Si}(d(a+b\log(cx^n)))}{x}+(bdn)\int\frac{\sin(d(a+b\log(cx^n)))}{dx^2(a+b\log(cx^n))}\,dx\\ &= -\frac{\text{Si}(d(a+b\log(cx^n)))}{x}+(bn)\int\frac{\sin(d(a+b\log(cx^n)))}{x^2(a+b\log(cx^n))}\,dx\end{aligned}$$

$$= -\frac{\text{Si}(d(a+b\log(cx^n)))}{x} + \frac{1}{2}\left(ibe^{-iad}nx^{ibdn}(cx^n)^{-ibd}\right)\int\frac{x^{-2-ibdn}}{a+b\log(cx^n)}\,dx - \frac{1}{2}\left(ibe^{iad}nx^{-ibdn}(cx^n)^{ibd}\right)\int\frac{x^{-2+ibdn}}{a+b\log(cx^n)}\,dx$$

$$= -\frac{\text{Si}(d(a+b\log(cx^n)))}{x} + \frac{\left(ibe^{-iad}(cx^n)^{-ibd-\frac{-1-ibdn}{n}}\right)\text{Subst}\left(\int\frac{e^{\frac{(-1-ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{2x} - \frac{\left(ibe^{iad}(cx^n)^{ibd-\frac{-1+ibdn}{n}}\right)\text{Subst}\left(\int\frac{e^{\frac{(-1+ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{2x}$$

$$= -\frac{ie^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\,\text{ExpIntegralEi}\left(-\frac{(1-ibdn)(a+b\log(cx^n))}{bn}\right)}{2x} + \frac{ie^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\,\text{ExpIntegralEi}\left(-\frac{(1+ibdn)(a+b\log(cx^n))}{bn}\right)}{2x} - \frac{\text{Si}(d(a+b\log(cx^n)))}{x}$$

Mathematica [A] (verified)

Time = 1.14 (sec) , antiderivative size = 107, normalized size of antiderivative = 0.82

$$\int\frac{\text{Si}(d(a+b\log(cx^n)))}{x^2}\,dx = \frac{ie^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\left(\text{ExpIntegralEi}\left(-\frac{i(-i+bdn)(a+b\log(cx^n))}{bn}\right) - \text{ExpIntegralEi}\left(\frac{i(i+bdn)(a+b\log(cx^n))}{bn}\right)\right) - 2\text{Si}(d(a+b\log(cx^n)))}{2x}$$

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

```
[Out] (I*E^(a/(b*n))*(c*x^n)^n^(-1)*(ExpIntegralEi[((-I)*(-I + b*d*n)*(a + b*Log[
c*x^n]))/(b*n)] - ExpIntegralEi[(I*(I + b*d*n)*(a + b*Log[c*x^n]))/(b*n)])
- 2*SinIntegral[d*(a + b*Log[c*x^n])])/(2*x)
```

Maple [F]

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

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

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

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 142, normalized size of antiderivative = 1.08

$$\int \frac{\mathrm{Si}(d(a+b\log(cx^n)))}{x^2}\,dx$$
$$= \frac{\left(-i\,x\mathrm{Ei}\left(\frac{i\,abdn+(i\,b^2dn-b)\,\log(c)+(i\,b^2dn^2-bn)\,\log(x)-a}{bn}\right)+i\,x\mathrm{Ei}\left(\frac{-i\,abdn+(-i\,b^2dn-b)\,\log(c)+(-i\,b^2dn^2-bn)\,\log(x)-a}{bn}\right)\right)e^{\left(\frac{b\,\mathrm{lo}\cdots}{\cdots}\right.}\cdots}{2\,x}$$

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

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

Sympy [F]

$$\int \frac{\mathrm{Si}(d(a+b\log(cx^n)))}{x^2}\,dx = \int \frac{\mathrm{Si}\,(ad+bd\log(cx^n))}{x^2}\,dx$$

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

```
[Out] Integral(Si(a*d + b*d*log(c*x**n))/x**2, x)
```

Maxima [F]

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

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

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

Giac [F(-1)]

Timed out.

$$\int \frac{\text{Si}(d(a + b\log(cx^n)))}{x^2}\,dx = \text{Timed out}$$

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

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{Si}(d(a + b\log(cx^n)))}{x^2}\,dx = \int \frac{\text{sinint}(d\,(a + b\,\ln(c\,x^n)))}{x^2}\,dx$$

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

3.37 $\int \frac{\mathrm{Si}(d(a+b\log(cx^n)))}{x^3}\,dx$

Optimal result

Integrand size = 17, antiderivative size = 139

$$\int \frac{\mathrm{Si}(d(a+b\log(cx^n)))}{x^3}\,dx = -\frac{ie^{\frac{2a}{bn}}(cx^n)^{2/n}\,\mathrm{ExpIntegralEi}\left(-\frac{(2-ibdn)(a+b\log(cx^n))}{bn}\right)}{4x^2} + \frac{ie^{\frac{2a}{bn}}(cx^n)^{2/n}\,\mathrm{ExpIntegralEi}\left(-\frac{(2+ibdn)(a+b\log(cx^n))}{bn}\right)}{4x^2} - \frac{\mathrm{Si}(d(a+b\log(cx^n)))}{2x^2}$$

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

Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 139, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294, Rules used = {6661, 12, 4585, 2347, 2209}

$$\int \frac{\mathrm{Si}(d(a+b\log(cx^n)))}{x^3}\,dx = -\frac{ie^{\frac{2a}{bn}}(cx^n)^{2/n}\,\mathrm{ExpIntegralEi}\left(-\frac{(2-ibdn)(a+b\log(cx^n))}{bn}\right)}{4x^2} + \frac{ie^{\frac{2a}{bn}}(cx^n)^{2/n}\,\mathrm{ExpIntegralEi}\left(-\frac{(ibdn+2)(a+b\log(cx^n))}{bn}\right)}{4x^2} - \frac{\mathrm{Si}(d(a+b\log(cx^n)))}{2x^2}$$

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

```
[Out] ((-1/4*I)*E^((2*a)/(b*n))*(c*x^n)^(2/n)*ExpIntegralEi[-(((2 - I*b*d*n)*(a +
 b*Log[c*x^n]))/(b*n))])/x^2 + ((I/4)*E^((2*a)/(b*n))*(c*x^n)^(2/n)*ExpInte
gralEi[-(((2 + I*b*d*n)*(a + b*Log[c*x^n]))/(b*n))])/x^2 - SinIntegral[d*(a
 + b*Log[c*x^n])]/(2*x^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 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

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

Rule 4585

```
Int[(((e_.) + Log[(g_.)*(x_)^(m_.)]*(f_.))*(h_.))^(q_.)*((i_.)*(x_))^(r_.)*
Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_Symbol] :> Dist[(I*(i*x
)^r*(1/((c*x^n)^(I*b*d)*(2*x^(r - I*b*d*n)))))/E^(I*a*d), Int[x^(r - I*b*d*
n)*(h*(e + f*Log[g*x^m]))^q, x], x] - Dist[I*E^(I*a*d)*(i*x)^r*((c*x^n)^(I*
b*d)/(2*x^(r + I*b*d*n))), Int[x^(r + I*b*d*n)*(h*(e + f*Log[g*x^m]))^q, x]
, x] /; FreeQ[{a, b, c, d, e, f, g, h, i, m, n, q, r}, x]
```

Rule 6661

```
Int[((e_.)*(x_))^(m_.)*SinIntegral[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d
_.)], x_Symbol] :> Simp[(e*x)^(m + 1)*(SinIntegral[d*(a + b*Log[c*x^n])]/(e
*(m + 1))), x] - Dist[b*d*(n/(m + 1)), Int[(e*x)^m*(Sin[d*(a + b*Log[c*x^n]
)]/(d*(a + b*Log[c*x^n]))), x], x] /; FreeQ[{a, b, c, d, e, m, n}, x] && Ne
Q[m, -1]
```

Rubi steps

$$\begin{aligned}\text{integral} &= -\frac{\text{Si}(d(a+b\log(cx^n)))}{2x^2}+\frac{1}{2}(bdn)\int\frac{\sin(d(a+b\log(cx^n)))}{dx^3(a+b\log(cx^n))}\,dx\\ &= -\frac{\text{Si}(d(a+b\log(cx^n)))}{2x^2}+\frac{1}{2}(bn)\int\frac{\sin(d(a+b\log(cx^n)))}{x^3(a+b\log(cx^n))}\,dx\end{aligned}$$

$$= -\frac{\text{Si}(d(a+b\log(cx^n)))}{2x^2} + \frac{1}{4}\left(ibe^{-iad}nx^{ibdn}(cx^n)^{-ibd}\right)\int \frac{x^{-3-ibdn}}{a+b\log(cx^n)}\,dx - \frac{1}{4}\left(ibe^{iad}nx^{-ibdn}(cx^n)^{ibd}\right)\int \frac{x^{-3+ibdn}}{a+b\log(cx^n)}\,dx$$

$$= -\frac{\text{Si}(d(a+b\log(cx^n)))}{2x^2} + \frac{\left(ibe^{-iad}(cx^n)^{-ibd-\frac{-2-ibdn}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(-2-ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{4x^2} - \frac{\left(ibe^{iad}(cx^n)^{ibd-\frac{-2+ibdn}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(-2+ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{4x^2}$$

$$= -\frac{ie^{\frac{2a}{bn}}(cx^n)^{2/n}\,\text{ExpIntegralEi}\left(-\frac{(2-ibdn)(a+b\log(cx^n))}{bn}\right)}{4x^2} + \frac{ie^{\frac{2a}{bn}}(cx^n)^{2/n}\,\text{ExpIntegralEi}\left(-\frac{(2+ibdn)(a+b\log(cx^n))}{bn}\right)}{4x^2} - \frac{\text{Si}(d(a+b\log(cx^n)))}{2x^2}$$

Mathematica [A] (verified)

Time = 1.15 (sec) , antiderivative size = 111, normalized size of antiderivative = 0.80

$$\int \frac{\text{Si}(d(a+b\log(cx^n)))}{x^3}\,dx = \frac{i\left(e^{\frac{2a}{bn}}(cx^n)^{2/n}\left(\text{ExpIntegralEi}\left(-\frac{i(-2i+bdn)(a+b\log(cx^n))}{bn}\right) - \text{ExpIntegralEi}\left(\frac{i(2i+bdn)(a+b\log(cx^n))}{bn}\right)\right) + 2i\text{Si}(d\right.}{4x^2}$$

```
[In] Integrate[SinIntegral[d*(a + b*Log[c*x^n])]/x^3,x]
[Out] ((I/4)*(E^((2*a)/(b*n))*(c*x^n)^(2/n)*(ExpIntegralEi[((-I)*(-2*I + b*d*n)*(
a + b*Log[c*x^n]))/(b*n)] - ExpIntegralEi[(I*(2*I + b*d*n)*(a + b*Log[c*x^n
]))/(b*n)]) + (2*I)*SinIntegral[d*(a + b*Log[c*x^n])]))/x^2
```

Maple [F]

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

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

Fricas [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 147, normalized size of antiderivative = 1.06

$$\int \frac{\mathrm{Si}(d(a+b\log(cx^n)))}{x^3}\,dx = \frac{\left(-i\,x^2\mathrm{Ei}\left(\frac{i\,abdn+(i\,b^2dn-2\,b)\log(c)+(i\,b^2dn^2-2\,bn)\log(x)-2\,a}{bn}\right)+i\,x^2\mathrm{Ei}\left(\frac{-i\,abdn+(-i\,b^2dn-2\,b)\log(c)+(-i\,b^2dn^2-2\,bn)\log(x)-2\,a}{bn}\right.\right.}{4\,x^2}$$

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

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

Sympy [F]

$$\int \frac{\mathrm{Si}(d(a+b\log(cx^n)))}{x^3}\,dx = \int \frac{\mathrm{Si}\left(ad+bd\log(cx^n)\right)}{x^3}\,dx$$

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

```
[Out] Integral(Si(a*d + b*d*log(c*x**n))/x**3, x)
```

Maxima [F]

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

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

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

Giac [F(-1)]

Timed out.

$$\int \frac{\text{Si}(d(a+b\log(cx^n)))}{x^3}\,dx = \text{Timed out}$$

```
[In] integrate(sin_integral(d*(a+b*log(c*x^n)))/x^3,x, algorithm="giac")
[Out] Timed out
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{Si}(d(a+b\log(cx^n)))}{x^3}\,dx = \int \frac{\text{sinint}(d\,(a+b\,\ln(c\,x^n)))}{x^3}\,dx$$

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

3.38 $\int (ex)^m \mathbf{Si}(d(a+b\log(cx^n)))\,dx$

Optimal result

Integrand size = 19, antiderivative size = 176

$$\begin{aligned}\int (ex)^m \mathrm{Si}(d(a+b\log(cx^n)))\,dx &= -\frac{ie^{-\frac{a(1+m)}{bn}}x(ex)^m(cx^n)^{-\frac{1+m}{n}}\,\mathrm{ExpIntegralEi}\left(\frac{(1+m-ibdn)(a+b\log(cx^n))}{bn}\right)}{2(1+m)}\\ &\quad+\frac{ie^{-\frac{a(1+m)}{bn}}x(ex)^m(cx^n)^{-\frac{1+m}{n}}\,\mathrm{ExpIntegralEi}\left(\frac{(1+m+ibdn)(a+b\log(cx^n))}{bn}\right)}{2(1+m)}\\ &\quad+\frac{(ex)^{1+m}\mathrm{Si}(d(a+b\log(cx^n)))}{e(1+m)}\end{aligned}$$

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

Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 176, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.263$, Rules used

$= \{6661, 12, 4585, 2347, 2209\}$

$$\int (ex)^m \mathrm{Si}(d(a+b\log(cx^n)))\,dx = -\frac{ix(ex)^m e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}\,\mathrm{ExpIntegralEi}\left(\frac{(m-ibdn+1)(a+b\log(cx^n))}{bn}\right)}{2(m+1)} + \frac{ix(ex)^m e^{-\frac{a(m+1)}{bn}}(cx^n)^{-\frac{m+1}{n}}\,\mathrm{ExpIntegralEi}\left(\frac{(m+ibdn+1)(a+b\log(cx^n))}{bn}\right)}{2(m+1)} + \frac{(ex)^{m+1}\mathrm{Si}(d(a+b\log(cx^n)))}{e(m+1)}$$

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

```
[Out] ((-1/2*I)*x*(e*x)^m*ExpIntegralEi[((1 + m - I*b*d*n)*(a + b*Log[c*x^n]))/(b
*n)])/(E^((a*(1 + m))/(b*n))*(1 + m)*(c*x^n)^((1 + m)/n)) + ((I/2)*x*(e*x)^
m*ExpIntegralEi[((1 + m + I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)])/(E^((a*(1 +
m))/(b*n))*(1 + m)*(c*x^n)^((1 + m)/n)) + ((e*x)^(1 + m)*SinIntegral[d*(a +
 b*Log[c*x^n])])/(e*(1 + m))
```

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 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

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

Rule 4585

```
Int[(((e_.) + Log[(g_.)*(x_)^(m_.)]*(f_.))*(h_.))^(q_.)*((i_.)*(x_))^(r_.)*
Sin[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)], x_Symbol] :> Dist[(I*(i*x
)^r*(1/((c*x^n)^(I*b*d)*(2*x^(r - I*b*d*n)))))/E^(I*a*d), Int[x^(r - I*b*d*
n)*(h*(e + f*Log[g*x^m]))^q, x], x] - Dist[I*E^(I*a*d)*(i*x)^r*((c*x^n)^(I*
b*d)/(2*x^(r + I*b*d*n))), Int[x^(r + I*b*d*n)*(h*(e + f*Log[g*x^m]))^q, x]
, x] /; FreeQ[{a, b, c, d, e, f, g, h, i, m, n, q, r}, x]
```

Rule 6661

```
Int[((e_.)*(x_))^(m_.)*SinIntegral[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d
_.)], x_Symbol] :> Simp[(e*x)^(m + 1)*(SinIntegral[d*(a + b*Log[c*x^n])]/(e
*(m + 1))), x] - Dist[b*d*(n/(m + 1)), Int[(e*x)^m*(Sin[d*(a + b*Log[c*x^n]
)]/(d*(a + b*Log[c*x^n]))), x], x] /; FreeQ[{a, b, c, d, e, m, n}, x] && Ne
Q[m, -1]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{(ex)^{1+m}\text{Si}(d(a+b\log(cx^n)))}{e(1+m)} - \frac{(bdn)\int \frac{(ex)^m\sin(d(a+b\log(cx^n)))}{d(a+b\log(cx^n))}\,dx}{1+m} \\
&= \frac{(ex)^{1+m}\text{Si}(d(a+b\log(cx^n)))}{e(1+m)} - \frac{(bn)\int \frac{(ex)^m\sin(d(a+b\log(cx^n)))}{a+b\log(cx^n)}\,dx}{1+m} \\
&= \frac{(ex)^{1+m}\text{Si}(d(a+b\log(cx^n)))}{e(1+m)} - \frac{\left(ibe^{-iad}nx^{-m+ibdn}(ex)^m\left(cx^n\right)^{-ibd}\right)\int \frac{x^{m-ibdn}}{a+b\log(cx^n)}\,dx}{2(1+m)} \\
&\quad + \frac{\left(ibe^{iad}nx^{-m-ibdn}(ex)^m\left(cx^n\right)^{ibd}\right)\int \frac{x^{m+ibdn}}{a+b\log(cx^n)}\,dx}{2(1+m)} \\
&= \frac{(ex)^{1+m}\text{Si}(d(a+b\log(cx^n)))}{e(1+m)} \\
&\quad - \frac{\left(ibe^{-iad}x(ex)^m\left(cx^n\right)^{-ibd-\frac{1+m-ibdn}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(1+m-ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{2(1+m)} \\
&\quad + \frac{\left(ibe^{iad}x(ex)^m\left(cx^n\right)^{ibd-\frac{1+m+ibdn}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(1+m+ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{2(1+m)} \\
&= -\frac{ie^{-\frac{a(1+m)}{bn}}x(ex)^m\left(cx^n\right)^{-\frac{1+m}{n}}\text{ExpIntegralEi}\left(\frac{(1+m-ibdn)(a+b\log(cx^n))}{bn}\right)}{2(1+m)} \\
&\quad + \frac{ie^{-\frac{a(1+m)}{bn}}x(ex)^m\left(cx^n\right)^{-\frac{1+m}{n}}\text{ExpIntegralEi}\left(\frac{(1+m+ibdn)(a+b\log(cx^n))}{bn}\right)}{2(1+m)} \\
&\quad + \frac{(ex)^{1+m}\text{Si}(d(a+b\log(cx^n)))}{e(1+m)}
\end{aligned}$$

Mathematica [A] (verified)

Time = 2.06 (sec) , antiderivative size = 128, normalized size of antiderivative = 0.73

$$\int (ex)^m \text{Si}(d(a+b\log(cx^n)))\,dx = \frac{(ex)^m\left(-ie^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}}x^{-m}\left(\text{ExpIntegralEi}\left(\frac{(1+m-ibdn)(a+b\log(cx^n))}{bn}\right)-\text{ExpIntegralEi}\left(\frac{(1+m+ib}{}\right.\right.\right.}{2(1+m)}$$

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

```
[Out] ((e*x)^m*(((-I)*(ExpIntegralEi[((1 + m - I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)
] - ExpIntegralEi[((1 + m + I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)]))/(E^(((1 +
 m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*x^m) + 2*x*SinIntegral[d*(a + b
*Log[c*x^n])]))/(2*(1 + m))
```

Maple [F]

$$\int (ex)^m \operatorname{Si}(d(a+b\ln(c\,x^n)))\,dx$$

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

```
[Out] int((e*x)^m*Si(d*(a+b*ln(c*x^n))),x)
```

Fricas [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 180, normalized size of antiderivative = 1.02

$$\int (ex)^m \text{Si}(d(a+b\log(cx^n)))\,dx = \frac{2\,xe^{(m\log(e)+m\log(x))}\,\text{Si}\,(bd\log(cx^n)+ad)+\left(i\,\text{Ei}\left(\frac{i\,abdn+am+(i\,b^2dn+bm+b)\log(c)+(i\,b^2dn^2+(bm+b)n)\log(x)+a}{bn}\right)-i\,\text{I}\right.}{2\,(m+1)}$$

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

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

Sympy [F]

$$\int (ex)^m \text{Si}(d(a+b\log(cx^n)))\,dx = \int (ex)^m \,\text{Si}\left(ad+bd\log(cx^n)\right)dx$$

```
[In] integrate((e*x)**m*Si(d*(a+b*ln(c*x**n))),x)
[Out] Integral((e*x)**m*Si(a*d + b*d*log(c*x**n)), x)
```

Maxima [F]

$$\int (ex)^m \text{Si}(d(a+b\log(cx^n)))\,dx = \int (ex)^m \,\text{Si}\left((b\log(cx^n)+a)d\right)\,dx$$

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

Giac [F(-1)]

Timed out.

$$\int (ex)^m \text{Si}(d(a+b\log(cx^n)))\,dx = \text{Timed out}$$

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

Mupad [F(-1)]

Timed out.

$$\int (ex)^m \text{Si}(d(a+b\log(cx^n)))\,dx = \int \text{sinint}(d\,(a+b\,\ln(c\,x^n)))\,(e\,x)^m\,dx$$

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

3.39 $\int \frac{\sin(bx)\mathbf{Si}(bx)}{x^3}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 96

$$\int \frac{\sin(bx)\text{Si}(bx)}{x^3}\,dx = b^2\,\text{CosIntegral}(2bx) - \frac{b\cos(bx)\sin(bx)}{2x} - \frac{\sin^2(bx)}{4x^2} - \frac{b\sin(2bx)}{4x} - \frac{b\cos(bx)\text{Si}(bx)}{2x} - \frac{\sin(bx)\text{Si}(bx)}{2x^2} - \frac{1}{4}b^2\text{Si}(bx)^2$$

```
[Out] b^2*Ci(2*b*x)-1/2*b*cos(b*x)*Si(b*x)/x-1/4*b^2*Si(b*x)^2-1/2*b*cos(b*x)*sin
(b*x)/x-1/2*Si(b*x)*sin(b*x)/x^2-1/4*sin(b*x)^2/x^2-1/4*b*sin(2*b*x)/x
```

Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.833, Rules used = {6650, 6656, 6818, 12, 4491, 3378, 3383, 3395, 29, 3393}

$$\int \frac{\sin(bx)\text{Si}(bx)}{x^3}\,dx = b^2\,\text{CosIntegral}(2bx) - \frac{1}{4}b^2\text{Si}(bx)^2 - \frac{\text{Si}(bx)\sin(bx)}{2x^2} - \frac{b\text{Si}(bx)\cos(bx)}{2x} - \frac{\sin^2(bx)}{4x^2} - \frac{b\sin(2bx)}{4x} - \frac{b\sin(bx)\cos(bx)}{2x}$$

```
[In] Int[(Sin[b*x]*SinIntegral[b*x])/x^3,x]
```

```
[Out] b^2*CosIntegral[2*b*x] - (b*Cos[b*x]*Sin[b*x])/(2*x) - Sin[b*x]^2/(4*x^2) -
 (b*Sin[2*b*x])/(4*x) - (b*Cos[b*x]*SinIntegral[b*x])/(2*x) - (Sin[b*x]*Sin
Integral[b*x])/(2*x^2) - (b^2*SinIntegral[b*x]^2)/4
```

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]
```

Rule 3378

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(c
 + d*x)^(m + 1)*(Sin[e + f*x]/(d*(m + 1))), x] - Dist[f/(d*(m + 1)), Int[(c
 + d*x)^(m + 1)*Cos[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && LtQ[m, -1
]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 3395

```
Int[((c_.) + (d_.)*(x_))^(m_)*((b_.)*sin[(e_.) + (f_.)*(x_)])^(n_), x_Symbo
l] :> Simp[(c + d*x)^(m + 1)*((b*Sin[e + f*x])^n/(d*(m + 1))), x] + (Dist[b
^2*f^2*n*((n - 1)/(d^2*(m + 1)*(m + 2))), Int[(c + d*x)^(m + 2)*(b*Sin[e +
f*x])^(n - 2), x], x] - Dist[f^2*(n^2/(d^2*(m + 1)*(m + 2))), Int[(c + d*x)
^(m + 2)*(b*Sin[e + f*x])^n, x], x] - Simp[b*f*n*(c + d*x)^(m + 2)*Cos[e +
f*x]*((b*Sin[e + f*x])^(n - 1)/(d^2*(m + 1)*(m + 2))), x]) /; FreeQ[{b, c,
d, e, f}, x] && GtQ[n, 1] && LtQ[m, -2]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6650

```
Int[((e_.) + (f_.)*(x_))^(m_)*Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (
d_.)*(x_)], x_Symbol] :> Simp[(e + f*x)^(m + 1)*Sin[a + b*x]*(SinIntegral[c
 + d*x]/(f*(m + 1))), x] + (-Dist[b/(f*(m + 1)), Int[(e + f*x)^(m + 1)*Cos[
a + b*x]*SinIntegral[c + d*x], x], x] - Dist[d/(f*(m + 1)), Int[(e + f*x)^(
m + 1)*Sin[a + b*x]*(Sin[c + d*x]/(c + d*x)), x], x]) /; FreeQ[{a, b, c, d,
```

```
 e, f}, x] && ILtQ[m, -1]
```

Rule 6656

```
Int[Cos[(a_.) + (b_.)*(x_)]*((e_.) + (f_.)*(x_))^(m_.)*SinIntegral[(c_.) +
(d_.)*(x_)], x_Symbol] :> Simp[(e + f*x)^(m + 1)*Cos[a + b*x]*(SinIntegral[
c + d*x]/(f*(m + 1))), x] + (Dist[b/(f*(m + 1)), Int[(e + f*x)^(m + 1)*Sin[
a + b*x]*SinIntegral[c + d*x], x], x] - Dist[d/(f*(m + 1)), Int[(e + f*x)^(
m + 1)*Cos[a + b*x]*(Sin[c + d*x]/(c + d*x)), x], x]) /; FreeQ[{a, b, c, d,
 e, f}, x] && ILtQ[m, -1]
```

Rule 6818

```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{\sin(bx)\text{Si}(bx)}{2x^2} + \frac{1}{2}b\int \frac{\sin^2(bx)}{bx^3}\,dx + \frac{1}{2}b\int \frac{\cos(bx)\text{Si}(bx)}{x^2}\,dx \\
&= -\frac{b\cos(bx)\text{Si}(bx)}{2x} - \frac{\sin(bx)\text{Si}(bx)}{2x^2} + \frac{1}{2}\int \frac{\sin^2(bx)}{x^3}\,dx \\
&\quad + \frac{1}{2}b^2\int \frac{\cos(bx)\sin(bx)}{bx^2}\,dx - \frac{1}{2}b^2\int \frac{\sin(bx)\text{Si}(bx)}{x}\,dx \\
&= -\frac{b\cos(bx)\sin(bx)}{2x} - \frac{\sin^2(bx)}{4x^2} - \frac{b\cos(bx)\text{Si}(bx)}{2x} - \frac{\sin(bx)\text{Si}(bx)}{2x^2} \\
&\quad - \frac{1}{4}b^2\text{Si}(bx)^2 + \frac{1}{2}b\int \frac{\cos(bx)\sin(bx)}{x^2}\,dx + \frac{1}{2}b^2\int \frac{1}{x}\,dx - b^2\int \frac{\sin^2(bx)}{x}\,dx \\
&= \frac{1}{2}b^2\log(x) - \frac{b\cos(bx)\sin(bx)}{2x} - \frac{\sin^2(bx)}{4x^2} - \frac{b\cos(bx)\text{Si}(bx)}{2x} - \frac{\sin(bx)\text{Si}(bx)}{2x^2} \\
&\quad - \frac{1}{4}b^2\text{Si}(bx)^2 + \frac{1}{2}b\int \frac{\sin(2bx)}{2x^2}\,dx - b^2\int \left(\frac{1}{2x} - \frac{\cos(2bx)}{2x}\right)\,dx \\
&= -\frac{b\cos(bx)\sin(bx)}{2x} - \frac{\sin^2(bx)}{4x^2} - \frac{b\cos(bx)\text{Si}(bx)}{2x} - \frac{\sin(bx)\text{Si}(bx)}{2x^2} \\
&\quad - \frac{1}{4}b^2\text{Si}(bx)^2 + \frac{1}{4}b\int \frac{\sin(2bx)}{x^2}\,dx + \frac{1}{2}b^2\int \frac{\cos(2bx)}{x}\,dx \\
&= \frac{1}{2}b^2\,\text{CosIntegral}(2bx) - \frac{b\cos(bx)\sin(bx)}{2x} - \frac{\sin^2(bx)}{4x^2} - \frac{b\sin(2bx)}{4x} \\
&\quad - \frac{b\cos(bx)\text{Si}(bx)}{2x} - \frac{\sin(bx)\text{Si}(bx)}{2x^2} - \frac{1}{4}b^2\text{Si}(bx)^2 + \frac{1}{2}b^2\int \frac{\cos(2bx)}{x}\,dx
\end{aligned}$$

$$= b^2\,\mathrm{CosIntegral}(2bx) - \frac{b\cos(bx)\sin(bx)}{2x} - \frac{\sin^2(bx)}{4x^2} - \frac{b\sin(2bx)}{4x} - \frac{b\cos(bx)\mathrm{Si}(bx)}{2x} - \frac{\sin(bx)\mathrm{Si}(bx)}{2x^2} - \frac{1}{4}b^2\mathrm{Si}(bx)^2$$

Mathematica [F]

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x^3}\,dx = \int \frac{\sin(bx)\mathrm{Si}(bx)}{x^3}\,dx$$

```
[In] Integrate[(Sin[b*x]*SinIntegral[b*x])/x^3,x]
[Out] Integrate[(Sin[b*x]*SinIntegral[b*x])/x^3, x]
```

Maple [F]

$$\int \frac{\mathrm{Si}\,(bx)\sin\,(bx)}{x^3}dx$$

```
[In] int(Si(b*x)*sin(b*x)/x^3,x)
[Out] int(Si(b*x)*sin(b*x)/x^3,x)
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 72, normalized size of antiderivative = 0.75

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x^3}\,dx = -\frac{b^2x^2\,\mathrm{Si}\,(bx)^2 - 4\,b^2x^2\,\mathrm{Ci}\,(2\,bx) + 2\,bx\cos\,(bx)\,\mathrm{Si}\,(bx) - \cos\,(bx)^2 + 2\,(2\,bx\cos\,(bx) + \mathrm{Si}\,(bx))\sin\,(bx) + 1}{4\,x^2}$$

```
[In] integrate(sin_integral(b*x)*sin(b*x)/x^3,x, algorithm="fricas")
[Out] -1/4*(b^2*x^2*sin_integral(b*x)^2 - 4*b^2*x^2*cos_integral(2*b*x) + 2*b*x*c
os(b*x)*sin_integral(b*x) - cos(b*x)^2 + 2*(2*b*x*cos(b*x) + sin_integral(b
*x))*sin(b*x) + 1)/x^2
```

Sympy [F]

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x^3}\,dx = \int \frac{\sin(bx)\,\mathrm{Si}(bx)}{x^3}\,dx$$

```
[In] integrate(Si(b*x)*sin(b*x)/x**3,x)
[Out] Integral(sin(b*x)*Si(b*x)/x**3, x)
```

Maxima [F]

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x^3}\,dx = \int \frac{\sin(bx)\,\mathrm{Si}(bx)}{x^3}\,dx$$

```
[In] integrate(sin_integral(b*x)*sin(b*x)/x^3,x, algorithm="maxima")
[Out] integrate(sin(b*x)*sin_integral(b*x)/x^3, x)
```

Giac [F]

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x^3}\,dx = \int \frac{\sin(bx)\,\mathrm{Si}(bx)}{x^3}\,dx$$

```
[In] integrate(sin_integral(b*x)*sin(b*x)/x^3,x, algorithm="giac")
[Out] integrate(sin(b*x)*sin_integral(b*x)/x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x^3}\,dx = \int \frac{\mathrm{sinint}(b\,x)\,\sin(b\,x)}{x^3}\,dx$$

```
[In] int((sinint(b*x)*sin(b*x))/x^3,x)
[Out] int((sinint(b*x)*sin(b*x))/x^3, x)
```

3.40 $\int \frac{\sin(bx)\mathbf{Si}(bx)}{x^2} dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x^2} dx = -\frac{\sin^2(bx)}{x} - \frac{\sin(bx)\mathrm{Si}(bx)}{x} + b\mathrm{Si}(2bx) + b\mathrm{Int}\left(\frac{\cos(bx)\mathrm{Si}(bx)}{x}, x\right)$$

```
[Out] b*CannotIntegrate(cos(b*x)*Si(b*x)/x,x)+b*Si(2*b*x)-Si(b*x)*sin(b*x)/x-sin(
b*x)^2/x
```

Rubi [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x^2} dx = \int \frac{\sin(bx)\mathrm{Si}(bx)}{x^2} dx$$

```
[In] Int[(Sin[b*x]*SinIntegral[b*x])/x^2,x]
```

```
[Out] -(Sin[b*x]^2/x) - (Sin[b*x]*SinIntegral[b*x])/x + b*SinIntegral[2*b*x] + b*
Defer[Int][(Cos[b*x]*SinIntegral[b*x])/x, x]
```

Rubi steps

$$\begin{aligned} \text{integral} &= -\frac{\sin(bx)\mathrm{Si}(bx)}{x} + b\int \frac{\sin^2(bx)}{bx^2} dx + b\int \frac{\cos(bx)\mathrm{Si}(bx)}{x} dx \\ &= -\frac{\sin(bx)\mathrm{Si}(bx)}{x} + b\int \frac{\cos(bx)\mathrm{Si}(bx)}{x} dx + \int \frac{\sin^2(bx)}{x^2} dx \end{aligned}$$

$$= -\frac{\sin^2(bx)}{x} - \frac{\sin(bx)\text{Si}(bx)}{x} + b\int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx + (2b)\int \frac{\sin(2bx)}{2x}\,dx$$
$$= -\frac{\sin^2(bx)}{x} - \frac{\sin(bx)\text{Si}(bx)}{x} + b\int \frac{\sin(2bx)}{x}\,dx + b\int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx$$
$$= -\frac{\sin^2(bx)}{x} - \frac{\sin(bx)\text{Si}(bx)}{x} + b\text{Si}(2bx) + b\int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 0.59 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\sin(bx)\text{Si}(bx)}{x^2}\,dx = \int \frac{\sin(bx)\text{Si}(bx)}{x^2}\,dx$$

```
[In] Integrate[(Sin[b*x]*SinIntegral[b*x])/x^2,x]
[Out] Integrate[(Sin[b*x]*SinIntegral[b*x])/x^2, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.18 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\text{Si}\,(bx)\sin\,(bx)}{x^2}dx$$

```
[In] int(Si(b*x)*sin(b*x)/x^2,x)
[Out] int(Si(b*x)*sin(b*x)/x^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\sin(bx)\text{Si}(bx)}{x^2}\,dx = \int \frac{\sin\,(bx)\,\text{Si}\,(bx)}{x^2}\,dx$$

```
[In] integrate(sin_integral(b*x)*sin(b*x)/x^2,x, algorithm="fricas")
[Out] integral(sin(b*x)*sin_integral(b*x)/x^2, x)
```

Sympy [N/A]

Not integrable

Time = 1.24 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\sin(bx)\text{Si}(bx)}{x^2} \, dx = \int \frac{\sin(bx)\,\text{Si}\,(bx)}{x^2} \, dx$$

```
[In] integrate(Si(b*x)*sin(b*x)/x**2,x)
[Out] Integral(sin(b*x)*Si(b*x)/x**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\sin(bx)\text{Si}(bx)}{x^2} \, dx = \int \frac{\sin(bx)\,\text{Si}\,(bx)}{x^2} \, dx$$

```
[In] integrate(sin_integral(b*x)*sin(b*x)/x^2,x, algorithm="maxima")
[Out] integrate(sin(b*x)*sin_integral(b*x)/x^2, x)
```

Giac [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\sin(bx)\text{Si}(bx)}{x^2} \, dx = \int \frac{\sin(bx)\,\text{Si}\,(bx)}{x^2} \, dx$$

```
[In] integrate(sin_integral(b*x)*sin(b*x)/x^2,x, algorithm="giac")
[Out] integrate(sin(b*x)*sin_integral(b*x)/x^2, x)
```

Mupad [N/A]

Not integrable

Time = 4.99 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\sin(bx)\text{Si}(bx)}{x^2}\,dx = \int \frac{\mathrm{sinint}(b\,x)\,\sin\left(b\,x\right)}{x^2}\,dx$$

```
[In] int((sinint(b*x)*sin(b*x))/x^2,x)
[Out] int((sinint(b*x)*sin(b*x))/x^2, x)
```

3.41 $\int \frac{\sin(bx)\mathbf{Si}(bx)}{x}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 10

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x}\,dx = \frac{\mathrm{Si}(bx)^2}{2}$$

```
[Out] 1/2*Si(b*x)^2
```

Rubi [A] (verified)

Time = 0.01 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.083, Rules used = {6818}

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x}\,dx = \frac{\mathrm{Si}(bx)^2}{2}$$

```
[In] Int[(Sin[b*x]*SinIntegral[b*x])/x,x]
```

```
[Out] SinIntegral[b*x]^2/2
```

Rule 6818

```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

Rubi steps

$$\text{integral} = \frac{\mathrm{Si}(bx)^2}{2}$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\sin(bx)\text{Si}(bx)}{x}\,dx = \frac{\text{Si}(bx)^2}{2}$$

```
[In] Integrate[(Sin[b*x]*SinIntegral[b*x])/x,x]
[Out] SinIntegral[b*x]^2/2
```

Maple [A] (verified)

Time = 0.25 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.90

method	result	size
derivativedivides	$\frac{\text{Si}(bx)^2}{2}$	9
default	$\frac{\text{Si}(bx)^2}{2}$	9

```
[In] int(Si(b*x)*sin(b*x)/x,x,method=_RETURNVERBOSE)
[Out] 1/2*Si(b*x)^2
```

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.80

$$\int \frac{\sin(bx)\text{Si}(bx)}{x}\,dx = \frac{1}{2}\,\text{Si}\,(bx)^2$$

```
[In] integrate(sin_integral(b*x)*sin(b*x)/x,x, algorithm="fricas")
[Out] 1/2*sin_integral(b*x)^2
```

Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.70

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x}\,dx = \frac{\mathrm{Si}^2\,(bx)}{2}$$

```
[In] integrate(Si(b*x)*sin(b*x)/x,x)
[Out] Si(b*x)**2/2
```

Maxima [A] (verification not implemented)

none

Time = 0.19 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.80

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x}\,dx = \frac{1}{2}\,\mathrm{Si}\,(bx)^2$$

```
[In] integrate(sin_integral(b*x)*sin(b*x)/x,x, algorithm="maxima")
[Out] 1/2*sin_integral(b*x)^2
```

Giac [F]

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x}\,dx = \int \frac{\sin\,(bx)\,\mathrm{Si}\,(bx)}{x}\,dx$$

```
[In] integrate(sin_integral(b*x)*sin(b*x)/x,x, algorithm="giac")
[Out] integrate(sin(b*x)*sin_integral(b*x)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\sin(bx)\mathrm{Si}(bx)}{x}\,dx = \frac{\mathrm{sinint}(b\,x)^2}{2}$$

```
[In] int((sinint(b*x)*sin(b*x))/x,x)
[Out] sinint(b*x)^2/2
```

3.42 $\int \sin(bx)\textbf{Si}(bx)\,dx$

Optimal result

Integrand size = 9, antiderivative size = 26

$$\int \sin(bx)\text{Si}(bx)\,dx = -\frac{\cos(bx)\text{Si}(bx)}{b} + \frac{\text{Si}(2bx)}{2b}$$

```
[Out] -cos(b*x)*Si(b*x)/b+1/2*Si(2*b*x)/b
```

Rubi [A] (verified)

Time = 0.03 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.444, Rules used = {6646, 12, 4491, 3380}

$$\int \sin(bx)\text{Si}(bx)\,dx = \frac{\text{Si}(2bx)}{2b} - \frac{\text{Si}(bx)\cos(bx)}{b}$$

```
[In] Int[Sin[b*x]*SinIntegral[b*x],x]
```

```
[Out] -((Cos[b*x]*SinIntegral[b*x])/b) + SinIntegral[2*b*x]/(2*b)
```

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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{\cos(bx)\text{Si}(bx)}{b} + \int \frac{\cos(bx)\sin(bx)}{bx}\,dx \\
&= -\frac{\cos(bx)\text{Si}(bx)}{b} + \frac{\int \frac{\cos(bx)\sin(bx)}{x}\,dx}{b} \\
&= -\frac{\cos(bx)\text{Si}(bx)}{b} + \frac{\int \frac{\sin(2bx)}{2x}\,dx}{b} \\
&= -\frac{\cos(bx)\text{Si}(bx)}{b} + \frac{\int \frac{\sin(2bx)}{x}\,dx}{2b} \\
&= -\frac{\cos(bx)\text{Si}(bx)}{b} + \frac{\text{Si}(2bx)}{2b}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \sin(bx)\text{Si}(bx)\,dx = -\frac{\cos(bx)\text{Si}(bx)}{b} + \frac{\text{Si}(2bx)}{2b}$$

```
[In] Integrate[Sin[b*x]*SinIntegral[b*x],x]
[Out] -((Cos[b*x]*SinIntegral[b*x])/b) + SinIntegral[2*b*x]/(2*b)
```

Maple [A] (verified)

Time = 0.32 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

method	result	size
derivativedivides	$\frac{-\cos(bx)\,\mathrm{Si}(bx)+\frac{\mathrm{Si}(2bx)}{2}}{b}$	23
default	$\frac{-\cos(bx)\,\mathrm{Si}(bx)+\frac{\mathrm{Si}(2bx)}{2}}{b}$	23

```
[In] int(Si(b*x)*sin(b*x),x,method=_RETURNVERBOSE)
[Out] 1/b*(-cos(b*x)*Si(b*x)+1/2*Si(2*b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.88

$$\int \sin(bx)\mathrm{Si}(bx)\,dx = -\frac{2\,\cos(bx)\,\mathrm{Si}\,(bx) - \mathrm{Si}\,(2\,bx)}{2\,b}$$

```
[In] integrate(sin_integral(b*x)*sin(b*x),x, algorithm="fricas")
[Out] -1/2*(2*cos(b*x)*sin_integral(b*x) - sin_integral(2*b*x))/b
```

Sympy [F]

$$\int \sin(bx)\mathrm{Si}(bx)\,dx = \int \sin\,(bx)\,\mathrm{Si}\,(bx)\,dx$$

```
[In] integrate(Si(b*x)*sin(b*x),x)
[Out] Integral(sin(b*x)*Si(b*x), x)
```

Maxima [F]

$$\int \sin(bx)\mathrm{Si}(bx)\,dx = \int \sin\,(bx)\,\mathrm{Si}\,(bx)\,dx$$

```
[In] integrate(sin_integral(b*x)*sin(b*x),x, algorithm="maxima")
[Out] integrate(sin(b*x)*sin_integral(b*x), x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.27 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.58

$$\int \sin(bx)\mathrm{Si}(bx)\,dx = -\frac{\cos(bx)\,\mathrm{Si}\,(bx)}{b} + \frac{\Im(\mathrm{Ci}\,(2\,bx)) - \Im(\mathrm{Ci}\,(-2\,bx)) + 2\,\mathrm{Si}\,(2\,bx)}{4\,b}$$

```
[In] integrate(sin_integral(b*x)*sin(b*x),x, algorithm="giac")
```

```
[Out] -cos(b*x)*sin_integral(b*x)/b + 1/4*(imag_part(cos_integral(2*b*x)) - imag_
part(cos_integral(-2*b*x)) + 2*sin_integral(2*b*x))/b
```

Mupad [F(-1)]

Timed out.

$$\int \sin(bx)\mathrm{Si}(bx)\,dx = \int \mathrm{sinint}(b\,x)\,\sin(b\,x)\,dx$$

```
[In] int(sinint(b*x)*sin(b*x),x)
```

```
[Out] int(sinint(b*x)*sin(b*x), x)
```

3.43 $\int x \sin(bx)\mathbf{Si}(bx)\,dx$

Optimal result

Integrand size = 10, antiderivative size = 61

$$\int x\sin(bx)\text{Si}(bx)\,dx=\frac{\text{CosIntegral}(2bx)}{2b^2}-\frac{\log(x)}{2b^2}+\frac{\sin^2(bx)}{2b^2}-\frac{x\cos(bx)\text{Si}(bx)}{b}+\frac{\sin(bx)\text{Si}(bx)}{b^2}$$

```
[Out] 1/2*Ci(2*b*x)/b^2-1/2*ln(x)/b^2-x*cos(b*x)*Si(b*x)/b+Si(b*x)*sin(b*x)/b^2+1
/2*sin(b*x)^2/b^2
```

Rubi [A] (verified)

Time = 0.08 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.700, Rules used = {6648, 12, 2644, 30, 6652, 3393, 3383}

$$\int x\sin(bx)\text{Si}(bx)\,dx=\frac{\text{CosIntegral}(2bx)}{2b^2}+\frac{\text{Si}(bx)\sin(bx)}{b^2}-\frac{\log(x)}{2b^2}+\frac{\sin^2(bx)}{2b^2}-\frac{x\text{Si}(bx)\cos(bx)}{b}$$

```
[In] Int[x*Sin[b*x]*SinIntegral[b*x],x]
```

```
[Out] CosIntegral[2*b*x]/(2*b^2) - Log[x]/(2*b^2) + Sin[b*x]^2/(2*b^2) - (x*Cos[b
*x]*SinIntegral[b*x])/b + (Sin[b*x]*SinIntegral[b*x])/b^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 30

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

Rule 2644

```
Int[cos[(e_.) + (f_.)*(x_)]^(n_.)*((a_.)*sin[(e_.) + (f_.)*(x_)])^(m_.), x_
Symbol] :> Dist[1/(a*f), Subst[Int[x^m*(1 - x^2/a^2)^((n - 1)/2), x], x, a*
Sin[e + f*x]], x] /; FreeQ[{a, e, f, m}, x] && IntegerQ[(n - 1)/2] &&  !(In
tegerQ[(m - 1)/2] && LtQ[0, m, n])
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 6648

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

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{x\cos(bx)\text{Si}(bx)}{b}+\frac{\int\cos(bx)\text{Si}(bx)\,dx}{b}+\int\frac{\cos(bx)\sin(bx)}{b}\,dx\\
&= -\frac{x\cos(bx)\text{Si}(bx)}{b}+\frac{\sin(bx)\text{Si}(bx)}{b^2}+\frac{\int\cos(bx)\sin(bx)\,dx}{b}-\frac{\int\frac{\sin^2(bx)}{bx}\,dx}{b}\\
&= -\frac{x\cos(bx)\text{Si}(bx)}{b}+\frac{\sin(bx)\text{Si}(bx)}{b^2}-\frac{\int\frac{\sin^2(bx)}{x}\,dx}{b^2}+\frac{\text{Subst}(\int x\,dx,x,\sin(bx))}{b^2}
\end{aligned}$$

$$= \frac{\sin^2(bx)}{2b^2} - \frac{x\cos(bx)\mathrm{Si}(bx)}{b} + \frac{\sin(bx)\mathrm{Si}(bx)}{b^2} - \frac{\int \left(\frac{1}{2x} - \frac{\cos(2bx)}{2x}\right) dx}{b^2}$$

$$= -\frac{\log(x)}{2b^2} + \frac{\sin^2(bx)}{2b^2} - \frac{x\cos(bx)\mathrm{Si}(bx)}{b} + \frac{\sin(bx)\mathrm{Si}(bx)}{b^2} + \frac{\int \frac{\cos(2bx)}{x} dx}{2b^2}$$

$$= \frac{\mathrm{CosIntegral}(2bx)}{2b^2} - \frac{\log(x)}{2b^2} + \frac{\sin^2(bx)}{2b^2} - \frac{x\cos(bx)\mathrm{Si}(bx)}{b} + \frac{\sin(bx)\mathrm{Si}(bx)}{b^2}$$

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.72

$$\int x\sin(bx)\mathrm{Si}(bx)\,dx = -\frac{\cos(2bx) - 2\,\mathrm{CosIntegral}(2bx) + 2\log(x) + 4(bx\cos(bx) - \sin(bx))\mathrm{Si}(bx)}{4b^2}$$

```
[In] Integrate[x*Sin[b*x]*SinIntegral[b*x],x]
[Out] -1/4*(Cos[2*b*x] - 2*CosIntegral[2*b*x] + 2*Log[x] + 4*(b*x*Cos[b*x] - Sin[
b*x])*SinIntegral[b*x])/b^2
```

Maple [A] (verified)

Time = 0.66 (sec) , antiderivative size = 45, normalized size of antiderivative = 0.74

method	result	size
derivativedivides	$\frac{\mathrm{Si}(bx)(\sin(bx)-bx\cos(bx))-\frac{\cos(bx)^2}{2}-\frac{\ln(bx)}{2}+\frac{\mathrm{Ci}(2bx)}{2}}{b^2}$	45
default	$\frac{\mathrm{Si}(bx)(\sin(bx)-bx\cos(bx))-\frac{\cos(bx)^2}{2}-\frac{\ln(bx)}{2}+\frac{\mathrm{Ci}(2bx)}{2}}{b^2}$	45

```
[In] int(x*Si(b*x)*sin(b*x),x,method=_RETURNVERBOSE)
[Out] 1/b^2*(Si(b*x)*(sin(b*x)-b*x*cos(b*x))-1/2*cos(b*x)^2-1/2*ln(b*x)+1/2*Ci(2*
b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.70

$$\int x\sin(bx)\mathrm{Si}(bx)\,dx = -\frac{2\,bx\cos\left(bx\right)\mathrm{Si}\left(bx\right)+\cos\left(bx\right)^{2}-2\,\sin\left(bx\right)\mathrm{Si}\left(bx\right)-\mathrm{Ci}\left(2\,bx\right)+\log\left(x\right)}{2\,b^{2}}$$

```
[In] integrate(x*sin_integral(b*x)*sin(b*x),x, algorithm="fricas")
[Out] -1/2*(2*b*x*cos(b*x)*sin_integral(b*x) + cos(b*x)^2 - 2*sin(b*x)*sin_integr
al(b*x) - cos_integral(2*b*x) + log(x))/b^2
```

Sympy [F]

$$\int x\sin(bx)\mathrm{Si}(bx)\,dx = \int x\sin\left(bx\right)\mathrm{Si}\left(bx\right)dx$$

```
[In] integrate(x*Si(b*x)*sin(b*x),x)
[Out] Integral(x*sin(b*x)*Si(b*x), x)
```

Maxima [F]

$$\int x\sin(bx)\mathrm{Si}(bx)\,dx = \int x\sin\left(bx\right)\mathrm{Si}\left(bx\right)\,dx$$

```
[In] integrate(x*sin_integral(b*x)*sin(b*x),x, algorithm="maxima")
[Out] integrate(x*sin(b*x)*sin_integral(b*x), x)
```

Giac [A] (verification not implemented)

none

Time = 0.29 (sec) , antiderivative size = 55, normalized size of antiderivative = 0.90

$$\int x\sin(bx)\mathrm{Si}(bx)\,dx = -\left(\frac{x\cos\left(bx\right)}{b}-\frac{\sin\left(bx\right)}{b^{2}}\right)\mathrm{Si}\left(bx\right) - \frac{\cos\left(2\,bx\right)-\mathrm{Ci}\left(2\,bx\right)-\mathrm{Ci}\left(-2\,bx\right)+2\,\log\left(x\right)}{4\,b^{2}}$$

```
[In] integrate(x*sin_integral(b*x)*sin(b*x),x, algorithm="giac")
[Out] -(x*cos(b*x)/b - sin(b*x)/b^2)*sin_integral(b*x) - 1/4*(cos(2*b*x) - cos_in
tegral(2*b*x) - cos_integral(-2*b*x) + 2*log(x))/b^2
```

Mupad [F(-1)]

Timed out.

$$\int x\sin(bx)\mathrm{Si}(bx)\,dx = \int x\,\mathrm{sinint}(b\,x)\,\sin\left(b\,x\right)\,dx$$

```
[In] int(x*sinint(b*x)*sin(b*x),x)
[Out] int(x*sinint(b*x)*sin(b*x), x)
```

3.44 $\int x^2 \sin(bx)\mathbf{Si}(bx)\,dx$

Optimal result

Integrand size = 12, antiderivative size = 91

$$\int x^2\sin(bx)\text{Si}(bx)\,dx=-\frac{5x}{4b^2}+\frac{5\cos(bx)\sin(bx)}{4b^3}+\frac{x\sin^2(bx)}{2b^2}+\frac{2\cos(bx)\text{Si}(bx)}{b^3}-\frac{x^2\cos(bx)\text{Si}(bx)}{b}+\frac{2x\sin(bx)\text{Si}(bx)}{b^2}-\frac{\text{Si}(2bx)}{b^3}$$

```
[Out] -5/4*x/b^2+2*cos(b*x)*Si(b*x)/b^3-x^2*cos(b*x)*Si(b*x)/b-Si(2*b*x)/b^3+5/4*
cos(b*x)*sin(b*x)/b^3+2*x*Si(b*x)*sin(b*x)/b^2+1/2*x*sin(b*x)^2/b^2
```

Rubi [A] (verified)

Time = 0.08 (sec) , antiderivative size = 91, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.750, Rules used = {6648, 12, 3524, 2715, 8, 6654, 6646, 4491, 3380}

$$\int x^2\sin(bx)\text{Si}(bx)\,dx=-\frac{\text{Si}(2bx)}{b^3}+\frac{2\text{Si}(bx)\cos(bx)}{b^3}+\frac{5\sin(bx)\cos(bx)}{4b^3}+\frac{2x\text{Si}(bx)\sin(bx)}{b^2}-\frac{5x}{4b^2}+\frac{x\sin^2(bx)}{2b^2}-\frac{x^2\text{Si}(bx)\cos(bx)}{b}$$

```
[In] Int[x^2*Sin[b*x]*SinIntegral[b*x],x]
```

```
[Out] (-5*x)/(4*b^2) + (5*Cos[b*x]*Sin[b*x])/(4*b^3) + (x*Sin[b*x]^2)/(2*b^2) + (
2*Cos[b*x]*SinIntegral[b*x])/b^3 - (x^2*Cos[b*x]*SinIntegral[b*x])/b + (2*x
*Sin[b*x]*SinIntegral[b*x])/b^2 - SinIntegral[2*b*x]/b^3
```

Rule 8

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

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 2715

```
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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3524

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

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6648

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

Rule 6654

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

Rubi steps

$$
\begin{aligned}
\text{integral} &= -\frac{x^2\cos(bx)\text{Si}(bx)}{b}+\frac{2\int x\cos(bx)\text{Si}(bx)\,dx}{b}+\int\frac{x\cos(bx)\sin(bx)}{b}\,dx\\
&= -\frac{x^2\cos(bx)\text{Si}(bx)}{b}+\frac{2x\sin(bx)\text{Si}(bx)}{b^2}-\frac{2\int\sin(bx)\text{Si}(bx)\,dx}{b^2}\\
&\quad+\frac{\int x\cos(bx)\sin(bx)\,dx}{b}-\frac{2\int\frac{\sin^2(bx)}{b}\,dx}{b}\\
&= \frac{x\sin^2(bx)}{2b^2}+\frac{2\cos(bx)\text{Si}(bx)}{b^3}-\frac{x^2\cos(bx)\text{Si}(bx)}{b}+\frac{2x\sin(bx)\text{Si}(bx)}{b^2}\\
&\quad-\frac{\int\sin^2(bx)\,dx}{2b^2}-\frac{2\int\frac{\cos(bx)\sin(bx)}{bx}\,dx}{b^2}-\frac{2\int\sin^2(bx)\,dx}{b^2}\\
&= \frac{5\cos(bx)\sin(bx)}{4b^3}+\frac{x\sin^2(bx)}{2b^2}+\frac{2\cos(bx)\text{Si}(bx)}{b^3}-\frac{x^2\cos(bx)\text{Si}(bx)}{b}\\
&\quad+\frac{2x\sin(bx)\text{Si}(bx)}{b^2}-\frac{2\int\frac{\cos(bx)\sin(bx)}{x}\,dx}{b^3}-\frac{\int 1\,dx}{4b^2}-\frac{\int 1\,dx}{b^2}\\
&= -\frac{5x}{4b^2}+\frac{5\cos(bx)\sin(bx)}{4b^3}+\frac{x\sin^2(bx)}{2b^2}+\frac{2\cos(bx)\text{Si}(bx)}{b^3}\\
&\quad-\frac{x^2\cos(bx)\text{Si}(bx)}{b}+\frac{2x\sin(bx)\text{Si}(bx)}{b^2}-\frac{2\int\frac{\sin(2bx)}{2x}\,dx}{b^3}\\
&= -\frac{5x}{4b^2}+\frac{5\cos(bx)\sin(bx)}{4b^3}+\frac{x\sin^2(bx)}{2b^2}+\frac{2\cos(bx)\text{Si}(bx)}{b^3}\\
&\quad-\frac{x^2\cos(bx)\text{Si}(bx)}{b}+\frac{2x\sin(bx)\text{Si}(bx)}{b^2}-\frac{\int\frac{\sin(2bx)}{x}\,dx}{b^3}\\
&= -\frac{5x}{4b^2}+\frac{5\cos(bx)\sin(bx)}{4b^3}+\frac{x\sin^2(bx)}{2b^2}+\frac{2\cos(bx)\text{Si}(bx)}{b^3}\\
&\quad-\frac{x^2\cos(bx)\text{Si}(bx)}{b}+\frac{2x\sin(bx)\text{Si}(bx)}{b^2}-\frac{\text{Si}(2bx)}{b^3}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 64, normalized size of antiderivative = 0.70

$$\int x^2 \sin(bx)\text{Si}(bx)\,dx = -\frac{8bx + 2bx\cos(2bx) - 5\sin(2bx) + 8((-2+b^2x^2)\cos(bx) - 2bx\sin(bx))\,\text{Si}(bx) + 8\text{Si}(2bx)}{8b^3}$$

```
[In] Integrate[x^2*Sin[b*x]*SinIntegral[b*x],x]
```

```
[Out] -1/8*(8*b*x + 2*b*x*Cos[2*b*x] - 5*Sin[2*b*x] + 8*((-2 + b^2*x^2)*Cos[b*x]
- 2*b*x*Sin[b*x])*SinIntegral[b*x] + 8*SinIntegral[2*b*x])/b^3
```

Maple [A] (verified)

Time = 0.82 (sec) , antiderivative size = 69, normalized size of antiderivative = 0.76

method	result	size
derivativedivides	$\frac{\text{Si}(bx)\left(-b^2x^2\cos(bx)+2\cos(bx)+2bx\sin(bx)\right)-\frac{bx\cos(bx)^2}{2}+\frac{5\sin(bx)\cos(bx)}{4}-\frac{3bx}{4}-\text{Si}(2bx)}{b^3}$	69
default	$\frac{\text{Si}(bx)\left(-b^2x^2\cos(bx)+2\cos(bx)+2bx\sin(bx)\right)-\frac{bx\cos(bx)^2}{2}+\frac{5\sin(bx)\cos(bx)}{4}-\frac{3bx}{4}-\text{Si}(2bx)}{b^3}$	69

```
[In] int(x^2*Si(b*x)*sin(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^3*(Si(b*x)*(-b^2*x^2*cos(b*x)+2*cos(b*x)+2*b*x*sin(b*x))-1/2*b*x*cos(b*
x)^2+5/4*sin(b*x)*cos(b*x)-3/4*b*x-Si(2*b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 67, normalized size of antiderivative = 0.74

$$\int x^2 \sin(bx)\text{Si}(bx)\,dx = -\frac{2\,bx\cos{(bx)}^2 + 4\,(b^2x^2 - 2)\cos{(bx)}\,\text{Si}\,(bx) + 3\,bx - (8\,bx\,\text{Si}\,(bx) + 5\,\cos{(bx)})\sin{(bx)} + 4\,\text{Si}\,(2\,bx)}{4\,b^3}$$

```
[In] integrate(x^2*sin_integral(b*x)*sin(b*x),x, algorithm="fricas")
```

```
[Out] -1/4*(2*b*x*cos(b*x)^2 + 4*(b^2*x^2 - 2)*cos(b*x)*sin_integral(b*x) + 3*b*x
 - (8*b*x*sin_integral(b*x) + 5*cos(b*x))*sin(b*x) + 4*sin_integral(2*b*x))
/b^3
```

Sympy [F]

$$\int x^2 \sin(bx)\text{Si}(bx)\,dx = \int x^2 \sin{(bx)}\,\text{Si}\,(bx)\,dx$$

```
[In] integrate(x**2*Si(b*x)*sin(b*x),x)
[Out] Integral(x**2*sin(b*x)*Si(b*x), x)
```

Maxima [F]

$$\int x^2 \sin(bx)\text{Si}(bx)\,dx = \int x^2 \sin{(bx)}\,\text{Si}\,(bx)\;dx$$

```
[In] integrate(x^2*sin_integral(b*x)*sin(b*x),x, algorithm="maxima")
[Out] integrate(x^2*sin(b*x)*sin_integral(b*x), x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.28 (sec) , antiderivative size = 138, normalized size of antiderivative = 1.52

$$\int x^2 \sin(bx)\text{Si}(bx)\,dx = \left(\frac{2\,x\sin{(bx)}}{b^2} - \frac{(b^2x^2-2)\cos{(bx)}}{b^3}\right)\text{Si}\,(bx) - \frac{3\,bx\tan{(bx)}^2 + 2\,\Im(\text{Ci}\,(2\,bx))\tan{(bx)}^2 - 2\,\Im(\text{Ci}\,(-2\,bx))\tan{(bx)}^2 + 4\,\text{Si}\,(2\,bx)\tan{(bx)}^2 + 5\,bx + 2\,\Im(\text{C}}{4\left(b^3\tan{(bx)}^2 + b^3\right)}$$

```
[In] integrate(x^2*sin_integral(b*x)*sin(b*x),x, algorithm="giac")
[Out] (2*x*sin(b*x)/b^2 - (b^2*x^2 - 2)*cos(b*x)/b^3)*sin_integral(b*x) - 1/4*(3*
b*x*tan(b*x)^2 + 2*imag_part(cos_integral(2*b*x))*tan(b*x)^2 - 2*imag_part(
cos_integral(-2*b*x))*tan(b*x)^2 + 4*sin_integral(2*b*x)*tan(b*x)^2 + 5*b*x
 + 2*imag_part(cos_integral(2*b*x)) - 2*imag_part(cos_integral(-2*b*x)) + 4
*sin_integral(2*b*x) - 5*tan(b*x))/(b^3*tan(b*x)^2 + b^3)
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \sin(bx)\mathrm{Si}(bx)\,dx = \int x^2\,\mathrm{sinint}(b\,x)\,\sin\left(b\,x\right)\,dx$$

```
[In] int(x^2*sinint(b*x)*sin(b*x),x)
[Out] int(x^2*sinint(b*x)*sin(b*x), x)
```

3.45 $\int x^3 \sin(bx)\mathbf{Si}(bx)\,dx$

Optimal result

Integrand size = 12, antiderivative size = 126

$$\int x^3\sin(bx)\text{Si}(bx)\,dx=-\frac{x^2}{b^2}-\frac{3\,\text{CosIntegral}(2bx)}{b^4}+\frac{3\log(x)}{b^4}+\frac{2x\cos(bx)\sin(bx)}{b^3}-\frac{4\sin^2(bx)}{b^4}+\frac{x^2\sin^2(bx)}{2b^2}+\frac{6x\cos(bx)\text{Si}(bx)}{b^3}-\frac{x^3\cos(bx)\text{Si}(bx)}{b}-\frac{6\sin(bx)\text{Si}(bx)}{b^4}+\frac{3x^2\sin(bx)\text{Si}(bx)}{b^2}$$

```
[Out] -x^2/b^2-3*Ci(2*b*x)/b^4+3*ln(x)/b^4+6*x*cos(b*x)*Si(b*x)/b^3-x^3*cos(b*x)*
Si(b*x)/b+2*x*cos(b*x)*sin(b*x)/b^3-6*Si(b*x)*sin(b*x)/b^4+3*x^2*Si(b*x)*si
n(b*x)/b^2-4*sin(b*x)^2/b^4+1/2*x^2*sin(b*x)^2/b^2
```

Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 126, normalized size of antiderivative = 1.00, number of steps used = 18, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.833, Rules used = {6648, 12, 3524, 3391, 30, 6654, 2644, 6652, 3393, 3383}

$$\int x^3\sin(bx)\text{Si}(bx)\,dx=-\frac{3\,\text{CosIntegral}(2bx)}{b^4}-\frac{6\text{Si}(bx)\sin(bx)}{b^4}+\frac{3\log(x)}{b^4}-\frac{4\sin^2(bx)}{b^4}+\frac{6x\text{Si}(bx)\cos(bx)}{b^3}+\frac{2x\sin(bx)\cos(bx)}{b^3}+\frac{3x^2\text{Si}(bx)\sin(bx)}{b^2}-\frac{x^2}{b^2}+\frac{x^2\sin^2(bx)}{2b^2}-\frac{x^3\text{Si}(bx)\cos(bx)}{b}$$

```
[In] Int[x^3*Sin[b*x]*SinIntegral[b*x],x]
```

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

```
*SinIntegral[b*x])/b^3 - (x^3*Cos[b*x]*SinIntegral[b*x])/b - (6*Sin[b*x]*Si
nIntegral[b*x])/b^4 + (3*x^2*Sin[b*x]*SinIntegral[b*x])/b^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 30

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

Rule 2644

```
Int[cos[(e_.) + (f_.)*(x_)]^(n_.)*((a_.)*sin[(e_.) + (f_.)*(x_)])^(m_.), x_
Symbol] :> Dist[1/(a*f), Subst[Int[x^m*(1 - x^2/a^2)^((n - 1)/2), x], x, a*
Sin[e + f*x]], x] /; FreeQ[{a, e, f, m}, x] && IntegerQ[(n - 1)/2] &&  !(In
tegerQ[(m - 1)/2] && LtQ[0, m, n])
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3391

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

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 3524

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

Rule 6648

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

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6654

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

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{x^3\cos(bx)\text{Si}(bx)}{b}+\frac{3\int x^2\cos(bx)\text{Si}(bx)\,dx}{b}+\int\frac{x^2\cos(bx)\sin(bx)}{b}\,dx\\
&= -\frac{x^3\cos(bx)\text{Si}(bx)}{b}+\frac{3x^2\sin(bx)\text{Si}(bx)}{b^2}-\frac{6\int x\sin(bx)\text{Si}(bx)\,dx}{b^2}\\
&\quad+\frac{\int x^2\cos(bx)\sin(bx)\,dx}{b}-\frac{3\int\frac{x\sin^2(bx)}{b}\,dx}{b}\\
&= \frac{x^2\sin^2(bx)}{2b^2}+\frac{6x\cos(bx)\text{Si}(bx)}{b^3}-\frac{x^3\cos(bx)\text{Si}(bx)}{b}+\frac{3x^2\sin(bx)\text{Si}(bx)}{b^2}\\
&\quad-\frac{6\int\cos(bx)\text{Si}(bx)\,dx}{b^3}-\frac{\int x\sin^2(bx)\,dx}{b^2}-\frac{3\int x\sin^2(bx)\,dx}{b^2}-\frac{6\int\frac{\cos(bx)\sin(bx)}{b}\,dx}{b^2}\\
&= \frac{2x\cos(bx)\sin(bx)}{b^3}-\frac{\sin^2(bx)}{b^4}+\frac{x^2\sin^2(bx)}{2b^2}+\frac{6x\cos(bx)\text{Si}(bx)}{b^3}\\
&\quad-\frac{x^3\cos(bx)\text{Si}(bx)}{b}-\frac{6\sin(bx)\text{Si}(bx)}{b^4}+\frac{3x^2\sin(bx)\text{Si}(bx)}{b^2}\\
&\quad-\frac{6\int\cos(bx)\sin(bx)\,dx}{b^3}+\frac{6\int\frac{\sin^2(bx)}{bx}\,dx}{b^3}-\frac{\int x\,dx}{2b^2}-\frac{3\int x\,dx}{2b^2}\\
&= -\frac{x^2}{b^2}+\frac{2x\cos(bx)\sin(bx)}{b^3}-\frac{\sin^2(bx)}{b^4}+\frac{x^2\sin^2(bx)}{2b^2}+\frac{6x\cos(bx)\text{Si}(bx)}{b^3}-\frac{x^3\cos(bx)\text{Si}(bx)}{b}\\
&\quad-\frac{6\sin(bx)\text{Si}(bx)}{b^4}+\frac{3x^2\sin(bx)\text{Si}(bx)}{b^2}+\frac{6\int\frac{\sin^2(bx)}{x}\,dx}{b^4}-\frac{6\text{Subst}(\int x\,dx,x,\sin(bx))}{b^4}
\end{aligned}$$

$$= -\frac{x^2}{b^2} + \frac{2x\cos(bx)\sin(bx)}{b^3} - \frac{4\sin^2(bx)}{b^4} + \frac{x^2\sin^2(bx)}{2b^2} + \frac{6x\cos(bx)\text{Si}(bx)}{b^3} - \frac{x^3\cos(bx)\text{Si}(bx)}{b} - \frac{6\sin(bx)\text{Si}(bx)}{b^4} + \frac{3x^2\sin(bx)\text{Si}(bx)}{b^2} + \frac{6\int\left(\frac{1}{2x} - \frac{\cos(2bx)}{2x}\right)dx}{b^4}$$

$$= -\frac{x^2}{b^2} + \frac{3\log(x)}{b^4} + \frac{2x\cos(bx)\sin(bx)}{b^3} - \frac{4\sin^2(bx)}{b^4} + \frac{x^2\sin^2(bx)}{2b^2} + \frac{6x\cos(bx)\text{Si}(bx)}{b^3} - \frac{x^3\cos(bx)\text{Si}(bx)}{b} - \frac{6\sin(bx)\text{Si}(bx)}{b^4} + \frac{3x^2\sin(bx)\text{Si}(bx)}{b^2} - \frac{3\int\frac{\cos(2bx)}{x}dx}{b^4}$$

$$= -\frac{x^2}{b^2} - \frac{3\,\text{CosIntegral}(2bx)}{b^4} + \frac{3\log(x)}{b^4} + \frac{2x\cos(bx)\sin(bx)}{b^3} - \frac{4\sin^2(bx)}{b^4} + \frac{x^2\sin^2(bx)}{2b^2} + \frac{6x\cos(bx)\text{Si}(bx)}{b^3} - \frac{x^3\cos(bx)\text{Si}(bx)}{b} - \frac{6\sin(bx)\text{Si}(bx)}{b^4} + \frac{3x^2\sin(bx)\text{Si}(bx)}{b^2}$$

Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 93, normalized size of antiderivative = 0.74

$$\int x^3\sin(bx)\text{Si}(bx)\,dx = -\frac{3b^2x^2 - 8\cos(2bx) + b^2x^2\cos(2bx) + 12\,\text{CosIntegral}(2bx) - 12\log(x) - 4bx\sin(2bx) + 4(bx(-6 + b^2x^2}{4b^4}$$

```
[In] Integrate[x^3*Sin[b*x]*SinIntegral[b*x],x]
```

```
[Out] -1/4*(3*b^2*x^2 - 8*Cos[2*b*x] + b^2*x^2*Cos[2*b*x] + 12*CosIntegral[2*b*x]
 - 12*Log[x] - 4*b*x*Sin[2*b*x] + 4*(b*x*(-6 + b^2*x^2)*Cos[b*x] - 3*(-2 +
b^2*x^2)*Sin[b*x])*SinIntegral[b*x])/b^4
```

Maple [A] (verified)

Time = 1.04 (sec) , antiderivative size = 138, normalized size of antiderivative = 1.10

method	result
derivativedivides	$\frac{\text{Si}(bx)\left(-b^3x^3\cos(bx)+3b^2x^2\sin(bx)-6\sin(bx)+6bx\cos(bx)\right)-\frac{b^2x^2\cos(bx)^2}{2}+bx\left(\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)+\frac{b^2x^2}{2}-\sin(bx)^2-}{b^4}$
default	$\frac{\text{Si}(bx)\left(-b^3x^3\cos(bx)+3b^2x^2\sin(bx)-6\sin(bx)+6bx\cos(bx)\right)-\frac{b^2x^2\cos(bx)^2}{2}+bx\left(\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)+\frac{b^2x^2}{2}-\sin(bx)^2-}{b^4}$

```
[In] int(x^3*Si(b*x)*sin(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^4*(Si(b*x)*(-b^3*x^3*cos(b*x)+3*b^2*x^2*sin(b*x)-6*sin(b*x)+6*b*x*cos(b
*x))-1/2*b^2*x^2*cos(b*x)^2+b*x*(1/2*sin(b*x)*cos(b*x)+1/2*b*x)+1/2*b^2*x^2
-sin(b*x)^2-3*b*x*(-1/2*sin(b*x)*cos(b*x)+1/2*b*x)+3*cos(b*x)^2+3*ln(b*x)-3
*Ci(2*b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 92, normalized size of antiderivative = 0.73

$$\int x^3\sin(bx)\text{Si}(bx)\,dx = -\frac{b^2x^2 + (b^2x^2-8)\cos(bx)^2 + 2\,(b^3x^3-6\,bx)\cos(bx)\,\text{Si}(bx) - 2\,(2\,bx\cos(bx) + 3\,(b^2x^2-2)\,\text{Si}(bx))\sin (}{2\,b^4}$$

```
[In] integrate(x^3*sin_integral(b*x)*sin(b*x),x, algorithm="fricas")
[Out] -1/2*(b^2*x^2 + (b^2*x^2 - 8)*cos(b*x)^2 + 2*(b^3*x^3 - 6*b*x)*cos(b*x)*sin
_integral(b*x) - 2*(2*b*x*cos(b*x) + 3*(b^2*x^2 - 2)*sin_integral(b*x))*sin
(b*x) + 6*cos_integral(2*b*x) - 6*log(x))/b^4
```

Sympy [F]

$$\int x^3\sin(bx)\text{Si}(bx)\,dx = \int x^3\sin(bx)\,\text{Si}(bx)\,dx$$

```
[In] integrate(x**3*Si(b*x)*sin(b*x),x)
[Out] Integral(x**3*sin(b*x)*Si(b*x), x)
```

Maxima [F]

$$\int x^3\sin(bx)\text{Si}(bx)\,dx = \int x^3\sin(bx)\,\text{Si}(bx)\,dx$$

```
[In] integrate(x^3*sin_integral(b*x)*sin(b*x),x, algorithm="maxima")
[Out] integrate(x^3*sin(b*x)*sin_integral(b*x), x)
```

Giac [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 106, normalized size of antiderivative = 0.84

$$\int x^3\sin(bx)\text{Si}(bx)\,dx = -\left(\frac{(b^3x^3-6\,bx)\cos(bx)}{b^4} - \frac{3\,(b^2x^2-2)\sin(bx)}{b^4}\right)\text{Si}(bx) - \frac{b^2x^2\cos(2\,bx) + 3\,b^2x^2 - 4\,bx\sin(2\,bx) - 8\,\cos(2\,bx) + 6\,\text{Ci}(2\,bx) + 6\,\text{Ci}(-2\,bx) - 12\,\log(x)}{4\,b^4}$$

```
[In] integrate(x^3*sin_integral(b*x)*sin(b*x),x, algorithm="giac")
```

```
[Out] -((b^3*x^3 - 6*b*x)*cos(b*x)/b^4 - 3*(b^2*x^2 - 2)*sin(b*x)/b^4)*sin_integr
al(b*x) - 1/4*(b^2*x^2*cos(2*b*x) + 3*b^2*x^2 - 4*b*x*sin(2*b*x) - 8*cos(2*
b*x) + 6*cos_integral(2*b*x) + 6*cos_integral(-2*b*x) - 12*log(x))/b^4
```

Mupad [F(-1)]

Timed out.

$$\int x^3 \sin(bx)\mathrm{Si}(bx)\,dx = \int x^3\,\mathrm{sinint}(b\,x)\,\sin\left(b\,x\right)\,dx$$

```
[In] int(x^3*sinint(b*x)*sin(b*x),x)
```

```
[Out] int(x^3*sinint(b*x)*sin(b*x), x)
```

3.46 $\int \frac{\cos(bx)\mathbf{Si}(bx)}{x^3}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int \frac{\cos(bx)\text{Si}(bx)}{x^3}\,dx = -\frac{b\cos(2bx)}{4x} + \frac{b\sin^2(bx)}{2x} - \frac{\sin(2bx)}{8x^2} - \frac{\cos(bx)\text{Si}(bx)}{2x^2} + \frac{b\sin(bx)\text{Si}(bx)}{2x} - b^2\text{Si}(2bx) - \frac{1}{2}b^2\text{Int}\left(\frac{\cos(bx)\text{Si}(bx)}{x},x\right)$$

```
[Out] -1/2*b^2*CannotIntegrate(cos(b*x)*Si(b*x)/x,x)-1/4*b*cos(2*b*x)/x-1/2*cos(b
*x)*Si(b*x)/x^2-b^2*Si(2*b*x)+1/2*b*Si(b*x)*sin(b*x)/x+1/2*b*sin(b*x)^2/x-1
/8*sin(2*b*x)/x^2
```

Rubi [N/A]

Not integrable

Time = 0.13 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\cos(bx)\text{Si}(bx)}{x^3}\,dx = \int \frac{\cos(bx)\text{Si}(bx)}{x^3}\,dx$$

```
[In] Int[(Cos[b*x]*SinIntegral[b*x])/x^3,x]
```

```
[Out] -1/4*(b*Cos[2*b*x])/x + (b*Sin[b*x]^2)/(2*x) - Sin[2*b*x]/(8*x^2) - (Cos[b*
x]*SinIntegral[b*x])/(2*x^2) + (b*Sin[b*x]*SinIntegral[b*x])/(2*x) - b^2*Si
nIntegral[2*b*x] - (b^2*Defer[Int][(Cos[b*x]*SinIntegral[b*x])/x, x])/2
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= -\frac{\cos(bx)\text{Si}(bx)}{2x^2} + \frac{1}{2}b\int \frac{\cos(bx)\sin(bx)}{bx^3}\,dx - \frac{1}{2}b\int \frac{\sin(bx)\text{Si}(bx)}{x^2}\,dx \\
&= -\frac{\cos(bx)\text{Si}(bx)}{2x^2} + \frac{b\sin(bx)\text{Si}(bx)}{2x} + \frac{1}{2}\int \frac{\cos(bx)\sin(bx)}{x^3}\,dx \\
&\quad - \frac{1}{2}b^2\int \frac{\sin^2(bx)}{bx^2}\,dx - \frac{1}{2}b^2\int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx \\
&= -\frac{\cos(bx)\text{Si}(bx)}{2x^2} + \frac{b\sin(bx)\text{Si}(bx)}{2x} + \frac{1}{2}\int \frac{\sin(2bx)}{2x^3}\,dx \\
&\quad - \frac{1}{2}b\int \frac{\sin^2(bx)}{x^2}\,dx - \frac{1}{2}b^2\int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx \\
&= \frac{b\sin^2(bx)}{2x} - \frac{\cos(bx)\text{Si}(bx)}{2x^2} + \frac{b\sin(bx)\text{Si}(bx)}{2x} + \frac{1}{4}\int \frac{\sin(2bx)}{x^3}\,dx \\
&\quad - \frac{1}{2}b^2\int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx - b^2\int \frac{\sin(2bx)}{2x}\,dx \\
&= \frac{b\sin^2(bx)}{2x} - \frac{\sin(2bx)}{8x^2} - \frac{\cos(bx)\text{Si}(bx)}{2x^2} + \frac{b\sin(bx)\text{Si}(bx)}{2x} \\
&\quad + \frac{1}{4}b\int \frac{\cos(2bx)}{x^2}\,dx - \frac{1}{2}b^2\int \frac{\sin(2bx)}{x}\,dx - \frac{1}{2}b^2\int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx \\
&= -\frac{b\cos(2bx)}{4x} + \frac{b\sin^2(bx)}{2x} - \frac{\sin(2bx)}{8x^2} - \frac{\cos(bx)\text{Si}(bx)}{2x^2} + \frac{b\sin(bx)\text{Si}(bx)}{2x} \\
&\quad - \frac{1}{2}b^2\text{Si}(2bx) - \frac{1}{2}b^2\int \frac{\sin(2bx)}{x}\,dx - \frac{1}{2}b^2\int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx \\
&= -\frac{b\cos(2bx)}{4x} + \frac{b\sin^2(bx)}{2x} - \frac{\sin(2bx)}{8x^2} - \frac{\cos(bx)\text{Si}(bx)}{2x^2} \\
&\quad + \frac{b\sin(bx)\text{Si}(bx)}{2x} - b^2\text{Si}(2bx) - \frac{1}{2}b^2\int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx
\end{aligned}
$$

Mathematica [N/A]

Not integrable

Time = 0.59 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$
\int \frac{\cos(bx)\text{Si}(bx)}{x^3}\,dx = \int \frac{\cos(bx)\text{Si}(bx)}{x^3}\,dx
$$

```
[In] Integrate[(Cos[b*x]*SinIntegral[b*x])/x^3,x]
[Out] Integrate[(Cos[b*x]*SinIntegral[b*x])/x^3, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.19 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\cos\left(bx\right)\operatorname{Si}\left(bx\right)}{x^{3}}dx$$

```
[In] int(cos(b*x)*Si(b*x)/x^3,x)
[Out] int(cos(b*x)*Si(b*x)/x^3,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\mathrm{Si}(bx)}{x^3}\,dx=\int \frac{\cos\left(bx\right)\operatorname{Si}\left(bx\right)}{x^{3}}\,dx$$

```
[In] integrate(cos(b*x)*sin_integral(b*x)/x^3,x, algorithm="fricas")
[Out] integral(cos(b*x)*sin_integral(b*x)/x^3, x)
```

Sympy [N/A]

Not integrable

Time = 1.80 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\mathrm{Si}(bx)}{x^3}\,dx=\int \frac{\cos\left(bx\right)\operatorname{Si}\left(bx\right)}{x^{3}}\,dx$$

```
[In] integrate(cos(b*x)*Si(b*x)/x**3,x)
[Out] Integral(cos(b*x)*Si(b*x)/x**3, x)
```

Maxima [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\mathrm{Si}(bx)}{x^3}\,dx=\int \frac{\cos\left(bx\right)\operatorname{Si}\left(bx\right)}{x^{3}}\,dx$$

```
[In] integrate(cos(b*x)*sin_integral(b*x)/x^3,x, algorithm="maxima")
[Out] integrate(cos(b*x)*sin_integral(b*x)/x^3, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\text{Si}(bx)}{x^3}\,dx = \int \frac{\cos(bx)\,\text{Si}(bx)}{x^3}\,dx$$

```
[In] integrate(cos(b*x)*sin_integral(b*x)/x^3,x, algorithm="giac")
[Out] integrate(cos(b*x)*sin_integral(b*x)/x^3, x)
```

Mupad [N/A]

Not integrable

Time = 5.29 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\text{Si}(bx)}{x^3}\,dx = \int \frac{\text{sinint}(b\,x)\,\cos(b\,x)}{x^3}\,dx$$

```
[In] int((sinint(b*x)*cos(b*x))/x^3,x)
[Out] int((sinint(b*x)*cos(b*x))/x^3, x)
```

3.47 $\int \frac{\cos(bx)\mathbf{Si}(bx)}{x^2}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 44

$$\int \frac{\cos(bx)\text{Si}(bx)}{x^2}\,dx = b\,\text{CosIntegral}(2bx) - \frac{\sin(2bx)}{2x} - \frac{\cos(bx)\text{Si}(bx)}{x} - \frac{1}{2}b\text{Si}(bx)^2$$

```
[Out] b*Ci(2*b*x)-cos(b*x)*Si(b*x)/x-1/2*b*Si(b*x)^2-1/2*sin(2*b*x)/x
```

Rubi [A] (verified)

Time = 0.07 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6656, 6818, 12, 4491, 3378, 3383}

$$\int \frac{\cos(bx)\text{Si}(bx)}{x^2}\,dx = b\,\text{CosIntegral}(2bx) - \frac{1}{2}b\text{Si}(bx)^2 - \frac{\text{Si}(bx)\cos(bx)}{x} - \frac{\sin(2bx)}{2x}$$

```
[In] Int[(Cos[b*x]*SinIntegral[b*x])/x^2,x]
```

```
[Out] b*CosIntegral[2*b*x] - Sin[2*b*x]/(2*x) - (Cos[b*x]*SinIntegral[b*x])/x - (
b*SinIntegral[b*x]^2)/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 3378

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(c
 + d*x)^(m + 1)*(Sin[e + f*x]/(d*(m + 1))), x] - Dist[f/(d*(m + 1)), Int[(c
 + d*x)^(m + 1)*Cos[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && LtQ[m, -1
```

```
]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6656

```
Int[Cos[(a_.) + (b_.)*(x_)]*((e_.) + (f_.)*(x_))^(m_.)*SinIntegral[(c_.) +
(d_.)*(x_)], x_Symbol] :> Simp[(e + f*x)^(m + 1)*Cos[a + b*x]*(SinIntegral[
c + d*x]/(f*(m + 1))), x] + (Dist[b/(f*(m + 1)), Int[(e + f*x)^(m + 1)*Sin[
a + b*x]*SinIntegral[c + d*x], x], x] - Dist[d/(f*(m + 1)), Int[(e + f*x)^(
m + 1)*Cos[a + b*x]*(Sin[c + d*x]/(c + d*x)), x], x]) /; FreeQ[{a, b, c, d,
 e, f}, x] && ILtQ[m, -1]
```

Rule 6818

```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= -\frac{\cos(bx)\text{Si}(bx)}{x} + b\int \frac{\cos(bx)\sin(bx)}{bx^2}\,dx - b\int \frac{\sin(bx)\text{Si}(bx)}{x}\,dx \\
&= -\frac{\cos(bx)\text{Si}(bx)}{x} - \frac{1}{2}b\text{Si}(bx)^2 + \int \frac{\cos(bx)\sin(bx)}{x^2}\,dx \\
&= -\frac{\cos(bx)\text{Si}(bx)}{x} - \frac{1}{2}b\text{Si}(bx)^2 + \int \frac{\sin(2bx)}{2x^2}\,dx \\
&= -\frac{\cos(bx)\text{Si}(bx)}{x} - \frac{1}{2}b\text{Si}(bx)^2 + \frac{1}{2}\int \frac{\sin(2bx)}{x^2}\,dx \\
&= -\frac{\sin(2bx)}{2x} - \frac{\cos(bx)\text{Si}(bx)}{x} - \frac{1}{2}b\text{Si}(bx)^2 + b\int \frac{\cos(2bx)}{x}\,dx \\
&= b\,\text{CosIntegral}(2bx) - \frac{\sin(2bx)}{2x} - \frac{\cos(bx)\text{Si}(bx)}{x} - \frac{1}{2}b\text{Si}(bx)^2
\end{aligned}
$$

Mathematica [F]

$$\int \frac{\cos(bx)\mathrm{Si}(bx)}{x^2}\,dx = \int \frac{\cos(bx)\mathrm{Si}(bx)}{x^2}\,dx$$

[In] Integrate[(Cos[b*x]*SinIntegral[b*x])/x^2,x]

[Out] Integrate[(Cos[b*x]*SinIntegral[b*x])/x^2, x]

Maple [F]

$$\int \frac{\cos(bx)\,\mathrm{Si}(bx)}{x^2}dx$$

[In] int(cos(b*x)*Si(b*x)/x^2,x)

[Out] int(cos(b*x)*Si(b*x)/x^2,x)

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00

$$\int \frac{\cos(bx)\mathrm{Si}(bx)}{x^2}\,dx = -\frac{bx\,\mathrm{Si}(bx)^2 - 2\,bx\,\mathrm{Ci}(2\,bx) + 2\,\cos(bx)\sin(bx) + 2\,\cos(bx)\,\mathrm{Si}(bx)}{2\,x}$$

[In] integrate(cos(b*x)*sin_integral(b*x)/x^2,x, algorithm="fricas")

[Out] -1/2*(b*x*sin_integral(b*x)^2 - 2*b*x*cos_integral(2*b*x) + 2*cos(b*x)*sin(b*x) + 2*cos(b*x)*sin_integral(b*x))/x

Sympy [F]

$$\int \frac{\cos(bx)\mathrm{Si}(bx)}{x^2}\,dx = \int \frac{\cos(bx)\,\mathrm{Si}(bx)}{x^2}\,dx$$

[In] integrate(cos(b*x)*Si(b*x)/x**2,x)

[Out] Integral(cos(b*x)*Si(b*x)/x**2, x)

Maxima [F]

$$\int \frac{\cos(bx)\text{Si}(bx)}{x^2}\,dx = \int \frac{\cos(bx)\,\text{Si}(bx)}{x^2}\,dx$$

```
[In] integrate(cos(b*x)*sin_integral(b*x)/x^2,x, algorithm="maxima")
[Out] integrate(cos(b*x)*sin_integral(b*x)/x^2, x)
```

Giac [F]

$$\int \frac{\cos(bx)\text{Si}(bx)}{x^2}\,dx = \int \frac{\cos(bx)\,\text{Si}(bx)}{x^2}\,dx$$

```
[In] integrate(cos(b*x)*sin_integral(b*x)/x^2,x, algorithm="giac")
[Out] integrate(cos(b*x)*sin_integral(b*x)/x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\cos(bx)\text{Si}(bx)}{x^2}\,dx = \int \frac{\text{sinint}(b\,x)\,\cos(b\,x)}{x^2}\,dx$$

```
[In] int((sinint(b*x)*cos(b*x))/x^2,x)
[Out] int((sinint(b*x)*cos(b*x))/x^2, x)
```

3.48 $\int \frac{\cos(bx)\mathbf{Si}(bx)}{x}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx = \text{Int}\left(\frac{\cos(bx)\text{Si}(bx)}{x},x\right)$$

```
[Out] CannotIntegrate(cos(b*x)*Si(b*x)/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx = \int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx$$

```
[In] Int[(Cos[b*x]*SinIntegral[b*x])/x,x]
```

```
[Out] Defer[Int][(Cos[b*x]*SinIntegral[b*x])/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\cos(bx)\text{Si}(bx)}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 0.69 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\mathrm{Si}(bx)}{x}\,dx = \int \frac{\cos(bx)\mathrm{Si}(bx)}{x}\,dx$$

```
[In] Integrate[(Cos[b*x]*SinIntegral[b*x])/x,x]
[Out] Integrate[(Cos[b*x]*SinIntegral[b*x])/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.21 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\cos (bx) \,\mathrm{Si}\,(bx)}{x}dx$$

```
[In] int(cos(b*x)*Si(b*x)/x,x)
[Out] int(cos(b*x)*Si(b*x)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\mathrm{Si}(bx)}{x}\,dx = \int \frac{\cos (bx) \,\mathrm{Si}\,(bx)}{x}\,dx$$

```
[In] integrate(cos(b*x)*sin_integral(b*x)/x,x, algorithm="fricas")
[Out] integral(cos(b*x)*sin_integral(b*x)/x, x)
```

Sympy [N/A]

Not integrable

Time = 1.38 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\cos(bx)\mathrm{Si}(bx)}{x}\,dx = \int \frac{\cos (bx) \,\mathrm{Si}\,(bx)}{x}\,dx$$

```
[In] integrate(cos(b*x)*Si(b*x)/x,x)
[Out] Integral(cos(b*x)*Si(b*x)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\text{Si}(bx)}{x} \, dx = \int \frac{\cos(bx)\,\text{Si}\,(bx)}{x} \, dx$$

```
[In] integrate(cos(b*x)*sin_integral(b*x)/x,x, algorithm="maxima")
[Out] integrate(cos(b*x)*sin_integral(b*x)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\text{Si}(bx)}{x} \, dx = \int \frac{\cos(bx)\,\text{Si}\,(bx)}{x} \, dx$$

```
[In] integrate(cos(b*x)*sin_integral(b*x)/x,x, algorithm="giac")
[Out] integrate(cos(b*x)*sin_integral(b*x)/x, x)
```

Mupad [N/A]

Not integrable

Time = 4.90 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\text{Si}(bx)}{x} \, dx = \int \frac{\text{sinint}(b\,x)\,\cos(b\,x)}{x} \, dx$$

```
[In] int((sinint(b*x)*cos(b*x))/x,x)
[Out] int((sinint(b*x)*cos(b*x))/x, x)
```

3.49 $\int \cos(bx)\mathbf{Si}(bx)\,dx$

Optimal result

Integrand size = 9, antiderivative size = 34

$$\int \cos(bx)\text{Si}(bx)\,dx = \frac{\text{CosIntegral}(2bx)}{2b} - \frac{\log(x)}{2b} + \frac{\sin(bx)\text{Si}(bx)}{b}$$

```
[Out] 1/2*Ci(2*b*x)/b-1/2*ln(x)/b+Si(b*x)*sin(b*x)/b
```

Rubi [A] (verified)

Time = 0.04 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.444, Rules used = {6652, 12, 3393, 3383}

$$\int \cos(bx)\text{Si}(bx)\,dx = \frac{\text{CosIntegral}(2bx)}{2b} + \frac{\text{Si}(bx)\sin(bx)}{b} - \frac{\log(x)}{2b}$$

```
[In] Int[Cos[b*x]*SinIntegral[b*x],x]
```

```
[Out] CosIntegral[2*b*x]/(2*b) - Log[x]/(2*b) + (Sin[b*x]*SinIntegral[b*x])/b
```

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 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{\sin(bx)\text{Si}(bx)}{b} - \int \frac{\sin^2(bx)}{bx}\,dx \\
&= \frac{\sin(bx)\text{Si}(bx)}{b} - \frac{\int \frac{\sin^2(bx)}{x}\,dx}{b} \\
&= \frac{\sin(bx)\text{Si}(bx)}{b} - \frac{\int \left(\frac{1}{2x} - \frac{\cos(2bx)}{2x}\right)dx}{b} \\
&= -\frac{\log(x)}{2b} + \frac{\sin(bx)\text{Si}(bx)}{b} + \frac{\int \frac{\cos(2bx)}{x}\,dx}{2b} \\
&= \frac{\text{CosIntegral}(2bx)}{2b} - \frac{\log(x)}{2b} + \frac{\sin(bx)\text{Si}(bx)}{b}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 36, normalized size of antiderivative = 1.06

$$\int \cos(bx)\text{Si}(bx)\,dx = \frac{\text{CosIntegral}(2bx)}{2b} - \frac{\log(bx)}{2b} + \frac{\sin(bx)\text{Si}(bx)}{b}$$

```
[In] Integrate[Cos[b*x]*SinIntegral[b*x],x]
[Out] CosIntegral[2*b*x]/(2*b) - Log[b*x]/(2*b) + (Sin[b*x]*SinIntegral[b*x])/b
```

Maple [A] (verified)

Time = 0.60 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.82

method	result	size
derivativedivides	$\frac{\mathrm{Si}(bx)\sin(bx)-\frac{\ln(bx)}{2}+\frac{\mathrm{Ci}(2bx)}{2}}{b}$	28
default	$\frac{\mathrm{Si}(bx)\sin(bx)-\frac{\ln(bx)}{2}+\frac{\mathrm{Ci}(2bx)}{2}}{b}$	28

```
[In] int(cos(b*x)*Si(b*x),x,method=_RETURNVERBOSE)
[Out] 1/b*(Si(b*x)*sin(b*x)-1/2*ln(b*x)+1/2*Ci(2*b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.24 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.74

$$\int \cos(bx)\mathrm{Si}(bx)\,dx = \frac{2\sin(bx)\,\mathrm{Si}(bx) + \mathrm{Ci}(2\,bx) - \log(x)}{2\,b}$$

```
[In] integrate(cos(b*x)*sin_integral(b*x),x, algorithm="fricas")
[Out] 1/2*(2*sin(b*x)*sin_integral(b*x) + cos_integral(2*b*x) - log(x))/b
```

Sympy [F]

$$\int \cos(bx)\mathrm{Si}(bx)\,dx = \int \cos(bx)\,\mathrm{Si}(bx)\,dx$$

```
[In] integrate(cos(b*x)*Si(b*x),x)
[Out] Integral(cos(b*x)*Si(b*x), x)
```

Maxima [F]

$$\int \cos(bx)\mathrm{Si}(bx)\,dx = \int \cos(bx)\,\mathrm{Si}(bx)\,dx$$

```
[In] integrate(cos(b*x)*sin_integral(b*x),x, algorithm="maxima")
[Out] integrate(cos(b*x)*sin_integral(b*x), x)
```

Giac [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 33, normalized size of antiderivative = 0.97

$$\int \cos(bx)\text{Si}(bx)\,dx = \frac{\sin(bx)\,\text{Si}(bx)}{b} + \frac{\text{Ci}(2\,bx) + \text{Ci}(-2\,bx) - 2\,\log(x)}{4\,b}$$

```
[In] integrate(cos(b*x)*sin_integral(b*x),x, algorithm="giac")
[Out] sin(b*x)*sin_integral(b*x)/b + 1/4*(cos_integral(2*b*x) + cos_integral(-2*b
*x) - 2*log(x))/b
```

Mupad [F(-1)]

Timed out.

$$\int \cos(bx)\text{Si}(bx)\,dx = \frac{\text{cosint}(2\,b\,x) - \ln(x) + 2\,\text{sinint}(b\,x)\,\sin(b\,x)}{2\,b}$$

```
[In] int(sinint(b*x)*cos(b*x),x)
[Out] (cosint(2*b*x) - log(x) + 2*sinint(b*x)*sin(b*x))/(2*b)
```

3.50 $\int x\cos(bx)\mathbf{Si}(bx)\,dx$

Optimal result

Integrand size = 10, antiderivative size = 61

$$\int x\cos(bx)\text{Si}(bx)\,dx=-\frac{x}{2b}+\frac{\cos(bx)\sin(bx)}{2b^2}+\frac{\cos(bx)\text{Si}(bx)}{b^2}+\frac{x\sin(bx)\text{Si}(bx)}{b}-\frac{\text{Si}(2bx)}{2b^2}$$

```
[Out] -1/2*x/b+cos(b*x)*Si(b*x)/b^2-1/2*Si(2*b*x)/b^2+1/2*cos(b*x)*sin(b*x)/b^2+x
*Si(b*x)*sin(b*x)/b
```

Rubi [A] (verified)

Time = 0.05 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.700, Rules used = {6654, 12, 2715, 8, 6646, 4491, 3380}

$$\int x\cos(bx)\text{Si}(bx)\,dx=-\frac{\text{Si}(2bx)}{2b^2}+\frac{\text{Si}(bx)\cos(bx)}{b^2}+\frac{\sin(bx)\cos(bx)}{2b^2}+\frac{x\text{Si}(bx)\sin(bx)}{b}-\frac{x}{2b}$$

```
[In] Int[x*Cos[b*x]*SinIntegral[b*x],x]
```

```
[Out] -1/2*x/b + (Cos[b*x]*Sin[b*x])/(2*b^2) + (Cos[b*x]*SinIntegral[b*x])/b^2 +
(x*Sin[b*x]*SinIntegral[b*x])/b - SinIntegral[2*b*x]/(2*b^2)
```

Rule 8

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

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 2715

```
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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6654

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

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{x\sin(bx)\text{Si}(bx)}{b} - \frac{\int \sin(bx)\text{Si}(bx)\,dx}{b} - \int \frac{\sin^2(bx)}{b}\,dx \\
&= \frac{\cos(bx)\text{Si}(bx)}{b^2} + \frac{x\sin(bx)\text{Si}(bx)}{b} - \frac{\int \frac{\cos(bx)\sin(bx)}{bx}\,dx}{b} - \frac{\int \sin^2(bx)\,dx}{b} \\
&= \frac{\cos(bx)\sin(bx)}{2b^2} + \frac{\cos(bx)\text{Si}(bx)}{b^2} + \frac{x\sin(bx)\text{Si}(bx)}{b} - \frac{\int \frac{\cos(bx)\sin(bx)}{x}\,dx}{b^2} - \frac{\int 1\,dx}{2b} \\
&= -\frac{x}{2b} + \frac{\cos(bx)\sin(bx)}{2b^2} + \frac{\cos(bx)\text{Si}(bx)}{b^2} + \frac{x\sin(bx)\text{Si}(bx)}{b} - \frac{\int \frac{\sin(2bx)}{2x}\,dx}{b^2}
\end{aligned}$$

$$= -\frac{x}{2b} + \frac{\cos(bx)\sin(bx)}{2b^2} + \frac{\cos(bx)\text{Si}(bx)}{b^2} + \frac{x\sin(bx)\text{Si}(bx)}{b} - \frac{\int \frac{\sin(2bx)}{x}\,dx}{2b^2}$$
$$= -\frac{x}{2b} + \frac{\cos(bx)\sin(bx)}{2b^2} + \frac{\cos(bx)\text{Si}(bx)}{b^2} + \frac{x\sin(bx)\text{Si}(bx)}{b} - \frac{\text{Si}(2bx)}{2b^2}$$

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 42, normalized size of antiderivative = 0.69

$$\int x\cos(bx)\text{Si}(bx)\,dx = \frac{-2bx + \sin(2bx) + 4(\cos(bx) + bx\sin(bx))\text{Si}(bx) - 2\text{Si}(2bx)}{4b^2}$$

```
[In] Integrate[x*Cos[b*x]*SinIntegral[b*x],x]
```

```
[Out] (-2*b*x + Sin[2*b*x] + 4*(Cos[b*x] + b*x*Sin[b*x])*SinIntegral[b*x] - 2*Sin
Integral[2*b*x])/(4*b^2)
```

Maple [A] (verified)

Time = 0.83 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.72

method	result	size
derivativedivides	$\frac{\text{Si}(bx)(\cos(bx)+bx\sin(bx))-\frac{\text{Si}(2bx)}{2}+\frac{\sin(bx)\cos(bx)}{2}-\frac{bx}{2}}{b^2}$	44
default	$\frac{\text{Si}(bx)(\cos(bx)+bx\sin(bx))-\frac{\text{Si}(2bx)}{2}+\frac{\sin(bx)\cos(bx)}{2}-\frac{bx}{2}}{b^2}$	44

```
[In] int(x*cos(b*x)*Si(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^2*(Si(b*x)*(cos(b*x)+b*x*sin(b*x))-1/2*Si(2*b*x)+1/2*sin(b*x)*cos(b*x)-
1/2*b*x)
```

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.70

$$\int x\cos(bx)\text{Si}(bx)\,dx = -\frac{bx - (2\,bx\,\text{Si}\,(bx) + \cos\,(bx))\sin\,(bx) - 2\,\cos\,(bx)\,\text{Si}\,(bx) + \text{Si}\,(2\,bx)}{2\,b^2}$$

```
[In] integrate(x*cos(b*x)*sin_integral(b*x),x, algorithm="fricas")
```

```
[Out] -1/2*(b*x - (2*b*x*sin_integral(b*x) + cos(b*x))*sin(b*x) - 2*cos(b*x)*sin_
integral(b*x) + sin_integral(2*b*x))/b^2
```

Sympy [F]

$$\int x\cos(bx)\mathrm{Si}(bx)\,dx=\int x\cos(bx)\,\mathrm{Si}(bx)\,dx$$

```
[In] integrate(x*cos(b*x)*Si(b*x),x)
[Out] Integral(x*cos(b*x)*Si(b*x), x)
```

Maxima [F]

$$\int x\cos(bx)\mathrm{Si}(bx)\,dx=\int x\cos(bx)\,\mathrm{Si}(bx)\,\,dx$$

```
[In] integrate(x*cos(b*x)*sin_integral(b*x),x, algorithm="maxima")
[Out] integrate(x*cos(b*x)*sin_integral(b*x), x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.28 (sec) , antiderivative size = 124, normalized size of antiderivative = 2.03

$$\int x\cos(bx)\mathrm{Si}(bx)\,dx=\left(\frac{x\sin(bx)}{b}+\frac{\cos(bx)}{b^2}\right)\mathrm{Si}(bx)-\frac{2\,bx\tan(bx)^2+\Im(\mathrm{Ci}(2\,bx))\tan(bx)^2-\Im(\mathrm{Ci}(-2\,bx))\tan(bx)^2+2\,\mathrm{Si}(2\,bx)\tan(bx)^2+2\,bx+\Im(\mathrm{Ci}(2\,\ldots}{4\left(b^2\tan(bx)^2+b^2\right)}$$

```
[In] integrate(x*cos(b*x)*sin_integral(b*x),x, algorithm="giac")
[Out] (x*sin(b*x)/b + cos(b*x)/b^2)*sin_integral(b*x) - 1/4*(2*b*x*tan(b*x)^2 + i
mag_part(cos_integral(2*b*x))*tan(b*x)^2 - imag_part(cos_integral(-2*b*x))*
tan(b*x)^2 + 2*sin_integral(2*b*x)*tan(b*x)^2 + 2*b*x + imag_part(cos_integ
ral(2*b*x)) - imag_part(cos_integral(-2*b*x)) + 2*sin_integral(2*b*x) - 2*t
an(b*x))/(b^2*tan(b*x)^2 + b^2)
```

Mupad [F(-1)]

Timed out.

$$\int x\cos(bx)\mathrm{Si}(bx)\,dx=\int x\,\mathrm{sinint}(b\,x)\,\cos\left(b\,x\right)\,dx$$

```
[In] int(x*sinint(b*x)*cos(b*x),x)
[Out] int(x*sinint(b*x)*cos(b*x), x)
```

3.51 $\int x^2 \cos(bx)\mathbf{Si}(bx)\,dx$

Optimal result

Integrand size = 12, antiderivative size = 98

$$\int x^2\cos(bx)\text{Si}(bx)\,dx=-\frac{x^2}{4b}-\frac{\text{CosIntegral}(2bx)}{b^3}+\frac{\log(x)}{b^3}+\frac{x\cos(bx)\sin(bx)}{2b^2}-\frac{5\sin^2(bx)}{4b^3}+\frac{2x\cos(bx)\text{Si}(bx)}{b^2}-\frac{2\sin(bx)\text{Si}(bx)}{b^3}+\frac{x^2\sin(bx)\text{Si}(bx)}{b}$$

```
[Out] -1/4*x^2/b-Ci(2*b*x)/b^3+ln(x)/b^3+2*x*cos(b*x)*Si(b*x)/b^2+1/2*x*cos(b*x)*
sin(b*x)/b^2-2*Si(b*x)*sin(b*x)/b^3+x^2*Si(b*x)*sin(b*x)/b-5/4*sin(b*x)^2/b
^3
```

Rubi [A] (verified)

Time = 0.09 (sec) , antiderivative size = 98, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.750, Rules used = {6654, 12, 3391, 30, 6648, 2644, 6652, 3393, 3383}

$$\int x^2\cos(bx)\text{Si}(bx)\,dx=-\frac{\text{CosIntegral}(2bx)}{b^3}-\frac{2\text{Si}(bx)\sin(bx)}{b^3}+\frac{\log(x)}{b^3}-\frac{5\sin^2(bx)}{4b^3}+\frac{2x\text{Si}(bx)\cos(bx)}{b^2}+\frac{x\sin(bx)\cos(bx)}{2b^2}+\frac{x^2\text{Si}(bx)\sin(bx)}{b}-\frac{x^2}{4b}$$

```
[In] Int[x^2*Cos[b*x]*SinIntegral[b*x],x]
```

```
[Out] -1/4*x^2/b - CosIntegral[2*b*x]/b^3 + Log[x]/b^3 + (x*Cos[b*x]*Sin[b*x])/(2
*b^2) - (5*Sin[b*x]^2)/(4*b^3) + (2*x*Cos[b*x]*SinIntegral[b*x])/b^2 - (2*S
in[b*x]*SinIntegral[b*x])/b^3 + (x^2*Sin[b*x]*SinIntegral[b*x])/b
```

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 30

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

Rule 2644

```
Int[cos[(e_.) + (f_.)*(x_)]^(n_.)*((a_.)*sin[(e_.) + (f_.)*(x_)])^(m_.), x_
Symbol] :> Dist[1/(a*f), Subst[Int[x^m*(1 - x^2/a^2)^((n - 1)/2), x], x, a*
Sin[e + f*x]], x] /; FreeQ[{a, e, f, m}, x] && IntegerQ[(n - 1)/2] &&  !(In
tegerQ[(m - 1)/2] && LtQ[0, m, n])
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3391

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

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 6648

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

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
```

```
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6654

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

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{x^2\sin(bx)\text{Si}(bx)}{b} - \frac{2\int x\sin(bx)\text{Si}(bx)\,dx}{b} - \int \frac{x\sin^2(bx)}{b}\,dx \\
&= \frac{2x\cos(bx)\text{Si}(bx)}{b^2} + \frac{x^2\sin(bx)\text{Si}(bx)}{b} - \frac{2\int \cos(bx)\text{Si}(bx)\,dx}{b^2} \\
&\quad - \frac{\int x\sin^2(bx)\,dx}{b} - \frac{2\int \frac{\cos(bx)\sin(bx)}{b}\,dx}{b} \\
&= \frac{x\cos(bx)\sin(bx)}{2b^2} - \frac{\sin^2(bx)}{4b^3} + \frac{2x\cos(bx)\text{Si}(bx)}{b^2} - \frac{2\sin(bx)\text{Si}(bx)}{b^3} \\
&\quad + \frac{x^2\sin(bx)\text{Si}(bx)}{b} - \frac{2\int \cos(bx)\sin(bx)\,dx}{b^2} + \frac{2\int \frac{\sin^2(bx)}{bx}\,dx}{b^2} - \frac{\int x\,dx}{2b} \\
&= -\frac{x^2}{4b} + \frac{x\cos(bx)\sin(bx)}{2b^2} - \frac{\sin^2(bx)}{4b^3} + \frac{2x\cos(bx)\text{Si}(bx)}{b^2} - \frac{2\sin(bx)\text{Si}(bx)}{b^3} \\
&\quad + \frac{x^2\sin(bx)\text{Si}(bx)}{b} + \frac{2\int \frac{\sin^2(bx)}{x}\,dx}{b^3} - \frac{2\text{Subst}(\int x\,dx, x, \sin(bx))}{b^3} \\
&= -\frac{x^2}{4b} + \frac{x\cos(bx)\sin(bx)}{2b^2} - \frac{5\sin^2(bx)}{4b^3} + \frac{2x\cos(bx)\text{Si}(bx)}{b^2} \\
&\quad - \frac{2\sin(bx)\text{Si}(bx)}{b^3} + \frac{x^2\sin(bx)\text{Si}(bx)}{b} + \frac{2\int \left(\frac{1}{2x} - \frac{\cos(2bx)}{2x}\right)\,dx}{b^3} \\
&= -\frac{x^2}{4b} + \frac{\log(x)}{b^3} + \frac{x\cos(bx)\sin(bx)}{2b^2} - \frac{5\sin^2(bx)}{4b^3} + \frac{2x\cos(bx)\text{Si}(bx)}{b^2} \\
&\quad - \frac{2\sin(bx)\text{Si}(bx)}{b^3} + \frac{x^2\sin(bx)\text{Si}(bx)}{b} - \frac{\int \frac{\cos(2bx)}{x}\,dx}{b^3} \\
&= -\frac{x^2}{4b} - \frac{\text{CosIntegral}(2bx)}{b^3} + \frac{\log(x)}{b^3} + \frac{x\cos(bx)\sin(bx)}{2b^2} - \frac{5\sin^2(bx)}{4b^3} \\
&\quad + \frac{2x\cos(bx)\text{Si}(bx)}{b^2} - \frac{2\sin(bx)\text{Si}(bx)}{b^3} + \frac{x^2\sin(bx)\text{Si}(bx)}{b}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 72, normalized size of antiderivative = 0.73

$$\int x^2\cos(bx)\mathrm{Si}(bx)\,dx = \frac{-2b^2x^2+5\cos(2bx)-8\,\mathrm{CosIntegral}(2bx)+8\log(x)+2bx\sin(2bx)+8(2bx\cos(bx)+(-2+b^2x^2)\sin(bx$$

$$8b^3$$

```
[In] Integrate[x^2*Cos[b*x]*SinIntegral[b*x],x]
```

```
[Out] (-2*b^2*x^2 + 5*Cos[2*b*x] - 8*CosIntegral[2*b*x] + 8*Log[x] + 2*b*x*Sin[2*
b*x] + 8*(2*b*x*Cos[b*x] + (-2 + b^2*x^2)*Sin[b*x])*SinIntegral[b*x])/(8*b^
3)
```

Maple [A] (verified)

Time = 1.01 (sec) , antiderivative size = 89, normalized size of antiderivative = 0.91

method	result
derivativedivides	$\frac{\mathrm{Si}(bx)(b^2x^2\sin(bx)-2\sin(bx)+2bx\cos(bx))-bx\left(-\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)+\frac{b^2x^2}{4}-\frac{\sin(bx)^2}{4}+\ln(bx)-\mathrm{Ci}(2bx)+\cos(bx)^2}{b^3}$
default	$\frac{\mathrm{Si}(bx)(b^2x^2\sin(bx)-2\sin(bx)+2bx\cos(bx))-bx\left(-\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)+\frac{b^2x^2}{4}-\frac{\sin(bx)^2}{4}+\ln(bx)-\mathrm{Ci}(2bx)+\cos(bx)^2}{b^3}$

```
[In] int(x^2*cos(b*x)*Si(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^3*(Si(b*x)*(b^2*x^2*sin(b*x)-2*sin(b*x)+2*b*x*cos(b*x))-b*x*(-1/2*sin(b
*x)*cos(b*x)+1/2*b*x)+1/4*b^2*x^2-1/4*sin(b*x)^2+ln(b*x)-Ci(2*b*x)+cos(b*x)
^2)
```

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 73, normalized size of antiderivative = 0.74

$$\int x^2\cos(bx)\mathrm{Si}(bx)\,dx =$$

$$-\frac{b^2x^2-8\,bx\cos(bx)\,\mathrm{Si}(bx)-5\,\cos(bx)^2-2\,(bx\cos(bx)+2\,(b^2x^2-2)\,\mathrm{Si}(bx))\sin(bx)+4\,\mathrm{Ci}(2\,bx)-}{4\,b^3}$$

```
[In] integrate(x^2*cos(b*x)*sin_integral(b*x),x, algorithm="fricas")
```

```
[Out] -1/4*(b^2*x^2 - 8*b*x*cos(b*x)*sin_integral(b*x) - 5*cos(b*x)^2 - 2*(b*x*co
s(b*x) + 2*(b^2*x^2 - 2)*sin_integral(b*x))*sin(b*x) + 4*cos_integral(2*b*x
) - 4*log(x))/b^3
```

Sympy [F]

$$\int x^2\cos(bx)\text{Si}(bx)\,dx = \int x^2\cos(bx)\,\text{Si}(bx)\,dx$$

```
[In] integrate(x**2*cos(b*x)*Si(b*x),x)
[Out] Integral(x**2*cos(b*x)*Si(b*x), x)
```

Maxima [F]

$$\int x^2\cos(bx)\text{Si}(bx)\,dx = \int x^2\cos(bx)\,\text{Si}(bx)\,dx$$

```
[In] integrate(x^2*cos(b*x)*sin_integral(b*x),x, algorithm="maxima")
[Out] integrate(x^2*cos(b*x)*sin_integral(b*x), x)
```

Giac [A] (verification not implemented)

none

Time = 0.29 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.84

$$\begin{aligned}&\int x^2\cos(bx)\text{Si}(bx)\,dx\\&=\left(\frac{2\,x\cos(bx)}{b^2}+\frac{(b^2x^2-2)\sin(bx)}{b^3}\right)\text{Si}(bx)\\&\quad-\frac{2\,b^2x^2-2\,bx\sin(2\,bx)-5\,\cos(2\,bx)+4\,\text{Ci}(2\,bx)+4\,\text{Ci}(-2\,bx)-8\,\log(x)}{8\,b^3}\end{aligned}$$

```
[In] integrate(x^2*cos(b*x)*sin_integral(b*x),x, algorithm="giac")
[Out] (2*x*cos(b*x)/b^2 + (b^2*x^2 - 2)*sin(b*x)/b^3)*sin_integral(b*x) - 1/8*(2*
b^2*x^2 - 2*b*x*sin(2*b*x) - 5*cos(2*b*x) + 4*cos_integral(2*b*x) + 4*cos_i
ntegral(-2*b*x) - 8*log(x))/b^3
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \cos(bx)\mathrm{Si}(bx)\,dx = \int x^2\,\mathrm{sinint}(b\,x)\,\cos\left(b\,x\right)\,dx$$

```
[In] int(x^2*sinint(b*x)*cos(b*x),x)
[Out] int(x^2*sinint(b*x)*cos(b*x), x)
```

3.52 $\int x^3 \cos(bx)\mathbf{Si}(bx)\,dx$

Optimal result

Integrand size = 12, antiderivative size = 128

$$\int x^3\cos(bx)\mathrm{Si}(bx)\,dx = \frac{4x}{b^3}-\frac{x^3}{6b}-\frac{4\cos(bx)\sin(bx)}{b^4}+\frac{x^2\cos(bx)\sin(bx)}{2b^2}-\frac{2x\sin^2(bx)}{b^3}-\frac{6\cos(bx)\mathrm{Si}(bx)}{b^4}+\frac{3x^2\cos(bx)\mathrm{Si}(bx)}{b^2}-\frac{6x\sin(bx)\mathrm{Si}(bx)}{b^3}+\frac{x^3\sin(bx)\mathrm{Si}(bx)}{b}+\frac{3\mathrm{Si}(2bx)}{b^4}$$

```
[Out] 4*x/b^3-1/6*x^3/b-6*cos(b*x)*Si(b*x)/b^4+3*x^2*cos(b*x)*Si(b*x)/b^2+3*Si(2*
b*x)/b^4-4*cos(b*x)*sin(b*x)/b^4+1/2*x^2*cos(b*x)*sin(b*x)/b^2-6*x*Si(b*x)*
sin(b*x)/b^3+x^3*Si(b*x)*sin(b*x)/b-2*x*sin(b*x)^2/b^3
```

Rubi [A] (verified)

Time = 0.12 (sec) , antiderivative size = 128, normalized size of antiderivative = 1.00, number of steps used = 20, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.917, Rules used = {6654, 12, 3392, 30, 2715, 8, 6648, 3524, 6646, 4491, 3380}

$$\int x^3\cos(bx)\mathrm{Si}(bx)\,dx = \frac{3\mathrm{Si}(2bx)}{b^4}-\frac{6\mathrm{Si}(bx)\cos(bx)}{b^4}-\frac{4\sin(bx)\cos(bx)}{b^4}-\frac{6x\mathrm{Si}(bx)\sin(bx)}{b^3}+\frac{4x}{b^3}-\frac{2x\sin^2(bx)}{b^3}+\frac{3x^2\mathrm{Si}(bx)\cos(bx)}{b^2}+\frac{x^2\sin(bx)\cos(bx)}{2b^2}+\frac{x^3\mathrm{Si}(bx)\sin(bx)}{b}-\frac{x^3}{6b}$$

```
[In] Int[x^3*Cos[b*x]*SinIntegral[b*x],x]
```

```
[Out] (4*x)/b^3 - x^3/(6*b) - (4*Cos[b*x]*Sin[b*x])/b^4 + (x^2*Cos[b*x]*Sin[b*x])
/(2*b^2) - (2*x*Sin[b*x]^2)/b^3 - (6*Cos[b*x]*SinIntegral[b*x])/b^4 + (3*x^
```

```
2*Cos[b*x]*SinIntegral[b*x])/b^2 - (6*x*Sin[b*x]*SinIntegral[b*x])/b^3 + (x
^3*Sin[b*x]*SinIntegral[b*x])/b + (3*SinIntegral[2*b*x])/b^4
```

Rule 8

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

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 30

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

Rule 2715

```
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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3392

```
Int[((c_.) + (d_.)*(x_))^(m_)*((b_.)*sin[(e_.) + (f_.)*(x_)])^(n_), x_Symbo
l] :> Simp[d*m*(c + d*x)^(m - 1)*((b*Sin[e + f*x])^n/(f^2*n^2)), x] + (Dist
[b^2*((n - 1)/n), Int[(c + d*x)^m*(b*Sin[e + f*x])^(n - 2), x], x] - Dist[d
^2*m*((m - 1)/(f^2*n^2)), Int[(c + d*x)^(m - 2)*(b*Sin[e + f*x])^n, x], x]
- Simp[b*(c + d*x)^m*Cos[e + f*x]*((b*Sin[e + f*x])^(n - 1)/(f*n)), x]) /;
FreeQ[{b, c, d, e, f}, x] && GtQ[n, 1] && GtQ[m, 1]
```

Rule 3524

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

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6648

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

Rule 6654

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

Rubi steps

$$
\begin{aligned}
\text{integral} &= \frac{x^3\sin(bx)\text{Si}(bx)}{b} - \frac{3\int x^2\sin(bx)\text{Si}(bx)\,dx}{b} - \int \frac{x^2\sin^2(bx)}{b}\,dx \\
&= \frac{3x^2\cos(bx)\text{Si}(bx)}{b^2} + \frac{x^3\sin(bx)\text{Si}(bx)}{b} - \frac{6\int x\cos(bx)\text{Si}(bx)\,dx}{b^2} \\
&\quad - \frac{\int x^2\sin^2(bx)\,dx}{b} - \frac{3\int \frac{x\cos(bx)\sin(bx)}{b}\,dx}{b} \\
&= \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{x\sin^2(bx)}{2b^3} + \frac{3x^2\cos(bx)\text{Si}(bx)}{b^2} - \frac{6x\sin(bx)\text{Si}(bx)}{b^3} + \frac{x^3\sin(bx)\text{Si}(bx)}{b} \\
&\quad + \frac{\int \sin^2(bx)\,dx}{2b^3} + \frac{6\int \sin(bx)\text{Si}(bx)\,dx}{b^3} - \frac{3\int x\cos(bx)\sin(bx)\,dx}{b^2} + \frac{6\int \frac{\sin^2(bx)}{b}\,dx}{b^2} \\
&\quad - \frac{\int x^2\,dx}{2b}
\end{aligned}
$$

$$
\begin{aligned}
&= -\frac{x^3}{6b} - \frac{\cos(bx)\sin(bx)}{4b^4} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{2x\sin^2(bx)}{b^3} - \frac{6\cos(bx)\mathrm{Si}(bx)}{b^4} \\
&\quad + \frac{3x^2\cos(bx)\mathrm{Si}(bx)}{b^2} - \frac{6x\sin(bx)\mathrm{Si}(bx)}{b^3} + \frac{x^3\sin(bx)\mathrm{Si}(bx)}{b} \\
&\quad + \frac{\int 1\,dx}{4b^3} + \frac{3\int \sin^2(bx)\,dx}{2b^3} + \frac{6\int \frac{\cos(bx)\sin(bx)}{bx}\,dx}{b^3} + \frac{6\int \sin^2(bx)\,dx}{b^3} \\
&= \frac{x}{4b^3} - \frac{x^3}{6b} - \frac{4\cos(bx)\sin(bx)}{b^4} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{2x\sin^2(bx)}{b^3} \\
&\quad - \frac{6\cos(bx)\mathrm{Si}(bx)}{b^4} + \frac{3x^2\cos(bx)\mathrm{Si}(bx)}{b^2} - \frac{6x\sin(bx)\mathrm{Si}(bx)}{b^3} \\
&\quad + \frac{x^3\sin(bx)\mathrm{Si}(bx)}{b} + \frac{6\int \frac{\cos(bx)\sin(bx)}{x}\,dx}{b^4} + \frac{3\int 1\,dx}{4b^3} + \frac{3\int 1\,dx}{b^3} \\
&= \frac{4x}{b^3} - \frac{x^3}{6b} - \frac{4\cos(bx)\sin(bx)}{b^4} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{2x\sin^2(bx)}{b^3} - \frac{6\cos(bx)\mathrm{Si}(bx)}{b^4} \\
&\quad + \frac{3x^2\cos(bx)\mathrm{Si}(bx)}{b^2} - \frac{6x\sin(bx)\mathrm{Si}(bx)}{b^3} + \frac{x^3\sin(bx)\mathrm{Si}(bx)}{b} + \frac{6\int \frac{\sin(2bx)}{2x}\,dx}{b^4} \\
&= \frac{4x}{b^3} - \frac{x^3}{6b} - \frac{4\cos(bx)\sin(bx)}{b^4} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{2x\sin^2(bx)}{b^3} - \frac{6\cos(bx)\mathrm{Si}(bx)}{b^4} \\
&\quad + \frac{3x^2\cos(bx)\mathrm{Si}(bx)}{b^2} - \frac{6x\sin(bx)\mathrm{Si}(bx)}{b^3} + \frac{x^3\sin(bx)\mathrm{Si}(bx)}{b} + \frac{3\int \frac{\sin(2bx)}{x}\,dx}{b^4} \\
&= \frac{4x}{b^3} - \frac{x^3}{6b} - \frac{4\cos(bx)\sin(bx)}{b^4} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{2x\sin^2(bx)}{b^3} - \frac{6\cos(bx)\mathrm{Si}(bx)}{b^4} \\
&\quad + \frac{3x^2\cos(bx)\mathrm{Si}(bx)}{b^2} - \frac{6x\sin(bx)\mathrm{Si}(bx)}{b^3} + \frac{x^3\sin(bx)\mathrm{Si}(bx)}{b} + \frac{3\mathrm{Si}(2bx)}{b^4}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 94, normalized size of antiderivative = 0.73

$$
\int x^3\cos(bx)\mathrm{Si}(bx)\,dx
= \frac{36bx - 2b^3x^3 + 12bx\cos(2bx) - 24\sin(2bx) + 3b^2x^2\sin(2bx) + 12(3(-2+b^2x^2)\cos(bx) + bx(-6+b^2x^2)}{12b^4}
$$

```
[In] Integrate[x^3*Cos[b*x]*SinIntegral[b*x],x]
```

```
[Out] (36*b*x - 2*b^3*x^3 + 12*b*x*Cos[2*b*x] - 24*Sin[2*b*x] + 3*b^2*x^2*Sin[2*b
*x] + 12*(3*(-2 + b^2*x^2)*Cos[b*x] + b*x*(-6 + b^2*x^2)*Sin[b*x])*SinInteg
ral[b*x] + 36*SinIntegral[2*b*x])/(12*b^4)
```

Maple [A] (verified)

Time = 1.68 (sec) , antiderivative size = 111, normalized size of antiderivative = 0.87

method	result
derivativedivides	$\frac{\mathrm{Si}(bx)\left(b^3x^3\sin(bx)+3b^2x^2\cos(bx)-6\cos(bx)-6bx\sin(bx)\right)-b^2x^2\left(-\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)+2bx\cos(bx)^2-4\sin(bx)\cos(bx)}{b^4}$
default	$\frac{\mathrm{Si}(bx)\left(b^3x^3\sin(bx)+3b^2x^2\cos(bx)-6\cos(bx)-6bx\sin(bx)\right)-b^2x^2\left(-\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)+2bx\cos(bx)^2-4\sin(bx)\cos(bx)}{b^4}$

```
[In] int(x^3*cos(b*x)*Si(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^4*(Si(b*x)*(b^3*x^3*sin(b*x)+3*b^2*x^2*cos(b*x)-6*cos(b*x)-6*b*x*sin(b*
x))-b^2*x^2*(-1/2*sin(b*x)*cos(b*x)+1/2*b*x)+2*b*x*cos(b*x)^2-4*sin(b*x)*co
s(b*x)+2*b*x+1/3*b^3*x^3+3*Si(2*b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 92, normalized size of antiderivative = 0.72

$$\int x^3\cos(bx)\mathrm{Si}(bx)\,dx =$$
$$-\frac{b^3x^3-12\,bx\cos\left(bx\right)^2-18\left(b^2x^2-2\right)\cos\left(bx\right)\mathrm{Si}\left(bx\right)-12\,bx-3\left(\left(b^2x^2-8\right)\cos\left(bx\right)+2\left(b^3x^3-6\,bx\right)\mathrm{Si}\right.}{6\,b^4}$$

```
[In] integrate(x^3*cos(b*x)*sin_integral(b*x),x, algorithm="fricas")
```

```
[Out] -1/6*(b^3*x^3 - 12*b*x*cos(b*x)^2 - 18*(b^2*x^2 - 2)*cos(b*x)*sin_integral(
b*x) - 12*b*x - 3*((b^2*x^2 - 8)*cos(b*x) + 2*(b^3*x^3 - 6*b*x)*sin_integra
l(b*x))*sin(b*x) - 18*sin_integral(2*b*x))/b^4
```

Sympy [F]

$$\int x^3\cos(bx)\mathrm{Si}(bx)\,dx = \int x^3\cos\left(bx\right)\mathrm{Si}\left(bx\right)dx$$

```
[In] integrate(x**3*cos(b*x)*Si(b*x),x)
```

```
[Out] Integral(x**3*cos(b*x)*Si(b*x), x)
```

Maxima [F]

$$\int x^3 \cos(bx)\mathrm{Si}(bx)\,dx = \int x^3 \cos(bx)\,\mathrm{Si}(bx)\,\,dx$$

```
[In] integrate(x^3*cos(b*x)*sin_integral(b*x),x, algorithm="maxima")
[Out] integrate(x^3*cos(b*x)*sin_integral(b*x), x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.29 (sec) , antiderivative size = 180, normalized size of antiderivative = 1.41

$$\int x^3 \cos(bx)\mathrm{Si}(bx)\,dx = \left(\frac{3\,(b^2x^2-2)\cos(bx)}{b^4} + \frac{(b^3x^3-6\,bx)\sin(bx)}{b^4}\right)\mathrm{Si}(bx) - \frac{b^3x^3\tan(bx)^2 + b^3x^3 - 3\,b^2x^2\tan(bx) - 12\,bx\tan(bx)^2 - 9\,\Im(\mathrm{Ci}(2\,bx))\tan(bx)^2 + 9\,\Im(\mathrm{Ci}(-2\,bx))\tan}{6\,(b^4\tan(b}$$

```
[In] integrate(x^3*cos(b*x)*sin_integral(b*x),x, algorithm="giac")
[Out] (3*(b^2*x^2 - 2)*cos(b*x)/b^4 + (b^3*x^3 - 6*b*x)*sin(b*x)/b^4)*sin_integra
l(b*x) - 1/6*(b^3*x^3*tan(b*x)^2 + b^3*x^3 - 3*b^2*x^2*tan(b*x) - 12*b*x*ta
n(b*x)^2 - 9*imag_part(cos_integral(2*b*x))*tan(b*x)^2 + 9*imag_part(cos_in
tegral(-2*b*x))*tan(b*x)^2 - 18*sin_integral(2*b*x)*tan(b*x)^2 - 24*b*x - 9
*imag_part(cos_integral(2*b*x)) + 9*imag_part(cos_integral(-2*b*x)) - 18*si
n_integral(2*b*x) + 24*tan(b*x))/(b^4*tan(b*x)^2 + b^4)
```

Mupad [F(-1)]

Timed out.

$$\int x^3 \cos(bx)\mathrm{Si}(bx)\,dx = \int x^3\,\mathrm{sinint}(b\,x)\,\cos(b\,x)\,\,dx$$

```
[In] int(x^3*sinint(b*x)*cos(b*x),x)
[Out] int(x^3*sinint(b*x)*cos(b*x), x)
```

3.53 $\int \sin(5x)\mathbf{Si}(2x)\,dx$

Optimal result

Integrand size = 9, antiderivative size = 29

$$\int \sin(5x)\text{Si}(2x)\,dx = -\frac{1}{5}\cos(5x)\text{Si}(2x) - \frac{\text{Si}(3x)}{10} + \frac{\text{Si}(7x)}{10}$$

```
[Out] -1/5*cos(5*x)*Si(2*x)-1/10*Si(3*x)+1/10*Si(7*x)
```

Rubi [A] (verified)

Time = 0.04 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.444, Rules used = {6646, 12, 4515, 3380}

$$\int \sin(5x)\text{Si}(2x)\,dx = -\frac{\text{Si}(3x)}{10} + \frac{\text{Si}(7x)}{10} - \frac{1}{5}\text{Si}(2x)\cos(5x)$$

```
[In] Int[Sin[5*x]*SinIntegral[2*x],x]
```

```
[Out] -1/5*(Cos[5*x]*SinIntegral[2*x]) - SinIntegral[3*x]/10 + SinIntegral[7*x]/1
0
```

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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 4515

```
Int[Cos[(c_.) + (d_.)*(x_)]^(q_.)*((e_.) + (f_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(p_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Sin[a + b*x
]^p*Cos[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] && IGtQ[p, 0]
 && IGtQ[q, 0]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= -\frac{1}{5}\cos(5x)\text{Si}(2x) + \frac{2}{5}\int \frac{\cos(5x)\sin(2x)}{2x}\,dx \\
&= -\frac{1}{5}\cos(5x)\text{Si}(2x) + \frac{1}{5}\int \frac{\cos(5x)\sin(2x)}{x}\,dx \\
&= -\frac{1}{5}\cos(5x)\text{Si}(2x) + \frac{1}{5}\int \left(-\frac{\sin(3x)}{2x} + \frac{\sin(7x)}{2x}\right)\,dx \\
&= -\frac{1}{5}\cos(5x)\text{Si}(2x) - \frac{1}{10}\int \frac{\sin(3x)}{x}\,dx + \frac{1}{10}\int \frac{\sin(7x)}{x}\,dx \\
&= -\frac{1}{5}\cos(5x)\text{Si}(2x) - \frac{\text{Si}(3x)}{10} + \frac{\text{Si}(7x)}{10}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

$$
\int \sin(5x)\text{Si}(2x)\,dx = \frac{1}{10}(-2\cos(5x)\text{Si}(2x) - \text{Si}(3x) + \text{Si}(7x))
$$

```
[In] Integrate[Sin[5*x]*SinIntegral[2*x],x]
[Out] (-2*Cos[5*x]*SinIntegral[2*x] - SinIntegral[3*x] + SinIntegral[7*x])/10
```

Maple [A] (verified)

Time = 1.22 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.83

method	result	size
default	$-\frac{\cos(5x)\,\mathrm{Si}(2x)}{5}-\frac{\mathrm{Si}(3x)}{10}+\frac{\mathrm{Si}(7x)}{10}$	24

```
[In] int(Si(2*x)*sin(5*x),x,method=_RETURNVERBOSE)
[Out] -1/5*cos(5*x)*Si(2*x)-1/10*Si(3*x)+1/10*Si(7*x)
```

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 41, normalized size of antiderivative = 1.41

$$\int \sin(5x)\mathrm{Si}(2x)\,dx = -\frac{16}{5}\cos{(x)}^{5}\,\mathrm{Si}\,(2\,x)+4\,\cos{(x)}^{3}\,\mathrm{Si}\,(2\,x) - \cos{(x)}\,\mathrm{Si}\,(2\,x)+\frac{1}{10}\,\mathrm{Si}\,(7\,x)-\frac{1}{10}\,\mathrm{Si}\,(3\,x)$$

```
[In] integrate(sin_integral(2*x)*sin(5*x),x, algorithm="fricas")
[Out] -16/5*cos(x)^5*sin_integral(2*x) + 4*cos(x)^3*sin_integral(2*x) - cos(x)*si
n_integral(2*x) + 1/10*sin_integral(7*x) - 1/10*sin_integral(3*x)
```

Sympy [F]

$$\int \sin(5x)\mathrm{Si}(2x)\,dx = \int \sin{(5x)}\,\mathrm{Si}\,(2x)\,dx$$

```
[In] integrate(Si(2*x)*sin(5*x),x)
[Out] Integral(sin(5*x)*Si(2*x), x)
```

Maxima [F]

$$\int \sin(5x)\mathrm{Si}(2x)\,dx = \int \sin(5x)\,\mathrm{Si}(2x)\,dx$$

```
[In] integrate(sin_integral(2*x)*sin(5*x),x, algorithm="maxima")
[Out] integrate(sin(5*x)*sin_integral(2*x), x)
```

Giac [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

$$\int \sin(5x)\mathrm{Si}(2x)\,dx = -\frac{1}{5}\cos(5x)\,\mathrm{Si}(2x) + \frac{1}{10}\,\mathrm{Si}(7x) - \frac{1}{10}\,\mathrm{Si}(3x)$$

```
[In] integrate(sin_integral(2*x)*sin(5*x),x, algorithm="giac")
[Out] -1/5*cos(5*x)*sin_integral(2*x) + 1/10*sin_integral(7*x) - 1/10*sin_integra
l(3*x)
```

Mupad [F(-1)]

Timed out.

$$\int \sin(5x)\mathrm{Si}(2x)\,dx = \int \mathrm{sinint}(2x)\,\sin(5x)\,dx$$

```
[In] int(sinint(2*x)*sin(5*x),x)
[Out] int(sinint(2*x)*sin(5*x), x)
```

3.54 $\int \cos(5x)\mathbf{Si}(2x)\,dx$

Optimal result

Integrand size = 9, antiderivative size = 29

$$\int \cos(5x)\mathrm{Si}(2x)\,dx = -\frac{\mathrm{CosIntegral}(3x)}{10} + \frac{\mathrm{CosIntegral}(7x)}{10} + \frac{1}{5}\sin(5x)\mathrm{Si}(2x)$$

```
[Out] -1/10*Ci(3*x)+1/10*Ci(7*x)+1/5*Si(2*x)*sin(5*x)
```

Rubi [A] (verified)

Time = 0.04 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.444, Rules used = {6652, 12, 4513, 3383}

$$\int \cos(5x)\mathrm{Si}(2x)\,dx = -\frac{\mathrm{CosIntegral}(3x)}{10} + \frac{\mathrm{CosIntegral}(7x)}{10} + \frac{1}{5}\mathrm{Si}(2x)\sin(5x)$$

```
[In] Int[Cos[5*x]*SinIntegral[2*x],x]
```

```
[Out] -1/10*CosIntegral[3*x] + CosIntegral[7*x]/10 + (Sin[5*x]*SinIntegral[2*x])/
5
```

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 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
```

```
c*f, 0]
```

Rule 4513

```
Int[((e_.) + (f_.)*(x_))^(m_.)*Sin[(a_.) + (b_.)*(x_)]^(p_.)*Sin[(c_.) + (d
_.)*(x_)]^(q_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Sin[a + b*x
]^p*Sin[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f}, x] && IGtQ[p, 0] &&
 IGtQ[q, 0] && IntegerQ[m]
```

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{1}{5}\sin(5x)\text{Si}(2x) - \frac{2}{5}\int \frac{\sin(2x)\sin(5x)}{2x}\,dx \\
&= \frac{1}{5}\sin(5x)\text{Si}(2x) - \frac{1}{5}\int \frac{\sin(2x)\sin(5x)}{x}\,dx \\
&= \frac{1}{5}\sin(5x)\text{Si}(2x) - \frac{1}{5}\int \left(\frac{\cos(3x)}{2x} - \frac{\cos(7x)}{2x}\right)dx \\
&= \frac{1}{5}\sin(5x)\text{Si}(2x) - \frac{1}{10}\int \frac{\cos(3x)}{x}\,dx + \frac{1}{10}\int \frac{\cos(7x)}{x}\,dx \\
&= -\frac{\text{CosIntegral}(3x)}{10} + \frac{\text{CosIntegral}(7x)}{10} + \frac{1}{5}\sin(5x)\text{Si}(2x)
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.86

$$\int \cos(5x)\text{Si}(2x)\,dx = \frac{1}{10}(-\text{CosIntegral}(3x) + \text{CosIntegral}(7x) + 2\sin(5x)\text{Si}(2x))$$

```
[In] Integrate[Cos[5*x]*SinIntegral[2*x],x]
[Out] (-CosIntegral[3*x] + CosIntegral[7*x] + 2*Sin[5*x]*SinIntegral[2*x])/10
```

Maple [A] (verified)

Time = 1.37 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.83

method	result	size
default	$-\frac{\operatorname{Ci}(3x)}{10}+\frac{\operatorname{Ci}(7x)}{10}+\frac{\operatorname{Si}(2x)\sin(5x)}{5}$	24

```
[In] int(cos(5*x)*Si(2*x),x,method=_RETURNVERBOSE)
[Out] -1/10*Ci(3*x)+1/10*Ci(7*x)+1/5*Si(2*x)*sin(5*x)
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.45

$$\int \cos(5x)\operatorname{Si}(2x)\,dx = \frac{1}{5}\left(16\cos(x)^4\operatorname{Si}(2x) - 12\cos(x)^2\operatorname{Si}(2x) + \operatorname{Si}(2x)\right)\sin(x) + \frac{1}{10}\operatorname{Ci}(7x) - \frac{1}{10}\operatorname{Ci}(3x)$$

```
[In] integrate(cos(5*x)*sin_integral(2*x),x, algorithm="fricas")
[Out] 1/5*(16*cos(x)^4*sin_integral(2*x) - 12*cos(x)^2*sin_integral(2*x) + sin_in
tegral(2*x))*sin(x) + 1/10*cos_integral(7*x) - 1/10*cos_integral(3*x)
```

Sympy [F]

$$\int \cos(5x)\operatorname{Si}(2x)\,dx = \int \cos(5x)\operatorname{Si}(2x)\,dx$$

```
[In] integrate(cos(5*x)*Si(2*x),x)
[Out] Integral(cos(5*x)*Si(2*x), x)
```

Maxima [F]

$$\int \cos(5x)\mathrm{Si}(2x)\,dx = \int \cos(5\,x)\,\mathrm{Si}\,(2\,x)\ dx$$

```
[In] integrate(cos(5*x)*sin_integral(2*x),x, algorithm="maxima")
```

```
[Out] integrate(cos(5*x)*sin_integral(2*x), x)
```

Giac [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

$$\int \cos(5x)\mathrm{Si}(2x)\,dx = \frac{1}{5}\sin(5\,x)\,\mathrm{Si}\,(2\,x) + \frac{1}{10}\,\mathrm{Ci}\,(7\,x) - \frac{1}{10}\,\mathrm{Ci}\,(3\,x)$$

```
[In] integrate(cos(5*x)*sin_integral(2*x),x, algorithm="giac")
```

```
[Out] 1/5*sin(5*x)*sin_integral(2*x) + 1/10*cos_integral(7*x) - 1/10*cos_integral
(3*x)
```

Mupad [F(-1)]

Timed out.

$$\int \cos(5x)\mathrm{Si}(2x)\,dx = \int \mathrm{sinint}(2\,x)\ \cos(5\,x)\ dx$$

```
[In] int(sinint(2*x)*cos(5*x),x)
```

```
[Out] int(sinint(2*x)*cos(5*x), x)
```

3.55 $\int x^2 \sin(a+bx)\mathbf{Si}(a+bx)\,dx$

Optimal result

Integrand size = 16, antiderivative size = 187

$$\begin{aligned}\int x^2\sin(a+bx)\text{Si}(a+bx)\,dx = & -\frac{x}{b^2}+\frac{a\cos(2a+2bx)}{4b^3}-\frac{x\cos(2a+2bx)}{4b^2}\\ & -\frac{a\,\text{CosIntegral}(2a+2bx)}{b^3}+\frac{a\log(a+bx)}{b^3}\\ & +\frac{\cos(a+bx)\sin(a+bx)}{b^3}+\frac{\sin(2a+2bx)}{8b^3}\\ & +\frac{2\cos(a+bx)\text{Si}(a+bx)}{b^3}-\frac{x^2\cos(a+bx)\text{Si}(a+bx)}{b}\\ & +\frac{2x\sin(a+bx)\text{Si}(a+bx)}{b^2}\\ & -\frac{\text{Si}(2a+2bx)}{b^3}+\frac{a^2\text{Si}(2a+2bx)}{2b^3}\end{aligned}$$

```
[Out] -x/b^2-a*Ci(2*b*x+2*a)/b^3+1/4*a*cos(2*b*x+2*a)/b^3-1/4*x*cos(2*b*x+2*a)/b^
2+a*ln(b*x+a)/b^3+2*cos(b*x+a)*Si(b*x+a)/b^3-x^2*cos(b*x+a)*Si(b*x+a)/b-Si(
2*b*x+2*a)/b^3+1/2*a^2*Si(2*b*x+2*a)/b^3+cos(b*x+a)*sin(b*x+a)/b^3+2*x*Si(b
*x+a)*sin(b*x+a)/b^2+1/8*sin(2*b*x+2*a)/b^3
```

Rubi [A] (verified)

Time = 0.47 (sec) , antiderivative size = 187, normalized size of antiderivative = 1.00, number of steps used = 21, number of rules used = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 1.000, Rules used = {6648, 4669, 6873, 6874, 2718, 3377, 2717, 3380, 6654, 2715, 8, 3393, 3383, 6646, 4491, 12}

$$\int x^2\sin(a+bx)\mathrm{Si}(a+bx)\,dx = \frac{a^2\mathrm{Si}(2a+2bx)}{2b^3} - \frac{a\,\mathrm{CosIntegral}(2a+2bx)}{b^3} - \frac{\mathrm{Si}(2a+2bx)}{b^3} + \frac{2\mathrm{Si}(a+bx)\cos(a+bx)}{b^3} + \frac{a\log(a+bx)}{b^3} + \frac{\sin(2a+2bx)}{8b^3} + \frac{a\cos(2a+2bx)}{4b^3} + \frac{\sin(a+bx)\cos(a+bx)}{b^3} + \frac{2x\mathrm{Si}(a+bx)\sin(a+bx)}{b^2} - \frac{x\cos(2a+2bx)}{4b^2} - \frac{x^2\mathrm{Si}(a+bx)\cos(a+bx)}{b} - \frac{x}{b^2}$$

```
[In] Int[x^2*Sin[a + b*x]*SinIntegral[a + b*x],x]
```

```
[Out] -(x/b^2) + (a*Cos[2*a + 2*b*x])/(4*b^3) - (x*Cos[2*a + 2*b*x])/(4*b^2) - (a
*CosIntegral[2*a + 2*b*x])/b^3 + (a*Log[a + b*x])/b^3 + (Cos[a + b*x]*Sin[a
 + b*x])/b^3 + Sin[2*a + 2*b*x]/(8*b^3) + (2*Cos[a + b*x]*SinIntegral[a + b
*x])/b^3 - (x^2*Cos[a + b*x]*SinIntegral[a + b*x])/b + (2*x*Sin[a + b*x]*Si
nIntegral[a + b*x])/b^2 - SinIntegral[2*a + 2*b*x]/b^3 + (a^2*SinIntegral[2
*a + 2*b*x])/(2*b^3)
```

Rule 8

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

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 2715

```
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 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 4669

```
Int[Cos[w_]^(p_.)*(u_.)*Sin[v_]^(p_.), x_Symbol] :> Dist[1/2^p, Int[u*Sin[2
*v]^p, x], x] /; EqQ[w, v] && IntegerQ[p]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6648

```
Int[((e_.) + (f_.)*(x_))^(m_.)*Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) +
(d_.)*(x_)], x_Symbol] :> Simp[(-(e + f*x)^m)*Cos[a + b*x]*(SinIntegral[c +
 d*x]/b), x] + (Dist[d/b, Int[(e + f*x)^m*Cos[a + b*x]*(Sin[c + d*x]/(c + d
*x)), x], x] + Dist[f*(m/b), Int[(e + f*x)^(m - 1)*Cos[a + b*x]*SinIntegral
```

```
[c + d*x], x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && IGtQ[m, 0]
```

Rule 6654

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

Rule 6873

```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{x^2\cos(a+bx)\text{Si}(a+bx)}{b}+\frac{2\int x\cos(a+bx)\text{Si}(a+bx)\,dx}{b} \\
&\quad+\int\frac{x^2\cos(a+bx)\sin(a+bx)}{a+bx}\,dx \\
&= -\frac{x^2\cos(a+bx)\text{Si}(a+bx)}{b}+\frac{2x\sin(a+bx)\text{Si}(a+bx)}{b^2} \\
&\quad+\frac{1}{2}\int\frac{x^2\sin(2(a+bx))}{a+bx}\,dx-\frac{2\int\sin(a+bx)\text{Si}(a+bx)\,dx}{b^2}-\frac{2\int\frac{x\sin^2(a+bx)}{a+bx}\,dx}{b} \\
&= \frac{2\cos(a+bx)\text{Si}(a+bx)}{b^3}-\frac{x^2\cos(a+bx)\text{Si}(a+bx)}{b}+\frac{2x\sin(a+bx)\text{Si}(a+bx)}{b^2} \\
&\quad+\frac{1}{2}\int\frac{x^2\sin(2a+2bx)}{a+bx}\,dx-\frac{2\int\frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{b^2}-\frac{2\int\left(\frac{\sin^2(a+bx)}{b}-\frac{a\sin^2(a+bx)}{b(a+bx)}\right)dx}{b} \\
&= \frac{2\cos(a+bx)\text{Si}(a+bx)}{b^3}-\frac{x^2\cos(a+bx)\text{Si}(a+bx)}{b}+\frac{2x\sin(a+bx)\text{Si}(a+bx)}{b^2} \\
&\quad+\frac{1}{2}\int\left(-\frac{a\sin(2a+2bx)}{b^2}+\frac{x\sin(2a+2bx)}{b}+\frac{a^2\sin(2a+2bx)}{b^2(a+bx)}\right)dx \\
&\quad-\frac{2\int\sin^2(a+bx)\,dx}{b^2}-\frac{2\int\frac{\sin(2a+2bx)}{2(a+bx)}\,dx}{b^2}+\frac{(2a)\int\frac{\sin^2(a+bx)}{a+bx}\,dx}{b^2}
\end{aligned}$$

$$= \frac{\cos(a+bx)\sin(a+bx)}{b^3} + \frac{2\cos(a+bx)\text{Si}(a+bx)}{b^3} - \frac{x^2\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{2x\sin(a+bx)\text{Si}(a+bx)}{b^2} - \frac{\int 1\,dx}{b^2} - \frac{\int \frac{\sin(2a+2bx)}{a+bx}\,dx}{b^2} - \frac{a\int \sin(2a+2bx)\,dx}{2b^2} + \frac{(2a)\int \left(\frac{1}{2(a+bx)} - \frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{b^2} + \frac{a^2\int \frac{\sin(2a+2bx)}{a+bx}\,dx}{2b^2} + \frac{\int x\sin(2a+2bx)\,dx}{2b}$$

$$= -\frac{x}{b^2} + \frac{a\cos(2a+2bx)}{4b^3} - \frac{x\cos(2a+2bx)}{4b^2} + \frac{a\log(a+bx)}{b^3} + \frac{\cos(a+bx)\sin(a+bx)}{b^3} + \frac{2\cos(a+bx)\text{Si}(a+bx)}{b^3} - \frac{x^2\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{2x\sin(a+bx)\text{Si}(a+bx)}{b^2} - \frac{\text{Si}(2a+2bx)}{b^3} + \frac{a^2\text{Si}(2a+2bx)}{2b^3} + \frac{\int \cos(2a+2bx)\,dx}{4b^2} - \frac{a\int \frac{\cos(2a+2bx)}{a+bx}\,dx}{b^2}$$

$$= -\frac{x}{b^2} + \frac{a\cos(2a+2bx)}{4b^3} - \frac{x\cos(2a+2bx)}{4b^2} - \frac{a\,\text{CosIntegral}(2a+2bx)}{b^3} + \frac{a\log(a+bx)}{b^3} + \frac{\cos(a+bx)\sin(a+bx)}{b^3} + \frac{\sin(2a+2bx)}{8b^3} + \frac{2\cos(a+bx)\text{Si}(a+bx)}{b^3} - \frac{x^2\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{2x\sin(a+bx)\text{Si}(a+bx)}{b^2} - \frac{\text{Si}(2a+2bx)}{b^3} + \frac{a^2\text{Si}(2a+2bx)}{2b^3}$$

Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 123, normalized size of antiderivative = 0.66

$$\int x^2\sin(a+bx)\text{Si}(a+bx)\,dx$$

$$= \frac{-8bx + 2a\cos(2(a+bx)) - 2bx\cos(2(a+bx)) - 8a\,\text{CosIntegral}(2(a+bx)) + 8a\log(a+bx) + 5\sin(2(a+}{8b^3}$$

```
[In] Integrate[x^2*Sin[a + b*x]*SinIntegral[a + b*x],x]
```

```
[Out] (-8*b*x + 2*a*Cos[2*(a + b*x)] - 2*b*x*Cos[2*(a + b*x)] - 8*a*CosIntegral[2
*(a + b*x)] + 8*a*Log[a + b*x] + 5*Sin[2*(a + b*x)] - 8*((-2 + b^2*x^2)*Cos
[a + b*x] - 2*b*x*Sin[a + b*x])*SinIntegral[a + b*x] - 8*SinIntegral[2*(a +
 b*x)] + 4*a^2*SinIntegral[2*(a + b*x)])/(8*b^3)
```

Maple [A] (verified)

Time = 2.51 (sec) , antiderivative size = 175, normalized size of antiderivative = 0.94

method	result
derivativedivides	$\frac{\mathrm{Si}(bx+a)\left(-a^2\cos(bx+a)-2a(\sin(bx+a)-(bx+a)\cos(bx+a))-(bx+a)^2\cos(bx+a)+2\cos(bx+a)+2(bx+a)\sin(bx+a)\right)}{}$
default	$\frac{\mathrm{Si}(bx+a)\left(-a^2\cos(bx+a)-2a(\sin(bx+a)-(bx+a)\cos(bx+a))-(bx+a)^2\cos(bx+a)+2\cos(bx+a)+2(bx+a)\sin(bx+a)\right)}{}$

```
[In] int(x^2*Si(b*x+a)*sin(b*x+a),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^3*(Si(b*x+a)*(-a^2*cos(b*x+a)-2*a*(sin(b*x+a)-(b*x+a)*cos(b*x+a))-(b*x+
a)^2*cos(b*x+a)+2*cos(b*x+a)+2*(b*x+a)*sin(b*x+a))+1/2*a^2*Si(2*b*x+2*a)+a*
cos(b*x+a)^2-1/2*(b*x+a)*cos(b*x+a)^2+5/4*sin(b*x+a)*cos(b*x+a)-3/4*b*x-3/4
*a+a*ln(b*x+a)-a*Ci(2*b*x+2*a)-Si(2*b*x+2*a))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 114, normalized size of antiderivative = 0.61

$$\int x^2\sin(a+bx)\mathrm{Si}(a+bx)\,dx = -\frac{2\,(bx-a)\cos{(bx+a)}^2+4\,(b^2x^2-2)\cos{(bx+a)}\,\mathrm{Si}\,(bx+a)+3\,bx+4\,a\,\mathrm{Ci}\,(2\,bx+2\,a)-4\,a\log{(bx}}{4\,b^3}$$

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

```
[Out] -1/4*(2*(b*x - a)*cos(b*x + a)^2 + 4*(b^2*x^2 - 2)*cos(b*x + a)*sin_integra
l(b*x + a) + 3*b*x + 4*a*cos_integral(2*b*x + 2*a) - 4*a*log(b*x + a) - (8*
b*x*sin_integral(b*x + a) + 5*cos(b*x + a))*sin(b*x + a) - 2*(a^2 - 2)*sin_
integral(2*b*x + 2*a))/b^3
```

Sympy [F]

$$\int x^2\sin(a+bx)\mathrm{Si}(a+bx)\,dx = \int x^2\sin{(a+bx)}\,\mathrm{Si}\,(a+bx)\,dx$$

```
[In] integrate(x**2*Si(b*x+a)*sin(b*x+a),x)
```

```
[Out] Integral(x**2*sin(a + b*x)*Si(a + b*x), x)
```

Maxima [F]

$$\int x^2 \sin(a+bx)\mathrm{Si}(a+bx)\,dx = \int x^2 \sin(bx+a)\,\mathrm{Si}(bx+a)\,dx$$

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

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.33 (sec) , antiderivative size = 398, normalized size of antiderivative = 2.13

$$\int x^2 \sin(a+bx)\mathrm{Si}(a+bx)\,dx = \left(\frac{2\,x\sin(bx+a)}{b^2} - \frac{(b^2x^2-2)\cos(bx+a)}{b^3}\right)\mathrm{Si}(bx+a) + \frac{a^2\Im(\mathrm{Ci}(2\,bx+2\,a))\tan(bx+a)^2 - a^2\Im(\mathrm{Ci}(-2\,bx-2\,a))\tan(bx+a)^2 + 2\,a^2\,\mathrm{Si}(2\,bx+2\,a)\tan(bx+a}{}$$

```
[In] integrate(x^2*sin_integral(b*x+a)*sin(b*x+a),x, algorithm="giac")
[Out] (2*x*sin(b*x + a)/b^2 - (b^2*x^2 - 2)*cos(b*x + a)/b^3)*sin_integral(b*x +
a) + 1/4*(a^2*imag_part(cos_integral(2*b*x + 2*a))*tan(b*x + a)^2 - a^2*ima
g_part(cos_integral(-2*b*x - 2*a))*tan(b*x + a)^2 + 2*a^2*sin_integral(2*b*
x + 2*a)*tan(b*x + a)^2 - 3*b*x*tan(b*x + a)^2 + 4*a*log(abs(b*x + a))*tan(
b*x + a)^2 - 2*a*real_part(cos_integral(2*b*x + 2*a))*tan(b*x + a)^2 - 2*a*
real_part(cos_integral(-2*b*x - 2*a))*tan(b*x + a)^2 + a^2*imag_part(cos_in
tegral(2*b*x + 2*a)) - a^2*imag_part(cos_integral(-2*b*x - 2*a)) + 2*a^2*si
n_integral(2*b*x + 2*a) - a*tan(b*x + a)^2 - 2*imag_part(cos_integral(2*b*x
 + 2*a))*tan(b*x + a)^2 + 2*imag_part(cos_integral(-2*b*x - 2*a))*tan(b*x +
 a)^2 - 4*sin_integral(2*b*x + 2*a)*tan(b*x + a)^2 - 5*b*x + 4*a*log(abs(b*
x + a)) - 2*a*real_part(cos_integral(2*b*x + 2*a)) - 2*a*real_part(cos_inte
gral(-2*b*x - 2*a)) + a - 2*imag_part(cos_integral(2*b*x + 2*a)) + 2*imag_p
art(cos_integral(-2*b*x - 2*a)) - 4*sin_integral(2*b*x + 2*a) + 5*tan(b*x +
 a))/(b^3*tan(b*x + a)^2 + b^3)
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \sin(a+bx)\text{Si}(a+bx)\,dx = \int x^2\,\text{sinint}(a+b\,x)\,\sin\left(a+b\,x\right)\,dx$$

```
[In] int(x^2*sinint(a + b*x)*sin(a + b*x),x)
[Out] int(x^2*sinint(a + b*x)*sin(a + b*x), x)
```

3.56 $\int x\sin(a+bx)\mathbf{Si}(a+bx)\,dx$

Optimal result

Integrand size = 14, antiderivative size = 97

$$\int x\sin(a+bx)\mathrm{Si}(a+bx)\,dx=-\frac{\cos(2a+2bx)}{4b^2}+\frac{\mathrm{CosIntegral}(2a+2bx)}{2b^2}-\frac{\log(a+bx)}{2b^2}-\frac{x\cos(a+bx)\mathrm{Si}(a+bx)}{b}+\frac{\sin(a+bx)\mathrm{Si}(a+bx)}{b^2}-\frac{a\mathrm{Si}(2a+2bx)}{2b^2}$$

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

Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.643, Rules used = {6648, 4669, 6873, 6874, 2718, 3380, 6652, 3393, 3383}

$$\int x\sin(a+bx)\mathrm{Si}(a+bx)\,dx=\frac{\mathrm{CosIntegral}(2a+2bx)}{2b^2}-\frac{a\mathrm{Si}(2a+2bx)}{2b^2}+\frac{\mathrm{Si}(a+bx)\sin(a+bx)}{b^2}-\frac{\log(a+bx)}{2b^2}-\frac{\cos(2a+2bx)}{4b^2}-\frac{x\mathrm{Si}(a+bx)\cos(a+bx)}{b}$$

```
[In] Int[x*Sin[a + b*x]*SinIntegral[a + b*x],x]
```

```
[Out] -1/4*Cos[2*a + 2*b*x]/b^2 + CosIntegral[2*a + 2*b*x]/(2*b^2) - Log[a + b*x]
/(2*b^2) - (x*Cos[a + b*x]*SinIntegral[a + b*x])/b + (Sin[a + b*x]*SinInteg
ral[a + b*x])/b^2 - (a*SinIntegral[2*a + 2*b*x])/(2*b^2)
```

Rule 2718

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

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 4669

```
Int[Cos[w_]^(p_.)*(u_.)*Sin[v_]^(p_.), x_Symbol] :> Dist[1/2^p, Int[u*Sin[2
*v]^p, x], x] /; EqQ[w, v] && IntegerQ[p]
```

Rule 6648

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

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6873

```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{x\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{\int \cos(a+bx)\text{Si}(a+bx)\,dx}{b} \\
&\quad + \int \frac{x\cos(a+bx)\sin(a+bx)}{a+bx}\,dx \\
&= -\frac{x\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{\sin(a+bx)\text{Si}(a+bx)}{b^2} \\
&\quad + \frac{1}{2}\int \frac{x\sin(2(a+bx))}{a+bx}\,dx - \frac{\int \frac{\sin^2(a+bx)}{a+bx}\,dx}{b} \\
&= -\frac{x\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{\sin(a+bx)\text{Si}(a+bx)}{b^2} \\
&\quad + \frac{1}{2}\int \frac{x\sin(2a+2bx)}{a+bx}\,dx - \frac{\int \left(\frac{1}{2(a+bx)} - \frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{b} \\
&= -\frac{\log(a+bx)}{2b^2} - \frac{x\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{\sin(a+bx)\text{Si}(a+bx)}{b^2} \\
&\quad + \frac{1}{2}\int \left(\frac{\sin(2a+2bx)}{b} + \frac{a\sin(2a+2bx)}{b(-a-bx)}\right)dx + \frac{\int \frac{\cos(2a+2bx)}{a+bx}\,dx}{2b} \\
&= \frac{\text{CosIntegral}(2a+2bx)}{2b^2} - \frac{\log(a+bx)}{2b^2} - \frac{x\cos(a+bx)\text{Si}(a+bx)}{b} \\
&\quad + \frac{\sin(a+bx)\text{Si}(a+bx)}{b^2} + \frac{\int \sin(2a+2bx)\,dx}{2b} + \frac{a\int \frac{\sin(2a+2bx)}{-a-bx}\,dx}{2b} \\
&= -\frac{\cos(2a+2bx)}{4b^2} + \frac{\text{CosIntegral}(2a+2bx)}{2b^2} - \frac{\log(a+bx)}{2b^2} \\
&\quad - \frac{x\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{\sin(a+bx)\text{Si}(a+bx)}{b^2} - \frac{a\text{Si}(2a+2bx)}{2b^2}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.18 (sec) , antiderivative size = 71, normalized size of antiderivative = 0.73

$$\int x\sin(a+bx)\text{Si}(a+bx)\,dx =$$

$$-\frac{\cos(2(a+bx)) - 2\,\text{CosIntegral}(2(a+bx)) + 2\log(a+bx) + 4(bx\cos(a+bx) - \sin(a+bx))\text{Si}(a+bx) -}{4b^2}$$

```
[In] Integrate[x*Sin[a + b*x]*SinIntegral[a + b*x],x]
[Out] -1/4*(Cos[2*(a + b*x)] - 2*CosIntegral[2*(a + b*x)] + 2*Log[a + b*x] + 4*(b
*x*Cos[a + b*x] - Sin[a + b*x])*SinIntegral[a + b*x] + 2*a*SinIntegral[2*(a
 + b*x)])/b^2
```

Maple [A] (verified)

Time = 1.58 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.85

method	result	size
derivativedivides	$\frac{\mathrm{Si}(bx+a)(a\cos(bx+a)+\sin(bx+a)-(bx+a)\cos(bx+a))-\frac{a\,\mathrm{Si}(2bx+2a)}{2}-\frac{\ln(bx+a)}{2}+\frac{\mathrm{Ci}(2bx+2a)}{2}-\frac{\cos(bx+a)^2}{2}}{b^2}$	82
default	$\frac{\mathrm{Si}(bx+a)(a\cos(bx+a)+\sin(bx+a)-(bx+a)\cos(bx+a))-\frac{a\,\mathrm{Si}(2bx+2a)}{2}-\frac{\ln(bx+a)}{2}+\frac{\mathrm{Ci}(2bx+2a)}{2}-\frac{\cos(bx+a)^2}{2}}{b^2}$	82

```
[In] int(x*Si(b*x+a)*sin(b*x+a),x,method=_RETURNVERBOSE)
[Out] 1/b^2*(Si(b*x+a)*(a*cos(b*x+a)+sin(b*x+a)-(b*x+a)*cos(b*x+a))-1/2*a*Si(2*b*
x+2*a)-1/2*ln(b*x+a)+1/2*Ci(2*b*x+2*a)-1/2*cos(b*x+a)^2)
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 72, normalized size of antiderivative = 0.74

$$\int x\sin(a+bx)\mathrm{Si}(a+bx)\,dx = -\frac{2\,bx\cos\left(bx+a\right)\mathrm{Si}\left(bx+a\right)+\cos\left(bx+a\right)^{2}+a\,\mathrm{Si}\left(2\,bx+2\,a\right)-2\,\sin\left(bx+a\right)\mathrm{Si}\left(bx+a\right)-\mathrm{Ci}\left(2\,bx+\right.}{2\,b^{2}}$$

```
[In] integrate(x*sin_integral(b*x+a)*sin(b*x+a),x, algorithm="fricas")
[Out] -1/2*(2*b*x*cos(b*x + a)*sin_integral(b*x + a) + cos(b*x + a)^2 + a*sin_int
egral(2*b*x + 2*a) - 2*sin(b*x + a)*sin_integral(b*x + a) - cos_integral(2*
b*x + 2*a) + log(b*x + a))/b^2
```

Sympy [F]

$$\int x\sin(a+bx)\mathrm{Si}(a+bx)\,dx = \int x\sin\left(a+bx\right)\mathrm{Si}\left(a+bx\right)dx$$

```
[In] integrate(x*Si(b*x+a)*sin(b*x+a),x)
[Out] Integral(x*sin(a + b*x)*Si(a + b*x), x)
```

Maxima [F]

$$\int x\sin(a+bx)\text{Si}(a+bx)\,dx = \int x\sin(bx+a)\,\text{Si}(bx+a)\,dx$$

```
[In] integrate(x*sin_integral(b*x+a)*sin(b*x+a),x, algorithm="maxima")
```

```
[Out] integrate(x*sin(b*x + a)*sin_integral(b*x + a), x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.31 (sec) , antiderivative size = 507, normalized size of antiderivative = 5.23

$$\int x\sin(a+bx)\text{Si}(a+bx)\,dx = -\left(\frac{x\cos(bx+a)}{b} - \frac{\sin(bx+a)}{b^2}\right)\text{Si}(bx+a) - \frac{a\Im(\text{Ci}(2\,bx+2\,a))\tan(bx)^2\tan(a)^2 - a\Im(\text{Ci}(-2\,bx-2\,a))\tan(bx)^2\tan(a)^2 + 2\,a\,\text{Si}(2\,bx+2\,a)\tan(b}{}$$

```
[In] integrate(x*sin_integral(b*x+a)*sin(b*x+a),x, algorithm="giac")
```

```
[Out] -(x*cos(b*x + a)/b - sin(b*x + a)/b^2)*sin_integral(b*x + a) - 1/4*(a*imag_
part(cos_integral(2*b*x + 2*a))*tan(b*x)^2*tan(a)^2 - a*imag_part(cos_integ
ral(-2*b*x - 2*a))*tan(b*x)^2*tan(a)^2 + 2*a*sin_integral(2*b*x + 2*a)*tan(
b*x)^2*tan(a)^2 + 2*log(abs(b*x + a))*tan(b*x)^2*tan(a)^2 - real_part(cos_i
ntegral(2*b*x + 2*a))*tan(b*x)^2*tan(a)^2 - real_part(cos_integral(-2*b*x -
 2*a))*tan(b*x)^2*tan(a)^2 + a*imag_part(cos_integral(2*b*x + 2*a))*tan(b*x
)^2 - a*imag_part(cos_integral(-2*b*x - 2*a))*tan(b*x)^2 + 2*a*sin_integral
(2*b*x + 2*a)*tan(b*x)^2 + a*imag_part(cos_integral(2*b*x + 2*a))*tan(a)^2
- a*imag_part(cos_integral(-2*b*x - 2*a))*tan(a)^2 + 2*a*sin_integral(2*b*x
 + 2*a)*tan(a)^2 + tan(b*x)^2*tan(a)^2 + 2*log(abs(b*x + a))*tan(b*x)^2 - r
eal_part(cos_integral(2*b*x + 2*a))*tan(b*x)^2 - real_part(cos_integral(-2*
b*x - 2*a))*tan(b*x)^2 + 2*log(abs(b*x + a))*tan(a)^2 - real_part(cos_integ
ral(2*b*x + 2*a))*tan(a)^2 - real_part(cos_integral(-2*b*x - 2*a))*tan(a)^2
 + a*imag_part(cos_integral(2*b*x + 2*a)) - a*imag_part(cos_integral(-2*b*x
 - 2*a)) + 2*a*sin_integral(2*b*x + 2*a) - tan(b*x)^2 - 4*tan(b*x)*tan(a) -
 tan(a)^2 + 2*log(abs(b*x + a)) - real_part(cos_integral(2*b*x + 2*a)) - re
al_part(cos_integral(-2*b*x - 2*a)) + 1)/(b^2*tan(b*x)^2*tan(a)^2 + b^2*tan
(b*x)^2 + b^2*tan(a)^2 + b^2)
```

Mupad [F(-1)]

Timed out.

$$\int x\sin(a+bx)\mathrm{Si}(a+bx)\,dx=\int x\,\mathrm{sinint}(a+b\,x)\,\sin\left(a+b\,x\right)\,dx$$

```
[In] int(x*sinint(a + b*x)*sin(a + b*x),x)
[Out] int(x*sinint(a + b*x)*sin(a + b*x), x)
```

3.57 $\int \sin(a+bx)\mathbf{Si}(a+bx)\,dx$

Optimal result

Integrand size = 13, antiderivative size = 34

$$\int \sin(a+bx)\mathrm{Si}(a+bx)\,dx=-\frac{\cos(a+bx)\mathrm{Si}(a+bx)}{b}+\frac{\mathrm{Si}(2a+2bx)}{2b}$$

```
[Out] -cos(b*x+a)*Si(b*x+a)/b+1/2*Si(2*b*x+2*a)/b
```

Rubi [A] (verified)

Time = 0.05 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.308, Rules used = {6646, 4491, 12, 3380}

$$\int \sin(a+bx)\mathrm{Si}(a+bx)\,dx=\frac{\mathrm{Si}(2a+2bx)}{2b}-\frac{\mathrm{Si}(a+bx)\cos(a+bx)}{b}$$

```
[In] Int[Sin[a + b*x]*SinIntegral[a + b*x],x]
[Out] -((Cos[a + b*x]*SinIntegral[a + b*x])/b) + SinIntegral[2*a + 2*b*x]/(2*b)
```

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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{\cos(a+bx)\text{Si}(a+bx)}{b} + \int \frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx \\
&= -\frac{\cos(a+bx)\text{Si}(a+bx)}{b} + \int \frac{\sin(2a+2bx)}{2(a+bx)}\,dx \\
&= -\frac{\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{1}{2}\int \frac{\sin(2a+2bx)}{a+bx}\,dx \\
&= -\frac{\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{\text{Si}(2a+2bx)}{2b}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 33, normalized size of antiderivative = 0.97

$$\int \sin(a+bx)\text{Si}(a+bx)\,dx = -\frac{\cos(a+bx)\text{Si}(a+bx)}{b} + \frac{\text{Si}(2(a+bx))}{2b}$$

```
[In] Integrate[Sin[a + b*x]*SinIntegral[a + b*x],x]
[Out] -((Cos[a + b*x]*SinIntegral[a + b*x])/b) + SinIntegral[2*(a + b*x)]/(2*b)
```

Maple [A] (verified)

Time = 0.67 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

method	result	size
derivativedivides	$\frac{-\cos(bx+a)\,\text{Si}(bx+a)+\frac{\text{Si}(2bx+2a)}{2}}{b}$	31
default	$\frac{-\cos(bx+a)\,\text{Si}(bx+a)+\frac{\text{Si}(2bx+2a)}{2}}{b}$	31

```
[In] int(Si(b*x+a)*sin(b*x+a),x,method=_RETURNVERBOSE)
[Out] 1/b*(-cos(b*x+a)*Si(b*x+a)+1/2*Si(2*b*x+2*a))
```

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 31, normalized size of antiderivative = 0.91

$$\int \sin(a+bx)\text{Si}(a+bx)\,dx = -\frac{2\,\cos\left(bx+a\right)\text{Si}\left(bx+a\right) - \text{Si}\left(2\,bx+2\,a\right)}{2\,b}$$

```
[In] integrate(sin_integral(b*x+a)*sin(b*x+a),x, algorithm="fricas")
[Out] -1/2*(2*cos(b*x + a)*sin_integral(b*x + a) - sin_integral(2*b*x + 2*a))/b
```

Sympy [F]

$$\int \sin(a+bx)\text{Si}(a+bx)\,dx = \int \sin\left(a+bx\right)\text{Si}\left(a+bx\right)\,dx$$

```
[In] integrate(Si(b*x+a)*sin(b*x+a),x)
[Out] Integral(sin(a + b*x)*Si(a + b*x), x)
```

Maxima [F]

$$\int \sin(a+bx)\text{Si}(a+bx)\,dx = \int \sin\left(bx+a\right)\text{Si}\left(bx+a\right)\,dx$$

```
[In] integrate(sin_integral(b*x+a)*sin(b*x+a),x, algorithm="maxima")
[Out] integrate(sin(b*x + a)*sin_integral(b*x + a), x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.30 (sec) , antiderivative size = 57, normalized size of antiderivative = 1.68

$$\int \sin(a+bx)\text{Si}(a+bx)\,dx = -\frac{\cos\left(bx+a\right)\text{Si}\left(bx+a\right)}{b} + \frac{\Im(\text{Ci}\left(2\,bx+2\,a\right)) - \Im(\text{Ci}\left(-2\,bx-2\,a\right)) + 2\,\text{Si}\left(2\,bx+2\,a\right)}{4\,b}$$

```
[In] integrate(sin_integral(b*x+a)*sin(b*x+a),x, algorithm="giac")
```

```
[Out] -cos(b*x + a)*sin_integral(b*x + a)/b + 1/4*(imag_part(cos_integral(2*b*x +
 2*a)) - imag_part(cos_integral(-2*b*x - 2*a)) + 2*sin_integral(2*b*x + 2*a
))/b
```

Mupad [F(-1)]

Timed out.

$$\int \sin(a+bx)\text{Si}(a+bx)\,dx = \int \text{sinint}(a+b\,x)\,\sin\left(a+b\,x\right)\,dx$$

```
[In] int(sinint(a + b*x)*sin(a + b*x),x)
```

```
[Out] int(sinint(a + b*x)*sin(a + b*x), x)
```

3.58 $\int \frac{\sin(a+bx)\mathbf{Si}(a+bx)}{x}\,dx$

Optimal result

Integrand size = 16, antiderivative size = 16

$$\int \frac{\sin(a+bx)\text{Si}(a+bx)}{x}\,dx = \text{Int}\left(\frac{\sin(a+bx)\text{Si}(a+bx)}{x},x\right)$$

```
[Out] CannotIntegrate(Si(b*x+a)*sin(b*x+a)/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.09 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\sin(a+bx)\text{Si}(a+bx)}{x}\,dx = \int \frac{\sin(a+bx)\text{Si}(a+bx)}{x}\,dx$$

```
[In] Int[(Sin[a + b*x]*SinIntegral[a + b*x])/x,x]
[Out] Defer[Int][(Sin[a + b*x]*SinIntegral[a + b*x])/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\sin(a+bx)\text{Si}(a+bx)}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 2.29 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\sin(a+bx)\mathrm{Si}(a+bx)}{x}\,dx = \int \frac{\sin(a+bx)\mathrm{Si}(a+bx)}{x}\,dx$$

```
[In] Integrate[(Sin[a + b*x]*SinIntegral[a + b*x])/x,x]
[Out] Integrate[(Sin[a + b*x]*SinIntegral[a + b*x])/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.27 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{\mathrm{Si}\,(bx+a)\sin\,(bx+a)}{x}dx$$

```
[In] int(Si(b*x+a)*sin(b*x+a)/x,x)
[Out] int(Si(b*x+a)*sin(b*x+a)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\sin(a+bx)\mathrm{Si}(a+bx)}{x}\,dx = \int \frac{\sin\,(bx+a)\,\mathrm{Si}\,(bx+a)}{x}\,dx$$

```
[In] integrate(sin_integral(b*x+a)*sin(b*x+a)/x,x, algorithm="fricas")
[Out] integral(sin(b*x + a)*sin_integral(b*x + a)/x, x)
```

Sympy [N/A]

Not integrable

Time = 1.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{\sin(a+bx)\mathrm{Si}(a+bx)}{x}\,dx = \int \frac{\sin\,(a+bx)\,\mathrm{Si}\,(a+bx)}{x}\,dx$$

```
[In] integrate(Si(b*x+a)*sin(b*x+a)/x,x)
[Out] Integral(sin(a + b*x)*Si(a + b*x)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\sin(a+bx)\text{Si}(a+bx)}{x}\,dx = \int \frac{\sin\left(bx+a\right)\text{Si}\left(bx+a\right)}{x}\,dx$$

```
[In] integrate(sin_integral(b*x+a)*sin(b*x+a)/x,x, algorithm="maxima")
[Out] integrate(sin(b*x + a)*sin_integral(b*x + a)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\sin(a+bx)\text{Si}(a+bx)}{x}\,dx = \int \frac{\sin\left(bx+a\right)\text{Si}\left(bx+a\right)}{x}\,dx$$

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

Mupad [N/A]

Not integrable

Time = 8.52 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\sin(a+bx)\text{Si}(a+bx)}{x}\,dx = \int \frac{\text{sinint}(a+b\,x)\,\sin\left(a+b\,x\right)}{x}\,dx$$

```
[In] int((sinint(a + b*x)*sin(a + b*x))/x,x)
[Out] int((sinint(a + b*x)*sin(a + b*x))/x, x)
```

3.59 $\int x^2 \cos(a+bx)\mathbf{Si}(a+bx)\,dx$

Optimal result

Integrand size = 16, antiderivative size = 218

$$\begin{aligned}\int x^2\cos(a+bx)\mathrm{Si}(a+bx)\,dx &= \frac{ax}{2b^2}-\frac{x^2}{4b}+\frac{\cos(2a+2bx)}{2b^3}-\frac{\mathrm{CosIntegral}(2a+2bx)}{b^3}\\&\quad+\frac{a^2\,\mathrm{CosIntegral}(2a+2bx)}{2b^3}+\frac{\log(a+bx)}{b^3}\\&\quad-\frac{a^2\log(a+bx)}{2b^3}-\frac{a\cos(a+bx)\sin(a+bx)}{2b^3}\\&\quad+\frac{x\cos(a+bx)\sin(a+bx)}{2b^2}-\frac{\sin^2(a+bx)}{4b^3}\\&\quad+\frac{2x\cos(a+bx)\mathrm{Si}(a+bx)}{b^2}-\frac{2\sin(a+bx)\mathrm{Si}(a+bx)}{b^3}\\&\quad+\frac{x^2\sin(a+bx)\mathrm{Si}(a+bx)}{b}+\frac{a\mathrm{Si}(2a+2bx)}{b^3}\end{aligned}$$

```
[Out] 1/2*a*x/b^2-1/4*x^2/b-Ci(2*b*x+2*a)/b^3+1/2*a^2*Ci(2*b*x+2*a)/b^3+1/2*cos(2
*b*x+2*a)/b^3+ln(b*x+a)/b^3-1/2*a^2*ln(b*x+a)/b^3+2*x*cos(b*x+a)*Si(b*x+a)/
b^2+a*Si(2*b*x+2*a)/b^3-1/2*a*cos(b*x+a)*sin(b*x+a)/b^3+1/2*x*cos(b*x+a)*si
n(b*x+a)/b^2-2*Si(b*x+a)*sin(b*x+a)/b^3+x^2*Si(b*x+a)*sin(b*x+a)/b-1/4*sin(
b*x+a)^2/b^3
```

Rubi [A] (verified)

Time = 0.53 (sec) , antiderivative size = 218, normalized size of antiderivative = 1.00, number of steps used = 21, number of rules used = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.875, Rules used = {6654, 6874, 2715, 8, 3391, 30, 3393, 3383, 6648, 4669, 6873, 2718, 3380, 6652}

$$\int x^2\cos(a+bx)\text{Si}(a+bx)\,dx=\frac{a^2\,\text{CosIntegral}(2a+2bx)}{2b^3}-\frac{a^2\log(a+bx)}{2b^3}-\frac{\text{CosIntegral}(2a+2bx)}{b^3}+\frac{a\text{Si}(2a+2bx)}{b^3}-\frac{2\text{Si}(a+bx)\sin(a+bx)}{b^3}+\frac{\log(a+bx)}{b^3}-\frac{\sin^2(a+bx)}{4b^3}+\frac{\cos(2a+2bx)}{2b^3}-\frac{a\sin(a+bx)\cos(a+bx)}{2b^3}+\frac{2x\text{Si}(a+bx)\cos(a+bx)}{b^2}+\frac{ax}{2b^2}+\frac{x\sin(a+bx)\cos(a+bx)}{2b^2}+\frac{x^2\text{Si}(a+bx)\sin(a+bx)}{b}-\frac{x^2}{4b}$$

```
[In] Int[x^2*Cos[a + b*x]*SinIntegral[a + b*x],x]
```

```
[Out] (a*x)/(2*b^2) - x^2/(4*b) + Cos[2*a + 2*b*x]/(2*b^3) - CosIntegral[2*a + 2*
b*x]/b^3 + (a^2*CosIntegral[2*a + 2*b*x])/(2*b^3) + Log[a + b*x]/b^3 - (a^2
*Log[a + b*x])/(2*b^3) - (a*Cos[a + b*x]*Sin[a + b*x])/(2*b^3) + (x*Cos[a +
 b*x]*Sin[a + b*x])/(2*b^2) - Sin[a + b*x]^2/(4*b^3) + (2*x*Cos[a + b*x]*Si
nIntegral[a + b*x])/b^2 - (2*Sin[a + b*x]*SinIntegral[a + b*x])/b^3 + (x^2*
Sin[a + b*x]*SinIntegral[a + b*x])/b + (a*SinIntegral[2*a + 2*b*x])/b^3
```

Rule 8

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

Rule 30

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

Rule 2715

```
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 2718

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

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3391

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

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 4669

```
Int[Cos[w_]^(p_.)*(u_.)*Sin[v_]^(p_.), x_Symbol] :> Dist[1/2^p, Int[u*Sin[2
*v]^p, x], x] /; EqQ[w, v] && IntegerQ[p]
```

Rule 6648

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

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6654

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

Rule 6873

```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{x^2\sin(a+bx)\text{Si}(a+bx)}{b}-\frac{2\int x\sin(a+bx)\text{Si}(a+bx)\,dx}{b}-\int\frac{x^2\sin^2(a+bx)}{a+bx}\,dx\\
&= \frac{2x\cos(a+bx)\text{Si}(a+bx)}{b^2}+\frac{x^2\sin(a+bx)\text{Si}(a+bx)}{b}-\frac{2\int\cos(a+bx)\text{Si}(a+bx)\,dx}{b^2}\\
&\quad-\frac{2\int\frac{x\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{b}-\int\left(-\frac{a\sin^2(a+bx)}{b^2}+\frac{x\sin^2(a+bx)}{b}+\frac{a^2\sin^2(a+bx)}{b^2(a+bx)}\right)dx\\
&= \frac{2x\cos(a+bx)\text{Si}(a+bx)}{b^2}-\frac{2\sin(a+bx)\text{Si}(a+bx)}{b^3}\\
&\quad+\frac{x^2\sin(a+bx)\text{Si}(a+bx)}{b}+\frac{2\int\frac{\sin^2(a+bx)}{a+bx}\,dx}{b^2}+\frac{a\int\sin^2(a+bx)\,dx}{b^2}\\
&\quad-\frac{a^2\int\frac{\sin^2(a+bx)}{a+bx}\,dx}{b^2}-\frac{\int x\sin^2(a+bx)\,dx}{b}-\frac{\int\frac{x\sin(2(a+bx))}{a+bx}\,dx}{b}\\
&= -\frac{a\cos(a+bx)\sin(a+bx)}{2b^3}+\frac{x\cos(a+bx)\sin(a+bx)}{2b^2}\\
&\quad-\frac{\sin^2(a+bx)}{4b^3}+\frac{2x\cos(a+bx)\text{Si}(a+bx)}{b^2}-\frac{2\sin(a+bx)\text{Si}(a+bx)}{b^3}\\
&\quad+\frac{x^2\sin(a+bx)\text{Si}(a+bx)}{b}+\frac{2\int\left(\frac{1}{2(a+bx)}-\frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{b^2}+\frac{a\int 1\,dx}{2b^2}\\
&\quad-\frac{a^2\int\left(\frac{1}{2(a+bx)}-\frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{b^2}-\frac{\int x\,dx}{2b}-\frac{\int\frac{x\sin(2a+2bx)}{a+bx}\,dx}{b}
\end{aligned}$$

$$= \frac{ax}{2b^2} - \frac{x^2}{4b} + \frac{\log(a+bx)}{b^3} - \frac{a^2\log(a+bx)}{2b^3} - \frac{a\cos(a+bx)\sin(a+bx)}{2b^3} + \frac{x\cos(a+bx)\sin(a+bx)}{2b^2} - \frac{\sin^2(a+bx)}{4b^3} + \frac{2x\cos(a+bx)\mathrm{Si}(a+bx)}{b^2} - \frac{2\sin(a+bx)\mathrm{Si}(a+bx)}{b^3} + \frac{x^2\sin(a+bx)\mathrm{Si}(a+bx)}{b} - \frac{\int\frac{\cos(2a+2bx)}{a+bx}\,dx}{b^2} + \frac{a^2\int\frac{\cos(2a+2bx)}{a+bx}\,dx}{2b^2} - \frac{\int\left(\frac{\sin(2a+2bx)}{b} + \frac{a\sin(2a+2bx)}{b(-a-bx)}\right)dx}{b}$$

$$= \frac{ax}{2b^2} - \frac{x^2}{4b} - \frac{\mathrm{CosIntegral}(2a+2bx)}{b^3} + \frac{a^2\,\mathrm{CosIntegral}(2a+2bx)}{2b^3} + \frac{\log(a+bx)}{b^3} - \frac{a^2\log(a+bx)}{2b^3} - \frac{a\cos(a+bx)\sin(a+bx)}{2b^3} + \frac{x\cos(a+bx)\sin(a+bx)}{2b^2} - \frac{\sin^2(a+bx)}{4b^3} + \frac{2x\cos(a+bx)\mathrm{Si}(a+bx)}{b^2} - \frac{2\sin(a+bx)\mathrm{Si}(a+bx)}{b^3} + \frac{x^2\sin(a+bx)\mathrm{Si}(a+bx)}{b} - \frac{\int\sin(2a+2bx)\,dx}{b^2} - \frac{a\int\frac{\sin(2a+2bx)}{-a-bx}\,dx}{b^2}$$

$$= \frac{ax}{2b^2} - \frac{x^2}{4b} + \frac{\cos(2a+2bx)}{2b^3} - \frac{\mathrm{CosIntegral}(2a+2bx)}{b^3} + \frac{a^2\,\mathrm{CosIntegral}(2a+2bx)}{2b^3} + \frac{\log(a+bx)}{b^3} - \frac{a^2\log(a+bx)}{2b^3} - \frac{a\cos(a+bx)\sin(a+bx)}{2b^3} + \frac{x\cos(a+bx)\sin(a+bx)}{2b^2} - \frac{\sin^2(a+bx)}{4b^3} + \frac{2x\cos(a+bx)\mathrm{Si}(a+bx)}{b^2} - \frac{2\sin(a+bx)\mathrm{Si}(a+bx)}{b^3} + \frac{x^2\sin(a+bx)\mathrm{Si}(a+bx)}{b} + \frac{a\mathrm{Si}(2a+2bx)}{b^3}$$

Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 134, normalized size of antiderivative = 0.61

$$\int x^2\cos(a+bx)\mathrm{Si}(a+bx)\,dx = \frac{4abx - 2b^2x^2 + 5\cos(2(a+bx)) + 4(-2+a^2)\,\mathrm{CosIntegral}(2(a+bx)) + 8\log(a+bx) - 4a^2\log(a+bx) -$$

```
[In] Integrate[x^2*Cos[a + b*x]*SinIntegral[a + b*x],x]
```

```
[Out] (4*a*b*x - 2*b^2*x^2 + 5*Cos[2*(a + b*x)] + 4*(-2 + a^2)*CosIntegral[2*(a +
 b*x)] + 8*Log[a + b*x] - 4*a^2*Log[a + b*x] - 2*a*Sin[2*(a + b*x)] + 2*b*x
*Sin[2*(a + b*x)] + 8*(2*b*x*Cos[a + b*x] + (-2 + b^2*x^2)*Sin[a + b*x])*Si
nIntegral[a + b*x] + 8*a*SinIntegral[2*(a + b*x)])/(8*b^3)
```

Maple [A] (verified)

Time = 4.36 (sec) , antiderivative size = 212, normalized size of antiderivative = 0.97

method	result
derivativedivides	$\frac{\mathrm{Si}(bx+a)\left(a^2\sin(bx+a)-2a(\cos(bx+a)+(bx+a)\sin(bx+a))+(bx+a)^2\sin(bx+a)-2\sin(bx+a)+2(bx+a)\cos(bx+a)\right)-\frac{a^2}{}}{}$
default	$\frac{\mathrm{Si}(bx+a)\left(a^2\sin(bx+a)-2a(\cos(bx+a)+(bx+a)\sin(bx+a))+(bx+a)^2\sin(bx+a)-2\sin(bx+a)+2(bx+a)\cos(bx+a)\right)-\frac{a^2}{}}{}$

```
[In] int(x^2*cos(b*x+a)*Si(b*x+a),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^3*(Si(b*x+a)*(a^2*sin(b*x+a)-2*a*(cos(b*x+a)+(b*x+a)*sin(b*x+a))+(b*x+a
)^2*sin(b*x+a)-2*sin(b*x+a)+2*(b*x+a)*cos(b*x+a))-1/2*a^2*ln(b*x+a)+1/2*a^2
*Ci(2*b*x+2*a)-cos(b*x+a)*sin(b*x+a)*a+(b*x+a)*a-(b*x+a)*(-1/2*sin(b*x+a)*c
os(b*x+a)+1/2*b*x+1/2*a)+1/4*(b*x+a)^2-1/4*sin(b*x+a)^2+a*Si(2*b*x+2*a)+cos
(b*x+a)^2+ln(b*x+a)-Ci(2*b*x+2*a))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 125, normalized size of antiderivative = 0.57

$$\int x^2\cos(a+bx)\mathrm{Si}(a+bx)\,dx = -\frac{b^2x^2-8\,bx\cos\left(bx+a\right)\mathrm{Si}\left(bx+a\right)-2\,abx-5\,\cos\left(bx+a\right)^2-2\left(a^2-2\right)\mathrm{Ci}\left(2\,bx+2\,a\right)+2\left(a^2-2\right)\log}{4\,b^3}$$

```
[In] integrate(x^2*cos(b*x+a)*sin_integral(b*x+a),x, algorithm="fricas")
```

```
[Out] -1/4*(b^2*x^2 - 8*b*x*cos(b*x + a)*sin_integral(b*x + a) - 2*a*b*x - 5*cos(
b*x + a)^2 - 2*(a^2 - 2)*cos_integral(2*b*x + 2*a) + 2*(a^2 - 2)*log(b*x +
a) - 2*((b*x - a)*cos(b*x + a) + 2*(b^2*x^2 - 2)*sin_integral(b*x + a))*sin
(b*x + a) - 4*a*sin_integral(2*b*x + 2*a))/b^3
```

Sympy [F]

$$\int x^2\cos(a+bx)\mathrm{Si}(a+bx)\,dx = \int x^2\cos\left(a+bx\right)\mathrm{Si}\left(a+bx\right)dx$$

```
[In] integrate(x**2*cos(b*x+a)*Si(b*x+a),x)
```

```
[Out] Integral(x**2*cos(a + b*x)*Si(a + b*x), x)
```

Maxima [F]

$$\int x^2\cos(a+bx)\mathrm{Si}(a+bx)\,dx=\int x^2\cos(bx+a)\,\mathrm{Si}(bx+a)\,dx$$

```
[In] integrate(x^2*cos(b*x+a)*sin_integral(b*x+a),x, algorithm="maxima")
[Out] integrate(x^2*cos(b*x + a)*sin_integral(b*x + a), x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.32 (sec) , antiderivative size = 431, normalized size of antiderivative = 1.98

$$\int x^2\cos(a+bx)\mathrm{Si}(a+bx)\,dx=\left(\frac{2\,x\cos(bx+a)}{b^2}+\frac{(b^2x^2-2)\sin(bx+a)}{b^3}\right)\mathrm{Si}(bx+a)$$
$$-\frac{2\,b^2x^2\tan(bx+a)^2-4\,abx\tan(bx+a)^2+4\,a^2\log(|bx+a|)\tan(bx+a)^2-2\,a^2\Re(\mathrm{Ci}(2\,bx+2\,a))\tan$$

```
[In] integrate(x^2*cos(b*x+a)*sin_integral(b*x+a),x, algorithm="giac")
[Out] (2*x*cos(b*x + a)/b^2 + (b^2*x^2 - 2)*sin(b*x + a)/b^3)*sin_integral(b*x +
a) - 1/8*(2*b^2*x^2*tan(b*x + a)^2 - 4*a*b*x*tan(b*x + a)^2 + 4*a^2*log(abs
(b*x + a))*tan(b*x + a)^2 - 2*a^2*real_part(cos_integral(2*b*x + 2*a))*tan(
b*x + a)^2 - 2*a^2*real_part(cos_integral(-2*b*x - 2*a))*tan(b*x + a)^2 + 2
*b^2*x^2 - 4*a*imag_part(cos_integral(2*b*x + 2*a))*tan(b*x + a)^2 + 4*a*im
ag_part(cos_integral(-2*b*x - 2*a))*tan(b*x + a)^2 - 8*a*sin_integral(2*b*x
 + 2*a)*tan(b*x + a)^2 - 4*a*b*x + 4*a^2*log(abs(b*x + a)) - 2*a^2*real_par
t(cos_integral(2*b*x + 2*a)) - 2*a^2*real_part(cos_integral(-2*b*x - 2*a))
- 4*b*x*tan(b*x + a) - 8*log(abs(b*x + a))*tan(b*x + a)^2 + 4*real_part(cos
_integral(2*b*x + 2*a))*tan(b*x + a)^2 + 4*real_part(cos_integral(-2*b*x -
2*a))*tan(b*x + a)^2 - 4*a*imag_part(cos_integral(2*b*x + 2*a)) + 4*a*imag_
part(cos_integral(-2*b*x - 2*a)) - 8*a*sin_integral(2*b*x + 2*a) + 4*a*tan(
b*x + a) + 5*tan(b*x + a)^2 - 8*log(abs(b*x + a)) + 4*real_part(cos_integra
l(2*b*x + 2*a)) + 4*real_part(cos_integral(-2*b*x - 2*a)) - 5)/(b^3*tan(b*x
 + a)^2 + b^3)
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \cos(a+bx)\mathrm{Si}(a+bx)\,dx = \int x^2\,\mathrm{sinint}(a+b\,x)\,\cos\left(a+b\,x\right)\,dx$$

```
[In] int(x^2*sinint(a + b*x)*cos(a + b*x),x)
[Out] int(x^2*sinint(a + b*x)*cos(a + b*x), x)
```

3.60 $\int x\cos(a+bx)\mathbf{Si}(a+bx)\,dx$

Optimal result

Integrand size = 14, antiderivative size = 108

$$\int x\cos(a+bx)\text{Si}(a+bx)\,dx=-\frac{x}{2b}-\frac{a\,\text{CosIntegral}(2a+2bx)}{2b^2}+\frac{a\log(a+bx)}{2b^2}+\frac{\cos(a+bx)\sin(a+bx)}{2b^2}+\frac{\cos(a+bx)\text{Si}(a+bx)}{b^2}+\frac{x\sin(a+bx)\text{Si}(a+bx)}{b}-\frac{\text{Si}(2a+2bx)}{2b^2}$$

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

Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 108, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.714, Rules used = {6654, 6874, 2715, 8, 3393, 3383, 6646, 4491, 12, 3380}

$$\int x\cos(a+bx)\text{Si}(a+bx)\,dx=-\frac{a\,\text{CosIntegral}(2a+2bx)}{2b^2}-\frac{\text{Si}(2a+2bx)}{2b^2}+\frac{\text{Si}(a+bx)\cos(a+bx)}{b^2}+\frac{a\log(a+bx)}{2b^2}+\frac{\sin(a+bx)\cos(a+bx)}{2b^2}+\frac{x\text{Si}(a+bx)\sin(a+bx)}{b}-\frac{x}{2b}$$

```
[In] Int[x*Cos[a + b*x]*SinIntegral[a + b*x],x]
```

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

```
/b^2 + (x*Sin[a + b*x]*SinIntegral[a + b*x])/b - SinIntegral[2*a + 2*b*x]/(
2*b^2)
```

Rule 8

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

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 2715

```
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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
```

```
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6654

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= \frac{x\sin(a+bx)\text{Si}(a+bx)}{b} - \frac{\int \sin(a+bx)\text{Si}(a+bx)\,dx}{b} - \int \frac{x\sin^2(a+bx)}{a+bx}\,dx \\
&= \frac{\cos(a+bx)\text{Si}(a+bx)}{b^2} + \frac{x\sin(a+bx)\text{Si}(a+bx)}{b} \\
&\quad - \frac{\int \frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{b} - \int \left(\frac{\sin^2(a+bx)}{b} - \frac{a\sin^2(a+bx)}{b(a+bx)}\right)dx \\
&= \frac{\cos(a+bx)\text{Si}(a+bx)}{b^2} + \frac{x\sin(a+bx)\text{Si}(a+bx)}{b} \\
&\quad - \frac{\int \sin^2(a+bx)\,dx}{b} - \frac{\int \frac{\sin(2a+2bx)}{2(a+bx)}\,dx}{b} + \frac{a\int \frac{\sin^2(a+bx)}{a+bx}\,dx}{b} \\
&= \frac{\cos(a+bx)\sin(a+bx)}{2b^2} + \frac{\cos(a+bx)\text{Si}(a+bx)}{b^2} + \frac{x\sin(a+bx)\text{Si}(a+bx)}{b} \\
&\quad - \frac{\int 1\,dx}{2b} - \frac{\int \frac{\sin(2a+2bx)}{a+bx}\,dx}{2b} + \frac{a\int \left(\frac{1}{2(a+bx)} - \frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{b} \\
&= -\frac{x}{2b} + \frac{a\log(a+bx)}{2b^2} + \frac{\cos(a+bx)\sin(a+bx)}{2b^2} + \frac{\cos(a+bx)\text{Si}(a+bx)}{b^2} \\
&\quad + \frac{x\sin(a+bx)\text{Si}(a+bx)}{b} - \frac{\text{Si}(2a+2bx)}{2b^2} - \frac{a\int \frac{\cos(2a+2bx)}{a+bx}\,dx}{2b} \\
&= -\frac{x}{2b} - \frac{a\,\text{CosIntegral}(2a+2bx)}{2b^2} + \frac{a\log(a+bx)}{2b^2} + \frac{\cos(a+bx)\sin(a+bx)}{2b^2} \\
&\quad + \frac{\cos(a+bx)\text{Si}(a+bx)}{b^2} + \frac{x\sin(a+bx)\text{Si}(a+bx)}{b} - \frac{\text{Si}(2a+2bx)}{2b^2}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.14 (sec) , antiderivative size = 74, normalized size of antiderivative = 0.69

$$\int x\cos(a+bx)\mathrm{Si}(a+bx)\,dx = \frac{-2bx-2a\,\mathrm{CosIntegral}(2(a+bx))+2a\log(a+bx)+\sin(2(a+bx))+4(\cos(a+bx)+bx\sin(a+bx))\mathrm{Si}(a}{4b^2}$$

[In] Integrate[x*Cos[a + b*x]*SinIntegral[a + b*x],x]

[Out] (-2*b*x - 2*a*CosIntegral[2*(a + b*x)] + 2*a*Log[a + b*x] + Sin[2*(a + b*x)
] + 4*(Cos[a + b*x] + b*x*Sin[a + b*x])*SinIntegral[a + b*x] - 2*SinIntegra
l[2*(a + b*x)])/(4*b^2)

Maple [A] (verified)

Time = 2.39 (sec) , antiderivative size = 95, normalized size of antiderivative = 0.88

method	result
derivativedivides	$\frac{\mathrm{Si}(bx+a)(-a\sin(bx+a)+\cos(bx+a)+(bx+a)\sin(bx+a))+a\left(\frac{\ln(bx+a)}{2}-\frac{\mathrm{Ci}(2bx+2a)}{2}\right)-\frac{\mathrm{Si}(2bx+2a)}{2}+\frac{\sin(bx+a)\cos(bx+a)}{2}-\frac{b}{2}}{b^2}$
default	$\frac{\mathrm{Si}(bx+a)(-a\sin(bx+a)+\cos(bx+a)+(bx+a)\sin(bx+a))+a\left(\frac{\ln(bx+a)}{2}-\frac{\mathrm{Ci}(2bx+2a)}{2}\right)-\frac{\mathrm{Si}(2bx+2a)}{2}+\frac{\sin(bx+a)\cos(bx+a)}{2}-\frac{b}{2}}{b^2}$

[In] int(x*cos(b*x+a)*Si(b*x+a),x,method=_RETURNVERBOSE)

[Out] 1/b^2*(Si(b*x+a)*(-a*sin(b*x+a)+cos(b*x+a)+(b*x+a)*sin(b*x+a))+a*(1/2*ln(b*
x+a)-1/2*Ci(2*b*x+2*a))-1/2*Si(2*b*x+2*a)+1/2*sin(b*x+a)*cos(b*x+a)-1/2*b*x
-1/2*a)

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 77, normalized size of antiderivative = 0.71

$$\int x\cos(a+bx)\mathrm{Si}(a+bx)\,dx = -\frac{bx+a\,\mathrm{Ci}\left(2\,bx+2\,a\right)-a\log\left(bx+a\right)-\left(2\,bx\,\mathrm{Si}\left(bx+a\right)+\cos\left(bx+a\right)\right)\sin\left(bx+a\right)-2\,\cos\left(bx+a\right)\mathrm{Si}}{2\,b^2}$$

[In] integrate(x*cos(b*x+a)*sin_integral(b*x+a),x, algorithm="fricas")

[Out] -1/2*(b*x + a*cos_integral(2*b*x + 2*a) - a*log(b*x + a) - (2*b*x*sin_integ
ral(b*x + a) + cos(b*x + a))*sin(b*x + a) - 2*cos(b*x + a)*sin_integral(b*x
 + a) + sin_integral(2*b*x + 2*a))/b^2

Sympy [F]

$$\int x\cos(a+bx)\mathrm{Si}(a+bx)\,dx = \int x\cos\left(a+bx\right)\mathrm{Si}\left(a+bx\right)dx$$

```
[In] integrate(x*cos(b*x+a)*Si(b*x+a),x)
[Out] Integral(x*cos(a + b*x)*Si(a + b*x), x)
```

Maxima [F]

$$\int x\cos(a+bx)\mathrm{Si}(a+bx)\,dx = \int x\cos\left(bx+a\right)\mathrm{Si}\left(bx+a\right)\,dx$$

```
[In] integrate(x*cos(b*x+a)*sin_integral(b*x+a),x, algorithm="maxima")
[Out] integrate(x*cos(b*x + a)*sin_integral(b*x + a), x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.31 (sec) , antiderivative size = 528, normalized size of antiderivative = 4.89

$$\int x\cos(a+bx)\mathrm{Si}(a+bx)\,dx = \left(\frac{x\sin\left(bx+a\right)}{b} + \frac{\cos\left(bx+a\right)}{b^2}\right)\mathrm{Si}\left(bx+a\right) - \frac{2\,bx\tan\left(bx\right)^2\tan\left(a\right)^2 - 2\,a\log\left(\left|bx+a\right|\right)\tan\left(bx\right)^2\tan\left(a\right)^2 + a\Re(\mathrm{Ci}\left(2\,bx+2\,a\right))\tan\left(bx\right)^2\tan\left(a\right)^2 + a\Re}{}$$

```
[In] integrate(x*cos(b*x+a)*sin_integral(b*x+a),x, algorithm="giac")
[Out] (x*sin(b*x + a)/b + cos(b*x + a)/b^2)*sin_integral(b*x + a) - 1/4*(2*b*x*ta
n(b*x)^2*tan(a)^2 - 2*a*log(abs(b*x + a))*tan(b*x)^2*tan(a)^2 + a*real_part
(cos_integral(2*b*x + 2*a))*tan(b*x)^2*tan(a)^2 + a*real_part(cos_integral(
-2*b*x - 2*a))*tan(b*x)^2*tan(a)^2 + imag_part(cos_integral(2*b*x + 2*a))*t
an(b*x)^2*tan(a)^2 - imag_part(cos_integral(-2*b*x - 2*a))*tan(b*x)^2*tan(a
)^2 + 2*sin_integral(2*b*x + 2*a)*tan(b*x)^2*tan(a)^2 + 2*b*x*tan(b*x)^2 -
2*a*log(abs(b*x + a))*tan(b*x)^2 + a*real_part(cos_integral(2*b*x + 2*a))*t
an(b*x)^2 + a*real_part(cos_integral(-2*b*x - 2*a))*tan(b*x)^2 + 2*b*x*tan(
a)^2 - 2*a*log(abs(b*x + a))*tan(a)^2 + a*real_part(cos_integral(2*b*x + 2*
a))*tan(a)^2 + a*real_part(cos_integral(-2*b*x - 2*a))*tan(a)^2 + imag_part
(cos_integral(2*b*x + 2*a))*tan(b*x)^2 - imag_part(cos_integral(-2*b*x - 2*
a))*tan(b*x)^2 + 2*sin_integral(2*b*x + 2*a)*tan(b*x)^2 + 2*tan(b*x)^2*tan(
```

```
a) + imag_part(cos_integral(2*b*x + 2*a))*tan(a)^2 - imag_part(cos_integral
(-2*b*x - 2*a))*tan(a)^2 + 2*sin_integral(2*b*x + 2*a)*tan(a)^2 + 2*tan(b*x
)*tan(a)^2 + 2*b*x - 2*a*log(abs(b*x + a)) + a*real_part(cos_integral(2*b*x
 + 2*a)) + a*real_part(cos_integral(-2*b*x - 2*a)) + imag_part(cos_integral
(2*b*x + 2*a)) - imag_part(cos_integral(-2*b*x - 2*a)) + 2*sin_integral(2*b
*x + 2*a) - 2*tan(b*x) - 2*tan(a))/(b^2*tan(b*x)^2*tan(a)^2 + b^2*tan(b*x)^
2 + b^2*tan(a)^2 + b^2)
```

Mupad [F(-1)]

Timed out.

$$\int x\cos(a+bx)\mathrm{Si}(a+bx)\,dx=\int x\,\mathrm{sinint}(a+b\,x)\,\cos\left(a+b\,x\right)\,dx$$

```
[In] int(x*sinint(a + b*x)*cos(a + b*x),x)
[Out] int(x*sinint(a + b*x)*cos(a + b*x), x)
```

3.61 $\int \cos(a+bx)\mathbf{Si}(a+bx)\,dx$

Optimal result

Integrand size = 13, antiderivative size = 46

$$\int \cos(a+bx)\text{Si}(a+bx)\,dx = \frac{\text{CosIntegral}(2a+2bx)}{2b} - \frac{\log(a+bx)}{2b} + \frac{\sin(a+bx)\text{Si}(a+bx)}{b}$$

```
[Out] 1/2*Ci(2*b*x+2*a)/b-1/2*ln(b*x+a)/b+Si(b*x+a)*sin(b*x+a)/b
```

Rubi [A] (verified)

Time = 0.06 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {6652, 3393, 3383}

$$\int \cos(a+bx)\text{Si}(a+bx)\,dx = \frac{\text{CosIntegral}(2a+2bx)}{2b} + \frac{\text{Si}(a+bx)\sin(a+bx)}{b} - \frac{\log(a+bx)}{2b}$$

```
[In] Int[Cos[a + b*x]*SinIntegral[a + b*x],x]
```

```
[Out] CosIntegral[2*a + 2*b*x]/(2*b) - Log[a + b*x]/(2*b) + (Sin[a + b*x]*SinInte
gral[a + b*x])/b
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
```

```
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}\text{integral} &= \frac{\sin(a+bx)\text{Si}(a+bx)}{b} - \int \frac{\sin^2(a+bx)}{a+bx}\,dx \\ &= \frac{\sin(a+bx)\text{Si}(a+bx)}{b} - \int \left(\frac{1}{2(a+bx)} - \frac{\cos(2a+2bx)}{2(a+bx)}\right)dx \\ &= -\frac{\log(a+bx)}{2b} + \frac{\sin(a+bx)\text{Si}(a+bx)}{b} + \frac{1}{2}\int \frac{\cos(2a+2bx)}{a+bx}\,dx \\ &= \frac{\text{CosIntegral}(2a+2bx)}{2b} - \frac{\log(a+bx)}{2b} + \frac{\sin(a+bx)\text{Si}(a+bx)}{b}\end{aligned}$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 45, normalized size of antiderivative = 0.98

$$\int \cos(a+bx)\text{Si}(a+bx)\,dx = \frac{\text{CosIntegral}(2(a+bx))}{2b} - \frac{\log(a+bx)}{2b} + \frac{\sin(a+bx)\text{Si}(a+bx)}{b}$$

```
[In] Integrate[Cos[a + b*x]*SinIntegral[a + b*x],x]
[Out] CosIntegral[2*(a + b*x)]/(2*b) - Log[a + b*x]/(2*b) + (Sin[a + b*x]*SinInte
gral[a + b*x])/b
```

Maple [A] (verified)

Time = 1.21 (sec) , antiderivative size = 38, normalized size of antiderivative = 0.83

method	result	size
derivativedivides	$\frac{\text{Si}(bx+a)\sin(bx+a)-\frac{\ln(bx+a)}{2}+\frac{\text{Ci}(2bx+2a)}{2}}{b}$	38
default	$\frac{\text{Si}(bx+a)\sin(bx+a)-\frac{\ln(bx+a)}{2}+\frac{\text{Ci}(2bx+2a)}{2}}{b}$	38

```
[In] int(cos(b*x+a)*Si(b*x+a),x,method=_RETURNVERBOSE)
[Out] 1/b*(Si(b*x+a)*sin(b*x+a)-1/2*ln(b*x+a)+1/2*Ci(2*b*x+2*a))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 37, normalized size of antiderivative = 0.80

$$\int \cos(a+bx)\text{Si}(a+bx)\,dx = \frac{2\,\sin\left(bx+a\right)\text{Si}\left(bx+a\right)+\text{Ci}\left(2\,bx+2\,a\right)-\log\left(bx+a\right)}{2\,b}$$

```
[In] integrate(cos(b*x+a)*sin_integral(b*x+a),x, algorithm="fricas")
[Out] 1/2*(2*sin(b*x + a)*sin_integral(b*x + a) + cos_integral(2*b*x + 2*a) - log
(b*x + a))/b
```

Sympy [F]

$$\int \cos(a+bx)\text{Si}(a+bx)\,dx = \int \cos\left(a+bx\right)\text{Si}\left(a+bx\right)\,dx$$

```
[In] integrate(cos(b*x+a)*Si(b*x+a),x)
[Out] Integral(cos(a + b*x)*Si(a + b*x), x)
```

Maxima [F]

$$\int \cos(a+bx)\text{Si}(a+bx)\,dx = \int \cos\left(bx+a\right)\text{Si}\left(bx+a\right)\,dx$$

```
[In] integrate(cos(b*x+a)*sin_integral(b*x+a),x, algorithm="maxima")
[Out] integrate(cos(b*x + a)*sin_integral(b*x + a), x)
```

Giac [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 95 vs. 2(42) = 84.

Time = 0.32 (sec) , antiderivative size = 95, normalized size of antiderivative = 2.07

$$\int \cos(a+bx)\text{Si}(a+bx)\,dx = \frac{\sin\left(bx+a\right)\text{Si}\left(bx+a\right)}{b} + \frac{\cos\left(2\,a\right)^{2}\text{Ci}\left(2\,bx+2\,a\right)+\cos\left(2\,a\right)^{2}\text{Ci}\left(-2\,bx-2\,a\right)+\text{Ci}\left(2\,bx+2\,a\right)\sin\left(2\,a\right)^{2}+\text{Ci}\left(-2\,bx-2\,a\right)\sin\left(\right.}{4\,b}$$

```
[In] integrate(cos(b*x+a)*sin_integral(b*x+a),x, algorithm="giac")
[Out] sin(b*x + a)*sin_integral(b*x + a)/b + 1/4*(cos(2*a)^2*cos_integral(2*b*x +
 2*a) + cos(2*a)^2*cos_integral(-2*b*x - 2*a) + cos_integral(2*b*x + 2*a)*s
in(2*a)^2 + cos_integral(-2*b*x - 2*a)*sin(2*a)^2 - 2*log(b*x + a))/b
```

Mupad [F(-1)]

Timed out.

$$\int \cos(a+bx)\mathrm{Si}(a+bx)\,dx = \frac{\mathrm{cosint}(2\,a+2\,b\,x)-\ln\left(a+b\,x\right)+2\,\mathrm{sinint}(a+b\,x)\,\sin\left(a+b\,x\right)}{2\,b}$$

```
[In] int(sinint(a + b*x)*cos(a + b*x),x)
[Out] (cosint(2*a + 2*b*x) - log(a + b*x) + 2*sinint(a + b*x)*sin(a + b*x))/(2*b)
```

3.62 $\int \frac{\cos(a+bx)\text{Si}(a+bx)}{x}\,dx$

Optimal result

Integrand size = 16, antiderivative size = 16

$$\int \frac{\cos(a+bx)\text{Si}(a+bx)}{x}\,dx = \text{Int}\left(\frac{\cos(a+bx)\text{Si}(a+bx)}{x},x\right)$$

```
[Out] CannotIntegrate(cos(b*x+a)*Si(b*x+a)/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\cos(a+bx)\text{Si}(a+bx)}{x}\,dx = \int \frac{\cos(a+bx)\text{Si}(a+bx)}{x}\,dx$$

```
[In] Int[(Cos[a + b*x]*SinIntegral[a + b*x])/x,x]
[Out] Defer[Int][(Cos[a + b*x]*SinIntegral[a + b*x])/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\cos(a+bx)\text{Si}(a+bx)}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 1.73 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\text{Si}(a+bx)}{x}\,dx=\int \frac{\cos(a+bx)\text{Si}(a+bx)}{x}\,dx$$

```
[In] Integrate[(Cos[a + b*x]*SinIntegral[a + b*x])/x,x]
[Out] Integrate[(Cos[a + b*x]*SinIntegral[a + b*x])/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.24 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{\cos(bx+a)\,\text{Si}(bx+a)}{x}dx$$

```
[In] int(cos(b*x+a)*Si(b*x+a)/x,x)
[Out] int(cos(b*x+a)*Si(b*x+a)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\text{Si}(a+bx)}{x}\,dx=\int \frac{\cos(bx+a)\,\text{Si}(bx+a)}{x}\,dx$$

```
[In] integrate(cos(b*x+a)*sin_integral(b*x+a)/x,x, algorithm="fricas")
[Out] integral(cos(b*x + a)*sin_integral(b*x + a)/x, x)
```

Sympy [N/A]

Not integrable

Time = 1.03 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{\cos(a+bx)\text{Si}(a+bx)}{x}\,dx=\int \frac{\cos(a+bx)\,\text{Si}(a+bx)}{x}\,dx$$

```
[In] integrate(cos(b*x+a)*Si(b*x+a)/x,x)
[Out] Integral(cos(a + b*x)*Si(a + b*x)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.38 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\mathrm{Si}(a+bx)}{x}\,dx = \int \frac{\cos\left(bx+a\right)\mathrm{Si}\left(bx+a\right)}{x}\,dx$$

```
[In] integrate(cos(b*x+a)*sin_integral(b*x+a)/x,x, algorithm="maxima")
[Out] integrate(cos(b*x + a)*sin_integral(b*x + a)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\mathrm{Si}(a+bx)}{x}\,dx = \int \frac{\cos\left(bx+a\right)\mathrm{Si}\left(bx+a\right)}{x}\,dx$$

```
[In] integrate(cos(b*x+a)*sin_integral(b*x+a)/x,x, algorithm="giac")
[Out] integrate(cos(b*x + a)*sin_integral(b*x + a)/x, x)
```

Mupad [N/A]

Not integrable

Time = 6.78 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\mathrm{Si}(a+bx)}{x}\,dx = \int \frac{\mathrm{sinint}(a+b\,x)\,\cos\left(a+b\,x\right)}{x}\,dx$$

```
[In] int((sinint(a + b*x)*cos(a + b*x))/x,x)
[Out] int((sinint(a + b*x)*cos(a + b*x))/x, x)
```

3.63 $\int x \sin(a+bx)\mathbf{Si}(c+dx)\,dx$

Optimal result

Integrand size = 14, antiderivative size = 371

$$\begin{aligned}\int x\sin(a+bx)\text{Si}(c+dx)\,dx=&\ \frac{\cos(a-c+(b-d)x)}{2b(b-d)}-\frac{\cos(a+c+(b+d)x)}{2b(b+d)}\\&-\frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2}\\&+\frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2}\\&+\frac{c\,\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2bd}\\&-\frac{c\,\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2bd}\\&+\frac{c\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2bd}\\&+\frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2}\\&-\frac{x\cos(a+bx)\text{Si}(c+dx)}{b}+\frac{\sin(a+bx)\text{Si}(c+dx)}{b^2}\\&-\frac{c\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2bd}\\&-\frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2}\end{aligned}$$

```
[Out] -1/2*Ci(c*(b-d)/d+(b-d)*x)*cos(a-b*c/d)/b^2+1/2*Ci(c*(b+d)/d+(b+d)*x)*cos(a
-b*c/d)/b^2+1/2*cos(a-c+(b-d)*x)/b/(b-d)-1/2*cos(a+c+(b+d)*x)/b/(b+d)+1/2*c
```

```
*cos(a-b*c/d)*Si(c*(b-d)/d+(b-d)*x)/b/d-x*cos(b*x+a)*Si(d*x+c)/b-1/2*c*cos(
a-b*c/d)*Si(c*(b+d)/d+(b+d)*x)/b/d+1/2*c*Ci(c*(b-d)/d+(b-d)*x)*sin(a-b*c/d)
/b/d-1/2*c*Ci(c*(b+d)/d+(b+d)*x)*sin(a-b*c/d)/b/d+1/2*Si(c*(b-d)/d+(b-d)*x)
*sin(a-b*c/d)/b^2-1/2*Si(c*(b+d)/d+(b+d)*x)*sin(a-b*c/d)/b^2+Si(d*x+c)*sin(
b*x+a)/b^2
```

Rubi [A] (verified)

Time = 0.71 (sec) , antiderivative size = 371, normalized size of antiderivative = 1.00, number of steps used = 24, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.714$, Rules used = {6648, 6874, 4670, 2718, 4515, 3384, 3380, 3383, 6652, 4513}

$$\begin{aligned}\int x\sin(a+bx)\text{Si}(c+dx)\,dx = &-\frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b^2} \\ &+\frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b^2} \\ &+\frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b^2} \\ &+\frac{\sin(a+bx)\text{Si}(c+dx)}{b^2}-\frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b^2} \\ &+\frac{c\sin\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2bd} \\ &-\frac{c\sin\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2bd} \\ &+\frac{c\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2bd} \\ &-\frac{x\cos(a+bx)\text{Si}(c+dx)}{b} \\ &-\frac{c\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2bd} \\ &+\frac{\cos(a+x(b-d)-c)}{2b(b-d)}-\frac{\cos(a+x(b+d)+c)}{2b(b+d)}\end{aligned}$$

```
[In] Int[x*Sin[a + b*x]*SinIntegral[c + d*x],x]
```

```
[Out] Cos[a - c + (b - d)*x]/(2*b*(b - d)) - Cos[a + c + (b + d)*x]/(2*b*(b + d))
 - (Cos[a - (b*c)/d]*CosIntegral[(c*(b - d))/d + (b - d)*x])/(2*b^2) + (Cos
[a - (b*c)/d]*CosIntegral[(c*(b + d))/d + (b + d)*x])/(2*b^2) + (c*CosInteg
ral[(c*(b - d))/d + (b - d)*x]*Sin[a - (b*c)/d])/(2*b*d) - (c*CosIntegral[(
c*(b + d))/d + (b + d)*x]*Sin[a - (b*c)/d])/(2*b*d) + (c*Cos[a - (b*c)/d]*S
```

```
inIntegral[(c*(b - d))/d + (b - d)*x])/(2*b*d) + (Sin[a - (b*c)/d]*SinInteg
ral[(c*(b - d))/d + (b - d)*x])/(2*b^2) - (x*Cos[a + b*x]*SinIntegral[c + d
*x])/b + (Sin[a + b*x]*SinIntegral[c + d*x])/b^2 - (c*Cos[a - (b*c)/d]*SinI
ntegral[(c*(b + d))/d + (b + d)*x])/(2*b*d) - (Sin[a - (b*c)/d]*SinIntegral
[(c*(b + d))/d + (b + d)*x])/(2*b^2)
```

Rule 2718

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

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3384

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Dist[Cos[(d*
e - c*f)/d], Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Dist[Sin[(d*e - c*f
)/d], Int[Cos[c*(f/d) + f*x]/(c + d*x), x], x] /; FreeQ[{c, d, e, f}, x] &&
 NeQ[d*e - c*f, 0]
```

Rule 4513

```
Int[((e_.) + (f_.)*(x_))^(m_.)*Sin[(a_.) + (b_.)*(x_)]^(p_.)*Sin[(c_.) + (d
_.)*(x_)]^(q_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Sin[a + b*x
]^p*Sin[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f}, x] && IGtQ[p, 0] &&
 IGtQ[q, 0] && IntegerQ[m]
```

Rule 4515

```
Int[Cos[(c_.) + (d_.)*(x_)]^(q_.)*((e_.) + (f_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(p_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Sin[a + b*x
]^p*Cos[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] && IGtQ[p, 0]
 && IGtQ[q, 0]
```

Rule 4670

```
Int[Cos[w_]^(q_.)*Sin[v_]^(p_.), x_Symbol] :> Int[ExpandTrigReduce[Sin[v]^p
*Cos[w]^q, x], x] /; IGtQ[p, 0] && IGtQ[q, 0] && ((PolynomialQ[v, x] && Pol
```

```
ynomialQ[w, x]) || (BinomialQ[{v, w}, x] && IndependentQ[Cancel[v/w], x]))
```

Rule 6648

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

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= -\frac{x\cos(a+bx)\text{Si}(c+dx)}{b}+\frac{\int \cos(a+bx)\text{Si}(c+dx)\,dx}{b}+\frac{d\int \frac{x\cos(a+bx)\sin(c+dx)}{c+dx}\,dx}{b}\\
&= -\frac{x\cos(a+bx)\text{Si}(c+dx)}{b}+\frac{\sin(a+bx)\text{Si}(c+dx)}{b^2}\\
&\quad -\frac{d\int \frac{\sin(a+bx)\sin(c+dx)}{c+dx}\,dx}{b^2}+\frac{d\int \left(\frac{\cos(a+bx)\sin(c+dx)}{d}-\frac{c\cos(a+bx)\sin(c+dx)}{d(c+dx)}\right)dx}{b}\\
&= -\frac{x\cos(a+bx)\text{Si}(c+dx)}{b}+\frac{\sin(a+bx)\text{Si}(c+dx)}{b^2}+\frac{\int \cos(a+bx)\sin(c+dx)\,dx}{b}\\
&\quad -\frac{c\int \frac{\cos(a+bx)\sin(c+dx)}{c+dx}\,dx}{b}-\frac{d\int \left(\frac{\cos(a-c+(b-d)x)}{2(c+dx)}-\frac{\cos(a+c+(b+d)x)}{2(c+dx)}\right)dx}{b^2}\\
&= -\frac{x\cos(a+bx)\text{Si}(c+dx)}{b}+\frac{\sin(a+bx)\text{Si}(c+dx)}{b^2}\\
&\quad +\frac{\int \left(-\frac{1}{2}\sin(a-c+(b-d)x)+\frac{1}{2}\sin(a+c+(b+d)x)\right)dx}{b}\\
&\quad -\frac{c\int \left(-\frac{\sin(a-c+(b-d)x)}{2(c+dx)}+\frac{\sin(a+c+(b+d)x)}{2(c+dx)}\right)dx}{b}\\
&\quad -\frac{d\int \frac{\cos(a-c+(b-d)x)}{c+dx}\,dx}{2b^2}+\frac{d\int \frac{\cos(a+c+(b+d)x)}{c+dx}\,dx}{2b^2}
\end{aligned}
$$

$$= -\frac{x\cos(a+bx)\text{Si}(c+dx)}{b} + \frac{\sin(a+bx)\text{Si}(c+dx)}{b^2} - \frac{\int \sin(a-c+(b-d)x)\,dx}{2b}$$
$$+ \frac{\int \sin(a+c+(b+d)x)\,dx}{2b} + \frac{c\int \frac{\sin(a-c+(b-d)x)}{c+dx}\,dx}{2b} - \frac{c\int \frac{\sin(a+c+(b+d)x)}{c+dx}\,dx}{2b}$$
$$- \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b^2} + \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b^2}$$
$$+ \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b^2} - \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b^2}$$
$$= \frac{\cos(a-c+(b-d)x)}{2b(b-d)} - \frac{\cos(a+c+(b+d)x)}{2b(b+d)}$$
$$- \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2}$$
$$+ \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2}$$
$$+ \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} - \frac{x\cos(a+bx)\text{Si}(c+dx)}{b}$$
$$+ \frac{\sin(a+bx)\text{Si}(c+dx)}{b^2} - \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2}$$
$$+ \frac{\left(c\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} - \frac{\left(c\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b}$$
$$+ \frac{\left(c\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} - \frac{\left(c\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b}$$

$$
\begin{aligned}
&= \frac{\cos(a-c+(b-d)x)}{2b(b-d)} - \frac{\cos(a+c+(b+d)x)}{2b(b+d)} \\
&- \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} \\
&+ \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2} \\
&+ \frac{c\,\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2bd} \\
&- \frac{c\,\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2bd} \\
&+ \frac{c\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2bd} + \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} \\
&- \frac{x\cos(a+bx)\text{Si}(c+dx)}{b} + \frac{\sin(a+bx)\text{Si}(c+dx)}{b^2} \\
&- \frac{c\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2bd} - \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2}
\end{aligned}
$$

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 3.59 (sec) , antiderivative size = 407, normalized size of antiderivative = 1.10

$$
\int x\sin(a+bx)\text{Si}(c+dx)\,dx
$$

$$
\begin{aligned}
&= \frac{e^{-ia}\left(-i(bc-id)e^{2ia-\frac{ibc}{d}}\text{ExpIntegralEi}\left(\frac{i(b-d)(c+dx)}{d}\right) + \frac{e^{-\frac{i(b+d)(c+dx)}{d}}\left(bde^{\frac{ibc}{d}}\left(b\left(-1+e^{2i(a+bx)}\right)+d\left(1+e^{2i(a+bx)}\right)\right)+(-i \cdots\right.}{(b-d)\cdots}\right.}{4b^2d} \\
&+ \frac{e^{-ia}\left(-\left((-ibc+d)e^{\frac{ibc}{d}}\text{ExpIntegralEi}\left(-\frac{i(b-d)(c+dx)}{d}\right)\right) + \frac{e^{-\frac{ibc}{d}}\left(bde^{\frac{i(b(c-dx)+d(c+dx))}{d}}\left(b+d-be^{2i(a+bx)}+de^{2i(a+bx)}\cdots\right.\right.}{(b-d)(b\cdots}\right.}{4b^2d} \\
&- \frac{(bx\cos(a+bx)-\sin(a+bx))\text{Si}(c+dx)}{b^2}
\end{aligned}
$$

```
[In] Integrate[x*Sin[a + b*x]*SinIntegral[c + d*x],x]
```

```
[Out] ((-I)*(b*c - I*d)*E^((2*I)*a - (I*b*c)/d)*ExpIntegralEi[(I*(b - d)*(c + d*x
))/d] + (b*d*E^((I*b*c)/d)*(b*(-1 + E^((2*I)*(a + b*x))) + d*(1 + E^((2*I)*
(a + b*x)))) + ((-I)*b*c + d)*(b^2 - d^2)*E^(I*(c + (2*b*c)/d + (b + d)*x))
*ExpIntegralEi[((-I)*(b + d)*(c + d*x))/d])/((b - d)*(b + d)*E^((I*(b + d)*
```

```
(c + d*x))/d)))/(4*b^2*d*E^(I*a)) + (-(((-I)*b*c + d)*E^((I*b*c)/d)*ExpInte
gralEi[((-I)*(b - d)*(c + d*x))/d]) + (b*d*E^((I*(b*(c - d*x) + d*(c + d*x)
))/d)*(b + d - b*E^((2*I)*(a + b*x)) + d*E^((2*I)*(a + b*x))) + (I*b*c + d)
*(b^2 - d^2)*E^((2*I)*a)*ExpIntegralEi[(I*(b + d)*(c + d*x))/d])/((b - d)*(
b + d)*E^((I*b*c)/d)))/(4*b^2*d*E^(I*a)) - ((b*x*Cos[a + b*x] - Sin[a + b*x
])*SinIntegral[c + d*x])/b^2
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1245 vs. $2(351) = 702$.

Time = 2.88 (sec) , antiderivative size = 1246, normalized size of antiderivative = 3.36

method	result	size
default	Expression too large to display	1246

```
[In] int(x*Si(d*x+c)*sin(b*x+a),x,method=_RETURNVERBOSE)
```

```
[Out] (-Si(d*x+c)/b*(-d/b*a*cos(1/d*b*(d*x+c)+(a*d-b*c)/d)-1/b*d*(sin(1/d*b*(d*x+
c)+(a*d-b*c)/d)-(1/d*b*(d*x+c)+(a*d-b*c)/d)*cos(1/d*b*(d*x+c)+(a*d-b*c)/d))
)+1/b*(1/2*a*d^2/(b-d)*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*cos(
(-a*d+b*c)/d)/d-Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*sin((-a*d+b*c)
/d)/d)-1/2*d^2*c/(b-d)*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*cos(
(-a*d+b*c)/d)/d-Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*sin((-a*d+b*c)
/d)/d)-1/2*(a*d-b*c)*d/(b-d)*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d
)*cos((-a*d+b*c)/d)/d-Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*sin((-a*
d+b*c)/d)/d)+1/2/(b-d)*d*cos((b-d)/d*(d*x+c)+(a*d-b*c)/d)-1/2*a*d^2/(b+d)*(
-Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci((b+d)
/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d)-1/2*d^2*c/(b+d)*(
-Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci((b+d)
/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d)+1/2*(a*d-b*c)*d/(
b+d)*(-Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci
((b+d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d)-1/2/(b+d)*d
*cos((b+d)/d*(d*x+c)+(a*d-b*c)/d)-1/2/b*d^2*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)
/d-(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b
*c)/d)*cos((-a*d+b*c)/d)/d)+1/2/b*d^2*(-Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a
*d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci((b+d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)
*cos((-a*d+b*c)/d)/d)))/d
```

Fricas [A] (verification not implemented)

none

Time = 0.29 (sec) , antiderivative size = 432, normalized size of antiderivative = 1.16

$$\int x\sin(a+bx)\text{Si}(c+dx)\,dx = \frac{2\,bd^2\cos\left(bx+a\right)\cos\left(dx+c\right)+2\,b^2d\sin\left(bx+a\right)\sin\left(dx+c\right)-2\left(b^3d-bd^3\right)x\cos\left(bx+a\right)\text{Si}\left(dx+c\right)+2}{}$$

```
[In] integrate(x*sin_integral(d*x+c)*sin(b*x+a),x, algorithm="fricas")
```

```
[Out] 1/2*(2*b*d^2*cos(b*x + a)*cos(d*x + c) + 2*b^2*d*sin(b*x + a)*sin(d*x + c)
- 2*(b^3*d - b*d^3)*x*cos(b*x + a)*sin_integral(d*x + c) + 2*(b^2*d - d^3)*
sin(b*x + a)*sin_integral(d*x + c) + ((b^2*d - d^3)*cos_integral((b*c + c*d
 + (b*d + d^2)*x)/d) - (b^2*d - d^3)*cos_integral(-(b*c - c*d + (b*d - d^2)
*x)/d) - (b^3*c - b*c*d^2)*sin_integral((b*c + c*d + (b*d + d^2)*x)/d) - (b
^3*c - b*c*d^2)*sin_integral(-(b*c - c*d + (b*d - d^2)*x)/d))*cos(-(b*c - a
*d)/d) - ((b^3*c - b*c*d^2)*cos_integral((b*c + c*d + (b*d + d^2)*x)/d) - (
b^3*c - b*c*d^2)*cos_integral(-(b*c - c*d + (b*d - d^2)*x)/d) + (b^2*d - d^
3)*sin_integral((b*c + c*d + (b*d + d^2)*x)/d) + (b^2*d - d^3)*sin_integral
(-(b*c - c*d + (b*d - d^2)*x)/d))*sin(-(b*c - a*d)/d))/(b^4*d - b^2*d^3)
```

Sympy [F]

$$\int x\sin(a+bx)\text{Si}(c+dx)\,dx = \int x\sin\left(a+bx\right)\text{Si}\left(c+dx\right)dx$$

```
[In] integrate(x*Si(d*x+c)*sin(b*x+a),x)
```

```
[Out] Integral(x*sin(a + b*x)*Si(c + d*x), x)
```

Maxima [F]

$$\int x\sin(a+bx)\text{Si}(c+dx)\,dx = \int x\sin\left(bx+a\right)\text{Si}\left(dx+c\right)\,dx$$

```
[In] integrate(x*sin_integral(d*x+c)*sin(b*x+a),x, algorithm="maxima")
```

```
[Out] integrate(x*sin(b*x + a)*sin_integral(d*x + c), x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 4.93 (sec) , antiderivative size = 200182, normalized size of antiderivative = 539.57

$$\int x\sin(a+bx)\mathrm{Si}(c+dx)\,dx = \text{Too large to display}$$

```
[In] integrate(x*sin_integral(d*x+c)*sin(b*x+a),x, algorithm="giac")
```

```
[Out] -(x*cos(b*x + a)/b - sin(b*x + a)/b^2)*sin_integral(d*x + c) - 1/4*(b^3*c*i
mag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(c
os_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral(
(b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*
c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
```

b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*re
al_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integral(-b*x
 + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x - d*x
 - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/
d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
 + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*
b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d
*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -

```
c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
- d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*im
ag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_pa
rt(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*sin_integral((
b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2
*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^3*c*imag_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
```

n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 8*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d

```
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 -
b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x
 + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*
c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*imag_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)
/d)^2 - 4*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*imag_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*t
an(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c -
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8
*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*b*c*d^2*sin_integral((b*d*x + d^
2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*
d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*
tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 +
2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x +
 d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
 - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
```

/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*
c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integral((b
*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
- 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*
d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integra
l((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 + 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
tan(1/2(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^
3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x - d^2
*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
tan(1/2(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_in
tegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^

2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part
(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*im
ag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x
+ d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*
b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b
*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
- 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*im
ag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x +
b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*
d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2

```
*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*
x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*ima
g_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_
part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*
c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integra
l((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
+ 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*
c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x
 + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x -
 d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
```

```
)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c -
 c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral
((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*real_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b
*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d) - 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c
*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*
c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x
 + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*re
al_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part
(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
```

tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*
real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 - 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) +
2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2
tan(1/2(b*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d) + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*real_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4
*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d) - 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integral(b*
x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c
*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t

an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*
c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integral
(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c
*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*rea
l_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part
(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d
)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
+ 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integ
ral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3
*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b

```
*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/
d)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2
*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b
^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(
1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_in
tegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_pa
rt(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c
*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x
 - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*
real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*real_part(cos_integral(b*x + d*x
 + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)
^2 - 4*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*real_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2
*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
```

(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*r
eal_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
- c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*
d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*
x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part
(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*r
eal_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*r
eal_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*r
eal_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(-
b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b

^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_in
tegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
 - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
 + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c -
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*
b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integr
al(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d
*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*
real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2
*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))

*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*
c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral
(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c
*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*rea
l_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
 d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x
 + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d)^2 + d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_i
ntegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
 b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(

```
1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_
part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos
_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*imag_part(cos_
integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*imag_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*imag_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*imag_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*imag_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*imag_part(cos_integral(
-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*imag_part(cos_integral(
-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*b^3*c*sin_integral((b*d*x + d
^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2
*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x +
 b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b
*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 4*b^3*c*imag_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*imag_part(cos
_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4
*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d) + 4*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 8*b^3*c*sin_integral((b*d*x + d^
```

2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 8*b*c*d^2*sin_i
ntegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
) + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2
tan(1/2(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*imag_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d) + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*d^3*sin_integral((b*d*x + d^2*x + b*c +
 c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + b^3*c*imag_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_i
ntegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^
3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b*
c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*
b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*
b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 -
2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c + c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*

tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*imag
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c
*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c + c*d)/d)^2 + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d
)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral
(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_integ
ral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*
sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^
2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*
c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*
d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^
2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x -
 d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*imag_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/

```
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x
 + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d
*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c +
c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*
d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
```

```
- 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 +
 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b
*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b*d
^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^3*c*imag_part(cos_integr
al(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^
2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*
c - c*d)/d) + 4*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*imag_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 8*b^3*c*sin_integ
ral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) +
8*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x -
 d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c
*d)/d) - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*sin_integral((b*d*x
- d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*i
mag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*i
mag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d) + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1
```

/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*sin_integral((b*d*x - d^2*x
+ b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*imag_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d) + 4*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*imag_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*ima
g_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d) - 8*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 8*b*c*d^2*sin_integral((b*d*x - d^2*x +
b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*imag_part
(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
 + 4*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) + 4*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*imag_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*b^3*
c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d) + 8*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*imag_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*imag_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b
^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d) - 4*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*b^3*c*sin_integral((b*d*x - d^2*
x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 8*b*c*d^2*sin_int
egral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)

```
- 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_i
ntegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
) - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*
d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*sin_integral((b*d
*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*
b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x
 + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*im
ag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integra
l((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) +
4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d) - b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
```

```
2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x +
b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x
+ b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x
+ b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*
x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)
/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b
*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^
3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c -
 c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
- c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/
```

d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c
 + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*
c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*
c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x +
b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^
2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x
 + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*si
n_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d
)/d)^2 - b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d
)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)
^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 +
 b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b
*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b
^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c
*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b
^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d

```
^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*s
in_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin
_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part
(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x
 + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x +
 d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2
*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x
 + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c -
 c*d)/d)^2 + 4*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c
+ c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*imag_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*imag
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c -
 c*d)/d)^2 + 4*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b
*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^3*c*sin_integral((b*d*x + d^2*x
 + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*b*c*d^2*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d
```

```
)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x + d*x +
 c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c
*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x + d^2*x + b
*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integr
al((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)
^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c +
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/
d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c +
 c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*sin_integral((
b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 +
 4*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/
2*(b*c - c*d)/d)^2 - 4*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*imag_part(cos_integral(-
b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*i
mag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c -
c*d)/d)^2 + 8*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)*tan(1/2*(b*c - c*d)/d)^2 - 8*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c +
c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*imag_part(cos_integ
ral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d
^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*
```

```
tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
 - c*d)/d)^2 - 4*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*imag_part(cos_integral(-b*x -
 d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^3*c*sin_inte
gral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 -
 8*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2
*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_
part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*
d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c +
c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x
 + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*
imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
 - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x
 - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
 + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1
/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
```

1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^
2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
 + b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c -
 c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_pa
rt(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x +
 c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x - d
*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(
-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(

```
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integral((b
*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral(
(b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integral(
(b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integra
l((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos
_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part
(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_
part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*i
mag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c
*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c
*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x + d
*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
```

```
b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x - d^2*x + b*c
 - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral
(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d
*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d)^2 - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 + 8*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*
imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x - d^2*x + b
*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((
b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3
*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*
c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
 b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
+ b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
```

```
^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*
x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^
2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^
2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x -
d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integra
```

```
l(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d
*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x +
b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*sin_integral(
(b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*
b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x
 - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_p
art(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/
d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 8*b^2*d*tan(1/2*b*x + 1/2*d*x)
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*
```

d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)
/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*
d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*real_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*b^3*c*real_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*real_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*real_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + b^2*d*real_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)^2 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d) - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x

+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
c*d)/d) + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d) - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d) - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d) + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d) - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d) + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2
tan(1/2(b*c + c*d)/d) - 4*b^2*d*real_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*rea
l_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d) + 4*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x + d*x + c +
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2
tan(1/2(b*c + c*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d) + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d) - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d) + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d) - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d) - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(
b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/
2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(
1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*

```
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*
tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x - d*x - c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integral(-b*x - d*x - c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
```

```
2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x +
 c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b
^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3
*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*r
eal_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
```

1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part
(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(
-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integral(-b*x
 - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3
*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
 - c*d)/d) + 4*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a

+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part
(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*
d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
+ 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
 - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d) + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d) - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d
*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_integral(b*x

- d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_par
t(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
) + 4*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d) + 4*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(-b*x + d*x + c - b
*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos_integr
al(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2
tan(1/2(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos_in
tegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(co
s_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_pa
rt(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*re
al_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*
real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*r
eal_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*rea
l_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/

```
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*re
al_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^
2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + b^2*
d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3
*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*
d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3
*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*
d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^
3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^
2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 -
d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 +
2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 -
 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^
2 + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d
)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*
d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/
d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d
)^2 + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^
2 - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^
2 + 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 -
 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 +
2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*
b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - b^
```

```
2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d
^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^
2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d
^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^
2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 -
d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 -
b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
+ d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
+ 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2
*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*
b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*
c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^
3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d
^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*
real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*
real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part
(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integr
al(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
```

*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/

```
2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*
real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c
*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c
*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2
*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 +
2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)
^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d
)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*
d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c -
 c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
 - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*
(b*c - c*d)/d)^2 - 4*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*real_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*real_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
 + 4*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1
/2*(b*c - c*d)/d)^2 - 4*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*real_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*real_pa
rt(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d
)^2 + 4*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*ta
n(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1
/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/
```

```
2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*
(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*
(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-
b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2
*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part
(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*re
al_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2
*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*
c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*
c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
 d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
 d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
```

```
b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
+ d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
- b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 + d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 - b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 + d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 + 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b
*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c
```

```
/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c +
 b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/
```

2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
- b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*
c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*imag_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 +
b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^3*c*imag_part(cos_i
ntegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b*c*d^2*imag_
part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*
x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - 2*b^3*c
*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + 2*b*c*d^2*sin_integral((b*d*x -
d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2 - 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c) + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c) - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) +
4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*

tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + b^3*c*im
ag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*imag_part(cos_integral(b
*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a - 1/2*c)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b*c
*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*imag_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*imag_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x +
b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
 1/2*c)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*sin
_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*
x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a - 1/2*c)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a
- 1/2*c)^2 - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2
*c)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c
)^2 + 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2
+ 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 4*d^
3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - b^3*c*imag_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x
 + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*imag_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x + c -
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2
 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*imag_part(cos_in
tegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b

*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 4*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 8*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 8*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*imag_part(cos_integral(-b*x -

d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^2*d*sin_integral((b*d*x + d^2*x
+ b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*d^3*sin_integral((b*d*x + d^2*x + b
*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*imag_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*imag_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*sin_integral((b*d*x + d^2*x + b
*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*d^3*sin_integral((b*d*x + d^2*x + b*c +
c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*imag_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d) - 4*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d) + 4*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d) + 8*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d) - 8*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
+ 4*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b
*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^3*
c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b*c*d^2*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 8*b^3*c*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 8*b*c*d^2*sin_integr
al((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*imag_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(

```
b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*imag_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*
c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d) - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)
/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d) + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d) - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d) + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) -
 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - b^3*c*i
mag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_integ
ral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*
d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c +
c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3
*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*
d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d
)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*im
ag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*ima
g_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
```

2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*im
ag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*im
ag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*
sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*d^3*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_par
t(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*i
mag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 -
b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c +
c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*sin_integ
ral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*
c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 + b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d
*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*i
mag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral
(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 +
 b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*sin_integral
((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c +

c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*sin_inte
gral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*im
ag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*ima
g_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*
sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*d^3*sin_
integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*imag_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*imag_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*imag_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*imag_part(cos_inte
gral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x
- d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*d^3*sin_integral((b*d*x - d^2*x
+ b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 8*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d
)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*imag_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*imag_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*imag_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x - d^2*x
 + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*d^3*sin_integral((b*d*x - d^2*x + b*c -
 c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/

```
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
+ b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x -
 d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^
3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x
 + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*
b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integ
ral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_
part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c
*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x
- d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4
*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1
```

```
/2*(b*c + c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2
*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*
d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*im
ag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*d^3*sin_integral
((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 8*b^2*d*tan(1/2*b*x + 1/2*
d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c
*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x
 - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*sin_integra
l((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)
/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*
b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*
b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*ta
```

```
n(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)
/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c - c*d)/d) - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*(b*c - c*d)/d) - 4*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c - c*d)/d) + 4*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(
1/2*(b*c - c*d)/d) + 4*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(
1/2*(b*c - c*d)/d) - 4*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c - c*d)/d) - 8*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c - c*d)/d) + 8*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*
(b*c - c*d)/d) - 4*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
- c*d)/d) + 4*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c
*d)/d) + 4*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/
d) - 4*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)
 - 8*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 8*b*c
*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*ima
g_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*imag_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*imag_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*imag_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 8*b^3*c*sin_integral((b*d
*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
```

```
n(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 8*b*c*d^2*sin_integral((b*d*x - d
^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x + d
*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x + d
*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x - d^2*x +
 b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c
 - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
- c*d)/d) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d
) - 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) +
 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^
2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*
imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*si
n_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*sin_integr
al((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
```

2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*
d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^
3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^
2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d
^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^
2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*
d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*
b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^
3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*
imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*i
mag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*
imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*
imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*
d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*si
n_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*imag
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*ima
g_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*imag
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*b^3*c*si
n_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 8*b*c*d^2*sin_
integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*imag_par
t(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*imag_pa
rt(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*imag_par

```
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*imag_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*b^3*c*sin_in
tegral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 8*b*c*d^2*sin_inte
gral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*imag_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*imag_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*imag_part(cos_integr
al(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*imag_part(cos_integral
(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*b^3*c*sin_integral((b*d*x - d^2*
x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d) + 8*b*c*d^2*sin_integral((b*d*x - d^2*x + b*
c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*
d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
```

b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x

+ c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/

2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*si
n_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_in
tegral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_par
t(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_in
tegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integr
al(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x -
d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x - d^2*x +
b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^
2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integr
al(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x - d^2*x +
b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c
*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 -
b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/
d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c

```
 - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*
c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x +
 d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*
c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integra
l(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c
 - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)
/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_pa
rt(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x
 - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c - c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d
^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x -
d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b
^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2
*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)
/d)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 +
2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d
^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*
```

tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_in
tegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((
b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 8*b^2*d*tan(1/2*b*x + 1/2*d*
x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*i
mag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
- c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)
/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(c
os_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d
)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral(
(b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d
)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*
c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^
2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)
tan(1/2(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)
/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c
+ c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d*
x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(
b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*
x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*

x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*imag_part(cos_integral(b
*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*
(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*imag_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2
*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*imag_part(cos_integral(-
b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2
*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*imag_part(cos_integral
(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1
/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^3*c*sin_integral((b*d*x +
d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(
b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*b*c*d^2*sin_integral((b*d*x + d^
2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*
c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*imag_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c
 + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*imag_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*
c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*imag_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*
c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*imag_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(
b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^3*c*sin_integral((b*d*x + d^2*
x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c
+ c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*b*c*d^2*sin_integral((b*d*x + d^2*x
+ b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c +
c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d*x
 + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*
x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x - d*
x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x + d^2*x +
b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c
+ c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c
 + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*

d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2

*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b
*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x + d
^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
 b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x
 + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integra
l((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x + d*x +
 c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3
*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^
3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x +
b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b

```
^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((
b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*
imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*i
mag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*
d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*si
n_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*si
n_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*sin_in
tegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 8*b^2*d*tan(1/2*
b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*ima
g_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*
c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2
```

*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integ
ral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*
c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_i
ntegral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 + 8*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 8*b
*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integ
ral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_inte
gral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_inte
gral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*
d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x
- d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d

)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 8*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 8*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b

*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*
c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 2*b*c*d^2*real_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c) + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) -
2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) + b^2*d*real_part(cos_i
ntegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^2*d*real_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2 - 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*real_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^3*c
*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral(b*
x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c) - 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*rea
l_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*real_part(cos_integral(b*x - d
*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c) + 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*real_part
(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c) - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_
integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2

*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integ

ral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - d^3*
real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*b^3*c*real_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*(b*c + c*d)/d) + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d
) - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*real_
part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*real_part(cos_integral(b
*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*real_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*r
eal_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*real_part(cos_integral
(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c + c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*
b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*real_part(cos_in
tegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d) - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*real_pa
rt(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^3*c*real_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d) + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^3*c*
real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*real_part(cos_integral
(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d) - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*

b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d

```
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2
*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)
/d)^2 - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 - b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x + d*x
 + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_pa
rt(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_pa
rt(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2 + d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*r
eal_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2
*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b
*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c +
 b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)
^2 - 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_par
```

t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)
/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)
^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_i
ntegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integral(-b*x + d*x + c -
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x
 - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a
+ 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integr

al(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*rea
l_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 - b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a +
 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x - d*x - c +
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c
*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*r
eal_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_inte
gral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)
/d) - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b
*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2
*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) +
4*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4
*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^
2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^
3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*
d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_in
tegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)

```
^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_integr
al(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) +
 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c -
c*d)/d) - 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3
*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c - c*d)/d) - 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*r
eal_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x -
 d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) +
 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
+ 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_pa
rt(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*t
```

an(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3
*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_inte
gral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
tan(1/2(b*c - c*d)/d) + 4*b^2*d*real_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d) + 4*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d) - 4*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d) + 4*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d) - 4*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
+ 4*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*
d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*
real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*
b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - b^2*d*real_part(cos_int
egral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*
d)/d)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2

- b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(

1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2
*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b
*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c +
 b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)
^2 + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)
/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)
^2 - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_i
ntegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d
)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x + d*x + c -
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/
d)^2 - b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*
d)/d)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d
)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x - d*x
 - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c -
 c*d)/d)^2 + d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*

x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d)

```
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/
2*(b*c - c*d)/d)^2 - 4*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/
2*(b*c - c*d)/d)^2 + 4*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*
(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c
*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*ta
n(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c -
b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^
2 - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*
d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*rea
l_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*real_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*real_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*real_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*r
eal_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral
(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_par
t(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*
```

```
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x - d
*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*
real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-
b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d
))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b
^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integra
l(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integr
al(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d
))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
 b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x + d
*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_pa
rt(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-b*x + d
```

```
*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - b*c
*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + b*c*d^2*imag_par
t(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - b*c*d^2*imag_part(cos_integr
al(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + b*c*d^2*imag_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + 2*b^3*
c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - 2*b^3*c*sin_integral(
(b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + 2*b^2*d*imag_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c) - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 2*b^2*d*ima
g_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 2*d^3*imag_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c) + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 4*d^3*sin_i
ntegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c) - b^3*c*imag_part(cos_integral(b*x + d*x +
 c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*imag_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*imag_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^3*c*i
mag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^3*c*imag_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 -
 b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + 2*b*c*d^2*sin_integr
al((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
```

c)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 8*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)

```
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*b^2*d*imag_part(cos_integral
(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c) - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 4*b^2*d*sin
_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c -
c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) +
b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*imag_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)
^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*imag_pa
rt(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
 - 1/2*c)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*imag_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^3
*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a - 1/2*c)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*sin_integral((b*d*x
- d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - 2*b
*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*a - 1/2*c)^2 + b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*imag_part(cos_int
egral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2
 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c +
 b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*imag_part(co
s_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*imag_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*im
ag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a - 1/2*c)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*sin_integral((b*d*x +
 d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^
3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a - 1/2*c)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*imag_part(cos
_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
c)*tan(1/2*a - 1/2*c)^2 - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b^
2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
```

2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*d^3*imag_part(cos_integral(-b
*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*
a - 1/2*c)^2 + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 4*d^3*sin_integr
al((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
c)*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*
d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b^2*d*imag_part(cos_integral(-
b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2
*a - 1/2*c)^2 + 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 4*b^2*d*sin_i
ntegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)*tan(1/2*a - 1/2*c)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*
d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 8*
b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*ta
n(1/2*a - 1/2*c)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - b^3*c*imag_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*i
mag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*imag_part(cos_integral(b*x - d
*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*imag_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x -
 c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*imag_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c
*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*sin_integral((b*
d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*b
*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*a - 1/2*c)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d
) + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*imag_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
(b*c + c*d)/d) - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 4*d^3*
sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/

2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*imag_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2
*(b*c + c*d)/d) - 4*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b^3*
c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*b*c*d^2*imag_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(
1/2*(b*c + c*d)/d) + 8*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 8*b*c*d^
2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*imag_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*
c + c*d)/d) - 4*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b^3*c*im
ag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*b*c*d^2*imag_part(cos_integral(-b
*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*
(b*c + c*d)/d) + 8*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 8*b*c*d^2*si
n_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*imag_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d) - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*imag_p
art(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d) + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*d^3*sin_inte
gral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*imag_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*
d)/d) - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*imag_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c
*d)/d) + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*d^3*sin_integral
((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
) + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*imag_part(cos_
integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*

c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 8*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 8*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x

```
- c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*s
in_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*(b*c + c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*sin_integral((b*
d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)
^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*i
mag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*
d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b
^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b
*c + c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x
 - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2
+ 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b
*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*
(b*c + c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d
*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-
b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2
*(b*c + c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*d^3*s
in_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c
 + c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*ima
g_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*
c + c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*d^3*sin_i
ntegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 8*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b
```

*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 8*b*d^2*tan(1
/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c
+ c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*
a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*i
mag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_integral
(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b
*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2
tan(1/2(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b
*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*sin_in
tegral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a
+ 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*imag_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c + c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 +
2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*imag_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)
/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 +
4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 8*b^2*d*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 8*
b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 +
 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*imag_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2
- 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*d^3*sin_integral((b*d*x
 - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c + c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*i

```
mag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c
*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*sin_integr
al((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c + c*d)/d)^2 + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)
*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 8*b^2*d
*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*
c + c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*im
ag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3
*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_part(cos_in
tegral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c
 + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*sin_in
tegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x +
 b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b*d^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 -
2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*imag_part(cos_integral
(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*ta
n(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*imag
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b
*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 8*b^2*d*tan(1/2*b*x + 1/2*d*
x)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 8*b*d
^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) -
2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)
```

```
^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c
 - c*d)/d) + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*sin_
integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x
 + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
(b*c - c*d)/d) + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*sin_
integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
- c*d)/d) - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x + d
*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
 - c*d)/d) + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*sin_inte
gral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*imag_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)
/d) + 4*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*imag_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*imag_part(cos_integral(-b*x + d*x
 + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c
*d)/d) - 8*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 8*b*c*d^2*sin_integr
al((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*imag_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)
+ 4*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*imag_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c
 - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/
d) - 8*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*
```

```
d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 8*b*c*d^2*sin_integral((
b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c - c*d)/d) - 4*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*
d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*imag_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
 - c*d)/d) - 4*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 8*b^3*c*sin_int
egral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)*tan(1/2*(b*c - c*d)/d) + 8*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*
d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 2*b^
2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*
d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x
 - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*
imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*
imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x - d
^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c - c*d)/d) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x - d*x -
 c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/
d) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos_in
tegral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)
*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*s
in_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d) - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d
```

*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integr
al(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d
)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d) - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(b*x - d*x -
 c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d) - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*
imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*sin_integral((b*d*x
 - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) +
2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2
tan(1/2(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
 + 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*sin_integral((b
*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*
tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^
3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*imag_part(cos_integr
al(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d) + 4*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b*
c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*b^3*c*sin_integral((b*d*x
 - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d) + 8*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*ta
n(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*
imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*
imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x - d
^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*

```
(b*c - c*d)/d) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + b^3*c*imag_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(
b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integ
ral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)
^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2
*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c
 - c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x +
 d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 +
2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c -
c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part
(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c
 - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2
- b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c -
c*d)/d)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^
2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b
^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d
)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*
imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x
 + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b
*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x + d
^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b
```

```
*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c -
 c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x + d^2*x
 + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c -
 c*d)/d)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 8*b^2*d*tan(1/2*
b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c
*d)/d)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*ima
g_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b
*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*
c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(
1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_int
egral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^
2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c
+ c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_int
egral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*
d)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x +
b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2
*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integ
ral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 +
 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*
d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^2
*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
```

x)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2
*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_inte
gral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4
*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b
*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_
part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d
)^2 + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x
 - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b
*c - c*d)/d)^2 + 8*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
- c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2
*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
- b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*sin_integ
ral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)
/d)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*
c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_i
ntegral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c -
c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^
3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*

x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 8*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/

```
d)^2 + 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integr
al((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d
)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 -
 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_int
egral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*t
an(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
 - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*sin_integral((
b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*t
an(1/2*(b*c - c*d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - b^3
*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
+ b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*i
mag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)
*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*sin_integral
((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x
 + b*c - c*d)/d)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*
d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 + 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1
/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*s
in_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x +
b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d)^2 - 8*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c +
```

c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2
*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2
*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d
^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*sin_integral((b*d*x
- d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 8*b^2*d*t
an(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + b^2*d*real_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - d^3*real_pa
rt(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - d^3*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2
- b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + d^3*real_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + 2*b^3*c*real_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a + 1/2*c) - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 2*b^3*c*real_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 2*b*c*d
^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*a + 1/2*c) + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 2*b*c*d^2*real_part(cos_int
egral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) +
2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c) - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) + b^2*d*real_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +

1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(c

os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)^2 - b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*real_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/
2*c)^2 - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a
 + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*real_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*real_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c
)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + d^3*r
eal_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(-b*x + d*x
 + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^2*d*real_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2 - 2*b^3*c*real_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*real_pa
rt(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b
*c + c*d)/d) - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*real_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d
) - 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*real_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 2*b^3*c*r
eal_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*(b*c + c*d)/d) + 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c
/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*real_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2
*c)*tan(1/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) -
 4*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*t
an(1/2*(b*c + c*d)/d) - 4*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*
d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*real_part(cos_integral

(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1
/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 2*b^3*c
*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/
2*(b*c + c*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))
*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*real_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2
*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c + c*d)/d) - 2*b^3*c*real_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*real_part(c
os_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d) - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*real_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*real
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_integral(b*x + d*x + c
 + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) -
 4*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_integral
(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d) + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b
^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(co
s_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c +
 c*d)/d)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x
 - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^
3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_
integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*
d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*r
eal_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_in
tegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d
)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*r
eal_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b

*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*ta
n(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - b^
2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d
^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 -
b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 + d^3*real_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2
 + 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*real_pa
rt(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c +
c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_pa
rt(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*real_pa
rt(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*r
eal_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c
*d)/d) - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(b*
x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 2*b
*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_
part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*(b*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b
^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*t

an(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b
*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c
)*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4
*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integr
al(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^
3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2
*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*r
eal_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d
) + 4*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c - c*d)/d) - 2*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integr
al(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*
b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*real_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d) - 2*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*real_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b
*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
) - 4*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)
tan(1/2(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_in
tegral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2
tan(1/2(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - b
^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c -
c*d)/d)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x +

d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*
real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*
d)/d)^2 - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*r
eal_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_inte
gral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/
d)^2 + d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x - d*x
 - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))
*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 +
2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*
tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos
_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/
d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x - d*x - c +
 b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d
)^2 - b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(c
os_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*
d)/d)^2 - d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
- c*d)/d)^2 + 2*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*real_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - b^2*d
*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*
real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(-

```
b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2
*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^
2 + 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c +
 c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*real_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^
2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)*ta
n(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4
*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(
1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*real_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/
2*(b*c - c*d)/d)^2 + 4*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*
real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 + d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_
part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*real_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 + b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - b^3*c*imag_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 + b*c*d^2*imag_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 + 2*b^3*c*sin_integr
al((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2 - 2*b*c*d^2*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2 - 2*b^3*c*
sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2 + 2*b*
c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2
+ b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x -
 1/2*d*x)^2 - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
b*x - 1/2*d*x)^2 + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*b*x - 1/2*d*x)^2 + b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c
```

```
/d))*tan(1/2*b*x - 1/2*d*x)^2 - b*c*d^2*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 - b^3*c*imag_part(cos_integral(-b*x -
 d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 + b*c*d^2*imag_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 + 2*b^3*c*sin_integral(
(b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2 - 2*b*c*d^2*sin_int
egral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2 - 2*b^3*c*sin
_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2 + 2*b*c*d
^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2 + 4
*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + 2*b^2*d*imag_par
t(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
 1/2*c) - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 2*b^2*d*imag_part(cos_integral(-b*x - d*x
 - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 2*d^3*imag_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
+ 1/2*c) + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 4*d^3*sin_integral((b*d*x + d^2*x + b*c +
 c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 2*b^2*d*imag_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c) - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c) - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 2*d^3*imag_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c) + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c) - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d
)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 8*b^2*d*tan(1/2*b*x + 1/
2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 8*b*d^2*tan(1/2*b*x +
1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) - b^3*c*imag_part(cos_
integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2 + b*c*d^2*imag_part(c
os_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2 - b^3*c*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2 + b*c*d^2*imag_pa
rt(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2 + b^3*c*imag_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2 - b*c*d^2*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2 + b^3*c*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2 - b*c*
d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2 -
2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2 +
2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2
- 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2
+ 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^
2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + 4*b*d^2*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - 2*b^2*d*imag_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*d^3*im
ag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a - 1/2*c) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*d^3*imag_part(cos_integral(-b*
```

x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 4*b^2*d
*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a - 1/2*c) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 8*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c) + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c) - 2*b^2*d*imag_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*d^3*im
ag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a - 1/2*c) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*d^3*imag_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 4*b^2*d
*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a - 1/2*c) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^2*d*imag_part(cos_integral(b*x - d
*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*d^3*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
) + 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c) - 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 4*b^2*d*sin_integral((b*d*x
 - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 4*d^3*si
n_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c) + 8*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c) + 8*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c) + b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c
)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/
2*c)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1
/2*c)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a
- 1/2*c)^2 - b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*
a - 1/2*c)^2 + b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(
1/2*a - 1/2*c)^2 - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*ta
n(1/2*a - 1/2*c)^2 + b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d
)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)
/d)*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)
/d)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*
d)/d)*tan(1/2*a - 1/2*c)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1
/2*c)^2 - 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*i
mag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a
- 1/2*c)^2 - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a
 + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*d^3*imag_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2
+ 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*ta
n(1/2*a - 1/2*c)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(
1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 8*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/

2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*
a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 4*b*d^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*imag_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*
d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*sin_integral(
(b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)
/d) + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*imag_par
t(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*
c + c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(-
b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 4
*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2
tan(1/2(b*c + c*d)/d) + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*imag_part(cos_in
tegral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) -
4*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)
tan(1/2(b*c + c*d)/d) - 4*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*b*c*d^2*imag_part(cos_
integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)
+ 8*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*t
an(1/2*(b*c + c*d)/d) - 8*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/
d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*imag_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*
d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c + c*d)/d) - 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d
))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*imag_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4
*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c + c*d)/d) - 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*imag_part(cos_integral(b
*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*
imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(-
b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2
*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d) + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - b^3*c*imag_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*imag_part(cos_inte

gral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*imag_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*imag_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^
2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2
+ b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)
/d)^2 - b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*
c + c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2
*(b*c + c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*t
an(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c -
 c*d)/d)*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d
)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*imag_part(c
os_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)
/d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1
/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c
+ c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*d^3*sin_integral(
(b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2
- 8*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^
2 + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d
)^2 - 4*b^2*d*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*imag_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c +
 c*d)/d)^2 + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*imag_
part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
+ c*d)/d)^2 - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*d^3*sin_integral((b*d*x - d^2*x + b*
c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 8*b^2*d*tan(1/2*b
*x - 1/2*d*x)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 8*b*d^2*tan(1/2
*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 2*
d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
tan(1/2(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*imag_part(co
s_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c -
 c*d)/d) + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*sin_integral((b*d*x - d^2*x + b
*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos_integra

l(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)
+ 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c -
c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*sin_integra
l((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*
d)/d) + 2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part
(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c -
c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*
c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*sin_integra
l((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d
) - 4*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*imag_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*imag_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d
) - 4*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c - c*d)/d) - 8*b^3*c*sin_integral((b*d*x - d^2*x + b*c -
c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 8*b*c*d^2*sin_integral(
(b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) -
2*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2
tan(1/2(b*c - c*d)/d) + 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*imag_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)
- 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)
/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*sin_integral((b*d*x
- d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^
2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2
tan(1/2(b*c - c*d)/d) - 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*imag_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*sin_integral((b*d*x - d^2*x
+ b*c - c*d)/d)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*sin
_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d) + b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))
tan(1/2(b*c - c*d)/d)^2 + b^3*c*imag_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*imag_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*imag_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*imag_pa

```
rt(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c
*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b
*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
 + 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b*c - c*d)/
d)^2 - 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b*c -
 c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*
b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part
(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d
)/d)^2 - 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1
/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*
d)/d)^2 + 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1
/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*sin_integral((b*d*x + d^2*x + b*c +
c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 8*b^2*d*tan(1/2*b*x +
 1/2*d*x)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x
 + 1/2*d*x)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*imag_part(cos_integral(b*x -
 d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
- c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*s
in_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
- c*d)/d)^2 - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 8*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2
*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c - c*d)/d)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*imag_part(cos_integ
ral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
 + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c
*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*imag_part(cos_integral(-b*x - d*x -
 c - b*c/d))*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
 - c*d)/d)^2 + 4*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b
*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - d^3*real_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 + b^2*d*real_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - d^3*real_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - b^2*d*real_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 + d^3*real_part(cos_
```

```
integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - b^2*d*real_par
t(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 + d^3*real_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 + b^2*d*
real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 - d
^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2
+ b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2 - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1
/2*d*x)^2 - b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2 + d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2 + 2*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*a + 1/2*c) - 2*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*a + 1/2*c) + 2*b^3*c*real_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*a + 1/2*c) - 2*b*c*d^2*real_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*a + 1/2*c) + b^2*d*real_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_integral(b*x + d*x + c +
 b*c/d))*tan(1/2*a + 1/2*c)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_integral(b*x - d*x - c +
 b*c/d))*tan(1/2*a + 1/2*c)^2 + b^2*d*real_part(cos_integral(-b*x + d*x + c
 - b*c/d))*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_integral(-b*x + d*x + c
 - b*c/d))*tan(1/2*a + 1/2*c)^2 + b^2*d*real_part(cos_integral(-b*x - d*x -
 c - b*c/d))*tan(1/2*a + 1/2*c)^2 - d^3*real_part(cos_integral(-b*x - d*x -
 c - b*c/d))*tan(1/2*a + 1/2*c)^2 - 2*b^3*c*real_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral(b*x -
 d*x - c + b*c/d))*tan(1/2*a - 1/2*c) - 2*b^3*c*real_part(cos_integral(-b*x
 + d*x + c - b*c/d))*tan(1/2*a - 1/2*c) + 2*b*c*d^2*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c) - b^2*d*real_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(b
*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2 - b^2*d*real_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2 + d^3*real_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2 - 2*b^3*c*real_part(cos_int
egral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*real_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d) - 2*b^3*c*real_
part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d) + 2*b*c*d
^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d) -
 4*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*
tan(1/2*(b*c + c*d)/d) + 4*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*real_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*d
^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1
/2*(b*c + c*d)/d) + b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*ta
n(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))
```

tan(1/2(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(b*x - d*x - c +
 b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(-b*x + d*x
 + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*real_part(cos_integral(
-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - d^3*real_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*real_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*real
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d) + 2*b^3*c
*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d) - 2
*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d
)/d) + 4*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*real_part(cos_integral(b*x - d*x - c +
 b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)
 - 4*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)
tan(1/2(b*c - c*d)/d) - b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_integral(-b*x
 + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_int
egral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + d^3*real_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*imag_pa
rt(cos_integral(b*x + d*x + c + b*c/d)) - b*c*d^2*imag_part(cos_integral(b*
x + d*x + c + b*c/d)) - b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d)
) + b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d)) + b^3*c*imag_par
t(cos_integral(-b*x + d*x + c - b*c/d)) - b*c*d^2*imag_part(cos_integral(-b
*x + d*x + c - b*c/d)) - b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/
d)) + b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d)) + 2*b^3*c*sin
_integral((b*d*x + d^2*x + b*c + c*d)/d) - 2*b*c*d^2*sin_integral((b*d*x +
d^2*x + b*c + c*d)/d) - 2*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)
 + 2*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d) - 4*b^2*d*tan(1/2*
b*x + 1/2*d*x)^2 + 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2 + 2*b^2*d*imag_part(cos
_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c) - 2*d^3*imag_part(cos_
integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c) - 2*b^2*d*imag_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c) + 2*d^3*imag_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c) + 4*b^2*d*sin_integra
l((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c) - 4*d^3*sin_integral((b
*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c) - 8*b^2*d*tan(1/2*b*x + 1/2
*d*x)*tan(1/2*a + 1/2*c) + 8*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c
) - 4*b^2*d*tan(1/2*a + 1/2*c)^2 - 2*b^2*d*imag_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*a - 1/2*c) + 2*d^3*imag_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*a - 1/2*c) + 2*b^2*d*imag_part(cos_integral(-b*x + d*

x + c - b*c/d))*tan(1/2*a - 1/2*c) - 2*d^3*imag_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*a - 1/2*c) - 4*b^2*d*sin_integral((b*d*x - d^2*x +
b*c - c*d)/d)*tan(1/2*a - 1/2*c) + 4*d^3*sin_integral((b*d*x - d^2*x + b*c
- c*d)/d)*tan(1/2*a - 1/2*c) + 8*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1
/2*c) + 8*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c) + 4*b^2*d*tan(1/2
*a - 1/2*c)^2 - 2*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*(b*c + c*d)/d) + 2*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*(b*c + c*d)/d) + 2*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c
/d))*tan(1/2*(b*c + c*d)/d) - 2*d^3*imag_part(cos_integral(-b*x - d*x - c -
 b*c/d))*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*sin_integral((b*d*x + d^2*x + b*c
 + c*d)/d)*tan(1/2*(b*c + c*d)/d) + 4*d^3*sin_integral((b*d*x + d^2*x + b*c
 + c*d)/d)*tan(1/2*(b*c + c*d)/d) - 4*b*d^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^
2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d) -
 2*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d
) - 2*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c -
c*d)/d) + 2*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*
c - c*d)/d) + 4*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(
b*c - c*d)/d) - 4*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(
b*c - c*d)/d) - 4*b*d^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*real_part(cos_inte
gral(b*x + d*x + c + b*c/d)) + d^3*real_part(cos_integral(b*x + d*x + c + b
*c/d)) + b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d)) - d^3*real_pa
rt(cos_integral(b*x - d*x - c + b*c/d)) + b^2*d*real_part(cos_integral(-b*x
 + d*x + c - b*c/d)) - d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))
- b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d)) + d^3*real_part(cos
_integral(-b*x - d*x - c - b*c/d)) - 4*b*d^2)/(b^4*d*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 +
 b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2
tan(1/2(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^
2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*ta

```
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 +
 b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/
d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 +
b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b
^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d)^2 - b^2*d^3*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
```

c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^
3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^
2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2
tan(1/2(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b
^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d
)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c -
 c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*ta
n(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*
d^3*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
+ b^4*d*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 - b^2*d^3*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - b^2*d
^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + b^4*d*tan(1/2*b*x +

```
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^2*d^
3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^4*d*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1
/2*c)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^4
*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)
/d)^2 + b^4*d*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c
- c*d)/d)^2 + b^4*d*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3
*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*a - 1/2*c)^2
*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d
)/d)^2 + b^4*d*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2
*d*x)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2
 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2 + b^4*d*tan(1/2*a + 1/2*c)^2 - b^2*d^3*
tan(1/2*a + 1/2*c)^2 + b^4*d*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*a - 1/2
*c)^2 + b^4*d*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*(b*c + c*d)/d)^2 +
 b^4*d*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*(b*c - c*d)/d)^2 + b^4*d
- b^2*d^3)
```

Mupad [F(-1)]

Timed out.

$$\int x\sin(a+bx)\text{Si}(c+dx)\,dx=\int x\,\mathrm{sinint}(c+d\,x)\,\sin\left(a+b\,x\right)\,dx$$

```
[In] int(x*sinint(c + d*x)*sin(a + b*x),x)
[Out] int(x*sinint(c + d*x)*sin(a + b*x), x)
```

3.64 $\int \sin(a+bx)\mathbf{Si}(c+dx)\,dx$

Optimal result

Integrand size = 13, antiderivative size = 154

$$\int \sin(a+bx)\text{Si}(c+dx)\,dx = -\frac{\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b} + \frac{\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b} - \frac{\cos(a+bx)\text{Si}(c+dx)}{b} + \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b}$$

```
[Out] -1/2*cos(a-b*c/d)*Si(c*(b-d)/d+(b-d)*x)/b-cos(b*x+a)*Si(d*x+c)/b+1/2*cos(a-
b*c/d)*Si(c*(b+d)/d+(b+d)*x)/b-1/2*Ci(c*(b-d)/d+(b-d)*x)*sin(a-b*c/d)/b+1/2
*Ci(c*(b+d)/d+(b+d)*x)*sin(a-b*c/d)/b
```

Rubi [A] (verified)

Time = 0.20 (sec) , antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.385, Rules used

$= \{6646, 4515, 3384, 3380, 3383\}$

$$\int \sin(a+bx)\text{Si}(c+dx)\,dx = -\frac{\sin\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b} + \frac{\sin\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b} - \frac{\cos(a+bx)\text{Si}(c+dx)}{b} + \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b}$$

```
[In] Int[Sin[a + b*x]*SinIntegral[c + d*x],x]
```

```
[Out] -1/2*(CosIntegral[(c*(b - d))/d + (b - d)*x]*Sin[a - (b*c)/d])/b + (CosInte
gral[(c*(b + d))/d + (b + d)*x]*Sin[a - (b*c)/d])/(2*b) - (Cos[a - (b*c)/d]
*SinIntegral[(c*(b - d))/d + (b - d)*x])/(2*b) - (Cos[a + b*x]*SinIntegral[
c + d*x])/b + (Cos[a - (b*c)/d]*SinIntegral[(c*(b + d))/d + (b + d)*x])/(2*
b)
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3384

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Dist[Cos[(d*
e - c*f)/d], Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Dist[Sin[(d*e - c*f
)/d], Int[Cos[c*(f/d) + f*x]/(c + d*x), x], x] /; FreeQ[{c, d, e, f}, x] &&
 NeQ[d*e - c*f, 0]
```

Rule 4515

```
Int[Cos[(c_.) + (d_.)*(x_)]^(q_.)*((e_.) + (f_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(p_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Sin[a + b*x
]^p*Cos[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] && IGtQ[p, 0]
 && IGtQ[q, 0]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\text{integral} = -\frac{\cos(a+bx)\text{Si}(c+dx)}{b} + \frac{d\int \frac{\cos(a+bx)\sin(c+dx)}{c+dx}\,dx}{b}$$

$$= -\frac{\cos(a+bx)\text{Si}(c+dx)}{b} + \frac{d\int \left(-\frac{\sin(a-c+(b-d)x)}{2(c+dx)} + \frac{\sin(a+c+(b+d)x)}{2(c+dx)}\right)dx}{b}$$

$$= -\frac{\cos(a+bx)\text{Si}(c+dx)}{b} - \frac{d\int \frac{\sin(a-c+(b-d)x)}{c+dx}\,dx}{2b} + \frac{d\int \frac{\sin(a+c+(b+d)x)}{c+dx}\,dx}{2b}$$

$$= -\frac{\cos(a+bx)\text{Si}(c+dx)}{b} - \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} + \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b} - \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} + \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b}$$

$$= -\frac{\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b} + \frac{\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b} - \frac{\cos(a+bx)\text{Si}(c+dx)}{b} + \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b}$$

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 1.01 (sec) , antiderivative size = 168, normalized size of antiderivative = 1.09

$$\int \sin(a+bx)\text{Si}(c+dx)\,dx$$

$$= \frac{ie^{-\frac{i(bc+ad)}{d}}\left(-e^{\frac{2ibc}{d}}\text{ExpIntegralEi}\left(-\frac{i(b-d)(c+dx)}{d}\right) + e^{2ia}\text{ExpIntegralEi}\left(\frac{i(b-d)(c+dx)}{d}\right) + e^{\frac{2ibc}{d}}\text{ExpIntegralEi}\right.}{4b}$$

```
[In] Integrate[Sin[a + b*x]*SinIntegral[c + d*x],x]
```

```
[Out] ((I/4)*(-(E^(((2*I)*b*c)/d)*ExpIntegralEi[((-I)*(b - d)*(c + d*x))/d]) + E^
((2*I)*a)*ExpIntegralEi[(I*(b - d)*(c + d*x))/d] + E^(((2*I)*b*c)/d)*ExpInt
egralEi[((-I)*(b + d)*(c + d*x))/d] - E^((2*I)*a)*ExpIntegralEi[(I*(b + d)*
(c + d*x))/d] + (4*I)*E^((I*(b*c + a*d))/d)*Cos[a + b*x]*SinIntegral[c + d*
x]))/(b*E^((I*(b*c + a*d))/d))
```

Maple [A] (verified)

Time = 1.81 (sec) , antiderivative size = 274, normalized size of antiderivative = 1.78

method	result
default	$\frac{-\frac{\mathrm{Si}(dx+c)d\cos\left(\frac{b(dx+c)}{d}+\frac{ad-bc}{d}\right)}{b}+\frac{d\left(-\frac{d\left(-\frac{\mathrm{Si}\left(-\left(-1+\frac{b}{d}\right)(dx+c)-a+\frac{bc}{d}-\frac{-ad+bc}{d}\right)\cos\left(\frac{-ad+bc}{d}\right)}{d}-\frac{\mathrm{Ci}\left(\left(-1+\frac{b}{d}\right)(dx+c)+a-\frac{bc}{d}+\frac{-ad+bc}{d}\right)\sin \cdots}{d}\right.}{2}\right.}{\cdots}}{d}$

```
[In] int(Si(d*x+c)*sin(b*x+a),x,method=_RETURNVERBOSE)
```

```
[Out] (-Si(d*x+c)/b*d*cos(1/d*b*(d*x+c)+(a*d-b*c)/d)+1/b*d*(-1/2*d*(-Si(-(-1+b/d)
*(d*x+c)-a+b*c/d-(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci((-1+b/d)*(d*x+c)+a-b*
c/d+(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d)+1/2*d*(-Si(-(1+b/d)*(d*x+c)-a+b*c/d-
(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci((1+b/d)*(d*x+c)+a-b*c/d+(-a*d+b*c)/d)*
sin((-a*d+b*c)/d)/d)))/d
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 146, normalized size of antiderivative = 0.95

$$\int \sin(a+bx)\mathrm{Si}(c+dx)\,dx = \frac{\left(\mathrm{Si}\left(\frac{bc+cd+(bd+d^2)x}{d}\right)+\mathrm{Si}\left(-\frac{bc-cd+(bd-d^2)x}{d}\right)\right)\cos\left(-\frac{bc-ad}{d}\right)+\left(\mathrm{Ci}\left(\frac{bc+cd+(bd+d^2)x}{d}\right)-\mathrm{Ci}\left(-\frac{bc-cd+(bd-d^2)x}{d}\right)\right)\cdots}{2\,b}$$

```
[In] integrate(sin_integral(d*x+c)*sin(b*x+a),x, algorithm="fricas")
```

```
[Out] 1/2*((sin_integral((b*c + c*d + (b*d + d^2)*x)/d) + sin_integral(-(b*c - c*
d + (b*d - d^2)*x)/d))*cos(-(b*c - a*d)/d) + (cos_integral((b*c + c*d + (b*
d + d^2)*x)/d) - cos_integral(-(b*c - c*d + (b*d - d^2)*x)/d))*sin(-(b*c -
a*d)/d) - 2*cos(b*x + a)*sin_integral(d*x + c))/b
```

Sympy [F]

$$\int \sin(a+bx)\text{Si}(c+dx)\,dx = \int \sin{(a+bx)}\,\text{Si}\,(c+dx)\,dx$$

```
[In] integrate(Si(d*x+c)*sin(b*x+a),x)
```

```
[Out] Integral(sin(a + b*x)*Si(c + d*x), x)
```

Maxima [F]

$$\int \sin(a+bx)\text{Si}(c+dx)\,dx = \int \sin{(bx+a)}\,\text{Si}\,(dx+c)\;dx$$

```
[In] integrate(sin_integral(d*x+c)*sin(b*x+a),x, algorithm="maxima")
```

```
[Out] integrate(sin(b*x + a)*sin_integral(d*x + c), x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.59 (sec) , antiderivative size = 9541, normalized size of antiderivative = 61.95

$$\int \sin(a+bx)\text{Si}(c+dx)\,dx = \text{Too large to display}$$

```
[In] integrate(sin_integral(d*x+c)*sin(b*x+a),x, algorithm="giac")
```

```
[Out] 1/4*(imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - imag
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + imag_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - imag_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*sin_integral((b*d*x + d^2*x
 + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*sin_integral((b*d*x - d^2*x + b*c - c
*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - 2*real_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d) - 2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
```

*d)/d) + 2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 +
2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*real_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*real_part(cos_i
ntegral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*real_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*real_part(cos_integral(-b*x - d*
x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 + imag_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + i
mag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 - imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*sin_integral((b*d*x + d^
2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2 + 2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*imag_part(cos_integ
ral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*imag_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*sin_integral((b*d*x - d^2*x + b*c - c*d)
/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d) - imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - imag_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c - c*d)/d)^2 + imag_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + imag_pa
rt(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*sin_integral((b*d*x + d^2*x + b*c + c*
d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 -
2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*imag_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)*tan(1/2*(b*c - c*d)/d)^2 - 4*imag_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*
(b*c - c*d)/d)^2 + 8*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a
+ 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)
^2 + imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + imag_part(cos_integral(b*
x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 - imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2

*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - imag_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*sin_integral((b*d*x + d^2*x + b*c +
c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 + 2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - imag_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 - imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + imag_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + imag_part(cos_integral(-b*x - d*x - c -
 b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 - 2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*sin_integral((b*d*x -
d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 + 2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*real_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d) - 2*real_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*real
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*real_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
- 2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*real_part(cos_integral(b*x -
d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c -
c*d)/d) - 2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*real_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d) + 2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*real_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*real_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d) + 2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b
*c - c*d)/d)^2 + 2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a
 + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*real_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 + 2*real_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*rea
l_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*real_part(cos_integral(b*x + d*x
 + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c

```
*d)/d)^2 - 2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*real_part(cos_in
tegral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 - 2*real_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*
real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*real_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 - imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)^2 + imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - imag_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + imag_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
^2 - 2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c)^2 + 2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 4*imag_part(cos_integral(b*x + d*x + c +
 b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4
*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 8*sin_integral((b*d*x + d^2*x + b*c
+ c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) +
imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2 - imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - imag_part(cos_
integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 + 2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2 - 2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - imag_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 - imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 + imag_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*sin_integral((b*d*x +
 d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*si
n_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2 - 4*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a +
 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*imag_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c - c*d)/d) - 8*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*imag_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d) + 4*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*ta
n(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*sin_in
tegral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d) - imag_part(cos_integral(b*x + d*x + c + b*c/
```

```
d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + imag_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - ima
g_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c - c*d)/d)^2 + imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*sin_integral((b*d*x + d^2*x + b*c
+ c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*sin_integral((b
*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
+ imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c - c*d)/d)^2 - imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + imag_part(cos_integral(-b*x + d*x
 + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - imag_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d
)/d)^2 + 2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2
*tan(1/2*(b*c - c*d)/d)^2 - 2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*imag_part(cos_integral(b*x
 + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
 - c*d)/d)^2 - 4*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a
+ 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8*sin_integral((
b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan
(1/2*(b*c - c*d)/d)^2 - imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + imag_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - ima
g_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 + imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*sin_integral((b*d*x + d^2*
x + b*c + c*d)/d)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*sin
_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d)^2 - 2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*real_part(cos_integral(-b*x + d*x + c -
 b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*real_part(cos_integral
(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*real_p
art(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/
2*c)^2 + 2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c + c*d)/d) + 2*real_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*real_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*rea
l_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d) - 2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a
+ 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*real_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*real_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2
- 2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(
1/2*(b*c + c*d)/d)^2 + 2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*real_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*real_part
```

```
(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c
*d)/d) - 2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c - c*d)/d) + 2*real_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*real_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
) + 2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan
(1/2*(b*c - c*d)/d)^2 + 2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*t
an(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*real_part(cos_integral(b*x -
 d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*real_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c
*d)/d)^2 - 2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c +
c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*real_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - imag_part(cos_i
ntegral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2 - imag_part(cos_integr
al(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2 + imag_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2 + imag_part(cos_integral(-b*x -
 d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2 - 2*sin_integral((b*d*x + d^2*x + b
*c + c*d)/d)*tan(1/2*a + 1/2*c)^2 - 2*sin_integral((b*d*x - d^2*x + b*c - c
*d)/d)*tan(1/2*a + 1/2*c)^2 + imag_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*a - 1/2*c)^2 + imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*a - 1/2*c)^2 - imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2
*a - 1/2*c)^2 - imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a -
 1/2*c)^2 + 2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c
)^2 + 2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2 +
4*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2
*(b*c + c*d)/d) - 4*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2
*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 8*sin_integral((b*d*x + d^2*x + b*c +
c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - imag_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - imag_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + imag_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + imag_part(cos_integral(-b
*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - 2*sin_integral((b*d*x + d
^2*x + b*c + c*d)/d)*tan(1/2*(b*c + c*d)/d)^2 - 2*sin_integral((b*d*x - d^2
*x + b*c - c*d)/d)*tan(1/2*(b*c + c*d)/d)^2 - 4*imag_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*imag_part
(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*
d)/d) - 8*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c - c*d)/d) + imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1
/2*(b*c - c*d)/d)^2 + imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*(b*c - c*d)/d)^2 - imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*(b*c - c*d)/d)^2 - imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/
2*(b*c - c*d)/d)^2 + 2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*
(b*c - c*d)/d)^2 + 2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b
*c - c*d)/d)^2 + 2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a
 + 1/2*c) + 2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1
```

```
/2*c) - 2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)
 - 2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c) - 2
*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d) - 2*
real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d) + 2*
real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d) + 2*r
eal_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d) + ima
g_part(cos_integral(b*x + d*x + c + b*c/d)) - imag_part(cos_integral(b*x -
d*x - c + b*c/d)) + imag_part(cos_integral(-b*x + d*x + c - b*c/d)) - imag_
part(cos_integral(-b*x - d*x - c - b*c/d)) + 2*sin_integral((b*d*x + d^2*x
+ b*c + c*d)/d) - 2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d))*d/(b*d*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 + b*d*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2 + b*d*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c -
c*d)/d)^2 + b*d*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 + b*d*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 + b*d*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b*d*tan(1/2
*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*d*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 + b*d*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*d*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*d*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 + b*d*tan(1/2*a + 1/2*c)^2 + b*d*tan(1/2*a - 1/2*
c)^2 + b*d*tan(1/2*(b*c + c*d)/d)^2 + b*d*tan(1/2*(b*c - c*d)/d)^2 + b*d) -
 cos(b*x + a)*sin_integral(d*x + c)/b
```

Mupad [F(-1)]

Timed out.

$$\int \sin(a+bx)\text{Si}(c+dx)\,dx=\int \text{sinint}(c+d\,x)\,\sin\left(a+b\,x\right)\,dx$$

```
[In] int(sinint(c + d*x)*sin(a + b*x),x)
[Out] int(sinint(c + d*x)*sin(a + b*x), x)
```

3.65 $\int \frac{\sin(a+bx)\mathbf{Si}(c+dx)}{x}\,dx$

Optimal result

Integrand size = 16, antiderivative size = 16

$$\int \frac{\sin(a+bx)\text{Si}(c+dx)}{x}\,dx = \text{Int}\left(\frac{\sin(a+bx)\text{Si}(c+dx)}{x},x\right)$$

```
[Out] CannotIntegrate(Si(d*x+c)*sin(b*x+a)/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.12 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\sin(a+bx)\text{Si}(c+dx)}{x}\,dx = \int \frac{\sin(a+bx)\text{Si}(c+dx)}{x}\,dx$$

```
[In] Int[(Sin[a + b*x]*SinIntegral[c + d*x])/x,x]
```

```
[Out] Defer[Int][(Sin[a + b*x]*SinIntegral[c + d*x])/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\sin(a+bx)\text{Si}(c+dx)}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 13.37 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\sin(a+bx)\mathrm{Si}(c+dx)}{x}\,dx = \int \frac{\sin(a+bx)\mathrm{Si}(c+dx)}{x}\,dx$$

```
[In] Integrate[(Sin[a + b*x]*SinIntegral[c + d*x])/x,x]
[Out] Integrate[(Sin[a + b*x]*SinIntegral[c + d*x])/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.35 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{\mathrm{Si}\,(dx+c)\sin\,(bx+a)}{x}dx$$

```
[In] int(Si(d*x+c)*sin(b*x+a)/x,x)
[Out] int(Si(d*x+c)*sin(b*x+a)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\sin(a+bx)\mathrm{Si}(c+dx)}{x}\,dx = \int \frac{\sin\,(bx+a)\,\mathrm{Si}\,(dx+c)}{x}\,dx$$

```
[In] integrate(sin_integral(d*x+c)*sin(b*x+a)/x,x, algorithm="fricas")
[Out] integral(sin(b*x + a)*sin_integral(d*x + c)/x, x)
```

Sympy [N/A]

Not integrable

Time = 0.75 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{\sin(a+bx)\mathrm{Si}(c+dx)}{x}\,dx = \int \frac{\sin\,(a+bx)\,\mathrm{Si}\,(c+dx)}{x}\,dx$$

```
[In] integrate(Si(d*x+c)*sin(b*x+a)/x,x)
[Out] Integral(sin(a + b*x)*Si(c + d*x)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.38 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\sin(a+bx)\mathrm{Si}(c+dx)}{x}\,dx = \int \frac{\sin\left(bx+a\right)\mathrm{Si}\left(dx+c\right)}{x}\,dx$$

```
[In] integrate(sin_integral(d*x+c)*sin(b*x+a)/x,x, algorithm="maxima")
[Out] integrate(sin(b*x + a)*sin_integral(d*x + c)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\sin(a+bx)\mathrm{Si}(c+dx)}{x}\,dx = \int \frac{\sin\left(bx+a\right)\mathrm{Si}\left(dx+c\right)}{x}\,dx$$

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

Mupad [N/A]

Not integrable

Time = 6.59 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\sin(a+bx)\mathrm{Si}(c+dx)}{x}\,dx = \int \frac{\mathrm{sinint}(c+d\,x)\,\sin\left(a+b\,x\right)}{x}\,dx$$

```
[In] int((sinint(c + d*x)*sin(a + b*x))/x,x)
[Out] int((sinint(c + d*x)*sin(a + b*x))/x, x)
```

3.66 $\int x\cos(a+bx)\mathbf{Si}(c+dx)\,dx$

Optimal result

Integrand size = 14, antiderivative size = 370

$$\begin{aligned}\int x\cos(a+bx)\mathrm{Si}(c+dx)\,dx &= \frac{c\cos\left(a-\frac{bc}{d}\right)\mathrm{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2bd}\\&-\frac{c\cos\left(a-\frac{bc}{d}\right)\mathrm{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2bd}\\&+\frac{\mathrm{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b^2}\\&-\frac{\mathrm{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b^2}\\&-\frac{\sin(a-c+(b-d)x)}{2b(b-d)}+\frac{\sin(a+c+(b+d)x)}{2b(b+d)}\\&+\frac{\cos\left(a-\frac{bc}{d}\right)\mathrm{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2}\\&-\frac{c\sin\left(a-\frac{bc}{d}\right)\mathrm{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2bd}\\&+\frac{\cos(a+bx)\mathrm{Si}(c+dx)}{b^2}+\frac{x\sin(a+bx)\mathrm{Si}(c+dx)}{b}\\&-\frac{\cos\left(a-\frac{bc}{d}\right)\mathrm{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2}\\&+\frac{c\sin\left(a-\frac{bc}{d}\right)\mathrm{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2bd}\end{aligned}$$

```
[Out] 1/2*c*Ci(c*(b-d)/d+(b-d)*x)*cos(a-b*c/d)/b/d-1/2*c*Ci(c*(b+d)/d+(b+d)*x)*co
s(a-b*c/d)/b/d+1/2*cos(a-b*c/d)*Si(c*(b-d)/d+(b-d)*x)/b^2+cos(b*x+a)*Si(d*x
```

```
+c)/b^2-1/2*cos(a-b*c/d)*Si(c*(b+d)/d+(b+d)*x)/b^2+1/2*Ci(c*(b-d)/d+(b-d)*x
)*sin(a-b*c/d)/b^2-1/2*Ci(c*(b+d)/d+(b+d)*x)*sin(a-b*c/d)/b^2-1/2*c*Si(c*(b
-d)/d+(b-d)*x)*sin(a-b*c/d)/b/d+1/2*c*Si(c*(b+d)/d+(b+d)*x)*sin(a-b*c/d)/b/
d+x*Si(d*x+c)*sin(b*x+a)/b-1/2*sin(a-c+(b-d)*x)/b/(b-d)+1/2*sin(a+c+(b+d)*x
)/b/(b+d)
```

Rubi [A] (verified)

Time = 0.95 (sec) , antiderivative size = 370, normalized size of antiderivative = 1.00, number of steps used = 24, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.643, Rules used = {6654, 4704, 6874, 2717, 3384, 3380, 3383, 6646, 4515}

$$\begin{aligned}\int x\cos(a+bx)\text{Si}(c+dx)\,dx = {}&\frac{\sin\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b^2}\\&-\frac{\sin\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b^2}\\&+\frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b^2}\\&+\frac{\cos(a+bx)\text{Si}(c+dx)}{b^2}\\&-\frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b^2}\\&+\frac{c\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2bd}\\&-\frac{c\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2bd}\\&-\frac{c\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2bd}\\&+\frac{x\sin(a+bx)\text{Si}(c+dx)}{b}\\&+\frac{c\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2bd}\\&-\frac{\sin(a+x(b-d)-c)}{2b(b-d)}+\frac{\sin(a+x(b+d)+c)}{2b(b+d)}\end{aligned}$$

```
[In] Int[x*Cos[a + b*x]*SinIntegral[c + d*x],x]
```

```
[Out] (c*Cos[a - (b*c)/d]*CosIntegral[(c*(b - d))/d + (b - d)*x])/(2*b*d) - (c*Co
s[a - (b*c)/d]*CosIntegral[(c*(b + d))/d + (b + d)*x])/(2*b*d) + (CosIntegr
al[(c*(b - d))/d + (b - d)*x]*Sin[a - (b*c)/d])/(2*b^2) - (CosIntegral[(c*(
```

```
b + d))/d + (b + d)*x]*Sin[a - (b*c)/d])/(2*b^2) - Sin[a - c + (b - d)*x]/(
2*b*(b - d)) + Sin[a + c + (b + d)*x]/(2*b*(b + d)) + (Cos[a - (b*c)/d]*Sin
Integral[(c*(b - d))/d + (b - d)*x])/(2*b^2) - (c*Sin[a - (b*c)/d]*SinInteg
ral[(c*(b - d))/d + (b - d)*x])/(2*b*d) + (Cos[a + b*x]*SinIntegral[c + d*x
])/b^2 + (x*Sin[a + b*x]*SinIntegral[c + d*x])/b - (Cos[a - (b*c)/d]*SinInt
egral[(c*(b + d))/d + (b + d)*x])/(2*b^2) + (c*Sin[a - (b*c)/d]*SinIntegral
[(c*(b + d))/d + (b + d)*x])/(2*b*d)
```

Rule 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3384

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Dist[Cos[(d*
e - c*f)/d], Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Dist[Sin[(d*e - c*f
)/d], Int[Cos[c*(f/d) + f*x]/(c + d*x), x], x] /; FreeQ[{c, d, e, f}, x] &&
 NeQ[d*e - c*f, 0]
```

Rule 4515

```
Int[Cos[(c_.) + (d_.)*(x_)]^(q_.)*((e_.) + (f_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(p_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Sin[a + b*x
]^p*Cos[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] && IGtQ[p, 0]
 && IGtQ[q, 0]
```

Rule 4704

```
Int[(u_.)*Sin[(a_.) + (b_.)*(x_)]^(m_.)*Sin[(c_.) + (d_.)*(x_)]^(n_.), x_Sy
mbol] :> Int[ExpandTrigReduce[u, Sin[a + b*x]^m*Sin[c + d*x]^n, x], x] /; F
reeQ[{a, b, c, d}, x] && IGtQ[m, 0] && IGtQ[n, 0]
```

Rule 6646

```
Int[Sin[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(SinIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
```

```
x]*(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6654

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= \frac{x\sin(a+bx)\text{Si}(c+dx)}{b} - \frac{\int \sin(a+bx)\text{Si}(c+dx)\,dx}{b} - \frac{d\int \frac{x\sin(a+bx)\sin(c+dx)}{c+dx}\,dx}{b} \\
&= \frac{\cos(a+bx)\text{Si}(c+dx)}{b^2} + \frac{x\sin(a+bx)\text{Si}(c+dx)}{b} \\
&\quad - \frac{d\int \frac{\cos(a+bx)\sin(c+dx)}{c+dx}\,dx}{b^2} - \frac{d\int \left(\frac{x\cos(a-c+(b-d)x)}{2(c+dx)} - \frac{x\cos(a+c+(b+d)x)}{2(c+dx)}\right)dx}{b} \\
&= \frac{\cos(a+bx)\text{Si}(c+dx)}{b^2} + \frac{x\sin(a+bx)\text{Si}(c+dx)}{b} \\
&\quad - \frac{d\int \left(-\frac{\sin(a-c+(b-d)x)}{2(c+dx)} + \frac{\sin(a+c+(b+d)x)}{2(c+dx)}\right)dx}{b^2} \\
&\quad - \frac{d\int \frac{x\cos(a-c+(b-d)x)}{c+dx}\,dx}{2b} + \frac{d\int \frac{x\cos(a+c+(b+d)x)}{c+dx}\,dx}{2b} \\
&= \frac{\cos(a+bx)\text{Si}(c+dx)}{b^2} + \frac{x\sin(a+bx)\text{Si}(c+dx)}{b} + \frac{d\int \frac{\sin(a-c+(b-d)x)}{c+dx}\,dx}{2b^2} \\
&\quad - \frac{d\int \frac{\sin(a+c+(b+d)x)}{c+dx}\,dx}{2b^2} - \frac{d\int \left(\frac{\cos(a-c+(b-d)x)}{d} - \frac{c\cos(a-c+(b-d)x)}{d(c+dx)}\right)dx}{2b} \\
&\quad + \frac{d\int \left(\frac{\cos(a+c+(b+d)x)}{d} - \frac{c\cos(a+c+(b+d)x)}{d(c+dx)}\right)dx}{2b}
\end{aligned}
$$

$$= \frac{\cos(a+bx)\mathrm{Si}(c+dx)}{b^2} + \frac{x\sin(a+bx)\mathrm{Si}(c+dx)}{b} - \frac{\int \cos(a-c+(b-d)x)\,dx}{2b} + \frac{\int \cos(a+c+(b+d)x)\,dx}{2b} + \frac{c\int \frac{\cos(a-c+(b-d)x)}{c+dx}\,dx}{2b} - \frac{c\int \frac{\cos(a+c+(b+d)x)}{c+dx}\,dx}{2b} + \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b^2} - \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b^2} + \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b^2} - \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b^2}$$

$$= \frac{\mathrm{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b^2} - \frac{\mathrm{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b^2} - \frac{\sin(a-c+(b-d)x)}{2b(b-d)} + \frac{\sin(a+c+(b+d)x)}{2b(b+d)} + \frac{\cos\left(a-\frac{bc}{d}\right)\mathrm{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} + \frac{\cos(a+bx)\mathrm{Si}(c+dx)}{b^2} + \frac{x\sin(a+bx)\mathrm{Si}(c+dx)}{b} - \frac{\cos\left(a-\frac{bc}{d}\right)\mathrm{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2} + \frac{\left(c\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} - \frac{\left(c\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b} - \frac{\left(c\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} + \frac{\left(c\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b}$$

$$= \frac{c\cos\left(a-\frac{bc}{d}\right)\mathrm{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2bd} - \frac{c\cos\left(a-\frac{bc}{d}\right)\mathrm{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2bd} + \frac{\mathrm{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b^2} - \frac{\mathrm{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b^2} - \frac{\sin(a-c+(b-d)x)}{2b(b-d)} + \frac{\sin(a+c+(b+d)x)}{2b(b+d)} + \frac{\cos\left(a-\frac{bc}{d}\right)\mathrm{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} - \frac{c\sin\left(a-\frac{bc}{d}\right)\mathrm{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2bd} + \frac{\cos(a+bx)\mathrm{Si}(c+dx)}{b^2} + \frac{x\sin(a+bx)\mathrm{Si}(c+dx)}{b} - \frac{\cos\left(a-\frac{bc}{d}\right)\mathrm{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2} + \frac{c\sin\left(a-\frac{bc}{d}\right)\mathrm{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2bd}$$

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 3.28 (sec) , antiderivative size = 389, normalized size of antiderivative = 1.05

$$\int x\cos(a+bx)\text{Si}(c+dx)\,dx =$$

$$-\frac{e^{-ia}\left(-\left((bc-id)e^{2ia-\frac{ibc}{d}}\text{ExpIntegralEi}\left(\frac{i(b-d)(c+dx)}{d}\right)\right)+\frac{e^{-\frac{i(b+d)(c+dx)}{d}}\left(-ibde^{\frac{ibc}{d}}\left(d\left(-1+e^{2i(a+bx)}\right)+b\left(1+e^{2i(a+bx)}\right)\right.\right.}{(}\right.}{4b^2d}$$

$$+\frac{e^{-ia}\left(-\frac{ibde^{i(c+(-b+d)x)}\left(b+d+be^{2i(a+bx)}-de^{2i(a+bx)}\right)}{(b-d)(b+d)}+(bc+id)e^{\frac{ibc}{d}}\text{ExpIntegralEi}\left(-\frac{i(b-d)(c+dx)}{d}\right)-(bc-id)e^{2ia-}\right.}{4b^2d}$$

$$+\frac{(\cos(a+bx)+bx\sin(a+bx))\text{Si}(c+dx)}{b^2}$$

```
[In] Integrate[x*Cos[a + b*x]*SinIntegral[c + d*x],x]
```

```
[Out] -1/4*(-((b*c - I*d)*E^((2*I)*a - (I*b*c)/d)*ExpIntegralEi[(I*(b - d)*(c + d
*x))/d]) + ((-I)*b*d*E^((I*b*c)/d)*(d*(-1 + E^((2*I)*(a + b*x))) + b*(1 + E
^((2*I)*(a + b*x)))) + (b*c + I*d)*(b^2 - d^2)*E^(I*(c + (2*b*c)/d + (b + d
)*x))*ExpIntegralEi[((-I)*(b + d)*(c + d*x))/d])/((b - d)*(b + d)*E^((I*(b
+ d)*(c + d*x))/d)))/(b^2*d*E^(I*a)) + (((-I)*b*d*E^(I*(c + (-b + d)*x))*(b
 + d + b*E^((2*I)*(a + b*x)) - d*E^((2*I)*(a + b*x))))/((b - d)*(b + d)) +
(b*c + I*d)*E^((I*b*c)/d)*ExpIntegralEi[((-I)*(b - d)*(c + d*x))/d] - (b*c
- I*d)*E^((2*I)*a - (I*b*c)/d)*ExpIntegralEi[(I*(b + d)*(c + d*x))/d])/(4*b
^2*d*E^(I*a)) + ((Cos[a + b*x] + b*x*Sin[a + b*x])*SinIntegral[c + d*x])/b^
2
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1239 vs. 2(350) = 700.

Time = 4.06 (sec) , antiderivative size = 1240, normalized size of antiderivative = 3.35

method	result	size
default	Expression too large to display	1240

```
[In] int(x*cos(b*x+a)*Si(d*x+c),x,method=_RETURNVERBOSE)
```

```
[Out] (-Si(d*x+c)/b*(d/b*a*sin(1/d*b*(d*x+c)+(a*d-b*c)/d)-1/b*d*(cos(1/d*b*(d*x+c
)+(a*d-b*c)/d)+(1/d*b*(d*x+c)+(a*d-b*c)/d)*sin(1/d*b*(d*x+c)+(a*d-b*c)/d)))
+1/b*(1/2*a*d^2/(b-d)*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*sin((
-a*d+b*c)/d)/d+Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*cos((-a*d+b*c)/
d)/d)-1/2*d^2*c/(b-d)*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*sin((
```

```
-a*d+b*c)/d)/d+Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*cos((-a*d+b*c)/
d)/d)-1/2*(a*d-b*c)*d/(b-d)*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)
*sin((-a*d+b*c)/d)/d+Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*cos((-a*d
+b*c)/d)/d)-1/2/(b-d)*d*sin((b-d)/d*(d*x+c)+(a*d-b*c)/d)-1/2*a*d^2/(b+d)*(-
Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci((b+d)/
d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d)-1/2*d^2*c/(b+d)*(-
Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci((b+d)/
d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d)+1/2*(a*d-b*c)*d/(b
+d)*(-Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci(
(b+d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d)+1/2/(b+d)*d*
sin((b+d)/d*(d*x+c)+(a*d-b*c)/d)-1/2/b*d^2*(-Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/
d-(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci((b+d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*
c)/d)*sin((-a*d+b*c)/d)/d)+1/2/b*d^2*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*
d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*
sin((-a*d+b*c)/d)/d)))/d
```

Fricas [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 429, normalized size of antiderivative = 1.16

$$\int x\cos(a+bx)\mathrm{Si}(c+dx)\,dx$$
$$= \frac{2\,b^2d\cos(bx+a)\sin(dx+c)+2\,(b^2d-d^3)\cos(bx+a)\,\mathrm{Si}(dx+c)-\Big((b^3c-bcd^2)\,\mathrm{Ci}\left(\frac{bc+cd+(bd+d^2)x}{d}\right)-\cdots}{\cdots}$$

```
[In] integrate(x*cos(b*x+a)*sin_integral(d*x+c),x, algorithm="fricas")
```

```
[Out] 1/2*(2*b^2*d*cos(b*x + a)*sin(d*x + c) + 2*(b^2*d - d^3)*cos(b*x + a)*sin_i
ntegral(d*x + c) - ((b^3*c - b*c*d^2)*cos_integral((b*c + c*d + (b*d + d^2)
*x)/d) - (b^3*c - b*c*d^2)*cos_integral(-(b*c - c*d + (b*d - d^2)*x)/d) + (
b^2*d - d^3)*sin_integral((b*c + c*d + (b*d + d^2)*x)/d) + (b^2*d - d^3)*si
n_integral(-(b*c - c*d + (b*d - d^2)*x)/d))*cos(-(b*c - a*d)/d) - 2*(b*d^2*
cos(d*x + c) - (b^3*d - b*d^3)*x*sin_integral(d*x + c))*sin(b*x + a) - ((b^
2*d - d^3)*cos_integral((b*c + c*d + (b*d + d^2)*x)/d) - (b^2*d - d^3)*cos_
integral(-(b*c - c*d + (b*d - d^2)*x)/d) - (b^3*c - b*c*d^2)*sin_integral((
b*c + c*d + (b*d + d^2)*x)/d) - (b^3*c - b*c*d^2)*sin_integral(-(b*c - c*d
+ (b*d - d^2)*x)/d))*sin(-(b*c - a*d)/d))/(b^4*d - b^2*d^3)
```

Sympy [F]

$$\int x\cos(a+bx)\text{Si}(c+dx)\,dx=\int x\cos\left(a+bx\right)\text{Si}\left(c+dx\right)dx$$

```
[In] integrate(x*cos(b*x+a)*Si(d*x+c),x)
[Out] Integral(x*cos(a + b*x)*Si(c + d*x), x)
```

Maxima [F]

$$\int x\cos(a+bx)\text{Si}(c+dx)\,dx=\int x\cos\left(bx+a\right)\text{Si}\left(dx+c\right)\,dx$$

```
[In] integrate(x*cos(b*x+a)*sin_integral(d*x+c),x, algorithm="maxima")
[Out] integrate(x*cos(b*x + a)*sin_integral(d*x + c), x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 5.04 (sec) , antiderivative size = 206132, normalized size of antiderivative = 557.11

$$\int x\cos(a+bx)\text{Si}(c+dx)\,dx=\text{Too large to display}$$

```
[In] integrate(x*cos(b*x+a)*sin_integral(d*x+c),x, algorithm="giac")
[Out] (x*sin(b*x + a)/b + cos(b*x + a)/b^2)*sin_integral(d*x + c) - 1/4*(b^3*c*re
al_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_pa
rt(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
```

+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*

```
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_
integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_
integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c -
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x
+ d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_par
t(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x -
 d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
```

2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -

1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(-b*x + d*x + c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
 - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integr
al(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*
d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*r
eal_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(cos_integral(b*x
 + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c
*d)/d)^2 - 4*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*real_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
 + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*
(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*re
al_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c

+ c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*rea
l_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*
c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_int
egral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*
real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b
*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +

```
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*
x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*rea
l_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*
c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x
 + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*re
al_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x -
 d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x + c -
```

```
 b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_in
tegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
 b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*imag_part(cos_int
egral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b
^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^3*c*sin_integral((b*d*x +
d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b*c*d^2*s
in_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^
2 + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)*tan(1/2*(b*c + c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*
d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d
*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*
c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x
 - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*im
ag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*
```

c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c
 + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_in
tegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 -
d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(b*x -
d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_pa
rt(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_int
egral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 +
2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x
 + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*sin_inte
gral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2 + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c +
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_in
tegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2
*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x -
d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*ima
g_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/

2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c
*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d) - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*sin_integral((b*d*
x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b
^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*
(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*imag_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d) + 4*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*imag_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) - 8*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 8*d^3*si
n_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_pa
rt(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x
 + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*
sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*ima

g_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/

2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x +

b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b

*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d
)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x
 - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integr
al((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 +
 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1
/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_int
egral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2
tan(1/2(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*sin_integr
al((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_i
ntegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c

```
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c +
 c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integr
al((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part
(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*si
n_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x -
d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x
 + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integr
al((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*
(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
```

(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c
*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x - d^2*
x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_i
ntegral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_int
egral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c
- c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integra
l((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
tan(1/2(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c

```
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c
)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x +
 d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*im
ag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_p
art(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c
*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*
imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integra
```

```
l(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^
2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b
*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral
((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
 b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
+ d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2
*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_
integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/
```

2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
tan(1/2(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)^2 + 4*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*real_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*real_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
) - 4*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*real_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*
d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d) - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + b^3*c*real_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*

```
tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_int
egral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part
(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)
^2 + 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*
real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d
^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^
3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b
*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
+ b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(c
os_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2 + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
```

```
2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 -
 b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 -
 4*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(
1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*r
eal_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
- c*d)/d) - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)
+ 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d
```

*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integr
al(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*
b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4
*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_i
ntegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
- 4*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*
real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d) - 4*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(co
s_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) +
 4*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integ
ral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2
*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2

```
*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*
d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d) + 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - b^
3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b
*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
+ b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d
)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)
/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c -
c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
- c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x -
d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_pa
rt(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)
/d)^2 - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +
```

1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral
(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^
3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part
(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integra
l(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral

(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*
x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*real_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c
*d)/d)^2 + 4*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c +
 c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*real_part(cos_integral(-b*x -
 d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
- c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x -
 d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
 - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*re
al_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b
*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*rea
l_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/

2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d
)/d)^2 + 4*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*real_part(cos_integral(-b*x - d*x -
 c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(cos_
integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*
b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2
*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*real_part(cos_integral(-
b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*rea
l_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c
*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 +
2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1
/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b
*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c
*d)/d)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2
tan(1/2(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan

(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d
*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral
(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_in

```
tegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x + d*x + c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(co
s_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_inte
gral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d
^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x -
d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_pa
rt(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral
(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan
```

(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_int
egral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2
tan(1/2(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(co
s_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_p
art(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*re
al_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*
d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3
*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a +
 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d

)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) -
 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) -
2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*
b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 4*
b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 4*b*c*d^
2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*imag
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b*c*d^2*imag_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*imag_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*imag_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 4*b^3*c*sin_integr
al((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 4*b*c*d^2*sin_integral((
b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - b^2*d*imag_part(cos_integral
(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + d^3*imag_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^2*d*imag_part(cos_integral(b*x - d
*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - d^3*imag_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(

1/2*a - 1/2*c)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2
*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) +
2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/
d) - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c
*d)/d) - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d) + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d) + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d) + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d) + 4*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*d^3*imag_part(cos_integral(b*x + d*x +
 c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*imag_part(cos_
integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4
*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d) + 8*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 8*d^3*sin_integral((b*d*x + d^2*x + b*c
+ c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2

*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^3*c*imag_part(cos_int
egral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*imag_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*imag_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*imag_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^3*c*sin_integral((b*d*x + d
^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b*c*d^2*sin_integral((b*d*x + d^2*x
 + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x +
 c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d) - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d
)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d) + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*
(b*c + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1
/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan
(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
tan(1/2(b*c + c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d
)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*t
an(1/2*(b*c + c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d
)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*t
an(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c

```
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d
)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d
)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c +
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x
 + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x - d^2*x + b
*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b
*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x -
 c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
*tan(1/2*(b*c + c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d
)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c + c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(
b*c + c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
 + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
+ c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c +
```

c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c +
c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d
)^2 - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2
- 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2
tan(1/2(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2
tan(1/2(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c +
c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*
d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*
d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)
/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c

*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4
*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b^2
*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2 - b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
+ d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^
2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*
sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*sin_in
tegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*sin_integr
al((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*sin_integral((b*
d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*
x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2
*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*im
ag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1

/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(
-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d
^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x +
 b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c
 - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d
)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4
*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*sin_inte
gral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*sin_inte
gral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)
+ 4*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c - c*d)/d) + 4*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*imag_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 8*b^2*d*sin_int

```
egral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)
+ 8*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*
(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)
/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)
/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 - c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c
*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)
/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/
d) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)
 + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)
 + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b
*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c
*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*
b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d) + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +
```

1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d) - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d) + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
tan(1/2(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*
c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*
c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x - d*x -
 c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*sin_integral((b*d*x - d^
2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*sin_integral((b*d*x - d^
2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*imag_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*imag
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d) + 4*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*imag_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*b^2*d*sin_int
egral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d) + 8*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*

tan(1/2*(b*c - c*d)/d) - 4*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*imag_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*imag
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d) - 4*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d) - 8*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d
)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 8*d^3*sin_integral((b*d*x - d^
2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*imag_pa
rt(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d) + 4*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d) + 4*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*imag_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*b^2*d*sin_
integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d) + 8*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
tan(1/2(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c -
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c

```
*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x + d
*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x +
 b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x - d^2*x +
 b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c
*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/
2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan
(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*t
an(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c -
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x + c - b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c -
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c -
```

```
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c +
 c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d
)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x + d
*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x - d^2*x +
 b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x - d^2*x +
 b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2
*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b
*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*
c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
- c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
- c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)
/d)^2 + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^
```

2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c
+ c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c +
c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c -
c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*
d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c +
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c -
 c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*
d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d
)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/

```
d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/
d)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 +
 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b
^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
- c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c
*d)/d)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d
)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^
2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 +
b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^
3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*
d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_inte
gral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((
b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b
^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*
imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*ima
g_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_par
t(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
```

/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_i
ntegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_int
egral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x +
 d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x
 + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b
*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c
*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 -
 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_in
tegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part
(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*
d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
+ 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^
2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)
/d)^2 + 4*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d
)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*imag_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*imag_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^
2 + 4*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*
tan(1/2*(b*c - c*d)/d)^2 + 8*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)
/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*ta
n(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*d^3*sin_integral((b*d*x +
 d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*
imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan

(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d
^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^
3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*
b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
- 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 +
4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 -
2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 +
2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^
2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d
)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*
d)/d)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)
/d)^2 + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)
/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d
)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c -
c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
- c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(
b*c - c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*
c - c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*
c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b
*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2
*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1
/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c
/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*t
an(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/
d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan

(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/
d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan
(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*imag_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*imag_
part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)
/d)^2 + 4*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*
tan(1/2*(b*c - c*d)/d)^2 + 8*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)
/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*d^3*sin_integral((b*d*x + d^2
*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*imag_par
t(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^
2 - 4*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1
/2*(b*c - c*d)/d)^2 - 4*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*imag_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^2*d*sin_i
ntegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^
2 - 8*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*
(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*
c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
 - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c -
 c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c -
 c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/
d)^2 + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c

```
*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x
+ b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*
x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x -
d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x
- d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_in
tegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos
_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*sin_in
tegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*sin_in
tegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_par
t(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*
c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^
2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*
```

tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*
d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)
/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)
/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^
2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(c
os_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part

```
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_i
ntegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_int
egral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_int
egral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integ
ral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b
*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c -
 b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)
^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c
 - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c
 - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*im
ag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*ima
g_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_p
```

```
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_inte
gral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral
((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4
*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c - b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d
)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/
d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos
_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*
```

```
c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(co
s_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(co
s_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_in
tegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_inte
gral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_inte
gral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integr
al((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*
x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1
/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*
a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*
a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/
2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4
*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4
*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*
```

x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x -
 d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/
2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
 4*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2 - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^3*c*real_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^3*c*real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_integral(-b
*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2 - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c) + 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*

```
a - 1/2*c) - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c) + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c) + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part
(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*real_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
 1/2*c)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*real
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a - 1/2*c)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b*
c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*real_part(cos_i
ntegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*d^3*real_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*real_part(cos_integral(
-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*d^3*real_part(cos_integral(-b*x
 - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - b^3*c*real_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*real_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 +
 b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*real_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^3
*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
```

/2*a - 1/2*c)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*r
eal_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*real_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 4*b^3*c*rea
l_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*re
al_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*rea
l_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*r
eal_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*r
eal_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*re
al_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*r
eal_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*r
eal_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d
*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*
real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d
*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3
*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3
*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*
real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*real_
part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*real_pa
rt(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*real_part(c
os_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*real_part(cos_
integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*real_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*real_part(cos_integra

l(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*real_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*real_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x - d*x
 - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*real_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*real_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d) - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d) - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d) - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^
2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c +
 c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^
2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_int
egral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*
c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b
*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*
c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(
b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(
b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^
2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d

```
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 -
 b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2
*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
+ b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x - d*x -
 c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(
b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c +
 c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c
*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/
```

d)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x

+ d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(

```
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part
(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part
(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_pa
rt(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_i
ntegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(-b*x + d*x
 + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x
 + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_i
ntegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_i
ntegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
```

)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part
(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part
(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integ
ral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*x

+ d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2

*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*rea
l_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b
*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integr
al(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*
d)/d)^2 - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_
part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3

```
*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integ
ral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
+ b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c
*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x
 - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2
*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
- c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1
/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x - d*x -
 c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/
d)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^
2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d
)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c
```

+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*

c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos
_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*real_part(cos
_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*real_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b
*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*
x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*rea
l_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2
tan(1/2(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*re
al_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c +
 b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*r
eal_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integ
ral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)

```
^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c -
 b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*
real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_int
egral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x +
 c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x
 + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*
x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x - d*
x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x
 + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2
*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*rea
l_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*
x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c
*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c -
 b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 + 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
```

)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d)^2 - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
 + 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3
*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integ
ral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
+ b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x
 - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
tan(1/2(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
) + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 2*b^3*c*imag_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 2*b*c*d^2*imag_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c) - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*

x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 4*b*c*d^2*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) - b^2*d*imag_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^2*d*imag_par
t(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + d^3*imag_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*imag_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^2*d*imag_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - 2*b^2*d*si
n_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + 2*d^3*sin_integral((b*d*x + d^2*x +
b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + 2*d^3*sin_in
tegral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + 2*b^3*c*imag_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*imag_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a - 1/2*c) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 4*b*c*
d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*b^3*c*imag_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*imag_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 4*b*c*d^2*sin_inte
gral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c) + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) -
2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*

d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*imag_part(cos_inte
gral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c) + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 4*b
^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 4*b*c*d^2*sin_integral((b*d*x - d^
2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c) - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + b^2*d*imag_pa
rt(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - d^3*imag_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
 1/2*c)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - d^3*imag_par
t(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*imag_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 - 1/2*c)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*imag_
part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*imag_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a - 1/2*c)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - 2*d^3*sin
_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x
+ b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 - 1/2*c)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - 2*b^3*c*imag_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2
*c)^2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*imag_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
 1/2*c)*tan(1/2*a - 1/2*c)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c +
c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 +
4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b^3*c*imag_part(cos_integra
l(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1
/2*a - 1/2*c)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*imag_part(cos_integral(-b

*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*
a - 1/2*c)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 4*b*c*d^2*sin_in
tegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)*tan(1/2*a - 1/2*c)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 4*b*d^2*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)
^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + d^3*imag_part(cos_integ
ral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*a - 1/2*c)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - d^3*im
ag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*imag_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
1/2*c)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^2*d*imag_part(c
os_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2
- 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 2*d^3*sin_integral((b*d*x +
d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*d^3*sin_in
tegral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*
x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 4*b*d^2*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + d^3*imag_part(cos_int
egral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - d^3*
imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*imag_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^2*d*imag_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 2*d^3*sin_integral((b*d*x
+ d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(

1/2*a - 1/2*c)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*d^3*sin_
integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 4*b*d^2*tan(1/2*
b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*i
mag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 2*b^3*c*imag_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c +
c*d)/d) + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*sin
_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 4*b^2*d*imag_part(cos_integral(b*x
 + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*d^3*imag_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*imag_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*d^3*imag_part(cos_integral(-b*x - d*
x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 8*b^2*d*sin_integral((b*d*x + d^2*x + b*
c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)*tan(1/2*(b*c + c*d)/d) - 8*d^3*sin_integral((b*d*x + d^2*x + b*c + c*
d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*
tan(1/2*(b*c + c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) +
 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*imag_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
c*d)/d) - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b*c*d^2*sin_int
egral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x + d*x +
 c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c
*d)/d) + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*imag_
part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2

```
*(b*c + c*d)/d) - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b*c*d^2
*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x
 + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^3
*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*imag_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2
*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/
d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4
*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*imag_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*imag_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c
 + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d) - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^2*d*imag_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1
/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*d^3*imag_part(cos_int
egral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*imag_part(cos_integral
(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*d^3*imag_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 8*b^2*d*sin_integral((b*d*x + d^2*x + b*
c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d) - 8*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d) + 4*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d) - 4*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d) - 4*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) +
 4*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 8*b^2
*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 8*d^3*sin_int
```

egral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*

tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(
1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2
+ 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b*c*d^2*sin_integral((b
*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*ta
n(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)
/d)^2 + b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x +
b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*sin_int
egral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c
- c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a +
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*ima
g_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*i
mag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(-b*

```
x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3
*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^
2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*t
an(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*imag_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2
 - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*imag_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c
 - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/
d)^2 - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c
*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x - d^2
*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
 + c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*
(b*c + c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*imag_part(cos_integ
ral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2
*(b*c + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*
c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b
*c + c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/
2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b*c*d^2*sin_
integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*b*
```

x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/
d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c +
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x + c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x - d*x -
 c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*sin_inte
gral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c
 - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d
*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x
 - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*
d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2
*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*d^3*si

n_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^
2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c
*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(
-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b^3*c*
sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x +
 b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d)^2 + 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2 - d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integr
al(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*ima
g_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a +
 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*
d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 -
2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d
^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2*
b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b*d^2*tan(1/2*
b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x

+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*i
mag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c -
c*d)/d) - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*sin
_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3
*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_inte
gral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
tan(1/2(b*c - c*d)/d) - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 4
*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)
+ 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c
- c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d
)/d) + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*d^3*imag_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*imag_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*imag_part(cos_in
tegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 8*b^2*d*sin_integral((b*
d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 8*d^3*sin_integral((b*d*x -
d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*imag_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*d^3*imag_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2

*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*imag_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c - c*d)/d) - 4*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c - c*d)/d) - 8*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c -
c*d)/d) + 8*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) -
4*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*d^
3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*ima
g_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*imag_part
(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 8*b^2*d*sin_integral(
(b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 8*d^3*sin_integral((b*d*x - d
^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
- c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*
d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*
b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_i
ntegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*
d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)
- 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*
b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integ

```
ral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*
sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*
b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*sin_integral((b*d*x - d^2*x +
b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d) + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c
*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c
 - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*
c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*sin_integral((b*d*x
 - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) +
 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d) - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*sin_int
egral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*imag_part(cos_integral(b*x - d*x -
 c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*d^3*imag_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*imag_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*imag_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d) - 8*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)
/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*ta
```

n(1/2*(b*c - c*d)/d) + 8*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d) - 4*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d) + 4*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d) + 4*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d) - 4*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
 c*d)/d) - 8*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d) + 8*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) -
 4*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*d^
3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*ima
g_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*d^3*imag_part
(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*b^2*d*sin_integral(
(b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 8*d^3*sin_integral((b*d*x - d
^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*
d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + b^2*d*imag_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2
+ b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*
c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2

```
*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d
*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c
*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d
)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_in
tegral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x +
 b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b
*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d
^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(
1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2
- 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b
*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*ta
n(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 +
 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2
*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*
d)/d)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_int
egral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1
/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*
c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x -
 d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b
*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*ima
g_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
```

(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*i
mag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x +
d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2
*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d
*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*
x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*
c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b
^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integra
l(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 -
d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integr
al(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 +
b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
tan(1/2(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d
)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
+ 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*
d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*t
an(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4
*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
tan(1/2(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c
*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x - d^2
*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
- c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*im

ag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*
(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*
c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d
*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(
1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*
b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*
tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
tan(1/2(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2
+ 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_i
ntegral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d
)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*
d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
 - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*im
ag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x
 - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*
sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2

```
*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integra
l(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^
2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 -
d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d
*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 +
2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d
*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c
 + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2
*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c -
b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 -
4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x +
 d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*ta
n(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c -
```

```
c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a +
1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b
^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_
part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x +
b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)
/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b
*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*
tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*
tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b
*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c +
c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(
b*c - c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c
*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d
)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c
 + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c
*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^
2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*sin_integral((b*d
*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*
tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*
d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d
)^2 + 4*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x +
```

1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)
^2 - 4*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
- 4*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
+ 4*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 +
8*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*d^
3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*im
ag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*imag_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*imag_p
art(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*imag_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^2*d*sin_inte
gral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*d^3*sin_integral((
b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*t
an(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*ta
n(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c
*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c
 + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/
d)^2 + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/
2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x
 + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c
*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*im
ag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2
*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
 - c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*im
ag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3*imag_part

```
(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*imag_part(cos_
integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*d^3*imag_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^2*d*sin_integral((b*d*x + d^
2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*d^3*sin_integral((b*d*x + d^2*x + b*c
+ c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*ta
n(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c +
 c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x
- c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3
*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c -
 b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2
*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*
b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
- d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c
*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
 - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*
```

imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^

```
2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)
/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
+ 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1
/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2
*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b
^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_in
tegral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d
)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 +
 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*a + 1/2*c)^2*tan(
1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*im
ag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*ima
g_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x
 + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*
imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b
*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/
2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^
3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d
^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/
```

2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*

```
real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
 - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*d^3*real_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a - 1/2*c) - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c
) + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^2*d*real_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c) + 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*b^
2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*d^3*real_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c) - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*d^3*real_pa
rt(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*b^2*d*real_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c) + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + b^3*c*real_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2
 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c +
b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_integral(-b*x + d
*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*real_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b*c
*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a - 1/2*c)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^
2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*real_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
 1/2*c)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2
```

*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d

))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2
*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*real_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d) - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) +
2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*real_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
- 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*real_part(cos_i
ntegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
- 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*real_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c
)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*real_part(cos_integral(b*x + d*x + c +
 b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/
d) + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*real_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*real_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d) + 4*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/
2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*real_part(cos_
integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d) + 4*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b*c*
d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(
1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*real_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d) - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*real_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/
2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*real_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
 - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x +
 c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_int

egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)
/d)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c
*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_pa
rt(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b
*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integr
al(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^
2 - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*r
eal_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c
/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1
/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/
d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a +
1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*
d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x - d*x
 - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c
*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a +
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(
1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*
d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2 - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x +
1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x + d*x +

c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)
/d)^2 + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part
(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)
/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part
(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a -
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/
d)^2 + 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_i
ntegral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/
d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - b^3*
c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1
/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integ
ral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 -
 b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b*c*d^2*real_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x -
d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*r
eal_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a +
 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d
)/d) - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1
/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_pa
rt(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*d^
3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral
(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan

(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b
^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2
*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4
*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_in
tegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)
tan(1/2(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) +
4*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_in
tegral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)
tan(1/2(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(-b*x + d*x + c -
 b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)
 - 4*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1
/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2
*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(b*x -
 d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c - c*d)/d) + 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*rea
l_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*re
al_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d
*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(b*x -
d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c -

c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b

*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c
 - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integra
l(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2
 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x -
 c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*re
al_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_
integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c
*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b
*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 +
2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_inte
gral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*ta
n(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2
 - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_i
ntegral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)
tan(1/2(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*
c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2
 + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c
)*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)
/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/
2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x - d*x
 - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_pa
rt(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
 - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d
^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan
(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 -
2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)
^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_inte
gral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c

```
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 +
 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*t
an(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b
*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2
 - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d
))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2
*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
- c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x
+ d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*r
eal_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral
(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b
*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2
*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d
)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a +
 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos
_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2
*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral
(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*ta
n(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
 - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c
 + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(
b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^
2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_int
egral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)
```

```
/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(cos_integral(b*x + d*x + c
 + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)
^2 - 4*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1
/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*real_part(c
os_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)
/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^2*real_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)
/d)^2 + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*
d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a +
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_pa
rt(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*
d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_pa
rt(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x + d*x
 + c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*
real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c
*d)/d)^2 + b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 -
b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*rea
l_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1
/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*rea
l_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*r
eal_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*
x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
```

b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - d^3*imag_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 -
 b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x
)^2*tan(1/2*b*x - 1/2*d*x)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + b^2*d*imag_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - b^2*d*imag_part(cos_integral(-b
*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 +
d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*b*x - 1/2*d*x)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*
d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - 2*d^3*sin_integra
l((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + 2*d^3*sin_integral((b*d*x - d^2*x +
b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - 2*b^3*c*i
mag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c) + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 2*b^3*c*imag_part(cos_integral
(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 2*b
*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a + 1/2*c) - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/
d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 4*b*c*d^2*sin_integral((b*
d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 2
*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c) + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 2*b^3*c*imag_part(cos_
integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c) - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c
 + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 4*b*c*d^2*sin_inte
gral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/
2*c) + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
+ 1/2*c) - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*a + 1/2*c) - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + d^3*imag_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^2*d*imag
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^2*d*imag_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*imag
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*a + 1/2*c)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*imag_part(cos_integral(-b*x

```
 - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - 2*b^2*
d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*a + 1/2*c)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - 2*b^2*d*sin_integral((b*d*x - d^2
*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + 2*d^3*si
n_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
a + 1/2*c)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(
1/2*a + 1/2*c)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*
tan(1/2*a + 1/2*c)^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + d^3*imag_part(cos_integral
(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^
2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a + 1/2*c)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^2*d*imag_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 -
d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a + 1/2*c)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - d^3*imag_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2
 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d
)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - 2*b^2*d*sin_integral((b*d
*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 +
2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a + 1/2*c)^2 + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b*c*d^2*imag_par
t(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a -
 1/2*c) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*imag_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 4*b^3*c*s
in_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a - 1/2*c) - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*b^3*c*imag_part(cos_integral(b*x -
 d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b*c*d^2*
imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a - 1/2*c) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*t
an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*imag_part(cos_integr
al(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 4
*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a - 1/2*c) - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 4*b^2*d*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 4*b*d^2*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*b^3*c*imag_part(co
```

s_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)
- 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c) - 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b
*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*b*c*d^2*imag_part(cos_in
tegral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 4
*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan
(1/2*a - 1/2*c) - 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + b^2*d*imag_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - d^3*imag_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
 - 1/2*c)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - d^3*imag_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*imag_
part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a - 1/2*c)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*imag_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + d^3*ima
g_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a - 1/2*c)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - 2*d^3*sin_integral((b*d*x + d^2*
x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*s
in_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a - 1/2*c)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2
*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)^2 + b^2*d*imag_part(cos_integral
(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - d^
3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a - 1/2*c)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - d^3*imag_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2
*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a - 1/2*c)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*imag_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 +
 d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)
^2*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/
d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - 2*d^3*sin_integral((b*d*
x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 2
*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2
*tan(1/2*a - 1/2*c)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*t

an(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*
x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + 4*b*d^2*tan(1/2*b*x + 1/
2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - 2*b^3*c*imag_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2
+ 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*
c)*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b*c*d^2*imag_part(cos_in
tegral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 4
*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1
/2*a - 1/2*c)^2 + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan
(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - b^2*d*imag_part(cos_integral(b*x + d
*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + d^3*imag_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*
c)^2*tan(1/2*a - 1/2*c)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/
d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d*imag_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + d^3*
imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/
2*a - 1/2*c)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - d^3*imag_part(cos_integral(-b*x - d
*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*b^2*d*sin_in
tegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/
d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 2*d^3*sin_integral((b*d*x -
d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 4*b^2*d*t
an(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 4*b*d^2*t
an(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 4*b^2*d*t
an(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - 4*b*d^2*t
an(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*i
mag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(
1/2*(b*c + c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 2*b^3*c*imag_part(cos_
integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c
*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*
b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*sin_integral((b*d*x + d^2
*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 4*b*c*
d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*(b*c + c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*imag_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c +

c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-
b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 4
*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2
tan(1/2(b*c + c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d
)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 4*b^2*d*imag_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2
*c)*tan(1/2*(b*c + c*d)/d) - 4*d^3*imag_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) -
 4*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*d^3*imag_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*t
an(1/2*(b*c + c*d)/d) + 8*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 8*d^3
*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*b^2*d*imag_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c
 + c*d)/d) - 4*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*imag_pa
rt(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*d^3*imag_part(cos_integral(-b*x - d*x
- c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*
d)/d) + 8*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 8*d^3*sin_integral((b
*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*ta
n(1/2*(b*c + c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*imag_part(cos_in
tegral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
+ 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^3*c*sin_integ
ral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)
/d) + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2
*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c
 + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*imag_par
t(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a
 - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*s
in_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*b^2*d*imag_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c
*d)/d) - 4*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1
/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*imag_part(cos_i

ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c + c*d)/d) + 4*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 8*b^2*d*
sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 8*d^3*sin_integral((b*d*x + d^2*x + b*c +
 c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - b
^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^
2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c +
c*d)/d)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*
imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*ta
n(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_i
ntegral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*
d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x +
b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*s
in_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x
+ 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(
b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 +
 d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c -
b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c
+ c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2
*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2
*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2
tan(1/2(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/
d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*sin_integral
((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d
)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^3*c*imag_part(cos_i
ntegral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2

```
 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2
*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(-b*x - d*x -
c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*imag_pa
rt(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c +
c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a +
 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b*c*d^2*sin_integral((b*d*x + d^2*x +
b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2
*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b*d^2*tan
(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b
*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 +
 b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d
))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_inte
gral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
 - b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x - d*x - c - b
*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*sin_integral
((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2
*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d
)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*
d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 +
 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d)^2 + 4*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c +
 c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^
3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(
1/2*(b*c + c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b^3*c*sin_integral((b
*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 -
4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c
)*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2*a + 1/2*c)^2*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*a + 1/2*c)^2*tan(1
```

```
/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x +
 d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(b*x -
d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*ima
g_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1
/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - d^3*i
mag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2
*(b*c + c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^
2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d
*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan
(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*
d*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x -
1/2*d*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*a
+ 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*a
+ 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c
- c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) -
2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c
- c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*sin_i
ntegral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*
c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) +
 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x
 + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*si
n_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*
(b*c - c*d)/d) + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b
*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*
tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)
```

/d) - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c -
c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*imag_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*
c)*tan(1/2*(b*c - c*d)/d) + 4*d^3*imag_part(cos_integral(b*x - d*x - c + b*
c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) +
4*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*imag_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*ta
n(1/2*(b*c - c*d)/d) - 8*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*
tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 8*d^3*
sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*imag_part(cos_integral(b*x -
d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
- c*d)/d) + 4*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*
x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*imag_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*imag_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d
)/d) - 8*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 8*d^3*sin_integral((b*
d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)*tan
(1/2*(b*c - c*d)/d) - 4*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*d^3*im
ag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*imag_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)
/d) - 4*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 8*b^2*d*sin_integral((b*d
*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*
(b*c - c*d)/d) + 8*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*
a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*
d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a
- 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x + d
*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*im
ag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c - c*d)/d) + 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x - d^2
*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*b^3*c*im
ag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_i
ntegral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(

```
b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*sin_integral((b*d*x - d^2*
x + b*c - c*d)/d)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b*c*d
^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d) - 4*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*d^
3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*imag_part(cos_integral(-
b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2
*(b*c - c*d)/d) - 4*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 8*b^2*d*s
in_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 8*d^3*sin_integral((b*d*x - d^2*x + b*
c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d) + b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral
(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2
 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b
*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/
2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d
^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*
b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d
)*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*(b*c - c*d)/d)^2 + b^2*d
*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_in
tegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)
/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/
2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x
 + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/
2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d
)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c
```

+ c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/

d)^2 + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/
2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
- 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integra
l(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - d
^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(
1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^
2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
+ d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*
tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)
/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d
*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 -
2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*ta
n(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d
*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1
/2*d*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x
 - 1/2*d*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b*d^2*tan(1/2
*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan
(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan
(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b^3*c*ima
g_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)*tan(1/2*
(b*c - c*d)/d)^2 - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))
tan(1/2(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^3*c*imag_part(cos_in
tegral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/
d)^2 + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b
*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^3*c*sin_integral((b*d*x + d^2*x
 + b*c + c*d)/d)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b*c*d^
2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b*c + c*d)/d)*tan(1/
2*(b*c - c*d)/d)^2 + 4*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))
*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*d^3
*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*
(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*imag_part(cos_integral(-b
*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b
*c - c*d)/d)^2 + 4*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(
1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 8*b^2*d*si

```
n_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c +
 c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 8*d^3*sin_integral((b*d*x + d^2*x + b*c
 + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)
^2 - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c
 + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
+ d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c
- b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part
(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2
*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^
2*x + b*c + c*d)/d)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*b
^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)
*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x +
1/2*d*x)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/
2*b*x + 1/2*d*x)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*
d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2
+ 4*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d)^2 - 4*b^2*d*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 + 4*b*d^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(
b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*t
an(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/
d))*tan(1/2*b*x + 1/2*d*x)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c
 + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - b^3*c*real_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 + b*c*d^2*real_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - b^3*c*real_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 + b*c*d^2*real_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 + b^3*c*real_
part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - b*c*d
^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2
 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d
*x)^2 - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2
*b*x - 1/2*d*x)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*b*x - 1/2*d*x)^2 - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*
c/d))*tan(1/2*b*x - 1/2*d*x)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x
+ c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 + b^3*c*real_part(cos_integral(-b*x
- d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 - b*c*d^2*real_part(cos_integr
```

al(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 + 2*b^2*d*real_part(co
s_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2
*c) - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/
2*d*x)^2*tan(1/2*a + 1/2*c) + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c
 - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 2*d^3*real_part(co
s_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/
2*c) + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 2*d^3*real_part(cos_integral(b*x + d*x + c
 + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) + 2*b^2*d*real_part(
cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a +
1/2*c) - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*a + 1/2*c) - b^3*c*real_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x
 + c + b*c/d))*tan(1/2*a + 1/2*c)^2 - b^3*c*real_part(cos_integral(b*x - d*
x - c + b*c/d))*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_integral(b*x -
 d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2 - b^3*c*real_part(cos_integral(-b*x
 + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_integral(
-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2 - b^3*c*real_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2 + b*c*d^2*real_part(cos_int
egral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2 - 2*b^2*d*real_part(cos
_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*
c) + 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c
- b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*d^3*real_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2
*c) - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a - 1/2*c) + 2*d^3*real_part(cos_integral(b*x - d*x - c
+ b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^2*d*real_part(c
os_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1
/2*c) + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 2*b^2*d*real_part(cos_integral(b*x - d*x -
 c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 2*d^3*real_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) -
2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c) + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + b^3*c*real_part(cos_integral(b*
x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_integral
(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2 + b^3*c*real_part(cos_integra
l(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos_inte
gral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2 + b^3*c*real_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2 + b^3*c*real_part(c
os_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2 - b*c*d^2*real_pa
rt(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*rea
l_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a -

1/2*c)^2 - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/

2*(b*c + c*d)/d)^2 - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^
2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(
1/2*(b*c + c*d)/d)^2 + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d)
)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*b^2*d*real_part(cos_integ
ral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)
 - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_pa
rt(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(
b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2
*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(-b*x + d*x + c -
 b*c/d))*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_par
t(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c -
c*d)/d) - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a +
1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x + d*x
 + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_par
t(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c -
 c*d)/d) - 4*b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a
 - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*real_part(cos_integral(b*x - d
*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*real_p
art(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c -
 c*d)/d) + 4*b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 2*b^2*d*real_part(cos_integral(b*x -
d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_
part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 - c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*d^3*real_part(cos_integral(-b*x +
 d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*re
al_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1
/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*ta
n(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d
) - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d) + b^3*c*real_part(cos_integral(b*x + d*x + c
 + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_integral(b*x +
d*x + c + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b
*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(co
s_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 - b*c*d^2*real
_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + b^3*

```
c*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2
- b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c - c*
d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a
+ 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(b*x + d*x
+ c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_pa
rt(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c -
c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a
 + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(b*x - d
*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_p
art(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c -
c*d)/d)^2 + 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2
*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*real_part(cos_integral(-b*x +
d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*rea
l_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)*tan(1/2*
(b*c - c*d)/d)^2 + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan
(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*b^2*d*real_part(cos_integr
al(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2
 + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d
)/d)*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x + d*x + c
+ b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - d^3*imag_part(cos_integral(b*x + d*x +
 c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - b^2*d*imag_part(cos_integral(b*x -
d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 + d^3*imag_part(cos_integral(b*x
 - d*x - c + b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 + b^2*d*imag_part(cos_integra
l(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - d^3*imag_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 - b^2*d*imag_part(c
os_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 + d^3*imag_pa
rt(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x + 1/2*d*x)^2 + 2*b^2*d
*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2 - 2*d
^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2 - 2
*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)^2
 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*x + 1/2*d*x)
^2 + 4*b^2*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x) + 4*b*d^2*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x) + b^2*d*imag_part(cos_integral(
b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 - d^3*imag_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 - b^2*d*imag_part(cos_i
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 + d^3*imag_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 + b^2*d*imag_pa
rt(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 - d^3*ima
g_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2 - b^2
*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*x)^2
 + d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*b*x - 1/2*d*
x)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x - 1/
2*d*x)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*b*x -
1/2*d*x)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*b*
x - 1/2*d*x)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*
```

b*x - 1/2*d*x)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2
+ 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*b*x - 1/2*d*x)^2 - 2*b^3*c*imag_pa
rt(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c) + 2*b*c*d^2*imag
_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c) + 2*b^3*c*ima
g_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c) - 2*b*c*d^2
*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c) - 4*b^3
*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c) + 4*b*c*d
^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c) + 4*b^2*d
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c) - 4*b*d^2*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*a + 1/2*c) - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*
c) + 4*b*d^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c) - b^2*d*imag_part(
cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2 + d^3*imag_part(c
os_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2 - b^2*d*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2 + d^3*imag_part(c
os_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2 + b^2*d*imag_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2 - d^3*imag_part(
cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2 + b^2*d*imag_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2 - d^3*imag_par
t(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2 - 2*b^2*d*sin_
integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2 + 2*d^3*sin_in
tegral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2 - 2*b^2*d*sin_in
tegral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2 + 2*d^3*sin_inte
gral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2 + 4*b^2*d*tan(1/2*
b*x + 1/2*d*x)*tan(1/2*a + 1/2*c)^2 - 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/
2*a + 1/2*c)^2 + 4*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2 + 4*b*
d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a + 1/2*c)^2 + 2*b^3*c*imag_part(cos_int
egral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c) - 2*b*c*d^2*imag_part(cos_
integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c) - 2*b^3*c*imag_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c) + 2*b*c*d^2*imag_part
(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c) + 4*b^3*c*sin_int
egral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c) - 4*b*c*d^2*sin_int
egral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c) + 4*b^2*d*tan(1/2*b
*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a - 1/2*c) - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) - 4*b*d
^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c) + 4*b^2*d*tan(1/2*a + 1/2*c)
^2*tan(1/2*a - 1/2*c) + 4*b*d^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + b
^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2 -
d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2 + b
^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2 -
d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2 - b
^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2 +
d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2 -
b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2
+ d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2
+ 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2

- 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a - 1/2*c)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*a - 1/2*c)^2 - 4*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)^2 - 4*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*a - 1/2*c)^2 - 4*b^2*d*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 4*b*d^2*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*b^3*c*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d) - 2*b^3*c*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d) + 4*b^3*c*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b*c + c*d)/d) - 4*b*c*d^2*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b*c + c*d)/d) + 4*b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 4*b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 4*d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) + 8*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - 8*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d) - b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 + b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b*c + c*d)/d)^2 + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*(b*c + c*d)/d)^2 - 4*b^2*d*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b^2*d*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*b*d^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*b^3*c*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d) + 2*b*c*d^2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d) + 2*b^3*c*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d) - 2*b*c*d^2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d) - 4*b^3*c*sin_integral((b*d*x - d^2*x + b*c - c*d

)/d)*tan(1/2*(b*c - c*d)/d) + 4*b*c*d^2*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b*c - c*d)/d) - 4*b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 4*b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 8*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + 8*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 - d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 - b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*b*x + 1/2*d*x)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x + 1/2*d*x)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*b*x - 1/2*d*x)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*b*x - 1/2*d*x)*tan(1/2*(b*c - c*d)/d)^2 - 4*b^2*d*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b^2*d*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 4*b*d^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + b^3*c*real_part(cos_integral(b*x + d*x + c + b*c/d)) - b*c*d^2*real_part(cos_integral(b*x + d*x + c + b*c/d)) - b^3*c*real_part(cos_integral(b*x - d*x - c + b*c/d)) + b*c*d^2*real_part(cos_integral(b*x - d*x - c + b*c/d)) - b^3*c*real_part(cos_integral(-b*x + d*x + c - b*c/d)) + b*c*d^2*real_part(cos_integral(-b*x + d*x + c - b*c/d)) + b^3*c*real_part(cos_integral(-b*x - d*x - c - b*c/d)) - b*c*d^2*real_part(cos_integral(-b*x - d*x - c - b*c/d)) + 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c) - 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c) + 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c) - 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c) - 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c) + 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c) - 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c) + 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c) - 2*b^2*d*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d) + 2*d^3*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d) - 2*b^2*d*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c *d)/d) + 2*d^3*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d) + 2*b^2*d*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d) + 2*b^2*d*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d) - 2*d^3*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d) + b^2*d*imag_part(cos_integral(b*x + d*x + c + b*c/d)) - d^3*imag_part(cos_integral(b*x + d*x + c + b*c/d)) - b^2*d*imag_part(cos_integral(b*x - d*x - c + b*c/d)) + d^3*imag_part(cos_integral(b*x - d*x - c + b*c/d)) + b^2*d*imag_part(cos_integral(-b*x + d*x + c - b*c/d)) - d^3*imag_part(cos_integral(-b*x + d*x + c - b*c/d)) - b^2*d*imag_part(cos_integral(-b*x - d*x - c - b*c/d)) + d^3*imag_part(cos_integral(-b*x - d*x - c - b*c/d)) + 2*b^2*d*sin_integral((b*d*x + d^2*x + b*c + c*d)/d) - 2*d^3*sin_integral((b*d*x + d^2*x + b*c + c*d)/d) - 2*b^2*d*sin_integral((b*d*x - d^2*x + b*c - c*d)/d) + 2*d^3*sin_integral((b*d*x - d^2*x + b*c - c*d)/d) - 4*b^2*d*tan(1/2*b*x + 1/2*d*x) + 4*b*d^2*tan(1/2*b*x + 1/2*d*x) + 4*b^2*d*tan(1/2*b*x - 1/2*d*x) + 4*b*d^2*tan(1/2*b*x - 1/2*d*x) - 4*b^2*d*tan(1/2*a + 1/2*c) + 4*b*d^2*tan(1/2*a + 1/2*c) + 4*b^2*d*tan(1/2*a - 1/2*c) + 4*b*d^2*tan(1/2*a - 1/2*c))/(b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*

x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*
tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1
/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x -
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2
*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(
b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*
x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2
tan(1/2(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/
2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)
^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*
c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
- 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x +
 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan
(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x -
1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d
)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*ta
n(1/2*a + 1/2*c)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x
)^2*tan(1/2*a + 1/2*c)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2
*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x
 - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1

/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan
(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*
d*x)^2*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*
x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(
1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*
tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^
2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^
2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)
/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan
(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*
b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*
tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d
*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1
/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b
*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1
/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3
*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b
^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2
 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d
)/d)^2 + b^4*d*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d
)/d)^2 - b^2*d^3*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c
*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^
2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c +
c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*a + 1/2*c)^2*t
an(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*a + 1/2*
c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/
2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*ta
n(1/2*b*x + 1/2*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 - b^2*d^3*tan(1/2*b*x + 1/2
*d*x)^2*tan(1/2*b*x - 1/2*d*x)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a
 + 1/2*c)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 + b^4*d
*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*a + 1/2*c)^2 - b^2*d^3*tan(1/2*b*x - 1/2*
d*x)^2*tan(1/2*a + 1/2*c)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/
2*c)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(
1/2*b*x - 1/2*d*x)^2*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^
2*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 -
b^2*d^3*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(1/2*b*x + 1/2

```
*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*tan(1/2
*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2
 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/
2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*a + 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2
- b^2*d^3*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*b*x
 + 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*b*x + 1/2*d*x)^2*t
an(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d
)/d)^2 - b^2*d^3*tan(1/2*b*x - 1/2*d*x)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*
tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*a + 1/2*c)^
2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)
/d)^2 - b^2*d^3*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1
/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - b^2*d^3*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 + b^4*d*tan(1/2*b*x + 1/2*d*x)^2 - b^2*d^3*ta
n(1/2*b*x + 1/2*d*x)^2 + b^4*d*tan(1/2*b*x - 1/2*d*x)^2 - b^2*d^3*tan(1/2*b
*x - 1/2*d*x)^2 + b^4*d*tan(1/2*a + 1/2*c)^2 - b^2*d^3*tan(1/2*a + 1/2*c)^2
 + b^4*d*tan(1/2*a - 1/2*c)^2 - b^2*d^3*tan(1/2*a - 1/2*c)^2 + b^4*d*tan(1/
2*(b*c + c*d)/d)^2 - b^2*d^3*tan(1/2*(b*c + c*d)/d)^2 + b^4*d*tan(1/2*(b*c
- c*d)/d)^2 - b^2*d^3*tan(1/2*(b*c - c*d)/d)^2 + b^4*d - b^2*d^3)
```

Mupad [F(-1)]

Timed out.

$$\int x\cos(a+bx)\mathrm{Si}(c+dx)\,dx=\int x\,\mathrm{sinint}(c+d\,x)\,\cos\left(a+b\,x\right)\,dx$$

```
[In] int(x*sinint(c + d*x)*cos(a + b*x),x)
```

```
[Out] int(x*sinint(c + d*x)*cos(a + b*x), x)
```

3.67 $\int \cos(a+bx)\mathbf{Si}(c+dx)\,dx$

Optimal result

Integrand size = 13, antiderivative size = 153

$$\int \cos(a+bx)\text{Si}(c+dx)\,dx = -\frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b} + \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b} + \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b} + \frac{\sin(a+bx)\text{Si}(c+dx)}{b} - \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b}$$

```
[Out] -1/2*Ci(c*(b-d)/d+(b-d)*x)*cos(a-b*c/d)/b+1/2*Ci(c*(b+d)/d+(b+d)*x)*cos(a-b
*c/d)/b+1/2*Si(c*(b-d)/d+(b-d)*x)*sin(a-b*c/d)/b-1/2*Si(c*(b+d)/d+(b+d)*x)*
sin(a-b*c/d)/b+Si(d*x+c)*sin(b*x+a)/b
```

Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 153, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.385, Rules used

$= \{6652, 4513, 3384, 3380, 3383\}$

$$\int \cos(a+bx)\text{Si}(c+dx)\,dx = -\frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b} + \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b} + \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b} + \frac{\sin(a+bx)\text{Si}(c+dx)}{b} - \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b}$$

```
[In] Int[Cos[a + b*x]*SinIntegral[c + d*x],x]
```

```
[Out] -1/2*(Cos[a - (b*c)/d]*CosIntegral[(c*(b - d))/d + (b - d)*x])/b + (Cos[a -
 (b*c)/d]*CosIntegral[(c*(b + d))/d + (b + d)*x])/(2*b) + (Sin[a - (b*c)/d]
*SinIntegral[(c*(b - d))/d + (b - d)*x])/(2*b) + (Sin[a + b*x]*SinIntegral[
c + d*x])/b - (Sin[a - (b*c)/d]*SinIntegral[(c*(b + d))/d + (b + d)*x])/(2*
b)
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3384

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Dist[Cos[(d*
e - c*f)/d], Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Dist[Sin[(d*e - c*f
)/d], Int[Cos[c*(f/d) + f*x]/(c + d*x), x], x] /; FreeQ[{c, d, e, f}, x] &&
 NeQ[d*e - c*f, 0]
```

Rule 4513

```
Int[((e_.) + (f_.)*(x_))^(m_.)*Sin[(a_.) + (b_.)*(x_)]^(p_.)*Sin[(c_.) + (d
_.)*(x_)]^(q_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Sin[a + b*x
]^p*Sin[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f}, x] && IGtQ[p, 0] &&
 IGtQ[q, 0] && IntegerQ[m]
```

Rule 6652

```
Int[Cos[(a_.) + (b_.)*(x_)]*SinIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(SinIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Sin[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{\sin(a+bx)\text{Si}(c+dx)}{b} - \frac{d\int \frac{\sin(a+bx)\sin(c+dx)}{c+dx}\,dx}{b} \\
&= \frac{\sin(a+bx)\text{Si}(c+dx)}{b} - \frac{d\int \left(\frac{\cos(a-c+(b-d)x)}{2(c+dx)} - \frac{\cos(a+c+(b+d)x)}{2(c+dx)}\right)dx}{b} \\
&= \frac{\sin(a+bx)\text{Si}(c+dx)}{b} - \frac{d\int \frac{\cos(a-c+(b-d)x)}{c+dx}\,dx}{2b} + \frac{d\int \frac{\cos(a+c+(b+d)x)}{c+dx}\,dx}{2b} \\
&= \frac{\sin(a+bx)\text{Si}(c+dx)}{b} - \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} \\
&\quad + \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b} \\
&\quad + \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} - \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b} \\
&= -\frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b} \\
&\quad + \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b} + \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b} \\
&\quad + \frac{\sin(a+bx)\text{Si}(c+dx)}{b} - \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b}
\end{aligned}$$

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 1.03 (sec) , antiderivative size = 164, normalized size of antiderivative = 1.07

$$\int \cos(a+bx)\text{Si}(c+dx)\,dx$$

$$= \frac{e^{-\frac{i(bc+ad)}{d}}\left(-e^{\frac{2ibc}{d}}\,\text{ExpIntegralEi}\left(-\frac{i(b-d)(c+dx)}{d}\right) - e^{2ia}\,\text{ExpIntegralEi}\left(\frac{i(b-d)(c+dx)}{d}\right) + e^{\frac{2ibc}{d}}\,\text{ExpIntegralEi}\left(\right.\right.}{4b}$$

```
[In] Integrate[Cos[a + b*x]*SinIntegral[c + d*x],x]
```

```
[Out] (-(E^(((2*I)*b*c)/d)*ExpIntegralEi[((-I)*(b - d)*(c + d*x))/d]) - E^((2*I)*
a)*ExpIntegralEi[(I*(b - d)*(c + d*x))/d] + E^(((2*I)*b*c)/d)*ExpIntegralEi
[((-I)*(b + d)*(c + d*x))/d] + E^((2*I)*a)*ExpIntegralEi[(I*(b + d)*(c + d*
x))/d] + 4*E^((I*(b*c + a*d))/d)*Sin[a + b*x]*SinIntegral[c + d*x])/(4*b*E^
((I*(b*c + a*d))/d))
```

Maple [A] (verified)

Time = 2.29 (sec) , antiderivative size = 272, normalized size of antiderivative = 1.78

method	result
default	$\frac{\frac{\operatorname{Si}(dx+c)d\sin\left(\frac{b(dx+c)}{d}+\frac{ad-bc}{d}\right)}{b}-\frac{d\left(\frac{d\left(-\frac{\operatorname{Si}\left(-\left(-1+\frac{b}{d}\right)(dx+c)-a+\frac{bc}{d}-\frac{-ad+bc}{d}\right)\sin\left(\frac{-ad+bc}{d}\right)}{d}+\frac{\operatorname{Ci}\left(\left(-1+\frac{b}{d}\right)(dx+c)+a-\frac{bc}{d}+\frac{-ad+bc}{d}\right)\cos\left(-\right.}{d}\right.}{2}\right.}{}}{d}$

```
[In] int(cos(b*x+a)*Si(d*x+c),x,method=_RETURNVERBOSE)
```

```
[Out] (Si(d*x+c)/b*d*sin(1/d*b*(d*x+c)+(a*d-b*c)/d)-1/b*d*(1/2*d*(-Si(-(-1+b/d)*(
d*x+c)-a+b*c/d-(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci((-1+b/d)*(d*x+c)+a-b*c/
d+(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d)-1/2*d*(-Si(-(1+b/d)*(d*x+c)-a+b*c/d-(-
a*d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci((1+b/d)*(d*x+c)+a-b*c/d+(-a*d+b*c)/d)*co
s((-a*d+b*c)/d)/d)))/d
```

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 147, normalized size of antiderivative = 0.96

$$\int \cos(a+bx)\operatorname{Si}(c+dx)\,dx$$
$$=\frac{\left(\operatorname{Ci}\left(\frac{bc+cd+(bd+d^2)x}{d}\right)-\operatorname{Ci}\left(-\frac{bc-cd+(bd-d^2)x}{d}\right)\right)\cos\left(-\frac{bc-ad}{d}\right)-\left(\operatorname{Si}\left(\frac{bc+cd+(bd+d^2)x}{d}\right)+\operatorname{Si}\left(-\frac{bc-cd+(bd-d^2)x}{d}\right)\right)}{2\,b}$$

```
[In] integrate(cos(b*x+a)*sin_integral(d*x+c),x, algorithm="fricas")
```

```
[Out] 1/2*((cos_integral((b*c + c*d + (b*d + d^2)*x)/d) - cos_integral(-(b*c - c*
d + (b*d - d^2)*x)/d))*cos(-(b*c - a*d)/d) - (sin_integral((b*c + c*d + (b*
d + d^2)*x)/d) + sin_integral(-(b*c - c*d + (b*d - d^2)*x)/d))*sin(-(b*c -
a*d)/d) + 2*sin(b*x + a)*sin_integral(d*x + c))/b
```

Sympy [F]

$$\int \cos(a+bx)\text{Si}(c+dx)\,dx = \int \cos(a+bx)\,\text{Si}(c+dx)\,dx$$

```
[In] integrate(cos(b*x+a)*Si(d*x+c),x)
[Out] Integral(cos(a + b*x)*Si(c + d*x), x)
```

Maxima [F]

$$\int \cos(a+bx)\text{Si}(c+dx)\,dx = \int \cos(bx+a)\,\text{Si}(dx+c)\,dx$$

```
[In] integrate(cos(b*x+a)*sin_integral(d*x+c),x, algorithm="maxima")
[Out] integrate(cos(b*x + a)*sin_integral(d*x + c), x)
```

Giac [C] (verification not implemented)

Result contains higher order function than in optimal. Order 9 vs. order 4.

Time = 0.56 (sec) , antiderivative size = 9214, normalized size of antiderivative = 60.22

$$\int \cos(a+bx)\text{Si}(c+dx)\,dx = \text{Too large to display}$$

```
[In] integrate(cos(b*x+a)*sin_integral(d*x+c),x, algorithm="giac")
[Out] 1/4*(real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - real
_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a -
 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - real_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + real_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*imag_part(cos_integral(b*x
- d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*imag_part(cos_integral(-b*x + d*x +
c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)^2*tan(1/2*(b*c - c*d)/d) + 4*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*
tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*
(b*c - c*d)/d) - 2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)
```

/d)^2 + 2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 -
4*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*imag_part(
cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c
)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*imag_part(cos_integ
ral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/
2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*sin_integral((b*d*x - d^2*x
 + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d
)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*imag_part(cos_integral(b*x + d*x + c +
b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b
*c - c*d)/d)^2 + 4*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a +
1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)
^2 + real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*ta
n(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + real_part(cos_integral(b*x -
d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c +
c*d)/d)^2 + real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + real_part(cos_integra
l(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/
2*(b*c + c*d)/d)^2 - 4*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d) - 4*real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2
*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) -
real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2
*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - real_part(cos_integral(b*x - d*x -
 c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/
d)^2 - real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - real_part(cos_integral(-b*
x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*
c - c*d)/d)^2 + 4*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a
+ 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)
^2 + 4*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + real_
part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c
 + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + real_part(cos_integral(b*x - d*x -
c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*
d)/d)^2 + real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c
)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + real_part(cos_integ
ral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*
tan(1/2*(b*c - c*d)/d)^2 - real_part(cos_integral(b*x + d*x + c + b*c/d))*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - rea
l_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - real_part(cos_integral(-b*x + d*x

+ c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - 2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 4*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + 2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 4*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) + 4*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - 2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 4*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*imag_part(cos_

integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d
)*tan(1/2*(b*c - c*d)/d)^2 - 2*imag_part(cos_integral(-b*x - d*x - c - b*c/
d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 +
4*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*
(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 + 2*imag_part(cos_integral(b*x + d*
x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c -
c*d)/d)^2 - 2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1
/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*sin_integral((b
*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*ta
n(1/2*(b*c - c*d)/d)^2 - 2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*t
an(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 + 2*ima
g_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*
c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - 4*sin_integral((b*d*x - d^2*x + b*
c - c*d)/d)*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 - real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2
*tan(1/2*a - 1/2*c)^2 + real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(
1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + real_part(cos_integral(-b*x + d*x +
 c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 - real_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + 4
*real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*
a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*real_part(cos_integral(-b*x - d*x -
 c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)
 + real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(
1/2*(b*c + c*d)/d)^2 - real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - real_part(cos_integral(-b*x + d*
x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + real_part(c
os_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*
d)/d)^2 - real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)
^2*tan(1/2*(b*c + c*d)/d)^2 + real_part(cos_integral(b*x - d*x - c + b*c/d)
)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + real_part(cos_integral(-b
*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 - real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b
*c + c*d)/d)^2 - 4*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a
 + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*real_part(cos_int
egral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)*tan(
1/2*(b*c - c*d)/d) - 4*real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*real_part
(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*
d)/d)^2*tan(1/2*(b*c - c*d)/d) - real_part(cos_integral(b*x + d*x + c + b*c
/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + real_part(cos_integral
(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + re
al_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*
(b*c - c*d)/d)^2 - real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*
a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + real_part(cos_integral(b*x + d*x +
c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 - real_part(cos_i

```
ntegral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)
^2 - real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2*t
an(1/2*(b*c - c*d)/d)^2 + real_part(cos_integral(-b*x - d*x - c - b*c/d))*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + 4*real_part(cos_integral(b*x
 + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c
 - c*d)/d)^2 + 4*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a
+ 1/2*c)*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - real_part(cos_in
tegral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)
/d)^2 + real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/
d)^2*tan(1/2*(b*c - c*d)/d)^2 + real_part(cos_integral(-b*x + d*x + c - b*c
/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d)^2 - real_part(cos_inte
gral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/
d)^2 + 2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a + 1/2*c)^
2*tan(1/2*a - 1/2*c) - 2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*ta
n(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) + 4*sin_integral((b*d*x - d^2*x + b*c
 - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c) - 2*imag_part(cos_integr
al(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a - 1/2*c)^2 + 2*imag
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*a -
1/2*c)^2 - 4*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)
*tan(1/2*a - 1/2*c)^2 - 2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*ta
n(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*imag_part(cos_integral(-b*x -
 d*x - c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d) - 4*sin_inte
gral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d
)/d) + 2*imag_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)^
2*tan(1/2*(b*c + c*d)/d) - 2*imag_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 4*sin_integral((b*d*x + d^2
*x + b*c + c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d) + 2*imag_par
t(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*
d)/d)^2 - 2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2
*c)*tan(1/2*(b*c + c*d)/d)^2 + 4*sin_integral((b*d*x + d^2*x + b*c + c*d)/d
)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 + 2*imag_part(cos_integral(b*
x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*imag_
part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c
+ c*d)/d)^2 + 4*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2
*c)*tan(1/2*(b*c + c*d)/d)^2 - 2*imag_part(cos_integral(b*x - d*x - c + b*c
/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 2*imag_part(cos_integral
(-b*x + d*x + c - b*c/d))*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 4*s
in_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*
c - c*d)/d) + 2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a -
1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*imag_part(cos_integral(-b*x + d*x + c -
 b*c/d))*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) + 4*sin_integral((b*d*
x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d) - 2*i
mag_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c + c*d)/d)^2*tan(
1/2*(b*c - c*d)/d) + 2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(
1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 4*sin_integral((b*d*x - d^2*x
```

```
 + b*c - c*d)/d)*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c - c*d)/d) - 2*imag_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c -
c*d)/d)^2 + 2*imag_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1
/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 4*sin_integral((b*d*x + d^2*x + b*c + c*d)
/d)*tan(1/2*a + 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 - 2*imag_part(cos_integral(
b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*ima
g_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*
c - c*d)/d)^2 - 4*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2*a - 1
/2*c)*tan(1/2*(b*c - c*d)/d)^2 + 2*imag_part(cos_integral(b*x + d*x + c + b
*c/d))*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/d)^2 - 2*imag_part(cos_in
tegral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c + c*d)/d)*tan(1/2*(b*c - c*d)/
d)^2 + 4*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*tan(1/2*(b*c + c*d)/d)
*tan(1/2*(b*c - c*d)/d)^2 - real_part(cos_integral(b*x + d*x + c + b*c/d))*
tan(1/2*a + 1/2*c)^2 - real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1
/2*a + 1/2*c)^2 - real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a
 + 1/2*c)^2 - real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1
/2*c)^2 + real_part(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a - 1/2*c)
^2 + real_part(cos_integral(b*x - d*x - c + b*c/d))*tan(1/2*a - 1/2*c)^2 +
real_part(cos_integral(-b*x + d*x + c - b*c/d))*tan(1/2*a - 1/2*c)^2 + real
_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a - 1/2*c)^2 + 4*real_p
art(cos_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c)*tan(1/2*(b*c +
c*d)/d) + 4*real_part(cos_integral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2
*c)*tan(1/2*(b*c + c*d)/d) - real_part(cos_integral(b*x + d*x + c + b*c/d))
*tan(1/2*(b*c + c*d)/d)^2 - real_part(cos_integral(b*x - d*x - c + b*c/d))*
tan(1/2*(b*c + c*d)/d)^2 - real_part(cos_integral(-b*x + d*x + c - b*c/d))*
tan(1/2*(b*c + c*d)/d)^2 - real_part(cos_integral(-b*x - d*x - c - b*c/d))*
tan(1/2*(b*c + c*d)/d)^2 - 4*real_part(cos_integral(b*x - d*x - c + b*c/d))
*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) - 4*real_part(cos_integral(-b*x
+ d*x + c - b*c/d))*tan(1/2*a - 1/2*c)*tan(1/2*(b*c - c*d)/d) + real_part(c
os_integral(b*x + d*x + c + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + real_part(co
s_integral(b*x - d*x - c + b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + real_part(cos
_integral(-b*x + d*x + c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 + real_part(cos
_integral(-b*x - d*x - c - b*c/d))*tan(1/2*(b*c - c*d)/d)^2 - 2*imag_part(c
os_integral(b*x + d*x + c + b*c/d))*tan(1/2*a + 1/2*c) + 2*imag_part(cos_in
tegral(-b*x - d*x - c - b*c/d))*tan(1/2*a + 1/2*c) - 4*sin_integral((b*d*x
+ d^2*x + b*c + c*d)/d)*tan(1/2*a + 1/2*c) + 2*imag_part(cos_integral(b*x -
 d*x - c + b*c/d))*tan(1/2*a - 1/2*c) - 2*imag_part(cos_integral(-b*x + d*x
 + c - b*c/d))*tan(1/2*a - 1/2*c) + 4*sin_integral((b*d*x - d^2*x + b*c - c
*d)/d)*tan(1/2*a - 1/2*c) + 2*imag_part(cos_integral(b*x + d*x + c + b*c/d)
)*tan(1/2*(b*c + c*d)/d) - 2*imag_part(cos_integral(-b*x - d*x - c - b*c/d)
)*tan(1/2*(b*c + c*d)/d) + 4*sin_integral((b*d*x + d^2*x + b*c + c*d)/d)*ta
n(1/2*(b*c + c*d)/d) - 2*imag_part(cos_integral(b*x - d*x - c + b*c/d))*tan
(1/2*(b*c - c*d)/d) + 2*imag_part(cos_integral(-b*x + d*x + c - b*c/d))*tan
(1/2*(b*c - c*d)/d) - 4*sin_integral((b*d*x - d^2*x + b*c - c*d)/d)*tan(1/2
*(b*c - c*d)/d) + real_part(cos_integral(b*x + d*x + c + b*c/d)) - real_par
```

```
t(cos_integral(b*x - d*x - c + b*c/d)) - real_part(cos_integral(-b*x + d*x
+ c - b*c/d)) + real_part(cos_integral(-b*x - d*x - c - b*c/d)))*d/(b*d*tan
(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 + b*d*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c
+ c*d)/d)^2 + b*d*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c -
c*d)/d)^2 + b*d*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*c
- c*d)/d)^2 + b*d*tan(1/2*a - 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2*tan(1/2*(b*
c - c*d)/d)^2 + b*d*tan(1/2*a + 1/2*c)^2*tan(1/2*a - 1/2*c)^2 + b*d*tan(1/2
*a + 1/2*c)^2*tan(1/2*(b*c + c*d)/d)^2 + b*d*tan(1/2*a - 1/2*c)^2*tan(1/2*(
b*c + c*d)/d)^2 + b*d*tan(1/2*a + 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*d*t
an(1/2*a - 1/2*c)^2*tan(1/2*(b*c - c*d)/d)^2 + b*d*tan(1/2*(b*c + c*d)/d)^2
*tan(1/2*(b*c - c*d)/d)^2 + b*d*tan(1/2*a + 1/2*c)^2 + b*d*tan(1/2*a - 1/2*
c)^2 + b*d*tan(1/2*(b*c + c*d)/d)^2 + b*d*tan(1/2*(b*c - c*d)/d)^2 + b*d) +
 sin(b*x + a)*sin_integral(d*x + c)/b
```

Mupad [F(-1)]

Timed out.

$$\int \cos(a+bx)\mathrm{Si}(c+dx)\,dx=\int \mathrm{sinint}(c+d\,x)\,\cos\left(a+b\,x\right)\,dx$$

```
[In] int(sinint(c + d*x)*cos(a + b*x),x)
[Out] int(sinint(c + d*x)*cos(a + b*x), x)
```

3.68 $\int \frac{\cos(a+bx)\mathbf{Si}(c+dx)}{x}\,dx$

Optimal result

Integrand size = 16, antiderivative size = 16

$$\int \frac{\cos(a+bx)\text{Si}(c+dx)}{x}\,dx = \text{Int}\left(\frac{\cos(a+bx)\text{Si}(c+dx)}{x},x\right)$$

```
[Out] CannotIntegrate(cos(b*x+a)*Si(d*x+c)/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\cos(a+bx)\text{Si}(c+dx)}{x}\,dx = \int \frac{\cos(a+bx)\text{Si}(c+dx)}{x}\,dx$$

```
[In] Int[(Cos[a + b*x]*SinIntegral[c + d*x])/x,x]
[Out] Defer[Int][(Cos[a + b*x]*SinIntegral[c + d*x])/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\cos(a+bx)\text{Si}(c+dx)}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 7.84 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\mathrm{Si}(c+dx)}{x}\,dx = \int \frac{\cos(a+bx)\mathrm{Si}(c+dx)}{x}\,dx$$

```
[In] Integrate[(Cos[a + b*x]*SinIntegral[c + d*x])/x,x]
[Out] Integrate[(Cos[a + b*x]*SinIntegral[c + d*x])/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.38 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{\cos(bx+a)\,\mathrm{Si}(dx+c)}{x}dx$$

```
[In] int(cos(b*x+a)*Si(d*x+c)/x,x)
[Out] int(cos(b*x+a)*Si(d*x+c)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\mathrm{Si}(c+dx)}{x}\,dx = \int \frac{\cos(bx+a)\,\mathrm{Si}(dx+c)}{x}\,dx$$

```
[In] integrate(cos(b*x+a)*sin_integral(d*x+c)/x,x, algorithm="fricas")
[Out] integral(cos(b*x + a)*sin_integral(d*x + c)/x, x)
```

Sympy [N/A]

Not integrable

Time = 0.85 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{\cos(a+bx)\mathrm{Si}(c+dx)}{x}\,dx = \int \frac{\cos(a+bx)\,\mathrm{Si}(c+dx)}{x}\,dx$$

```
[In] integrate(cos(b*x+a)*Si(d*x+c)/x,x)
[Out] Integral(cos(a + b*x)*Si(c + d*x)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.38 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\mathrm{Si}(c+dx)}{x}\,dx = \int \frac{\cos\left(bx+a\right)\mathrm{Si}\left(dx+c\right)}{x}\,dx$$

```
[In] integrate(cos(b*x+a)*sin_integral(d*x+c)/x,x, algorithm="maxima")
[Out] integrate(cos(b*x + a)*sin_integral(d*x + c)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\mathrm{Si}(c+dx)}{x}\,dx = \int \frac{\cos\left(bx+a\right)\mathrm{Si}\left(dx+c\right)}{x}\,dx$$

```
[In] integrate(cos(b*x+a)*sin_integral(d*x+c)/x,x, algorithm="giac")
[Out] integrate(cos(b*x + a)*sin_integral(d*x + c)/x, x)
```

Mupad [N/A]

Not integrable

Time = 6.07 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\mathrm{Si}(c+dx)}{x}\,dx = \int \frac{\mathrm{sinint}(c+d\,x)\,\cos\left(a+b\,x\right)}{x}\,dx$$

```
[In] int((sinint(c + d*x)*cos(a + b*x))/x,x)
[Out] int((sinint(c + d*x)*cos(a + b*x))/x, x)
```

3.69 $\int x^m \operatorname{CosIntegral}(bx)\,dx$

Optimal result

Integrand size = 8, antiderivative size = 90

$$\int x^m \operatorname{CosIntegral}(bx)\,dx = \frac{x^{1+m}\operatorname{CosIntegral}(bx)}{1+m} + \frac{ix^m(-ibx)^{-m}\Gamma(1+m,-ibx)}{2b(1+m)} - \frac{ix^m(ibx)^{-m}\Gamma(1+m,ibx)}{2b(1+m)}$$

```
[Out] x^(1+m)*Ci(b*x)/(1+m)+1/2*I*x^m*GAMMA(1+m,-I*b*x)/b/(1+m)/((-I*b*x)^m)-1/2*
I*x^m*GAMMA(1+m,I*b*x)/b/(1+m)/((I*b*x)^m)
```

Rubi [A] (verified)

Time = 0.06 (sec) , antiderivative size = 90, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6639, 12, 3388, 2212}

$$\int x^m \operatorname{CosIntegral}(bx)\,dx = \frac{x^{m+1}\operatorname{CosIntegral}(bx)}{m+1} + \frac{ix^m(-ibx)^{-m}\Gamma(m+1,-ibx)}{2b(m+1)} - \frac{ix^m(ibx)^{-m}\Gamma(m+1,ibx)}{2b(m+1)}$$

```
[In] Int[x^m*CosIntegral[b*x],x]
```

```
[Out] (x^(1 + m)*CosIntegral[b*x])/(1 + m) + ((I/2)*x^m*Gamma[1 + m, (-I)*b*x])/(
b*(1 + m)*((-I)*b*x)^m) - ((I/2)*x^m*Gamma[1 + m, I*b*x])/(b*(1 + m)*(I*b*x
)^m)
```

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 2212

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> Simp[(-F^(g*(e - c*(f/d))))*((c + d*x)^FracPart[m]/(d*((-f)*g*(Log[F]/d)
)^(IntPart[m] + 1)*((-f)*g*Log[F]*((c + d*x)/d))^FracPart[m]))*Gamma[m + 1,
 ((-f)*g*(Log[F]/d))*(c + d*x)], x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&
!IntegerQ[m]
```

Rule 3388

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Dist[I/2, Int[(c + d*x)^m/(E^(I*k*Pi)*E^(I*(e + f*x))), x], x] - Dist[
I/2, Int[(c + d*x)^m*E^(I*k*Pi)*E^(I*(e + f*x)), x], x] /; FreeQ[{c, d, e,
f, m}, x] && IntegerQ[2*k]
```

Rule 6639

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

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{x^{1+m}\,\text{CosIntegral}(bx)}{1+m} - \frac{b\int \frac{x^m\cos(bx)}{b}\,dx}{1+m}\\
&= \frac{x^{1+m}\,\text{CosIntegral}(bx)}{1+m} - \frac{\int x^m\cos(bx)\,dx}{1+m}\\
&= \frac{x^{1+m}\,\text{CosIntegral}(bx)}{1+m} - \frac{\int e^{-ibx}x^m\,dx}{2(1+m)} - \frac{\int e^{ibx}x^m\,dx}{2(1+m)}\\
&= \frac{x^{1+m}\,\text{CosIntegral}(bx)}{1+m} + \frac{ix^m(-ibx)^{-m}\Gamma(1+m,-ibx)}{2b(1+m)} - \frac{ix^m(ibx)^{-m}\Gamma(1+m,ibx)}{2b(1+m)}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 78, normalized size of antiderivative = 0.87

$$\int x^m \operatorname{CosIntegral}(bx)\,dx = \frac{x^m\left(2x \operatorname{CosIntegral}(bx) + \frac{i(b^2x^2)^{-m}((ibx)^m\Gamma(1+m,-ibx)-(-ibx)^m\Gamma(1+m,ibx))}{b}\right)}{2(1+m)}$$

```
[In] Integrate[x^m*CosIntegral[b*x],x]
```

```
[Out] (x^m*(2*x*CosIntegral[b*x] + (I*((I*b*x)^m*Gamma[1 + m, (-I)*b*x] - ((-I)*b
*x)^m*Gamma[1 + m, I*b*x]))/(b*(b^2*x^2)^m)))/(2*(1 + m))
```

Maple [C] (verified)

Result contains higher order function than in optimal. Order 5 vs. order 4.

Time = 0.67 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.38

method	result
meijerg	$2^{m-1}b^{-m-1}\sqrt{\pi}\left(-\frac{2^{-m-1}x^{3+m}b^{3+m}\operatorname{hypergeom}\left(\left[1,1,\frac{3}{2}+\frac{m}{2}\right],\left[\frac{3}{2},2,2,\frac{5}{2}+\frac{m}{2}\right],-\frac{b^2x^2}{4}\right)}{\sqrt{\pi}\,(3+m)} + \frac{2\left(\Psi\left(\frac{1}{2}+\frac{m}{2}\right)+2\gamma-\Psi\left(\frac{3}{2}+\frac{m}{2}\right)+2\ln(\right.}{\sqrt{\pi}\,(1+}\right.$

```
[In] int(x^m*Ci(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 2^(m-1)*b^(-m-1)*Pi^(1/2)*(-2^(-m-1)/Pi^(1/2)/(3+m)*x^(3+m)*b^(3+m)*hyperge
om([1,1,3/2+1/2*m],[3/2,2,2,5/2+1/2*m],-1/4*b^2*x^2)+2*(Psi(1/2+1/2*m)+2*ga
mma-Psi(3/2+1/2*m)+2*ln(x)+2*ln(b))/Pi^(1/2)*x^(1+m)*2^(-m-1)*b^(1+m)/(1+m)
)
```

Fricas [A] (verification not implemented)

none

Time = 0.09 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.21

$$\int x^m \operatorname{CosIntegral}(bx)\,dx = \frac{2\,\pi bxx^m\,\mathrm{C}\left(bx\right) - i\left(\cosh\left(\frac{1}{2}\,m\log\left(\frac{1}{2}i\,\pi b^2\right)\right) - \sinh\left(\frac{1}{2}\,m\log\left(\frac{1}{2}i\,\pi b^2\right)\right)\right)\Gamma\left(\frac{1}{2}\,m+1,\frac{1}{2}i\,\pi b^2x^2\right) + i\left(\cosh\left(\frac{1}{2}\,m\right.\right.}{2\,\pi(bm+b)}$$

```
[In] integrate(x^m*fresnel_cos(b*x),x, algorithm="fricas")
```

```
[Out] 1/2*(2*pi*b*x*x^m*fresnel_cos(b*x) - I*(cosh(1/2*m*log(1/2*I*pi*b^2)) - sin
h(1/2*m*log(1/2*I*pi*b^2)))*gamma(1/2*m + 1, 1/2*I*pi*b^2*x^2) + I*(cosh(1/
```

```
2*m*log(-1/2*I*pi*b^2)) - sinh(1/2*m*log(-1/2*I*pi*b^2)))*gamma(1/2*m + 1,
-1/2*I*pi*b^2*x^2))/(pi*(b*m + b))
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 700 vs. $2(70) = 140$.

Time = 1.01 (sec) , antiderivative size = 700, normalized size of antiderivative = 7.78

$$\int x^m \operatorname{CosIntegral}(bx)\,dx = \frac{4\cdot 2^m b b^{-m-1} m x\sqrt{e^{-2m\log(2)}e^{m\log(b^2x^2)}}\log(b^2x^2)\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)}{8m^2\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+16m\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+8\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)} + \frac{8\cdot 2^m \gamma b b^{-m-1} m x\sqrt{e^{-2m\log(2)}e^{m\log(b^2x^2)}}\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)}{8m^2\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+16m\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+8\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)} + \frac{4\cdot 2^m b b^{-m-1} x\sqrt{e^{-2m\log(2)}e^{m\log(b^2x^2)}}\log(b^2x^2)\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)}{8m^2\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+16m\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+8\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)} - \frac{8\cdot 2^m b b^{-m-1} x\sqrt{e^{-2m\log(2)}e^{m\log(b^2x^2)}}\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)}{8m^2\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+16m\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+8\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)} + \frac{8\cdot 2^m \gamma b b^{-m-1} x\sqrt{e^{-2m\log(2)}e^{m\log(b^2x^2)}}\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)}{8m^2\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+16m\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+8\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)} - \frac{b^{-m-1}b^{m+3}m^2x^{m+3}\Gamma\left(\frac{m}{2}+\frac{3}{2}\right){}_3F_4\left(\begin{matrix}1,1,\frac{m}{2}+\frac{3}{2}\\ \frac{3}{2},2,2,\frac{m}{2}+\frac{5}{2}\end{matrix}\middle|-\frac{b^2x^2}{4}\right)}{8m^2\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+16m\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+8\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)} - \frac{2b^{-m-1}b^{m+3}mx^{m+3}\Gamma\left(\frac{m}{2}+\frac{3}{2}\right){}_3F_4\left(\begin{matrix}1,1,\frac{m}{2}+\frac{3}{2}\\ \frac{3}{2},2,2,\frac{m}{2}+\frac{5}{2}\end{matrix}\middle|-\frac{b^2x^2}{4}\right)}{8m^2\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+16m\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+8\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)} - \frac{b^{-m-1}b^{m+3}x^{m+3}\Gamma\left(\frac{m}{2}+\frac{3}{2}\right){}_3F_4\left(\begin{matrix}1,1,\frac{m}{2}+\frac{3}{2}\\ \frac{3}{2},2,2,\frac{m}{2}+\frac{5}{2}\end{matrix}\middle|-\frac{b^2x^2}{4}\right)}{8m^2\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+16m\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)+8\Gamma\left(\frac{m}{2}+\frac{5}{2}\right)}$$

```
[In] integrate(x**m*Ci(b*x),x)
```

```
[Out] 4*2**m*b*b**(-m - 1)*m*x*sqrt(exp(-2*m*log(2))*exp(m*log(b**2*x**2)))*log(b
**2*x**2)*gamma(m/2 + 5/2)/(8*m**2*gamma(m/2 + 5/2) + 16*m*gamma(m/2 + 5/2)
 + 8*gamma(m/2 + 5/2)) + 8*2**m*EulerGamma*b*b**(-m - 1)*m*x*sqrt(exp(-2*m*
log(2))*exp(m*log(b**2*x**2)))*gamma(m/2 + 5/2)/(8*m**2*gamma(m/2 + 5/2) +
16*m*gamma(m/2 + 5/2) + 8*gamma(m/2 + 5/2)) + 4*2**m*b*b**(-m - 1)*x*sqrt(e
xp(-2*m*log(2))*exp(m*log(b**2*x**2)))*log(b**2*x**2)*gamma(m/2 + 5/2)/(8*m
**2*gamma(m/2 + 5/2) + 16*m*gamma(m/2 + 5/2) + 8*gamma(m/2 + 5/2)) - 8*2**m
*b*b**(-m - 1)*x*sqrt(exp(-2*m*log(2))*exp(m*log(b**2*x**2)))*gamma(m/2 + 5
```

```
/2)/(8*m**2*gamma(m/2 + 5/2) + 16*m*gamma(m/2 + 5/2) + 8*gamma(m/2 + 5/2))
+ 8*2**m*EulerGamma*b*b**(-m - 1)*x*sqrt(exp(-2*m*log(2))*exp(m*log(b**2*x*
*2)))*gamma(m/2 + 5/2)/(8*m**2*gamma(m/2 + 5/2) + 16*m*gamma(m/2 + 5/2) + 8
*gamma(m/2 + 5/2)) - b**(-m - 1)*b**(m + 3)*m**2*x**(m + 3)*gamma(m/2 + 3/2
)*hyper((1, 1, m/2 + 3/2), (3/2, 2, 2, m/2 + 5/2), -b**2*x**2/4)/(8*m**2*ga
mma(m/2 + 5/2) + 16*m*gamma(m/2 + 5/2) + 8*gamma(m/2 + 5/2)) - 2*b**(-m - 1
)*b**(m + 3)*m*x**(m + 3)*gamma(m/2 + 3/2)*hyper((1, 1, m/2 + 3/2), (3/2, 2
, 2, m/2 + 5/2), -b**2*x**2/4)/(8*m**2*gamma(m/2 + 5/2) + 16*m*gamma(m/2 +
5/2) + 8*gamma(m/2 + 5/2)) - b**(-m - 1)*b**(m + 3)*x**(m + 3)*gamma(m/2 +
3/2)*hyper((1, 1, m/2 + 3/2), (3/2, 2, 2, m/2 + 5/2), -b**2*x**2/4)/(8*m**2
*gamma(m/2 + 5/2) + 16*m*gamma(m/2 + 5/2) + 8*gamma(m/2 + 5/2))
```

Maxima [F]

$$\int x^m \operatorname{CosIntegral}(bx)\,dx = \int x^m \operatorname{C}(bx)\,dx$$

```
[In] integrate(x^m*fresnel_cos(b*x),x, algorithm="maxima")
[Out] integrate(x^m*fresnel_cos(b*x), x)
```

Giac [F]

$$\int x^m \operatorname{CosIntegral}(bx)\,dx = \int x^m \operatorname{C}(bx)\,dx$$

```
[In] integrate(x^m*fresnel_cos(b*x),x, algorithm="giac")
[Out] integrate(x^m*fresnel_cos(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int x^m \operatorname{CosIntegral}(bx)\,dx = \int x^m \operatorname{cosint}(b\,x)\,dx$$

```
[In] int(x^m*cosint(b*x),x)
[Out] int(x^m*cosint(b*x), x)
```

3.70 $\int x^3 \operatorname{CosIntegral}(bx)\,dx$

Optimal result

Integrand size = 8, antiderivative size = 63

$$\int x^3 \operatorname{CosIntegral}(bx)\,dx=\frac{3\cos(bx)}{2b^4}-\frac{3x^2\cos(bx)}{4b^2}+\frac{1}{4}x^4 \operatorname{CosIntegral}(bx)+\frac{3x\sin(bx)}{2b^3}-\frac{x^3\sin(bx)}{4b}$$

```
[Out] 1/4*x^4*Ci(b*x)+3/2*cos(b*x)/b^4-3/4*x^2*cos(b*x)/b^2+3/2*x*sin(b*x)/b^3-1/
4*x^3*sin(b*x)/b
```

Rubi [A] (verified)

Time = 0.05 (sec) , antiderivative size = 63, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6639, 12, 3377, 2718}

$$\int x^3 \operatorname{CosIntegral}(bx)\,dx=\frac{3\cos(bx)}{2b^4}+\frac{3x\sin(bx)}{2b^3}-\frac{3x^2\cos(bx)}{4b^2}+\frac{1}{4}x^4 \operatorname{CosIntegral}(bx)-\frac{x^3\sin(bx)}{4b}$$

```
[In] Int[x^3*CosIntegral[b*x],x]
```

```
[Out] (3*Cos[b*x])/(2*b^4) - (3*x^2*Cos[b*x])/(4*b^2) + (x^4*CosIntegral[b*x])/4
+ (3*x*Sin[b*x])/(2*b^3) - (x^3*Sin[b*x])/(4*b)
```

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 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 6639

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

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{1}{4}x^4 \operatorname{CosIntegral}(bx) - \frac{1}{4}b\int \frac{x^3\cos(bx)}{b}\,dx \\
&= \frac{1}{4}x^4 \operatorname{CosIntegral}(bx) - \frac{1}{4}\int x^3\cos(bx)\,dx \\
&= \frac{1}{4}x^4 \operatorname{CosIntegral}(bx) - \frac{x^3\sin(bx)}{4b} + \frac{3\int x^2\sin(bx)\,dx}{4b} \\
&= -\frac{3x^2\cos(bx)}{4b^2} + \frac{1}{4}x^4 \operatorname{CosIntegral}(bx) - \frac{x^3\sin(bx)}{4b} + \frac{3\int x\cos(bx)\,dx}{2b^2} \\
&= -\frac{3x^2\cos(bx)}{4b^2} + \frac{1}{4}x^4 \operatorname{CosIntegral}(bx) + \frac{3x\sin(bx)}{2b^3} - \frac{x^3\sin(bx)}{4b} - \frac{3\int \sin(bx)\,dx}{2b^3} \\
&= \frac{3\cos(bx)}{2b^4} - \frac{3x^2\cos(bx)}{4b^2} + \frac{1}{4}x^4 \operatorname{CosIntegral}(bx) + \frac{3x\sin(bx)}{2b^3} - \frac{x^3\sin(bx)}{4b}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 53, normalized size of antiderivative = 0.84

$$\int x^3 \operatorname{CosIntegral}(bx)\,dx = -\frac{3(-2+b^2x^2)\cos(bx)}{4b^4} + \frac{1}{4}x^4 \operatorname{CosIntegral}(bx) - \frac{x(-6+b^2x^2)\sin(bx)}{4b^3}$$

```
[In] Integrate[x^3*CosIntegral[b*x],x]
[Out] (-3*(-2 + b^2*x^2)*Cos[b*x])/(4*b^4) + (x^4*CosIntegral[b*x])/4 - (x*(-6 +
b^2*x^2)*Sin[b*x])/(4*b^3)
```

Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 54, normalized size of antiderivative = 0.86

method	result	size
parts	$\frac{x^{4}\operatorname{Ci}(bx)}{4}-\frac{b^{3}x^{3}\sin(bx)+3b^{2}x^{2}\cos(bx)-6\cos(bx)-6bx\sin(bx)}{4b^{4}}$	54
derivativedivides	$\frac{\frac{b^{4}x^{4}\operatorname{Ci}(bx)}{4}-\frac{b^{3}x^{3}\sin(bx)}{4}-\frac{3b^{2}x^{2}\cos(bx)}{4}+\frac{3\cos(bx)}{2}+\frac{3bx\sin(bx)}{2}}{b^{4}}$	56
default	$\frac{\frac{b^{4}x^{4}\operatorname{Ci}(bx)}{4}-\frac{b^{3}x^{3}\sin(bx)}{4}-\frac{3b^{2}x^{2}\cos(bx)}{4}+\frac{3\cos(bx)}{2}+\frac{3bx\sin(bx)}{2}}{b^{4}}$	56
meijerg	$\frac{4\sqrt{\pi}\left(-\frac{b^{6}x^{6}\operatorname{hypergeom}\left([1,1,3],\left[\frac{3}{2},2,2,4\right],-\frac{b^{2}x^{2}}{4}\right)}{96\sqrt{\pi}}+\frac{\left(-\frac{1}{2}+2\gamma+2\ln(x)+2\ln(b)\right)x^{4}b^{4}}{32\sqrt{\pi}}\right)}{b^{4}}$	63

```
[In] int(x^3*Ci(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*x^4*Ci(b*x)-1/4/b^4*(b^3*x^3*sin(b*x)+3*b^2*x^2*cos(b*x)-6*cos(b*x)-6*b
*x*sin(b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 59, normalized size of antiderivative = 0.94

$$\int x^{3}\operatorname{CosIntegral}(bx)\,dx=-\frac{\pi b^{3}x^{3}\sin\left(\frac{1}{2}\pi b^{2}x^{2}\right)+3\,bx\cos\left(\frac{1}{2}\pi b^{2}x^{2}\right)-\left(\pi^{2}b^{4}x^{4}+3\right)\operatorname{C}(bx)}{4\,\pi^{2}b^{4}}$$

```
[In] integrate(x^3*fresnel_cos(b*x),x, algorithm="fricas")
```

```
[Out] -1/4*(pi*b^3*x^3*sin(1/2*pi*b^2*x^2) + 3*b*x*cos(1/2*pi*b^2*x^2) - (pi^2*b^
4*x^4 + 3)*fresnel_cos(b*x))/(pi^2*b^4)
```

Sympy [A] (verification not implemented)

Time = 1.52 (sec) , antiderivative size = 85, normalized size of antiderivative = 1.35

$$\int x^{3}\operatorname{CosIntegral}(bx)\,dx=-\frac{x^{4}\log(bx)}{4}+\frac{x^{4}\log(b^{2}x^{2})}{8}+\frac{x^{4}\operatorname{Ci}(bx)}{4}-\frac{x^{3}\sin(bx)}{4b}-\frac{3x^{2}\cos(bx)}{4b^{2}}+\frac{3x\sin(bx)}{2b^{3}}+\frac{3\cos(bx)}{2b^{4}}$$

```
[In] integrate(x**3*Ci(b*x),x)
```

```
[Out] -x**4*log(b*x)/4 + x**4*log(b**2*x**2)/8 + x**4*Ci(b*x)/4 - x**3*sin(b*x)/(
4*b) - 3*x**2*cos(b*x)/(4*b**2) + 3*x*sin(b*x)/(2*b**3) + 3*cos(b*x)/(2*b**
4)
```

Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.29 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.49

$$\int x^3 \operatorname{CosIntegral}(bx)\,dx = \frac{1}{4}\,x^4\,\mathrm{C}\left(bx\right) - \frac{\sqrt{\frac{1}{2}}\left(4\,\sqrt{\frac{1}{2}}\pi^2 b^3 x^3 \sin\left(\frac{1}{2}\,\pi b^2 x^2\right) + 12\,\sqrt{\frac{1}{2}}\pi bx \cos\left(\frac{1}{2}\,\pi b^2 x^2\right) + (3i-3)\,\left(\frac{1}{4}\right)^{\frac{1}{4}}\pi \operatorname{erf}\left(\sqrt{\frac{1}{2}i\,\pi}bx\right) - (3i+3)\right.}{8\,\pi^3 b^4}$$

```
[In] integrate(x^3*fresnel_cos(b*x),x, algorithm="maxima")
```

```
[Out] 1/4*x^4*fresnel_cos(b*x) - 1/8*sqrt(1/2)*(4*sqrt(1/2)*pi^2*b^3*x^3*sin(1/2*
pi*b^2*x^2) + 12*sqrt(1/2)*pi*b*x*cos(1/2*pi*b^2*x^2) + (3*I - 3)*(1/4)^(1/
4)*pi*erf(sqrt(1/2*I*pi)*b*x) - (3*I + 3)*(1/4)^(1/4)*pi*erf(sqrt(-1/2*I*pi
)*b*x))/(pi^3*b^4)
```

Giac [F]

$$\int x^3 \operatorname{CosIntegral}(bx)\,dx = \int x^3\,\mathrm{C}\left(bx\right)\,dx$$

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

```
[Out] integrate(x^3*fresnel_cos(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int x^3 \operatorname{CosIntegral}(bx)\,dx = \frac{6\,\cos\left(b\,x\right) - 3\,b^2\,x^2\,\cos\left(b\,x\right) - b^3\,x^3\,\sin\left(b\,x\right) + 6\,b\,x\,\sin\left(b\,x\right)}{4\,b^4} + \frac{x^4\,\mathrm{cosint}(b\,x)}{4}$$

```
[In] int(x^3*cosint(b*x),x)
```

```
[Out] (6*cos(b*x) - 3*b^2*x^2*cos(b*x) - b^3*x^3*sin(b*x) + 6*b*x*sin(b*x))/(4*b^
4) + (x^4*cosint(b*x))/4
```

3.71 $\int x^2 \operatorname{CosIntegral}(bx)\,dx$

Optimal result

Integrand size = 8, antiderivative size = 49

$$\int x^2 \operatorname{CosIntegral}(bx)\,dx = -\frac{2x\cos(bx)}{3b^2} + \frac{1}{3}x^3 \operatorname{CosIntegral}(bx) + \frac{2\sin(bx)}{3b^3} - \frac{x^2\sin(bx)}{3b}$$

```
[Out] 1/3*x^3*Ci(b*x)-2/3*x*cos(b*x)/b^2+2/3*sin(b*x)/b^3-1/3*x^2*sin(b*x)/b
```

Rubi [A] (verified)

Time = 0.04 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6639, 12, 3377, 2717}

$$\int x^2 \operatorname{CosIntegral}(bx)\,dx = \frac{2\sin(bx)}{3b^3} - \frac{2x\cos(bx)}{3b^2} + \frac{1}{3}x^3 \operatorname{CosIntegral}(bx) - \frac{x^2\sin(bx)}{3b}$$

```
[In] Int[x^2*CosIntegral[b*x],x]
```

```
[Out] (-2*x*Cos[b*x])/(3*b^2) + (x^3*CosIntegral[b*x])/3 + (2*Sin[b*x])/(3*b^3) -
 (x^2*Sin[b*x])/(3*b)
```

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 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 6639

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

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{1}{3}x^3 \operatorname{CosIntegral}(bx) - \frac{1}{3}b \int \frac{x^2 \cos(bx)}{b} \, dx \\
&= \frac{1}{3}x^3 \operatorname{CosIntegral}(bx) - \frac{1}{3} \int x^2 \cos(bx) \, dx \\
&= \frac{1}{3}x^3 \operatorname{CosIntegral}(bx) - \frac{x^2 \sin(bx)}{3b} + \frac{2 \int x \sin(bx) \, dx}{3b} \\
&= -\frac{2x \cos(bx)}{3b^2} + \frac{1}{3}x^3 \operatorname{CosIntegral}(bx) - \frac{x^2 \sin(bx)}{3b} + \frac{2 \int \cos(bx) \, dx}{3b^2} \\
&= -\frac{2x \cos(bx)}{3b^2} + \frac{1}{3}x^3 \operatorname{CosIntegral}(bx) + \frac{2 \sin(bx)}{3b^3} - \frac{x^2 \sin(bx)}{3b}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.90

$$\int x^2 \operatorname{CosIntegral}(bx) \, dx = -\frac{2x \cos(bx)}{3b^2} + \frac{1}{3}x^3 \operatorname{CosIntegral}(bx) - \frac{(-2 + b^2x^2) \sin(bx)}{3b^3}$$

```
[In] Integrate[x^2*CosIntegral[b*x],x]
[Out] (-2*x*Cos[b*x])/(3*b^2) + (x^3*CosIntegral[b*x])/3 - ((-2 + b^2*x^2)*Sin[b*
x])/(3*b^3)
```

Maple [A] (verified)

Time = 0.37 (sec) , antiderivative size = 42, normalized size of antiderivative = 0.86

method	result	size
parts	$\frac{x^{3} \operatorname{Ci}(bx)}{3}-\frac{b^{2} x^{2} \sin(bx)-2 \sin(bx)+2 b x \cos(bx)}{3 b^{3}}$	42
derivativedivides	$\frac{\frac{b^{3} x^{3} \operatorname{Ci}(bx)}{3}-\frac{b^{2} x^{2} \sin(bx)}{3}+\frac{2 \sin(bx)}{3}-\frac{2 b x \cos(bx)}{3}}{b^{3}}$	44
default	$\frac{\frac{b^{3} x^{3} \operatorname{Ci}(bx)}{3}-\frac{b^{2} x^{2} \sin(bx)}{3}+\frac{2 \sin(bx)}{3}-\frac{2 b x \cos(bx)}{3}}{b^{3}}$	44
meijerg	$\frac{2\sqrt{\pi}\left(-\frac{b^{5} x^{5} \operatorname{hypergeom}\left(\left[1,1,\frac{5}{2}\right],\left[\frac{3}{2},2,2,\frac{7}{2}\right],-\frac{b^{2} x^{2}}{4}\right)}{40\sqrt{\pi}}+\frac{\left(-\frac{2}{3}+2\gamma+2\ln(x)+2\ln(b)\right) x^{3} b^{3}}{12\sqrt{\pi}}\right)}{b^{3}}$	63

[In] int(x^2*Ci(b*x),x,method=_RETURNVERBOSE)

[Out] 1/3*x^3*Ci(b*x)-1/3/b^3*(b^2*x^2*sin(b*x)-2*sin(b*x)+2*b*x*cos(b*x))

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 54, normalized size of antiderivative = 1.10

$$\int x^2 \operatorname{CosIntegral}(bx)\, dx = \frac{\pi^2 b^3 x^3 \operatorname{C}(bx) - \pi b^2 x^2 \sin\left(\frac{1}{2}\pi b^2 x^2\right) - 2\cos\left(\frac{1}{2}\pi b^2 x^2\right)}{3\pi^2 b^3}$$

[In] integrate(x^2*fresnel_cos(b*x),x, algorithm="fricas")

[Out] 1/3*(pi^2*b^3*x^3*fresnel_cos(b*x) - pi*b^2*x^2*sin(1/2*pi*b^2*x^2) - 2*cos
(1/2*pi*b^2*x^2))/(pi^2*b^3)

Sympy [A] (verification not implemented)

Time = 1.23 (sec) , antiderivative size = 70, normalized size of antiderivative = 1.43

$$\int x^2 \operatorname{CosIntegral}(bx)\, dx = -\frac{x^3 \log(bx)}{3} + \frac{x^3 \log(b^2x^2)}{6} + \frac{x^3 \operatorname{Ci}(bx)}{3} - \frac{x^2 \sin(bx)}{3b} - \frac{2x\cos(bx)}{3b^2} + \frac{2\sin(bx)}{3b^3}$$

[In] integrate(x**2*Ci(b*x),x)

[Out] -x**3*log(b*x)/3 + x**3*log(b**2*x**2)/6 + x**3*Ci(b*x)/3 - x**2*sin(b*x)/(
3*b) - 2*x*cos(b*x)/(3*b**2) + 2*sin(b*x)/(3*b**3)

Maxima [A] (verification not implemented)

none

Time = 0.21 (sec) , antiderivative size = 49, normalized size of antiderivative = 1.00

$$\int x^2 \operatorname{CosIntegral}(bx)\,dx = \frac{1}{3}\,x^3\,\mathrm{C}\,(bx) - \frac{\pi b^2 x^2 \sin\left(\frac{1}{2}\,\pi b^2 x^2\right) + 2\,\cos\left(\frac{1}{2}\,\pi b^2 x^2\right)}{3\,\pi^2 b^3}$$

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

```
[Out] 1/3*x^3*fresnel_cos(b*x) - 1/3*(pi*b^2*x^2*sin(1/2*pi*b^2*x^2) + 2*cos(1/2*
pi*b^2*x^2))/(pi^2*b^3)
```

Giac [F]

$$\int x^2 \operatorname{CosIntegral}(bx)\,dx = \int x^2\,\mathrm{C}\,(bx)\;dx$$

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

```
[Out] integrate(x^2*fresnel_cos(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \operatorname{CosIntegral}(bx)\,dx = \frac{x^3 \operatorname{cosint}(b\,x)}{3} - \frac{b^2\,x^2\,\sin(b\,x) - 2\,\sin(b\,x) + 2\,b\,x\,\cos(b\,x)}{3\,b^3}$$

```
[In] int(x^2*cosint(b*x),x)
```

```
[Out] (x^3*cosint(b*x))/3 - (b^2*x^2*sin(b*x) - 2*sin(b*x) + 2*b*x*cos(b*x))/(3*b
^3)
```

3.72 $\int x \operatorname{CosIntegral}(bx)\,dx$

Optimal result

Integrand size = 6, antiderivative size = 35

$$\int x \operatorname{CosIntegral}(bx)\,dx = -\frac{\cos(bx)}{2b^2} + \frac{1}{2}x^2 \operatorname{CosIntegral}(bx) - \frac{x\sin(bx)}{2b}$$

```
[Out] 1/2*x^2*Ci(b*x)-1/2*cos(b*x)/b^2-1/2*x*sin(b*x)/b
```

Rubi [A] (verified)

Time = 0.02 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.667, Rules used = {6639, 12, 3377, 2718}

$$\int x \operatorname{CosIntegral}(bx)\,dx = -\frac{\cos(bx)}{2b^2} + \frac{1}{2}x^2 \operatorname{CosIntegral}(bx) - \frac{x\sin(bx)}{2b}$$

```
[In] Int[x*CosIntegral[b*x],x]
```

```
[Out] -1/2*Cos[b*x]/b^2 + (x^2*CosIntegral[b*x])/2 - (x*Sin[b*x])/(2*b)
```

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 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 6639

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

Rubi steps

$$\begin{aligned} \text{integral} &= \frac{1}{2}x^2 \operatorname{CosIntegral}(bx) - \frac{1}{2}b \int \frac{x\cos(bx)}{b}\,dx \\ &= \frac{1}{2}x^2 \operatorname{CosIntegral}(bx) - \frac{1}{2}\int x\cos(bx)\,dx \\ &= \frac{1}{2}x^2 \operatorname{CosIntegral}(bx) - \frac{x\sin(bx)}{2b} + \frac{\int \sin(bx)\,dx}{2b} \\ &= -\frac{\cos(bx)}{2b^2} + \frac{1}{2}x^2 \operatorname{CosIntegral}(bx) - \frac{x\sin(bx)}{2b} \end{aligned}$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.00

$$\int x \operatorname{CosIntegral}(bx)\,dx = -\frac{\cos(bx)}{2b^2} + \frac{1}{2}x^2 \operatorname{CosIntegral}(bx) - \frac{x\sin(bx)}{2b}$$

```
[In] Integrate[x*CosIntegral[b*x],x]
[Out] -1/2*Cos[b*x]/b^2 + (x^2*CosIntegral[b*x])/2 - (x*Sin[b*x])/(2*b)
```

Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 28, normalized size of antiderivative = 0.80

method	result	size
parts	$\frac{x^2\,\mathrm{Ci}(bx)}{2}-\frac{\cos(bx)+bx\sin(bx)}{2b^2}$	28
derivativedivides	$\frac{\frac{b^2x^2\,\mathrm{Ci}(bx)}{2}-\frac{\cos(bx)}{2}-\frac{bx\sin(bx)}{2}}{b^2}$	32
default	$\frac{\frac{b^2x^2\,\mathrm{Ci}(bx)}{2}-\frac{\cos(bx)}{2}-\frac{bx\sin(bx)}{2}}{b^2}$	32
meijerg	$\frac{\sqrt{\pi}\left(\frac{\frac{b^2x^2}{2}+1}{2\sqrt{\pi}}-\frac{b^2x^2\gamma}{2\sqrt{\pi}}-\frac{b^2x^2\ln(2)}{2\sqrt{\pi}}-\frac{b^2x^2\ln\left(\frac{bx}{2}\right)}{2\sqrt{\pi}}-\frac{\cos(bx)}{2\sqrt{\pi}}-\frac{bx\sin(bx)}{2\sqrt{\pi}}+\frac{b^2x^2\,\mathrm{Ci}(bx)}{2\sqrt{\pi}}+\frac{(2\gamma-1+2\ln(x)+2\ln(b))x^2b^2}{4\sqrt{\pi}}\right)}{b^2}$	124

```
[In] int(x*Ci(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/2*x^2*Ci(b*x)-1/2/b^2*(cos(b*x)+b*x*sin(b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 51, normalized size of antiderivative = 1.46

$$\int x\,\mathrm{CosIntegral}(bx)\,dx=\frac{\pi b^3x^2\,\mathrm{C}\left(bx\right)-b^2x\sin\left(\frac{1}{2}\pi b^2x^2\right)+\sqrt{b^2}\,\mathrm{S}\left(\sqrt{b^2}x\right)}{2\,\pi b^3}$$

```
[In] integrate(x*fresnel_cos(b*x),x, algorithm="fricas")
```

```
[Out] 1/2*(pi*b^3*x^2*fresnel_cos(b*x) - b^2*x*sin(1/2*pi*b^2*x^2) + sqrt(b^2)*fr
esnel_sin(sqrt(b^2)*x))/(pi*b^3)
```

Sympy [A] (verification not implemented)

Time = 0.88 (sec) , antiderivative size = 53, normalized size of antiderivative = 1.51

$$\int x\,\mathrm{CosIntegral}(bx)\,dx=-\frac{x^2\log\left(bx\right)}{2}+\frac{x^2\log\left(b^2x^2\right)}{4}+\frac{x^2\,\mathrm{Ci}\left(bx\right)}{2}-\frac{x\sin\left(bx\right)}{2b}-\frac{\cos\left(bx\right)}{2b^2}$$

```
[In] integrate(x*Ci(b*x),x)
```

```
[Out] -x**2*log(b*x)/2 + x**2*log(b**2*x**2)/4 + x**2*Ci(b*x)/2 - x*sin(b*x)/(2*b
) - cos(b*x)/(2*b**2)
```

Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.29 (sec) , antiderivative size = 70, normalized size of antiderivative = 2.00

$$\int x\,\mathrm{CosIntegral}(bx)\,dx = \frac{1}{2}\,x^2\,\mathrm{C}\left(bx\right) - \frac{\sqrt{\frac{1}{2}}\left(4\,\sqrt{\frac{1}{2}}\pi bx\sin\left(\frac{1}{2}\,\pi b^2x^2\right) - (i+1)\,\left(\frac{1}{4}\right)^{\frac{1}{4}}\pi\,\mathrm{erf}\left(\sqrt{\frac{1}{2}i\,\pi}bx\right) + (i-1)\,\left(\frac{1}{4}\right)^{\frac{1}{4}}\pi\,\mathrm{erf}\left(\sqrt{-\frac{1}{2}i\,\pi}bx\right)\right)}{4\,\pi^2b^2}$$

```
[In] integrate(x*fresnel_cos(b*x),x, algorithm="maxima")
[Out] 1/2*x^2*fresnel_cos(b*x) - 1/4*sqrt(1/2)*(4*sqrt(1/2)*pi*b*x*sin(1/2*pi*b^2
*x^2) - (I + 1)*(1/4)^(1/4)*pi*erf(sqrt(1/2*I*pi)*b*x) + (I - 1)*(1/4)^(1/4
)*pi*erf(sqrt(-1/2*I*pi)*b*x))/(pi^2*b^2)
```

Giac [F]

$$\int x\,\mathrm{CosIntegral}(bx)\,dx = \int x\,\mathrm{C}\left(bx\right)\,dx$$

```
[In] integrate(x*fresnel_cos(b*x),x, algorithm="giac")
[Out] integrate(x*fresnel_cos(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int x\,\mathrm{CosIntegral}(bx)\,dx = \frac{x^2\,\mathrm{cosint}(b\,x)}{2} - \frac{\cos\left(b\,x\right) + b\,x\,\sin\left(b\,x\right)}{2\,b^2}$$

```
[In] int(x*cosint(b*x),x)
[Out] (x^2*cosint(b*x))/2 - (cos(b*x) + b*x*sin(b*x))/(2*b^2)
```

3.73 $\int \text{CosIntegral}(bx)\,dx$

Optimal result

Integrand size = 4, antiderivative size = 16

$$\int \text{CosIntegral}(bx)\,dx = x\,\text{CosIntegral}(bx) - \frac{\sin(bx)}{b}$$

```
[Out] x*Ci(b*x)-sin(b*x)/b
```

Rubi [A] (verified)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {6635}

$$\int \text{CosIntegral}(bx)\,dx = x\,\text{CosIntegral}(bx) - \frac{\sin(bx)}{b}$$

```
[In] Int[CosIntegral[b*x],x]
```

```
[Out] x*CosIntegral[b*x] - Sin[b*x]/b
```

Rule 6635

```
Int[CosIntegral[(a_.) + (b_.)*(x_)], x_Symbol] :> Simp[(a + b*x)*(CosIntegr
al[a + b*x]/b), x] - Simp[Sin[a + b*x]/b, x] /; FreeQ[{a, b}, x]
```

Rubi steps

$$\text{integral} = x\,\text{CosIntegral}(bx) - \frac{\sin(bx)}{b}$$

Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \text{CosIntegral}(bx)\,dx = x\,\text{CosIntegral}(bx) - \frac{\sin(bx)}{b}$$

[In] Integrate[CosIntegral[b*x],x]

[Out] x*CosIntegral[b*x] - Sin[b*x]/b

Maple [A] (verified)

Time = 0.24 (sec) , antiderivative size = 17, normalized size of antiderivative = 1.06

method	result	size
parts	$x\ \text{Ci}\left(bx\right)-\frac{\sin\left(bx\right)}{b}$	17
derivativedivides	$\frac{\text{Ci}\left(bx\right)bx-\sin\left(bx\right)}{b}$	19
default	$\frac{\text{Ci}\left(bx\right)bx-\sin\left(bx\right)}{b}$	19
meijerg	$\frac{\sqrt{\pi}\left(\frac{2bx}{\sqrt{\pi}}-\frac{2bx\gamma}{\sqrt{\pi}}-\frac{2bx\ln\left(2\right)}{\sqrt{\pi}}-\frac{2bx\ln\left(\frac{bx}{2}\right)}{\sqrt{\pi}}-\frac{2\sin\left(bx\right)}{\sqrt{\pi}}+\frac{2bx\ \text{Ci}\left(bx\right)}{\sqrt{\pi}}+\frac{\left(2\gamma-2+2\ln\left(x\right)+2\ln\left(b\right)\right)xb}{\sqrt{\pi}}\right)}{2b}$	85

[In] int(Ci(b*x),x,method=_RETURNVERBOSE)

[Out] x*Ci(b*x)-sin(b*x)/b

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 28, normalized size of antiderivative = 1.75

$$\int \text{CosIntegral}(bx)\,dx = \frac{\pi bx\,\mathrm{C}\left(bx\right) - \sin\left(\frac{1}{2}\,\pi b^2x^2\right)}{\pi b}$$

[In] integrate(fresnel_cos(b*x),x, algorithm="fricas")

[Out] (pi*b*x*fresnel_cos(b*x) - sin(1/2*pi*b^2*x^2))/(pi*b)

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 31 vs. $2(12) = 24$.

Time = 0.82 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.94

$$\int \text{CosIntegral}(bx)\,dx = -x\log(bx) + \frac{x\log(b^2x^2)}{2} + x\,\text{Ci}(bx) - \frac{\sin(bx)}{b}$$

```
[In] integrate(Ci(b*x),x)
[Out] -x*log(b*x) + x*log(b**2*x**2)/2 + x*Ci(b*x) - sin(b*x)/b
```

Maxima [A] (verification not implemented)

none

Time = 0.20 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.69

$$\int \text{CosIntegral}(bx)\,dx = \frac{bx\,\text{C}(bx) - \frac{\sin\left(\frac{1}{2}\pi b^2x^2\right)}{\pi}}{b}$$

```
[In] integrate(fresnel_cos(b*x),x, algorithm="maxima")
[Out] (b*x*fresnel_cos(b*x) - sin(1/2*pi*b^2*x^2)/pi)/b
```

Giac [F]

$$\int \text{CosIntegral}(bx)\,dx = \int \text{C}(bx)\,dx$$

```
[In] integrate(fresnel_cos(b*x),x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \text{CosIntegral}(bx)\,dx = x\,\text{cosint}(b\,x) - \frac{\sin(b\,x)}{b}$$

```
[In] int(cosint(b*x),x)
[Out] x*cosint(b*x) - sin(b*x)/b
```

3.74 $\int \frac{\text{CosIntegral}(bx)}{x} dx$

Optimal result

Integrand size = 8, antiderivative size = 61

$$\int \frac{\text{CosIntegral}(bx)}{x} dx = -\frac{1}{2} ibx\,{}_3F_3(1,1,1;2,2,2;-ibx) + \frac{1}{2} ibx\,{}_3F_3(1,1,1;2,2,2;ibx) + \gamma \log(x) + \frac{1}{2}\log^2(bx)$$

```
[Out] -1/2*I*b*x*hypergeom([1, 1, 1],[2, 2, 2],-I*b*x)+1/2*I*b*x*hypergeom([1, 1,
 1],[2, 2, 2],I*b*x)+EulerGamma*ln(x)+1/2*ln(b*x)^2
```

Rubi [A] (verified)

Time = 0.02 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {6637}

$$\int \frac{\text{CosIntegral}(bx)}{x} dx = -\frac{1}{2} ibx\,{}_3F_3(1,1,1;2,2,2;-ibx) + \frac{1}{2} ibx\,{}_3F_3(1,1,1;2,2,2;ibx) + \frac{1}{2}\log^2(bx) + \gamma \log(x)$$

```
[In] Int[CosIntegral[b*x]/x,x]
```

```
[Out] (-1/2*I)*b*x*HypergeometricPFQ[{1, 1, 1}, {2, 2, 2}, (-I)*b*x] + (I/2)*b*x*
HypergeometricPFQ[{1, 1, 1}, {2, 2, 2}, I*b*x] + EulerGamma*Log[x] + Log[b*
x]^2/2
```

Rule 6637

```
Int[CosIntegral[(b_.)*(x_)]/(x_), x_Symbol] :> Simp[(-2^(-1))*I*b*x*Hyperge
ometricPFQ[{1, 1, 1}, {2, 2, 2}, (-I)*b*x], x] + (Simp[(1/2)*I*b*x*Hypergeo
metricPFQ[{1, 1, 1}, {2, 2, 2}, I*b*x], x] + Simp[EulerGamma*Log[x], x] + S
```

```
imp[(1/2)*Log[b*x]^2, x]) /; FreeQ[b, x]
```

Rubi steps

$$\text{integral} = -\frac{1}{2} ibx\,{}_3F_3(1,1,1;2,2,2;-ibx) + \frac{1}{2} ibx\,{}_3F_3(1,1,1;2,2,2;ibx) + \gamma \log(x) + \frac{1}{2}\log^2(bx)$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 94, normalized size of antiderivative = 1.54

$$\int \frac{\text{CosIntegral}(bx)}{x}\,dx = \frac{1}{2}\big(-ibx\,{}_3F_3(1,1,1;2,2,2;-ibx) + ibx\,{}_3F_3(1,1,1;2,2,2;ibx) + \log(x)(2\gamma + 2\,\text{CosIntegral}(bx) + \Gamma(0,-ibx) + \Gamma(0,ibx) - \log(x) + \log(-ibx) + \log(ibx))\big)$$

```
[In] Integrate[CosIntegral[b*x]/x,x]
```

```
[Out] ((-I)*b*x*HypergeometricPFQ[{1, 1, 1}, {2, 2, 2}, (-I)*b*x] + I*b*x*Hyperge
ometricPFQ[{1, 1, 1}, {2, 2, 2}, I*b*x] + Log[x]*(2*EulerGamma + 2*CosInteg
ral[b*x] + Gamma[0, (-I)*b*x] + Gamma[0, I*b*x] - Log[x] + Log[(-I)*b*x] +
Log[I*b*x]))/2
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 157 vs. 2(51) = 102.

Time = 0.45 (sec) , antiderivative size = 158, normalized size of antiderivative = 2.59

method	result
meijerg	$\frac{\sqrt{\pi}\left(-\frac{b^2x^2\,\text{hypergeom}\left([1,1,1],\left[\frac{3}{2},2,2,2\right],-\frac{b^2x^2}{4}\right)}{2\sqrt{\pi}}+\frac{-2\gamma(-\gamma-2\ln(2))-4\ln(x)(-\gamma-2\ln(2))+4\ln(2)(-\gamma-2\ln(2))-4\ln(b)(-\gamma-2\ln(2))+8\ln(x)\ln(b)}{}\right.}{4}$

```
[In] int(Ci(b*x)/x,x,method=_RETURNVERBOSE)
```

```
[Out] 1/4*Pi^(1/2)*(-1/2/Pi^(1/2)*b^2*x^2*hypergeom([1,1,1],[3/2,2,2,2],-1/4*b^2*
x^2)+1/2*(-2*gamma*(-gamma-2*ln(2))-4*ln(x)*(-gamma-2*ln(2))+4*ln(2)*(-gamm
a-2*ln(2))-4*ln(b)*(-gamma-2*ln(2))+8*ln(x)*ln(b)-8*ln(x)*ln(2)-1/3*Pi^2+(-
gamma-2*ln(2))^2+gamma^2+4*ln(x)^2+4*ln(b)^2+4*ln(2)^2-4*ln(2)*gamma+4*ln(b
)*gamma-8*ln(2)*ln(b)+4*ln(x)*gamma)/Pi^(1/2))
```

Fricas [F]

$$\int \frac{\text{CosIntegral}(bx)}{x}\,dx = \int \frac{\text{C}\,(bx)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x)/x,x, algorithm="fricas")
```

```
[Out] integral(fresnel_cos(b*x)/x, x)
```

Sympy [A] (verification not implemented)

Time = 0.58 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.72

$$\int \frac{\text{CosIntegral}(bx)}{x}\,dx = -\frac{b^2x^2{}_3F_4\left(\begin{matrix}1,1,1\\ \frac{3}{2},2,2,2\end{matrix}\middle| -\frac{b^2x^2}{4}\right)}{8} + \frac{\log\left(b^2x^2\right)^2}{8} + \frac{\gamma\log\left(b^2x^2\right)}{2}$$

```
[In] integrate(Ci(b*x)/x,x)
```

```
[Out] -b**2*x**2*hyper((1, 1, 1), (3/2, 2, 2, 2), -b**2*x**2/4)/8 + log(b**2*x**2
)**2/8 + EulerGamma*log(b**2*x**2)/2
```

Maxima [F]

$$\int \frac{\text{CosIntegral}(bx)}{x}\,dx = \int \frac{\text{C}\,(bx)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x)/x,x, algorithm="maxima")
```

```
[Out] integrate(fresnel_cos(b*x)/x, x)
```

Giac [F]

$$\int \frac{\text{CosIntegral}(bx)}{x}\,dx = \int \frac{\text{C}\,(bx)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x)/x,x, algorithm="giac")
```

```
[Out] integrate(fresnel_cos(b*x)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{CosIntegral}(bx)}{x}\,dx = \int \frac{\text{cosint}(b\,x)}{x}\,dx$$

```
[In] int(cosint(b*x)/x,x)
[Out] int(cosint(b*x)/x, x)
```

3.75 $\int \frac{\text{CosIntegral}(bx)}{x^2}\,dx$

Optimal result

Integrand size = 8, antiderivative size = 26

$$\int \frac{\text{CosIntegral}(bx)}{x^2}\,dx = -\frac{\cos(bx)}{x} - \frac{\text{CosIntegral}(bx)}{x} - b\text{Si}(bx)$$

```
[Out] -Ci(b*x)/x-cos(b*x)/x-b*Si(b*x)
```

Rubi [A] (verified)

Time = 0.03 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6639, 12, 3378, 3380}

$$\int \frac{\text{CosIntegral}(bx)}{x^2}\,dx = -\frac{\text{CosIntegral}(bx)}{x} - b\text{Si}(bx) - \frac{\cos(bx)}{x}$$

```
[In] Int[CosIntegral[b*x]/x^2,x]
```

```
[Out] -(Cos[b*x]/x) - CosIntegral[b*x]/x - b*SinIntegral[b*x]
```

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 3378

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(c
 + d*x)^(m + 1)*(Sin[e + f*x]/(d*(m + 1))), x] - Dist[f/(d*(m + 1)), Int[(c
 + d*x)^(m + 1)*Cos[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && LtQ[m, -1
```

```
]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 6639

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

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{\text{CosIntegral}(bx)}{x} + b\int \frac{\cos(bx)}{bx^2}\,dx \\
&= -\frac{\text{CosIntegral}(bx)}{x} + \int \frac{\cos(bx)}{x^2}\,dx \\
&= -\frac{\cos(bx)}{x} - \frac{\text{CosIntegral}(bx)}{x} - b\int \frac{\sin(bx)}{x}\,dx \\
&= -\frac{\cos(bx)}{x} - \frac{\text{CosIntegral}(bx)}{x} - b\text{Si}(bx)
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 26, normalized size of antiderivative = 1.00

$$\int \frac{\text{CosIntegral}(bx)}{x^2}\,dx = -\frac{\cos(bx)}{x} - \frac{\text{CosIntegral}(bx)}{x} - b\text{Si}(bx)$$

```
[In] Integrate[CosIntegral[b*x]/x^2,x]
[Out] -(Cos[b*x]/x) - CosIntegral[b*x]/x - b*SinIntegral[b*x]
```

Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 32, normalized size of antiderivative = 1.23

method	result	size
parts	$-\frac{\operatorname{Ci}(bx)}{x}+b\left(-\frac{\cos(bx)}{bx}-\operatorname{Si}(bx)\right)$	32
derivativedivides	$b\left(-\frac{\operatorname{Ci}(bx)}{bx}-\frac{\cos(bx)}{bx}-\operatorname{Si}(bx)\right)$	34
default	$b\left(-\frac{\operatorname{Ci}(bx)}{bx}-\frac{\cos(bx)}{bx}-\operatorname{Si}(bx)\right)$	34
meijerg	$\frac{b\sqrt{\pi}\left(-\frac{2bx\,\mathrm{hypergeom}\left(\left[\frac{1}{2},1,1\right],\left[\frac{3}{2},\frac{3}{2},2,2\right],-\frac{b^2x^2}{4}\right)}{\sqrt{\pi}}-\frac{4(2+2\gamma+2\ln(x)+2\ln(b))}{\sqrt{\pi}\,xb}\right)}{8}$	57

```
[In] int(Ci(b*x)/x^2,x,method=_RETURNVERBOSE)
[Out] -Ci(b*x)/x+b*(-cos(b*x)/b/x-Si(b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 25, normalized size of antiderivative = 0.96

$$\int \frac{\mathrm{CosIntegral}(bx)}{x^2}\,dx = \frac{bx\operatorname{Ci}\left(\frac{1}{2}\,\pi b^2x^2\right)-2\,\mathrm{C}\left(bx\right)}{2\,x}$$

```
[In] integrate(fresnel_cos(b*x)/x^2,x, algorithm="fricas")
[Out] 1/2*(b*x*cos_integral(1/2*pi*b^2*x^2) - 2*fresnel_cos(b*x))/x
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 42 vs. 2(20) = 40.

Time = 0.62 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.62

$$\int \frac{\mathrm{CosIntegral}(bx)}{x^2}\,dx = -\frac{b^2x\,{}_3F_4\left(\begin{matrix}\frac{1}{2},1,1\\ \frac{3}{2},\frac{3}{2},2,2\end{matrix}\middle|-\frac{b^2x^2}{4}\right)}{4}-\frac{\log\left(b^2x^2\right)}{2x}-\frac{1}{x}-\frac{\gamma}{x}$$

```
[In] integrate(Ci(b*x)/x**2,x)
[Out] -b**2*x*hyper((1/2, 1, 1), (3/2, 3/2, 2, 2), -b**2*x**2/4)/4 - log(b**2*x**
2)/(2*x) - 1/x - EulerGamma/x
```

Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.29 (sec) , antiderivative size = 34, normalized size of antiderivative = 1.31

$$\int \frac{\text{CosIntegral}(bx)}{x^2}\,dx = \frac{1}{4}b\left(\text{Ei}\left(\frac{1}{2}i\,\pi b^2x^2\right) + \text{Ei}\left(-\frac{1}{2}i\,\pi b^2x^2\right)\right) - \frac{\text{C}\,(bx)}{x}$$

```
[In] integrate(fresnel_cos(b*x)/x^2,x, algorithm="maxima")
[Out] 1/4*b*(Ei(1/2*I*pi*b^2*x^2) + Ei(-1/2*I*pi*b^2*x^2)) - fresnel_cos(b*x)/x
```

Giac [F]

$$\int \frac{\text{CosIntegral}(bx)}{x^2}\,dx = \int \frac{\text{C}\,(bx)}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x)/x^2,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x)/x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{CosIntegral}(bx)}{x^2}\,dx = -b\,\text{sinint}(b\,x) - \frac{\text{cosint}(b\,x)}{x} - \frac{\cos\,(b\,x)}{x}$$

```
[In] int(cosint(b*x)/x^2,x)
[Out] - b*sinint(b*x) - cosint(b*x)/x - cos(b*x)/x
```

3.76 $\int \frac{\text{CosIntegral}(bx)}{x^3} dx$

Optimal result

Integrand size = 8, antiderivative size = 46

$$\int \frac{\text{CosIntegral}(bx)}{x^3} dx = -\frac{\cos(bx)}{4x^2} - \frac{1}{4}b^2 \text{CosIntegral}(bx) - \frac{\text{CosIntegral}(bx)}{2x^2} + \frac{b\sin(bx)}{4x}$$

```
[Out] -1/4*b^2*Ci(b*x)-1/2*Ci(b*x)/x^2-1/4*cos(b*x)/x^2+1/4*b*sin(b*x)/x
```

Rubi [A] (verified)

Time = 0.05 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6639, 12, 3378, 3383}

$$\int \frac{\text{CosIntegral}(bx)}{x^3} dx = -\frac{1}{4}b^2 \text{CosIntegral}(bx) - \frac{\text{CosIntegral}(bx)}{2x^2} - \frac{\cos(bx)}{4x^2} + \frac{b\sin(bx)}{4x}$$

```
[In] Int[CosIntegral[b*x]/x^3,x]
```

```
[Out] -1/4*Cos[b*x]/x^2 - (b^2*CosIntegral[b*x])/4 - CosIntegral[b*x]/(2*x^2) + (
b*Sin[b*x])/(4*x)
```

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 3378

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(c
 + d*x)^(m + 1)*(Sin[e + f*x]/(d*(m + 1))), x] - Dist[f/(d*(m + 1)), Int[(c
 + d*x)^(m + 1)*Cos[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && LtQ[m, -1
```

```
]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 6639

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

Rubi steps

$$
\begin{aligned}
\text{integral} &= -\frac{\text{CosIntegral}(bx)}{2x^2} + \frac{1}{2}b\int \frac{\cos(bx)}{bx^3}\,dx \\
&= -\frac{\text{CosIntegral}(bx)}{2x^2} + \frac{1}{2}\int \frac{\cos(bx)}{x^3}\,dx \\
&= -\frac{\cos(bx)}{4x^2} - \frac{\text{CosIntegral}(bx)}{2x^2} - \frac{1}{4}b\int \frac{\sin(bx)}{x^2}\,dx \\
&= -\frac{\cos(bx)}{4x^2} - \frac{\text{CosIntegral}(bx)}{2x^2} + \frac{b\sin(bx)}{4x} - \frac{1}{4}b^2\int \frac{\cos(bx)}{x}\,dx \\
&= -\frac{\cos(bx)}{4x^2} - \frac{1}{4}b^2\,\text{CosIntegral}(bx) - \frac{\text{CosIntegral}(bx)}{2x^2} + \frac{b\sin(bx)}{4x}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 46, normalized size of antiderivative = 1.00

$$\int \frac{\text{CosIntegral}(bx)}{x^3}\,dx = -\frac{\cos(bx)}{4x^2} - \frac{1}{4}b^2\,\text{CosIntegral}(bx) - \frac{\text{CosIntegral}(bx)}{2x^2} + \frac{b\sin(bx)}{4x}$$

```
[In] Integrate[CosIntegral[b*x]/x^3,x]
[Out] -1/4*Cos[b*x]/x^2 - (b^2*CosIntegral[b*x])/4 - CosIntegral[b*x]/(2*x^2) + (
b*Sin[b*x])/(4*x)
```

Maple [A] (verified)

Time = 0.36 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.02

method	result
parts	$-\frac{\operatorname{Ci}(bx)}{2x^2}+\frac{b^2\left(-\frac{\cos(bx)}{2b^2x^2}+\frac{\sin(bx)}{2bx}-\frac{\operatorname{Ci}(bx)}{2}\right)}{2}$
derivativedivides	$b^2\left(-\frac{\operatorname{Ci}(bx)}{2b^2x^2}-\frac{\cos(bx)}{4b^2x^2}+\frac{\sin(bx)}{4bx}-\frac{\operatorname{Ci}(bx)}{4}\right)$
default	$b^2\left(-\frac{\operatorname{Ci}(bx)}{2b^2x^2}-\frac{\cos(bx)}{4b^2x^2}+\frac{\sin(bx)}{4bx}-\frac{\operatorname{Ci}(bx)}{4}\right)$
meijerg	$\frac{\sqrt{\pi}\,b^2\left(\frac{-8b^2x^2+4}{\sqrt{\pi}\,b^2x^2}+\frac{4\left(3b^2x^2+6\right)\gamma}{3\sqrt{\pi}\,b^2x^2}+\frac{4\left(3b^2x^2+6\right)\ln(2)}{3\sqrt{\pi}\,b^2x^2}+\frac{4\left(3b^2x^2+6\right)\ln\left(\frac{bx}{2}\right)}{3\sqrt{\pi}\,b^2x^2}-\frac{4\cos(bx)}{\sqrt{\pi}\,b^2x^2}+\frac{4\sin(bx)}{\sqrt{\pi}\,bx}-\frac{4\left(3b^2x^2+6\right)\operatorname{Ci}(bx)}{3\sqrt{\pi}\,b^2x^2}-\frac{4(1+}{}\right.}{16}$

```
[In] int(Ci(b*x)/x^3,x,method=_RETURNVERBOSE)
[Out] -1/2*Ci(b*x)/x^2+1/2*b^2*(-1/2*cos(b*x)/b^2/x^2+1/2*sin(b*x)/b/x-1/2*Ci(b*x
))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 42, normalized size of antiderivative = 0.91

$$\int \frac{\text{CosIntegral}(bx)}{x^3}\,dx=-\frac{\pi\sqrt{b^2}bx^2\,\mathrm{S}\left(\sqrt{b^2}x\right)+bx\cos\left(\frac{1}{2}\pi b^2x^2\right)+\mathrm{C}\left(bx\right)}{2\,x^2}$$

```
[In] integrate(fresnel_cos(b*x)/x^3,x, algorithm="fricas")
[Out] -1/2*(pi*sqrt(b^2)*b*x^2*fresnel_sin(sqrt(b^2)*x) + b*x*cos(1/2*pi*b^2*x^2)
 + fresnel_cos(b*x))/x^2
```

Sympy [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 87 vs. 2(39) = 78.

Time = 1.48 (sec) , antiderivative size = 87, normalized size of antiderivative = 1.89

$$\int \frac{\text{CosIntegral}(bx)}{x^3}\,dx=\frac{b^2\log\left(bx\right)}{4}-\frac{b^2\log\left(b^2x^2\right)}{8}-\frac{b^2\operatorname{Ci}\left(bx\right)}{4}+\frac{b\sin\left(bx\right)}{4x}+\frac{\log\left(bx\right)}{2x^2}-\frac{\log\left(b^2x^2\right)}{4x^2}-\frac{\cos\left(bx\right)}{4x^2}-\frac{\operatorname{Ci}\left(bx\right)}{2x^2}$$

```
[In] integrate(Ci(b*x)/x**3,x)
[Out] b**2*log(b*x)/4 - b**2*log(b**2*x**2)/8 - b**2*Ci(b*x)/4 + b*sin(b*x)/(4*x)
 + log(b*x)/(2*x**2) - log(b**2*x**2)/(4*x**2) - cos(b*x)/(4*x**2) - Ci(b*x
)/(2*x**2)
```

Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.35 (sec) , antiderivative size = 61, normalized size of antiderivative = 1.33

$$\int \frac{\text{CosIntegral}(bx)}{x^3}\,dx = -\frac{\sqrt{\frac{1}{2}}\sqrt{\pi x^2}\left((i+1)\,\sqrt{2}\Gamma\left(-\frac{1}{2},\frac{1}{2}i\,\pi b^2x^2\right)-(i-1)\,\sqrt{2}\Gamma\left(-\frac{1}{2},-\frac{1}{2}i\,\pi b^2x^2\right)\right)b^2}{16\,x} - \frac{\text{C}\,(bx)}{2\,x^2}$$

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

```
[Out] -1/16*sqrt(1/2)*sqrt(pi*x^2)*((I + 1)*sqrt(2)*gamma(-1/2, 1/2*I*pi*b^2*x^2)
 - (I - 1)*sqrt(2)*gamma(-1/2, -1/2*I*pi*b^2*x^2))*b^2/x - 1/2*fresnel_cos(
b*x)/x^2
```

Giac [F]

$$\int \frac{\text{CosIntegral}(bx)}{x^3}\,dx = \int \frac{\text{C}\,(bx)}{x^3}\,dx$$

```
[In] integrate(fresnel_cos(b*x)/x^3,x, algorithm="giac")
```

```
[Out] integrate(fresnel_cos(b*x)/x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{CosIntegral}(bx)}{x^3}\,dx = -\frac{\frac{\cos(b\,x)}{2}-\frac{b\,x\,\sin(b\,x)}{2}}{2\,x^2} - \frac{b^2\,\text{cosint}(b\,x)}{4} - \frac{\text{cosint}(b\,x)}{2\,x^2}$$

```
[In] int(cosint(b*x)/x^3,x)
```

```
[Out] - (cos(b*x)/2 - (b*x*sin(b*x))/2)/(2*x^2) - (b^2*cosint(b*x))/4 - cosint(b*
x)/(2*x^2)
```

3.77 $\int x^m \operatorname{CosIntegral}(bx)^2 \, dx$

Optimal result

Integrand size = 10, antiderivative size = 10

$$\int x^m \operatorname{CosIntegral}(bx)^2 \, dx = \operatorname{Int}\left(x^m \operatorname{CosIntegral}(bx)^2, x\right)$$

```
[Out] CannotIntegrate(x^m*Ci(b*x)^2,x)
```

Rubi [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^m \operatorname{CosIntegral}(bx)^2 \, dx = \int x^m \operatorname{CosIntegral}(bx)^2 \, dx$$

```
[In] Int[x^m*CosIntegral[b*x]^2,x]
[Out] Defer[Int][x^m*CosIntegral[b*x]^2, x]
```

Rubi steps

$$\text{integral} = \int x^m \operatorname{CosIntegral}(bx)^2 \, dx$$

Mathematica [N/A]

Not integrable

Time = 1.94 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \operatorname{CosIntegral}(bx)^2 \, dx = \int x^m \operatorname{CosIntegral}(bx)^2 \, dx$$

```
[In] Integrate[x^m*CosIntegral[b*x]^2,x]
[Out] Integrate[x^m*CosIntegral[b*x]^2, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.22 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int x^m \operatorname{Ci}(bx)^2 \, dx$$

```
[In] int(x^m*Ci(b*x)^2,x)
[Out] int(x^m*Ci(b*x)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \operatorname{CosIntegral}(bx)^2 \, dx = \int x^m \operatorname{C}(bx)^2 \, dx$$

```
[In] integrate(x^m*fresnel_cos(b*x)^2,x, algorithm="fricas")
[Out] integral(x^m*fresnel_cos(b*x)^2, x)
```

Sympy [N/A]

Not integrable

Time = 3.59 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int x^m \operatorname{CosIntegral}(bx)^2 \, dx = \int x^m \operatorname{Ci}^2(bx) \, dx$$

```
[In] integrate(x**m*Ci(b*x)**2,x)
[Out] Integral(x**m*Ci(b*x)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \operatorname{CosIntegral}(bx)^2 \, dx = \int x^m \operatorname{C}(bx)^2 \, dx$$

```
[In] integrate(x^m*fresnel_cos(b*x)^2,x, algorithm="maxima")
[Out] integrate(x^m*fresnel_cos(b*x)^2, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \operatorname{CosIntegral}(bx)^2 \, dx = \int x^m \operatorname{C}(bx)^2 \, dx$$

```
[In] integrate(x^m*fresnel_cos(b*x)^2,x, algorithm="giac")
[Out] integrate(x^m*fresnel_cos(b*x)^2, x)
```

Mupad [N/A]

Not integrable

Time = 4.89 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \operatorname{CosIntegral}(bx)^2 \, dx = \int x^m \operatorname{cosint}(b\,x)^2 \, dx$$

```
[In] int(x^m*cosint(b*x)^2,x)
[Out] int(x^m*cosint(b*x)^2, x)
```

3.78 $\int x^3 \operatorname{CosIntegral}(bx)^2 \, dx$

Optimal result

Integrand size = 10, antiderivative size = 163

$$\int x^3 \operatorname{CosIntegral}(bx)^2 \, dx = \frac{x^2}{4b^2} + \frac{3\cos^2(bx)}{8b^4} + \frac{3\cos(bx)\operatorname{CosIntegral}(bx)}{b^4} - \frac{3x^2\cos(bx)\operatorname{CosIntegral}(bx)}{2b^2} + \frac{1}{4}x^4\operatorname{CosIntegral}(bx)^2 - \frac{3\operatorname{CosIntegral}(2bx)}{2b^4} - \frac{3\log(x)}{2b^4} + \frac{x\cos(bx)\sin(bx)}{b^3} + \frac{3x\operatorname{CosIntegral}(bx)\sin(bx)}{b^3} - \frac{x^3\operatorname{CosIntegral}(bx)\sin(bx)}{2b} - \frac{13\sin^2(bx)}{8b^4} + \frac{x^2\sin^2(bx)}{4b^2}$$

```
[Out] 1/4*x^2/b^2+1/4*x^4*Ci(b*x)^2-3/2*Ci(2*b*x)/b^4+3*Ci(b*x)*cos(b*x)/b^4-3/2*
x^2*Ci(b*x)*cos(b*x)/b^2+3/8*cos(b*x)^2/b^4-3/2*ln(x)/b^4+3*x*Ci(b*x)*sin(b
*x)/b^3-1/2*x^3*Ci(b*x)*sin(b*x)/b+x*cos(b*x)*sin(b*x)/b^3-13/8*sin(b*x)^2/
b^4+1/4*x^2*sin(b*x)^2/b^2
```

Rubi [A] (verified)

Time = 0.16 (sec) , antiderivative size = 163, normalized size of antiderivative = 1.00, number of steps used = 19, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}} = 1.100$, Rules

used = {6643, 6649, 12, 3524, 3391, 30, 6655, 2644, 6653, 3393, 3383}

$$\int x^3 \operatorname{CosIntegral}(bx)^2\,dx = -\frac{3\operatorname{CosIntegral}(2bx)}{2b^4} + \frac{3\operatorname{CosIntegral}(bx)\cos(bx)}{b^4} - \frac{3\log(x)}{2b^4} - \frac{13\sin^2(bx)}{8b^4} + \frac{3\cos^2(bx)}{8b^4} + \frac{3x\operatorname{CosIntegral}(bx)\sin(bx)}{b^3} + \frac{x\sin(bx)\cos(bx)}{b^3} - \frac{3x^2\operatorname{CosIntegral}(bx)\cos(bx)}{2b^2} + \frac{x^2}{4b^2} + \frac{x^2\sin^2(bx)}{4b^2} + \frac{1}{4}x^4\operatorname{CosIntegral}(bx)^2 - \frac{x^3\operatorname{CosIntegral}(bx)\sin(bx)}{2b}$$

```
[In] Int[x^3*CosIntegral[b*x]^2,x]
```

```
[Out] x^2/(4*b^2) + (3*Cos[b*x]^2)/(8*b^4) + (3*Cos[b*x]*CosIntegral[b*x])/b^4 -
(3*x^2*Cos[b*x]*CosIntegral[b*x])/(2*b^2) + (x^4*CosIntegral[b*x]^2)/4 - (3
*CosIntegral[2*b*x])/(2*b^4) - (3*Log[x])/(2*b^4) + (x*Cos[b*x]*Sin[b*x])/b
^3 + (3*x*CosIntegral[b*x]*Sin[b*x])/b^3 - (x^3*CosIntegral[b*x]*Sin[b*x])/
(2*b) - (13*Sin[b*x]^2)/(8*b^4) + (x^2*Sin[b*x]^2)/(4*b^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 30

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

Rule 2644

```
Int[cos[(e_.) + (f_.)*(x_)]^(n_.)*((a_.)*sin[(e_.) + (f_.)*(x_)])^(m_.), x_
Symbol] :> Dist[1/(a*f), Subst[Int[x^m*(1 - x^2/a^2)^((n - 1)/2), x], x, a*
Sin[e + f*x]], x] /; FreeQ[{a, e, f, m}, x] && IntegerQ[(n - 1)/2] &&  !(In
tegerQ[(m - 1)/2] && LtQ[0, m, n])
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3391

```
Int[((c_.) + (d_.)*(x_))*((b_.)*sin[(e_.) + (f_.)*(x_)])^(n_), x_Symbol] :>
 Simp[d*((b*Sin[e + f*x])^n/(f^2*n^2)), x] + (Dist[b^2*((n - 1)/n), Int[(c
```

```
+ d*x)*(b*Sin[e + f*x])^(n - 2), x], x] - Simp[b*(c + d*x)*Cos[e + f*x]*((b
*Sin[e + f*x])^(n - 1)/(f*n)), x]) /; FreeQ[{b, c, d, e, f}, x] && GtQ[n, 1
]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 3524

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

Rule 6643

```
Int[CosIntegral[(b_.)*(x_)]^2*(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)*(CosI
ntegral[b*x]^2/(m + 1)), x] - Dist[2/(m + 1), Int[x^m*Cos[b*x]*CosIntegral[
b*x], x], x] /; FreeQ[b, x] && IGtQ[m, 0]
```

Rule 6649

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

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6655

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

Rubi steps

$$\text{integral} = \frac{1}{4}x^4 \operatorname{CosIntegral}(bx)^2 - \frac{1}{2}\int x^3 \cos(bx) \operatorname{CosIntegral}(bx)\,dx$$

$$= \frac{1}{4}x^4 \operatorname{CosIntegral}(bx)^2 - \frac{x^3 \operatorname{CosIntegral}(bx)\sin(bx)}{2b} + \frac{1}{2}\int \frac{x^2\cos(bx)\sin(bx)}{b}\,dx + \frac{3\int x^2 \operatorname{CosIntegral}(bx)\sin(bx)\,dx}{2b}$$

$$= -\frac{3x^2\cos(bx)\operatorname{CosIntegral}(bx)}{2b^2} + \frac{1}{4}x^4 \operatorname{CosIntegral}(bx)^2 - \frac{x^3 \operatorname{CosIntegral}(bx)\sin(bx)}{2b} + \frac{3\int x\cos(bx)\operatorname{CosIntegral}(bx)\,dx}{b^2} + \frac{\int x^2\cos(bx)\sin(bx)\,dx}{2b} + \frac{3\int \frac{x\cos^2(bx)}{b}\,dx}{2b}$$

$$= -\frac{3x^2\cos(bx)\operatorname{CosIntegral}(bx)}{2b^2} + \frac{1}{4}x^4 \operatorname{CosIntegral}(bx)^2 + \frac{3x\operatorname{CosIntegral}(bx)\sin(bx)}{b^3} - \frac{x^3 \operatorname{CosIntegral}(bx)\sin(bx)}{2b} + \frac{x^2\sin^2(bx)}{4b^2} - \frac{3\int \operatorname{CosIntegral}(bx)\sin(bx)\,dx}{b^3} - \frac{\int x\sin^2(bx)\,dx}{2b^2} + \frac{3\int x\cos^2(bx)\,dx}{2b^2} - \frac{3\int \frac{\cos(bx)\sin(bx)}{b}\,dx}{b^2}$$

$$= \frac{3\cos^2(bx)}{8b^4} + \frac{3\cos(bx)\operatorname{CosIntegral}(bx)}{b^4} - \frac{3x^2\cos(bx)\operatorname{CosIntegral}(bx)}{2b^2} + \frac{1}{4}x^4 \operatorname{CosIntegral}(bx)^2 + \frac{x\cos(bx)\sin(bx)}{b^3} + \frac{3x\operatorname{CosIntegral}(bx)\sin(bx)}{b^3} - \frac{x^3 \operatorname{CosIntegral}(bx)\sin(bx)}{2b} - \frac{\sin^2(bx)}{8b^4} + \frac{x^2\sin^2(bx)}{4b^2} - \frac{3\int \frac{\cos^2(bx)}{bx}\,dx}{b^3} - \frac{3\int \cos(bx)\sin(bx)\,dx}{b^3} - \frac{\int x\,dx}{4b^2} + \frac{3\int x\,dx}{4b^2}$$

$$= \frac{x^2}{4b^2} + \frac{3\cos^2(bx)}{8b^4} + \frac{3\cos(bx)\operatorname{CosIntegral}(bx)}{b^4} - \frac{3x^2\cos(bx)\operatorname{CosIntegral}(bx)}{2b^2} + \frac{1}{4}x^4 \operatorname{CosIntegral}(bx)^2 + \frac{x\cos(bx)\sin(bx)}{b^3} + \frac{3x\operatorname{CosIntegral}(bx)\sin(bx)}{b^3} - \frac{x^3 \operatorname{CosIntegral}(bx)\sin(bx)}{2b} - \frac{\sin^2(bx)}{8b^4} + \frac{x^2\sin^2(bx)}{4b^2} - \frac{3\int \frac{\cos^2(bx)}{x}\,dx}{b^4} - \frac{3\operatorname{Subst}(\int x\,dx, x, \sin(bx))}{b^4}$$

$$= \frac{x^2}{4b^2} + \frac{3\cos^2(bx)}{8b^4} + \frac{3\cos(bx)\operatorname{CosIntegral}(bx)}{b^4} - \frac{3x^2\cos(bx)\operatorname{CosIntegral}(bx)}{2b^2} + \frac{1}{4}x^4 \operatorname{CosIntegral}(bx)^2 + \frac{x\cos(bx)\sin(bx)}{b^3} + \frac{3x\operatorname{CosIntegral}(bx)\sin(bx)}{b^3} - \frac{x^3 \operatorname{CosIntegral}(bx)\sin(bx)}{2b} - \frac{13\sin^2(bx)}{8b^4} + \frac{x^2\sin^2(bx)}{4b^2} - \frac{3\int \left(\frac{1}{2x} + \frac{\cos(2bx)}{2x}\right)\,dx}{b^4}$$

$$
\begin{aligned}
&= \frac{x^2}{4b^2} + \frac{3\cos^2(bx)}{8b^4} + \frac{3\cos(bx)\,\text{CosIntegral}(bx)}{b^4} - \frac{3x^2\cos(bx)\,\text{CosIntegral}(bx)}{2b^2} \\
&\quad + \frac{1}{4}x^4\,\text{CosIntegral}(bx)^2 - \frac{3\log(x)}{2b^4} + \frac{x\cos(bx)\sin(bx)}{b^3} + \frac{3x\,\text{CosIntegral}(bx)\sin(bx)}{b^3} \\
&\quad - \frac{x^3\,\text{CosIntegral}(bx)\sin(bx)}{2b} - \frac{13\sin^2(bx)}{8b^4} + \frac{x^2\sin^2(bx)}{4b^2} - \frac{3\int\frac{\cos(2bx)}{x}\,dx}{2b^4} \\
&= \frac{x^2}{4b^2} + \frac{3\cos^2(bx)}{8b^4} + \frac{3\cos(bx)\,\text{CosIntegral}(bx)}{b^4} - \frac{3x^2\cos(bx)\,\text{CosIntegral}(bx)}{2b^2} \\
&\quad + \frac{1}{4}x^4\,\text{CosIntegral}(bx)^2 - \frac{3\,\text{CosIntegral}(2bx)}{2b^4} - \frac{3\log(x)}{2b^4} + \frac{x\cos(bx)\sin(bx)}{b^3} \\
&\quad + \frac{3x\,\text{CosIntegral}(bx)\sin(bx)}{b^3} - \frac{x^3\,\text{CosIntegral}(bx)\sin(bx)}{2b} - \frac{13\sin^2(bx)}{8b^4} \\
&\quad + \frac{x^2\sin^2(bx)}{4b^2}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 108, normalized size of antiderivative = 0.66

$$
\int x^3\,\text{CosIntegral}(bx)^2\,dx = \frac{3b^2x^2 + 8\cos(2bx) - b^2x^2\cos(2bx) + 2b^4x^4\,\text{CosIntegral}(bx)^2 - 12\,\text{CosIntegral}(2bx) - 12\log(x) - 4\,\text{CosInt}}{8b^4}
$$

```
[In] Integrate[x^3*CosIntegral[b*x]^2,x]
```

```
[Out] (3*b^2*x^2 + 8*Cos[2*b*x] - b^2*x^2*Cos[2*b*x] + 2*b^4*x^4*CosIntegral[b*x]
^2 - 12*CosIntegral[2*b*x] - 12*Log[x] - 4*CosIntegral[b*x]*(3*(-2 + b^2*x^
2)*Cos[b*x] + b*x*(-6 + b^2*x^2)*Sin[b*x]) + 4*b*x*Sin[2*b*x])/(8*b^4)
```

Maple [A] (verified)

Time = 0.56 (sec) , antiderivative size = 135, normalized size of antiderivative = 0.83

method	result
derivativedivides	$\frac{\frac{b^4x^4\,\text{Ci}(bx)^2}{4} - 2\,\text{Ci}(bx)\left(\frac{b^3x^3\sin(bx)}{4} + \frac{3b^2x^2\cos(bx)}{4} - \frac{3\cos(bx)}{2} - \frac{3bx\sin(bx)}{2}\right) - \frac{b^2x^2\cos(bx)^2}{4} + 2bx\left(\frac{\sin(bx)\cos(bx)}{2} + \frac{bx}{2}\right) - \frac{b^2x}{2}}{b^4}$
default	$\frac{\frac{b^4x^4\,\text{Ci}(bx)^2}{4} - 2\,\text{Ci}(bx)\left(\frac{b^3x^3\sin(bx)}{4} + \frac{3b^2x^2\cos(bx)}{4} - \frac{3\cos(bx)}{2} - \frac{3bx\sin(bx)}{2}\right) - \frac{b^2x^2\cos(bx)^2}{4} + 2bx\left(\frac{\sin(bx)\cos(bx)}{2} + \frac{bx}{2}\right) - \frac{b^2x}{2}}{b^4}$

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

```
[Out] 1/b^4*(1/4*b^4*x^4*Ci(b*x)^2-2*Ci(b*x)*(1/4*b^3*x^3*sin(b*x)+3/4*b^2*x^2*co
s(b*x)-3/2*cos(b*x)-3/2*b*x*sin(b*x))-1/4*b^2*x^2*cos(b*x)^2+2*b*x*(1/2*sin
```

```
(b*x)*cos(b*x)+1/2*b*x)-1/2*b^2*x^2-1/2*sin(b*x)^2-3/2*ln(b*x)-3/2*Ci(2*b*x
)+3/2*cos(b*x)^2)
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 118, normalized size of antiderivative = 0.72

$$\int x^3\,\text{CosIntegral}(bx)^2\,dx = -\frac{\pi b^2x^2\cos\left(\frac{1}{2}\pi b^2x^2\right)^2 - 2\pi b^2x^2 + 6\pi bx\cos\left(\frac{1}{2}\pi b^2x^2\right)\text{C}\left(bx\right) - \left(3\pi + \pi^3b^4x^4\right)\text{C}\left(bx\right)^2 + 2\left(\pi^2b^3x^3\,\text{C}\left(bx\right)\right.}{4\pi^3b^4}$$

```
[In] integrate(x^3*fresnel_cos(b*x)^2,x, algorithm="fricas")
[Out] -1/4*(pi*b^2*x^2*cos(1/2*pi*b^2*x^2)^2 - 2*pi*b^2*x^2 + 6*pi*b*x*cos(1/2*pi
*b^2*x^2)*fresnel_cos(b*x) - (3*pi + pi^3*b^4*x^4)*fresnel_cos(b*x)^2 + 2*(
pi^2*b^3*x^3*fresnel_cos(b*x) - 2*cos(1/2*pi*b^2*x^2))*sin(1/2*pi*b^2*x^2))
/(pi^3*b^4)
```

Sympy [F]

$$\int x^3\,\text{CosIntegral}(bx)^2\,dx = \int x^3\,\text{Ci}^2\left(bx\right)dx$$

```
[In] integrate(x**3*Ci(b*x)**2,x)
[Out] Integral(x**3*Ci(b*x)**2, x)
```

Maxima [F]

$$\int x^3\,\text{CosIntegral}(bx)^2\,dx = \int x^3\,\text{C}\left(bx\right)^2\,dx$$

```
[In] integrate(x^3*fresnel_cos(b*x)^2,x, algorithm="maxima")
[Out] integrate(x^3*fresnel_cos(b*x)^2, x)
```

Giac [F]

$$\int x^3 \operatorname{CosIntegral}(bx)^2 \, dx = \int x^3 \operatorname{C}(bx)^2 \, dx$$

[In] integrate(x^3*fresnel_cos(b*x)^2,x, algorithm="giac")

[Out] integrate(x^3*fresnel_cos(b*x)^2, x)

Mupad [F(-1)]

Timed out.

$$\int x^3 \operatorname{CosIntegral}(bx)^2 \, dx = \int x^3 \operatorname{cosint}(b\,x)^2 \, dx$$

[In] int(x^3*cosint(b*x)^2,x)

[Out] int(x^3*cosint(b*x)^2, x)

3.79 $\int x^2 \operatorname{CosIntegral}(bx)^2 \, dx$

Optimal result

Integrand size = 10, antiderivative size = 112

$$\int x^2 \operatorname{CosIntegral}(bx)^2 \, dx = \frac{x}{2b^2} - \frac{4x\cos(bx)\operatorname{CosIntegral}(bx)}{3b^2} + \frac{1}{3}x^3 \operatorname{CosIntegral}(bx)^2 + \frac{5\cos(bx)\sin(bx)}{6b^3} + \frac{4\operatorname{CosIntegral}(bx)\sin(bx)}{3b^3} - \frac{2x^2\operatorname{CosIntegral}(bx)\sin(bx)}{3b} + \frac{x\sin^2(bx)}{3b^2} - \frac{2\operatorname{Si}(2bx)}{3b^3}$$

```
[Out] 1/2*x/b^2+1/3*x^3*Ci(b*x)^2-4/3*x*Ci(b*x)*cos(b*x)/b^2-2/3*Si(2*b*x)/b^3+4/
3*Ci(b*x)*sin(b*x)/b^3-2/3*x^2*Ci(b*x)*sin(b*x)/b+5/6*cos(b*x)*sin(b*x)/b^3
+1/3*x*sin(b*x)^2/b^2
```

Rubi [A] (verified)

Time = 0.09 (sec) , antiderivative size = 112, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 1.000, Rules used = {6643, 6649, 12, 3524, 2715, 8, 6655, 6647, 4491, 3380}

$$\int x^2 \operatorname{CosIntegral}(bx)^2 \, dx = \frac{4\operatorname{CosIntegral}(bx)\sin(bx)}{3b^3} - \frac{2\operatorname{Si}(2bx)}{3b^3} + \frac{5\sin(bx)\cos(bx)}{6b^3} - \frac{4x\operatorname{CosIntegral}(bx)\cos(bx)}{3b^2} + \frac{x}{2b^2} + \frac{x\sin^2(bx)}{3b^2} + \frac{1}{3}x^3\operatorname{CosIntegral}(bx)^2 - \frac{2x^2\operatorname{CosIntegral}(bx)\sin(bx)}{3b}$$

```
[In] Int[x^2*CosIntegral[b*x]^2,x]
```

```
[Out] x/(2*b^2) - (4*x*Cos[b*x]*CosIntegral[b*x])/(3*b^2) + (x^3*CosIntegral[b*x]
^2)/3 + (5*Cos[b*x]*Sin[b*x])/(6*b^3) + (4*CosIntegral[b*x]*Sin[b*x])/(3*b^
```

```
3) - (2*x^2*CosIntegral[b*x]*Sin[b*x])/(3*b) + (x*Sin[b*x]^2)/(3*b^2) - (2*
SinIntegral[2*b*x])/(3*b^3)
```

Rule 8

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

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 2715

```
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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3524

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

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6643

```
Int[CosIntegral[(b_.)*(x_)]^2*(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)*(CosI
ntegral[b*x]^2/(m + 1)), x] - Dist[2/(m + 1), Int[x^m*Cos[b*x]*CosIntegral[
b*x], x], x] /; FreeQ[b, x] && IGtQ[m, 0]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
```

```
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6649

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

Rule 6655

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

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{1}{3}x^3\,\text{CosIntegral}(bx)^2 - \frac{2}{3}\int x^2\cos(bx)\,\text{CosIntegral}(bx)\,dx \\
&= \frac{1}{3}x^3\,\text{CosIntegral}(bx)^2 - \frac{2x^2\,\text{CosIntegral}(bx)\sin(bx)}{3b} \\
&\quad + \frac{2}{3}\int \frac{x\cos(bx)\sin(bx)}{b}\,dx + \frac{4\int x\,\text{CosIntegral}(bx)\sin(bx)\,dx}{3b} \\
&= -\frac{4x\cos(bx)\,\text{CosIntegral}(bx)}{3b^2} + \frac{1}{3}x^3\,\text{CosIntegral}(bx)^2 - \frac{2x^2\,\text{CosIntegral}(bx)\sin(bx)}{3b} \\
&\quad + \frac{4\int\cos(bx)\,\text{CosIntegral}(bx)\,dx}{3b^2} + \frac{2\int x\cos(bx)\sin(bx)\,dx}{3b} + \frac{4\int\frac{\cos^2(bx)}{b}\,dx}{3b} \\
&= -\frac{4x\cos(bx)\,\text{CosIntegral}(bx)}{3b^2} + \frac{1}{3}x^3\,\text{CosIntegral}(bx)^2 \\
&\quad + \frac{4\,\text{CosIntegral}(bx)\sin(bx)}{3b^3} - \frac{2x^2\,\text{CosIntegral}(bx)\sin(bx)}{3b} \\
&\quad + \frac{x\sin^2(bx)}{3b^2} - \frac{\int\sin^2(bx)\,dx}{3b^2} + \frac{4\int\cos^2(bx)\,dx}{3b^2} - \frac{4\int\frac{\cos(bx)\sin(bx)}{bx}\,dx}{3b^2} \\
&= -\frac{4x\cos(bx)\,\text{CosIntegral}(bx)}{3b^2} + \frac{1}{3}x^3\,\text{CosIntegral}(bx)^2 + \frac{5\cos(bx)\sin(bx)}{6b^3} \\
&\quad + \frac{4\,\text{CosIntegral}(bx)\sin(bx)}{3b^3} - \frac{2x^2\,\text{CosIntegral}(bx)\sin(bx)}{3b} \\
&\quad + \frac{x\sin^2(bx)}{3b^2} - \frac{4\int\frac{\cos(bx)\sin(bx)}{x}\,dx}{3b^3} - \frac{\int 1\,dx}{6b^2} + \frac{2\int 1\,dx}{3b^2}
\end{aligned}$$

$$
\begin{aligned}
&= \frac{x}{2b^2} - \frac{4x\cos(bx)\operatorname{CosIntegral}(bx)}{3b^2} + \frac{1}{3}x^3\operatorname{CosIntegral}(bx)^2 + \frac{5\cos(bx)\sin(bx)}{6b^3} \\
&\quad + \frac{4\operatorname{CosIntegral}(bx)\sin(bx)}{3b^3} - \frac{2x^2\operatorname{CosIntegral}(bx)\sin(bx)}{3b} + \frac{x\sin^2(bx)}{3b^2} \\
&\quad - \frac{4\int\frac{\sin(2bx)}{2x}\,dx}{3b^3} \\
&= \frac{x}{2b^2} - \frac{4x\cos(bx)\operatorname{CosIntegral}(bx)}{3b^2} + \frac{1}{3}x^3\operatorname{CosIntegral}(bx)^2 + \frac{5\cos(bx)\sin(bx)}{6b^3} \\
&\quad + \frac{4\operatorname{CosIntegral}(bx)\sin(bx)}{3b^3} - \frac{2x^2\operatorname{CosIntegral}(bx)\sin(bx)}{3b} + \frac{x\sin^2(bx)}{3b^2} \\
&\quad - \frac{2\int\frac{\sin(2bx)}{x}\,dx}{3b^3} \\
&= \frac{x}{2b^2} - \frac{4x\cos(bx)\operatorname{CosIntegral}(bx)}{3b^2} + \frac{1}{3}x^3\operatorname{CosIntegral}(bx)^2 + \frac{5\cos(bx)\sin(bx)}{6b^3} \\
&\quad + \frac{4\operatorname{CosIntegral}(bx)\sin(bx)}{3b^3} - \frac{2x^2\operatorname{CosIntegral}(bx)\sin(bx)}{3b} + \frac{x\sin^2(bx)}{3b^2} - \frac{2\operatorname{Si}(2bx)}{3b^3}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 78, normalized size of antiderivative = 0.70

$$
\int x^2\operatorname{CosIntegral}(bx)^2\,dx
= \frac{8bx - 2bx\cos(2bx) + 4b^3x^3\operatorname{CosIntegral}(bx)^2 - 8\operatorname{CosIntegral}(bx)\left(2bx\cos(bx) + (-2+b^2x^2)\sin(bx)\right) + 5\,\mathrm{s}}{12b^3}
$$

```
[In] Integrate[x^2*CosIntegral[b*x]^2,x]
```

```
[Out] (8*b*x - 2*b*x*Cos[2*b*x] + 4*b^3*x^3*CosIntegral[b*x]^2 - 8*CosIntegral[b*
x]*(2*b*x*Cos[b*x] + (-2 + b^2*x^2)*Sin[b*x]) + 5*Sin[2*b*x] - 8*SinIntegra
l[2*b*x])/(12*b^3)
```

Maple [A] (verified)

Time = 0.62 (sec) , antiderivative size = 84, normalized size of antiderivative = 0.75

method	result	size
derivativedivides	$\frac{\frac{b^3x^3\operatorname{Ci}(bx)^2}{3} - 2\operatorname{Ci}(bx)\left(\frac{b^2x^2\sin(bx)}{3} - \frac{2\sin(bx)}{3} + \frac{2bx\cos(bx)}{3}\right) - \frac{bx\cos(bx)^2}{3} + \frac{5\sin(bx)\cos(bx)}{6} + \frac{5bx}{6} - \frac{2\operatorname{Si}(2bx)}{3}}{b^3}$	84
default	$\frac{\frac{b^3x^3\operatorname{Ci}(bx)^2}{3} - 2\operatorname{Ci}(bx)\left(\frac{b^2x^2\sin(bx)}{3} - \frac{2\sin(bx)}{3} + \frac{2bx\cos(bx)}{3}\right) - \frac{bx\cos(bx)^2}{3} + \frac{5\sin(bx)\cos(bx)}{6} + \frac{5bx}{6} - \frac{2\operatorname{Si}(2bx)}{3}}{b^3}$	84

```
[In] int(x^2*Ci(b*x)^2,x,method=_RETURNVERBOSE)
```

[Out] 1/b^3*(1/3*b^3*x^3*Ci(b*x)^2-2*Ci(b*x)*(1/3*b^2*x^2*sin(b*x)-2/3*sin(b*x)+2/3*b*x*cos(b*x))-1/3*b*x*cos(b*x)^2+5/6*sin(b*x)*cos(b*x)+5/6*b*x-2/3*Si(2*b*x))

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 111, normalized size of antiderivative = 0.99

$$\int x^2 \,\text{CosIntegral}(bx)^2 \, dx = \frac{4\,\pi^2 b^4 x^3\,\mathrm{C}\left(bx\right)^2 - 8\,\pi b^3 x^2\,\mathrm{C}\left(bx\right)\sin\left(\frac{1}{2}\,\pi b^2 x^2\right) - 4\,b^2 x\cos\left(\frac{1}{2}\,\pi b^2 x^2\right)^2 + 10\,b^2 x - 16\,b\cos\left(\frac{1}{2}\,\pi b^2 x^2\right)\mathrm{C}\left(bx\right)}{12\,\pi^2 b^4}$$

[In] integrate(x^2*fresnel_cos(b*x)^2,x, algorithm="fricas")

[Out] 1/12*(4*pi^2*b^4*x^3*fresnel_cos(b*x)^2 - 8*pi*b^3*x^2*fresnel_cos(b*x)*sin(1/2*pi*b^2*x^2) - 4*b^2*x*cos(1/2*pi*b^2*x^2)^2 + 10*b^2*x - 16*b*cos(1/2*pi*b^2*x^2)*fresnel_cos(b*x) + 5*sqrt(2)*sqrt(b^2)*fresnel_cos(sqrt(2)*sqrt(b^2)*x))/(pi^2*b^4)

Sympy [F]

$$\int x^2 \,\text{CosIntegral}(bx)^2 \, dx = \int x^2 \,\mathrm{Ci}^2\left(bx\right) dx$$

[In] integrate(x**2*Ci(b*x)**2,x)

[Out] Integral(x**2*Ci(b*x)**2, x)

Maxima [F]

$$\int x^2 \,\text{CosIntegral}(bx)^2 \, dx = \int x^2 \,\mathrm{C}\left(bx\right)^2 \, dx$$

[In] integrate(x^2*fresnel_cos(b*x)^2,x, algorithm="maxima")

[Out] integrate(x^2*fresnel_cos(b*x)^2, x)

Giac [F]

$$\int x^2 \operatorname{CosIntegral}(bx)^2\,dx = \int x^2 \operatorname{C}(bx)^2\,dx$$

```
[In] integrate(x^2*fresnel_cos(b*x)^2,x, algorithm="giac")
[Out] integrate(x^2*fresnel_cos(b*x)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \operatorname{CosIntegral}(bx)^2\,dx = \int x^2 \operatorname{cosint}(b\,x)^2\,dx$$

```
[In] int(x^2*cosint(b*x)^2,x)
[Out] int(x^2*cosint(b*x)^2, x)
```

3.80 $\int x \text{CosIntegral}(bx)^2 \, dx$

Optimal result

Integrand size = 8, antiderivative size = 75

$$\int x \text{CosIntegral}(bx)^2 \, dx = -\frac{\cos(bx) \text{CosIntegral}(bx)}{b^2} + \frac{1}{2}x^2 \text{CosIntegral}(bx)^2 + \frac{\text{CosIntegral}(2bx)}{2b^2} + \frac{\log(x)}{2b^2} - \frac{x \text{CosIntegral}(bx) \sin(bx)}{b} + \frac{\sin^2(bx)}{2b^2}$$

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

Rubi [A] (verified)

Time = 0.06 (sec) , antiderivative size = 75, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 1.000, Rules used = {6643, 6649, 12, 2644, 30, 6653, 3393, 3383}

$$\int x \text{CosIntegral}(bx)^2 \, dx = \frac{\text{CosIntegral}(2bx)}{2b^2} - \frac{\text{CosIntegral}(bx) \cos(bx)}{b^2} + \frac{\log(x)}{2b^2} + \frac{\sin^2(bx)}{2b^2} + \frac{1}{2}x^2 \text{CosIntegral}(bx)^2 - \frac{x \text{CosIntegral}(bx) \sin(bx)}{b}$$

```
[In] Int[x*CosIntegral[b*x]^2,x]
```

```
[Out] -((Cos[b*x]*CosIntegral[b*x])/b^2) + (x^2*CosIntegral[b*x]^2)/2 + CosIntegr
al[2*b*x]/(2*b^2) + Log[x]/(2*b^2) - (x*CosIntegral[b*x]*Sin[b*x])/b + Sin[
b*x]^2/(2*b^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 30

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

Rule 2644

```
Int[cos[(e_.) + (f_.)*(x_)]^(n_.)*((a_.)*sin[(e_.) + (f_.)*(x_)])^(m_.), x_
Symbol] :> Dist[1/(a*f), Subst[Int[x^m*(1 - x^2/a^2)^((n - 1)/2), x], x, a*
Sin[e + f*x]], x] /; FreeQ[{a, e, f, m}, x] && IntegerQ[(n - 1)/2] &&  !(In
tegerQ[(m - 1)/2] && LtQ[0, m, n])
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 6643

```
Int[CosIntegral[(b_.)*(x_)]^2*(x_)^(m_.), x_Symbol] :> Simp[x^(m + 1)*(CosI
ntegral[b*x]^2/(m + 1)), x] - Dist[2/(m + 1), Int[x^m*Cos[b*x]*CosIntegral[
b*x], x], x] /; FreeQ[b, x] && IGtQ[m, 0]
```

Rule 6649

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

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

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

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 58, normalized size of antiderivative = 0.77

$$
\int x\,\text{CosIntegral}(bx)^2\,dx = \frac{-\cos(2bx) + 2b^2x^2\,\text{CosIntegral}(bx)^2 + 2\,\text{CosIntegral}(2bx) + 2\log(x) - 4\,\text{CosIntegral}(bx)(\cos(bx) + bx\,\text{si}}{4b^2}
$$

```
[In] Integrate[x*CosIntegral[b*x]^2,x]
```

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

Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 62, normalized size of antiderivative = 0.83

method	result	size
derivativedivides	$\frac{\frac{b^2x^2\operatorname{Ci}(bx)^2}{2}-2\operatorname{Ci}(bx)\left(\frac{\cos(bx)}{2}+\frac{bx\sin(bx)}{2}\right)+\frac{\ln(bx)}{2}+\frac{\operatorname{Ci}(2bx)}{2}-\frac{\cos(bx)^2}{2}}{b^2}$	62
default	$\frac{\frac{b^2x^2\operatorname{Ci}(bx)^2}{2}-2\operatorname{Ci}(bx)\left(\frac{\cos(bx)}{2}+\frac{bx\sin(bx)}{2}\right)+\frac{\ln(bx)}{2}+\frac{\operatorname{Ci}(2bx)}{2}-\frac{\cos(bx)^2}{2}}{b^2}$	62

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

Fricas [F]

$$\int x\,\mathrm{CosIntegral}(bx)^2\,dx = \int x\,\mathrm{C}\,(bx)^2\,dx$$

```
[In] integrate(x*fresnel_cos(b*x)^2,x, algorithm="fricas")
[Out] integral(x*fresnel_cos(b*x)^2, x)
```

Sympy [F]

$$\int x\,\mathrm{CosIntegral}(bx)^2\,dx = \int x\,\mathrm{Ci}^2\,(bx)\,dx$$

```
[In] integrate(x*Ci(b*x)**2,x)
[Out] Integral(x*Ci(b*x)**2, x)
```

Maxima [F]

$$\int x\,\mathrm{CosIntegral}(bx)^2\,dx = \int x\,\mathrm{C}\,(bx)^2\,dx$$

```
[In] integrate(x*fresnel_cos(b*x)^2,x, algorithm="maxima")
[Out] integrate(x*fresnel_cos(b*x)^2, x)
```

Giac [F]

$$\int x \operatorname{CosIntegral}(bx)^2 \, dx = \int x \operatorname{C}(bx)^2 \, dx$$

```
[In] integrate(x*fresnel_cos(b*x)^2,x, algorithm="giac")
[Out] integrate(x*fresnel_cos(b*x)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int x \operatorname{CosIntegral}(bx)^2 \, dx = \int x \operatorname{cosint}(b\,x)^2 \, dx$$

```
[In] int(x*cosint(b*x)^2,x)
[Out] int(x*cosint(b*x)^2, x)
```

3.81 $\int \text{CosIntegral}(bx)^2 \, dx$

Optimal result

Integrand size = 6, antiderivative size = 31

$$\int \text{CosIntegral}(bx)^2 \, dx = x \, \text{CosIntegral}(bx)^2 - \frac{2 \, \text{CosIntegral}(bx) \sin(bx)}{b} + \frac{\text{Si}(2bx)}{b}$$

```
[Out] x*Ci(b*x)^2+Si(2*b*x)/b-2*Ci(b*x)*sin(b*x)/b
```

Rubi [A] (verified)

Time = 0.04 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.833$, Rules used = {6641, 6647, 12, 4491, 3380}

$$\int \text{CosIntegral}(bx)^2 \, dx = x \, \text{CosIntegral}(bx)^2 - \frac{2 \, \text{CosIntegral}(bx) \sin(bx)}{b} + \frac{\text{Si}(2bx)}{b}$$

```
[In] Int[CosIntegral[b*x]^2,x]
```

```
[Out] x*CosIntegral[b*x]^2 - (2*CosIntegral[b*x]*Sin[b*x])/b + SinIntegral[2*b*x]
/b
```

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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6641

```
Int[CosIntegral[(a_.) + (b_.)*(x_)]^2, x_Symbol] :> Simp[(a + b*x)*(CosInte
gral[a + b*x]^2/b), x] - Dist[2, Int[Cos[a + b*x]*CosIntegral[a + b*x], x],
 x] /; FreeQ[{a, b}, x]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= x\,\text{CosIntegral}(bx)^2 - 2\int \cos(bx)\,\text{CosIntegral}(bx)\,dx \\
&= x\,\text{CosIntegral}(bx)^2 - \frac{2\,\text{CosIntegral}(bx)\sin(bx)}{b} + 2\int \frac{\cos(bx)\sin(bx)}{bx}\,dx \\
&= x\,\text{CosIntegral}(bx)^2 - \frac{2\,\text{CosIntegral}(bx)\sin(bx)}{b} + \frac{2\int \frac{\cos(bx)\sin(bx)}{x}\,dx}{b} \\
&= x\,\text{CosIntegral}(bx)^2 - \frac{2\,\text{CosIntegral}(bx)\sin(bx)}{b} + \frac{2\int \frac{\sin(2bx)}{2x}\,dx}{b} \\
&= x\,\text{CosIntegral}(bx)^2 - \frac{2\,\text{CosIntegral}(bx)\sin(bx)}{b} + \frac{\int \frac{\sin(2bx)}{x}\,dx}{b} \\
&= x\,\text{CosIntegral}(bx)^2 - \frac{2\,\text{CosIntegral}(bx)\sin(bx)}{b} + \frac{\text{Si}(2bx)}{b}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 31, normalized size of antiderivative = 1.00

$$\int \text{CosIntegral}(bx)^2\,dx = x\,\text{CosIntegral}(bx)^2 - \frac{2\,\text{CosIntegral}(bx)\sin(bx)}{b} + \frac{\text{Si}(2bx)}{b}$$

```
[In] Integrate[CosIntegral[b*x]^2,x]
```

```
[Out] x*CosIntegral[b*x]^2 - (2*CosIntegral[b*x]*Sin[b*x])/b + SinIntegral[2*b*x]
/b
```

Maple [A] (verified)

Time = 0.49 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.97

method	result	size
derivativedivides	$\frac{\text{Ci}(bx)^2 bx-2\ \text{Ci}(bx)\sin(bx)+\text{Si}(2bx)}{b}$	30
default	$\frac{\text{Ci}(bx)^2 bx-2\ \text{Ci}(bx)\sin(bx)+\text{Si}(2bx)}{b}$	30

```
[In] int(Ci(b*x)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/b*(Ci(b*x)^2*b*x-2*Ci(b*x)*sin(b*x)+Si(2*b*x))
```

Fricas [A] (verification not implemented)

none

Time = 0.25 (sec) , antiderivative size = 59, normalized size of antiderivative = 1.90

$$\int \text{CosIntegral}(bx)^2\,dx = \frac{2\,\pi b^2 x\,\text{C}\left(bx\right)^2 - 4\,b\,\text{C}\left(bx\right)\sin\left(\frac{1}{2}\,\pi b^2 x^2\right) + \sqrt{2}\sqrt{b^2}\,\text{S}\left(\sqrt{2}\sqrt{b^2}x\right)}{2\,\pi b^2}$$

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

```
[Out] 1/2*(2*pi*b^2*x*fresnel_cos(b*x)^2 - 4*b*fresnel_cos(b*x)*sin(1/2*pi*b^2*x^
2) + sqrt(2)*sqrt(b^2)*fresnel_sin(sqrt(2)*sqrt(b^2)*x))/(pi*b^2)
```

Sympy [F]

$$\int \text{CosIntegral}(bx)^2\,dx = \int \text{Ci}^2\,(bx)\,dx$$

```
[In] integrate(Ci(b*x)**2,x)
[Out] Integral(Ci(b*x)**2, x)
```

Maxima [F]

$$\int \text{CosIntegral}(bx)^2\,dx = \int \text{C}\,(bx)^2\;dx$$

```
[In] integrate(fresnel_cos(b*x)^2,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x)^2, x)
```

Giac [F]

$$\int \text{CosIntegral}(bx)^2\,dx = \int \text{C}\,(bx)^2\;dx$$

```
[In] integrate(fresnel_cos(b*x)^2,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \text{CosIntegral}(bx)^2\,dx = \int \text{cosint}(b\,x)^2\,dx$$

```
[In] int(cosint(b*x)^2,x)
[Out] int(cosint(b*x)^2, x)
```

3.82 $\int \frac{\text{CosIntegral}(bx)^2}{x} dx$

Optimal result

Integrand size = 10, antiderivative size = 10

$$\int \frac{\text{CosIntegral}(bx)^2}{x} dx = \text{Int}\left(\frac{\text{CosIntegral}(bx)^2}{x}, x\right)$$

```
[Out] CannotIntegrate(Ci(b*x)^2/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\text{CosIntegral}(bx)^2}{x} dx = \int \frac{\text{CosIntegral}(bx)^2}{x} dx$$

```
[In] Int[CosIntegral[b*x]^2/x,x]
```

```
[Out] Defer[Int][CosIntegral[b*x]^2/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{CosIntegral}(bx)^2}{x} dx$$

Mathematica [N/A]

Not integrable

Time = 0.31 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x} dx = \int \frac{\text{CosIntegral}(bx)^2}{x} dx$$

```
[In] Integrate[CosIntegral[b*x]^2/x,x]
[Out] Integrate[CosIntegral[b*x]^2/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.10 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\text{Ci}\,(bx)^2}{x} dx$$

```
[In] int(Ci(b*x)^2/x,x)
[Out] int(Ci(b*x)^2/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x} dx = \int \frac{\text{C}\,(bx)^2}{x} dx$$

```
[In] integrate(fresnel_cos(b*x)^2/x,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x)^2/x, x)
```

Sympy [N/A]

Not integrable

Time = 3.38 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.80

$$\int \frac{\text{CosIntegral}(bx)^2}{x} dx = \int \frac{\text{Ci}^2\,(bx)}{x} dx$$

```
[In] integrate(Ci(b*x)**2/x,x)
[Out] Integral(Ci(b*x)**2/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x}\,dx = \int \frac{\text{C}\,(bx)^2}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x)^2/x,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x)^2/x, x)
```

Giac [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x}\,dx = \int \frac{\text{C}\,(bx)^2}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x)^2/x,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x)^2/x, x)
```

Mupad [N/A]

Not integrable

Time = 4.89 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x}\,dx = \int \frac{\text{cosint}(b\,x)^2}{x}\,dx$$

```
[In] int(cosint(b*x)^2/x,x)
[Out] int(cosint(b*x)^2/x, x)
```

3.83 $\int \frac{\text{CosIntegral}(bx)^2}{x^2} dx$

Optimal result

Integrand size = 10, antiderivative size = 10

$$\int \frac{\text{CosIntegral}(bx)^2}{x^2} dx = \text{Int}\left(\frac{\text{CosIntegral}(bx)^2}{x^2}, x\right)$$

```
[Out] CannotIntegrate(Ci(b*x)^2/x^2,x)
```

Rubi [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\text{CosIntegral}(bx)^2}{x^2} dx = \int \frac{\text{CosIntegral}(bx)^2}{x^2} dx$$

```
[In] Int[CosIntegral[b*x]^2/x^2,x]
[Out] Defer[Int][CosIntegral[b*x]^2/x^2, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{CosIntegral}(bx)^2}{x^2} dx$$

Mathematica [N/A]

Not integrable

Time = 0.33 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x^2}\,dx = \int \frac{\text{CosIntegral}(bx)^2}{x^2}\,dx$$

```
[In] Integrate[CosIntegral[b*x]^2/x^2,x]
[Out] Integrate[CosIntegral[b*x]^2/x^2, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.16 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\text{Ci}\left(bx\right)^2}{x^2}dx$$

```
[In] int(Ci(b*x)^2/x^2,x)
[Out] int(Ci(b*x)^2/x^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x^2}\,dx = \int \frac{\text{C}\left(bx\right)^2}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x)^2/x^2,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x)^2/x^2, x)
```

Sympy [N/A]

Not integrable

Time = 3.37 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\text{CosIntegral}(bx)^2}{x^2}\,dx = \int \frac{\text{Ci}^2\left(bx\right)}{x^2}\,dx$$

```
[In] integrate(Ci(b*x)**2/x**2,x)
[Out] Integral(Ci(b*x)**2/x**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x^2}\,dx = \int \frac{\mathrm{C}\,(bx)^2}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x)^2/x^2,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x)^2/x^2, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x^2}\,dx = \int \frac{\mathrm{C}\,(bx)^2}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x)^2/x^2,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x)^2/x^2, x)
```

Mupad [N/A]

Not integrable

Time = 4.86 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x^2}\,dx = \int \frac{\mathrm{cosint}(b\,x)^2}{x^2}\,dx$$

```
[In] int(cosint(b*x)^2/x^2,x)
[Out] int(cosint(b*x)^2/x^2, x)
```

3.84 $\int \frac{\text{CosIntegral}(bx)^2}{x^3} dx$

Optimal result

Integrand size = 10, antiderivative size = 10

$$\int \frac{\text{CosIntegral}(bx)^2}{x^3} dx = \text{Int}\left(\frac{\text{CosIntegral}(bx)^2}{x^3}, x\right)$$

```
[Out] CannotIntegrate(Ci(b*x)^2/x^3,x)
```

Rubi [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\text{CosIntegral}(bx)^2}{x^3} dx = \int \frac{\text{CosIntegral}(bx)^2}{x^3} dx$$

```
[In] Int[CosIntegral[b*x]^2/x^3,x]
[Out] Defer[Int][CosIntegral[b*x]^2/x^3, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{CosIntegral}(bx)^2}{x^3} dx$$

Mathematica [N/A]

Not integrable

Time = 0.36 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x^3} dx = \int \frac{\text{CosIntegral}(bx)^2}{x^3} dx$$

```
[In] Integrate[CosIntegral[b*x]^2/x^3,x]
[Out] Integrate[CosIntegral[b*x]^2/x^3, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.13 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\text{Ci}\,(bx)^2}{x^3} dx$$

```
[In] int(Ci(b*x)^2/x^3,x)
[Out] int(Ci(b*x)^2/x^3,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x^3} dx = \int \frac{\text{C}\,(bx)^2}{x^3} dx$$

```
[In] integrate(fresnel_cos(b*x)^2/x^3,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x)^2/x^3, x)
```

Sympy [N/A]

Not integrable

Time = 3.46 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\text{CosIntegral}(bx)^2}{x^3} dx = \int \frac{\text{Ci}^2\,(bx)}{x^3} dx$$

```
[In] integrate(Ci(b*x)**2/x**3,x)
[Out] Integral(Ci(b*x)**2/x**3, x)
```

Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x^3} \, dx = \int \frac{\text{C}\left(bx\right)^2}{x^3} \, dx$$

```
[In] integrate(fresnel_cos(b*x)^2/x^3,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x)^2/x^3, x)
```

Giac [N/A]

Not integrable

Time = 0.28 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x^3} \, dx = \int \frac{\text{C}\left(bx\right)^2}{x^3} \, dx$$

```
[In] integrate(fresnel_cos(b*x)^2/x^3,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x)^2/x^3, x)
```

Mupad [N/A]

Not integrable

Time = 4.88 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(bx)^2}{x^3} \, dx = \int \frac{\mathrm{cosint}(b\,x)^2}{x^3} \, dx$$

```
[In] int(cosint(b*x)^2/x^3,x)
[Out] int(cosint(b*x)^2/x^3, x)
```

3.85 $\int x^m \operatorname{CosIntegral}(a+bx)\,dx$

Optimal result

Integrand size = 10, antiderivative size = 10

$$\int x^m \operatorname{CosIntegral}(a+bx)\,dx=\frac{x^{1+m}\operatorname{CosIntegral}(a+bx)}{1+m}-\frac{b\operatorname{Int}\left(\frac{x^{1+m}\cos(a+bx)}{a+bx},x\right)}{1+m}$$

```
[Out] -b*CannotIntegrate(x^(1+m)*cos(b*x+a)/(b*x+a),x)/(1+m)+x^(1+m)*Ci(b*x+a)/(1
+m)
```

Rubi [N/A]

Not integrable

Time = 0.24 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int x^m \operatorname{CosIntegral}(a+bx)\,dx=\int x^m \operatorname{CosIntegral}(a+bx)\,dx$$

```
[In] Int[x^m*CosIntegral[a + b*x],x]
```

```
[Out] (x^(1 + m)*CosIntegral[a + b*x])/(1 + m) - (b*Defer[Int][(x^(1 + m)*Cos[a +
 b*x])/(a + b*x), x])/(1 + m)
```

Rubi steps

$$\text{integral}=\frac{x^{1+m}\operatorname{CosIntegral}(a+bx)}{1+m}-\frac{b\int\frac{x^{1+m}\cos(a+bx)}{a+bx}\,dx}{1+m}$$

Mathematica [N/A]

Not integrable

Time = 2.19 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \operatorname{CosIntegral}(a+bx)\,dx = \int x^m \operatorname{CosIntegral}(a+bx)\,dx$$

```
[In] Integrate[x^m*CosIntegral[a + b*x],x]
[Out] Integrate[x^m*CosIntegral[a + b*x], x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.27 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int x^m \operatorname{Ci}(bx+a)\,dx$$

```
[In] int(x^m*Ci(b*x+a),x)
[Out] int(x^m*Ci(b*x+a),x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \operatorname{CosIntegral}(a+bx)\,dx = \int x^m \operatorname{C}(bx+a)\,dx$$

```
[In] integrate(x^m*fresnel_cos(b*x+a),x, algorithm="fricas")
[Out] integral(x^m*fresnel_cos(b*x + a), x)
```

Sympy [N/A]

Not integrable

Time = 0.61 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int x^m \operatorname{CosIntegral}(a+bx)\,dx = \int x^m \operatorname{Ci}(a+bx)\,dx$$

```
[In] integrate(x**m*Ci(b*x+a),x)
[Out] Integral(x**m*Ci(a + b*x), x)
```

Maxima [N/A]

Not integrable

Time = 0.21 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \operatorname{CosIntegral}(a+bx)\,dx = \int x^m \operatorname{C}(bx+a)\ dx$$

```
[In] integrate(x^m*fresnel_cos(b*x+a),x, algorithm="maxima")
[Out] integrate(x^m*fresnel_cos(b*x + a), x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \operatorname{CosIntegral}(a+bx)\,dx = \int x^m \operatorname{C}(bx+a)\ dx$$

```
[In] integrate(x^m*fresnel_cos(b*x+a),x, algorithm="giac")
[Out] integrate(x^m*fresnel_cos(b*x + a), x)
```

Mupad [N/A]

Not integrable

Time = 5.42 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int x^m \operatorname{CosIntegral}(a+bx)\,dx = \int x^m \operatorname{cosint}(a+b\,x)\ dx$$

```
[In] int(x^m*cosint(a + b*x),x)
[Out] int(x^m*cosint(a + b*x), x)
```

3.86 $\int x^3 \text{CosIntegral}(a+bx)\,dx$

Optimal result

Integrand size = 10, antiderivative size = 184

$$\begin{aligned}\int x^3 \text{CosIntegral}(a+bx)\,dx =& \frac{3\cos(a+bx)}{2b^4}-\frac{a^2\cos(a+bx)}{4b^4}+\frac{ax\cos(a+bx)}{2b^3}\\&-\frac{3x^2\cos(a+bx)}{4b^2}-\frac{a^4\text{CosIntegral}(a+bx)}{4b^4}\\&+\frac{1}{4}x^4\text{CosIntegral}(a+bx)-\frac{a\sin(a+bx)}{2b^4}\\&+\frac{a^3\sin(a+bx)}{4b^4}+\frac{3x\sin(a+bx)}{2b^3}-\frac{a^2x\sin(a+bx)}{4b^3}\\&+\frac{ax^2\sin(a+bx)}{4b^2}-\frac{x^3\sin(a+bx)}{4b}\end{aligned}$$

```
[Out] -1/4*a^4*Ci(b*x+a)/b^4+1/4*x^4*Ci(b*x+a)+3/2*cos(b*x+a)/b^4-1/4*a^2*cos(b*x
+a)/b^4+1/2*a*x*cos(b*x+a)/b^3-3/4*x^2*cos(b*x+a)/b^2-1/2*a*sin(b*x+a)/b^4+
1/4*a^3*sin(b*x+a)/b^4+3/2*x*sin(b*x+a)/b^3-1/4*a^2*x*sin(b*x+a)/b^3+1/4*a*
x^2*sin(b*x+a)/b^2-1/4*x^3*sin(b*x+a)/b
```

Rubi [A] (verified)

Time = 0.32 (sec) , antiderivative size = 184, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.600, Rules used

$= \{6639, 6874, 2717, 3377, 2718, 3383\}$

$$\int x^3 \operatorname{CosIntegral}(a+bx)\,dx = -\frac{a^4 \operatorname{CosIntegral}(a+bx)}{4b^4} + \frac{a^3\sin(a+bx)}{4b^4} - \frac{a^2\cos(a+bx)}{4b^4} - \frac{a^2x\sin(a+bx)}{4b^3} - \frac{a\sin(a+bx)}{2b^4} + \frac{3\cos(a+bx)}{2b^4} + \frac{3x\sin(a+bx)}{2b^3} + \frac{ax\cos(a+bx)}{2b^3} + \frac{ax^2\sin(a+bx)}{4b^2} - \frac{3x^2\cos(a+bx)}{4b^2} + \frac{1}{4}x^4 \operatorname{CosIntegral}(a+bx) - \frac{x^3\sin(a+bx)}{4b}$$

```
[In] Int[x^3*CosIntegral[a + b*x],x]
```

```
[Out] (3*Cos[a + b*x])/(2*b^4) - (a^2*Cos[a + b*x])/(4*b^4) + (a*x*Cos[a + b*x])/
(2*b^3) - (3*x^2*Cos[a + b*x])/(4*b^2) - (a^4*CosIntegral[a + b*x])/(4*b^4)
 + (x^4*CosIntegral[a + b*x])/4 - (a*Sin[a + b*x])/(2*b^4) + (a^3*Sin[a + b
*x])/(4*b^4) + (3*x*Sin[a + b*x])/(2*b^3) - (a^2*x*Sin[a + b*x])/(4*b^3) +
(a*x^2*Sin[a + b*x])/(4*b^2) - (x^3*Sin[a + b*x])/(4*b)
```

Rule 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 6639

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{1}{4}x^4\,\text{CosIntegral}(a+bx)-\frac{1}{4}b\int\frac{x^4\cos(a+bx)}{a+bx}\,dx\\
&= \frac{1}{4}x^4\,\text{CosIntegral}(a+bx)-\frac{1}{4}b\int\left(-\frac{a^3\cos(a+bx)}{b^4}+\frac{a^2x\cos(a+bx)}{b^3}\right.\\
&\qquad\left.-\frac{ax^2\cos(a+bx)}{b^2}+\frac{x^3\cos(a+bx)}{b}+\frac{a^4\cos(a+bx)}{b^4(a+bx)}\right)dx\\
&= \frac{1}{4}x^4\,\text{CosIntegral}(a+bx)-\frac{1}{4}\int x^3\cos(a+bx)\,dx+\frac{a^3\int\cos(a+bx)\,dx}{4b^3}\\
&\quad-\frac{a^4\int\frac{\cos(a+bx)}{a+bx}\,dx}{4b^3}-\frac{a^2\int x\cos(a+bx)\,dx}{4b^2}+\frac{a\int x^2\cos(a+bx)\,dx}{4b}\\
&= -\frac{a^4\,\text{CosIntegral}(a+bx)}{4b^4}+\frac{1}{4}x^4\,\text{CosIntegral}(a+bx)+\frac{a^3\sin(a+bx)}{4b^4}\\
&\quad-\frac{a^2x\sin(a+bx)}{4b^3}+\frac{ax^2\sin(a+bx)}{4b^2}-\frac{x^3\sin(a+bx)}{4b}\\
&\quad+\frac{a^2\int\sin(a+bx)\,dx}{4b^3}-\frac{a\int x\sin(a+bx)\,dx}{2b^2}+\frac{3\int x^2\sin(a+bx)\,dx}{4b}\\
&= -\frac{a^2\cos(a+bx)}{4b^4}+\frac{ax\cos(a+bx)}{2b^3}-\frac{3x^2\cos(a+bx)}{4b^2}-\frac{a^4\,\text{CosIntegral}(a+bx)}{4b^4}\\
&\quad+\frac{1}{4}x^4\,\text{CosIntegral}(a+bx)+\frac{a^3\sin(a+bx)}{4b^4}-\frac{a^2x\sin(a+bx)}{4b^3}\\
&\quad+\frac{ax^2\sin(a+bx)}{4b^2}-\frac{x^3\sin(a+bx)}{4b}-\frac{a\int\cos(a+bx)\,dx}{2b^3}+\frac{3\int x\cos(a+bx)\,dx}{2b^2}\\
&= -\frac{a^2\cos(a+bx)}{4b^4}+\frac{ax\cos(a+bx)}{2b^3}-\frac{3x^2\cos(a+bx)}{4b^2}-\frac{a^4\,\text{CosIntegral}(a+bx)}{4b^4}\\
&\quad+\frac{1}{4}x^4\,\text{CosIntegral}(a+bx)-\frac{a\sin(a+bx)}{2b^4}+\frac{a^3\sin(a+bx)}{4b^4}+\frac{3x\sin(a+bx)}{2b^3}\\
&\quad-\frac{a^2x\sin(a+bx)}{4b^3}+\frac{ax^2\sin(a+bx)}{4b^2}-\frac{x^3\sin(a+bx)}{4b}-\frac{3\int\sin(a+bx)\,dx}{2b^3}\\
&= \frac{3\cos(a+bx)}{2b^4}-\frac{a^2\cos(a+bx)}{4b^4}+\frac{ax\cos(a+bx)}{2b^3}-\frac{3x^2\cos(a+bx)}{4b^2}\\
&\quad-\frac{a^4\,\text{CosIntegral}(a+bx)}{4b^4}+\frac{1}{4}x^4\,\text{CosIntegral}(a+bx)\\
&\quad-\frac{a\sin(a+bx)}{2b^4}+\frac{a^3\sin(a+bx)}{4b^4}+\frac{3x\sin(a+bx)}{2b^3}\\
&\quad-\frac{a^2x\sin(a+bx)}{4b^3}+\frac{ax^2\sin(a+bx)}{4b^2}-\frac{x^3\sin(a+bx)}{4b}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.16 (sec) , antiderivative size = 95, normalized size of antiderivative = 0.52

$$\int x^3 \operatorname{CosIntegral}(a+bx)\,dx = \frac{-((-6+a^2-2abx+3b^2x^2)\cos(a+bx))+(-a^4+b^4x^4)\operatorname{CosIntegral}(a+bx)+(-2a+a^3+6bx-a^2bx}{4b^4}$$

```
[In] Integrate[x^3*CosIntegral[a + b*x],x]
[Out] (-((-6 + a^2 - 2*a*b*x + 3*b^2*x^2)*Cos[a + b*x]) + (-a^4 + b^4*x^4)*CosInt
egral[a + b*x] + (-2*a + a^3 + 6*b*x - a^2*b*x + a*b^2*x^2 - b^3*x^3)*Sin[a
 + b*x])/(4*b^4)
```

Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 153, normalized size of antiderivative = 0.83

method	result
parts	$\frac{x^4\operatorname{Ci}(bx+a)}{4}-\frac{a^4\operatorname{Ci}(bx+a)-4a^3\sin(bx+a)+6a^2(\cos(bx+a)+(bx+a)\sin(bx+a))-4a\left((bx+a)^2\sin(bx+a)-2\sin(bx+\right.}{4b}$
derivativedivides	$\frac{\frac{\operatorname{Ci}(bx+a)b^4x^4}{4}-\frac{a^4\operatorname{Ci}(bx+a)}{4}+a^3\sin(bx+a)-\frac{3a^2(\cos(bx+a)+(bx+a)\sin(bx+a))}{2}+a\left((bx+a)^2\sin(bx+a)-2\sin(bx+a)+2(bx\right.}{b^4}$
default	$\frac{\frac{\operatorname{Ci}(bx+a)b^4x^4}{4}-\frac{a^4\operatorname{Ci}(bx+a)}{4}+a^3\sin(bx+a)-\frac{3a^2(\cos(bx+a)+(bx+a)\sin(bx+a))}{2}+a\left((bx+a)^2\sin(bx+a)-2\sin(bx+a)+2(bx\right.}{b^4}$

```
[In] int(x^3*Ci(b*x+a),x,method=_RETURNVERBOSE)
[Out] 1/4*x^4*Ci(b*x+a)-1/4/b^4*(a^4*Ci(b*x+a)-4*a^3*sin(b*x+a)+6*a^2*(cos(b*x+a)
+(b*x+a)*sin(b*x+a))-4*a*((b*x+a)^2*sin(b*x+a)-2*sin(b*x+a)+2*(b*x+a)*cos(b
*x+a))+(b*x+a)^3*sin(b*x+a)+3*(b*x+a)^2*cos(b*x+a)-6*cos(b*x+a)-6*(b*x+a)*s
in(b*x+a))
```

Fricas [A] (verification not implemented)

none

Time = 0.27 (sec) , antiderivative size = 176, normalized size of antiderivative = 0.96

$$\int x^3 \operatorname{CosIntegral}(a+bx)\,dx = \frac{\pi^2b^5x^4\,\mathrm{C}\left(bx+a\right)+6\,\pi a^2\sqrt{b^2}\,\mathrm{S}\left(\frac{\sqrt{b^2}(bx+a)}{b}\right)-(\pi^2a^4-3)\sqrt{b^2}\,\mathrm{C}\left(\frac{\sqrt{b^2}(bx+a)}{b}\right)-(3\,b^2x-5\,ab)\cos\left(\frac{1}{2}\,\pi b^2x^2\right.}{4\,\pi^2b^5}$$

```
[In] integrate(x^3*fresnel_cos(b*x+a),x, algorithm="fricas")
```

```
[Out] 1/4*(pi^2*b^5*x^4*fresnel_cos(b*x + a) + 6*pi*a^2*sqrt(b^2)*fresnel_sin(sqr
t(b^2)*(b*x + a)/b) - (pi^2*a^4 - 3)*sqrt(b^2)*fresnel_cos(sqrt(b^2)*(b*x +
 a)/b) - (3*b^2*x - 5*a*b)*cos(1/2*pi*b^2*x^2 + pi*a*b*x + 1/2*pi*a^2) - (p
i*b^4*x^3 - pi*a*b^3*x^2 + pi*a^2*b^2*x - pi*a^3*b)*sin(1/2*pi*b^2*x^2 + pi
*a*b*x + 1/2*pi*a^2))/(pi^2*b^5)
```

Sympy [F]

$$\int x^3 \operatorname{CosIntegral}(a+bx)\,dx = \int x^3 \operatorname{Ci}(a+bx)\,dx$$

```
[In] integrate(x**3*Ci(b*x+a),x)
[Out] Integral(x**3*Ci(a + b*x), x)
```

Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 1.10 (sec) , antiderivative size = 502, normalized size of antiderivative = 2.73

$$\int x^3 \operatorname{CosIntegral}(a+bx)\,dx = \frac{1}{4}x^4\,\mathrm{C}\,(bx+a) + \frac{\left(16\left(-i\pi^2 e^{\left(\frac{1}{2}i\pi b^2x^2+i\pi abx+\frac{1}{2}i\pi a^2\right)} + i\pi^2 e^{\left(-\frac{1}{2}i\pi b^2x^2-i\pi abx-\frac{1}{2}i\pi a^2\right)}\right)a^4 + 32\left(\pi\Gamma\left(2, \frac{1}{2}i\pi b^2x^2 + i\pi abx + \frac{1}{2}i\pi a^2\right.\right.}{}$$

```
[In] integrate(x^3*fresnel_cos(b*x+a),x, algorithm="maxima")
[Out] 1/4*x^4*fresnel_cos(b*x + a) + 1/32*(16*(-I*pi^2*e^(1/2*I*pi*b^2*x^2 + I*pi
*a*b*x + 1/2*I*pi*a^2) + I*pi^2*e^(-1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*p
i*a^2))*a^4 + 32*(pi*gamma(2, 1/2*I*pi*b^2*x^2 + I*pi*a*b*x + 1/2*I*pi*a^2)
 + pi*gamma(2, -1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*pi*a^2))*a^2 + 16*((-
I*pi^2*e^(1/2*I*pi*b^2*x^2 + I*pi*a*b*x + 1/2*I*pi*a^2) + I*pi^2*e^(-1/2*I*
pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*pi*a^2))*a^3 + 2*(pi*gamma(2, 1/2*I*pi*b^2*
x^2 + I*pi*a*b*x + 1/2*I*pi*a^2) + pi*gamma(2, -1/2*I*pi*b^2*x^2 - I*pi*a*b
*x - 1/2*I*pi*a^2))*a)*b*x + (((I - 1)*sqrt(2)*pi^(5/2)*(erf(sqrt(1/2*I*pi*
b^2*x^2 + I*pi*a*b*x + 1/2*I*pi*a^2)) - 1) - (I + 1)*sqrt(2)*pi^(5/2)*(erf(
sqrt(-1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*pi*a^2)) - 1))*a^4 + 12*(-(I +
1)*sqrt(2)*pi*gamma(3/2, 1/2*I*pi*b^2*x^2 + I*pi*a*b*x + 1/2*I*pi*a^2) + (I
 - 1)*sqrt(2)*pi*gamma(3/2, -1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*pi*a^2))
*a^2 + (4*I - 4)*sqrt(2)*gamma(5/2, 1/2*I*pi*b^2*x^2 + I*pi*a*b*x + 1/2*I*p
i*a^2) - (4*I + 4)*sqrt(2)*gamma(5/2, -1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*
I*pi*a^2))*sqrt(2*pi*b^2*x^2 + 4*pi*a*b*x + 2*pi*a^2))*b/(pi^3*b^6*x + pi^3
*a*b^5)
```

Giac [F]

$$\int x^3 \operatorname{CosIntegral}(a+bx)\,dx = \int x^3 \operatorname{C}(bx+a)\;dx$$

```
[In] integrate(x^3*fresnel_cos(b*x+a),x, algorithm="giac")
[Out] integrate(x^3*fresnel_cos(b*x + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int x^3 \operatorname{CosIntegral}(a+bx)\,dx = \int x^3 \operatorname{cosint}(a+b\,x)\;dx$$

```
[In] int(x^3*cosint(a + b*x),x)
[Out] int(x^3*cosint(a + b*x), x)
```

3.87 $\int x^2 \text{CosIntegral}(a+bx)\,dx$

Optimal result

Integrand size = 10, antiderivative size = 118

$$\int x^2 \text{CosIntegral}(a+bx)\,dx = \frac{a\cos(a+bx)}{3b^3} - \frac{2x\cos(a+bx)}{3b^2} + \frac{a^3 \text{CosIntegral}(a+bx)}{3b^3} + \frac{1}{3}x^3 \text{CosIntegral}(a+bx) + \frac{2\sin(a+bx)}{3b^3} - \frac{a^2\sin(a+bx)}{3b^3} + \frac{ax\sin(a+bx)}{3b^2} - \frac{x^2\sin(a+bx)}{3b}$$

```
[Out] 1/3*a^3*Ci(b*x+a)/b^3+1/3*x^3*Ci(b*x+a)+1/3*a*cos(b*x+a)/b^3-2/3*x*cos(b*x+
a)/b^2+2/3*sin(b*x+a)/b^3-1/3*a^2*sin(b*x+a)/b^3+1/3*a*x*sin(b*x+a)/b^2-1/3
*x^2*sin(b*x+a)/b
```

Rubi [A] (verified)

Time = 0.23 (sec) , antiderivative size = 118, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.600, Rules used = {6639, 6874, 2717, 3377, 2718, 3383}

$$\int x^2 \text{CosIntegral}(a+bx)\,dx = \frac{a^3 \text{CosIntegral}(a+bx)}{3b^3} - \frac{a^2\sin(a+bx)}{3b^3} + \frac{2\sin(a+bx)}{3b^3} + \frac{a\cos(a+bx)}{3b^3} + \frac{ax\sin(a+bx)}{3b^2} - \frac{2x\cos(a+bx)}{3b^2} + \frac{1}{3}x^3 \text{CosIntegral}(a+bx) - \frac{x^2\sin(a+bx)}{3b}$$

```
[In] Int[x^2*CosIntegral[a + b*x],x]
```

```
[Out] (a*Cos[a + b*x])/(3*b^3) - (2*x*Cos[a + b*x])/(3*b^2) + (a^3*CosIntegral[a
+ b*x])/(3*b^3) + (x^3*CosIntegral[a + b*x])/3 + (2*Sin[a + b*x])/(3*b^3) -
```

```
(a^2*Sin[a + b*x])/(3*b^3) + (a*x*Sin[a + b*x])/(3*b^2) - (x^2*Sin[a + b*x
])/(3*b)
```

Rule 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 6639

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}\text{integral} &= \frac{1}{3}x^3\,\text{CosIntegral}(a+bx) - \frac{1}{3}b\int \frac{x^3\cos(a+bx)}{a+bx}\,dx \\ &= \frac{1}{3}x^3\,\text{CosIntegral}(a+bx) \\ &\quad - \frac{1}{3}b\int \left(\frac{a^2\cos(a+bx)}{b^3} - \frac{ax\cos(a+bx)}{b^2} + \frac{x^2\cos(a+bx)}{b} - \frac{a^3\cos(a+bx)}{b^3(a+bx)}\right)dx\end{aligned}$$

$$
\begin{aligned}
&= \frac{1}{3}x^3 \operatorname{CosIntegral}(a+bx) - \frac{1}{3}\int x^2 \cos(a+bx)\,dx \\
&\quad - \frac{a^2 \int \cos(a+bx)\,dx}{3b^2} + \frac{a^3 \int \frac{\cos(a+bx)}{a+bx}\,dx}{3b^2} + \frac{a\int x\cos(a+bx)\,dx}{3b} \\
&= \frac{a^3 \operatorname{CosIntegral}(a+bx)}{3b^3} + \frac{1}{3}x^3 \operatorname{CosIntegral}(a+bx) - \frac{a^2 \sin(a+bx)}{3b^3} \\
&\quad + \frac{ax\sin(a+bx)}{3b^2} - \frac{x^2\sin(a+bx)}{3b} - \frac{a\int \sin(a+bx)\,dx}{3b^2} + \frac{2\int x\sin(a+bx)\,dx}{3b} \\
&= \frac{a\cos(a+bx)}{3b^3} - \frac{2x\cos(a+bx)}{3b^2} + \frac{a^3 \operatorname{CosIntegral}(a+bx)}{3b^3} + \frac{1}{3}x^3 \operatorname{CosIntegral}(a+bx) \\
&\quad - \frac{a^2\sin(a+bx)}{3b^3} + \frac{ax\sin(a+bx)}{3b^2} - \frac{x^2\sin(a+bx)}{3b} + \frac{2\int \cos(a+bx)\,dx}{3b^2} \\
&= \frac{a\cos(a+bx)}{3b^3} - \frac{2x\cos(a+bx)}{3b^2} + \frac{a^3 \operatorname{CosIntegral}(a+bx)}{3b^3} + \frac{1}{3}x^3 \operatorname{CosIntegral}(a+bx) \\
&\quad + \frac{2\sin(a+bx)}{3b^3} - \frac{a^2\sin(a+bx)}{3b^3} + \frac{ax\sin(a+bx)}{3b^2} - \frac{x^2\sin(a+bx)}{3b}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.11 (sec) , antiderivative size = 64, normalized size of antiderivative = 0.54

$$
\int x^2 \operatorname{CosIntegral}(a+bx)\,dx
= \frac{(a-2bx)\cos(a+bx) + (a^3+b^3x^3)\operatorname{CosIntegral}(a+bx) - (-2+a^2-abx+b^2x^2)\sin(a+bx)}{3b^3}
$$

```
[In] Integrate[x^2*CosIntegral[a + b*x],x]
```

```
[Out] ((a - 2*b*x)*Cos[a + b*x] + (a^3 + b^3*x^3)*CosIntegral[a + b*x] - (-2 + a^
2 - a*b*x + b^2*x^2)*Sin[a + b*x])/(3*b^3)
```

Maple [A] (verified)

Time = 0.48 (sec) , antiderivative size = 98, normalized size of antiderivative = 0.83

method	result
parts	$\frac{x^3 \operatorname{Ci}(bx+a)}{3} - \frac{-a^3 \operatorname{Ci}(bx+a)+3a^2\sin(bx+a)-3a(\cos(bx+a)+(bx+a)\sin(bx+a))+(bx+a)^2\sin(bx+a)-2\sin(bx+a)+2}{3b^3}$
derivativedivides	$\frac{\frac{\operatorname{Ci}(bx+a)b^3x^3}{3}+\frac{a^3\operatorname{Ci}(bx+a)}{3}-a^2\sin(bx+a)+a(\cos(bx+a)+(bx+a)\sin(bx+a))-\frac{(bx+a)^2\sin(bx+a)}{3}+\frac{2\sin(bx+a)}{3}-\frac{2(bx+a)\cos}{3}}{b^3}$
default	$\frac{\frac{\operatorname{Ci}(bx+a)b^3x^3}{3}+\frac{a^3\operatorname{Ci}(bx+a)}{3}-a^2\sin(bx+a)+a(\cos(bx+a)+(bx+a)\sin(bx+a))-\frac{(bx+a)^2\sin(bx+a)}{3}+\frac{2\sin(bx+a)}{3}-\frac{2(bx+a)\cos}{3}}{b^3}$

```
[In] int(x^2*Ci(b*x+a),x,method=_RETURNVERBOSE)
```

```
[Out] 1/3*x^3*Ci(b*x+a)-1/3/b^3*(-a^3*Ci(b*x+a)+3*a^2*sin(b*x+a)-3*a*(cos(b*x+a)+
(b*x+a)*sin(b*x+a))+(b*x+a)^2*sin(b*x+a)-2*sin(b*x+a)+2*(b*x+a)*cos(b*x+a))
```

Fricas [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 148, normalized size of antiderivative = 1.25

$$\int x^2 \operatorname{CosIntegral}(a+bx)\,dx$$
$$= \frac{\pi^2 b^4 x^3 \operatorname{C}(bx+a) + \pi^2 a^3 \sqrt{b^2} \operatorname{C}\left(\frac{\sqrt{b^2}(bx+a)}{b}\right) - 3\,\pi a \sqrt{b^2} \operatorname{S}\left(\frac{\sqrt{b^2}(bx+a)}{b}\right) - 2\,b \cos\left(\frac{1}{2}\,\pi b^2 x^2 + \pi abx + \frac{1}{2}\,\pi a^2\right) -}{3\,\pi^2 b^4}$$

```
[In] integrate(x^2*fresnel_cos(b*x+a),x, algorithm="fricas")
```

```
[Out] 1/3*(pi^2*b^4*x^3*fresnel_cos(b*x + a) + pi^2*a^3*sqrt(b^2)*fresnel_cos(sqr
t(b^2)*(b*x + a)/b) - 3*pi*a*sqrt(b^2)*fresnel_sin(sqrt(b^2)*(b*x + a)/b) -
 2*b*cos(1/2*pi*b^2*x^2 + pi*a*b*x + 1/2*pi*a^2) - (pi*b^3*x^2 - pi*a*b^2*x
 + pi*a^2*b)*sin(1/2*pi*b^2*x^2 + pi*a*b*x + 1/2*pi*a^2))/(pi^2*b^4)
```

Sympy [F]

$$\int x^2 \operatorname{CosIntegral}(a+bx)\,dx = \int x^2 \operatorname{Ci}(a+bx)\,dx$$

```
[In] integrate(x**2*Ci(b*x+a),x)
```

```
[Out] Integral(x**2*Ci(a + b*x), x)
```

Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.83 (sec) , antiderivative size = 423, normalized size of antiderivative = 3.58

$$\int x^2 \operatorname{CosIntegral}(a+bx)\,dx = \frac{1}{3}\,x^3 \operatorname{C}(bx+a)$$
$$- \frac{\left(12\left(-i\,\pi e^{\left(\frac{1}{2}\,i\,\pi b^2 x^2 + i\,\pi abx + \frac{1}{2}\,i\,\pi a^2\right)} + i\,\pi e^{\left(-\frac{1}{2}\,i\,\pi b^2 x^2 - i\,\pi abx - \frac{1}{2}\,i\,\pi a^2\right)}\right)a^3 + 4\left(3\left(-i\,\pi e^{\left(\frac{1}{2}\,i\,\pi b^2 x^2 + i\,\pi abx + \frac{1}{2}\,i\,\pi a^2\right)} + i\,\pi\right.\right.}{}$$

```
[In] integrate(x^2*fresnel_cos(b*x+a),x, algorithm="maxima")
```

```
[Out] 1/3*x^3*fresnel_cos(b*x + a) - 1/24*(12*(-I*pi*e^(1/2*I*pi*b^2*x^2 + I*pi*a
*b*x + 1/2*I*pi*a^2) + I*pi*e^(-1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*pi*a^
2))*a^3 + 4*(3*(-I*pi*e^(1/2*I*pi*b^2*x^2 + I*pi*a*b*x + 1/2*I*pi*a^2) + I*
pi*e^(-1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*pi*a^2))*a^2 + 2*gamma(2, 1/2*
I*pi*b^2*x^2 + I*pi*a*b*x + 1/2*I*pi*a^2) + 2*gamma(2, -1/2*I*pi*b^2*x^2 -
I*pi*a*b*x - 1/2*I*pi*a^2))*b*x + 8*a*(gamma(2, 1/2*I*pi*b^2*x^2 + I*pi*a*b
*x + 1/2*I*pi*a^2) + gamma(2, -1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*pi*a^2
)) + sqrt(2*pi*b^2*x^2 + 4*pi*a*b*x + 2*pi*a^2)*(((I - 1)*sqrt(2)*pi^(3/2)*
(erf(sqrt(1/2*I*pi*b^2*x^2 + I*pi*a*b*x + 1/2*I*pi*a^2)) - 1) - (I + 1)*sqr
t(2)*pi^(3/2)*(erf(sqrt(-1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*pi*a^2)) - 1
))*a^3 + 6*(-(I + 1)*sqrt(2)*gamma(3/2, 1/2*I*pi*b^2*x^2 + I*pi*a*b*x + 1/2
*I*pi*a^2) + (I - 1)*sqrt(2)*gamma(3/2, -1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/
2*I*pi*a^2))*a))*b/(pi^2*b^5*x + pi^2*a*b^4)
```

Giac [F]

$$\int x^2 \operatorname{CosIntegral}(a+bx)\,dx = \int x^2\,\mathrm{C}\left(bx+a\right)\,dx$$

```
[In] integrate(x^2*fresnel_cos(b*x+a),x, algorithm="giac")
```

```
[Out] integrate(x^2*fresnel_cos(b*x + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \operatorname{CosIntegral}(a+bx)\,dx = \int x^2\,\mathrm{cosint}(a+b\,x)\,dx$$

```
[In] int(x^2*cosint(a + b*x),x)
```

```
[Out] int(x^2*cosint(a + b*x), x)
```

3.88 $\int x \operatorname{CosIntegral}(a+bx)\,dx$

Optimal result

Integrand size = 8, antiderivative size = 71

$$\int x \operatorname{CosIntegral}(a+bx)\,dx = -\frac{\cos(a+bx)}{2b^2} - \frac{a^2 \operatorname{CosIntegral}(a+bx)}{2b^2} + \frac{1}{2}x^2 \operatorname{CosIntegral}(a+bx) + \frac{a\sin(a+bx)}{2b^2} - \frac{x\sin(a+bx)}{2b}$$

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

Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.750, Rules used = {6639, 6874, 2717, 3377, 2718, 3383}

$$\int x \operatorname{CosIntegral}(a+bx)\,dx = -\frac{a^2 \operatorname{CosIntegral}(a+bx)}{2b^2} + \frac{a\sin(a+bx)}{2b^2} - \frac{\cos(a+bx)}{2b^2} + \frac{1}{2}x^2 \operatorname{CosIntegral}(a+bx) - \frac{x\sin(a+bx)}{2b}$$

```
[In] Int[x*CosIntegral[a + b*x],x]
```

```
[Out] -1/2*Cos[a + b*x]/b^2 - (a^2*CosIntegral[a + b*x])/(2*b^2) + (x^2*CosIntegr
al[a + b*x])/2 + (a*Sin[a + b*x])/(2*b^2) - (x*Sin[a + b*x])/(2*b)
```

Rule 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 6639

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= \frac{1}{2}x^2\,\text{CosIntegral}(a+bx)-\frac{1}{2}b\int\frac{x^2\cos(a+bx)}{a+bx}\,dx\\
&=\frac{1}{2}x^2\,\text{CosIntegral}(a+bx)-\frac{1}{2}b\int\left(-\frac{a\cos(a+bx)}{b^2}+\frac{x\cos(a+bx)}{b}+\frac{a^2\cos(a+bx)}{b^2(a+bx)}\right)dx\\
&=\frac{1}{2}x^2\,\text{CosIntegral}(a+bx)-\frac{1}{2}\int x\cos(a+bx)\,dx+\frac{a\int\cos(a+bx)\,dx}{2b}-\frac{a^2\int\frac{\cos(a+bx)}{a+bx}\,dx}{2b}\\
&=-\frac{a^2\,\text{CosIntegral}(a+bx)}{2b^2}+\frac{1}{2}x^2\,\text{CosIntegral}(a+bx)\\
&\quad+\frac{a\sin(a+bx)}{2b^2}-\frac{x\sin(a+bx)}{2b}+\frac{\int\sin(a+bx)\,dx}{2b}\\
&=-\frac{\cos(a+bx)}{2b^2}-\frac{a^2\,\text{CosIntegral}(a+bx)}{2b^2}\\
&\quad+\frac{1}{2}x^2\,\text{CosIntegral}(a+bx)+\frac{a\sin(a+bx)}{2b^2}-\frac{x\sin(a+bx)}{2b}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 49, normalized size of antiderivative = 0.69

$$\int x \operatorname{CosIntegral}(a+bx)\,dx = \frac{-\cos(a+bx)+(-a^2+b^2x^2)\operatorname{CosIntegral}(a+bx)+(a-bx)\sin(a+bx)}{2b^2}$$

```
[In] Integrate[x*CosIntegral[a + b*x],x]
[Out] (-Cos[a + b*x] + (-a^2 + b^2*x^2)*CosIntegral[a + b*x] + (a - b*x)*Sin[a +
b*x])/(2*b^2)
```

Maple [A] (verified)

Time = 0.47 (sec) , antiderivative size = 56, normalized size of antiderivative = 0.79

method	result	size
parts	$\frac{x^2 \operatorname{Ci}(bx+a)}{2}-\frac{a^2 \operatorname{Ci}(bx+a)-2a\sin(bx+a)+\cos(bx+a)+(bx+a)\sin(bx+a)}{2b^2}$	56
derivativedivides	$\frac{\operatorname{Ci}(bx+a)\left(-(bx+a)a+\frac{(bx+a)^2}{2}\right)+a\sin(bx+a)-\frac{\cos(bx+a)}{2}-\frac{(bx+a)\sin(bx+a)}{2}}{b^2}$	60
default	$\frac{\operatorname{Ci}(bx+a)\left(-(bx+a)a+\frac{(bx+a)^2}{2}\right)+a\sin(bx+a)-\frac{\cos(bx+a)}{2}-\frac{(bx+a)\sin(bx+a)}{2}}{b^2}$	60

```
[In] int(x*Ci(b*x+a),x,method=_RETURNVERBOSE)
[Out] 1/2*x^2*Ci(b*x+a)-1/2/b^2*(a^2*Ci(b*x+a)-2*a*sin(b*x+a)+cos(b*x+a)+(b*x+a)*
sin(b*x+a))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 104, normalized size of antiderivative = 1.46

$$\int x \operatorname{CosIntegral}(a+bx)\,dx = \frac{\pi b^3x^2\operatorname{C}(bx+a)-\pi a^2\sqrt{b^2}\operatorname{C}\left(\frac{\sqrt{b^2}(bx+a)}{b}\right)-(b^2x-ab)\sin\left(\frac{1}{2}\pi b^2x^2+\pi abx+\frac{1}{2}\pi a^2\right)+\sqrt{b^2}\operatorname{S}\left(\frac{\sqrt{b^2}(bx+a)}{b}\right)}{2\pi b^3}$$

```
[In] integrate(x*fresnel_cos(b*x+a),x, algorithm="fricas")
[Out] 1/2*(pi*b^3*x^2*fresnel_cos(b*x + a) - pi*a^2*sqrt(b^2)*fresnel_cos(sqrt(b^
2)*(b*x + a)/b) - (b^2*x - a*b)*sin(1/2*pi*b^2*x^2 + pi*a*b*x + 1/2*pi*a^2)
 + sqrt(b^2)*fresnel_sin(sqrt(b^2)*(b*x + a)/b))/(pi*b^3)
```

Sympy [F]

$$\int x \operatorname{CosIntegral}(a+bx)\, dx = \int x \operatorname{Ci}(a+bx)\, dx$$

```
[In] integrate(x*Ci(b*x+a),x)
[Out] Integral(x*Ci(a + b*x), x)
```

Maxima [C] (verification not implemented)

Result contains complex when optimal does not.

Time = 0.74 (sec) , antiderivative size = 311, normalized size of antiderivative = 4.38

$$\int x \operatorname{CosIntegral}(a+bx)\, dx = \frac{1}{2}x^2 \operatorname{C}(bx+a) + \frac{\left(8\left(-i\pi e^{\left(\frac{1}{2}i\pi b^2x^2+i\pi abx+\frac{1}{2}i\pi a^2\right)} + i\pi e^{\left(-\frac{1}{2}i\pi b^2x^2-i\pi abx-\frac{1}{2}i\pi a^2\right)}\right)abx + 8\left(-i\pi e^{\left(\frac{1}{2}i\pi b^2x^2+i\pi abx+\frac{1}{2}i\pi a^2\right)} + i\pi e^{(-$$

```
[In] integrate(x*fresnel_cos(b*x+a),x, algorithm="maxima")
[Out] 1/2*x^2*fresnel_cos(b*x + a) + 1/16*(8*(-I*pi*e^(1/2*I*pi*b^2*x^2 + I*pi*a*
b*x + 1/2*I*pi*a^2) + I*pi*e^(-1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*pi*a^2
))*a*b*x + 8*(-I*pi*e^(1/2*I*pi*b^2*x^2 + I*pi*a*b*x + 1/2*I*pi*a^2) + I*pi
*e^(-1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*pi*a^2))*a^2 - sqrt(2*pi*b^2*x^2
 + 4*pi*a*b*x + 2*pi*a^2)*((-(I - 1)*sqrt(2)*pi^(3/2)*(erf(sqrt(1/2*I*pi*b^
2*x^2 + I*pi*a*b*x + 1/2*I*pi*a^2)) - 1) + (I + 1)*sqrt(2)*pi^(3/2)*(erf(sq
rt(-1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*pi*a^2)) - 1))*a^2 + (2*I + 2)*sq
rt(2)*gamma(3/2, 1/2*I*pi*b^2*x^2 + I*pi*a*b*x + 1/2*I*pi*a^2) - (2*I - 2)*
sqrt(2)*gamma(3/2, -1/2*I*pi*b^2*x^2 - I*pi*a*b*x - 1/2*I*pi*a^2)))*b/(pi^2
*b^4*x + pi^2*a*b^3)
```

Giac [F]

$$\int x \operatorname{CosIntegral}(a+bx)\, dx = \int x \operatorname{C}(bx+a)\, dx$$

```
[In] integrate(x*fresnel_cos(b*x+a),x, algorithm="giac")
[Out] integrate(x*fresnel_cos(b*x + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int x\,\text{CosIntegral}(a+bx)\,dx$$
$$=\frac{x^2\,\text{cosint}(a+b\,x)}{2}-\frac{\cos\left(a+b\,x\right)-a\,\sin\left(a+b\,x\right)+a^2\,\text{cosint}(a+b\,x)+b\,x\,\sin\left(a+b\,x\right)}{2\,b^2}$$

```
[In] int(x*cosint(a + b*x),x)
```

```
[Out] (x^2*cosint(a + b*x))/2 - (cos(a + b*x) - a*sin(a + b*x) + a^2*cosint(a + b
*x) + b*x*sin(a + b*x))/(2*b^2)
```

3.89 $\int \text{CosIntegral}(a + bx) \, dx$

Optimal result

Integrand size = 6, antiderivative size = 27

$$\int \text{CosIntegral}(a + bx) \, dx = \frac{(a + bx) \text{CosIntegral}(a + bx)}{b} - \frac{\sin(a + bx)}{b}$$

```
[Out] (b*x+a)*Ci(b*x+a)/b-sin(b*x+a)/b
```

Rubi [A] (verified)

Time = 0.00 (sec) , antiderivative size = 27, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {6635}

$$\int \text{CosIntegral}(a + bx) \, dx = \frac{(a + bx) \text{CosIntegral}(a + bx)}{b} - \frac{\sin(a + bx)}{b}$$

```
[In] Int[CosIntegral[a + b*x],x]
```

```
[Out] ((a + b*x)*CosIntegral[a + b*x])/b - Sin[a + b*x]/b
```

Rule 6635

```
Int[CosIntegral[(a_.) + (b_.)*(x_)], x_Symbol] :> Simp[(a + b*x)*(CosIntegr
al[a + b*x]/b), x] - Simp[Sin[a + b*x]/b, x] /; FreeQ[{a, b}, x]
```

Rubi steps

$$\text{integral} = \frac{(a + bx) \text{CosIntegral}(a + bx)}{b} - \frac{\sin(a + bx)}{b}$$

Mathematica [A] (verified)

Time = 0.03 (sec) , antiderivative size = 42, normalized size of antiderivative = 1.56

$$\int \text{CosIntegral}(a+bx)\,dx = \frac{a\,\text{CosIntegral}(a+bx)}{b} + x\,\text{CosIntegral}(a+bx) - \frac{\cos(bx)\sin(a)}{b} - \frac{\cos(a)\sin(bx)}{b}$$

```
[In] Integrate[CosIntegral[a + b*x],x]
[Out] (a*CosIntegral[a + b*x])/b + x*CosIntegral[a + b*x] - (Cos[b*x]*Sin[a])/b -
 (Cos[a]*Sin[b*x])/b
```

Maple [A] (verified)

Time = 0.42 (sec) , antiderivative size = 26, normalized size of antiderivative = 0.96

method	result	size
derivativedivides	$\frac{\text{Ci}(bx+a)(bx+a)-\sin(bx+a)}{b}$	26
default	$\frac{\text{Ci}(bx+a)(bx+a)-\sin(bx+a)}{b}$	26
parts	$x\ \text{Ci}\left(bx+a\right)-\frac{-a\ \text{Ci}(bx+a)+\sin(bx+a)}{b}$	31

```
[In] int(Ci(b*x+a),x,method=_RETURNVERBOSE)
[Out] 1/b*(Ci(b*x+a)*(b*x+a)-sin(b*x+a))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.74

$$\int \text{CosIntegral}(a+bx)\,dx = \frac{(\pi bx+\pi a)\,\mathrm{C}\left(bx+a\right)-\sin\left(\frac{1}{2}\,\pi b^2x^2+\pi abx+\frac{1}{2}\,\pi a^2\right)}{\pi b}$$

```
[In] integrate(fresnel_cos(b*x+a),x, algorithm="fricas")
[Out] ((pi*b*x + pi*a)*fresnel_cos(b*x + a) - sin(1/2*pi*b^2*x^2 + pi*a*b*x + 1/2
*pi*a^2))/(pi*b)
```

Sympy [F]

$$\int \text{CosIntegral}(a+bx)\,dx = \int \text{Ci}\,(a+bx)\,dx$$

```
[In] integrate(Ci(b*x+a),x)
[Out] Integral(Ci(a + b*x), x)
```

Maxima [A] (verification not implemented)

none

Time = 0.20 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.63

$$\int \text{CosIntegral}(a+bx)\,dx = \frac{(bx+a)\,\text{C}\,(bx+a) - \frac{\sin\left(\frac{1}{2}\,\pi b^2x^2+\pi abx+\frac{1}{2}\,\pi a^2\right)}{\pi}}{b}$$

```
[In] integrate(fresnel_cos(b*x+a),x, algorithm="maxima")
[Out] ((b*x + a)*fresnel_cos(b*x + a) - sin(1/2*pi*b^2*x^2 + pi*a*b*x + 1/2*pi*a^
2)/pi)/b
```

Giac [F]

$$\int \text{CosIntegral}(a+bx)\,dx = \int \text{C}\,(bx+a)\,\,dx$$

```
[In] integrate(fresnel_cos(b*x+a),x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int \text{CosIntegral}(a+bx)\,dx = x\,\text{cosint}(a+b\,x) - \frac{\sin\,(a+b\,x) - a\,\text{cosint}(a+b\,x)}{b}$$

```
[In] int(cosint(a + b*x),x)
[Out] x*cosint(a + b*x) - (sin(a + b*x) - a*cosint(a + b*x))/b
```

3.90 $\int \frac{\text{CosIntegral}(a+bx)}{x} \, dx$

Optimal result

Integrand size = 10, antiderivative size = 10

$$\int \frac{\text{CosIntegral}(a+bx)}{x} \, dx = \text{Int}\left(\frac{\text{CosIntegral}(a+bx)}{x}, x\right)$$

```
[Out] CannotIntegrate(Ci(b*x+a)/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\text{CosIntegral}(a+bx)}{x} \, dx = \int \frac{\text{CosIntegral}(a+bx)}{x} \, dx$$

```
[In] Int[CosIntegral[a + b*x]/x,x]
```

```
[Out] Defer[Int][CosIntegral[a + b*x]/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{CosIntegral}(a+bx)}{x} \, dx$$

Mathematica [N/A]

Not integrable

Time = 0.39 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(a+bx)}{x}\,dx = \int \frac{\text{CosIntegral}(a+bx)}{x}\,dx$$

```
[In] Integrate[CosIntegral[a + b*x]/x,x]
[Out] Integrate[CosIntegral[a + b*x]/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.26 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\text{Ci}\,(bx+a)}{x}dx$$

```
[In] int(Ci(b*x+a)/x,x)
[Out] int(Ci(b*x+a)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(a+bx)}{x}\,dx = \int \frac{\text{C}\,(bx+a)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)/x,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x + a)/x, x)
```

Sympy [N/A]

Not integrable

Time = 0.34 (sec) , antiderivative size = 8, normalized size of antiderivative = 0.80

$$\int \frac{\text{CosIntegral}(a+bx)}{x}\,dx = \int \frac{\text{Ci}\,(a+bx)}{x}\,dx$$

```
[In] integrate(Ci(b*x+a)/x,x)
[Out] Integral(Ci(a + b*x)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.75 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(a+bx)}{x}\,dx = \int \frac{C\left(bx+a\right)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)/x,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x + a)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(a+bx)}{x}\,dx = \int \frac{C\left(bx+a\right)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)/x,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x + a)/x, x)
```

Mupad [N/A]

Not integrable

Time = 5.16 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.20

$$\int \frac{\text{CosIntegral}(a+bx)}{x}\,dx = \int \frac{\text{cosint}(a+b\,x)}{x}\,dx$$

```
[In] int(cosint(a + b*x)/x,x)
[Out] int(cosint(a + b*x)/x, x)
```

3.91 $\int \frac{\text{CosIntegral}(a+bx)}{x^2} dx$

Optimal result

Integrand size = 10, antiderivative size = 47

$$\int \frac{\text{CosIntegral}(a+bx)}{x^2} dx = \frac{b\cos(a)\,\text{CosIntegral}(bx)}{a} - \frac{b\,\text{CosIntegral}(a+bx)}{a} - \frac{\text{CosIntegral}(a+bx)}{x} - \frac{b\sin(a)\text{Si}(bx)}{a}$$

```
[Out] -b*Ci(b*x+a)/a-Ci(b*x+a)/x+b*Ci(b*x)*cos(a)/a-b*Si(b*x)*sin(a)/a
```

Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6639, 6874, 3384, 3380, 3383}

$$\int \frac{\text{CosIntegral}(a+bx)}{x^2} dx = -\frac{b\,\text{CosIntegral}(a+bx)}{a} - \frac{\text{CosIntegral}(a+bx)}{x} + \frac{b\cos(a)\,\text{CosIntegral}(bx)}{a} - \frac{b\sin(a)\text{Si}(bx)}{a}$$

```
[In] Int[CosIntegral[a + b*x]/x^2,x]
```

```
[Out] (b*Cos[a]*CosIntegral[b*x])/a - (b*CosIntegral[a + b*x])/a - CosIntegral[a
+ b*x]/x - (b*Sin[a]*SinIntegral[b*x])/a
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3384

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Dist[Cos[(d*
e - c*f)/d], Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Dist[Sin[(d*e - c*f
)/d], Int[Cos[c*(f/d) + f*x]/(c + d*x), x], x] /; FreeQ[{c, d, e, f}, x] &&
 NeQ[d*e - c*f, 0]
```

Rule 6639

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= -\frac{\text{CosIntegral}(a+bx)}{x} + b\int \frac{\cos(a+bx)}{x(a+bx)}\,dx \\
&= -\frac{\text{CosIntegral}(a+bx)}{x} + b\int \left(\frac{\cos(a+bx)}{ax} - \frac{b\cos(a+bx)}{a(a+bx)}\right)dx \\
&= -\frac{\text{CosIntegral}(a+bx)}{x} + \frac{b\int \frac{\cos(a+bx)}{x}\,dx}{a} - \frac{b^2\int \frac{\cos(a+bx)}{a+bx}\,dx}{a} \\
&= -\frac{b\,\text{CosIntegral}(a+bx)}{a} - \frac{\text{CosIntegral}(a+bx)}{x} \\
&\quad + \frac{(b\cos(a))\int \frac{\cos(bx)}{x}\,dx}{a} - \frac{(b\sin(a))\int \frac{\sin(bx)}{x}\,dx}{a} \\
&= \frac{b\cos(a)\,\text{CosIntegral}(bx)}{a} - \frac{b\,\text{CosIntegral}(a+bx)}{a} - \frac{\text{CosIntegral}(a+bx)}{x} - \frac{b\sin(a)\text{Si}(bx)}{a}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.05 (sec) , antiderivative size = 40, normalized size of antiderivative = 0.85

$$\int \frac{\text{CosIntegral}(a+bx)}{x^2}\,dx = \frac{bx\cos(a)\,\text{CosIntegral}(bx)-(a+bx)\,\text{CosIntegral}(a+bx)-bx\sin(a)\text{Si}(bx)}{ax}$$

```
[In] Integrate[CosIntegral[a + b*x]/x^2,x]
[Out] (b*x*Cos[a]*CosIntegral[b*x] - (a + b*x)*CosIntegral[a + b*x] - b*x*Sin[a]*
SinIntegral[b*x])/(a*x)
```

Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.00

method	result	size
parts	$-\frac{\text{Ci}(bx+a)}{x}+b\left(\frac{-\text{Si}(bx)\sin(a)+\text{Ci}(bx)\cos(a)}{a}-\frac{\text{Ci}(bx+a)}{a}\right)$	47
derivativedivides	$b\left(-\frac{\text{Ci}(bx+a)}{bx}+\frac{-\text{Si}(bx)\sin(a)+\text{Ci}(bx)\cos(a)}{a}-\frac{\text{Ci}(bx+a)}{a}\right)$	49
default	$b\left(-\frac{\text{Ci}(bx+a)}{bx}+\frac{-\text{Si}(bx)\sin(a)+\text{Ci}(bx)\cos(a)}{a}-\frac{\text{Ci}(bx+a)}{a}\right)$	49

```
[In] int(Ci(b*x+a)/x^2,x,method=_RETURNVERBOSE)
[Out] -Ci(b*x+a)/x+b*(1/a*(-Si(b*x)*sin(a)+Ci(b*x)*cos(a))-1/a*Ci(b*x+a))
```

Fricas [F]

$$\int \frac{\text{CosIntegral}(a+bx)}{x^2}\,dx = \int \frac{\text{C}\,(bx+a)}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)/x^2,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x + a)/x^2, x)
```

Sympy [F]

$$\int \frac{\text{CosIntegral}(a+bx)}{x^2}\,dx = \int \frac{\text{Ci}\,(a+bx)}{x^2}\,dx$$

```
[In] integrate(Ci(b*x+a)/x**2,x)
[Out] Integral(Ci(a + b*x)/x**2, x)
```

Maxima [F]

$$\int \frac{\text{CosIntegral}(a+bx)}{x^2}\,dx = \int \frac{\text{C}\,(bx+a)}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)/x^2,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x + a)/x^2, x)
```

Giac [F]

$$\int \frac{\text{CosIntegral}(a+bx)}{x^2}\,dx = \int \frac{\text{C}\,(bx+a)}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)/x^2,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x + a)/x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{CosIntegral}(a+bx)}{x^2}\,dx = \int \frac{\text{cosint}(a+b\,x)}{x^2}\,dx$$

```
[In] int(cosint(a + b*x)/x^2,x)
[Out] int(cosint(a + b*x)/x^2, x)
```

3.92 $\int \frac{\text{CosIntegral}(a+bx)}{x^3} dx$

Optimal result

Integrand size = 10, antiderivative size = 111

$$\int \frac{\text{CosIntegral}(a+bx)}{x^3} dx = -\frac{b\cos(a+bx)}{2ax} - \frac{b^2\cos(a)\,\text{CosIntegral}(bx)}{2a^2} + \frac{b^2\,\text{CosIntegral}(a+bx)}{2a^2} - \frac{\text{CosIntegral}(a+bx)}{2x^2} - \frac{b^2\,\text{CosIntegral}(bx)\sin(a)}{2a} - \frac{b^2\cos(a)\text{Si}(bx)}{2a} + \frac{b^2\sin(a)\text{Si}(bx)}{2a^2}$$

```
[Out] 1/2*b^2*Ci(b*x+a)/a^2-1/2*Ci(b*x+a)/x^2-1/2*b^2*Ci(b*x)*cos(a)/a^2-1/2*b*co
s(b*x+a)/a/x-1/2*b^2*cos(a)*Si(b*x)/a-1/2*b^2*Ci(b*x)*sin(a)/a+1/2*b^2*Si(b
*x)*sin(a)/a^2
```

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 111, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.600, Rules used = {6639, 6874, 3378, 3384, 3380, 3383}

$$\int \frac{\text{CosIntegral}(a+bx)}{x^3} dx = \frac{b^2\,\text{CosIntegral}(a+bx)}{2a^2} - \frac{b^2\cos(a)\,\text{CosIntegral}(bx)}{2a^2} + \frac{b^2\sin(a)\text{Si}(bx)}{2a^2} - \frac{b^2\sin(a)\,\text{CosIntegral}(bx)}{2a} - \frac{b^2\cos(a)\text{Si}(bx)}{2a} - \frac{\text{CosIntegral}(a+bx)}{2x^2} - \frac{b\cos(a+bx)}{2ax}$$

```
[In] Int[CosIntegral[a + b*x]/x^3,x]
```

```
[Out] -1/2*(b*Cos[a + b*x])/(a*x) - (b^2*Cos[a]*CosIntegral[b*x])/(2*a^2) + (b^2*
CosIntegral[a + b*x])/(2*a^2) - CosIntegral[a + b*x]/(2*x^2) - (b^2*CosInte
```

```
gral[b*x]*Sin[a])/(2*a) - (b^2*Cos[a]*SinIntegral[b*x])/(2*a) + (b^2*Sin[a]
*SinIntegral[b*x])/(2*a^2)
```

Rule 3378

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(c
 + d*x)^(m + 1)*(Sin[e + f*x]/(d*(m + 1))), x] - Dist[f/(d*(m + 1)), Int[(c
 + d*x)^(m + 1)*Cos[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && LtQ[m, -1
]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3384

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Dist[Cos[(d*
e - c*f)/d], Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Dist[Sin[(d*e - c*f
)/d], Int[Cos[c*(f/d) + f*x]/(c + d*x), x], x] /; FreeQ[{c, d, e, f}, x] &&
 NeQ[d*e - c*f, 0]
```

Rule 6639

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}\text{integral} &= -\frac{\text{CosIntegral}(a+bx)}{2x^2}+\frac{1}{2}b\int\frac{\cos(a+bx)}{x^2(a+bx)}\,dx\\ &= -\frac{\text{CosIntegral}(a+bx)}{2x^2}+\frac{1}{2}b\int\left(\frac{\cos(a+bx)}{ax^2}-\frac{b\cos(a+bx)}{a^2x}+\frac{b^2\cos(a+bx)}{a^2(a+bx)}\right)\,dx\end{aligned}$$

$$= -\frac{\text{CosIntegral}(a+bx)}{2x^2} + \frac{b\int \frac{\cos(a+bx)}{x^2}\,dx}{2a} - \frac{b^2\int \frac{\cos(a+bx)}{x}\,dx}{2a^2} + \frac{b^3\int \frac{\cos(a+bx)}{a+bx}\,dx}{2a^2}$$

$$= -\frac{b\cos(a+bx)}{2ax} + \frac{b^2\,\text{CosIntegral}(a+bx)}{2a^2} - \frac{\text{CosIntegral}(a+bx)}{2x^2} - \frac{b^2\int \frac{\sin(a+bx)}{x}\,dx}{2a} - \frac{(b^2\cos(a))\int \frac{\cos(bx)}{x}\,dx}{2a^2} + \frac{(b^2\sin(a))\int \frac{\sin(bx)}{x}\,dx}{2a^2}$$

$$= -\frac{b\cos(a+bx)}{2ax} - \frac{b^2\cos(a)\,\text{CosIntegral}(bx)}{2a^2} + \frac{b^2\,\text{CosIntegral}(a+bx)}{2a^2} - \frac{\text{CosIntegral}(a+bx)}{2x^2} + \frac{b^2\sin(a)\text{Si}(bx)}{2a^2} - \frac{(b^2\cos(a))\int \frac{\sin(bx)}{x}\,dx}{2a} - \frac{(b^2\sin(a))\int \frac{\cos(bx)}{x}\,dx}{2a}$$

$$= -\frac{b\cos(a+bx)}{2ax} - \frac{b^2\cos(a)\,\text{CosIntegral}(bx)}{2a^2} + \frac{b^2\,\text{CosIntegral}(a+bx)}{2a^2} - \frac{\text{CosIntegral}(a+bx)}{2x^2} - \frac{b^2\,\text{CosIntegral}(bx)\sin(a)}{2a} - \frac{b^2\cos(a)\text{Si}(bx)}{2a} + \frac{b^2\sin(a)\text{Si}(bx)}{2a^2}$$

Mathematica [A] (verified)

Time = 0.28 (sec) , antiderivative size = 76, normalized size of antiderivative = 0.68

$$\int \frac{\text{CosIntegral}(a+bx)}{x^3}\,dx = -\frac{(a^2-b^2x^2)\,\text{CosIntegral}(a+bx) + b^2x^2\,\text{CosIntegral}(bx)(\cos(a)+a\sin(a)) + bx(a\cos(a+bx) + bx(a\cos}{2a^2x^2}$$

```
[In] Integrate[CosIntegral[a + b*x]/x^3,x]
```

```
[Out] -1/2*((a^2 - b^2*x^2)*CosIntegral[a + b*x] + b^2*x^2*CosIntegral[b*x]*(Cos[
a] + a*Sin[a]) + b*x*(a*Cos[a + b*x] + b*x*(a*Cos[a] - Sin[a])*SinIntegral[
b*x]))/(a^2*x^2)
```

Maple [A] (verified)

Time = 0.44 (sec) , antiderivative size = 85, normalized size of antiderivative = 0.77

method	result	s
parts	$-\frac{\mathrm{Ci}(bx+a)}{2x^2}+\frac{b^2\left(\frac{\mathrm{Ci}(bx+a)}{a^2}-\frac{-\mathrm{Si}(bx)\sin(a)+\mathrm{Ci}(bx)\cos(a)}{a^2}+\frac{-\frac{\cos(bx+a)}{bx}-\mathrm{Si}(bx)\cos(a)-\mathrm{Ci}(bx)\sin(a)}{a}\right)}{2}$	8
derivativedivides	$b^2\left(-\frac{\mathrm{Ci}(bx+a)}{2b^2x^2}+\frac{\mathrm{Ci}(bx+a)}{2a^2}-\frac{-\mathrm{Si}(bx)\sin(a)+\mathrm{Ci}(bx)\cos(a)}{2a^2}+\frac{-\frac{\cos(bx+a)}{bx}-\mathrm{Si}(bx)\cos(a)-\mathrm{Ci}(bx)\sin(a)}{2a}\right)$	8
default	$b^2\left(-\frac{\mathrm{Ci}(bx+a)}{2b^2x^2}+\frac{\mathrm{Ci}(bx+a)}{2a^2}-\frac{-\mathrm{Si}(bx)\sin(a)+\mathrm{Ci}(bx)\cos(a)}{2a^2}+\frac{-\frac{\cos(bx+a)}{bx}-\mathrm{Si}(bx)\cos(a)-\mathrm{Ci}(bx)\sin(a)}{2a}\right)$	8

```
[In] int(Ci(b*x+a)/x^3,x,method=_RETURNVERBOSE)
[Out] -1/2*Ci(b*x+a)/x^2+1/2*b^2*(1/a^2*Ci(b*x+a)-1/a^2*(-Si(b*x)*sin(a)+Ci(b*x)*
cos(a))+1/a*(-cos(b*x+a)/b/x-Si(b*x)*cos(a)-Ci(b*x)*sin(a)))
```

Fricas [F]

$$\int \frac{\mathrm{CosIntegral}(a+bx)}{x^3}\,dx=\int \frac{\mathrm{C}\left(bx+a\right)}{x^3}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)/x^3,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x + a)/x^3, x)
```

Sympy [F]

$$\int \frac{\mathrm{CosIntegral}(a+bx)}{x^3}\,dx=\int \frac{\mathrm{Ci}\left(a+bx\right)}{x^3}\,dx$$

```
[In] integrate(Ci(b*x+a)/x**3,x)
[Out] Integral(Ci(a + b*x)/x**3, x)
```

Maxima [F]

$$\int \frac{\mathrm{CosIntegral}(a+bx)}{x^3}\,dx=\int \frac{\mathrm{C}\left(bx+a\right)}{x^3}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)/x^3,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x + a)/x^3, x)
```

Giac [F]

$$\int \frac{\text{CosIntegral}(a+bx)}{x^3}\,dx = \int \frac{C\,(bx+a)}{x^3}\,dx$$

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

```
[Out] integrate(fresnel_cos(b*x + a)/x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{CosIntegral}(a+bx)}{x^3}\,dx = \int \frac{\text{cosint}(a+b\,x)}{x^3}\,dx$$

```
[In] int(cosint(a + b*x)/x^3,x)
```

```
[Out] int(cosint(a + b*x)/x^3, x)
```

3.93 $\int x^m \operatorname{CosIntegral}(a+bx)^2\,dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int x^m \operatorname{CosIntegral}(a+bx)^2\,dx = \operatorname{Int}\left(x^m \operatorname{CosIntegral}(a+bx)^2, x\right)$$

```
[Out] CannotIntegrate(x^m*Ci(b*x+a)^2,x)
```

Rubi [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int x^m \operatorname{CosIntegral}(a+bx)^2\,dx = \int x^m \operatorname{CosIntegral}(a+bx)^2\,dx$$

```
[In] Int[x^m*CosIntegral[a + b*x]^2,x]
[Out] Defer[Int][x^m*CosIntegral[a + b*x]^2, x]
```

Rubi steps

$$\text{integral} = \int x^m \operatorname{CosIntegral}(a+bx)^2\,dx$$

Mathematica [N/A]

Not integrable

Time = 5.62 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int x^m \operatorname{CosIntegral}(a+bx)^2 \, dx = \int x^m \operatorname{CosIntegral}(a+bx)^2 \, dx$$

```
[In] Integrate[x^m*CosIntegral[a + b*x]^2,x]
[Out] Integrate[x^m*CosIntegral[a + b*x]^2, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.25 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int x^m \operatorname{Ci}(bx+a)^2 \, dx$$

```
[In] int(x^m*Ci(b*x+a)^2,x)
[Out] int(x^m*Ci(b*x+a)^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int x^m \operatorname{CosIntegral}(a+bx)^2 \, dx = \int x^m \operatorname{C}(bx+a)^2 \, dx$$

```
[In] integrate(x^m*fresnel_cos(b*x+a)^2,x, algorithm="fricas")
[Out] integral(x^m*fresnel_cos(b*x + a)^2, x)
```

Sympy [N/A]

Not integrable

Time = 1.19 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int x^m \operatorname{CosIntegral}(a+bx)^2 \, dx = \int x^m \operatorname{Ci}^2(a+bx) \, dx$$

```
[In] integrate(x**m*Ci(b*x+a)**2,x)
[Out] Integral(x**m*Ci(a + b*x)**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int x^m \operatorname{CosIntegral}(a+bx)^2 \, dx = \int x^m \operatorname{C}(bx+a)^2 \, dx$$

```
[In] integrate(x^m*fresnel_cos(b*x+a)^2,x, algorithm="maxima")
[Out] integrate(x^m*fresnel_cos(b*x + a)^2, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int x^m \operatorname{CosIntegral}(a+bx)^2 \, dx = \int x^m \operatorname{C}(bx+a)^2 \, dx$$

```
[In] integrate(x^m*fresnel_cos(b*x+a)^2,x, algorithm="giac")
[Out] integrate(x^m*fresnel_cos(b*x + a)^2, x)
```

Mupad [N/A]

Not integrable

Time = 4.85 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int x^m \operatorname{CosIntegral}(a+bx)^2 \, dx = \int x^m \operatorname{cosint}(a+b\,x)^2 \, dx$$

```
[In] int(x^m*cosint(a + b*x)^2,x)
[Out] int(x^m*cosint(a + b*x)^2, x)
```

3.94 $\int x^2 \,\mathrm{CosIntegral}(a+bx)^2\,dx$

Optimal result

Integrand size = 12, antiderivative size = 329

$$\begin{aligned}\int x^2 \,\mathrm{CosIntegral}(a+bx)^2\,dx = {} & \frac{2x}{3b^2}+\frac{a\cos(2a+2bx)}{3b^3}-\frac{x\cos(2a+2bx)}{6b^2} \\ & +\frac{2a\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{3b^3} \\ & -\frac{4x\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{3b^2} \\ & +\frac{a^2(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b^3} \\ & -\frac{ax(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b^2} \\ & +\frac{x^2(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b} \\ & -\frac{a\,\mathrm{CosIntegral}(2a+2bx)}{b^3}-\frac{a\log(a+bx)}{b^3} \\ & +\frac{2\cos(a+bx)\sin(a+bx)}{3b^3} \\ & +\frac{4\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} \\ & -\frac{2a^2\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} \\ & +\frac{2ax\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^2} \\ & -\frac{2x^2\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b} \\ & +\frac{\sin(2a+2bx)}{12b^3}-\frac{2\mathrm{Si}(2a+2bx)}{3b^3}+\frac{a^2\mathrm{Si}(2a+2bx)}{b^3}\end{aligned}$$

```
[Out] 2/3*x/b^2+1/3*a^2*(b*x+a)*Ci(b*x+a)^2/b^3-1/3*a*x*(b*x+a)*Ci(b*x+a)^2/b^2+1
/3*x^2*(b*x+a)*Ci(b*x+a)^2/b-a*Ci(2*b*x+2*a)/b^3+2/3*a*Ci(b*x+a)*cos(b*x+a)
/b^3-4/3*x*Ci(b*x+a)*cos(b*x+a)/b^2+1/3*a*cos(2*b*x+2*a)/b^3-1/6*x*cos(2*b*
x+2*a)/b^2-a*ln(b*x+a)/b^3-2/3*Si(2*b*x+2*a)/b^3+a^2*Si(2*b*x+2*a)/b^3+4/3*
Ci(b*x+a)*sin(b*x+a)/b^3-2/3*a^2*Ci(b*x+a)*sin(b*x+a)/b^3+2/3*a*x*Ci(b*x+a)
*sin(b*x+a)/b^2-2/3*x^2*Ci(b*x+a)*sin(b*x+a)/b+2/3*cos(b*x+a)*sin(b*x+a)/b^
3+1/12*sin(2*b*x+2*a)/b^3
```

Rubi [A] (verified)

Time = 1.07 (sec) , antiderivative size = 329, normalized size of antiderivative = 1.00, number of steps used = 39, number of rules used = 19, $\frac{\text{number of rules}}{\text{integrand size}}$ = 1.583, Rules used = {6645, 6649, 4669, 6873, 6874, 2718, 3377, 2717, 3380, 6655, 2715, 8, 3393, 3383, 6647, 4491, 12, 6653, 6641}

$$\begin{aligned}\int x^2 \operatorname{CosIntegral}(a+bx)^2\,dx =& \frac{a^2(a+bx)\operatorname{CosIntegral}(a+bx)^2}{3b^3} \\ &- \frac{2a^2\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} \\ &+ \frac{a^2\operatorname{Si}(2a+2bx)}{b^3} - \frac{a\operatorname{CosIntegral}(2a+2bx)}{b^3} \\ &+ \frac{4\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} \\ &+ \frac{2a\operatorname{CosIntegral}(a+bx)\cos(a+bx)}{3b^3} \\ &- \frac{2\operatorname{Si}(2a+2bx)}{3b^3} - \frac{a\log(a+bx)}{b^3} + \frac{\sin(2a+2bx)}{12b^3} \\ &+ \frac{a\cos(2a+2bx)}{3b^3} + \frac{2\sin(a+bx)\cos(a+bx)}{3b^3} \\ &- \frac{ax(a+bx)\operatorname{CosIntegral}(a+bx)^2}{3b^2} \\ &+ \frac{2ax\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{3b^2} \\ &- \frac{4x\operatorname{CosIntegral}(a+bx)\cos(a+bx)}{3b^2} \\ &- \frac{x\cos(2a+2bx)}{6b^2} + \frac{x^2(a+bx)\operatorname{CosIntegral}(a+bx)^2}{3b} \\ &- \frac{2x^2\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{3b} + \frac{2x}{3b^2}\end{aligned}$$

```
[In] Int[x^2*CosIntegral[a + b*x]^2,x]
```

```
[Out] (2*x)/(3*b^2) + (a*Cos[2*a + 2*b*x])/(3*b^3) - (x*Cos[2*a + 2*b*x])/(6*b^2)
 + (2*a*Cos[a + b*x]*CosIntegral[a + b*x])/(3*b^3) - (4*x*Cos[a + b*x]*CosI
ntegral[a + b*x])/(3*b^2) + (a^2*(a + b*x)*CosIntegral[a + b*x]^2)/(3*b^3)
```

```
- (a*x*(a + b*x)*CosIntegral[a + b*x]^2)/(3*b^2) + (x^2*(a + b*x)*CosIntegr
al[a + b*x]^2)/(3*b) - (a*CosIntegral[2*a + 2*b*x])/b^3 - (a*Log[a + b*x])/
b^3 + (2*Cos[a + b*x]*Sin[a + b*x])/(3*b^3) + (4*CosIntegral[a + b*x]*Sin[a
 + b*x])/(3*b^3) - (2*a^2*CosIntegral[a + b*x]*Sin[a + b*x])/(3*b^3) + (2*a
*x*CosIntegral[a + b*x]*Sin[a + b*x])/(3*b^2) - (2*x^2*CosIntegral[a + b*x]
*Sin[a + b*x])/(3*b) + Sin[2*a + 2*b*x]/(12*b^3) - (2*SinIntegral[2*a + 2*b
*x])/(3*b^3) + (a^2*SinIntegral[2*a + 2*b*x])/b^3
```

Rule 8

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

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 2715

```
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 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 4669

```
Int[Cos[w_]^(p_.)*(u_.)*Sin[v_]^(p_.), x_Symbol] :> Dist[1/2^p, Int[u*Sin[2
*v]^p, x], x] /; EqQ[w, v] && IntegerQ[p]
```

Rule 6641

```
Int[CosIntegral[(a_.) + (b_.)*(x_)]^2, x_Symbol] :> Simp[(a + b*x)*(CosInte
gral[a + b*x]^2/b), x] - Dist[2, Int[Cos[a + b*x]*CosIntegral[a + b*x], x],
 x] /; FreeQ[{a, b}, x]
```

Rule 6645

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

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6649

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)]*((e_.) + (f_.)*
(x_))^(m_.), x_Symbol] :> Simp[(e + f*x)^m*Sin[a + b*x]*(CosIntegral[c + d*
```

```
x]/b), x] + (-Dist[d/b, Int[(e + f*x)^m*Sin[a + b*x]*(Cos[c + d*x]/(c + d*x
)), x], x] - Dist[f*(m/b), Int[(e + f*x)^(m - 1)*Sin[a + b*x]*CosIntegral[c
 + d*x], x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && IGtQ[m, 0]
```

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6655

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

Rule 6873

```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{x^2(a+bx)\,\text{CosIntegral}(a+bx)^2}{3b} - \frac{2}{3}\int x^2\cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx \\
&\quad - \frac{(2a)\int x\,\text{CosIntegral}(a+bx)^2\,dx}{3b} \\
&= -\frac{ax(a+bx)\,\text{CosIntegral}(a+bx)^2}{3b^2} + \frac{x^2(a+bx)\,\text{CosIntegral}(a+bx)^2}{3b} \\
&\quad - \frac{2x^2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{3b} + \frac{2}{3}\int \frac{x^2\cos(a+bx)\sin(a+bx)}{a+bx}\,dx \\
&\quad + \frac{a^2\int \text{CosIntegral}(a+bx)^2\,dx}{3b^2} + \frac{4\int x\,\text{CosIntegral}(a+bx)\sin(a+bx)\,dx}{3b} \\
&\quad + \frac{(2a)\int x\cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx}{3b}
\end{aligned}$$

$$
\begin{aligned}
&= -\frac{4x\cos(a+bx)\,\text{CosIntegral}(a+bx)}{3b^2} + \frac{a^2(a+bx)\,\text{CosIntegral}(a+bx)^2}{3b^3} \\
&\quad - \frac{ax(a+bx)\,\text{CosIntegral}(a+bx)^2}{3b^2} + \frac{x^2(a+bx)\,\text{CosIntegral}(a+bx)^2}{3b} \\
&\quad + \frac{2ax\,\text{CosIntegral}(a+bx)\sin(a+bx)}{3b^2} - \frac{2x^2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{3b} \\
&\quad + \frac{1}{3}\int \frac{x^2\sin(2(a+bx))}{a+bx}\,dx + \frac{4\int \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx}{3b^2} \\
&\quad - \frac{(2a)\int \text{CosIntegral}(a+bx)\sin(a+bx)\,dx}{3b^2} \\
&\quad - \frac{(2a^2)\int \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx}{3b^2} \\
&\quad + \frac{4\int \frac{x\cos^2(a+bx)}{a+bx}\,dx}{3b} - \frac{(2a)\int \frac{x\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{3b}
\end{aligned}
$$

$$
\begin{aligned}
&= \frac{2a\cos(a+bx)\,\text{CosIntegral}(a+bx)}{3b^3} - \frac{4x\cos(a+bx)\,\text{CosIntegral}(a+bx)}{3b^2} \\
&\quad + \frac{a^2(a+bx)\,\text{CosIntegral}(a+bx)^2}{3b^3} - \frac{ax(a+bx)\,\text{CosIntegral}(a+bx)^2}{3b^2} \\
&\quad + \frac{x^2(a+bx)\,\text{CosIntegral}(a+bx)^2}{3b} + \frac{4\,\text{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} \\
&\quad - \frac{2a^2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} + \frac{2ax\,\text{CosIntegral}(a+bx)\sin(a+bx)}{3b^2} \\
&\quad - \frac{2x^2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{3b} + \frac{1}{3}\int \frac{x^2\sin(2a+2bx)}{a+bx}\,dx \\
&\quad - \frac{4\int \frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{3b^2} - \frac{(2a)\int \frac{\cos^2(a+bx)}{a+bx}\,dx}{3b^2} + \frac{(2a^2)\int \frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{3b^2} \\
&\quad + \frac{4\int \left(\frac{\cos^2(a+bx)}{b} - \frac{a\cos^2(a+bx)}{b(a+bx)}\right)dx}{3b} - \frac{a\int \frac{x\sin(2(a+bx))}{a+bx}\,dx}{3b}
\end{aligned}
$$

$$
\begin{aligned}
&= \frac{2a\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{3b^3} - \frac{4x\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{3b^2} \\
&\quad + \frac{a^2(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b^3} - \frac{ax(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b^2} \\
&\quad + \frac{x^2(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b} + \frac{4\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} \\
&\quad - \frac{2a^2\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} + \frac{2ax\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^2} \\
&\quad - \frac{2x^2\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b} \\
&\quad + \frac{1}{3}\int\left(-\frac{a\sin(2a+2bx)}{b^2} + \frac{x\sin(2a+2bx)}{b} + \frac{a^2\sin(2a+2bx)}{b^2(a+bx)}\right)dx \\
&\quad + \frac{4\int\cos^2(a+bx)\,dx}{3b^2} - \frac{4\int\frac{\sin(2a+2bx)}{2(a+bx)}\,dx}{3b^2} - \frac{(2a)\int\left(\frac{1}{2(a+bx)} + \frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{3b^2} \\
&\quad - \frac{(4a)\int\frac{\cos^2(a+bx)}{a+bx}\,dx}{3b^2} + \frac{(2a^2)\int\frac{\sin(2a+2bx)}{2(a+bx)}\,dx}{3b^2} - \frac{a\int\frac{x\sin(2a+2bx)}{a+bx}\,dx}{3b}
\end{aligned}
$$

$$
\begin{aligned}
&= \frac{2a\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{3b^3} - \frac{4x\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{3b^2} \\
&\quad + \frac{a^2(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b^3} - \frac{ax(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b^2} \\
&\quad + \frac{x^2(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b} - \frac{a\log(a+bx)}{3b^3} + \frac{2\cos(a+bx)\sin(a+bx)}{3b^3} \\
&\quad + \frac{4\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} - \frac{2a^2\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} \\
&\quad + \frac{2ax\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^2} - \frac{2x^2\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b} \\
&\quad + \frac{2\int 1\,dx}{3b^2} - \frac{2\int\frac{\sin(2a+2bx)}{a+bx}\,dx}{3b^2} - \frac{a\int\frac{\cos(2a+2bx)}{a+bx}\,dx}{3b^2} - \frac{a\int\sin(2a+2bx)\,dx}{3b^2} \\
&\quad - \frac{(4a)\int\left(\frac{1}{2(a+bx)} + \frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{3b^2} + 2\frac{a^2\int\frac{\sin(2a+2bx)}{a+bx}\,dx}{3b^2} \\
&\quad + \frac{\int x\sin(2a+2bx)\,dx}{3b} - \frac{a\int\left(\frac{\sin(2a+2bx)}{b} + \frac{a\sin(2a+2bx)}{b(-a-bx)}\right)dx}{3b}
\end{aligned}
$$

$$= \frac{2x}{3b^2} + \frac{a\cos(2a+2bx)}{6b^3} - \frac{x\cos(2a+2bx)}{6b^2} + \frac{2a\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{3b^3} - \frac{4x\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{3b^2} + \frac{a^2(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b^3} - \frac{ax(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b^2} + \frac{x^2(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b} - \frac{a\,\mathrm{CosIntegral}(2a+2bx)}{3b^3} - \frac{a\log(a+bx)}{b^3} + \frac{2\cos(a+bx)\sin(a+bx)}{3b^3} + \frac{4\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} - \frac{2a^2\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} + \frac{2ax\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^2} - \frac{2x^2\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b} - \frac{2\mathrm{Si}(2a+2bx)}{3b^3} + \frac{2a^2\mathrm{Si}(2a+2bx)}{3b^3} + \frac{\int\cos(2a+2bx)\,dx}{6b^2} - \frac{a\int\sin(2a+2bx)\,dx}{3b^2} - \frac{(2a)\int\frac{\cos(2a+2bx)}{a+bx}\,dx}{3b^2} - \frac{a^2\int\frac{\sin(2a+2bx)}{-a-bx}\,dx}{3b^2}$$

$$= \frac{2x}{3b^2} + \frac{a\cos(2a+2bx)}{3b^3} - \frac{x\cos(2a+2bx)}{6b^2} + \frac{2a\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{3b^3} - \frac{4x\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{3b^2} + \frac{a^2(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b^3} - \frac{ax(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b^2} + \frac{x^2(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{3b} - \frac{a\,\mathrm{CosIntegral}(2a+2bx)}{b^3} - \frac{a\log(a+bx)}{b^3} + \frac{2\cos(a+bx)\sin(a+bx)}{3b^3} + \frac{4\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} - \frac{2a^2\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^3} + \frac{2ax\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b^2} - \frac{2x^2\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{3b} + \frac{\sin(2a+2bx)}{12b^3} - \frac{2\mathrm{Si}(2a+2bx)}{3b^3} + \frac{a^2\mathrm{Si}(2a+2bx)}{b^3}$$

Mathematica [A] (verified)

Time = 0.88 (sec) , antiderivative size = 159, normalized size of antiderivative = 0.48

$$\int x^2\,\mathrm{CosIntegral}(a+bx)^2\,dx = \frac{8a+8bx+4a\cos(2(a+bx))-2bx\cos(2(a+bx))+4(a^3+b^3x^3)\,\mathrm{CosIntegral}(a+bx)^2-12a\,\mathrm{CosIntegra}}{}$$

```
[In] Integrate[x^2*CosIntegral[a + b*x]^2,x]
[Out] (8*a + 8*b*x + 4*a*Cos[2*(a + b*x)] - 2*b*x*Cos[2*(a + b*x)] + 4*(a^3 + b^3
*x^3)*CosIntegral[a + b*x]^2 - 12*a*CosIntegral[2*(a + b*x)] - 12*a*Log[a +
 b*x] - 8*CosIntegral[a + b*x]*(-((a - 2*b*x)*Cos[a + b*x]) + (-2 + a^2 - a
*b*x + b^2*x^2)*Sin[a + b*x]) + 5*Sin[2*(a + b*x)] - 8*SinIntegral[2*(a + b
*x)] + 12*a^2*SinIntegral[2*(a + b*x)])/(12*b^3)
```

Maple [F]

$$\int x^2 \operatorname{Ci}(bx+a)^2 \, dx$$

```
[In] int(x^2*Ci(b*x+a)^2,x)
[Out] int(x^2*Ci(b*x+a)^2,x)
```

Fricas [F]

$$\int x^2 \operatorname{CosIntegral}(a+bx)^2 \, dx = \int x^2 \operatorname{C}(bx+a)^2 \, dx$$

```
[In] integrate(x^2*fresnel_cos(b*x+a)^2,x, algorithm="fricas")
[Out] integral(x^2*fresnel_cos(b*x + a)^2, x)
```

Sympy [F]

$$\int x^2 \operatorname{CosIntegral}(a+bx)^2 \, dx = \int x^2 \operatorname{Ci}^2(a+bx) \, dx$$

```
[In] integrate(x**2*Ci(b*x+a)**2,x)
[Out] Integral(x**2*Ci(a + b*x)**2, x)
```

Maxima [F]

$$\int x^2 \operatorname{CosIntegral}(a+bx)^2 \, dx = \int x^2 \operatorname{C}(bx+a)^2 \, dx$$

```
[In] integrate(x^2*fresnel_cos(b*x+a)^2,x, algorithm="maxima")
[Out] integrate(x^2*fresnel_cos(b*x + a)^2, x)
```

Giac [F]

$$\int x^2 \operatorname{CosIntegral}(a+bx)^2\,dx = \int x^2 \operatorname{C}\left(bx+a\right)^2\,dx$$

```
[In] integrate(x^2*fresnel_cos(b*x+a)^2,x, algorithm="giac")
[Out] integrate(x^2*fresnel_cos(b*x + a)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \operatorname{CosIntegral}(a+bx)^2\,dx = \int x^2 \operatorname{cosint}(a+b\,x)^2\,dx$$

```
[In] int(x^2*cosint(a + b*x)^2,x)
[Out] int(x^2*cosint(a + b*x)^2, x)
```

3.95 $\int x \operatorname{CosIntegral}(a+bx)^2 \, dx$

Optimal result

Integrand size = 10, antiderivative size = 155

$$\int x \operatorname{CosIntegral}(a+bx)^2 \, dx = -\frac{\cos(2a+2bx)}{4b^2} - \frac{\cos(a+bx) \operatorname{CosIntegral}(a+bx)}{b^2} - \frac{a(a+bx) \operatorname{CosIntegral}(a+bx)^2}{2b^2} + \frac{x(a+bx) \operatorname{CosIntegral}(a+bx)^2}{2b} + \frac{\operatorname{CosIntegral}(2a+2bx)}{2b^2} + \frac{\log(a+bx)}{2b^2} + \frac{a \operatorname{CosIntegral}(a+bx) \sin(a+bx)}{b^2} - \frac{x \operatorname{CosIntegral}(a+bx) \sin(a+bx)}{b} - \frac{a\operatorname{Si}(2a+2bx)}{b^2}$$

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

Rubi [A] (verified)

Time = 0.26 (sec) , antiderivative size = 155, normalized size of antiderivative = 1.00, number of steps used = 17, number of rules used = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 1.400$, Rules

used = {6645, 6649, 4669, 6873, 6874, 2718, 3380, 6653, 3393, 3383, 6641, 6647, 4491, 12}

$$\int x \operatorname{CosIntegral}(a+bx)^2\,dx = -\frac{a(a+bx)\operatorname{CosIntegral}(a+bx)^2}{2b^2} + \frac{\operatorname{CosIntegral}(2a+2bx)}{2b^2} + \frac{a\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b^2} - \frac{\operatorname{CosIntegral}(a+bx)\cos(a+bx)}{b^2} - \frac{a\operatorname{Si}(2a+2bx)}{b^2} + \frac{\log(a+bx)}{2b^2} - \frac{\cos(2a+2bx)}{4b^2} + \frac{x(a+bx)\operatorname{CosIntegral}(a+bx)^2}{2b} - \frac{x\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b}$$

```
[In] Int[x*CosIntegral[a + b*x]^2,x]
```

```
[Out] -1/4*Cos[2*a + 2*b*x]/b^2 - (Cos[a + b*x]*CosIntegral[a + b*x])/b^2 - (a*(a
 + b*x)*CosIntegral[a + b*x]^2)/(2*b^2) + (x*(a + b*x)*CosIntegral[a + b*x]
^2)/(2*b) + CosIntegral[2*a + 2*b*x]/(2*b^2) + Log[a + b*x]/(2*b^2) + (a*Co
sIntegral[a + b*x]*Sin[a + b*x])/b^2 - (x*CosIntegral[a + b*x]*Sin[a + b*x]
)/b - (a*SinIntegral[2*a + 2*b*x])/b^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 2718

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

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
```

```
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 4669

```
Int[Cos[w_]^(p_.)*(u_.)*Sin[v_]^(p_.), x_Symbol] :> Dist[1/2^p, Int[u*Sin[2
*v]^p, x], x] /; EqQ[w, v] && IntegerQ[p]
```

Rule 6641

```
Int[CosIntegral[(a_.) + (b_.)*(x_)]^2, x_Symbol] :> Simp[(a + b*x)*(CosInte
gral[a + b*x]^2/b), x] - Dist[2, Int[Cos[a + b*x]*CosIntegral[a + b*x], x],
 x] /; FreeQ[{a, b}, x]
```

Rule 6645

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

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6649

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

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
```

```
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6873

```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{x(a+bx)\,\text{CosIntegral}(a+bx)^2}{2b} - \frac{a\int \text{CosIntegral}(a+bx)^2\,dx}{2b} \\
&\quad - \int x\cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx \\
&= -\frac{a(a+bx)\,\text{CosIntegral}(a+bx)^2}{2b^2} + \frac{x(a+bx)\,\text{CosIntegral}(a+bx)^2}{2b} \\
&\quad - \frac{x\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} + \frac{\int \text{CosIntegral}(a+bx)\sin(a+bx)\,dx}{b} \\
&\quad + \frac{a\int \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx}{b} + \int \frac{x\cos(a+bx)\sin(a+bx)}{a+bx}\,dx \\
&= -\frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^2} - \frac{a(a+bx)\,\text{CosIntegral}(a+bx)^2}{2b^2} \\
&\quad + \frac{x(a+bx)\,\text{CosIntegral}(a+bx)^2}{2b} + \frac{a\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2} \\
&\quad - \frac{x\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} + \frac{1}{2}\int \frac{x\sin(2(a+bx))}{a+bx}\,dx \\
&\quad + \frac{\int \frac{\cos^2(a+bx)}{a+bx}\,dx}{b} - \frac{a\int \frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{b} \\
&= -\frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^2} - \frac{a(a+bx)\,\text{CosIntegral}(a+bx)^2}{2b^2} \\
&\quad + \frac{x(a+bx)\,\text{CosIntegral}(a+bx)^2}{2b} + \frac{a\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2} \\
&\quad - \frac{x\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} + \frac{1}{2}\int \frac{x\sin(2a+2bx)}{a+bx}\,dx \\
&\quad + \frac{\int \left(\frac{1}{2(a+bx)} + \frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{b} - \frac{a\int \frac{\sin(2a+2bx)}{2(a+bx)}\,dx}{b}
\end{aligned}$$

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

$$= -\frac{\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{b^2} - \frac{a(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{2b^2} + \frac{x(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{2b} + \frac{\mathrm{CosIntegral}(2a+2bx)}{2b^2} + \frac{\log(a+bx)}{2b^2} + \frac{a\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{b^2} - \frac{x\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{a\mathrm{Si}(2a+2bx)}{2b^2} + \frac{\int\sin(2a+2bx)\,dx}{2b} + \frac{a\int\frac{\sin(2a+2bx)}{-a-bx}dx}{2b}$$

$$= -\frac{\cos(2a+2bx)}{4b^2} - \frac{\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{b^2} - \frac{a(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{2b^2} + \frac{x(a+bx)\,\mathrm{CosIntegral}(a+bx)^2}{2b} + \frac{\mathrm{CosIntegral}(2a+2bx)}{2b^2} + \frac{\log(a+bx)}{2b^2} + \frac{a\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{b^2} - \frac{x\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{a\mathrm{Si}(2a+2bx)}{b^2}$$

Mathematica [A] (verified)

Time = 0.25 (sec) , antiderivative size = 96, normalized size of antiderivative = 0.62

$$\int x\,\mathrm{CosIntegral}(a+bx)^2\,dx = -\frac{\cos(2(a+bx)) + 2(a^2-b^2x^2)\,\mathrm{CosIntegral}(a+bx)^2 - 2\,\mathrm{CosIntegral}(2(a+bx)) - 2\log(a+bx) + 4\,\mathrm{CosI}}{4b^2}$$

```
[In] Integrate[x*CosIntegral[a + b*x]^2,x]
```

```
[Out] -1/4*(Cos[2*(a + b*x)] + 2*(a^2 - b^2*x^2)*CosIntegral[a + b*x]^2 - 2*CosIn
tegral[2*(a + b*x)] - 2*Log[a + b*x] + 4*CosIntegral[a + b*x]*(Cos[a + b*x]
 + (-a + b*x)*Sin[a + b*x]) + 4*a*SinIntegral[2*(a + b*x)])/b^2
```

Maple [A] (verified)

Time = 0.90 (sec) , antiderivative size = 113, normalized size of antiderivative = 0.73

method	result
derivativedivides	$\frac{\mathrm{Ci}(bx+a)^2\left(-(bx+a)a+\frac{(bx+a)^2}{2}\right)-2\,\mathrm{Ci}(bx+a)\left(-a\sin(bx+a)+\frac{\cos(bx+a)}{2}+\frac{(bx+a)\sin(bx+a)}{2}\right)-a\,\mathrm{Si}(2bx+2a)-\frac{\cos(bx+}{2}}{b^2}$
default	$\frac{\mathrm{Ci}(bx+a)^2\left(-(bx+a)a+\frac{(bx+a)^2}{2}\right)-2\,\mathrm{Ci}(bx+a)\left(-a\sin(bx+a)+\frac{\cos(bx+a)}{2}+\frac{(bx+a)\sin(bx+a)}{2}\right)-a\,\mathrm{Si}(2bx+2a)-\frac{\cos(bx+}{2}}{b^2}$

```
[In] int(x*Ci(b*x+a)^2,x,method=_RETURNVERBOSE)
```

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

Fricas [F]

$$\int x\,\mathrm{CosIntegral}(a+bx)^2\,dx=\int x\,\mathrm{C}\left(bx+a\right)^2\,dx$$

```
[In] integrate(x*fresnel_cos(b*x+a)^2,x, algorithm="fricas")
```

```
[Out] integral(x*fresnel_cos(b*x + a)^2, x)
```

Sympy [F]

$$\int x\,\mathrm{CosIntegral}(a+bx)^2\,dx=\int x\,\mathrm{Ci}^2\left(a+bx\right)dx$$

```
[In] integrate(x*Ci(b*x+a)**2,x)
```

```
[Out] Integral(x*Ci(a + b*x)**2, x)
```

Maxima [F]

$$\int x\,\mathrm{CosIntegral}(a+bx)^2\,dx=\int x\,\mathrm{C}\left(bx+a\right)^2\,dx$$

```
[In] integrate(x*fresnel_cos(b*x+a)^2,x, algorithm="maxima")
```

```
[Out] integrate(x*fresnel_cos(b*x + a)^2, x)
```

Giac [F]

$$\int x \operatorname{CosIntegral}(a+bx)^2 \, dx = \int x \operatorname{C}\left(bx+a\right)^2 \, dx$$

```
[In] integrate(x*fresnel_cos(b*x+a)^2,x, algorithm="giac")
[Out] integrate(x*fresnel_cos(b*x + a)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int x \operatorname{CosIntegral}(a+bx)^2 \, dx = \int x \operatorname{cosint}(a+b\,x)^2 \, dx$$

```
[In] int(x*cosint(a + b*x)^2,x)
[Out] int(x*cosint(a + b*x)^2, x)
```

3.96 $\int \text{CosIntegral}(a+bx)^2\,dx$

Optimal result

Integrand size = 8, antiderivative size = 48

$$\int \text{CosIntegral}(a+bx)^2\,dx = \frac{(a+bx)\,\text{CosIntegral}(a+bx)^2}{b} - \frac{2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} + \frac{\text{Si}(2a+2bx)}{b}$$

```
[Out] (b*x+a)*Ci(b*x+a)^2/b+Si(2*b*x+2*a)/b-2*Ci(b*x+a)*sin(b*x+a)/b
```

Rubi [A] (verified)

Time = 0.05 (sec) , antiderivative size = 48, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.625$, Rules used = {6641, 6647, 4491, 12, 3380}

$$\int \text{CosIntegral}(a+bx)^2\,dx = \frac{(a+bx)\,\text{CosIntegral}(a+bx)^2}{b} - \frac{2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} + \frac{\text{Si}(2a+2bx)}{b}$$

```
[In] Int[CosIntegral[a + b*x]^2,x]
```

```
[Out] ((a + b*x)*CosIntegral[a + b*x]^2)/b - (2*CosIntegral[a + b*x]*Sin[a + b*x]
)/b + SinIntegral[2*a + 2*b*x]/b
```

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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6641

```
Int[CosIntegral[(a_.) + (b_.)*(x_)]^2, x_Symbol] :> Simp[(a + b*x)*(CosInte
gral[a + b*x]^2/b), x] - Dist[2, Int[Cos[a + b*x]*CosIntegral[a + b*x], x],
 x] /; FreeQ[{a, b}, x]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= \frac{(a+bx)\,\text{CosIntegral}(a+bx)^2}{b} - 2\int \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx \\
&= \frac{(a+bx)\,\text{CosIntegral}(a+bx)^2}{b} - \frac{2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} \\
&\quad + 2\int \frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx \\
&= \frac{(a+bx)\,\text{CosIntegral}(a+bx)^2}{b} - \frac{2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} + 2\int \frac{\sin(2a+2bx)}{2(a+bx)}\,dx \\
&= \frac{(a+bx)\,\text{CosIntegral}(a+bx)^2}{b} - \frac{2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} + \int \frac{\sin(2a+2bx)}{a+bx}\,dx \\
&= \frac{(a+bx)\,\text{CosIntegral}(a+bx)^2}{b} - \frac{2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} + \frac{\text{Si}(2a+2bx)}{b}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 41, normalized size of antiderivative = 0.85

$$\int \text{CosIntegral}(a+bx)^2\,dx = \frac{(a+bx)\,\text{CosIntegral}(a+bx)^2 - 2\,\text{CosIntegral}(a+bx)\sin(a+bx) + \text{Si}(2(a+bx))}{b}$$

```
[In] Integrate[CosIntegral[a + b*x]^2,x]
```

```
[Out] ((a + b*x)*CosIntegral[a + b*x]^2 - 2*CosIntegral[a + b*x]*Sin[a + b*x] + S
inIntegral[2*(a + b*x)])/b
```

Maple [A] (verified)

Time = 0.43 (sec) , antiderivative size = 43, normalized size of antiderivative = 0.90

method	result	size
derivativedivides	$\frac{\text{Ci}(bx+a)^2(bx+a)-2\ \text{Ci}(bx+a)\sin(bx+a)+\text{Si}(2bx+2a)}{b}$	43
default	$\frac{\text{Ci}(bx+a)^2(bx+a)-2\ \text{Ci}(bx+a)\sin(bx+a)+\text{Si}(2bx+2a)}{b}$	43

```
[In] int(Ci(b*x+a)^2,x,method=_RETURNVERBOSE)
```

```
[Out] 1/b*(Ci(b*x+a)^2*(b*x+a)-2*Ci(b*x+a)*sin(b*x+a)+Si(2*b*x+2*a))
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 88, normalized size of antiderivative = 1.83

$$\int \text{CosIntegral}(a+bx)^2\,dx = \frac{2\left(\pi b^2x + \pi ab\right)\text{C}\left(bx+a\right)^2 - 4\,b\,\text{C}\left(bx+a\right)\sin\left(\frac{1}{2}\,\pi b^2x^2 + \pi abx + \frac{1}{2}\,\pi a^2\right) + \sqrt{2}\sqrt{b^2}\,\text{S}\left(\frac{\sqrt{2}\sqrt{b^2}(bx+a)}{b}\right)}{2\,\pi b^2}$$

```
[In] integrate(fresnel_cos(b*x+a)^2,x, algorithm="fricas")
```

```
[Out] 1/2*(2*(pi*b^2*x + pi*a*b)*fresnel_cos(b*x + a)^2 - 4*b*fresnel_cos(b*x + a
)*sin(1/2*pi*b^2*x^2 + pi*a*b*x + 1/2*pi*a^2) + sqrt(2)*sqrt(b^2)*fresnel_s
in(sqrt(2)*sqrt(b^2)*(b*x + a)/b))/(pi*b^2)
```

Sympy [F]

$$\int \mathrm{CosIntegral}(a+bx)^2\,dx = \int \mathrm{Ci}^2\,(a+bx)\,dx$$

```
[In] integrate(Ci(b*x+a)**2,x)
[Out] Integral(Ci(a + b*x)**2, x)
```

Maxima [F]

$$\int \mathrm{CosIntegral}(a+bx)^2\,dx = \int \mathrm{C}\,(bx+a)^2\,\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)^2,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x + a)^2, x)
```

Giac [F]

$$\int \mathrm{CosIntegral}(a+bx)^2\,dx = \int \mathrm{C}\,(bx+a)^2\,\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)^2,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x + a)^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \mathrm{CosIntegral}(a+bx)^2\,dx = \int \mathrm{cosint}(a+b\,x)^2\,dx$$

```
[In] int(cosint(a + b*x)^2,x)
[Out] int(cosint(a + b*x)^2, x)
```

3.97 $\int \frac{\text{CosIntegral}(a+bx)^2}{x}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x}\,dx = \text{Int}\left(\frac{\text{CosIntegral}(a+bx)^2}{x},x\right)$$

```
[Out] CannotIntegrate(Ci(b*x+a)^2/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x}\,dx = \int \frac{\text{CosIntegral}(a+bx)^2}{x}\,dx$$

```
[In] Int[CosIntegral[a + b*x]^2/x,x]
```

```
[Out] Defer[Int][CosIntegral[a + b*x]^2/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{CosIntegral}(a+bx)^2}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 0.80 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x}\,dx = \int \frac{\text{CosIntegral}(a+bx)^2}{x}\,dx$$

```
[In] Integrate[CosIntegral[a + b*x]^2/x,x]
[Out] Integrate[CosIntegral[a + b*x]^2/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.10 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\text{Ci}\left(bx+a\right)^2}{x}dx$$

```
[In] int(Ci(b*x+a)^2/x,x)
[Out] int(Ci(b*x+a)^2/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x}\,dx = \int \frac{\text{C}\left(bx+a\right)^2}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)^2/x,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x + a)^2/x, x)
```

Sympy [N/A]

Not integrable

Time = 0.37 (sec) , antiderivative size = 10, normalized size of antiderivative = 0.83

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x}\,dx = \int \frac{\text{Ci}^2\left(a+bx\right)}{x}\,dx$$

```
[In] integrate(Ci(b*x+a)**2/x,x)
[Out] Integral(Ci(a + b*x)**2/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x}\,dx = \int \frac{\text{C}\,(bx+a)^2}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)^2/x,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x + a)^2/x, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x}\,dx = \int \frac{\text{C}\,(bx+a)^2}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)^2/x,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x + a)^2/x, x)
```

Mupad [N/A]

Not integrable

Time = 4.86 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x}\,dx = \int \frac{\text{cosint}(a+b\,x)^2}{x}\,dx$$

```
[In] int(cosint(a + b*x)^2/x,x)
[Out] int(cosint(a + b*x)^2/x, x)
```

3.98 $\int \frac{\text{CosIntegral}(a+bx)^2}{x^2} dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^2} dx = \text{Int}\left(\frac{\text{CosIntegral}(a+bx)^2}{x^2}, x\right)$$

```
[Out] CannotIntegrate(Ci(b*x+a)^2/x^2,x)
```

Rubi [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^2} dx = \int \frac{\text{CosIntegral}(a+bx)^2}{x^2} dx$$

```
[In] Int[CosIntegral[a + b*x]^2/x^2,x]
[Out] Defer[Int][CosIntegral[a + b*x]^2/x^2, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{CosIntegral}(a+bx)^2}{x^2} dx$$

Mathematica [N/A]

Not integrable

Time = 1.39 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^2}\,dx=\int \frac{\text{CosIntegral}(a+bx)^2}{x^2}\,dx$$

```
[In] Integrate[CosIntegral[a + b*x]^2/x^2,x]
[Out] Integrate[CosIntegral[a + b*x]^2/x^2, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.18 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\text{Ci}\left(bx+a\right)^2}{x^2}dx$$

```
[In] int(Ci(b*x+a)^2/x^2,x)
[Out] int(Ci(b*x+a)^2/x^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^2}\,dx=\int \frac{\text{C}\left(bx+a\right)^2}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)^2/x^2,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x + a)^2/x^2, x)
```

Sympy [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^2}\,dx=\int \frac{\text{Ci}^2\left(a+bx\right)}{x^2}\,dx$$

```
[In] integrate(Ci(b*x+a)**2/x**2,x)
[Out] Integral(Ci(a + b*x)**2/x**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.22 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^2}\,dx = \int \frac{\text{C}\left(bx+a\right)^2}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)^2/x^2,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x + a)^2/x^2, x)
```

Giac [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^2}\,dx = \int \frac{\text{C}\left(bx+a\right)^2}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)^2/x^2,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x + a)^2/x^2, x)
```

Mupad [N/A]

Not integrable

Time = 4.95 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^2}\,dx = \int \frac{\text{cosint}(a+b\,x)^2}{x^2}\,dx$$

```
[In] int(cosint(a + b*x)^2/x^2,x)
[Out] int(cosint(a + b*x)^2/x^2, x)
```

3.99 $\int \frac{\text{CosIntegral}(a+bx)^2}{x^3} \, dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^3} \, dx = \text{Int}\left(\frac{\text{CosIntegral}(a+bx)^2}{x^3}, x\right)$$

```
[Out] CannotIntegrate(Ci(b*x+a)^2/x^3,x)
```

Rubi [N/A]

Not integrable

Time = 0.03 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^3} \, dx = \int \frac{\text{CosIntegral}(a+bx)^2}{x^3} \, dx$$

```
[In] Int[CosIntegral[a + b*x]^2/x^3,x]
[Out] Defer[Int][CosIntegral[a + b*x]^2/x^3, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{CosIntegral}(a+bx)^2}{x^3} \, dx$$

Mathematica [N/A]

Not integrable

Time = 1.76 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^3}\,dx=\int \frac{\text{CosIntegral}(a+bx)^2}{x^3}\,dx$$

```
[In] Integrate[CosIntegral[a + b*x]^2/x^3,x]
[Out] Integrate[CosIntegral[a + b*x]^2/x^3, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.18 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\mathrm{Ci}\left(bx+a\right)^{2}}{x^{3}}dx$$

```
[In] int(Ci(b*x+a)^2/x^3,x)
[Out] int(Ci(b*x+a)^2/x^3,x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^3}\,dx=\int \frac{\mathrm{C}\left(bx+a\right)^{2}}{x^{3}}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)^2/x^3,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x + a)^2/x^3, x)
```

Sympy [N/A]

Not integrable

Time = 0.36 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^3}\,dx=\int \frac{\mathrm{Ci}^{2}\left(a+bx\right)}{x^{3}}\,dx$$

```
[In] integrate(Ci(b*x+a)**2/x**3,x)
[Out] Integral(Ci(a + b*x)**2/x**3, x)
```

Maxima [N/A]

Not integrable

Time = 0.23 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^3}\,dx = \int \frac{\mathrm{C}\left(bx+a\right)^2}{x^3}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)^2/x^3,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x + a)^2/x^3, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^3}\,dx = \int \frac{\mathrm{C}\left(bx+a\right)^2}{x^3}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)^2/x^3,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x + a)^2/x^3, x)
```

Mupad [N/A]

Not integrable

Time = 4.95 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(a+bx)^2}{x^3}\,dx = \int \frac{\mathrm{cosint}(a+b\,x)^2}{x^3}\,dx$$

```
[In] int(cosint(a + b*x)^2/x^3,x)
[Out] int(cosint(a + b*x)^2/x^3, x)
```

3.100 $\int x^2 \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx$

Optimal result

Integrand size = 17, antiderivative size = 133

$$\begin{aligned}\int x^2 \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx &= \frac{1}{3}x^3\operatorname{CosIntegral}(d(a+b\log(cx^n))) \\ &\quad -\frac{1}{6}e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\operatorname{ExpIntegralEi}\left(\frac{(3-ibdn)(a+b\log(cx^n))}{bn}\right) \\ &\quad -\frac{1}{6}e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\operatorname{ExpIntegralEi}\left(\frac{(3+ibdn)(a+b\log(cx^n))}{bn}\right)\end{aligned}$$

```
[Out] 1/3*x^3*Ci(d*(a+b*ln(c*x^n)))-1/6*x^3*Ei((3-I*b*d*n)*(a+b*ln(c*x^n))/b/n)/e
xp(3*a/b/n)/((c*x^n)^(3/n))-1/6*x^3*Ei((3+I*b*d*n)*(a+b*ln(c*x^n))/b/n)/exp
(3*a/b/n)/((c*x^n)^(3/n))
```

Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.294$, Rules used = {6662, 12, 4586, 2347, 2209}

$$\begin{aligned}\int x^2 \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx &= \frac{1}{3}x^3\operatorname{CosIntegral}(d(a+b\log(cx^n))) \\ &\quad -\frac{1}{6}x^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\operatorname{ExpIntegralEi}\left(\frac{(3-ibdn)(a+b\log(cx^n))}{bn}\right) \\ &\quad -\frac{1}{6}x^3e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\operatorname{ExpIntegralEi}\left(\frac{(ibdn+3)(a+b\log(cx^n))}{bn}\right)\end{aligned}$$

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

```
[Out] (x^3*CosIntegral[d*(a + b*Log[c*x^n])])/3 - (x^3*ExpIntegralEi[((3 - I*b*d*
n)*(a + b*Log[c*x^n]))/(b*n)])/(6*E^((3*a)/(b*n))*(c*x^n)^(3/n)) - (x^3*Exp
IntegralEi[((3 + I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)])/(6*E^((3*a)/(b*n))*(c
*x^n)^(3/n))
```

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 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

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

Rule 4586

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*(((e_.) + Log[(g_.)*(x
_)^(m_.)]*(f_.))*(h_.))^(q_.)*((i_.)*(x_))^(r_.), x_Symbol] :> Dist[((i*x)^
r*(1/((c*x^n)^(I*b*d)*(2*x^(r - I*b*d*n)))))/E^(I*a*d), Int[x^(r - I*b*d*n)
*(h*(e + f*Log[g*x^m]))^q, x], x] + Dist[E^(I*a*d)*(i*x)^r*((c*x^n)^(I*b*d)
/(2*x^(r + I*b*d*n))), Int[x^(r + I*b*d*n)*(h*(e + f*Log[g*x^m]))^q, x], x]
 /; FreeQ[{a, b, c, d, e, f, g, h, i, m, n, q, r}, x]
```

Rule 6662

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

Rubi steps

$$\begin{aligned}\text{integral} &= \frac{1}{3}x^3\,\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)-\frac{1}{3}(bdn)\int\frac{x^2\cos\left(d(a+b\log\left(cx^n\right))\right)}{d\left(a+b\log\left(cx^n\right)\right)}\,dx\\ &= \frac{1}{3}x^3\,\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)-\frac{1}{3}(bn)\int\frac{x^2\cos\left(d(a+b\log\left(cx^n\right))\right)}{a+b\log\left(cx^n\right)}\,dx\end{aligned}$$

$$= \frac{1}{3}x^3 \operatorname{CosIntegral}(d(a+b\log(cx^n))) - \frac{1}{6}\left(be^{-iad}nx^{ibdn}(cx^n)^{-ibd}\right)\int \frac{x^{2-ibdn}}{a+b\log(cx^n)}\,dx - \frac{1}{6}\left(be^{iad}nx^{-ibdn}(cx^n)^{ibd}\right)\int \frac{x^{2+ibdn}}{a+b\log(cx^n)}\,dx$$

$$= \frac{1}{3}x^3 \operatorname{CosIntegral}(d(a+b\log(cx^n))) - \frac{1}{6}\left(be^{-iad}x^3(cx^n)^{-ibd-\frac{3-ibdn}{n}}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{(3-ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right) - \frac{1}{6}\left(be^{iad}x^3(cx^n)^{ibd-\frac{3+ibdn}{n}}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{(3+ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)$$

$$= \frac{1}{3}x^3 \operatorname{CosIntegral}(d(a+b\log(cx^n))) - \frac{1}{6}e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\operatorname{ExpIntegralEi}\left(\frac{(3-ibdn)(a+b\log(cx^n))}{bn}\right) - \frac{1}{6}e^{-\frac{3a}{bn}}x^3(cx^n)^{-3/n}\operatorname{ExpIntegralEi}\left(\frac{(3+ibdn)(a+b\log(cx^n))}{bn}\right)$$

Mathematica [A] (verified)

Time = 1.19 (sec) , antiderivative size = 102, normalized size of antiderivative = 0.77

$$\int x^2 \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx = \frac{1}{6}x^3\left(2\operatorname{CosIntegral}(d(a+b\log(cx^n))) - e^{-\frac{3a}{bn}}(cx^n)^{-3/n}\left(\operatorname{ExpIntegralEi}\left(\frac{(3-ibdn)(a+b\log(cx^n))}{bn}\right) + \operatorname{ExpIntegralEi}\left(\frac{(3+ibdn)(a+b\log(c\right.\right.\right.$$

```
[In] Integrate[x^2*CosIntegral[d*(a + b*Log[c*x^n])],x]
[Out] (x^3*(2*CosIntegral[d*(a + b*Log[c*x^n])] - (ExpIntegralEi[((3 - I*b*d*n)*(
a + b*Log[c*x^n]))/(b*n)] + ExpIntegralEi[((3 + I*b*d*n)*(a + b*Log[c*x^n])
)/(b*n)])/(E^((3*a)/(b*n))*(c*x^n)^(3/n))))/6
```

Maple [F]

$$\int x^2 \operatorname{Ci}(d(a+b\ln(c\,x^n)))\,dx$$

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

Fricas [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 448 vs. 2(125) = 250.

Time = 0.27 (sec) , antiderivative size = 448, normalized size of antiderivative = 3.37

$$\int x^2 \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx = \frac{1}{3}x^3 \operatorname{C}(bd\log(cx^n)+ad) - \frac{1}{6}\pi\sqrt{b^2d^2n^2}e^{\left(-\frac{3\log(c)}{n}-\frac{3a}{bn}-\frac{9i}{2\pi b^2d^2n^2}\right)}\operatorname{C}\left(\frac{(\pi b^2d^2n^2\log(x)+\pi b^2d^2n\log(c)+\pi abd^2n+3i)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right) - \frac{1}{6}\pi\sqrt{b^2d^2n^2}e^{\left(-\frac{3\log(c)}{n}-\frac{3a}{bn}+\frac{9i}{2\pi b^2d^2n^2}\right)}\operatorname{C}\left(\frac{(\pi b^2d^2n^2\log(x)+\pi b^2d^2n\log(c)+\pi abd^2n-3i)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right) + \frac{1}{6}i\pi\sqrt{b^2d^2n^2}e^{\left(-\frac{3\log(c)}{n}-\frac{3a}{bn}-\frac{9i}{2\pi b^2d^2n^2}\right)}\operatorname{S}\left(\frac{(\pi b^2d^2n^2\log(x)+\pi b^2d^2n\log(c)+\pi abd^2n+3i)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right) - \frac{1}{6}i\pi\sqrt{b^2d^2n^2}e^{\left(-\frac{3\log(c)}{n}-\frac{3a}{bn}+\frac{9i}{2\pi b^2d^2n^2}\right)}\operatorname{S}\left(\frac{(\pi b^2d^2n^2\log(x)+\pi b^2d^2n\log(c)+\pi abd^2n-3i)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right)$$

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

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

Sympy [F]

$$\int x^2 \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx = \int x^2 \operatorname{Ci}(ad+bd\log(cx^n))\,dx$$

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

```
[Out] Integral(x**2*Ci(a*d + b*d*log(c*x**n)), x)
```

Maxima [F]

$$\int x^2 \operatorname{CosIntegral}(d(a + b\log(cx^n)))\,dx = \int x^2\,\mathrm{C}\left((b\log(cx^n) + a)d\right)\,dx$$

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

Giac [F]

$$\int x^2 \operatorname{CosIntegral}(d(a + b\log(cx^n)))\,dx = \int x^2\,\mathrm{C}\left((b\log(cx^n) + a)d\right)\,dx$$

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

Mupad [F(-1)]

Timed out.

$$\int x^2 \operatorname{CosIntegral}(d(a + b\log(cx^n)))\,dx = \int x^2\,\mathrm{cosint}(d\,(a + b\,\ln(c\,x^n)))\,dx$$

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

3.101 $\int x \,\text{CosIntegral}\left(d(a+b\log(cx^n))\right)\,dx$

Optimal result

Integrand size = 15, antiderivative size = 133

$$\begin{aligned}
&\int x \,\text{CosIntegral}\left(d(a+b\log(cx^n))\right)\,dx \\
&= \frac{1}{2}x^2\,\text{CosIntegral}\left(d(a+b\log(cx^n))\right) \\
&\quad - \frac{1}{4}e^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\,\text{ExpIntegralEi}\left(\frac{(2-ibdn)\left(a+b\log(cx^n)\right)}{bn}\right) \\
&\quad - \frac{1}{4}e^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\,\text{ExpIntegralEi}\left(\frac{(2+ibdn)\left(a+b\log(cx^n)\right)}{bn}\right)
\end{aligned}$$

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

Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 133, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {6662, 12, 4586, 2347, 2209}

$$\begin{aligned}
&\int x \,\text{CosIntegral}\left(d(a+b\log(cx^n))\right)\,dx \\
&= \frac{1}{2}x^2\,\text{CosIntegral}\left(d(a+b\log(cx^n))\right) \\
&\quad - \frac{1}{4}x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\,\text{ExpIntegralEi}\left(\frac{(2-ibdn)\left(a+b\log(cx^n)\right)}{bn}\right) \\
&\quad - \frac{1}{4}x^2e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\,\text{ExpIntegralEi}\left(\frac{(ibdn+2)\left(a+b\log(cx^n)\right)}{bn}\right)
\end{aligned}$$

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

```
[Out] (x^2*CosIntegral[d*(a + b*Log[c*x^n])])/2 - (x^2*ExpIntegralEi[((2 - I*b*d*
n)*(a + b*Log[c*x^n]))/(b*n)])/(4*E^((2*a)/(b*n))*(c*x^n)^(2/n)) - (x^2*Exp
IntegralEi[((2 + I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)])/(4*E^((2*a)/(b*n))*(c
*x^n)^(2/n))
```

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 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

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

Rule 4586

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*(((e_.) + Log[(g_.)*(x
_)^(m_.)]*(f_.))*(h_.))^(q_.)*((i_.)*(x_))^(r_.), x_Symbol] :> Dist[((i*x)^
r*(1/((c*x^n)^(I*b*d)*(2*x^(r - I*b*d*n)))))/E^(I*a*d), Int[x^(r - I*b*d*n)
*(h*(e + f*Log[g*x^m]))^q, x], x] + Dist[E^(I*a*d)*(i*x)^r*((c*x^n)^(I*b*d)
/(2*x^(r + I*b*d*n))), Int[x^(r + I*b*d*n)*(h*(e + f*Log[g*x^m]))^q, x], x]
 /; FreeQ[{a, b, c, d, e, f, g, h, i, m, n, q, r}, x]
```

Rule 6662

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

Rubi steps

$$\text{integral} = \frac{1}{2}x^2\,\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)-\frac{1}{2}(bdn)\int\frac{x\cos\left(d(a+b\log\left(cx^n\right))\right)}{d\left(a+b\log\left(cx^n\right)\right)}\,dx$$

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

$$= \frac{1}{2}x^2 \operatorname{CosIntegral}(d(a+b\log(cx^n))) - \frac{1}{4}\left(be^{-iad}nx^{ibdn}(cx^n)^{-ibd}\right)\int \frac{x^{1-ibdn}}{a+b\log(cx^n)}\,dx$$
$$-\frac{1}{4}\left(be^{iad}nx^{-ibdn}(cx^n)^{ibd}\right)\int \frac{x^{1+ibdn}}{a+b\log(cx^n)}\,dx$$
$$= \frac{1}{2}x^2 \operatorname{CosIntegral}(d(a+b\log(cx^n)))$$
$$-\frac{1}{4}\left(be^{-iad}x^2(cx^n)^{-ibd-\frac{2-ibdn}{n}}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{(2-ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)$$
$$-\frac{1}{4}\left(be^{iad}x^2(cx^n)^{ibd-\frac{2+ibdn}{n}}\right)\operatorname{Subst}\left(\int \frac{e^{\frac{(2+ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)$$
$$= \frac{1}{2}x^2 \operatorname{CosIntegral}(d(a+b\log(cx^n)))$$
$$-\frac{1}{4}e^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\operatorname{ExpIntegralEi}\left(\frac{(2-ibdn)(a+b\log(cx^n))}{bn}\right)$$
$$-\frac{1}{4}e^{-\frac{2a}{bn}}x^2(cx^n)^{-2/n}\operatorname{ExpIntegralEi}\left(\frac{(2+ibdn)(a+b\log(cx^n))}{bn}\right)$$

Mathematica [A] (verified)

Time = 1.15 (sec) , antiderivative size = 102, normalized size of antiderivative = 0.77

$$\int x \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx = \frac{1}{4}x^2\Bigg(2\operatorname{CosIntegral}(d(a+b\log(cx^n)))$$
$$-e^{-\frac{2a}{bn}}(cx^n)^{-2/n}\left(\operatorname{ExpIntegralEi}\left(\frac{(2-ibdn)(a+b\log(cx^n))}{bn}\right)+\operatorname{ExpIntegralEi}\left(\frac{(2+ibdn)(a+b\log(}{bn}\right.\right.$$

```
[In] Integrate[x*CosIntegral[d*(a + b*Log[c*x^n])],x]
[Out] (x^2*(2*CosIntegral[d*(a + b*Log[c*x^n])] - (ExpIntegralEi[((2 - I*b*d*n)*(
a + b*Log[c*x^n]))/(b*n)] + ExpIntegralEi[((2 + I*b*d*n)*(a + b*Log[c*x^n])
)/(b*n)])/(E^((2*a)/(b*n))*(c*x^n)^(2/n))))/4
```

Maple [F]

$$\int x \operatorname{Ci}(d(a+b\ln(cx^n)))\,dx$$

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

Fricas [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 448 vs. $2(125) = 250$.

Time = 0.28 (sec) , antiderivative size = 448, normalized size of antiderivative = 3.37

$$
\begin{aligned}
&\int x \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx = \\
&-\frac{1}{4}\pi\sqrt{b^2d^2n^2}e^{\left(-\frac{2\log(c)}{n}-\frac{2a}{bn}-\frac{2i}{\pi b^2d^2n^2}\right)}\operatorname{C}\left(\frac{(\pi b^2d^2n^2\log(x)+\pi b^2d^2n\log(c)+\pi abd^2n+2i)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right) \\
&-\frac{1}{4}\pi\sqrt{b^2d^2n^2}e^{\left(-\frac{2\log(c)}{n}-\frac{2a}{bn}+\frac{2i}{\pi b^2d^2n^2}\right)}\operatorname{C}\left(\frac{(\pi b^2d^2n^2\log(x)+\pi b^2d^2n\log(c)+\pi abd^2n-2i)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right) \\
&+\frac{1}{4}i\pi\sqrt{b^2d^2n^2}e^{\left(-\frac{2\log(c)}{n}-\frac{2a}{bn}-\frac{2i}{\pi b^2d^2n^2}\right)}\operatorname{S}\left(\frac{(\pi b^2d^2n^2\log(x)+\pi b^2d^2n\log(c)+\pi abd^2n+2i)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right) \\
&-\frac{1}{4}i\pi\sqrt{b^2d^2n^2}e^{\left(-\frac{2\log(c)}{n}-\frac{2a}{bn}+\frac{2i}{\pi b^2d^2n^2}\right)}\operatorname{S}\left(\frac{(\pi b^2d^2n^2\log(x)+\pi b^2d^2n\log(c)+\pi abd^2n-2i)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right) \\
&+\frac{1}{2}x^2\operatorname{C}(bd\log(cx^n)+ad)
\end{aligned}
$$

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

```
[Out] -1/4*pi*sqrt(b^2*d^2*n^2)*e^(-2*log(c)/n - 2*a/(b*n) - 2*I/(pi*b^2*d^2*n^2)
)*fresnel_cos((pi*b^2*d^2*n^2*log(x) + pi*b^2*d^2*n*log(c) + pi*a*b*d^2*n +
 2*I)*sqrt(b^2*d^2*n^2)/(pi*b^2*d^2*n^2)) - 1/4*pi*sqrt(b^2*d^2*n^2)*e^(-2*
log(c)/n - 2*a/(b*n) + 2*I/(pi*b^2*d^2*n^2))*fresnel_cos((pi*b^2*d^2*n^2*lo
g(x) + pi*b^2*d^2*n*log(c) + pi*a*b*d^2*n - 2*I)*sqrt(b^2*d^2*n^2)/(pi*b^2*
d^2*n^2)) + 1/4*I*pi*sqrt(b^2*d^2*n^2)*e^(-2*log(c)/n - 2*a/(b*n) - 2*I/(pi
*b^2*d^2*n^2))*fresnel_sin((pi*b^2*d^2*n^2*log(x) + pi*b^2*d^2*n*log(c) + p
i*a*b*d^2*n + 2*I)*sqrt(b^2*d^2*n^2)/(pi*b^2*d^2*n^2)) - 1/4*I*pi*sqrt(b^2*
d^2*n^2)*e^(-2*log(c)/n - 2*a/(b*n) + 2*I/(pi*b^2*d^2*n^2))*fresnel_sin((pi
*b^2*d^2*n^2*log(x) + pi*b^2*d^2*n*log(c) + pi*a*b*d^2*n - 2*I)*sqrt(b^2*d^
2*n^2)/(pi*b^2*d^2*n^2)) + 1/2*x^2*fresnel_cos(b*d*log(c*x^n) + a*d)
```

Sympy [F]

$$
\int x \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx = \int x \operatorname{Ci}(ad+bd\log(cx^n))\,dx
$$

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

```
[Out] Integral(x*Ci(a*d + b*d*log(c*x**n)), x)
```

Maxima [F]

$$\int x \operatorname{CosIntegral}(d(a + b \log(cx^n))) \, dx = \int x \operatorname{C}((b \log(cx^n) + a)d) \, dx$$

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

Giac [F]

$$\int x \operatorname{CosIntegral}(d(a + b \log(cx^n))) \, dx = \int x \operatorname{C}((b \log(cx^n) + a)d) \, dx$$

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

Mupad [F(-1)]

Timed out.

$$\int x \operatorname{CosIntegral}(d(a + b \log(cx^n))) \, dx = \int x \operatorname{cosint}(d (a + b \ln(c x^n))) \, dx$$

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

3.102 $\int \text{CosIntegral}\left(d(a+b\log(cx^n))\right)\,dx$

Optimal result

Integrand size = 13, antiderivative size = 124

$$\begin{aligned}\int \text{CosIntegral}\left(d(a+b\log(cx^n))\right)\,dx &= x\,\text{CosIntegral}\left(d(a+b\log(cx^n))\right)\\ &\quad-\frac{1}{2}e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\text{ExpIntegralEi}\left(\frac{(1-ibdn)\left(a+b\log(cx^n)\right)}{bn}\right)\\ &\quad-\frac{1}{2}e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\text{ExpIntegralEi}\left(\frac{(1+ibdn)\left(a+b\log(cx^n)\right)}{bn}\right)\end{aligned}$$

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

Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 124, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.385, Rules used = {6659, 12, 4584, 2347, 2209}

$$\begin{aligned}\int \text{CosIntegral}\left(d(a+b\log(cx^n))\right)\,dx &= x\,\text{CosIntegral}\left(d(a+b\log(cx^n))\right)\\ &\quad-\frac{1}{2}xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\,\text{ExpIntegralEi}\left(\frac{(1-ibdn)\left(a+b\log(cx^n)\right)}{bn}\right)\\ &\quad-\frac{1}{2}xe^{-\frac{a}{bn}}(cx^n)^{-1/n}\,\text{ExpIntegralEi}\left(\frac{(ibdn+1)\left(a+b\log(cx^n)\right)}{bn}\right)\end{aligned}$$

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

```
[Out] x*CosIntegral[d*(a + b*Log[c*x^n])] - (x*ExpIntegralEi[((1 - I*b*d*n)*(a +
b*Log[c*x^n]))/(b*n)])/(2*E^(a/(b*n))*(c*x^n)^n^(-1)) - (x*ExpIntegralEi[((
1 + I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)])/(2*E^(a/(b*n))*(c*x^n)^n^(-1))
```

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 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

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

Rule 4584

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*(((e_.) + Log[(g_.)*(x
_)^(m_.)]*(f_.))*(h_.))^(q_.), x_Symbol] :> Dist[1/((c*x^n)^(I*b*d)*(2/x^(I
*b*d*n)))/E^(I*a*d), Int[(h*(e + f*Log[g*x^m]))^q/x^(I*b*d*n), x], x] + Dis
t[E^(I*a*d)*((c*x^n)^(I*b*d)/(2*x^(I*b*d*n))), Int[x^(I*b*d*n)*(h*(e + f*Lo
g[g*x^m]))^q, x], x] /; FreeQ[{a, b, c, d, e, f, g, h, m, n, q}, x]
```

Rule 6659

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

Rubi steps

$$\begin{aligned}
\text{integral} &= x\,\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)-(bdn)\int\frac{\cos\left(d(a+b\log\left(cx^n\right))\right)}{d\left(a+b\log\left(cx^n\right)\right)}\,dx\\
&= x\,\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)-(bn)\int\frac{\cos\left(d(a+b\log\left(cx^n\right))\right)}{a+b\log\left(cx^n\right)}\,dx\\
&= x\,\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)-\frac{1}{2}\left(be^{-iad}nx^{ibdn}\left(cx^n\right)^{-ibd}\right)\int\frac{x^{-ibdn}}{a+b\log\left(cx^n\right)}\,dx\\
&\quad-\frac{1}{2}\left(be^{iad}nx^{-ibdn}\left(cx^n\right)^{ibd}\right)\int\frac{x^{ibdn}}{a+b\log\left(cx^n\right)}\,dx
\end{aligned}$$

$$= x\,\text{CosIntegral}\,(d(a+b\log(cx^n))) - \frac{1}{2}\left(be^{-iad}x(cx^n)^{-ibd-\frac{1-ibdn}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(1-ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right) - \frac{1}{2}\left(be^{iad}x(cx^n)^{ibd-\frac{1+ibdn}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(1+ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)$$

$$= x\,\text{CosIntegral}\,(d(a+b\log(cx^n))) - \frac{1}{2}e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\text{ExpIntegralEi}\left(\frac{(1-ibdn)(a+b\log(cx^n))}{bn}\right) - \frac{1}{2}e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\,\text{ExpIntegralEi}\left(\frac{(1+ibdn)(a+b\log(cx^n))}{bn}\right)$$

Mathematica [A] (verified)

Time = 1.11 (sec) , antiderivative size = 98, normalized size of antiderivative = 0.79

$$\int \text{CosIntegral}\,(d(a+b\log(cx^n)))\,dx = x\,\text{CosIntegral}\,(d(a+b\log(cx^n))) - \frac{1}{2}e^{-\frac{a}{bn}}x(cx^n)^{-1/n}\left(\text{ExpIntegralEi}\left(\frac{(1-ibdn)(a+b\log(cx^n))}{bn}\right) + \text{ExpIntegralEi}\left(\frac{(1+ibdn)(a+b\log(cx^n))}{bn}\right)\right)$$

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

```
[Out] x*CosIntegral[d*(a + b*Log[c*x^n])] - (x*(ExpIntegralEi[((1 - I*b*d*n)*(a +
 b*Log[c*x^n]))/(b*n)] + ExpIntegralEi[((1 + I*b*d*n)*(a + b*Log[c*x^n]))/(
b*n)]))/(2*E^(a/(b*n))*(c*x^n)^n^(-1))
```

Maple [F]

$$\int \text{Ci}\,(d(a+b\ln(c\,x^n)))\,dx$$

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

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

Fricas [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 445 vs. 2(114) = 228.

Time = 0.29 (sec) , antiderivative size = 445, normalized size of antiderivative = 3.59

$$\int \text{CosIntegral}\,(d(a+b\log{(cx^n)}))\;dx =$$
$$-\frac{1}{2}\,\pi\sqrt{b^2d^2n^2}e^{\left(-\frac{\log(c)}{n}-\frac{a}{bn}-\frac{i}{2\,\pi b^2d^2n^2}\right)}\,\mathrm{C}\left(\frac{\left(\pi b^2d^2n^2\log{(x)}+\pi b^2d^2n\log{(c)}+\pi abd^2n+i\right)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right)$$
$$-\frac{1}{2}\,\pi\sqrt{b^2d^2n^2}e^{\left(-\frac{\log(c)}{n}-\frac{a}{bn}+\frac{i}{2\,\pi b^2d^2n^2}\right)}\,\mathrm{C}\left(\frac{\left(\pi b^2d^2n^2\log{(x)}+\pi b^2d^2n\log{(c)}+\pi abd^2n-i\right)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right)$$
$$+\frac{1}{2}i\,\pi\sqrt{b^2d^2n^2}e^{\left(-\frac{\log(c)}{n}-\frac{a}{bn}-\frac{i}{2\,\pi b^2d^2n^2}\right)}\,\mathrm{S}\left(\frac{\left(\pi b^2d^2n^2\log{(x)}+\pi b^2d^2n\log{(c)}+\pi abd^2n+i\right)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right)$$
$$-\frac{1}{2}i\,\pi\sqrt{b^2d^2n^2}e^{\left(-\frac{\log(c)}{n}-\frac{a}{bn}+\frac{i}{2\,\pi b^2d^2n^2}\right)}\,\mathrm{S}\left(\frac{\left(\pi b^2d^2n^2\log{(x)}+\pi b^2d^2n\log{(c)}+\pi abd^2n-i\right)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right)$$
$$+x\,\mathrm{C}\left(bd\log{(cx^n)}+ad\right)$$

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

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

Sympy [F]

$$\int \text{CosIntegral}\,(d(a+b\log{(cx^n)}))\;dx = \int \mathrm{Ci}\,(d(a+b\log{(cx^n)}))\,dx$$

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

```
[Out] Integral(Ci(d*(a + b*log(c*x**n))), x)
```

Maxima [F]

$$\int \text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)\,dx=\int \text{C}\left((b\log\left(cx^n\right)+a)d\right)\,dx$$

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

Giac [F]

$$\int \text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)\,dx=\int \text{C}\left((b\log\left(cx^n\right)+a)d\right)\,dx$$

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

Mupad [F(-1)]

Timed out.

$$\int \text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)\,dx=\int \text{cosint}\left(d\left(a+b\,\ln\left(c\,x^n\right)\right)\right)\,dx$$

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

3.103 $\int \frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{x}\,dx$

Optimal result

Integrand size = 17, antiderivative size = 55

$$\int \frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{x}\,dx=\frac{\text{CosIntegral}(d(a+b\log(cx^n)))\,(a+b\log(cx^n))}{bn}-\frac{\sin(d(a+b\log(cx^n)))}{bdn}$$

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

Rubi [A] (verified)

Time = 0.03 (sec) , antiderivative size = 55, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.059, Rules used = {6635}

$$\int \frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{x}\,dx=\frac{(a+b\log(cx^n))\,\text{CosIntegral}(d(a+b\log(cx^n)))}{bn}-\frac{\sin(d(a+b\log(cx^n)))}{bdn}$$

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

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

Rule 6635

```
Int[CosIntegral[(a_.) + (b_.)*(x_)], x_Symbol] :> Simp[(a + b*x)*(CosIntegr
al[a + b*x]/b), x] - Simp[Sin[a + b*x]/b, x] /; FreeQ[{a, b}, x]
```

Rubi steps

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

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.75

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

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

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

Maple [A] (verified)

Time = 1.05 (sec) , antiderivative size = 56, normalized size of antiderivative = 1.02

method	result	size
derivativedivides	$\frac{\text{Ci}(ad+bd\ln(c\,x^n))(ad+bd\ln(c\,x^n))-\sin(ad+bd\ln(c\,x^n))}{ndb}$	56
default	$\frac{\text{Ci}(ad+bd\ln(c\,x^n))(ad+bd\ln(c\,x^n))-\sin(ad+bd\ln(c\,x^n))}{ndb}$	56

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

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

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 121 vs. 2(55) = 110.

Time = 0.26 (sec) , antiderivative size = 121, normalized size of antiderivative = 2.20

$$\int \frac{\text{CosIntegral}\left(d(a + b\log\left(cx^n\right))\right)}{x}\,dx$$
$$= \frac{(\pi bdn\log\left(x\right) + \pi bd\log\left(c\right) + \pi ad)\,\mathrm{C}\left(bd\log\left(cx^n\right) + ad\right) - \sin\left(\frac{1}{2}\pi b^2d^2n^2\log\left(x\right)^2 + \pi b^2d^2n\log\left(c\right)\log\left(x\right) -}{\pi bdn}$$

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

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

Sympy [F]

$$\int \frac{\text{CosIntegral}\left(d(a + b\log\left(cx^n\right))\right)}{x}\,dx = \int \frac{\mathrm{Ci}\left(ad + bd\log\left(cx^n\right)\right)}{x}\,dx$$

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

```
[Out] Integral(Ci(a*d + b*d*log(c*x**n))/x, x)
```

Maxima [A] (verification not implemented)

none

Time = 0.20 (sec) , antiderivative size = 82, normalized size of antiderivative = 1.49

$$\int \frac{\text{CosIntegral}\left(d(a + b\log\left(cx^n\right))\right)}{x}\,dx$$
$$= \frac{(b\log\left(cx^n\right) + a)d\,\mathrm{C}\left((b\log\left(cx^n\right) + a)d\right) - \frac{\sin\left(\frac{1}{2}\pi b^2d^2\log\left(cx^n\right)^2 + \pi abd^2\log\left(cx^n\right) + \frac{1}{2}\pi a^2d^2\right)}{\pi}}{bdn}$$

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

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

Giac [F]

$$\int \frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x}\,dx = \int \frac{\text{C}\left((b\log\left(cx^n\right)+a)d\right)}{x}\,dx$$

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

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

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x}\,dx = \frac{\ln\left(c\,x^n\right)\,\mathrm{cosint}(d\,(a+b\,\ln\left(c\,x^n\right)))}{n} + \frac{a\,\mathrm{cosint}(d\,(a+b\,\ln\left(c\,x^n\right)))}{b\,n} - \frac{\sin\left(d\,(a+b\,\ln\left(c\,x^n\right))\right)}{b\,d\,n}$$

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

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

3.104 $\int \frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{x^2}\,dx$

Optimal result

Integrand size = 17, antiderivative size = 127

$$\int \frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{x^2}\,dx = -\frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{x} + \frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\,\text{ExpIntegralEi}\left(-\frac{(1-ibdn)(a+b\log(cx^n))}{bn}\right)}{2x} + \frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\,\text{ExpIntegralEi}\left(-\frac{(1+ibdn)(a+b\log(cx^n))}{bn}\right)}{2x}$$

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

Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 127, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294, Rules used = {6662, 12, 4586, 2347, 2209}

$$\int \frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{x^2}\,dx = -\frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{x} + \frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\,\text{ExpIntegralEi}\left(-\frac{(1-ibdn)(a+b\log(cx^n))}{bn}\right)}{2x} + \frac{e^{\frac{a}{bn}}(cx^n)^{\frac{1}{n}}\,\text{ExpIntegralEi}\left(-\frac{(ibdn+1)(a+b\log(cx^n))}{bn}\right)}{2x}$$

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

```
[Out] -(CosIntegral[d*(a + b*Log[c*x^n])]/x) + (E^(a/(b*n))*(c*x^n)^n^(-1)*ExpInt
egralEi[-(((1 - I*b*d*n)*(a + b*Log[c*x^n]))/(b*n))])/(2*x) + (E^(a/(b*n))*
(c*x^n)^n^(-1)*ExpIntegralEi[-(((1 + I*b*d*n)*(a + b*Log[c*x^n]))/(b*n))])/
(2*x)
```

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 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

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

Rule 4586

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*(((e_.) + Log[(g_.)*(x
_)^(m_.)]*(f_.))*(h_.))^(q_.)*((i_.)*(x_))^(r_.), x_Symbol] :> Dist[((i*x)^
r*(1/((c*x^n)^(I*b*d)*(2*x^(r - I*b*d*n)))))/E^(I*a*d), Int[x^(r - I*b*d*n)
*(h*(e + f*Log[g*x^m]))^q, x], x] + Dist[E^(I*a*d)*(i*x)^r*((c*x^n)^(I*b*d)
/(2*x^(r + I*b*d*n))), Int[x^(r + I*b*d*n)*(h*(e + f*Log[g*x^m]))^q, x], x]
 /; FreeQ[{a, b, c, d, e, f, g, h, i, m, n, q, r}, x]
```

Rule 6662

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

Rubi steps

$$\begin{aligned}\text{integral} &= -\frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x}+(bdn)\int\frac{\cos\left(d(a+b\log\left(cx^n\right))\right)}{dx^2\left(a+b\log\left(cx^n\right)\right)}\,dx\\ &= -\frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x}+(bn)\int\frac{\cos\left(d(a+b\log\left(cx^n\right))\right)}{x^2\left(a+b\log\left(cx^n\right)\right)}\,dx\end{aligned}$$

$$= -\frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x} + \frac{1}{2}\left(be^{-iad}nx^{ibdn}\left(cx^n\right)^{-ibd}\right)\int\frac{x^{-2-ibdn}}{a+b\log\left(cx^n\right)}\,dx + \frac{1}{2}\left(be^{iad}nx^{-ibdn}\left(cx^n\right)^{ibd}\right)\int\frac{x^{-2+ibdn}}{a+b\log\left(cx^n\right)}\,dx$$

$$= -\frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x} + \frac{\left(be^{-iad}\left(cx^n\right)^{-ibd-\frac{-1-ibdn}{n}}\right)\text{Subst}\left(\int\frac{e^{\frac{(-1-ibdn)x}{n}}}{a+bx}\,dx, x, \log\left(cx^n\right)\right)}{2x} + \frac{\left(be^{iad}\left(cx^n\right)^{ibd-\frac{-1+ibdn}{n}}\right)\text{Subst}\left(\int\frac{e^{\frac{(-1+ibdn)x}{n}}}{a+bx}\,dx, x, \log\left(cx^n\right)\right)}{2x}$$

$$= -\frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x} + \frac{e^{\frac{a}{bn}}\left(cx^n\right)^{\frac{1}{n}}\text{ExpIntegralEi}\left(-\frac{(1-ibdn)(a+b\log(cx^n))}{bn}\right)}{2x} + \frac{e^{\frac{a}{bn}}\left(cx^n\right)^{\frac{1}{n}}\text{ExpIntegralEi}\left(-\frac{(1+ibdn)(a+b\log(cx^n))}{bn}\right)}{2x}$$

Mathematica [A] (verified)

Time = 1.16 (sec) , antiderivative size = 102, normalized size of antiderivative = 0.80

$$\int\frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x^2}\,dx = \frac{-2\,\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right) + e^{\frac{a}{bn}}\left(cx^n\right)^{\frac{1}{n}}\left(\text{ExpIntegralEi}\left(-\frac{i(-i+bdn)(a+b\log(cx^n))}{bn}\right) + \text{ExpIntegralE}\right.}{2x}$$

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

```
[Out] (-2*CosIntegral[d*(a + b*Log[c*x^n])] + E^(a/(b*n))*(c*x^n)^n^(-1)*(ExpInte
gralEi[((-I)*(-I + b*d*n)*(a + b*Log[c*x^n]))/(b*n)] + ExpIntegralEi[(I*(I
+ b*d*n)*(a + b*Log[c*x^n]))/(b*n)]))/(2*x)
```

Maple [F]

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

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

Fricas [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 444 vs. $2(115) = 230$.

Time = 0.28 (sec) , antiderivative size = 444, normalized size of antiderivative = 3.50

$$\int \frac{\operatorname{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x^2}\,dx = \frac{\pi\sqrt{b^2d^2n^2}xe^{\left(\frac{\log(c)}{n}+\frac{a}{bn}+\frac{i}{2\,\pi b^2d^2n^2}\right)}\operatorname{C}\left(\frac{(\pi b^2d^2n^2\log(x)+\pi b^2d^2n\log(c)+\pi abd^2n+i)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right)+\pi\sqrt{b^2d^2n^2}xe^{\left(\frac{\log(c)}{n}+\frac{a}{bn}-\frac{i}{2\,\pi b^2d^2n^2}\right)}\cdots}{\cdots}$$

```
[In] integrate(fresnel_cos(d*(a+b*log(c*x^n)))/x^2,x, algorithm="fricas")
[Out] 1/2*(pi*sqrt(b^2*d^2*n^2)*x*e^(log(c)/n + a/(b*n) + 1/2*I/(pi*b^2*d^2*n^2))
*fresnel_cos((pi*b^2*d^2*n^2*log(x) + pi*b^2*d^2*n*log(c) + pi*a*b*d^2*n +
I)*sqrt(b^2*d^2*n^2)/(pi*b^2*d^2*n^2)) + pi*sqrt(b^2*d^2*n^2)*x*e^(log(c)/n
 + a/(b*n) - 1/2*I/(pi*b^2*d^2*n^2))*fresnel_cos((pi*b^2*d^2*n^2*log(x) + p
i*b^2*d^2*n*log(c) + pi*a*b*d^2*n - I)*sqrt(b^2*d^2*n^2)/(pi*b^2*d^2*n^2))
+ I*pi*sqrt(b^2*d^2*n^2)*x*e^(log(c)/n + a/(b*n) + 1/2*I/(pi*b^2*d^2*n^2))*
fresnel_sin((pi*b^2*d^2*n^2*log(x) + pi*b^2*d^2*n*log(c) + pi*a*b*d^2*n + I
)*sqrt(b^2*d^2*n^2)/(pi*b^2*d^2*n^2)) - I*pi*sqrt(b^2*d^2*n^2)*x*e^(log(c)/
n + a/(b*n) - 1/2*I/(pi*b^2*d^2*n^2))*fresnel_sin((pi*b^2*d^2*n^2*log(x) +
pi*b^2*d^2*n*log(c) + pi*a*b*d^2*n - I)*sqrt(b^2*d^2*n^2)/(pi*b^2*d^2*n^2))
 - 2*fresnel_cos(b*d*log(c*x^n) + a*d))/x
```

Sympy [F]

$$\int \frac{\operatorname{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x^2}\,dx = \int \frac{\operatorname{Ci}\left(ad+bd\log\left(cx^n\right)\right)}{x^2}\,dx$$

```
[In] integrate(Ci(d*(a+b*ln(c*x**n)))/x**2,x)
[Out] Integral(Ci(a*d + b*d*log(c*x**n))/x**2, x)
```

Maxima [F]

$$\int \frac{\text{CosIntegral}\left(d(a + b\log\left(cx^n\right))\right)}{x^2}\,dx = \int \frac{\mathrm{C}\left((b\log\left(cx^n\right) + a)d\right)}{x^2}\,dx$$

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

Giac [F]

$$\int \frac{\text{CosIntegral}\left(d(a + b\log\left(cx^n\right))\right)}{x^2}\,dx = \int \frac{\mathrm{C}\left((b\log\left(cx^n\right) + a)d\right)}{x^2}\,dx$$

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

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{CosIntegral}\left(d(a + b\log\left(cx^n\right))\right)}{x^2}\,dx = \int \frac{\text{cosint}\left(d\left(a + b\,\ln\left(c\,x^n\right)\right)\right)}{x^2}\,dx$$

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

3.105 $\int \frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{x^3}\,dx$

Optimal result

Integrand size = 17, antiderivative size = 135

$$\int \frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x^3}\,dx = -\frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{2x^2} + \frac{e^{\frac{2a}{bn}}\left(cx^n\right)^{2/n}\text{ExpIntegralEi}\left(-\frac{(2-ibdn)(a+b\log(cx^n))}{bn}\right)}{4x^2} + \frac{e^{\frac{2a}{bn}}\left(cx^n\right)^{2/n}\text{ExpIntegralEi}\left(-\frac{(2+ibdn)(a+b\log(cx^n))}{bn}\right)}{4x^2}$$

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

Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 135, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.294, Rules used = {6662, 12, 4586, 2347, 2209}

$$\int \frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x^3}\,dx = -\frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{2x^2} + \frac{e^{\frac{2a}{bn}}\left(cx^n\right)^{2/n}\text{ExpIntegralEi}\left(-\frac{(2-ibdn)(a+b\log(cx^n))}{bn}\right)}{4x^2} + \frac{e^{\frac{2a}{bn}}\left(cx^n\right)^{2/n}\text{ExpIntegralEi}\left(-\frac{(ibdn+2)(a+b\log(cx^n))}{bn}\right)}{4x^2}$$

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

```
[Out] -1/2*CosIntegral[d*(a + b*Log[c*x^n])]/x^2 + (E^((2*a)/(b*n))*(c*x^n)^(2/n)
*ExpIntegralEi[-(((2 - I*b*d*n)*(a + b*Log[c*x^n]))/(b*n))])/(4*x^2) + (E^(
(2*a)/(b*n))*(c*x^n)^(2/n)*ExpIntegralEi[-(((2 + I*b*d*n)*(a + b*Log[c*x^n]
))/(b*n))])/(4*x^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 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

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

Rule 4586

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*(((e_.) + Log[(g_.)*(x
_)^(m_.)]*(f_.))*(h_.))^(q_.)*((i_.)*(x_))^(r_.), x_Symbol] :> Dist[((i*x)^
r*(1/((c*x^n)^(I*b*d)*(2*x^(r - I*b*d*n)))))/E^(I*a*d), Int[x^(r - I*b*d*n)
*(h*(e + f*Log[g*x^m]))^q, x], x] + Dist[E^(I*a*d)*(i*x)^r*((c*x^n)^(I*b*d)
/(2*x^(r + I*b*d*n))), Int[x^(r + I*b*d*n)*(h*(e + f*Log[g*x^m]))^q, x], x]
 /; FreeQ[{a, b, c, d, e, f, g, h, i, m, n, q, r}, x]
```

Rule 6662

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

Rubi steps

$$\begin{aligned}\text{integral} &= -\frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{2x^2}+\frac{1}{2}(bdn)\int\frac{\cos\left(d(a+b\log\left(cx^n\right))\right)}{dx^3\left(a+b\log\left(cx^n\right)\right)}\,dx\\ &= -\frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{2x^2}+\frac{1}{2}(bn)\int\frac{\cos\left(d(a+b\log\left(cx^n\right))\right)}{x^3\left(a+b\log\left(cx^n\right)\right)}\,dx\end{aligned}$$

$$= -\frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{2x^2} + \frac{1}{4}\left(be^{-iad}nx^{ibdn}(cx^n)^{-ibd}\right)\int \frac{x^{-3-ibdn}}{a+b\log(cx^n)}\,dx$$
$$+ \frac{1}{4}\left(be^{iad}nx^{-ibdn}(cx^n)^{ibd}\right)\int \frac{x^{-3+ibdn}}{a+b\log(cx^n)}\,dx$$
$$= -\frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{2x^2}$$
$$+ \frac{\left(be^{-iad}(cx^n)^{-ibd-\frac{-2-ibdn}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(-2-ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{4x^2}$$
$$+ \frac{\left(be^{iad}(cx^n)^{ibd-\frac{-2+ibdn}{n}}\right)\text{Subst}\left(\int \frac{e^{\frac{(-2+ibdn)x}{n}}}{a+bx}\,dx, x, \log(cx^n)\right)}{4x^2}$$
$$= -\frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{2x^2}$$
$$+ \frac{e^{\frac{2a}{bn}}(cx^n)^{2/n}\,\text{ExpIntegralEi}\left(-\frac{(2-ibdn)(a+b\log(cx^n))}{bn}\right)}{4x^2}$$
$$+ \frac{e^{\frac{2a}{bn}}(cx^n)^{2/n}\,\text{ExpIntegralEi}\left(-\frac{(2+ibdn)(a+b\log(cx^n))}{bn}\right)}{4x^2}$$

Mathematica [A] (verified)

Time = 1.13 (sec) , antiderivative size = 105, normalized size of antiderivative = 0.78

$$\int \frac{\text{CosIntegral}(d(a+b\log(cx^n)))}{x^3}\,dx$$
$$= \frac{-2\,\text{CosIntegral}(d(a+b\log(cx^n))) + e^{\frac{2a}{bn}}(cx^n)^{2/n}\left(\text{ExpIntegralEi}\left(-\frac{i(-2i+bdn)(a+b\log(cx^n))}{bn}\right) + \text{ExpIntegralE}\right.}{4x^2}$$

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

```
[Out] (-2*CosIntegral[d*(a + b*Log[c*x^n])] + E^((2*a)/(b*n))*(c*x^n)^(2/n)*(ExpI
ntegralEi[((-I)*(-2*I + b*d*n)*(a + b*Log[c*x^n]))/(b*n)] + ExpIntegralEi[(
I*(2*I + b*d*n)*(a + b*Log[c*x^n]))/(b*n)]))/(4*x^2)
```

Maple [F]

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

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

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

Fricas [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 460 vs. $2(121) = 242$.

Time = 0.29 (sec) , antiderivative size = 460, normalized size of antiderivative = 3.41

$$\int \frac{\text{CosIntegral}\left(d(a+b\log\left(cx^{n}\right))\right)}{x^{3}}\,dx = \frac{\pi\sqrt{b^2d^2n^2}x^2e^{\left(\frac{2\log(c)}{n}+\frac{2a}{bn}+\frac{2i}{\pi b^2d^2n^2}\right)}C\left(\frac{\left(\pi b^2d^2n^2\log(x)+\pi b^2d^2n\log(c)+\pi abd^2n+2i\right)\sqrt{b^2d^2n^2}}{\pi b^2d^2n^2}\right)+\pi\sqrt{b^2d^2n^2}x^2e^{\left(\frac{2\log(c)}{n}+\frac{2a}{bn}-\cdots\right.}\cdots}{\cdots}$$

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

```
[Out] 1/4*(pi*sqrt(b^2*d^2*n^2)*x^2*e^(2*log(c)/n + 2*a/(b*n) + 2*I/(pi*b^2*d^2*n
^2))*fresnel_cos((pi*b^2*d^2*n^2*log(x) + pi*b^2*d^2*n*log(c) + pi*a*b*d^2*
n + 2*I)*sqrt(b^2*d^2*n^2)/(pi*b^2*d^2*n^2)) + pi*sqrt(b^2*d^2*n^2)*x^2*e^(
2*log(c)/n + 2*a/(b*n) - 2*I/(pi*b^2*d^2*n^2))*fresnel_cos((pi*b^2*d^2*n^2*
log(x) + pi*b^2*d^2*n*log(c) + pi*a*b*d^2*n - 2*I)*sqrt(b^2*d^2*n^2)/(pi*b^
2*d^2*n^2)) + I*pi*sqrt(b^2*d^2*n^2)*x^2*e^(2*log(c)/n + 2*a/(b*n) + 2*I/(p
i*b^2*d^2*n^2))*fresnel_sin((pi*b^2*d^2*n^2*log(x) + pi*b^2*d^2*n*log(c) +
pi*a*b*d^2*n + 2*I)*sqrt(b^2*d^2*n^2)/(pi*b^2*d^2*n^2)) - I*pi*sqrt(b^2*d^2
*n^2)*x^2*e^(2*log(c)/n + 2*a/(b*n) - 2*I/(pi*b^2*d^2*n^2))*fresnel_sin((pi
*b^2*d^2*n^2*log(x) + pi*b^2*d^2*n*log(c) + pi*a*b*d^2*n - 2*I)*sqrt(b^2*d^
2*n^2)/(pi*b^2*d^2*n^2)) - 2*fresnel_cos(b*d*log(c*x^n) + a*d))/x^2
```

Sympy [F]

$$\int \frac{\text{CosIntegral}\left(d(a+b\log\left(cx^{n}\right))\right)}{x^{3}}\,dx = \int \frac{\operatorname{Ci}\left(ad+bd\log\left(cx^{n}\right)\right)}{x^{3}}\,dx$$

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

```
[Out] Integral(Ci(a*d + b*d*log(c*x**n))/x**3, x)
```

Maxima [F]

$$\int \frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x^3}\,dx = \int \frac{\text{C}\left((b\log\left(cx^n\right)+a)d\right)}{x^3}\,dx$$

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

Giac [F]

$$\int \frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x^3}\,dx = \int \frac{\text{C}\left((b\log\left(cx^n\right)+a)d\right)}{x^3}\,dx$$

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

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{x^3}\,dx = \int \frac{\text{cosint}\left(d\left(a+b\,\ln\left(c\,x^n\right)\right)\right)}{x^3}\,dx$$

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

3.106 $\int (ex)^m \text{CosIntegral}(d(a+b\log(cx^n)))\,dx$

Optimal result

Integrand size = 19, antiderivative size = 172

$$\int (ex)^m \text{CosIntegral}(d(a+b\log(cx^n)))\,dx = \frac{(ex)^{1+m}\text{CosIntegral}(d(a+b\log(cx^n)))}{e(1+m)} - \frac{e^{-\frac{a(1+m)}{bn}}x(ex)^m(cx^n)^{-\frac{1+m}{n}}\text{ExpIntegralEi}\left(\frac{(1+m-ibdn)(a+b\log(cx^n))}{bn}\right)}{2(1+m)} - \frac{e^{-\frac{a(1+m)}{bn}}x(ex)^m(cx^n)^{-\frac{1+m}{n}}\text{ExpIntegralEi}\left(\frac{(1+m+ibdn)(a+b\log(cx^n))}{bn}\right)}{2(1+m)}$$

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

Rubi [A] (verified)

Time = 0.29 (sec) , antiderivative size = 172, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.263$, Rules used

= {6662, 12, 4586, 2347, 2209}

$$\int (ex)^m \text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)\,dx = \frac{(ex)^{m+1}\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{e(m+1)} - \frac{x(ex)^m e^{-\frac{a(m+1)}{bn}}\left(cx^n\right)^{-\frac{m+1}{n}}\text{ExpIntegralEi}\left(\frac{(m-ibdn+1)(a+b\log(cx^n))}{bn}\right)}{2(m+1)} - \frac{x(ex)^m e^{-\frac{a(m+1)}{bn}}\left(cx^n\right)^{-\frac{m+1}{n}}\text{ExpIntegralEi}\left(\frac{(m+ibdn+1)(a+b\log(cx^n))}{bn}\right)}{2(m+1)}$$

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

```
[Out] ((e*x)^(1 + m)*CosIntegral[d*(a + b*Log[c*x^n])])/(e*(1 + m)) - (x*(e*x)^m*
ExpIntegralEi[((1 + m - I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)])/(2*E^((a*(1 +
m))/(b*n))*(1 + m)*(c*x^n)^((1 + m)/n)) - (x*(e*x)^m*ExpIntegralEi[((1 + m
+ I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)])/(2*E^((a*(1 + m))/(b*n))*(1 + m)*(c*
x^n)^((1 + m)/n))
```

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 2209

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))/((c_.) + (d_.)*(x_)), x_Symbol] :> Si
mp[(F^(g*(e - c*(f/d)))/d)*ExpIntegralEi[f*g*(c + d*x)*(Log[F]/d)], x] /; F
reeQ[{F, c, d, e, f, g}, x] &&  !TrueQ[$UseGamma]
```

Rule 2347

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

Rule 4586

```
Int[Cos[((a_.) + Log[(c_.)*(x_)^(n_.)]*(b_.))*(d_.)]*(((e_.) + Log[(g_.)*(x
_)^(m_.)]*(f_.))*(h_.))^(q_.)*((i_.)*(x_))^(r_.), x_Symbol] :> Dist[((i*x)^
r*(1/((c*x^n)^(I*b*d)*(2*x^(r - I*b*d*n)))))/E^(I*a*d), Int[x^(r - I*b*d*n)
*(h*(e + f*Log[g*x^m]))^q, x], x] + Dist[E^(I*a*d)*(i*x)^r*((c*x^n)^(I*b*d)
/(2*x^(r + I*b*d*n))), Int[x^(r + I*b*d*n)*(h*(e + f*Log[g*x^m]))^q, x], x]
 /; FreeQ[{a, b, c, d, e, f, g, h, i, m, n, q, r}, x]
```

Rule 6662

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

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{(ex)^{1+m}\,\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{e(1+m)} - \frac{(bdn)\int\frac{(ex)^m\cos(d(a+b\log(cx^n)))}{d(a+b\log(cx^n))}\,dx}{1+m} \\
&= \frac{(ex)^{1+m}\,\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{e(1+m)} - \frac{(bn)\int\frac{(ex)^m\cos(d(a+b\log(cx^n)))}{a+b\log(cx^n)}\,dx}{1+m} \\
&= \frac{(ex)^{1+m}\,\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{e(1+m)} \\
&\quad - \frac{\left(be^{-iad}nx^{-m+ibdn}(ex)^m\left(cx^n\right)^{-ibd}\right)\int\frac{x^{m-ibdn}}{a+b\log(cx^n)}\,dx}{2(1+m)} \\
&\quad - \frac{\left(be^{iad}nx^{-m-ibdn}(ex)^m\left(cx^n\right)^{ibd}\right)\int\frac{x^{m+ibdn}}{a+b\log(cx^n)}\,dx}{2(1+m)} \\
&= \frac{(ex)^{1+m}\,\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{e(1+m)} \\
&\quad - \frac{\left(be^{-iad}x(ex)^m\left(cx^n\right)^{-ibd-\frac{1+m-ibdn}{n}}\right)\text{Subst}\left(\int\frac{e^{\frac{(1+m-ibdn)x}{n}}}{a+bx}\,dx, x, \log\left(cx^n\right)\right)}{2(1+m)} \\
&\quad - \frac{\left(be^{iad}x(ex)^m\left(cx^n\right)^{ibd-\frac{1+m+ibdn}{n}}\right)\text{Subst}\left(\int\frac{e^{\frac{(1+m+ibdn)x}{n}}}{a+bx}\,dx, x, \log\left(cx^n\right)\right)}{2(1+m)} \\
&= \frac{(ex)^{1+m}\,\text{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)}{e(1+m)} \\
&\quad - \frac{e^{-\frac{a(1+m)}{bn}}x(ex)^m\left(cx^n\right)^{-\frac{1+m}{n}}\,\text{ExpIntegralEi}\left(\frac{(1+m-ibdn)(a+b\log(cx^n))}{bn}\right)}{2(1+m)} \\
&\quad - \frac{e^{-\frac{a(1+m)}{bn}}x(ex)^m\left(cx^n\right)^{-\frac{1+m}{n}}\,\text{ExpIntegralEi}\left(\frac{(1+m+ibdn)(a+b\log(cx^n))}{bn}\right)}{2(1+m)}
\end{aligned}$$

Mathematica [A] (verified)

Time = 2.07 (sec) , antiderivative size = 124, normalized size of antiderivative = 0.72

$$\int (ex)^m \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx = \frac{(ex)^m\left(2x\operatorname{CosIntegral}(d(a+b\log(cx^n))) - e^{-\frac{(1+m)(a-bn\log(x)+b\log(cx^n))}{bn}}x^{-m}\left(\operatorname{ExpIntegralEi}\left(\frac{(1+m-ibdn)(a+b\log(cx^n))}{bn}\right)\right.\right.}{2(1+m)}$$

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

[Out] ((e*x)^m*(2*x*CosIntegral[d*(a + b*Log[c*x^n])] - (ExpIntegralEi[((1 + m - I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)] + ExpIntegralEi[((1 + m + I*b*d*n)*(a + b*Log[c*x^n]))/(b*n)])/(E^(((1 + m)*(a - b*n*Log[x] + b*Log[c*x^n]))/(b*n))*x^m)))/(2*(1 + m))

Maple [F]

$$\int (ex)^m \operatorname{Ci}(d(a+b\ln(c\,x^n)))\,dx$$

[In] int((e*x)^m*Ci(d*(a+b*ln(c*x^n))),x)

[Out] int((e*x)^m*Ci(d*(a+b*ln(c*x^n))),x)

Fricas [B] (verification not implemented)

Both result and optimal contain complex but leaf count of result is larger than twice the leaf count of optimal. 689 vs. 2(164) = 328.

Time = 0.29 (sec) , antiderivative size = 689, normalized size of antiderivative = 4.01

$$\int (ex)^m \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx = -\frac{\pi\sqrt{b^2d^2n^2}e^{\left(m\log(e)-\frac{m\log(c)}{n}-\frac{am}{bn}-\frac{\log(c)}{n}-\frac{a}{bn}-\frac{im^2}{2\pi b^2d^2n^2}-\frac{im}{\pi b^2d^2n^2}-\frac{i}{2\pi b^2d^2n^2}\right)}C\left(\frac{(\pi b^2d^2n^2\log(x)+\pi b^2d^2n\log(c)+\pi abd^2n+im+i)}{\pi b^2d^2n^2}\right.}{}$$

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

[Out] -1/2*(pi*sqrt(b^2*d^2*n^2)*e^(m*log(e) - m*log(c)/n - a*m/(b*n) - log(c)/n - a/(b*n) - 1/2*I*m^2/(pi*b^2*d^2*n^2) - I*m/(pi*b^2*d^2*n^2) - 1/2*I/(pi*b^2*d^2*n^2))*fresnel_cos((pi*b^2*d^2*n^2*log(x) + pi*b^2*d^2*n*log(c) + pi*a*b*d^2*n + I*m + I)*sqrt(b^2*d^2*n^2)/(pi*b^2*d^2*n^2)) + pi*sqrt(b^2*d^2*n^2)*e^(m*log(e) - m*log(c)/n - a*m/(b*n) - log(c)/n - a/(b*n) + 1/2*I*m^2/(pi*b^2*d^2*n^2) + I*m/(pi*b^2*d^2*n^2) + 1/2*I/(pi*b^2*d^2*n^2))*fresnel_c

```
os((pi*b^2*d^2*n^2*log(x) + pi*b^2*d^2*n*log(c) + pi*a*b*d^2*n - I*m - I)*s
qrt(b^2*d^2*n^2)/(pi*b^2*d^2*n^2)) - I*pi*sqrt(b^2*d^2*n^2)*e^(m*log(e) - m
*log(c)/n - a*m/(b*n) - log(c)/n - a/(b*n) - 1/2*I*m^2/(pi*b^2*d^2*n^2) - I
*m/(pi*b^2*d^2*n^2) - 1/2*I/(pi*b^2*d^2*n^2))*fresnel_sin((pi*b^2*d^2*n^2*l
og(x) + pi*b^2*d^2*n*log(c) + pi*a*b*d^2*n + I*m + I)*sqrt(b^2*d^2*n^2)/(pi
*b^2*d^2*n^2)) + I*pi*sqrt(b^2*d^2*n^2)*e^(m*log(e) - m*log(c)/n - a*m/(b*n
) - log(c)/n - a/(b*n) + 1/2*I*m^2/(pi*b^2*d^2*n^2) + I*m/(pi*b^2*d^2*n^2)
+ 1/2*I/(pi*b^2*d^2*n^2))*fresnel_sin((pi*b^2*d^2*n^2*log(x) + pi*b^2*d^2*n
*log(c) + pi*a*b*d^2*n - I*m - I)*sqrt(b^2*d^2*n^2)/(pi*b^2*d^2*n^2)) - 2*x
*e^(m*log(e) + m*log(x))*fresnel_cos(b*d*log(c*x^n) + a*d))/(m + 1)
```

Sympy [F]

$$\int (ex)^m \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx = \int (ex)^m \operatorname{Ci}(ad+bd\log(cx^n))\,dx$$

```
[In] integrate((e*x)**m*Ci(d*(a+b*ln(c*x**n))),x)
[Out] Integral((e*x)**m*Ci(a*d + b*d*log(c*x**n)), x)
```

Maxima [F]

$$\int (ex)^m \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx = \int (ex)^m \operatorname{C}((b\log(cx^n)+a)d)\,dx$$

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

Giac [F]

$$\int (ex)^m \operatorname{CosIntegral}(d(a+b\log(cx^n)))\,dx = \int (ex)^m \operatorname{C}((b\log(cx^n)+a)d)\,dx$$

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

Mupad [F(-1)]

Timed out.

$$\int (ex)^m \operatorname{CosIntegral}\left(d(a+b\log\left(cx^n\right))\right)\,dx=\int \operatorname{cosint}\left(d\left(a+b\,\ln\left(c\,x^n\right)\right)\right)\,\left(e\,x\right)^m\,dx$$

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

3.107 $\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^3}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^3}\,dx = -\frac{b\cos^2(bx)}{2x} - \frac{b\cos(2bx)}{4x} - \frac{b\cos(bx)\,\text{CosIntegral}(bx)}{2x} - \frac{\text{CosIntegral}(bx)\sin(bx)}{2x^2} - \frac{\sin(2bx)}{8x^2} - b^2\text{Si}(2bx) - \frac{1}{2}b^2\text{Int}\left(\frac{\text{CosIntegral}(bx)\sin(bx)}{x},x\right)$$

```
[Out] -1/2*b^2*CannotIntegrate(Ci(b*x)*sin(b*x)/x,x)-1/2*b*Ci(b*x)*cos(b*x)/x-1/2
*b*cos(b*x)^2/x-1/4*b*cos(2*b*x)/x-b^2*Si(2*b*x)-1/2*Ci(b*x)*sin(b*x)/x^2-1
/8*sin(2*b*x)/x^2
```

Rubi [N/A]

Not integrable

Time = 0.19 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^3}\,dx = \int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^3}\,dx$$

```
[In] Int[(CosIntegral[b*x]*Sin[b*x])/x^3,x]
```

```
[Out] -1/2*(b*Cos[b*x]^2)/x - (b*Cos[2*b*x])/(4*x) - (b*Cos[b*x]*CosIntegral[b*x]
)/(2*x) - (CosIntegral[b*x]*Sin[b*x])/(2*x^2) - Sin[2*b*x]/(8*x^2) - b^2*Si
nIntegral[2*b*x] - (b^2*Defer[Int][(CosIntegral[b*x]*Sin[b*x])/x, x])/2
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{\text{CosIntegral}(bx)\sin(bx)}{2x^2} + \frac{1}{2}b\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^2}\,dx \\
&\quad + \frac{1}{2}b\int \frac{\cos(bx)\sin(bx)}{bx^3}\,dx \\
&= -\frac{b\cos(bx)\,\text{CosIntegral}(bx)}{2x} - \frac{\text{CosIntegral}(bx)\sin(bx)}{2x^2} + \frac{1}{2}\int \frac{\cos(bx)\sin(bx)}{x^3}\,dx \\
&\quad + \frac{1}{2}b^2\int \frac{\cos^2(bx)}{bx^2}\,dx - \frac{1}{2}b^2\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx \\
&= -\frac{b\cos(bx)\,\text{CosIntegral}(bx)}{2x} - \frac{\text{CosIntegral}(bx)\sin(bx)}{2x^2} + \frac{1}{2}\int \frac{\sin(2bx)}{2x^3}\,dx \\
&\quad + \frac{1}{2}b\int \frac{\cos^2(bx)}{x^2}\,dx - \frac{1}{2}b^2\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx \\
&= -\frac{b\cos^2(bx)}{2x} - \frac{b\cos(bx)\,\text{CosIntegral}(bx)}{2x} - \frac{\text{CosIntegral}(bx)\sin(bx)}{2x^2} \\
&\quad + \frac{1}{4}\int \frac{\sin(2bx)}{x^3}\,dx - \frac{1}{2}b^2\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx + b^2\int -\frac{\sin(2bx)}{2x}\,dx \\
&= -\frac{b\cos^2(bx)}{2x} - \frac{b\cos(bx)\,\text{CosIntegral}(bx)}{2x} - \frac{\text{CosIntegral}(bx)\sin(bx)}{2x^2} - \frac{\sin(2bx)}{8x^2} \\
&\quad + \frac{1}{4}b\int \frac{\cos(2bx)}{x^2}\,dx - \frac{1}{2}b^2\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx - \frac{1}{2}b^2\int \frac{\sin(2bx)}{x}\,dx \\
&= -\frac{b\cos^2(bx)}{2x} - \frac{b\cos(2bx)}{4x} - \frac{b\cos(bx)\,\text{CosIntegral}(bx)}{2x} - \frac{\text{CosIntegral}(bx)\sin(bx)}{2x^2} \\
&\quad - \frac{\sin(2bx)}{8x^2} - \frac{1}{2}b^2\text{Si}(2bx) - \frac{1}{2}b^2\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx - \frac{1}{2}b^2\int \frac{\sin(2bx)}{x}\,dx \\
&= -\frac{b\cos^2(bx)}{2x} - \frac{b\cos(2bx)}{4x} - \frac{b\cos(bx)\,\text{CosIntegral}(bx)}{2x} - \frac{\text{CosIntegral}(bx)\sin(bx)}{2x^2} \\
&\quad - \frac{\sin(2bx)}{8x^2} - b^2\text{Si}(2bx) - \frac{1}{2}b^2\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx
\end{aligned}$$

Mathematica [N/A]

Not integrable

Time = 1.06 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^3}\,dx = \int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^3}\,dx$$

```
[In] Integrate[(CosIntegral[b*x]*Sin[b*x])/x^3,x]
[Out] Integrate[(CosIntegral[b*x]*Sin[b*x])/x^3, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.21 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\mathrm{Ci}\,(bx)\sin\,(bx)}{x^3}dx$$

```
[In] int(Ci(b*x)*sin(b*x)/x^3,x)
[Out] int(Ci(b*x)*sin(b*x)/x^3,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\mathrm{CosIntegral}(bx)\sin(bx)}{x^3}\,dx = \int \frac{\mathrm{C}\,(bx)\sin\,(bx)}{x^3}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*sin(b*x)/x^3,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x)*sin(b*x)/x^3, x)
```

Sympy [N/A]

Not integrable

Time = 2.46 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\mathrm{CosIntegral}(bx)\sin(bx)}{x^3}\,dx = \int \frac{\sin\,(bx)\,\mathrm{Ci}\,(bx)}{x^3}\,dx$$

```
[In] integrate(Ci(b*x)*sin(b*x)/x**3,x)
[Out] Integral(sin(b*x)*Ci(b*x)/x**3, x)
```

Maxima [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\mathrm{CosIntegral}(bx)\sin(bx)}{x^3}\,dx = \int \frac{\mathrm{C}\,(bx)\sin\,(bx)}{x^3}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*sin(b*x)/x^3,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x)*sin(b*x)/x^3, x)
```

Giac [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^3}\,dx = \int \frac{\text{C}\,(bx)\sin\,(bx)}{x^3}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*sin(b*x)/x^3,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x)*sin(b*x)/x^3, x)
```

Mupad [N/A]

Not integrable

Time = 5.56 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^3}\,dx = \int \frac{\text{cosint}(b\,x)\ \sin\,(b\,x)}{x^3}\,dx$$

```
[In] int((cosint(b*x)*sin(b*x))/x^3,x)
[Out] int((cosint(b*x)*sin(b*x))/x^3, x)
```

3.108 $\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^2}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 44

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^2}\,dx = \frac{1}{2}b\,\text{CosIntegral}(bx)^2 + b\,\text{CosIntegral}(2bx) - \frac{\text{CosIntegral}(bx)\sin(bx)}{x} - \frac{\sin(2bx)}{2x}$$

```
[Out] 1/2*b*Ci(b*x)^2+b*Ci(2*b*x)-Ci(b*x)*sin(b*x)/x-1/2*sin(2*b*x)/x
```

Rubi [A] (verified)

Time = 0.07 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {6657, 6818, 12, 4491, 3378, 3383}

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^2}\,dx = \frac{1}{2}b\,\text{CosIntegral}(bx)^2 + b\,\text{CosIntegral}(2bx) - \frac{\text{CosIntegral}(bx)\sin(bx)}{x} - \frac{\sin(2bx)}{2x}$$

```
[In] Int[(CosIntegral[b*x]*Sin[b*x])/x^2,x]
```

```
[Out] (b*CosIntegral[b*x]^2)/2 + b*CosIntegral[2*b*x] - (CosIntegral[b*x]*Sin[b*x
])/x - Sin[2*b*x]/(2*x)
```

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 3378

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(c
 + d*x)^(m + 1)*(Sin[e + f*x]/(d*(m + 1))), x] - Dist[f/(d*(m + 1)), Int[(c
 + d*x)^(m + 1)*Cos[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && LtQ[m, -1
]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6657

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*((e_.) + (f_.)*(x_))^(m_)*Sin[(a_.) + (
b_.)*(x_)], x_Symbol] :> Simp[(e + f*x)^(m + 1)*Sin[a + b*x]*(CosIntegral[c
 + d*x]/(f*(m + 1))), x] + (-Dist[b/(f*(m + 1)), Int[(e + f*x)^(m + 1)*Cos[
a + b*x]*CosIntegral[c + d*x], x], x] - Dist[d/(f*(m + 1)), Int[(e + f*x)^(
m + 1)*Sin[a + b*x]*(Cos[c + d*x]/(c + d*x)), x], x]) /; FreeQ[{a, b, c, d,
 e, f}, x] && ILtQ[m, -1]
```

Rule 6818

```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

Rubi steps

$$\begin{aligned}
&\text{integral} \\
&\quad = -\frac{\text{CosIntegral}(bx)\sin(bx)}{x} + b\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x}\,dx + b\int \frac{\cos(bx)\sin(bx)}{bx^2}\,dx \\
&= \frac{1}{2}b\,\text{CosIntegral}(bx)^2 - \frac{\text{CosIntegral}(bx)\sin(bx)}{x} + \int \frac{\cos(bx)\sin(bx)}{x^2}\,dx \\
&= \frac{1}{2}b\,\text{CosIntegral}(bx)^2 - \frac{\text{CosIntegral}(bx)\sin(bx)}{x} + \int \frac{\sin(2bx)}{2x^2}\,dx \\
&= \frac{1}{2}b\,\text{CosIntegral}(bx)^2 - \frac{\text{CosIntegral}(bx)\sin(bx)}{x} + \frac{1}{2}\int \frac{\sin(2bx)}{x^2}\,dx
\end{aligned}$$

$$= \frac{1}{2}b\,\text{CosIntegral}(bx)^2 - \frac{\text{CosIntegral}(bx)\sin(bx)}{x} - \frac{\sin(2bx)}{2x} + b\int \frac{\cos(2bx)}{x}\,dx$$

$$= \frac{1}{2}b\,\text{CosIntegral}(bx)^2 + b\,\text{CosIntegral}(2bx) - \frac{\text{CosIntegral}(bx)\sin(bx)}{x} - \frac{\sin(2bx)}{2x}$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 44, normalized size of antiderivative = 1.00

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^2}\,dx = \frac{1}{2}b\,\text{CosIntegral}(bx)^2 + b\,\text{CosIntegral}(2bx) - \frac{\text{CosIntegral}(bx)\sin(bx)}{x} - \frac{\sin(2bx)}{2x}$$

```
[In] Integrate[(CosIntegral[b*x]*Sin[b*x])/x^2,x]
[Out] (b*CosIntegral[b*x]^2)/2 + b*CosIntegral[2*b*x] - (CosIntegral[b*x]*Sin[b*x
])/x - Sin[2*b*x]/(2*x)
```

Maple [F]

$$\int \frac{\operatorname{Ci}(bx)\sin(bx)}{x^2}dx$$

```
[In] int(Ci(b*x)*sin(b*x)/x^2,x)
[Out] int(Ci(b*x)*sin(b*x)/x^2,x)
```

Fricas [F]

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^2}\,dx = \int \frac{C(bx)\sin(bx)}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*sin(b*x)/x^2,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x)*sin(b*x)/x^2, x)
```

Sympy [F]

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^2}\,dx = \int \frac{\sin(bx)\,\text{Ci}(bx)}{x^2}\,dx$$

```
[In] integrate(Ci(b*x)*sin(b*x)/x**2,x)
[Out] Integral(sin(b*x)*Ci(b*x)/x**2, x)
```

Maxima [F]

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^2}\,dx = \int \frac{C(bx)\sin(bx)}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*sin(b*x)/x^2,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x)*sin(b*x)/x^2, x)
```

Giac [F]

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^2}\,dx = \int \frac{C(bx)\sin(bx)}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*sin(b*x)/x^2,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x)*sin(b*x)/x^2, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x^2}\,dx = \int \frac{\text{cosint}(b\,x)\,\sin(b\,x)}{x^2}\,dx$$

```
[In] int((cosint(b*x)*sin(b*x))/x^2,x)
[Out] int((cosint(b*x)*sin(b*x))/x^2, x)
```

3.109 $\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx = \text{Int}\left(\frac{\text{CosIntegral}(bx)\sin(bx)}{x},x\right)$$

```
[Out] CannotIntegrate(Ci(b*x)*sin(b*x)/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.02 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx = \int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx$$

```
[In] Int[(CosIntegral[b*x]*Sin[b*x])/x,x]
```

```
[Out] Defer[Int][(CosIntegral[b*x]*Sin[b*x])/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 1.45 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx = \int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx$$

```
[In] Integrate[(CosIntegral[b*x]*Sin[b*x])/x,x]
[Out] Integrate[(CosIntegral[b*x]*Sin[b*x])/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.21 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\text{Ci}\,(bx)\sin\,(bx)}{x}dx$$

```
[In] int(Ci(b*x)*sin(b*x)/x,x)
[Out] int(Ci(b*x)*sin(b*x)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx = \int \frac{\text{C}\,(bx)\sin\,(bx)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*sin(b*x)/x,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x)*sin(b*x)/x, x)
```

Sympy [N/A]

Not integrable

Time = 2.12 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx = \int \frac{\sin\,(bx)\,\text{Ci}\,(bx)}{x}\,dx$$

```
[In] integrate(Ci(b*x)*sin(b*x)/x,x)
[Out] Integral(sin(b*x)*Ci(b*x)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx = \int \frac{\mathrm{C}\,(bx)\sin\,(bx)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*sin(b*x)/x,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x)*sin(b*x)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx = \int \frac{\mathrm{C}\,(bx)\sin\,(bx)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*sin(b*x)/x,x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x)*sin(b*x)/x, x)
```

Mupad [N/A]

Not integrable

Time = 5.15 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx = \int \frac{\mathrm{cosint}(b\,x)\,\sin\,(b\,x)}{x}\,dx$$

```
[In] int((cosint(b*x)*sin(b*x))/x,x)
[Out] int((cosint(b*x)*sin(b*x))/x, x)
```

3.110 $\int \text{CosIntegral}(bx)\sin(bx)\,dx$

Optimal result

Integrand size = 9, antiderivative size = 35

$$\int \text{CosIntegral}(bx)\sin(bx)\,dx = -\frac{\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{\text{CosIntegral}(2bx)}{2b} + \frac{\log(x)}{2b}$$

```
[Out] 1/2*Ci(2*b*x)/b-Ci(b*x)*cos(b*x)/b+1/2*ln(x)/b
```

Rubi [A] (verified)

Time = 0.04 (sec) , antiderivative size = 35, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.444, Rules used = {6653, 12, 3393, 3383}

$$\int \text{CosIntegral}(bx)\sin(bx)\,dx = \frac{\text{CosIntegral}(2bx)}{2b} - \frac{\text{CosIntegral}(bx)\cos(bx)}{b} + \frac{\log(x)}{2b}$$

```
[In] Int[CosIntegral[b*x]*Sin[b*x],x]
```

```
[Out] -((Cos[b*x]*CosIntegral[b*x])/b) + CosIntegral[2*b*x]/(2*b) + Log[x]/(2*b)
```

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 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{\cos(bx)\,\text{CosIntegral}(bx)}{b} + \int \frac{\cos^2(bx)}{bx}\,dx \\
&= -\frac{\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{\int \frac{\cos^2(bx)}{x}\,dx}{b} \\
&= -\frac{\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{\int \left(\frac{1}{2x} + \frac{\cos(2bx)}{2x}\right)\,dx}{b} \\
&= -\frac{\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{\log(x)}{2b} + \frac{\int \frac{\cos(2bx)}{x}\,dx}{2b} \\
&= -\frac{\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{\text{CosIntegral}(2bx)}{2b} + \frac{\log(x)}{2b}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 37, normalized size of antiderivative = 1.06

$$\int \text{CosIntegral}(bx)\sin(bx)\,dx = -\frac{\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{\text{CosIntegral}(2bx)}{2b} + \frac{\log(bx)}{2b}$$

```
[In] Integrate[CosIntegral[b*x]*Sin[b*x],x]
[Out] -((Cos[b*x]*CosIntegral[b*x])/b) + CosIntegral[2*b*x]/(2*b) + Log[b*x]/(2*b
)
```

Maple [A] (verified)

Time = 0.52 (sec) , antiderivative size = 29, normalized size of antiderivative = 0.83

method	result	size
derivativedivides	$\frac{-\operatorname{Ci}(bx)\cos(bx)+\frac{\ln(bx)}{2}+\frac{\operatorname{Ci}(2bx)}{2}}{b}$	29
default	$\frac{-\operatorname{Ci}(bx)\cos(bx)+\frac{\ln(bx)}{2}+\frac{\operatorname{Ci}(2bx)}{2}}{b}$	29

```
[In] int(Ci(b*x)*sin(b*x),x,method=_RETURNVERBOSE)
[Out] 1/b*(-Ci(b*x)*cos(b*x)+1/2*ln(b*x)+1/2*Ci(2*b*x))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 145 vs. 2(31) = 62.

Time = 0.26 (sec) , antiderivative size = 145, normalized size of antiderivative = 4.14

$$\int \text{CosIntegral}(bx)\sin(bx)\,dx = -\frac{2\,b\cos\left(bx\right)\text{C}\left(bx\right)-\sqrt{b^2}\cos\left(\frac{1}{2\,\pi}\right)\text{C}\left(\frac{(\pi bx+1)\sqrt{b^2}}{\pi b}\right)-\sqrt{b^2}\cos\left(\frac{1}{2\,\pi}\right)\text{C}\left(\frac{(\pi bx-1)\sqrt{b^2}}{\pi b}\right)-\sqrt{b^2}\,\text{S}\left(\frac{(\pi bx+1)\sqrt{b^2}}{\pi b}\right)\sin}{2\,b^2}$$

```
[In] integrate(fresnel_cos(b*x)*sin(b*x),x, algorithm="fricas")
[Out] -1/2*(2*b*cos(b*x)*fresnel_cos(b*x) - sqrt(b^2)*cos(1/2/pi)*fresnel_cos((pi
*b*x + 1)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*cos(1/2/pi)*fresnel_cos((pi*b*x - 1
)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*fresnel_sin((pi*b*x + 1)*sqrt(b^2)/(pi*b))*
sin(1/2/pi) - sqrt(b^2)*fresnel_sin((pi*b*x - 1)*sqrt(b^2)/(pi*b))*sin(1/2/
pi))/b^2
```

Sympy [F]

$$\int \text{CosIntegral}(bx)\sin(bx)\,dx = \int \sin\left(bx\right)\operatorname{Ci}\left(bx\right)\,dx$$

```
[In] integrate(Ci(b*x)*sin(b*x),x)
[Out] Integral(sin(b*x)*Ci(b*x), x)
```

Maxima [F]

$$\int \mathrm{CosIntegral}(bx)\sin(bx)\,dx = \int \mathrm{C}\left(bx\right)\sin\left(bx\right)\,dx$$

```
[In] integrate(fresnel_cos(b*x)*sin(b*x),x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x)*sin(b*x), x)
```

Giac [F]

$$\int \mathrm{CosIntegral}(bx)\sin(bx)\,dx = \int \mathrm{C}\left(bx\right)\sin\left(bx\right)\,dx$$

```
[In] integrate(fresnel_cos(b*x)*sin(b*x),x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x)*sin(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \mathrm{CosIntegral}(bx)\sin(bx)\,dx = \frac{\ln\left(x\right)}{2\,b} + \frac{\mathrm{cosint}(2\,b\,x)}{2\,b} - \frac{\mathrm{cosint}(b\,x)\,\cos\left(b\,x\right)}{b}$$

```
[In] int(cosint(b*x)*sin(b*x),x)
[Out] log(x)/(2*b) + cosint(2*b*x)/(2*b) - (cosint(b*x)*cos(b*x))/b
```

3.111 $\int x \operatorname{CosIntegral}(bx) \sin(bx) \, dx$

Optimal result

Integrand size = 10, antiderivative size = 62

$$\int x \operatorname{CosIntegral}(bx) \sin(bx) \, dx = \frac{x}{2b} - \frac{x \cos(bx) \operatorname{CosIntegral}(bx)}{b} + \frac{\cos(bx) \sin(bx)}{2b^2} + \frac{\operatorname{CosIntegral}(bx) \sin(bx)}{b^2} - \frac{\operatorname{Si}(2bx)}{2b^2}$$

```
[Out] 1/2*x/b-x*Ci(b*x)*cos(b*x)/b-1/2*Si(2*b*x)/b^2+Ci(b*x)*sin(b*x)/b^2+1/2*cos
(b*x)*sin(b*x)/b^2
```

Rubi [A] (verified)

Time = 0.06 (sec) , antiderivative size = 62, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.700, Rules used = {6655, 12, 2715, 8, 6647, 4491, 3380}

$$\int x \operatorname{CosIntegral}(bx) \sin(bx) \, dx = \frac{\operatorname{CosIntegral}(bx) \sin(bx)}{b^2} - \frac{\operatorname{Si}(2bx)}{2b^2} + \frac{\sin(bx) \cos(bx)}{2b^2} - \frac{x \operatorname{CosIntegral}(bx) \cos(bx)}{b} + \frac{x}{2b}$$

```
[In] Int[x*CosIntegral[b*x]*Sin[b*x],x]
```

```
[Out] x/(2*b) - (x*Cos[b*x]*CosIntegral[b*x])/b + (Cos[b*x]*Sin[b*x])/(2*b^2) + (
CosIntegral[b*x]*Sin[b*x])/b^2 - SinIntegral[2*b*x]/(2*b^2)
```

Rule 8

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

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 2715

```
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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6655

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

Rubi steps

$$\begin{aligned}\text{integral} &= -\frac{x\cos(bx)\,\text{CosIntegral}(bx)}{b}+\frac{\int\cos(bx)\,\text{CosIntegral}(bx)\,dx}{b}+\int\frac{\cos^2(bx)}{b}\,dx\\
&= -\frac{x\cos(bx)\,\text{CosIntegral}(bx)}{b}+\frac{\text{CosIntegral}(bx)\sin(bx)}{b^2}+\frac{\int\cos^2(bx)\,dx}{b}-\frac{\int\frac{\cos(bx)\sin(bx)}{bx}\,dx}{b}\\
&= -\frac{x\cos(bx)\,\text{CosIntegral}(bx)}{b}+\frac{\cos(bx)\sin(bx)}{2b^2}\\
&\quad+\frac{\text{CosIntegral}(bx)\sin(bx)}{b^2}-\frac{\int\frac{\cos(bx)\sin(bx)}{x}\,dx}{b^2}+\frac{\int 1\,dx}{2b}\end{aligned}$$

$$= \frac{x}{2b} - \frac{x\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{\cos(bx)\sin(bx)}{2b^2} + \frac{\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{\int \frac{\sin(2bx)}{2x}\,dx}{b^2}$$

$$= \frac{x}{2b} - \frac{x\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{\cos(bx)\sin(bx)}{2b^2} + \frac{\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{\int \frac{\sin(2bx)}{x}\,dx}{2b^2}$$

$$= \frac{x}{2b} - \frac{x\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{\cos(bx)\sin(bx)}{2b^2} + \frac{\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{\text{Si}(2bx)}{2b^2}$$

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.71

$$\int x\,\text{CosIntegral}(bx)\sin(bx)\,dx = \frac{2bx + \text{CosIntegral}(bx)(-4bx\cos(bx) + 4\sin(bx)) + \sin(2bx) - 2\text{Si}(2bx)}{4b^2}$$

```
[In] Integrate[x*CosIntegral[b*x]*Sin[b*x],x]
```

```
[Out] (2*b*x + CosIntegral[b*x]*(-4*b*x*Cos[b*x] + 4*Sin[b*x]) + Sin[2*b*x] - 2*S
inIntegral[2*b*x])/(4*b^2)
```

Maple [A] (verified)

Time = 0.72 (sec) , antiderivative size = 45, normalized size of antiderivative = 0.73

method	result	size
derivativedivides	$\frac{\text{Ci}(bx)(\sin(bx)-bx\cos(bx))+\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}-\frac{\text{Si}(2bx)}{2}}{b^2}$	45
default	$\frac{\text{Ci}(bx)(\sin(bx)-bx\cos(bx))+\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}-\frac{\text{Si}(2bx)}{2}}{b^2}$	45

```
[In] int(x*Ci(b*x)*sin(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^2*(Ci(b*x)*(sin(b*x)-b*x*cos(b*x))+1/2*sin(b*x)*cos(b*x)+1/2*b*x-1/2*Si
(2*b*x))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 219 vs. $2(56) = 112$.

Time = 0.27 (sec) , antiderivative size = 219, normalized size of antiderivative = 3.53

$$\int x \operatorname{CosIntegral}(bx)\sin(bx)\,dx =$$

$$-\frac{2\,\pi b^2 x\cos(bx)\,\mathrm{C}(bx) - 2\,\pi b\,\mathrm{C}(bx)\sin(bx) - 2\,b\cos(bx)\sin\left(\frac{1}{2}\,\pi b^2 x^2\right) - \sqrt{b^2}\left(\pi\sin\left(\frac{1}{2\,\pi}\right) - \cos\left(\frac{1}{2\,\pi}\right)\right)\mathrm{C}}{}$$

```
[In] integrate(x*fresnel_cos(b*x)*sin(b*x),x, algorithm="fricas")
```

```
[Out] -1/2*(2*pi*b^2*x*cos(b*x)*fresnel_cos(b*x) - 2*pi*b*fresnel_cos(b*x)*sin(b*
x) - 2*b*cos(b*x)*sin(1/2*pi*b^2*x^2) - sqrt(b^2)*(pi*sin(1/2/pi) - cos(1/2
/pi))*fresnel_cos((pi*b*x + 1)*sqrt(b^2)/(pi*b)) + sqrt(b^2)*(pi*sin(1/2/pi
) - cos(1/2/pi))*fresnel_cos((pi*b*x - 1)*sqrt(b^2)/(pi*b)) + sqrt(b^2)*(pi
*cos(1/2/pi) + sin(1/2/pi))*fresnel_sin((pi*b*x + 1)*sqrt(b^2)/(pi*b)) - sq
rt(b^2)*(pi*cos(1/2/pi) + sin(1/2/pi))*fresnel_sin((pi*b*x - 1)*sqrt(b^2)/(
pi*b)))/(pi*b^3)
```

Sympy [F]

$$\int x \operatorname{CosIntegral}(bx)\sin(bx)\,dx = \int x\sin(bx)\,\mathrm{Ci}(bx)\,dx$$

```
[In] integrate(x*Ci(b*x)*sin(b*x),x)
```

```
[Out] Integral(x*sin(b*x)*Ci(b*x), x)
```

Maxima [F]

$$\int x \operatorname{CosIntegral}(bx)\sin(bx)\,dx = \int x\,\mathrm{C}(bx)\sin(bx)\;dx$$

```
[In] integrate(x*fresnel_cos(b*x)*sin(b*x),x, algorithm="maxima")
```

```
[Out] integrate(x*fresnel_cos(b*x)*sin(b*x), x)
```

Giac [F]

$$\int x \,\mathrm{CosIntegral}(bx)\sin(bx)\,dx = \int x\,\mathrm{C}\left(bx\right)\sin\left(bx\right)\,dx$$

```
[In] integrate(x*fresnel_cos(b*x)*sin(b*x),x, algorithm="giac")
[Out] integrate(x*fresnel_cos(b*x)*sin(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int x \,\mathrm{CosIntegral}(bx)\sin(bx)\,dx = \int x\,\mathrm{cosint}(b\,x)\,\sin\left(b\,x\right)\,dx$$

```
[In] int(x*cosint(b*x)*sin(b*x),x)
[Out] int(x*cosint(b*x)*sin(b*x), x)
```

3.112 $\int x^2 \text{CosIntegral}(bx) \sin(bx) \, dx$

Optimal result

Integrand size = 12, antiderivative size = 111

$$\int x^2 \text{CosIntegral}(bx) \sin(bx) \, dx = \frac{x^2}{4b} + \frac{\cos^2(bx)}{4b^3} + \frac{2\cos(bx) \text{CosIntegral}(bx)}{b^3} - \frac{x^2 \cos(bx) \text{CosIntegral}(bx)}{b} - \frac{\text{CosIntegral}(2bx)}{b^3} - \frac{\log(x)}{b^3} + \frac{x\cos(bx)\sin(bx)}{2b^2} + \frac{2x \text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{\sin^2(bx)}{b^3}$$

```
[Out] 1/4*x^2/b-Ci(2*b*x)/b^3+2*Ci(b*x)*cos(b*x)/b^3-x^2*Ci(b*x)*cos(b*x)/b+1/4*c
os(b*x)^2/b^3-ln(x)/b^3+2*x*Ci(b*x)*sin(b*x)/b^2+1/2*x*cos(b*x)*sin(b*x)/b^
2-sin(b*x)^2/b^3
```

Rubi [A] (verified)

Time = 0.09 (sec) , antiderivative size = 111, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.750, Rules used = {6655, 12, 3391, 30, 6649, 2644, 6653, 3393, 3383}

$$\int x^2 \text{CosIntegral}(bx) \sin(bx) \, dx = -\frac{\text{CosIntegral}(2bx)}{b^3} + \frac{2\text{CosIntegral}(bx)\cos(bx)}{b^3} - \frac{\log(x)}{b^3} - \frac{\sin^2(bx)}{b^3} + \frac{\cos^2(bx)}{4b^3} + \frac{2x\text{CosIntegral}(bx)\sin(bx)}{b^2} + \frac{x\sin(bx)\cos(bx)}{2b^2} - \frac{x^2\text{CosIntegral}(bx)\cos(bx)}{b} + \frac{x^2}{4b}$$

```
[In] Int[x^2*CosIntegral[b*x]*Sin[b*x],x]
```

```
[Out] x^2/(4*b) + Cos[b*x]^2/(4*b^3) + (2*Cos[b*x]*CosIntegral[b*x])/b^3 - (x^2*C
os[b*x]*CosIntegral[b*x])/b - CosIntegral[2*b*x]/b^3 - Log[x]/b^3 + (x*Cos[
b*x]*Sin[b*x])/(2*b^2) + (2*x*CosIntegral[b*x]*Sin[b*x])/b^2 - Sin[b*x]^2/b
^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 30

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

Rule 2644

```
Int[cos[(e_.) + (f_.)*(x_)]^(n_.)*((a_.)*sin[(e_.) + (f_.)*(x_)])^(m_.), x_
Symbol] :> Dist[1/(a*f), Subst[Int[x^m*(1 - x^2/a^2)^((n - 1)/2), x], x, a*
Sin[e + f*x]], x] /; FreeQ[{a, e, f, m}, x] && IntegerQ[(n - 1)/2] &&  !(In
tegerQ[(m - 1)/2] && LtQ[0, m, n])
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3391

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

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 6649

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)]*((e_.) + (f_.)*
(x_))^(m_.), x_Symbol] :> Simp[(e + f*x)^m*Sin[a + b*x]*(CosIntegral[c + d*
x]/b), x] + (-Dist[d/b, Int[(e + f*x)^m*Sin[a + b*x]*(Cos[c + d*x]/(c + d*x
```

```
)), x], x] - Dist[f*(m/b), Int[(e + f*x)^(m - 1)*Sin[a + b*x]*CosIntegral[c
 + d*x], x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && IGtQ[m, 0]
```

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6655

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

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{x^2\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{2\int x\cos(bx)\,\text{CosIntegral}(bx)\,dx}{b} + \int \frac{x\cos^2(bx)}{b}\,dx \\
&= -\frac{x^2\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{2x\,\text{CosIntegral}(bx)\sin(bx)}{b^2} \\
&\quad - \frac{2\int \text{CosIntegral}(bx)\sin(bx)\,dx}{b^2} + \frac{\int x\cos^2(bx)\,dx}{b} - \frac{2\int \frac{\cos(bx)\sin(bx)}{b}\,dx}{b} \\
&= \frac{\cos^2(bx)}{4b^3} + \frac{2\cos(bx)\,\text{CosIntegral}(bx)}{b^3} - \frac{x^2\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{x\cos(bx)\sin(bx)}{2b^2} \\
&\quad + \frac{2x\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{2\int \frac{\cos^2(bx)}{bx}\,dx}{b^2} - \frac{2\int \cos(bx)\sin(bx)\,dx}{b^2} + \frac{\int x\,dx}{2b} \\
&= \frac{x^2}{4b} + \frac{\cos^2(bx)}{4b^3} + \frac{2\cos(bx)\,\text{CosIntegral}(bx)}{b^3} - \frac{x^2\cos(bx)\,\text{CosIntegral}(bx)}{b} \\
&\quad + \frac{x\cos(bx)\sin(bx)}{2b^2} + \frac{2x\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{2\int \frac{\cos^2(bx)}{x}\,dx}{b^3} \\
&\quad - \frac{2\text{Subst}\left(\int x\,dx, x, \sin(bx)\right)}{b^3} \\
&= \frac{x^2}{4b} + \frac{\cos^2(bx)}{4b^3} + \frac{2\cos(bx)\,\text{CosIntegral}(bx)}{b^3} \\
&\quad - \frac{x^2\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{x\cos(bx)\sin(bx)}{2b^2} \\
&\quad + \frac{2x\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{\sin^2(bx)}{b^3} - \frac{2\int \left(\frac{1}{2x} + \frac{\cos(2bx)}{2x}\right)dx}{b^3}
\end{aligned}$$

$$= \frac{x^2}{4b} + \frac{\cos^2(bx)}{4b^3} + \frac{2\cos(bx)\,\text{CosIntegral}(bx)}{b^3} - \frac{x^2\cos(bx)\,\text{CosIntegral}(bx)}{b} - \frac{\log(x)}{b^3} + \frac{x\cos(bx)\sin(bx)}{2b^2} + \frac{2x\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{\sin^2(bx)}{b^3} - \frac{\int \frac{\cos(2bx)}{x}\,dx}{b^3}$$

$$= \frac{x^2}{4b} + \frac{\cos^2(bx)}{4b^3} + \frac{2\cos(bx)\,\text{CosIntegral}(bx)}{b^3} - \frac{x^2\cos(bx)\,\text{CosIntegral}(bx)}{b} - \frac{\text{CosIntegral}(2bx)}{b^3} - \frac{\log(x)}{b^3} + \frac{x\cos(bx)\sin(bx)}{2b^2} + \frac{2x\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{\sin^2(bx)}{b^3}$$

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 72, normalized size of antiderivative = 0.65

$$\int x^2\,\text{CosIntegral}(bx)\sin(bx)\,dx = \frac{2b^2x^2 + 5\cos(2bx) - 8\,\text{CosIntegral}(2bx) - 8\log(x) - 8\,\text{CosIntegral}(bx)\left((-2+b^2x^2)\cos(bx) - 2bx\sin(bx)\right.}{8b^3}$$

```
[In] Integrate[x^2*CosIntegral[b*x]*Sin[b*x],x]
```

```
[Out] (2*b^2*x^2 + 5*Cos[2*b*x] - 8*CosIntegral[2*b*x] - 8*Log[x] - 8*CosIntegral
[b*x]*((-2 + b^2*x^2)*Cos[b*x] - 2*b*x*Sin[b*x]) + 2*b*x*Sin[2*b*x])/(8*b^3
)
```

Maple [A] (verified)

Time = 0.75 (sec) , antiderivative size = 91, normalized size of antiderivative = 0.82

method	result	s
derivativedivides	$\frac{\text{Ci}(bx)\left(-b^2x^2\cos(bx)+2\cos(bx)+2bx\sin(bx)\right)+bx\left(\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)-\frac{b^2x^2}{4}-\frac{\sin(bx)^2}{4}+\cos(bx)^2-\ln(bx)-\text{Ci}(2bx)}{b^3}$	9
default	$\frac{\text{Ci}(bx)\left(-b^2x^2\cos(bx)+2\cos(bx)+2bx\sin(bx)\right)+bx\left(\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)-\frac{b^2x^2}{4}-\frac{\sin(bx)^2}{4}+\cos(bx)^2-\ln(bx)-\text{Ci}(2bx)}{b^3}$	9

```
[In] int(x^2*Ci(b*x)*sin(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^3*(Ci(b*x)*(-b^2*x^2*cos(b*x)+2*cos(b*x)+2*b*x*sin(b*x))+b*x*(1/2*sin(b
*x)*cos(b*x)+1/2*b*x)-1/4*b^2*x^2-1/4*sin(b*x)^2+cos(b*x)^2-ln(b*x)-Ci(2*b*
x))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 296 vs. 2(105) = 210.

Time = 0.29 (sec) , antiderivative size = 296, normalized size of antiderivative = 2.67

$$\int x^2 \operatorname{CosIntegral}(bx)\sin(bx)\,dx = -\frac{2\left(\pi^2b^3x^2 - 2\pi^2b\right)\cos(bx)\,C(bx) + \sqrt{b^2}\left(\left(2\pi^2-1\right)\cos\left(\frac{1}{2\pi}\right) + \pi\sin\left(\frac{1}{2\pi}\right)\right)C\left(\frac{(\pi bx+1)\sqrt{b^2}}{\pi b}\right) + \sqrt{b^2}\left(\left(2\pi^2 -\right.\right.}{}$$

```
[In] integrate(x^2*fresnel_cos(b*x)*sin(b*x),x, algorithm="fricas")
```

```
[Out] -1/2*(2*(pi^2*b^3*x^2 - 2*pi^2*b)*cos(b*x)*fresnel_cos(b*x) + sqrt(b^2)*((2
*pi^2 - 1)*cos(1/2/pi) + pi*sin(1/2/pi))*fresnel_cos((pi*b*x + 1)*sqrt(b^2)
/(pi*b)) + sqrt(b^2)*((2*pi^2 - 1)*cos(1/2/pi) + pi*sin(1/2/pi))*fresnel_co
s((pi*b*x - 1)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*(pi*cos(1/2/pi) - (2*pi^2 - 1)
*sin(1/2/pi))*fresnel_sin((pi*b*x + 1)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*(pi*co
s(1/2/pi) - (2*pi^2 - 1)*sin(1/2/pi))*fresnel_sin((pi*b*x - 1)*sqrt(b^2)/(p
i*b)) - 2*(pi*b^2*x*cos(b*x) - 2*pi*b*sin(b*x))*sin(1/2*pi*b^2*x^2) - 2*(2*
pi^2*b^2*x*fresnel_cos(b*x) - b*cos(1/2*pi*b^2*x^2))*sin(b*x))/(pi^2*b^4)
```

Sympy [F]

$$\int x^2 \operatorname{CosIntegral}(bx)\sin(bx)\,dx = \int x^2\sin(bx)\operatorname{Ci}(bx)\,dx$$

```
[In] integrate(x**2*Ci(b*x)*sin(b*x),x)
```

```
[Out] Integral(x**2*sin(b*x)*Ci(b*x), x)
```

Maxima [F]

$$\int x^2 \operatorname{CosIntegral}(bx)\sin(bx)\,dx = \int x^2\,C(bx)\sin(bx)\,dx$$

```
[In] integrate(x^2*fresnel_cos(b*x)*sin(b*x),x, algorithm="maxima")
```

```
[Out] integrate(x^2*fresnel_cos(b*x)*sin(b*x), x)
```

Giac [F]

$$\int x^2 \text{CosIntegral}(bx)\sin(bx)\,dx = \int x^2\,\text{C}\,(bx)\sin\,(bx)\;dx$$

```
[In] integrate(x^2*fresnel_cos(b*x)*sin(b*x),x, algorithm="giac")
[Out] integrate(x^2*fresnel_cos(b*x)*sin(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \text{CosIntegral}(bx)\sin(bx)\,dx = \int x^2\,\text{cosint}(b\,x)\;\sin\,(b\,x)\;dx$$

```
[In] int(x^2*cosint(b*x)*sin(b*x),x)
[Out] int(x^2*cosint(b*x)*sin(b*x), x)
```

3.113 $\int x^3 \text{CosIntegral}(bx) \sin(bx) \, dx$

Optimal result

Integrand size = 12, antiderivative size = 147

$$\int x^3 \text{CosIntegral}(bx) \sin(bx) \, dx = -\frac{5x}{2b^3} + \frac{x^3}{6b} + \frac{x\cos^2(bx)}{2b^3} + \frac{6x\cos(bx)\text{CosIntegral}(bx)}{b^3} - \frac{x^3\cos(bx)\text{CosIntegral}(bx)}{b} - \frac{4\cos(bx)\sin(bx)}{b^4} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{6\,\text{CosIntegral}(bx)\sin(bx)}{b^4} + \frac{3x^2\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{3x\sin^2(bx)}{2b^3} + \frac{3\text{Si}(2bx)}{b^4}$$

```
[Out] -5/2*x/b^3+1/6*x^3/b+6*x*Ci(b*x)*cos(b*x)/b^3-x^3*Ci(b*x)*cos(b*x)/b+1/2*x*
cos(b*x)^2/b^3+3*Si(2*b*x)/b^4-6*Ci(b*x)*sin(b*x)/b^4+3*x^2*Ci(b*x)*sin(b*x
)/b^2-4*cos(b*x)*sin(b*x)/b^4+1/2*x^2*cos(b*x)*sin(b*x)/b^2-3/2*x*sin(b*x)^
2/b^3
```

Rubi [A] (verified)

Time = 0.13 (sec) , antiderivative size = 147, normalized size of antiderivative = 1.00, number of steps used = 20, number of rules used = 11, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.917, Rules used = {6655, 12, 3392, 30, 2715, 8, 6649, 3524, 6647, 4491, 3380}

$$\int x^3 \text{CosIntegral}(bx) \sin(bx) \, dx = -\frac{6\,\text{CosIntegral}(bx)\sin(bx)}{b^4} + \frac{3\text{Si}(2bx)}{b^4} - \frac{4\sin(bx)\cos(bx)}{b^4} + \frac{6x\,\text{CosIntegral}(bx)\cos(bx)}{b^3} - \frac{5x}{2b^3} - \frac{3x\sin^2(bx)}{2b^3} + \frac{x\cos^2(bx)}{2b^3} + \frac{3x^2\,\text{CosIntegral}(bx)\sin(bx)}{b^2} + \frac{x^2\sin(bx)\cos(bx)}{2b^2} - \frac{x^3\,\text{CosIntegral}(bx)\cos(bx)}{b} + \frac{x^3}{6b}$$

```
[In] Int[x^3*CosIntegral[b*x]*Sin[b*x],x]
```

```
[Out] (-5*x)/(2*b^3) + x^3/(6*b) + (x*Cos[b*x]^2)/(2*b^3) + (6*x*Cos[b*x]*CosInte
gral[b*x])/b^3 - (x^3*Cos[b*x]*CosIntegral[b*x])/b - (4*Cos[b*x]*Sin[b*x])/
b^4 + (x^2*Cos[b*x]*Sin[b*x])/(2*b^2) - (6*CosIntegral[b*x]*Sin[b*x])/b^4 +
 (3*x^2*CosIntegral[b*x]*Sin[b*x])/b^2 - (3*x*Sin[b*x]^2)/(2*b^3) + (3*SinI
ntegral[2*b*x])/b^4
```

Rule 8

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

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 30

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

Rule 2715

```
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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3392

```
Int[((c_.) + (d_.)*(x_))^(m_)*((b_.)*sin[(e_.) + (f_.)*(x_)])^(n_), x_Symbo
l] :> Simp[d*m*(c + d*x)^(m - 1)*((b*Sin[e + f*x])^n/(f^2*n^2)), x] + (Dist
[b^2*((n - 1)/n), Int[(c + d*x)^m*(b*Sin[e + f*x])^(n - 2), x], x] - Dist[d
^2*m*((m - 1)/(f^2*n^2)), Int[(c + d*x)^(m - 2)*(b*Sin[e + f*x])^n, x], x]
- Simp[b*(c + d*x)^m*Cos[e + f*x]*((b*Sin[e + f*x])^(n - 1)/(f*n)), x]) /;
FreeQ[{b, c, d, e, f}, x] && GtQ[n, 1] && GtQ[m, 1]
```

Rule 3524

```
Int[Cos[(a_.) + (b_.)*(x_)^(n_.)]*(x_)^(m_.)*Sin[(a_.) + (b_.)*(x_)^(n_.)]^
(p_.), x_Symbol] :> Simp[x^(m - n + 1)*(Sin[a + b*x^n]^(p + 1)/(b*n*(p + 1)
)), x] - Dist[(m - n + 1)/(b*n*(p + 1)), Int[x^(m - n)*Sin[a + b*x^n]^(p +
```

```
1), x], x] /; FreeQ[{a, b, p}, x] && LtQ[0, n, m + 1] && NeQ[p, -1]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6649

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

Rule 6655

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

Rubi steps

integral

$$= -\frac{x^3\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{3\int x^2\cos(bx)\,\text{CosIntegral}(bx)\,dx}{b} + \int \frac{x^2\cos^2(bx)}{b}\,dx$$

$$= -\frac{x^3\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{3x^2\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{6\int x\,\text{CosIntegral}(bx)\sin(bx)\,dx}{b^2} + \frac{\int x^2\cos^2(bx)\,dx}{b} - \frac{3\int \frac{x\cos(bx)\sin(bx)}{b}\,dx}{b}$$

$$= \frac{x\cos^2(bx)}{2b^3} + \frac{6x\cos(bx)\,\text{CosIntegral}(bx)}{b^3} - \frac{x^3\cos(bx)\,\text{CosIntegral}(bx)}{b} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} + \frac{3x^2\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{\int\cos^2(bx)\,dx}{2b^3} - \frac{6\int\cos(bx)\,\text{CosIntegral}(bx)\,dx}{b^3} - \frac{3\int x\cos(bx)\sin(bx)\,dx}{b^2} - \frac{6\int\frac{\cos^2(bx)}{b}\,dx}{b^2} + \frac{\int x^2\,dx}{2b}$$

$$= \frac{x^3}{6b} + \frac{x\cos^2(bx)}{2b^3} + \frac{6x\cos(bx)\,\text{CosIntegral}(bx)}{b^3} - \frac{x^3\cos(bx)\,\text{CosIntegral}(bx)}{b} - \frac{\cos(bx)\sin(bx)}{4b^4} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{6\,\text{CosIntegral}(bx)\sin(bx)}{b^4} + \frac{3x^2\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{3x\sin^2(bx)}{2b^3} - \frac{\int 1\,dx}{4b^3} + \frac{3\int \sin^2(bx)\,dx}{2b^3} - \frac{6\int \cos^2(bx)\,dx}{b^3} + \frac{6\int \frac{\cos(bx)\sin(bx)}{bx}\,dx}{b^3}$$

$$= -\frac{x}{4b^3} + \frac{x^3}{6b} + \frac{x\cos^2(bx)}{2b^3} + \frac{6x\cos(bx)\,\text{CosIntegral}(bx)}{b^3} - \frac{x^3\cos(bx)\,\text{CosIntegral}(bx)}{b} - \frac{4\cos(bx)\sin(bx)}{b^4} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{6\,\text{CosIntegral}(bx)\sin(bx)}{b^4} + \frac{3x^2\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{3x\sin^2(bx)}{2b^3} + \frac{6\int \frac{\cos(bx)\sin(bx)}{x}\,dx}{b^4} + \frac{3\int 1\,dx}{4b^3} - \frac{3\int 1\,dx}{b^3}$$

$$= -\frac{5x}{2b^3} + \frac{x^3}{6b} + \frac{x\cos^2(bx)}{2b^3} + \frac{6x\cos(bx)\,\text{CosIntegral}(bx)}{b^3} - \frac{x^3\cos(bx)\,\text{CosIntegral}(bx)}{b} - \frac{4\cos(bx)\sin(bx)}{b^4} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{6\,\text{CosIntegral}(bx)\sin(bx)}{b^4} + \frac{3x^2\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{3x\sin^2(bx)}{2b^3} + \frac{6\int \frac{\sin(2bx)}{2x}\,dx}{b^4}$$

$$= -\frac{5x}{2b^3} + \frac{x^3}{6b} + \frac{x\cos^2(bx)}{2b^3} + \frac{6x\cos(bx)\,\text{CosIntegral}(bx)}{b^3} - \frac{x^3\cos(bx)\,\text{CosIntegral}(bx)}{b} - \frac{4\cos(bx)\sin(bx)}{b^4} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{6\,\text{CosIntegral}(bx)\sin(bx)}{b^4} + \frac{3x^2\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{3x\sin^2(bx)}{2b^3} + \frac{3\int \frac{\sin(2bx)}{x}\,dx}{b^4}$$

$$= -\frac{5x}{2b^3} + \frac{x^3}{6b} + \frac{x\cos^2(bx)}{2b^3} + \frac{6x\cos(bx)\,\text{CosIntegral}(bx)}{b^3} - \frac{x^3\cos(bx)\,\text{CosIntegral}(bx)}{b} - \frac{4\cos(bx)\sin(bx)}{b^4} + \frac{x^2\cos(bx)\sin(bx)}{2b^2} - \frac{6\,\text{CosIntegral}(bx)\sin(bx)}{b^4} + \frac{3x^2\,\text{CosIntegral}(bx)\sin(bx)}{b^2} - \frac{3x\sin^2(bx)}{2b^3} + \frac{3\text{Si}(2bx)}{b^4}$$

Mathematica [A] (verified)

Time = 0.07 (sec) , antiderivative size = 94, normalized size of antiderivative = 0.64

$$\int x^3\,\text{CosIntegral}(bx)\sin(bx)\,dx = \frac{-36bx + 2b^3x^3 + 12bx\cos(2bx) - 12\,\text{CosIntegral}(bx)\left(bx(-6+b^2x^2)\cos(bx) - 3(-2+b^2x^2)\sin(bx)\right) - 24}{12b^4}$$

```
[In] Integrate[x^3*CosIntegral[b*x]*Sin[b*x],x]
```

```
[Out] (-36*b*x + 2*b^3*x^3 + 12*b*x*Cos[2*b*x] - 12*CosIntegral[b*x]*(b*x*(-6 + b
^2*x^2)*Cos[b*x] - 3*(-2 + b^2*x^2)*Sin[b*x]) - 24*Sin[2*b*x] + 3*b^2*x^2*S
in[2*b*x] + 36*SinIntegral[2*b*x])/(12*b^4)
```

Maple [A] (verified)

Time = 1.46 (sec) , antiderivative size = 111, normalized size of antiderivative = 0.76

method	result
derivativedivides	$\frac{\mathrm{Ci}(bx)\left(-b^3x^3\cos(bx)+3b^2x^2\sin(bx)-6\sin(bx)+6bx\cos(bx)\right)+b^2x^2\left(\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)+2bx\cos(bx)^2-4\sin(bx)\cos(b}{b^4}$
default	$\frac{\mathrm{Ci}(bx)\left(-b^3x^3\cos(bx)+3b^2x^2\sin(bx)-6\sin(bx)+6bx\cos(bx)\right)+b^2x^2\left(\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)+2bx\cos(bx)^2-4\sin(bx)\cos(b}{b^4}$

```
[In] int(x^3*Ci(b*x)*sin(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^4*(Ci(b*x)*(-b^3*x^3*cos(b*x)+3*b^2*x^2*sin(b*x)-6*sin(b*x)+6*b*x*cos(b
*x))+b^2*x^2*(1/2*sin(b*x)*cos(b*x)+1/2*b*x)+2*b*x*cos(b*x)^2-4*sin(b*x)*co
s(b*x)-4*b*x-1/3*b^3*x^3+3*Si(2*b*x))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 361 vs. 2(137) = 274.

Time = 0.30 (sec) , antiderivative size = 361, normalized size of antiderivative = 2.46

$$\int x^3\,\mathrm{CosIntegral}(bx)\sin(bx)\,dx =$$

$$-\frac{2\,\pi b\cos\left(\frac{1}{2}\,\pi b^2x^2\right)\cos\left(bx\right)+2\left(\pi^3b^4x^3-6\,\pi^3b^2x\right)\cos\left(bx\right)\mathrm{C}\left(bx\right)+\left(6\,\pi^3\sin\left(\frac{1}{2\,\pi}\right)-\left(3\,\pi^2-1\right)\cos\left(\frac{1}{2\,\pi}\right)\right.}{}$$

```
[In] integrate(x^3*fresnel_cos(b*x)*sin(b*x),x, algorithm="fricas")
```

```
[Out] -1/2*(2*pi*b*cos(1/2*pi*b^2*x^2)*cos(b*x) + 2*(pi^3*b^4*x^3 - 6*pi^3*b^2*x)
*cos(b*x)*fresnel_cos(b*x) + (6*pi^3*sin(1/2/pi) - (3*pi^2 - 1)*cos(1/2/pi)
)*sqrt(b^2)*fresnel_cos((pi*b*x + 1)*sqrt(b^2)/(pi*b)) - (6*pi^3*sin(1/2/pi
) - (3*pi^2 - 1)*cos(1/2/pi))*sqrt(b^2)*fresnel_cos((pi*b*x - 1)*sqrt(b^2)/
(pi*b)) - (6*pi^3*cos(1/2/pi) + (3*pi^2 - 1)*sin(1/2/pi))*sqrt(b^2)*fresnel
_sin((pi*b*x + 1)*sqrt(b^2)/(pi*b)) + (6*pi^3*cos(1/2/pi) + (3*pi^2 - 1)*si
n(1/2/pi))*sqrt(b^2)*fresnel_sin((pi*b*x - 1)*sqrt(b^2)/(pi*b)) + 2*(3*pi^2
*b^2*x*sin(b*x) - (pi^2*b^3*x^2 - 6*pi^2*b + b)*cos(b*x))*sin(1/2*pi*b^2*x^
2) + 2*(pi*b^2*x*cos(1/2*pi*b^2*x^2) - 3*(pi^3*b^3*x^2 - 2*pi^3*b)*fresnel_
cos(b*x))*sin(b*x))/(pi^3*b^5)
```

Sympy [F]

$$\int x^3 \operatorname{CosIntegral}(bx)\sin(bx)\,dx = \int x^3 \sin(bx)\operatorname{Ci}(bx)\,dx$$

```
[In] integrate(x**3*Ci(b*x)*sin(b*x),x)
[Out] Integral(x**3*sin(b*x)*Ci(b*x), x)
```

Maxima [F]

$$\int x^3 \operatorname{CosIntegral}(bx)\sin(bx)\,dx = \int x^3 C(bx)\sin(bx)\,dx$$

```
[In] integrate(x^3*fresnel_cos(b*x)*sin(b*x),x, algorithm="maxima")
[Out] integrate(x^3*fresnel_cos(b*x)*sin(b*x), x)
```

Giac [F]

$$\int x^3 \operatorname{CosIntegral}(bx)\sin(bx)\,dx = \int x^3 C(bx)\sin(bx)\,dx$$

```
[In] integrate(x^3*fresnel_cos(b*x)*sin(b*x),x, algorithm="giac")
[Out] integrate(x^3*fresnel_cos(b*x)*sin(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int x^3 \operatorname{CosIntegral}(bx)\sin(bx)\,dx = \int x^3 \operatorname{cosint}(b\,x)\,\sin(b\,x)\,dx$$

```
[In] int(x^3*cosint(b*x)*sin(b*x),x)
[Out] int(x^3*cosint(b*x)*sin(b*x), x)
```

3.114 $\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^3}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 97

$$\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^3}\,dx = -\frac{\cos^2(bx)}{4x^2} - \frac{\cos(bx)\,\text{CosIntegral}(bx)}{2x^2} - \frac{1}{4}b^2\,\text{CosIntegral}(bx)^2 - b^2\,\text{CosIntegral}(2bx) + \frac{b\cos(bx)\sin(bx)}{2x} + \frac{b\,\text{CosIntegral}(bx)\sin(bx)}{2x} + \frac{b\sin(2bx)}{4x}$$

```
[Out] -1/4*b^2*Ci(b*x)^2-b^2*Ci(2*b*x)-1/2*Ci(b*x)*cos(b*x)/x^2-1/4*cos(b*x)^2/x^
2+1/2*b*Ci(b*x)*sin(b*x)/x+1/2*b*cos(b*x)*sin(b*x)/x+1/4*b*sin(2*b*x)/x
```

Rubi [A] (verified)

Time = 0.14 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.833, Rules used = {6651, 6657, 6818, 12, 4491, 3378, 3383, 3395, 29, 3393}

$$\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^3}\,dx = -\frac{1}{4}b^2\,\text{CosIntegral}(bx)^2 - b^2\,\text{CosIntegral}(2bx) - \frac{\text{CosIntegral}(bx)\cos(bx)}{2x^2} + \frac{b\,\text{CosIntegral}(bx)\sin(bx)}{2x} - \frac{\cos^2(bx)}{4x^2} + \frac{b\sin(2bx)}{4x} + \frac{b\sin(bx)\cos(bx)}{2x}$$

```
[In] Int[(Cos[b*x]*CosIntegral[b*x])/x^3,x]
```

```
[Out] -1/4*Cos[b*x]^2/x^2 - (Cos[b*x]*CosIntegral[b*x])/(2*x^2) - (b^2*CosIntegra
l[b*x]^2)/4 - b^2*CosIntegral[2*b*x] + (b*Cos[b*x]*Sin[b*x])/(2*x) + (b*Cos
Integral[b*x]*Sin[b*x])/(2*x) + (b*Sin[2*b*x])/(4*x)
```

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]
```

Rule 3378

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(c
 + d*x)^(m + 1)*(Sin[e + f*x]/(d*(m + 1))), x] - Dist[f/(d*(m + 1)), Int[(c
 + d*x)^(m + 1)*Cos[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && LtQ[m, -1
]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 3395

```
Int[((c_.) + (d_.)*(x_))^(m_)*((b_.)*sin[(e_.) + (f_.)*(x_)])^(n_), x_Symbo
l] :> Simp[(c + d*x)^(m + 1)*((b*Sin[e + f*x])^n/(d*(m + 1))), x] + (Dist[b
^2*f^2*n*((n - 1)/(d^2*(m + 1)*(m + 2))), Int[(c + d*x)^(m + 2)*(b*Sin[e +
f*x])^(n - 2), x], x] - Dist[f^2*(n^2/(d^2*(m + 1)*(m + 2))), Int[(c + d*x)
^(m + 2)*(b*Sin[e + f*x])^n, x], x] - Simp[b*f*n*(c + d*x)^(m + 2)*Cos[e +
f*x]*((b*Sin[e + f*x])^(n - 1)/(d^2*(m + 1)*(m + 2))), x]) /; FreeQ[{b, c,
d, e, f}, x] && GtQ[n, 1] && LtQ[m, -2]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6651

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)]*((e_.) + (f_.)*
(x_))^(m_.), x_Symbol] :> Simp[(e + f*x)^(m + 1)*Cos[a + b*x]*(CosIntegral[
c + d*x]/(f*(m + 1))), x] + (Dist[b/(f*(m + 1)), Int[(e + f*x)^(m + 1)*Sin[
a + b*x]*CosIntegral[c + d*x], x], x] - Dist[d/(f*(m + 1)), Int[(e + f*x)^(
m + 1)*Cos[a + b*x]*(Cos[c + d*x]/(c + d*x)), x], x]) /; FreeQ[{a, b, c, d,
 e, f}, x] && ILtQ[m, -1]
```

Rule 6657

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*((e_.) + (f_.)*(x_))^(m_)*Sin[(a_.) + (
b_.)*(x_)], x_Symbol] :> Simp[(e + f*x)^(m + 1)*Sin[a + b*x]*(CosIntegral[c
 + d*x]/(f*(m + 1))), x] + (-Dist[b/(f*(m + 1)), Int[(e + f*x)^(m + 1)*Cos[
a + b*x]*CosIntegral[c + d*x], x], x] - Dist[d/(f*(m + 1)), Int[(e + f*x)^(
m + 1)*Sin[a + b*x]*(Cos[c + d*x]/(c + d*x)), x], x]) /; FreeQ[{a, b, c, d,
 e, f}, x] && ILtQ[m, -1]
```

Rule 6818

```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{\cos(bx)\,\text{CosIntegral}(bx)}{2x^2}+\frac{1}{2}b\int\frac{\cos^2(bx)}{bx^3}\,dx-\frac{1}{2}b\int\frac{\text{CosIntegral}(bx)\sin(bx)}{x^2}\,dx\\
&= -\frac{\cos(bx)\,\text{CosIntegral}(bx)}{2x^2}+\frac{b\,\text{CosIntegral}(bx)\sin(bx)}{2x}+\frac{1}{2}\int\frac{\cos^2(bx)}{x^3}\,dx\\
&\quad -\frac{1}{2}b^2\int\frac{\cos(bx)\,\text{CosIntegral}(bx)}{x}\,dx-\frac{1}{2}b^2\int\frac{\cos(bx)\sin(bx)}{bx^2}\,dx\\
&= -\frac{\cos^2(bx)}{4x^2}-\frac{\cos(bx)\,\text{CosIntegral}(bx)}{2x^2}-\frac{1}{4}b^2\,\text{CosIntegral}(bx)^2+\frac{b\cos(bx)\sin(bx)}{2x}\\
&\quad +\frac{b\,\text{CosIntegral}(bx)\sin(bx)}{2x}-\frac{1}{2}b\int\frac{\cos(bx)\sin(bx)}{x^2}\,dx+\frac{1}{2}b^2\int\frac{1}{x}\,dx-b^2\int\frac{\cos^2(bx)}{x}\,dx\\
&= -\frac{\cos^2(bx)}{4x^2}-\frac{\cos(bx)\,\text{CosIntegral}(bx)}{2x^2}-\frac{1}{4}b^2\,\text{CosIntegral}(bx)^2+\frac{1}{2}b^2\log(x)\\
&\quad +\frac{b\cos(bx)\sin(bx)}{2x}+\frac{b\,\text{CosIntegral}(bx)\sin(bx)}{2x}-\frac{1}{2}b\int\frac{\sin(2bx)}{2x^2}\,dx-b^2\int\left(\frac{1}{2x}\right.\\
&\quad \left.+\frac{\cos(2bx)}{2x}\right)dx\\
&= -\frac{\cos^2(bx)}{4x^2}-\frac{\cos(bx)\,\text{CosIntegral}(bx)}{2x^2}-\frac{1}{4}b^2\,\text{CosIntegral}(bx)^2+\frac{b\cos(bx)\sin(bx)}{2x}\\
&\quad +\frac{b\,\text{CosIntegral}(bx)\sin(bx)}{2x}-\frac{1}{4}b\int\frac{\sin(2bx)}{x^2}\,dx-\frac{1}{2}b^2\int\frac{\cos(2bx)}{x}\,dx
\end{aligned}$$

$$= -\frac{\cos^2(bx)}{4x^2} - \frac{\cos(bx)\,\text{CosIntegral}(bx)}{2x^2} - \frac{1}{4}b^2\,\text{CosIntegral}(bx)^2 - \frac{1}{2}b^2\,\text{CosIntegral}(2bx) + \frac{b\cos(bx)\sin(bx)}{2x} + \frac{b\,\text{CosIntegral}(bx)\sin(bx)}{2x} + \frac{b\sin(2bx)}{4x} - \frac{1}{2}b^2\int\frac{\cos(2bx)}{x}\,dx$$

$$= -\frac{\cos^2(bx)}{4x^2} - \frac{\cos(bx)\,\text{CosIntegral}(bx)}{2x^2} - \frac{1}{4}b^2\,\text{CosIntegral}(bx)^2 - b^2\,\text{CosIntegral}(2bx) + \frac{b\cos(bx)\sin(bx)}{2x} + \frac{b\,\text{CosIntegral}(bx)\sin(bx)}{2x} + \frac{b\sin(2bx)}{4x}$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 97, normalized size of antiderivative = 1.00

$$\int\frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^3}\,dx = -\frac{\cos^2(bx)}{4x^2} - \frac{\cos(bx)\,\text{CosIntegral}(bx)}{2x^2} - \frac{1}{4}b^2\,\text{CosIntegral}(bx)^2 - b^2\,\text{CosIntegral}(2bx) + \frac{b\cos(bx)\sin(bx)}{2x} + \frac{b\,\text{CosIntegral}(bx)\sin(bx)}{2x} + \frac{b\sin(2bx)}{4x}$$

```
[In] Integrate[(Cos[b*x]*CosIntegral[b*x])/x^3,x]
```

```
[Out] -1/4*Cos[b*x]^2/x^2 - (Cos[b*x]*CosIntegral[b*x])/(2*x^2) - (b^2*CosIntegra
l[b*x]^2)/4 - b^2*CosIntegral[2*b*x] + (b*Cos[b*x]*Sin[b*x])/(2*x) + (b*Cos
Integral[b*x]*Sin[b*x])/(2*x) + (b*Sin[2*b*x])/(4*x)
```

Maple [F]

$$\int\frac{\text{Ci}\,(bx)\cos\,(bx)}{x^3}dx$$

```
[In] int(Ci(b*x)*cos(b*x)/x^3,x)
```

```
[Out] int(Ci(b*x)*cos(b*x)/x^3,x)
```

Fricas [F]

$$\int\frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^3}\,dx = \int\frac{\cos\,(bx)\,\text{C}\,(bx)}{x^3}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*cos(b*x)/x^3,x, algorithm="fricas")
```

```
[Out] integral(cos(b*x)*fresnel_cos(b*x)/x^3, x)
```

Sympy [F]

$$\int \frac{\cos(bx)\,\mathrm{CosIntegral}(bx)}{x^3}\,dx = \int \frac{\cos{(bx)}\,\mathrm{Ci}\,(bx)}{x^3}\,dx$$

```
[In] integrate(Ci(b*x)*cos(b*x)/x**3,x)
[Out] Integral(cos(b*x)*Ci(b*x)/x**3, x)
```

Maxima [F]

$$\int \frac{\cos(bx)\,\mathrm{CosIntegral}(bx)}{x^3}\,dx = \int \frac{\cos{(bx)}\,C\,(bx)}{x^3}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*cos(b*x)/x^3,x, algorithm="maxima")
[Out] integrate(cos(b*x)*fresnel_cos(b*x)/x^3, x)
```

Giac [F]

$$\int \frac{\cos(bx)\,\mathrm{CosIntegral}(bx)}{x^3}\,dx = \int \frac{\cos{(bx)}\,C\,(bx)}{x^3}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*cos(b*x)/x^3,x, algorithm="giac")
[Out] integrate(cos(b*x)*fresnel_cos(b*x)/x^3, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\cos(bx)\,\mathrm{CosIntegral}(bx)}{x^3}\,dx = \int \frac{\mathrm{cosint}(b\,x)\,\cos{(b\,x)}}{x^3}\,dx$$

```
[In] int((cosint(b*x)*cos(b*x))/x^3,x)
[Out] int((cosint(b*x)*cos(b*x))/x^3, x)
```

3.115 $\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^2}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 12

$$\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^2}\,dx = -\frac{\cos^2(bx)}{x} - \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x} - b\text{Si}(2bx) - b\text{Int}\left(\frac{\text{CosIntegral}(bx)\sin(bx)}{x},x\right)$$

```
[Out] -b*CannotIntegrate(Ci(b*x)*sin(b*x)/x,x)-Ci(b*x)*cos(b*x)/x-cos(b*x)^2/x-b*
Si(2*b*x)
```

Rubi [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^2}\,dx = \int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^2}\,dx$$

```
[In] Int[(Cos[b*x]*CosIntegral[b*x])/x^2,x]
```

```
[Out] -(Cos[b*x]^2/x) - (Cos[b*x]*CosIntegral[b*x])/x - b*SinIntegral[2*b*x] - b*
Defer[Int][(CosIntegral[b*x]*Sin[b*x])/x, x]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= -\frac{\cos(bx)\,\text{CosIntegral}(bx)}{x} + b\int \frac{\cos^2(bx)}{bx^2}\,dx - b\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx \\
&= -\frac{\cos(bx)\,\text{CosIntegral}(bx)}{x} - b\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx + \int \frac{\cos^2(bx)}{x^2}\,dx \\
&= -\frac{\cos^2(bx)}{x} - \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x} \\
&\quad - b\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx + (2b)\int -\frac{\sin(2bx)}{2x}\,dx \\
&= -\frac{\cos^2(bx)}{x} - \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x} - b\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx - b\int \frac{\sin(2bx)}{x}\,dx \\
&= -\frac{\cos^2(bx)}{x} - \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x} - b\text{Si}(2bx) - b\int \frac{\text{CosIntegral}(bx)\sin(bx)}{x}\,dx
\end{aligned}
$$

Mathematica [A] (warning: unable to verify)

Time = 0.03 (sec) , antiderivative size = 13, normalized size of antiderivative = 1.08

$$
\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^2}\,dx = -\frac{\cos(bx)\,\text{CosIntegral}(bx)}{x}
$$

```
[In] Integrate[(Cos[b*x]*CosIntegral[b*x])/x^2,x]
[Out] -((Cos[b*x]*CosIntegral[b*x])/x)
```

Maple [N/A] (verified)

Not integrable

Time = 0.22 (sec) , antiderivative size = 12, normalized size of antiderivative = 1.00

$$
\int \frac{\text{Ci}\left(bx\right)\cos\left(bx\right)}{x^2}dx
$$

```
[In] int(Ci(b*x)*cos(b*x)/x^2,x)
[Out] int(Ci(b*x)*cos(b*x)/x^2,x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\,\mathrm{CosIntegral}(bx)}{x^2}\,dx = \int \frac{\cos(bx)\,\mathrm{C}(bx)}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*cos(b*x)/x^2,x, algorithm="fricas")
[Out] integral(cos(b*x)*fresnel_cos(b*x)/x^2, x)
```

Sympy [N/A]

Not integrable

Time = 1.97 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\,\mathrm{CosIntegral}(bx)}{x^2}\,dx = \int \frac{\cos(bx)\,\mathrm{Ci}(bx)}{x^2}\,dx$$

```
[In] integrate(Ci(b*x)*cos(b*x)/x**2,x)
[Out] Integral(cos(b*x)*Ci(b*x)/x**2, x)
```

Maxima [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\,\mathrm{CosIntegral}(bx)}{x^2}\,dx = \int \frac{\cos(bx)\,\mathrm{C}(bx)}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*cos(b*x)/x^2,x, algorithm="maxima")
[Out] integrate(cos(b*x)*fresnel_cos(b*x)/x^2, x)
```

Giac [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^2}\,dx = \int \frac{\cos(bx)\,\mathrm{C}(bx)}{x^2}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*cos(b*x)/x^2,x, algorithm="giac")
[Out] integrate(cos(b*x)*fresnel_cos(b*x)/x^2, x)
```

Mupad [N/A]

Not integrable

Time = 5.38 (sec) , antiderivative size = 14, normalized size of antiderivative = 1.17

$$\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x^2}\,dx = \int \frac{\mathrm{cosint}(b\,x)\,\cos(b\,x)}{x^2}\,dx$$

```
[In] int((cosint(b*x)*cos(b*x))/x^2,x)
[Out] int((cosint(b*x)*cos(b*x))/x^2, x)
```

3.116 $\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x}\,dx$

Optimal result

Integrand size = 12, antiderivative size = 10

$$\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x}\,dx = \frac{\text{CosIntegral}(bx)^2}{2}$$

[Out] 1/2*Ci(b*x)^2

Rubi [A] (verified)

Time = 0.02 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, $\frac{\text{number of rules}}{\text{integrand size}} = 0.083$, Rules used = {6818}

$$\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x}\,dx = \frac{\text{CosIntegral}(bx)^2}{2}$$

[In] Int[(Cos[b*x]*CosIntegral[b*x])/x,x]

[Out] CosIntegral[b*x]^2/2

Rule 6818

```
Int[(u_)*(y_)^(m_.), x_Symbol] :> With[{q = DerivativeDivides[y, u, x]}, Si
mp[q*(y^(m + 1)/(m + 1)), x] /;  !FalseQ[q]] /; FreeQ[m, x] && NeQ[m, -1]
```

Rubi steps

$$\text{integral} = \frac{\text{CosIntegral}(bx)^2}{2}$$

Mathematica [A] (verified)

Time = 0.00 (sec) , antiderivative size = 10, normalized size of antiderivative = 1.00

$$\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x}\,dx = \frac{\text{CosIntegral}(bx)^2}{2}$$

```
[In] Integrate[(Cos[b*x]*CosIntegral[b*x])/x,x]
[Out] CosIntegral[b*x]^2/2
```

Maple [A] (verified)

Time = 0.28 (sec) , antiderivative size = 9, normalized size of antiderivative = 0.90

method	result	size
derivativedivides	$\frac{\text{Ci}(bx)^2}{2}$	9
default	$\frac{\text{Ci}(bx)^2}{2}$	9

```
[In] int(Ci(b*x)*cos(b*x)/x,x,method=_RETURNVERBOSE)
[Out] 1/2*Ci(b*x)^2
```

Fricas [F]

$$\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x}\,dx = \int \frac{\cos(bx)\,\text{C}(bx)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*cos(b*x)/x,x, algorithm="fricas")
[Out] integral(cos(b*x)*fresnel_cos(b*x)/x, x)
```

Sympy [A] (verification not implemented)

Time = 0.22 (sec) , antiderivative size = 7, normalized size of antiderivative = 0.70

$$\int \frac{\cos(bx)\,\text{CosIntegral}(bx)}{x}\,dx = \frac{\text{Ci}^2(bx)}{2}$$

```
[In] integrate(Ci(b*x)*cos(b*x)/x,x)
[Out] Ci(b*x)**2/2
```

Maxima [F]

$$\int \frac{\cos(bx)\,\mathrm{CosIntegral}(bx)}{x}\,dx = \int \frac{\cos(bx)\,\mathrm{C}(bx)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*cos(b*x)/x,x, algorithm="maxima")
[Out] integrate(cos(b*x)*fresnel_cos(b*x)/x, x)
```

Giac [F]

$$\int \frac{\cos(bx)\,\mathrm{CosIntegral}(bx)}{x}\,dx = \int \frac{\cos(bx)\,\mathrm{C}(bx)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x)*cos(b*x)/x,x, algorithm="giac")
[Out] integrate(cos(b*x)*fresnel_cos(b*x)/x, x)
```

Mupad [F(-1)]

Timed out.

$$\int \frac{\cos(bx)\,\mathrm{CosIntegral}(bx)}{x}\,dx = \frac{\mathrm{cosint}(b\,x)^2}{2}$$

```
[In] int((cosint(b*x)*cos(b*x))/x,x)
[Out] cosint(b*x)^2/2
```

3.117 $\int \cos(bx)\,\text{CosIntegral}(bx)\,dx$

Optimal result

Integrand size = 9, antiderivative size = 25

$$\int \cos(bx)\,\text{CosIntegral}(bx)\,dx=\frac{\text{CosIntegral}(bx)\sin(bx)}{b}-\frac{\text{Si}(2bx)}{2b}$$

```
[Out] -1/2*Si(2*b*x)/b+Ci(b*x)*sin(b*x)/b
```

Rubi [A] (verified)

Time = 0.03 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.444, Rules used = {6647, 12, 4491, 3380}

$$\int \cos(bx)\,\text{CosIntegral}(bx)\,dx=\frac{\text{CosIntegral}(bx)\sin(bx)}{b}-\frac{\text{Si}(2bx)}{2b}$$

```
[In] Int[Cos[b*x]*CosIntegral[b*x],x]
```

```
[Out] (CosIntegral[b*x]*Sin[b*x])/b - SinIntegral[2*b*x]/(2*b)
```

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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= \frac{\text{CosIntegral}(bx)\sin(bx)}{b} - \int \frac{\cos(bx)\sin(bx)}{bx}\,dx \\
&= \frac{\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{\int \frac{\cos(bx)\sin(bx)}{x}\,dx}{b} \\
&= \frac{\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{\int \frac{\sin(2bx)}{2x}\,dx}{b} \\
&= \frac{\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{\int \frac{\sin(2bx)}{x}\,dx}{2b} \\
&= \frac{\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{\text{Si}(2bx)}{2b}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.01 (sec) , antiderivative size = 25, normalized size of antiderivative = 1.00

$$\int \cos(bx)\,\text{CosIntegral}(bx)\,dx = \frac{\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{\text{Si}(2bx)}{2b}$$

```
[In] Integrate[Cos[b*x]*CosIntegral[b*x],x]
[Out] (CosIntegral[b*x]*Sin[b*x])/b - SinIntegral[2*b*x]/(2*b)
```

Maple [A] (verified)

Time = 0.41 (sec) , antiderivative size = 22, normalized size of antiderivative = 0.88

method	result	size
derivativedivides	$\frac{\mathrm{Ci}(bx)\sin(bx)-\frac{\mathrm{Si}(2bx)}{2}}{b}$	22
default	$\frac{\mathrm{Ci}(bx)\sin(bx)-\frac{\mathrm{Si}(2bx)}{2}}{b}$	22

```
[In] int(Ci(b*x)*cos(b*x),x,method=_RETURNVERBOSE)
[Out] 1/b*(Ci(b*x)*sin(b*x)-1/2*Si(2*b*x))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 143 vs. 2(23) = 46.

Time = 0.28 (sec) , antiderivative size = 143, normalized size of antiderivative = 5.72

$$\int \cos(bx)\,\mathrm{CosIntegral}(bx)\,dx = \frac{2\,b\,\mathrm{C}\left(bx\right)\sin\left(bx\right)-\sqrt{b^2}\cos\left(\frac{1}{2\,\pi}\right)\mathrm{S}\left(\frac{(\pi bx+1)\sqrt{b^2}}{\pi b}\right)+\sqrt{b^2}\cos\left(\frac{1}{2\,\pi}\right)\mathrm{S}\left(\frac{(\pi bx-1)\sqrt{b^2}}{\pi b}\right)+\sqrt{b^2}\,\mathrm{C}\left(\frac{(\pi bx+1)\sqrt{b^2}}{\pi b}\right)\sin\left(\right.}{2\,b^2}$$

```
[In] integrate(fresnel_cos(b*x)*cos(b*x),x, algorithm="fricas")
[Out] 1/2*(2*b*fresnel_cos(b*x)*sin(b*x) - sqrt(b^2)*cos(1/2/pi)*fresnel_sin((pi*
b*x + 1)*sqrt(b^2)/(pi*b)) + sqrt(b^2)*cos(1/2/pi)*fresnel_sin((pi*b*x - 1)
*sqrt(b^2)/(pi*b)) + sqrt(b^2)*fresnel_cos((pi*b*x + 1)*sqrt(b^2)/(pi*b))*s
in(1/2/pi) - sqrt(b^2)*fresnel_cos((pi*b*x - 1)*sqrt(b^2)/(pi*b))*sin(1/2/p
i))/b^2
```

Sympy [F]

$$\int \cos(bx)\,\mathrm{CosIntegral}(bx)\,dx = \int \cos\left(bx\right)\mathrm{Ci}\left(bx\right)dx$$

```
[In] integrate(Ci(b*x)*cos(b*x),x)
[Out] Integral(cos(b*x)*Ci(b*x), x)
```

Maxima [F]

$$\int \cos(bx)\,\text{CosIntegral}(bx)\,dx = \int \cos\left(bx\right)\text{C}\left(bx\right)\,dx$$

```
[In] integrate(fresnel_cos(b*x)*cos(b*x),x, algorithm="maxima")
[Out] integrate(cos(b*x)*fresnel_cos(b*x), x)
```

Giac [F]

$$\int \cos(bx)\,\text{CosIntegral}(bx)\,dx = \int \cos\left(bx\right)\text{C}\left(bx\right)\,dx$$

```
[In] integrate(fresnel_cos(b*x)*cos(b*x),x, algorithm="giac")
[Out] integrate(cos(b*x)*fresnel_cos(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \cos(bx)\,\text{CosIntegral}(bx)\,dx = \int \text{cosint}(b\,x)\,\cos\left(b\,x\right)\,dx$$

```
[In] int(cosint(b*x)*cos(b*x),x)
[Out] int(cosint(b*x)*cos(b*x), x)
```

3.118 $\int x\cos(bx)\,\mathrm{CosIntegral}(bx)\,dx$

Optimal result

Integrand size = 10, antiderivative size = 60

$$\int x\cos(bx)\,\mathrm{CosIntegral}(bx)\,dx=\frac{\cos(bx)\,\mathrm{CosIntegral}(bx)}{b^2}-\frac{\mathrm{CosIntegral}(2bx)}{2b^2}-\frac{\log(x)}{2b^2}+\frac{x\,\mathrm{CosIntegral}(bx)\sin(bx)}{b}-\frac{\sin^2(bx)}{2b^2}$$

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

Rubi [A] (verified)

Time = 0.06 (sec) , antiderivative size = 60, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.700, Rules used = {6649, 12, 2644, 30, 6653, 3393, 3383}

$$\int x\cos(bx)\,\mathrm{CosIntegral}(bx)\,dx=-\frac{\mathrm{CosIntegral}(2bx)}{2b^2}+\frac{\mathrm{CosIntegral}(bx)\cos(bx)}{b^2}-\frac{\log(x)}{2b^2}-\frac{\sin^2(bx)}{2b^2}+\frac{x\,\mathrm{CosIntegral}(bx)\sin(bx)}{b}$$

```
[In] Int[x*Cos[b*x]*CosIntegral[b*x],x]
```

```
[Out] (Cos[b*x]*CosIntegral[b*x])/b^2 - CosIntegral[2*b*x]/(2*b^2) - Log[x]/(2*b^
2) + (x*CosIntegral[b*x]*Sin[b*x])/b - Sin[b*x]^2/(2*b^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 30

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

Rule 2644

```
Int[cos[(e_.) + (f_.)*(x_)]^(n_.)*((a_.)*sin[(e_.) + (f_.)*(x_)])^(m_.), x_
Symbol] :> Dist[1/(a*f), Subst[Int[x^m*(1 - x^2/a^2)^((n - 1)/2), x], x, a*
Sin[e + f*x]], x] /; FreeQ[{a, e, f, m}, x] && IntegerQ[(n - 1)/2] &&  !(In
tegerQ[(m - 1)/2] && LtQ[0, m, n])
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 6649

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

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{x\,\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{\int \text{CosIntegral}(bx)\sin(bx)\,dx}{b} - \int \frac{\cos(bx)\sin(bx)}{b}\,dx \\
&= \frac{\cos(bx)\,\text{CosIntegral}(bx)}{b^2} + \frac{x\,\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{\int \frac{\cos^2(bx)}{bx}\,dx}{b} - \frac{\int \cos(bx)\sin(bx)\,dx}{b}
\end{aligned}$$

$$= \frac{\cos(bx)\,\text{CosIntegral}(bx)}{b^2} + \frac{x\,\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{\int \frac{\cos^2(bx)}{x}\,dx}{b^2} - \frac{\text{Subst}(\int x\,dx, x, \sin(bx))}{b^2}$$

$$= \frac{\cos(bx)\,\text{CosIntegral}(bx)}{b^2} + \frac{x\,\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{\sin^2(bx)}{2b^2} - \frac{\int \left(\frac{1}{2x} + \frac{\cos(2bx)}{2x}\right)\,dx}{b^2}$$

$$= \frac{\cos(bx)\,\text{CosIntegral}(bx)}{b^2} - \frac{\log(x)}{2b^2} + \frac{x\,\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{\sin^2(bx)}{2b^2} - \frac{\int \frac{\cos(2bx)}{x}\,dx}{2b^2}$$

$$= \frac{\cos(bx)\,\text{CosIntegral}(bx)}{b^2} - \frac{\text{CosIntegral}(2bx)}{2b^2} - \frac{\log(x)}{2b^2} + \frac{x\,\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{\sin^2(bx)}{2b^2}$$

Mathematica [A] (verified)

Time = 0.04 (sec) , antiderivative size = 42, normalized size of antiderivative = 0.70

$$\int x\cos(bx)\,\text{CosIntegral}(bx)\,dx = \frac{\cos(2bx) - 2\,\text{CosIntegral}(2bx) - 2\log(x) + 4\,\text{CosIntegral}(bx)(\cos(bx) + bx\sin(bx))}{4b^2}$$

```
[In] Integrate[x*Cos[b*x]*CosIntegral[b*x],x]
[Out] (Cos[2*b*x] - 2*CosIntegral[2*b*x] - 2*Log[x] + 4*CosIntegral[b*x]*(Cos[b*x
] + b*x*Sin[b*x]))/(4*b^2)
```

Maple [A] (verified)

Time = 0.77 (sec) , antiderivative size = 44, normalized size of antiderivative = 0.73

method	result	size
derivativedivides	$\frac{\text{Ci}(bx)(\cos(bx)+bx\sin(bx))-\frac{\ln(bx)}{2}-\frac{\text{Ci}(2bx)}{2}+\frac{\cos(bx)^2}{2}}{b^2}$	44
default	$\frac{\text{Ci}(bx)(\cos(bx)+bx\sin(bx))-\frac{\ln(bx)}{2}-\frac{\text{Ci}(2bx)}{2}+\frac{\cos(bx)^2}{2}}{b^2}$	44

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

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 221 vs. $2(54) = 108$.

Time = 0.27 (sec) , antiderivative size = 221, normalized size of antiderivative = 3.68

$$\int x\cos(bx)\,\text{CosIntegral}(bx)\,dx$$
$$= \frac{2\,\pi b^2 x\,\mathrm{C}\left(bx\right)\sin\left(bx\right) + 2\,\pi b\cos\left(bx\right)\mathrm{C}\left(bx\right) - 2\,b\sin\left(\frac{1}{2}\,\pi b^2 x^2\right)\sin\left(bx\right) - \sqrt{b^2}\left(\pi\cos\left(\frac{1}{2\,\pi}\right) + \sin\left(\frac{1}{2\,\pi}\right)\right)\mathrm{C}\left(\frac{(\pi b}{\cdots}\right.}{}$$

[In] integrate(x*fresnel_cos(b*x)*cos(b*x),x, algorithm="fricas")

[Out] 1/2*(2*pi*b^2*x*fresnel_cos(b*x)*sin(b*x) + 2*pi*b*cos(b*x)*fresnel_cos(b*x
) - 2*b*sin(1/2*pi*b^2*x^2)*sin(b*x) - sqrt(b^2)*(pi*cos(1/2/pi) + sin(1/2/
pi))*fresnel_cos((pi*b*x + 1)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*(pi*cos(1/2/pi)
 + sin(1/2/pi))*fresnel_cos((pi*b*x - 1)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*(pi*
sin(1/2/pi) - cos(1/2/pi))*fresnel_sin((pi*b*x + 1)*sqrt(b^2)/(pi*b)) - sqr
t(b^2)*(pi*sin(1/2/pi) - cos(1/2/pi))*fresnel_sin((pi*b*x - 1)*sqrt(b^2)/(p
i*b)))/(pi*b^3)

Sympy [F]

$$\int x\cos(bx)\,\text{CosIntegral}(bx)\,dx = \int x\cos\left(bx\right)\mathrm{Ci}\left(bx\right)\,dx$$

[In] integrate(x*Ci(b*x)*cos(b*x),x)

[Out] Integral(x*cos(b*x)*Ci(b*x), x)

Maxima [F]

$$\int x\cos(bx)\,\text{CosIntegral}(bx)\,dx = \int x\cos\left(bx\right)\mathrm{C}\left(bx\right)\,dx$$

[In] integrate(x*fresnel_cos(b*x)*cos(b*x),x, algorithm="maxima")

[Out] integrate(x*cos(b*x)*fresnel_cos(b*x), x)

Giac [F]

$$\int x\cos(bx)\,\text{CosIntegral}(bx)\,dx=\int x\cos(bx)\,C(bx)\;dx$$

```
[In] integrate(x*fresnel_cos(b*x)*cos(b*x),x, algorithm="giac")
[Out] integrate(x*cos(b*x)*fresnel_cos(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int x\cos(bx)\,\text{CosIntegral}(bx)\,dx=\int x\,\text{cosint}(b\,x)\;\cos(b\,x)\;dx$$

```
[In] int(x*cosint(b*x)*cos(b*x),x)
[Out] int(x*cosint(b*x)*cos(b*x), x)
```

3.119 $\int x^2 \cos(bx) \text{CosIntegral}(bx) \, dx$

Optimal result

Integrand size = 12, antiderivative size = 89

$$\int x^2 \cos(bx) \text{CosIntegral}(bx) \, dx = -\frac{3x}{4b^2} + \frac{2x\cos(bx)\text{CosIntegral}(bx)}{b^2} - \frac{5\cos(bx)\sin(bx)}{4b^3} - \frac{2\,\text{CosIntegral}(bx)\sin(bx)}{b^3} + \frac{x^2\,\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{x\sin^2(bx)}{2b^2} + \frac{\text{Si}(2bx)}{b^3}$$

```
[Out] -3/4*x/b^2+2*x*Ci(b*x)*cos(b*x)/b^2+Si(2*b*x)/b^3-2*Ci(b*x)*sin(b*x)/b^3+x^
2*Ci(b*x)*sin(b*x)/b-5/4*cos(b*x)*sin(b*x)/b^3-1/2*x*sin(b*x)^2/b^2
```

Rubi [A] (verified)

Time = 0.08 (sec) , antiderivative size = 89, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.750$, Rules used = {6649, 12, 3524, 2715, 8, 6655, 6647, 4491, 3380}

$$\int x^2 \cos(bx) \text{CosIntegral}(bx) \, dx = -\frac{2\,\text{CosIntegral}(bx)\sin(bx)}{b^3} + \frac{\text{Si}(2bx)}{b^3} - \frac{5\sin(bx)\cos(bx)}{4b^3} + \frac{2x\,\text{CosIntegral}(bx)\cos(bx)}{b^2} - \frac{3x}{4b^2} - \frac{x\sin^2(bx)}{2b^2} + \frac{x^2\,\text{CosIntegral}(bx)\sin(bx)}{b}$$

```
[In] Int[x^2*Cos[b*x]*CosIntegral[b*x],x]
```

```
[Out] (-3*x)/(4*b^2) + (2*x*Cos[b*x]*CosIntegral[b*x])/b^2 - (5*Cos[b*x]*Sin[b*x]
)/(4*b^3) - (2*CosIntegral[b*x]*Sin[b*x])/b^3 + (x^2*CosIntegral[b*x]*Sin[b
*x])/b - (x*Sin[b*x]^2)/(2*b^2) + SinIntegral[2*b*x]/b^3
```

Rule 8

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

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 2715

```
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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3524

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

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6649

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)]*((e_.) + (f_.)*
(x_))^(m_.), x_Symbol] :> Simp[(e + f*x)^m*Sin[a + b*x]*(CosIntegral[c + d*
x]/b), x] + (-Dist[d/b, Int[(e + f*x)^m*Sin[a + b*x]*(Cos[c + d*x]/(c + d*x
)), x], x] - Dist[f*(m/b), Int[(e + f*x)^(m - 1)*Sin[a + b*x]*CosIntegral[c
```

```
 + d*x], x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && IGtQ[m, 0]
```

Rule 6655

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

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{x^2 \operatorname{CosIntegral}(bx)\sin(bx)}{b} \\
&\quad - \frac{2\int x \operatorname{CosIntegral}(bx)\sin(bx)\,dx}{b} - \int \frac{x\cos(bx)\sin(bx)}{b}\,dx \\
&= \frac{2x\cos(bx)\operatorname{CosIntegral}(bx)}{b^2} + \frac{x^2 \operatorname{CosIntegral}(bx)\sin(bx)}{b} \\
&\quad - \frac{2\int \cos(bx)\operatorname{CosIntegral}(bx)\,dx}{b^2} - \frac{\int x\cos(bx)\sin(bx)\,dx}{b} - \frac{2\int \frac{\cos^2(bx)}{b}\,dx}{b} \\
&= \frac{2x\cos(bx)\operatorname{CosIntegral}(bx)}{b^2} - \frac{2\operatorname{CosIntegral}(bx)\sin(bx)}{b^3} + \frac{x^2 \operatorname{CosIntegral}(bx)\sin(bx)}{b} \\
&\quad - \frac{x\sin^2(bx)}{2b^2} + \frac{\int \sin^2(bx)\,dx}{2b^2} - \frac{2\int \cos^2(bx)\,dx}{b^2} + \frac{2\int \frac{\cos(bx)\sin(bx)}{bx}\,dx}{b^2} \\
&= \frac{2x\cos(bx)\operatorname{CosIntegral}(bx)}{b^2} - \frac{5\cos(bx)\sin(bx)}{4b^3} - \frac{2\operatorname{CosIntegral}(bx)\sin(bx)}{b^3} \\
&\quad + \frac{x^2 \operatorname{CosIntegral}(bx)\sin(bx)}{b} - \frac{x\sin^2(bx)}{2b^2} + \frac{2\int \frac{\cos(bx)\sin(bx)}{x}\,dx}{b^3} + \frac{\int 1\,dx}{4b^2} - \frac{\int 1\,dx}{b^2} \\
&= -\frac{3x}{4b^2} + \frac{2x\cos(bx)\operatorname{CosIntegral}(bx)}{b^2} - \frac{5\cos(bx)\sin(bx)}{4b^3} - \frac{2\operatorname{CosIntegral}(bx)\sin(bx)}{b^3} \\
&\quad + \frac{x^2 \operatorname{CosIntegral}(bx)\sin(bx)}{b} - \frac{x\sin^2(bx)}{2b^2} + \frac{2\int \frac{\sin(2bx)}{2x}\,dx}{b^3} \\
&= -\frac{3x}{4b^2} + \frac{2x\cos(bx)\operatorname{CosIntegral}(bx)}{b^2} - \frac{5\cos(bx)\sin(bx)}{4b^3} - \frac{2\operatorname{CosIntegral}(bx)\sin(bx)}{b^3} \\
&\quad + \frac{x^2 \operatorname{CosIntegral}(bx)\sin(bx)}{b} - \frac{x\sin^2(bx)}{2b^2} + \frac{\int \frac{\sin(2bx)}{x}\,dx}{b^3} \\
&= -\frac{3x}{4b^2} + \frac{2x\cos(bx)\operatorname{CosIntegral}(bx)}{b^2} - \frac{5\cos(bx)\sin(bx)}{4b^3} \\
&\quad - \frac{2\operatorname{CosIntegral}(bx)\sin(bx)}{b^3} + \frac{x^2 \operatorname{CosIntegral}(bx)\sin(bx)}{b} - \frac{x\sin^2(bx)}{2b^2} + \frac{\operatorname{Si}(2bx)}{b^3}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.06 (sec) , antiderivative size = 64, normalized size of antiderivative = 0.72

$$\int x^2\cos(bx)\,\text{CosIntegral}(bx)\,dx = \frac{-8bx+2bx\cos(2bx)+8\,\text{CosIntegral}(bx)\left(2bx\cos(bx)+(-2+b^2x^2)\sin(bx)\right)-5\sin(2bx)+8\text{Si}(2bx)}{8b^3}$$

```
[In] Integrate[x^2*Cos[b*x]*CosIntegral[b*x],x]
[Out] (-8*b*x + 2*b*x*Cos[2*b*x] + 8*CosIntegral[b*x]*(2*b*x*Cos[b*x] + (-2 + b^2
*x^2)*Sin[b*x]) - 5*Sin[2*b*x] + 8*SinIntegral[2*b*x])/(8*b^3)
```

Maple [A] (verified)

Time = 1.05 (sec) , antiderivative size = 66, normalized size of antiderivative = 0.74

method	result	size
derivativedivides	$\frac{\text{Ci}(bx)\left(b^2x^2\sin(bx)-2\sin(bx)+2bx\cos(bx)\right)+\frac{bx\cos(bx)^2}{2}-\frac{5\sin(bx)\cos(bx)}{4}-\frac{5bx}{4}+\text{Si}(2bx)}{b^3}$	66
default	$\frac{\text{Ci}(bx)\left(b^2x^2\sin(bx)-2\sin(bx)+2bx\cos(bx)\right)+\frac{bx\cos(bx)^2}{2}-\frac{5\sin(bx)\cos(bx)}{4}-\frac{5bx}{4}+\text{Si}(2bx)}{b^3}$	66

```
[In] int(x^2*Ci(b*x)*cos(b*x),x,method=_RETURNVERBOSE)
[Out] 1/b^3*(Ci(b*x)*(b^2*x^2*sin(b*x)-2*sin(b*x)+2*b*x*cos(b*x))+1/2*b*x*cos(b*x
)^2-5/4*sin(b*x)*cos(b*x)-5/4*b*x+Si(2*b*x))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 297 vs. 2(83) = 166.

Time = 0.29 (sec) , antiderivative size = 297, normalized size of antiderivative = 3.34

$$\int x^2\cos(bx)\,\text{CosIntegral}(bx)\,dx = \frac{4\pi^2b^2x\cos(bx)\,\text{C}(bx)-2b\cos\left(\frac{1}{2}\pi b^2x^2\right)\cos(bx)+2\left(\pi^2b^3x^2-2\pi^2b\right)\text{C}(bx)\sin(bx)+\sqrt{b^2}\left(\pi\cos\left(\frac{1}{2\pi}\right)-\right.}{}$$

```
[In] integrate(x^2*fresnel_cos(b*x)*cos(b*x),x, algorithm="fricas")
[Out] 1/2*(4*pi^2*b^2*x*cos(b*x)*fresnel_cos(b*x) - 2*b*cos(1/2*pi*b^2*x^2)*cos(b
*x) + 2*(pi^2*b^3*x^2 - 2*pi^2*b)*fresnel_cos(b*x)*sin(b*x) + sqrt(b^2)*(pi
*cos(1/2/pi) - (2*pi^2 - 1)*sin(1/2/pi))*fresnel_cos((pi*b*x + 1)*sqrt(b^2)
/(pi*b)) - sqrt(b^2)*(pi*cos(1/2/pi) - (2*pi^2 - 1)*sin(1/2/pi))*fresnel_co
```

```
s((pi*b*x - 1)*sqrt(b^2)/(pi*b)) + sqrt(b^2)*((2*pi^2 - 1)*cos(1/2/pi) + pi
*sin(1/2/pi))*fresnel_sin((pi*b*x + 1)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*((2*pi
^2 - 1)*cos(1/2/pi) + pi*sin(1/2/pi))*fresnel_sin((pi*b*x - 1)*sqrt(b^2)/(p
i*b)) - 2*(pi*b^2*x*sin(b*x) + 2*pi*b*cos(b*x))*sin(1/2*pi*b^2*x^2))/(pi^2*
b^4)
```

Sympy [F]

$$\int x^2 \cos(bx) \operatorname{CosIntegral}(bx) \, dx = \int x^2 \cos(bx) \operatorname{Ci}(bx) \, dx$$

```
[In] integrate(x**2*Ci(b*x)*cos(b*x),x)
[Out] Integral(x**2*cos(b*x)*Ci(b*x), x)
```

Maxima [F]

$$\int x^2 \cos(bx) \operatorname{CosIntegral}(bx) \, dx = \int x^2 \cos(bx) \operatorname{C}(bx) \, dx$$

```
[In] integrate(x^2*fresnel_cos(b*x)*cos(b*x),x, algorithm="maxima")
[Out] integrate(x^2*cos(b*x)*fresnel_cos(b*x), x)
```

Giac [F]

$$\int x^2 \cos(bx) \operatorname{CosIntegral}(bx) \, dx = \int x^2 \cos(bx) \operatorname{C}(bx) \, dx$$

```
[In] integrate(x^2*fresnel_cos(b*x)*cos(b*x),x, algorithm="giac")
[Out] integrate(x^2*cos(b*x)*fresnel_cos(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \cos(bx) \operatorname{CosIntegral}(bx) \, dx = \int x^2 \operatorname{cosint}(b\,x) \cos(b\,x) \, dx$$

```
[In] int(x^2*cosint(b*x)*cos(b*x),x)
[Out] int(x^2*cosint(b*x)*cos(b*x), x)
```

3.120 $\int x^3 \cos(bx) \operatorname{CosIntegral}(bx) \, dx$

Optimal result

Integrand size = 12, antiderivative size = 142

$$\int x^3 \cos(bx) \operatorname{CosIntegral}(bx) \, dx = -\frac{x^2}{2b^2} - \frac{3\cos^2(bx)}{4b^4} - \frac{6\cos(bx) \operatorname{CosIntegral}(bx)}{b^4} + \frac{3x^2 \cos(bx) \operatorname{CosIntegral}(bx)}{b^2} + \frac{3 \operatorname{CosIntegral}(2bx)}{b^4} + \frac{3\log(x)}{b^4} - \frac{2x\cos(bx)\sin(bx)}{b^3} - \frac{6x \operatorname{CosIntegral}(bx)\sin(bx)}{b^3} + \frac{x^3 \operatorname{CosIntegral}(bx)\sin(bx)}{b} + \frac{13\sin^2(bx)}{4b^4} - \frac{x^2\sin^2(bx)}{2b^2}$$

```
[Out] -1/2*x^2/b^2+3*Ci(2*b*x)/b^4-6*Ci(b*x)*cos(b*x)/b^4+3*x^2*Ci(b*x)*cos(b*x)/
b^2-3/4*cos(b*x)^2/b^4+3*ln(x)/b^4-6*x*Ci(b*x)*sin(b*x)/b^3+x^3*Ci(b*x)*sin
(b*x)/b-2*x*cos(b*x)*sin(b*x)/b^3+13/4*sin(b*x)^2/b^4-1/2*x^2*sin(b*x)^2/b^
2
```

Rubi [A] (verified)

Time = 0.15 (sec) , antiderivative size = 142, normalized size of antiderivative = 1.00, number of steps used = 18, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.833$, Rules

used = {6649, 12, 3524, 3391, 30, 6655, 2644, 6653, 3393, 3383}

$$\int x^3 \cos(bx) \operatorname{CosIntegral}(bx)\, dx = \frac{3 \operatorname{CosIntegral}(2bx)}{b^4} - \frac{6 \operatorname{CosIntegral}(bx) \cos(bx)}{b^4} + \frac{3 \log(x)}{b^4} + \frac{13 \sin^2(bx)}{4b^4} - \frac{3 \cos^2(bx)}{4b^4} - \frac{6x \operatorname{CosIntegral}(bx) \sin(bx)}{b^3} - \frac{2x \sin(bx) \cos(bx)}{b^3} + \frac{3x^2 \operatorname{CosIntegral}(bx) \cos(bx)}{b^2} - \frac{x^2}{2b^2} - \frac{x^2 \sin^2(bx)}{2b^2} + \frac{x^3 \operatorname{CosIntegral}(bx) \sin(bx)}{b}$$

```
[In] Int[x^3*Cos[b*x]*CosIntegral[b*x],x]
```

```
[Out] -1/2*x^2/b^2 - (3*Cos[b*x]^2)/(4*b^4) - (6*Cos[b*x]*CosIntegral[b*x])/b^4 +
 (3*x^2*Cos[b*x]*CosIntegral[b*x])/b^2 + (3*CosIntegral[2*b*x])/b^4 + (3*Lo
g[x])/b^4 - (2*x*Cos[b*x]*Sin[b*x])/b^3 - (6*x*CosIntegral[b*x]*Sin[b*x])/b
^3 + (x^3*CosIntegral[b*x]*Sin[b*x])/b + (13*Sin[b*x]^2)/(4*b^4) - (x^2*Sin
[b*x]^2)/(2*b^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 30

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

Rule 2644

```
Int[cos[(e_.) + (f_.)*(x_)]^(n_.)*((a_.)*sin[(e_.) + (f_.)*(x_)])^(m_.), x_
Symbol] :> Dist[1/(a*f), Subst[Int[x^m*(1 - x^2/a^2)^((n - 1)/2), x], x, a*
Sin[e + f*x]], x] /; FreeQ[{a, e, f, m}, x] && IntegerQ[(n - 1)/2] &&  !(In
tegerQ[(m - 1)/2] && LtQ[0, m, n])
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3391

```
Int[((c_.) + (d_.)*(x_))*((b_.)*sin[(e_.) + (f_.)*(x_)])^(n_), x_Symbol] :>
 Simp[d*((b*Sin[e + f*x])^n/(f^2*n^2)), x] + (Dist[b^2*((n - 1)/n), Int[(c
+ d*x)*(b*Sin[e + f*x])^(n - 2), x], x] - Simp[b*(c + d*x)*Cos[e + f*x]*((b
```

```
*Sin[e + f*x])^(n - 1)/(f*n)), x]) /; FreeQ[{b, c, d, e, f}, x] && GtQ[n, 1
]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 3524

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

Rule 6649

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

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6655

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

Rubi steps

$$\text{integral} = \frac{x^3\,\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{3\int x^2\,\text{CosIntegral}(bx)\sin(bx)\,dx}{b} - \int \frac{x^2\cos(bx)\sin(bx)}{b}\,dx$$

$$
\begin{aligned}
&= \frac{3x^2\cos(bx)\,\text{CosIntegral}(bx)}{b^2} + \frac{x^3\,\text{CosIntegral}(bx)\sin(bx)}{b} \\
&\quad - \frac{6\int x\cos(bx)\,\text{CosIntegral}(bx)\,dx}{b^2} - \frac{\int x^2\cos(bx)\sin(bx)\,dx}{b} - \frac{3\int \frac{x\cos^2(bx)}{b}\,dx}{b} \\
&= \frac{3x^2\cos(bx)\,\text{CosIntegral}(bx)}{b^2} - \frac{6x\,\text{CosIntegral}(bx)\sin(bx)}{b^3} \\
&\quad + \frac{x^3\,\text{CosIntegral}(bx)\sin(bx)}{b} - \frac{x^2\sin^2(bx)}{2b^2} + \frac{6\int \text{CosIntegral}(bx)\sin(bx)\,dx}{b^3} \\
&\quad + \frac{\int x\sin^2(bx)\,dx}{b^2} - \frac{3\int x\cos^2(bx)\,dx}{b^2} + \frac{6\int \frac{\cos(bx)\sin(bx)}{b}\,dx}{b^2} \\
&= -\frac{3\cos^2(bx)}{4b^4} - \frac{6\cos(bx)\,\text{CosIntegral}(bx)}{b^4} + \frac{3x^2\cos(bx)\,\text{CosIntegral}(bx)}{b^2} \\
&\quad - \frac{2x\cos(bx)\sin(bx)}{b^3} - \frac{6x\,\text{CosIntegral}(bx)\sin(bx)}{b^3} \\
&\quad + \frac{x^3\,\text{CosIntegral}(bx)\sin(bx)}{b} + \frac{\sin^2(bx)}{4b^4} - \frac{x^2\sin^2(bx)}{2b^2} \\
&\quad + \frac{6\int \frac{\cos^2(bx)}{bx}\,dx}{b^3} + \frac{6\int \cos(bx)\sin(bx)\,dx}{b^3} + \frac{\int x\,dx}{2b^2} - \frac{3\int x\,dx}{2b^2} \\
&= -\frac{x^2}{2b^2} - \frac{3\cos^2(bx)}{4b^4} - \frac{6\cos(bx)\,\text{CosIntegral}(bx)}{b^4} + \frac{3x^2\cos(bx)\,\text{CosIntegral}(bx)}{b^2} \\
&\quad - \frac{2x\cos(bx)\sin(bx)}{b^3} - \frac{6x\,\text{CosIntegral}(bx)\sin(bx)}{b^3} + \frac{x^3\,\text{CosIntegral}(bx)\sin(bx)}{b} \\
&\quad + \frac{\sin^2(bx)}{4b^4} - \frac{x^2\sin^2(bx)}{2b^2} + \frac{6\int \frac{\cos^2(bx)}{x}\,dx}{b^4} + \frac{6\text{Subst}(\int x\,dx, x, \sin(bx))}{b^4} \\
&= -\frac{x^2}{2b^2} - \frac{3\cos^2(bx)}{4b^4} - \frac{6\cos(bx)\,\text{CosIntegral}(bx)}{b^4} + \frac{3x^2\cos(bx)\,\text{CosIntegral}(bx)}{b^2} \\
&\quad - \frac{2x\cos(bx)\sin(bx)}{b^3} - \frac{6x\,\text{CosIntegral}(bx)\sin(bx)}{b^3} + \frac{x^3\,\text{CosIntegral}(bx)\sin(bx)}{b} \\
&\quad + \frac{13\sin^2(bx)}{4b^4} - \frac{x^2\sin^2(bx)}{2b^2} + \frac{6\int \left(\frac{1}{2x} + \frac{\cos(2bx)}{2x}\right)\,dx}{b^4} \\
&= -\frac{x^2}{2b^2} - \frac{3\cos^2(bx)}{4b^4} - \frac{6\cos(bx)\,\text{CosIntegral}(bx)}{b^4} + \frac{3x^2\cos(bx)\,\text{CosIntegral}(bx)}{b^2} \\
&\quad + \frac{3\log(x)}{b^4} - \frac{2x\cos(bx)\sin(bx)}{b^3} - \frac{6x\,\text{CosIntegral}(bx)\sin(bx)}{b^3} \\
&\quad + \frac{x^3\,\text{CosIntegral}(bx)\sin(bx)}{b} + \frac{13\sin^2(bx)}{4b^4} - \frac{x^2\sin^2(bx)}{2b^2} + \frac{3\int \frac{\cos(2bx)}{x}\,dx}{b^4} \\
&= -\frac{x^2}{2b^2} - \frac{3\cos^2(bx)}{4b^4} - \frac{6\cos(bx)\,\text{CosIntegral}(bx)}{b^4} + \frac{3x^2\cos(bx)\,\text{CosIntegral}(bx)}{b^2} \\
&\quad + \frac{3\,\text{CosIntegral}(2bx)}{b^4} + \frac{3\log(x)}{b^4} - \frac{2x\cos(bx)\sin(bx)}{b^3} - \frac{6x\,\text{CosIntegral}(bx)\sin(bx)}{b^3} \\
&\quad + \frac{x^3\,\text{CosIntegral}(bx)\sin(bx)}{b} + \frac{13\sin^2(bx)}{4b^4} - \frac{x^2\sin^2(bx)}{2b^2}
\end{aligned}
$$

Mathematica [A] (verified)

Time = 0.08 (sec) , antiderivative size = 93, normalized size of antiderivative = 0.65

$$\int x^3 \cos(bx)\,\text{CosIntegral}(bx)\,dx$$
$$= \frac{-3b^2x^2 - 8\cos(2bx) + b^2x^2\cos(2bx) + 12\,\text{CosIntegral}(2bx) + 12\log(x) + 4\,\text{CosIntegral}(bx)\,(3(-2+b^2x^2$$
$$4b^4$$

```
[In] Integrate[x^3*Cos[b*x]*CosIntegral[b*x],x]
```

```
[Out] (-3*b^2*x^2 - 8*Cos[2*b*x] + b^2*x^2*Cos[2*b*x] + 12*CosIntegral[2*b*x] + 1
2*Log[x] + 4*CosIntegral[b*x]*(3*(-2 + b^2*x^2)*Cos[b*x] + b*x*(-6 + b^2*x^
2)*Sin[b*x]) - 4*b*x*Sin[2*b*x])/(4*b^4)
```

Maple [A] (verified)

Time = 1.50 (sec) , antiderivative size = 116, normalized size of antiderivative = 0.82

method	result
derivativedivides	$\frac{\text{Ci}(bx)\left(b^3x^3\sin(bx)+3b^2x^2\cos(bx)-6\cos(bx)-6bx\sin(bx)\right)+\frac{b^2x^2\cos(bx)^2}{2}-4bx\left(\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)+b^2x^2+\sin(bx)^2+}{b^4}$
default	$\frac{\text{Ci}(bx)\left(b^3x^3\sin(bx)+3b^2x^2\cos(bx)-6\cos(bx)-6bx\sin(bx)\right)+\frac{b^2x^2\cos(bx)^2}{2}-4bx\left(\frac{\sin(bx)\cos(bx)}{2}+\frac{bx}{2}\right)+b^2x^2+\sin(bx)^2+}{b^4}$

```
[In] int(x^3*Ci(b*x)*cos(b*x),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^4*(Ci(b*x)*(b^3*x^3*sin(b*x)+3*b^2*x^2*cos(b*x)-6*cos(b*x)-6*b*x*sin(b*
x))+1/2*b^2*x^2*cos(b*x)^2-4*b*x*(1/2*sin(b*x)*cos(b*x)+1/2*b*x)+b^2*x^2+si
n(b*x)^2+3*ln(b*x)+3*Ci(2*b*x)-3*cos(b*x)^2)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 361 vs. 2(134) = 268.

Time = 0.28 (sec) , antiderivative size = 361, normalized size of antiderivative = 2.54

$$\int x^3 \cos(bx)\,\text{CosIntegral}(bx)\,dx =$$
$$-\frac{2\,\pi b^2x\cos\left(\frac{1}{2}\,\pi b^2x^2\right)\cos(bx) - 6\left(\pi^3b^3x^2 - 2\,\pi^3b\right)\cos(bx)\,\text{C}(bx) - \left(6\,\pi^3\cos\left(\frac{1}{2\,\pi}\right) + \left(3\,\pi^2-1\right)\sin\left(\frac{1}{2\,\pi}\right)\right.}{}$$

```
[In] integrate(x^3*fresnel_cos(b*x)*cos(b*x),x, algorithm="fricas")
```

```
[Out] -1/2*(2*pi*b^2*x*cos(1/2*pi*b^2*x^2)*cos(b*x) - 6*(pi^3*b^3*x^2 - 2*pi^3*b)
*cos(b*x)*fresnel_cos(b*x) - (6*pi^3*cos(1/2/pi) + (3*pi^2 - 1)*sin(1/2/pi)
```

```
)*sqrt(b^2)*fresnel_cos((pi*b*x + 1)*sqrt(b^2)/(pi*b)) - (6*pi^3*cos(1/2/pi
) + (3*pi^2 - 1)*sin(1/2/pi))*sqrt(b^2)*fresnel_cos((pi*b*x - 1)*sqrt(b^2)/
(pi*b)) - (6*pi^3*sin(1/2/pi) - (3*pi^2 - 1)*cos(1/2/pi))*sqrt(b^2)*fresnel
_sin((pi*b*x + 1)*sqrt(b^2)/(pi*b)) - (6*pi^3*sin(1/2/pi) - (3*pi^2 - 1)*co
s(1/2/pi))*sqrt(b^2)*fresnel_sin((pi*b*x - 1)*sqrt(b^2)/(pi*b)) + 2*(3*pi^2
*b^2*x*cos(b*x) + (pi^2*b^3*x^2 - 6*pi^2*b + b)*sin(b*x))*sin(1/2*pi*b^2*x^
2) - 2*(pi*b*cos(1/2*pi*b^2*x^2) + (pi^3*b^4*x^3 - 6*pi^3*b^2*x)*fresnel_co
s(b*x))*sin(b*x))/(pi^3*b^5)
```

Sympy [F]

$$\int x^3\cos(bx)\,\text{CosIntegral}(bx)\,dx=\int x^3\cos{(bx)}\operatorname{Ci}{(bx)}\,dx$$

```
[In] integrate(x**3*Ci(b*x)*cos(b*x),x)
[Out] Integral(x**3*cos(b*x)*Ci(b*x), x)
```

Maxima [F]

$$\int x^3\cos(bx)\,\text{CosIntegral}(bx)\,dx=\int x^3\cos{(bx)}\,C{(bx)}\,dx$$

```
[In] integrate(x^3*fresnel_cos(b*x)*cos(b*x),x, algorithm="maxima")
[Out] integrate(x^3*cos(b*x)*fresnel_cos(b*x), x)
```

Giac [F]

$$\int x^3\cos(bx)\,\text{CosIntegral}(bx)\,dx=\int x^3\cos{(bx)}\,C{(bx)}\,dx$$

```
[In] integrate(x^3*fresnel_cos(b*x)*cos(b*x),x, algorithm="giac")
[Out] integrate(x^3*cos(b*x)*fresnel_cos(b*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int x^3 \cos(bx) \operatorname{CosIntegral}(bx) \, dx = \int x^3 \operatorname{cosint}(b\,x) \, \cos(b\,x) \, dx$$

```
[In] int(x^3*cosint(b*x)*cos(b*x),x)
[Out] int(x^3*cosint(b*x)*cos(b*x), x)
```

3.121 $\int \text{CosIntegral}(2x)\sin(5x)\,dx$

Optimal result

Integrand size = 9, antiderivative size = 29

$$\int \text{CosIntegral}(2x)\sin(5x)\,dx = -\frac{1}{5}\cos(5x)\,\text{CosIntegral}(2x) + \frac{\text{CosIntegral}(3x)}{10} + \frac{\text{CosIntegral}(7x)}{10}$$

```
[Out] 1/10*Ci(3*x)+1/10*Ci(7*x)-1/5*Ci(2*x)*cos(5*x)
```

Rubi [A] (verified)

Time = 0.04 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}} = 0.444$, Rules used = {6653, 12, 4514, 3383}

$$\int \text{CosIntegral}(2x)\sin(5x)\,dx = \frac{\text{CosIntegral}(3x)}{10} + \frac{\text{CosIntegral}(7x)}{10} - \frac{1}{5}\text{CosIntegral}(2x)\cos(5x)$$

```
[In] Int[CosIntegral[2*x]*Sin[5*x],x]
```

```
[Out] -1/5*(Cos[5*x]*CosIntegral[2*x]) + CosIntegral[3*x]/10 + CosIntegral[7*x]/1
0
```

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 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 4514

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*Cos[(c_.) + (d_.)*(x_)]^(q_.)*((e_.) + (f
_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Cos[a + b*x
]^p*Cos[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f}, x] && IGtQ[p, 0] &&
 IGtQ[q, 0] && IntegerQ[m]
```

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{1}{5}\cos(5x)\,\text{CosIntegral}(2x)+\frac{2}{5}\int\frac{\cos(2x)\cos(5x)}{2x}\,dx\\
&= -\frac{1}{5}\cos(5x)\,\text{CosIntegral}(2x)+\frac{1}{5}\int\frac{\cos(2x)\cos(5x)}{x}\,dx\\
&= -\frac{1}{5}\cos(5x)\,\text{CosIntegral}(2x)+\frac{1}{5}\int\left(\frac{\cos(3x)}{2x}+\frac{\cos(7x)}{2x}\right)\,dx\\
&= -\frac{1}{5}\cos(5x)\,\text{CosIntegral}(2x)+\frac{1}{10}\int\frac{\cos(3x)}{x}\,dx+\frac{1}{10}\int\frac{\cos(7x)}{x}\,dx\\
&= -\frac{1}{5}\cos(5x)\,\text{CosIntegral}(2x)+\frac{\text{CosIntegral}(3x)}{10}+\frac{\text{CosIntegral}(7x)}{10}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 23, normalized size of antiderivative = 0.79

$$\int \text{CosIntegral}(2x)\sin(5x)\,dx=\frac{1}{10}(-2\cos(5x)\,\text{CosIntegral}(2x)+\text{CosIntegral}(3x)+\text{CosIntegral}(7x))$$

```
[In] Integrate[CosIntegral[2*x]*Sin[5*x],x]
[Out] (-2*Cos[5*x]*CosIntegral[2*x] + CosIntegral[3*x] + CosIntegral[7*x])/10
```

Maple [A] (verified)

Time = 1.09 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.83

method	result	size
default	$\frac{\mathrm{Ci}(3x)}{10}+\frac{\mathrm{Ci}(7x)}{10}-\frac{\mathrm{Ci}(2x)\cos(5x)}{5}$	24

```
[In] int(Ci(2*x)*sin(5*x),x,method=_RETURNVERBOSE)
[Out] 1/10*Ci(3*x)+1/10*Ci(7*x)-1/5*Ci(2*x)*cos(5*x)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 84 vs. $2(23) = 46$.

Time = 0.28 (sec) , antiderivative size = 84, normalized size of antiderivative = 2.90

$$\int \text{CosIntegral}(2x)\sin(5x)\,dx = -\frac{1}{5}\cos(5x)\,C(2x)+\frac{1}{10}\cos\left(\frac{25}{8\pi}\right)C\left(\frac{4\pi x+5}{2\pi}\right)+\frac{1}{10}\cos\left(\frac{25}{8\pi}\right)C\left(\frac{4\pi x-5}{2\pi}\right)+\frac{1}{10}\left(S\left(\frac{4\pi x+5}{2\pi}\right)+S\left(\frac{4\pi x-5}{2\pi}\right)\right)\sin\left(\frac{25}{8\pi}\right)$$

```
[In] integrate(fresnel_cos(2*x)*sin(5*x),x, algorithm="fricas")
[Out] -1/5*cos(5*x)*fresnel_cos(2*x) + 1/10*cos(25/8/pi)*fresnel_cos(1/2*(4*pi*x
+ 5)/pi) + 1/10*cos(25/8/pi)*fresnel_cos(1/2*(4*pi*x - 5)/pi) + 1/10*(fresn
el_sin(1/2*(4*pi*x + 5)/pi) + fresnel_sin(1/2*(4*pi*x - 5)/pi))*sin(25/8/pi
)
```

Sympy [F]

$$\int \text{CosIntegral}(2x)\sin(5x)\,dx = \int \sin(5x)\,\mathrm{Ci}(2x)\,dx$$

```
[In] integrate(Ci(2*x)*sin(5*x),x)
[Out] Integral(sin(5*x)*Ci(2*x), x)
```

Maxima [F]

$$\int \mathrm{CosIntegral}(2x)\sin(5x)\,dx = \int \mathrm{C}\left(2\,x\right)\sin\left(5\,x\right)\,dx$$

```
[In] integrate(fresnel_cos(2*x)*sin(5*x),x, algorithm="maxima")
[Out] integrate(fresnel_cos(2*x)*sin(5*x), x)
```

Giac [F]

$$\int \mathrm{CosIntegral}(2x)\sin(5x)\,dx = \int \mathrm{C}\left(2\,x\right)\sin\left(5\,x\right)\,dx$$

```
[In] integrate(fresnel_cos(2*x)*sin(5*x),x, algorithm="giac")
[Out] integrate(fresnel_cos(2*x)*sin(5*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \mathrm{CosIntegral}(2x)\sin(5x)\,dx = \frac{\mathrm{cosint}(3\,x)}{10} + \frac{\mathrm{cosint}(7\,x)}{10} - \frac{\mathrm{cosint}(2\,x)\,\cos\left(5\,x\right)}{5}$$

```
[In] int(cosint(2*x)*sin(5*x),x)
[Out] cosint(3*x)/10 + cosint(7*x)/10 - (cosint(2*x)*cos(5*x))/5
```

3.122 $\int \cos(5x) \operatorname{CosIntegral}(2x) \, dx$

Optimal result

Integrand size = 9, antiderivative size = 29

$$\int \cos(5x) \operatorname{CosIntegral}(2x) \, dx = \frac{1}{5} \operatorname{CosIntegral}(2x) \sin(5x) - \frac{\operatorname{Si}(3x)}{10} - \frac{\operatorname{Si}(7x)}{10}$$

```
[Out] -1/10*Si(3*x)-1/10*Si(7*x)+1/5*Ci(2*x)*sin(5*x)
```

Rubi [A] (verified)

Time = 0.04 (sec) , antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.444, Rules used = {6647, 12, 4515, 3380}

$$\int \cos(5x) \operatorname{CosIntegral}(2x) \, dx = \frac{1}{5} \operatorname{CosIntegral}(2x) \sin(5x) - \frac{\operatorname{Si}(3x)}{10} - \frac{\operatorname{Si}(7x)}{10}$$

```
[In] Int[Cos[5*x]*CosIntegral[2*x],x]
[Out] (CosIntegral[2*x]*Sin[5*x])/5 - SinIntegral[3*x]/10 - SinIntegral[7*x]/10
```

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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 4515

```
Int[Cos[(c_.) + (d_.)*(x_)]^(q_.)*((e_.) + (f_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(p_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Sin[a + b*x
]^p*Cos[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] && IGtQ[p, 0]
 && IGtQ[q, 0]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{1}{5}\text{CosIntegral}(2x)\sin(5x) - \frac{2}{5}\int \frac{\cos(2x)\sin(5x)}{2x}\,dx \\
&= \frac{1}{5}\text{CosIntegral}(2x)\sin(5x) - \frac{1}{5}\int \frac{\cos(2x)\sin(5x)}{x}\,dx \\
&= \frac{1}{5}\text{CosIntegral}(2x)\sin(5x) - \frac{1}{5}\int \left(\frac{\sin(3x)}{2x} + \frac{\sin(7x)}{2x}\right)dx \\
&= \frac{1}{5}\text{CosIntegral}(2x)\sin(5x) - \frac{1}{10}\int \frac{\sin(3x)}{x}\,dx - \frac{1}{10}\int \frac{\sin(7x)}{x}\,dx \\
&= \frac{1}{5}\text{CosIntegral}(2x)\sin(5x) - \frac{\text{Si}(3x)}{10} - \frac{\text{Si}(7x)}{10}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 27, normalized size of antiderivative = 0.93

$$\int \cos(5x)\,\text{CosIntegral}(2x)\,dx = \frac{1}{10}(2\,\text{CosIntegral}(2x)\sin(5x) - \text{Si}(3x) - \text{Si}(7x))$$

```
[In] Integrate[Cos[5*x]*CosIntegral[2*x],x]
[Out] (2*CosIntegral[2*x]*Sin[5*x] - SinIntegral[3*x] - SinIntegral[7*x])/10
```

Maple [A] (verified)

Time = 1.15 (sec) , antiderivative size = 24, normalized size of antiderivative = 0.83

method	result	size
default	$-\frac{\mathrm{Si}(3x)}{10}-\frac{\mathrm{Si}(7x)}{10}+\frac{\mathrm{Ci}(2x)\sin(5x)}{5}$	24

```
[In] int(Ci(2*x)*cos(5*x),x,method=_RETURNVERBOSE)
[Out] -1/10*Si(3*x)-1/10*Si(7*x)+1/5*Ci(2*x)*sin(5*x)
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 86 vs. $2(23) = 46$.

Time = 0.27 (sec) , antiderivative size = 86, normalized size of antiderivative = 2.97

$$\begin{aligned}\int \cos(5x)\,\mathrm{CosIntegral}(2x)\,dx = &-\frac{1}{10}\cos\left(\frac{25}{8\pi}\right)\mathrm{S}\left(\frac{4\pi x+5}{2\pi}\right)\\&+\frac{1}{10}\cos\left(\frac{25}{8\pi}\right)\mathrm{S}\left(\frac{4\pi x-5}{2\pi}\right)+\frac{1}{5}\,\mathrm{C}\left(2\,x\right)\sin\left(5\,x\right)\\&+\frac{1}{10}\left(\mathrm{C}\left(\frac{4\pi x+5}{2\pi}\right)-\mathrm{C}\left(\frac{4\pi x-5}{2\pi}\right)\right)\sin\left(\frac{25}{8\pi}\right)\end{aligned}$$

```
[In] integrate(fresnel_cos(2*x)*cos(5*x),x, algorithm="fricas")
[Out] -1/10*cos(25/8/pi)*fresnel_sin(1/2*(4*pi*x + 5)/pi) + 1/10*cos(25/8/pi)*fre
snel_sin(1/2*(4*pi*x - 5)/pi) + 1/5*fresnel_cos(2*x)*sin(5*x) + 1/10*(fresn
el_cos(1/2*(4*pi*x + 5)/pi) - fresnel_cos(1/2*(4*pi*x - 5)/pi))*sin(25/8/pi
)
```

Sympy [F]

$$\int \cos(5x)\,\mathrm{CosIntegral}(2x)\,dx = \int \cos\left(5x\right)\mathrm{Ci}\left(2x\right)\,dx$$

```
[In] integrate(Ci(2*x)*cos(5*x),x)
[Out] Integral(cos(5*x)*Ci(2*x), x)
```

Maxima [F]

$$\int \cos(5x)\,\text{CosIntegral}(2x)\,dx = \int \cos(5\,x)\,\text{C}\,(2\,x)\;dx$$

```
[In] integrate(fresnel_cos(2*x)*cos(5*x),x, algorithm="maxima")
[Out] integrate(cos(5*x)*fresnel_cos(2*x), x)
```

Giac [F]

$$\int \cos(5x)\,\text{CosIntegral}(2x)\,dx = \int \cos(5\,x)\,\text{C}\,(2\,x)\;dx$$

```
[In] integrate(fresnel_cos(2*x)*cos(5*x),x, algorithm="giac")
[Out] integrate(cos(5*x)*fresnel_cos(2*x), x)
```

Mupad [F(-1)]

Timed out.

$$\int \cos(5x)\,\text{CosIntegral}(2x)\,dx = \int \text{cosint}(2\,x)\,\cos(5\,x)\;dx$$

```
[In] int(cosint(2*x)*cos(5*x),x)
[Out] int(cosint(2*x)*cos(5*x), x)
```

3.123 $\int x^2 \text{CosIntegral}(a+bx)\sin(a+bx)\,dx$

Optimal result

Integrand size = 16, antiderivative size = 220

$$\begin{aligned}
&\int x^2 \text{CosIntegral}(a+bx)\sin(a+bx)\,dx \\
&= -\frac{ax}{2b^2}+\frac{x^2}{4b}+\frac{\cos^2(a+bx)}{4b^3}+\frac{\cos(2a+2bx)}{2b^3}+\frac{2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^3} \\
&\quad -\frac{x^2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b}-\frac{\text{CosIntegral}(2a+2bx)}{b^3} \\
&\quad +\frac{a^2\,\text{CosIntegral}(2a+2bx)}{2b^3}-\frac{\log(a+bx)}{b^3}+\frac{a^2\log(a+bx)}{2b^3}-\frac{a\cos(a+bx)\sin(a+bx)}{2b^3} \\
&\quad +\frac{x\cos(a+bx)\sin(a+bx)}{2b^2}+\frac{2x\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2}+\frac{a\text{Si}(2a+2bx)}{b^3}
\end{aligned}$$

```
[Out] -1/2*a*x/b^2+1/4*x^2/b-Ci(2*b*x+2*a)/b^3+1/2*a^2*Ci(2*b*x+2*a)/b^3+2*Ci(b*x
+a)*cos(b*x+a)/b^3-x^2*Ci(b*x+a)*cos(b*x+a)/b+1/4*cos(b*x+a)^2/b^3+1/2*cos(
2*b*x+2*a)/b^3-ln(b*x+a)/b^3+1/2*a^2*ln(b*x+a)/b^3+a*Si(2*b*x+2*a)/b^3+2*x*
Ci(b*x+a)*sin(b*x+a)/b^2-1/2*a*cos(b*x+a)*sin(b*x+a)/b^3+1/2*x*cos(b*x+a)*s
in(b*x+a)/b^2
```

Rubi [A] (verified)

Time = 0.65 (sec) , antiderivative size = 220, normalized size of antiderivative = 1.00, number of steps used = 21, number of rules used = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.875, Rules

used = {6655, 6874, 2715, 8, 3391, 30, 3393, 3383, 6649, 4669, 6873, 2718, 3380, 6653}

$$\int x^2 \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx = \frac{a^2\operatorname{CosIntegral}(2a+2bx)}{2b^3} + \frac{a^2\log(a+bx)}{2b^3} - \frac{\operatorname{CosIntegral}(2a+2bx)}{b^3} + \frac{2\operatorname{CosIntegral}(a+bx)\cos(a+bx)}{b^3} + \frac{a\operatorname{Si}(2a+2bx)}{b^3} - \frac{\log(a+bx)}{b^3} + \frac{\cos^2(a+bx)}{4b^3} + \frac{\cos(2a+2bx)}{2b^3} - \frac{a\sin(a+bx)\cos(a+bx)}{2b^3} + \frac{2x\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b^2} - \frac{ax}{2b^2} + \frac{x\sin(a+bx)\cos(a+bx)}{2b^2} - \frac{x^2\operatorname{CosIntegral}(a+bx)\cos(a+bx)}{b} + \frac{x^2}{4b}$$

```
[In] Int[x^2*CosIntegral[a + b*x]*Sin[a + b*x],x]
```

```
[Out] -1/2*(a*x)/b^2 + x^2/(4*b) + Cos[a + b*x]^2/(4*b^3) + Cos[2*a + 2*b*x]/(2*b
^3) + (2*Cos[a + b*x]*CosIntegral[a + b*x])/b^3 - (x^2*Cos[a + b*x]*CosInte
gral[a + b*x])/b - CosIntegral[2*a + 2*b*x]/b^3 + (a^2*CosIntegral[2*a + 2*
b*x])/(2*b^3) - Log[a + b*x]/b^3 + (a^2*Log[a + b*x])/(2*b^3) - (a*Cos[a +
b*x]*Sin[a + b*x])/(2*b^3) + (x*Cos[a + b*x]*Sin[a + b*x])/(2*b^2) + (2*x*C
osIntegral[a + b*x]*Sin[a + b*x])/b^2 + (a*SinIntegral[2*a + 2*b*x])/b^3
```

Rule 8

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

Rule 30

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

Rule 2715

```
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 2718

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

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3391

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

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 4669

```
Int[Cos[w_]^(p_.)*(u_.)*Sin[v_]^(p_.), x_Symbol] :> Dist[1/2^p, Int[u*Sin[2
*v]^p, x], x] /; EqQ[w, v] && IntegerQ[p]
```

Rule 6649

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

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6655

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

Rule 6873

```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= -\frac{x^2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b} \\
&\quad + \frac{2\int x\cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx}{b} + \int \frac{x^2\cos^2(a+bx)}{a+bx}\,dx \\
&= -\frac{x^2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b} + \frac{2x\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2} \\
&\quad - \frac{2\int \text{CosIntegral}(a+bx)\sin(a+bx)\,dx}{b^2} - \frac{2\int \frac{x\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{b} \\
&\quad + \int \left(-\frac{a\cos^2(a+bx)}{b^2} + \frac{x\cos^2(a+bx)}{b} + \frac{a^2\cos^2(a+bx)}{b^2(a+bx)}\right)dx \\
&= \frac{2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^3} - \frac{x^2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b} \\
&\quad + \frac{2x\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2} - \frac{2\int \frac{\cos^2(a+bx)}{a+bx}\,dx}{b^2} - \frac{a\int \cos^2(a+bx)\,dx}{b^2} \\
&\quad + \frac{a^2\int \frac{\cos^2(a+bx)}{a+bx}\,dx}{b^2} + \frac{\int x\cos^2(a+bx)\,dx}{b} - \frac{\int \frac{x\sin(2(a+bx))}{a+bx}\,dx}{b}
\end{aligned}
$$

$$= \frac{\cos^2(a+bx)}{4b^3} + \frac{2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^3} - \frac{x^2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b} - \frac{a\cos(a+bx)\sin(a+bx)}{2b^3} + \frac{x\cos(a+bx)\sin(a+bx)}{2b^2} + \frac{2x\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2} - \frac{2\int\left(\frac{1}{2(a+bx)} + \frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{b^2} - \frac{a\int 1\,dx}{2b^2} + \frac{a^2\int\left(\frac{1}{2(a+bx)} + \frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{b^2} + \frac{\int x\,dx}{2b} - \frac{\int \frac{x\sin(2a+2bx)}{a+bx}\,dx}{b}$$

$$= -\frac{ax}{2b^2} + \frac{x^2}{4b} + \frac{\cos^2(a+bx)}{4b^3} + \frac{2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^3} - \frac{x^2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b} - \frac{\log(a+bx)}{b^3} + \frac{a^2\log(a+bx)}{2b^3} - \frac{a\cos(a+bx)\sin(a+bx)}{2b^3} + \frac{x\cos(a+bx)\sin(a+bx)}{2b^2} + \frac{2x\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2} - \frac{\int \frac{\cos(2a+2bx)}{a+bx}\,dx}{b^2} + \frac{a^2\int \frac{\cos(2a+2bx)}{a+bx}\,dx}{2b^2} - \frac{\int\left(\frac{\sin(2a+2bx)}{b} + \frac{a\sin(2a+2bx)}{b(-a-bx)}\right)dx}{b}$$

$$= -\frac{ax}{2b^2} + \frac{x^2}{4b} + \frac{\cos^2(a+bx)}{4b^3} + \frac{2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^3} - \frac{x^2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b} - \frac{\text{CosIntegral}(2a+2bx)}{b^3} + \frac{a^2\,\text{CosIntegral}(2a+2bx)}{2b^3} - \frac{\log(a+bx)}{b^3} + \frac{a^2\log(a+bx)}{2b^3} - \frac{a\cos(a+bx)\sin(a+bx)}{2b^3} + \frac{x\cos(a+bx)\sin(a+bx)}{2b^2} + \frac{2x\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2} - \frac{\int\sin(2a+2bx)\,dx}{b^2} - \frac{a\int \frac{\sin(2a+2bx)}{-a-bx}\,dx}{b^2}$$

$$= -\frac{ax}{2b^2} + \frac{x^2}{4b} + \frac{\cos^2(a+bx)}{4b^3} + \frac{\cos(2a+2bx)}{2b^3} + \frac{2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^3} - \frac{x^2\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b} - \frac{\text{CosIntegral}(2a+2bx)}{b^3} + \frac{a^2\,\text{CosIntegral}(2a+2bx)}{2b^3} - \frac{\log(a+bx)}{b^3} + \frac{a^2\log(a+bx)}{2b^3} - \frac{a\cos(a+bx)\sin(a+bx)}{2b^3} + \frac{x\cos(a+bx)\sin(a+bx)}{2b^2} + \frac{2x\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2} + \frac{a\text{Si}(2a+2bx)}{b^3}$$

Mathematica [A] (verified)

Time = 0.24 (sec) , antiderivative size = 134, normalized size of antiderivative = 0.61

$$\int x^2 \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx$$
$$= \frac{-4abx + 2b^2x^2 + 5\cos(2(a+bx)) + 4(-2+a^2)\operatorname{CosIntegral}(2(a+bx)) - 8\log(a+bx) + 4a^2\log(a+bx}{}$$

```
[In] Integrate[x^2*CosIntegral[a + b*x]*Sin[a + b*x],x]
```

```
[Out] (-4*a*b*x + 2*b^2*x^2 + 5*Cos[2*(a + b*x)] + 4*(-2 + a^2)*CosIntegral[2*(a
+ b*x)] - 8*Log[a + b*x] + 4*a^2*Log[a + b*x] - 8*CosIntegral[a + b*x]*((-2
 + b^2*x^2)*Cos[a + b*x] - 2*b*x*Sin[a + b*x]) - 2*a*Sin[2*(a + b*x)] + 2*b
*x*Sin[2*(a + b*x)] + 8*a*SinIntegral[2*(a + b*x)])/(8*b^3)
```

Maple [A] (verified)

Time = 2.43 (sec) , antiderivative size = 217, normalized size of antiderivative = 0.99

method	result
derivativedivides	$\frac{\operatorname{Ci}(bx+a)\left(-a^2\cos(bx+a)-2a(\sin(bx+a)-(bx+a)\cos(bx+a))-(bx+a)^2\cos(bx+a)+2\cos(bx+a)+2(bx+a)\sin(bx+a)\right)}{}$
default	$\frac{\operatorname{Ci}(bx+a)\left(-a^2\cos(bx+a)-2a(\sin(bx+a)-(bx+a)\cos(bx+a))-(bx+a)^2\cos(bx+a)+2\cos(bx+a)+2(bx+a)\sin(bx+a)\right)}{}$

```
[In] int(x^2*Ci(b*x+a)*sin(b*x+a),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^3*(Ci(b*x+a)*(-a^2*cos(b*x+a)-2*a*(sin(b*x+a)-(b*x+a)*cos(b*x+a))-(b*x+
a)^2*cos(b*x+a)+2*cos(b*x+a)+2*(b*x+a)*sin(b*x+a))+1/2*a^2*ln(b*x+a)+1/2*a^
2*Ci(2*b*x+2*a)-cos(b*x+a)*sin(b*x+a)*a-(b*x+a)*a+(b*x+a)*(1/2*sin(b*x+a)*c
os(b*x+a)+1/2*b*x+1/2*a)-1/4*(b*x+a)^2-1/4*sin(b*x+a)^2+a*Si(2*b*x+2*a)+cos
(b*x+a)^2-ln(b*x+a)-Ci(2*b*x+2*a))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 414 vs. $2(204) = 408$.

Time = 0.30 (sec) , antiderivative size = 414, normalized size of antiderivative = 1.88

$$\int x^2 \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx =$$
$$-\frac{2\left(\pi^2b^3x^2 - 2\pi^2b\right)\cos(bx+a)\,\mathrm{C}(bx+a) - \sqrt{b^2}\left(\left(\pi^2(a^2-2) + 2\pi a + 1\right)\cos\left(\frac{1}{2\pi}\right) - \left(\pi + 2\pi^2a\right)\sin\left(\frac{1}{2\pi}\right.\right.}{}$$

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

```
[Out] -1/2*(2*(pi^2*b^3*x^2 - 2*pi^2*b)*cos(b*x + a)*fresnel_cos(b*x + a) - sqrt(
b^2)*((pi^2*(a^2 - 2) + 2*pi*a + 1)*cos(1/2/pi) - (pi + 2*pi^2*a)*sin(1/2/p
i))*fresnel_cos((pi*b*x + pi*a + 1)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*((pi^2*(a
^2 - 2) - 2*pi*a + 1)*cos(1/2/pi) - (pi - 2*pi^2*a)*sin(1/2/pi))*fresnel_co
s((pi*b*x + pi*a - 1)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*((pi + 2*pi^2*a)*cos(1/
2/pi) + (pi^2*(a^2 - 2) + 2*pi*a + 1)*sin(1/2/pi))*fresnel_sin((pi*b*x + pi
*a + 1)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*((pi - 2*pi^2*a)*cos(1/2/pi) + (pi^2*
(a^2 - 2) - 2*pi*a + 1)*sin(1/2/pi))*fresnel_sin((pi*b*x + pi*a - 1)*sqrt(b
^2)/(pi*b)) + 2*(2*pi*b*sin(b*x + a) - (pi*b^2*x - pi*a*b)*cos(b*x + a))*si
n(1/2*pi*b^2*x^2 + pi*a*b*x + 1/2*pi*a^2) - 2*(2*pi^2*b^2*x*fresnel_cos(b*x
 + a) - b*cos(1/2*pi*b^2*x^2 + pi*a*b*x + 1/2*pi*a^2))*sin(b*x + a))/(pi^2*
b^4)
```

Sympy [F]

$$\int x^2 \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx = \int x^2 \sin(a+bx)\operatorname{Ci}(a+bx)\,dx$$

```
[In] integrate(x**2*Ci(b*x+a)*sin(b*x+a),x)
[Out] Integral(x**2*sin(a + b*x)*Ci(a + b*x), x)
```

Maxima [F]

$$\int x^2 \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx = \int x^2 \operatorname{C}(bx+a)\sin(bx+a)\,dx$$

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

Giac [F]

$$\int x^2 \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx = \int x^2 \operatorname{C}(bx+a)\sin(bx+a)\,dx$$

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

Mupad [F(-1)]

Timed out.

$$\int x^2 \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx = \int x^2\,\mathrm{cosint}(a+b\,x)\,\sin\left(a+b\,x\right)\,dx$$

```
[In] int(x^2*cosint(a + b*x)*sin(a + b*x),x)
[Out] int(x^2*cosint(a + b*x)*sin(a + b*x), x)
```

3.124 $\int x \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx$

Optimal result

Integrand size = 14, antiderivative size = 109

$$\int x \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx = \frac{x}{2b}-\frac{x\cos(a+bx)\operatorname{CosIntegral}(a+bx)}{b}-\frac{a\operatorname{CosIntegral}(2a+2bx)}{2b^2}-\frac{a\log(a+bx)}{2b^2}+\frac{\cos(a+bx)\sin(a+bx)}{2b^2}+\frac{\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b^2}-\frac{\operatorname{Si}(2a+2bx)}{2b^2}$$

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

Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 109, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.714, Rules used = {6655, 6874, 2715, 8, 3393, 3383, 6647, 4491, 12, 3380}

$$\int x \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx = -\frac{a\operatorname{CosIntegral}(2a+2bx)}{2b^2}+\frac{\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b^2}-\frac{\operatorname{Si}(2a+2bx)}{2b^2}-\frac{a\log(a+bx)}{2b^2}+\frac{\sin(a+bx)\cos(a+bx)}{2b^2}-\frac{x\operatorname{CosIntegral}(a+bx)\cos(a+bx)}{b}+\frac{x}{2b}$$

```
[In] Int[x*CosIntegral[a + b*x]*Sin[a + b*x],x]
```

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

Rule 8

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

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 2715

```
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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6655

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{x\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b} \\
&\quad+\frac{\int\cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx}{b}+\int\frac{x\cos^2(a+bx)}{a+bx}\,dx \\
&= -\frac{x\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b}+\frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2} \\
&\quad-\frac{\int\frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{b}+\int\left(\frac{\cos^2(a+bx)}{b}-\frac{a\cos^2(a+bx)}{b(a+bx)}\right)dx \\
&= -\frac{x\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b}+\frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2} \\
&\quad+\frac{\int\cos^2(a+bx)\,dx}{b}-\frac{\int\frac{\sin(2a+2bx)}{2(a+bx)}\,dx}{b}-\frac{a\int\frac{\cos^2(a+bx)}{a+bx}\,dx}{b} \\
&= -\frac{x\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b}+\frac{\cos(a+bx)\sin(a+bx)}{2b^2} \\
&\quad+\frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2}+\frac{\int 1\,dx}{2b} \\
&\quad-\frac{\int\frac{\sin(2a+2bx)}{a+bx}\,dx}{2b}-\frac{a\int\left(\frac{1}{2(a+bx)}+\frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{b} \\
&= \frac{x}{2b}-\frac{x\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b}-\frac{a\log(a+bx)}{2b^2}+\frac{\cos(a+bx)\sin(a+bx)}{2b^2} \\
&\quad+\frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{b^2}-\frac{\text{Si}(2a+2bx)}{2b^2}-\frac{a\int\frac{\cos(2a+2bx)}{a+bx}\,dx}{2b}
\end{aligned}$$

$$= \frac{x}{2b} - \frac{x\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{b} - \frac{a\,\mathrm{CosIntegral}(2a+2bx)}{2b^2} - \frac{a\log(a+bx)}{2b^2} + \frac{\cos(a+bx)\sin(a+bx)}{2b^2} + \frac{\mathrm{CosIntegral}(a+bx)\sin(a+bx)}{b^2} - \frac{\mathrm{Si}(2a+2bx)}{2b^2}$$

Mathematica [A] (verified)

Time = 0.13 (sec) , antiderivative size = 76, normalized size of antiderivative = 0.70

$$\int x\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)\,dx$$
$$= \frac{2bx - 2a\,\mathrm{CosIntegral}(2(a+bx)) - 2a\log(a+bx) + \mathrm{CosIntegral}(a+bx)(-4bx\cos(a+bx) + 4\sin(a+bx}{4b^2}$$

```
[In] Integrate[x*CosIntegral[a + b*x]*Sin[a + b*x],x]
```

```
[Out] (2*b*x - 2*a*CosIntegral[2*(a + b*x)] - 2*a*Log[a + b*x] + CosIntegral[a +
b*x]*(-4*b*x*Cos[a + b*x] + 4*Sin[a + b*x]) + Sin[2*(a + b*x)] - 2*SinInteg
ral[2*(a + b*x)])/(4*b^2)
```

Maple [A] (verified)

Time = 1.49 (sec) , antiderivative size = 96, normalized size of antiderivative = 0.88

method	result
derivativedivides	$\frac{\mathrm{Ci}(bx+a)(a\cos(bx+a)+\sin(bx+a)-(bx+a)\cos(bx+a))-a\left(\frac{\ln(bx+a)}{2}+\frac{\mathrm{Ci}(2bx+2a)}{2}\right)-\frac{\mathrm{Si}(2bx+2a)}{2}+\frac{\sin(bx+a)\cos(bx+a)}{2}+}{b^2}$
default	$\frac{\mathrm{Ci}(bx+a)(a\cos(bx+a)+\sin(bx+a)-(bx+a)\cos(bx+a))-a\left(\frac{\ln(bx+a)}{2}+\frac{\mathrm{Ci}(2bx+2a)}{2}\right)-\frac{\mathrm{Si}(2bx+2a)}{2}+\frac{\sin(bx+a)\cos(bx+a)}{2}+}{b^2}$

```
[In] int(x*Ci(b*x+a)*sin(b*x+a),x,method=_RETURNVERBOSE)
```

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

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 274 vs. $2(99) = 198$.

Time = 0.28 (sec) , antiderivative size = 274, normalized size of antiderivative = 2.51

$$\int x\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)\,dx = -\frac{2\,\pi b^2x\cos\left(bx+a\right)\mathrm{C}\left(bx+a\right)-2\,\pi b\,\mathrm{C}\left(bx+a\right)\sin\left(bx+a\right)-2\,b\cos\left(bx+a\right)\sin\left(\frac{1}{2}\,\pi b^2x^2+\pi abx+\frac{1}{2}\,\pi a}{}$$

```
[In] integrate(x*fresnel_cos(b*x+a)*sin(b*x+a),x, algorithm="fricas")
```

```
[Out] -1/2*(2*pi*b^2*x*cos(b*x + a)*fresnel_cos(b*x + a) - 2*pi*b*fresnel_cos(b*x
 + a)*sin(b*x + a) - 2*b*cos(b*x + a)*sin(1/2*pi*b^2*x^2 + pi*a*b*x + 1/2*p
i*a^2) + sqrt(b^2)*((pi*a + 1)*cos(1/2/pi) - pi*sin(1/2/pi))*fresnel_cos((p
i*b*x + pi*a + 1)*sqrt(b^2)/(pi*b)) + sqrt(b^2)*((pi*a - 1)*cos(1/2/pi) + p
i*sin(1/2/pi))*fresnel_cos((pi*b*x + pi*a - 1)*sqrt(b^2)/(pi*b)) + sqrt(b^2
)*(pi*cos(1/2/pi) + (pi*a + 1)*sin(1/2/pi))*fresnel_sin((pi*b*x + pi*a + 1)
*sqrt(b^2)/(pi*b)) - sqrt(b^2)*(pi*cos(1/2/pi) - (pi*a - 1)*sin(1/2/pi))*fr
esnel_sin((pi*b*x + pi*a - 1)*sqrt(b^2)/(pi*b)))/(pi*b^3)
```

Sympy [F]

$$\int x\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)\,dx = \int x\sin\left(a+bx\right)\mathrm{Ci}\left(a+bx\right)\,dx$$

```
[In] integrate(x*Ci(b*x+a)*sin(b*x+a),x)
```

```
[Out] Integral(x*sin(a + b*x)*Ci(a + b*x), x)
```

Maxima [F]

$$\int x\,\mathrm{CosIntegral}(a+bx)\sin(a+bx)\,dx = \int x\,\mathrm{C}\left(bx+a\right)\sin\left(bx+a\right)\,dx$$

```
[In] integrate(x*fresnel_cos(b*x+a)*sin(b*x+a),x, algorithm="maxima")
```

```
[Out] integrate(x*fresnel_cos(b*x + a)*sin(b*x + a), x)
```

Giac [F]

$$\int x \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx = \int x\,\mathrm{C}\,(bx+a)\sin\,(bx+a)\,\,dx$$

```
[In] integrate(x*fresnel_cos(b*x+a)*sin(b*x+a),x, algorithm="giac")
[Out] integrate(x*fresnel_cos(b*x + a)*sin(b*x + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int x \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx = \int x\,\mathrm{cosint}(a+b\,x)\,\sin\,(a+b\,x)\,\,dx$$

```
[In] int(x*cosint(a + b*x)*sin(a + b*x),x)
[Out] int(x*cosint(a + b*x)*sin(a + b*x), x)
```

3.125 $\int \text{CosIntegral}(a+bx)\sin(a+bx)\,dx$

Optimal result

Integrand size = 13, antiderivative size = 47

$$\int \text{CosIntegral}(a+bx)\sin(a+bx)\,dx=-\frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b}+\frac{\text{CosIntegral}(2a+2bx)}{2b}+\frac{\log(a+bx)}{2b}$$

```
[Out] 1/2*Ci(2*b*x+2*a)/b-Ci(b*x+a)*cos(b*x+a)/b+1/2*ln(b*x+a)/b
```

Rubi [A] (verified)

Time = 0.06 (sec) , antiderivative size = 47, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.231, Rules used = {6653, 3393, 3383}

$$\int \text{CosIntegral}(a+bx)\sin(a+bx)\,dx=\frac{\text{CosIntegral}(2a+2bx)}{2b}-\frac{\text{CosIntegral}(a+bx)\cos(a+bx)}{b}+\frac{\log(a+bx)}{2b}$$

```
[In] Int[CosIntegral[a + b*x]*Sin[a + b*x],x]
```

```
[Out] -((Cos[a + b*x]*CosIntegral[a + b*x])/b) + CosIntegral[2*a + 2*b*x]/(2*b) +
 Log[a + b*x]/(2*b)
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b}+\int\frac{\cos^2(a+bx)}{a+bx}\,dx\\
&= -\frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b}+\int\left(\frac{1}{2(a+bx)}+\frac{\cos(2a+2bx)}{2(a+bx)}\right)dx\\
&= -\frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b}+\frac{\log(a+bx)}{2b}+\frac{1}{2}\int\frac{\cos(2a+2bx)}{a+bx}\,dx\\
&= -\frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b}+\frac{\text{CosIntegral}(2a+2bx)}{2b}+\frac{\log(a+bx)}{2b}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 46, normalized size of antiderivative = 0.98

$$\int \text{CosIntegral}(a+bx)\sin(a+bx)\,dx = -\frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b}+\frac{\text{CosIntegral}(2(a+bx))}{2b}+\frac{\log(a+bx)}{2b}$$

```
[In] Integrate[CosIntegral[a + b*x]*Sin[a + b*x],x]
[Out] -((Cos[a + b*x]*CosIntegral[a + b*x])/b) + CosIntegral[2*(a + b*x)]/(2*b) +
 Log[a + b*x]/(2*b)
```

Maple [A] (verified)

Time = 0.86 (sec) , antiderivative size = 39, normalized size of antiderivative = 0.83

method	result	size
derivativedivides	$\frac{-\operatorname{Ci}(bx+a)\cos(bx+a)+\frac{\ln(bx+a)}{2}+\frac{\operatorname{Ci}(2bx+2a)}{2}}{b}$	39
default	$\frac{-\operatorname{Ci}(bx+a)\cos(bx+a)+\frac{\ln(bx+a)}{2}+\frac{\operatorname{Ci}(2bx+2a)}{2}}{b}$	39

```
[In] int(Ci(b*x+a)*sin(b*x+a),x,method=_RETURNVERBOSE)
[Out] 1/b*(-Ci(b*x+a)*cos(b*x+a)+1/2*ln(b*x+a)+1/2*Ci(2*b*x+2*a))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 161 vs. 2(43) = 86.

Time = 0.27 (sec) , antiderivative size = 161, normalized size of antiderivative = 3.43

$$\int \text{CosIntegral}(a+bx)\sin(a+bx)\,dx = -\frac{2\,b\cos\left(bx+a\right)\mathrm{C}\left(bx+a\right)-\sqrt{b^2}\cos\left(\frac{1}{2\,\pi}\right)\mathrm{C}\left(\frac{(\pi bx+\pi a+1)\sqrt{b^2}}{\pi b}\right)-\sqrt{b^2}\cos\left(\frac{1}{2\,\pi}\right)\mathrm{C}\left(\frac{(\pi bx+\pi a-1)\sqrt{b^2}}{\pi b}\right)-\sqrt{b^2}\,\mathrm{S}\left(\right.}{2\,b^2}$$

```
[In] integrate(fresnel_cos(b*x+a)*sin(b*x+a),x, algorithm="fricas")
[Out] -1/2*(2*b*cos(b*x + a)*fresnel_cos(b*x + a) - sqrt(b^2)*cos(1/2/pi)*fresnel
_cos((pi*b*x + pi*a + 1)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*cos(1/2/pi)*fresnel_
cos((pi*b*x + pi*a - 1)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*fresnel_sin((pi*b*x +
 pi*a + 1)*sqrt(b^2)/(pi*b))*sin(1/2/pi) - sqrt(b^2)*fresnel_sin((pi*b*x +
pi*a - 1)*sqrt(b^2)/(pi*b))*sin(1/2/pi))/b^2
```

Sympy [F]

$$\int \text{CosIntegral}(a+bx)\sin(a+bx)\,dx = \int \sin\left(a+bx\right)\operatorname{Ci}\left(a+bx\right)\,dx$$

```
[In] integrate(Ci(b*x+a)*sin(b*x+a),x)
[Out] Integral(sin(a + b*x)*Ci(a + b*x), x)
```

Maxima [F]

$$\int \text{CosIntegral}(a+bx)\sin(a+bx)\,dx = \int \text{C}\left(bx+a\right)\sin\left(bx+a\right)\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)*sin(b*x+a),x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x + a)*sin(b*x + a), x)
```

Giac [F]

$$\int \text{CosIntegral}(a+bx)\sin(a+bx)\,dx = \int \text{C}\left(bx+a\right)\sin\left(bx+a\right)\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)*sin(b*x+a),x, algorithm="giac")
[Out] integrate(fresnel_cos(b*x + a)*sin(b*x + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int \text{CosIntegral}(a+bx)\sin(a+bx)\,dx = \frac{\ln\left(a+b\,x\right)}{2\,b}+\frac{\mathrm{cosint}(2\,a+2\,b\,x)}{2\,b}-\frac{\mathrm{cosint}(a+b\,x)\,\cos\left(a+b\,x\right)}{b}$$

```
[In] int(cosint(a + b*x)*sin(a + b*x),x)
[Out] log(a + b*x)/(2*b) + cosint(2*a + 2*b*x)/(2*b) - (cosint(a + b*x)*cos(a + b
*x))/b
```

3.126 $\int \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x}\,dx$

Optimal result

Integrand size = 16, antiderivative size = 16

$$\int \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x}\,dx=\text{Int}\left(\frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x},x\right)$$

```
[Out] CannotIntegrate(Ci(b*x+a)*sin(b*x+a)/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.11 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x}\,dx=\int \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x}\,dx$$

```
[In] Int[(CosIntegral[a + b*x]*Sin[a + b*x])/x,x]
```

```
[Out] Defer[Int][(CosIntegral[a + b*x]*Sin[a + b*x])/x, x]
```

Rubi steps

$$\text{integral}=\int \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 3.23 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x}\,dx = \int \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x}\,dx$$

```
[In] Integrate[(CosIntegral[a + b*x]*Sin[a + b*x])/x,x]
[Out] Integrate[(CosIntegral[a + b*x]*Sin[a + b*x])/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.25 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{\text{Ci}\,(bx+a)\sin\,(bx+a)}{x}dx$$

```
[In] int(Ci(b*x+a)*sin(b*x+a)/x,x)
[Out] int(Ci(b*x+a)*sin(b*x+a)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x}\,dx = \int \frac{\text{C}\,(bx+a)\sin\,(bx+a)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)*sin(b*x+a)/x,x, algorithm="fricas")
[Out] integral(fresnel_cos(b*x + a)*sin(b*x + a)/x, x)
```

Sympy [N/A]

Not integrable

Time = 1.06 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x}\,dx = \int \frac{\sin\,(a+bx)\,\text{Ci}\,(a+bx)}{x}\,dx$$

```
[In] integrate(Ci(b*x+a)*sin(b*x+a)/x,x)
[Out] Integral(sin(a + b*x)*Ci(a + b*x)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.29 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x}\,dx = \int \frac{\mathrm{C}\left(bx+a\right)\sin\left(bx+a\right)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)*sin(b*x+a)/x,x, algorithm="maxima")
[Out] integrate(fresnel_cos(b*x + a)*sin(b*x + a)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x}\,dx = \int \frac{\mathrm{C}\left(bx+a\right)\sin\left(bx+a\right)}{x}\,dx$$

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

Mupad [N/A]

Not integrable

Time = 7.00 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{x}\,dx = \int \frac{\mathrm{cosint}(a+b\,x)\,\sin\left(a+b\,x\right)}{x}\,dx$$

```
[In] int((cosint(a + b*x)*sin(a + b*x))/x,x)
[Out] int((cosint(a + b*x)*sin(a + b*x))/x, x)
```

3.127 $\int x^2 \cos(a+bx) \operatorname{CosIntegral}(a+bx)\,dx$

Optimal result

Integrand size = 16, antiderivative size = 185

$$\int x^2 \cos(a+bx) \operatorname{CosIntegral}(a+bx)\,dx = -\frac{x}{b^2} - \frac{a\cos(2a+2bx)}{4b^3} + \frac{x\cos(2a+2bx)}{4b^2} + \frac{2x\cos(a+bx)\operatorname{CosIntegral}(a+bx)}{b^2} + \frac{a\operatorname{CosIntegral}(2a+2bx)}{b^3} + \frac{a\log(a+bx)}{b^3} - \frac{\cos(a+bx)\sin(a+bx)}{b^3} - \frac{2\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b^3} + \frac{x^2\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{\sin(2a+2bx)}{8b^3} + \frac{\operatorname{Si}(2a+2bx)}{b^3} - \frac{a^2\operatorname{Si}(2a+2bx)}{2b^3}$$

```
[Out] -x/b^2+a*Ci(2*b*x+2*a)/b^3+2*x*Ci(b*x+a)*cos(b*x+a)/b^2-1/4*a*cos(2*b*x+2*a
)/b^3+1/4*x*cos(2*b*x+2*a)/b^2+a*ln(b*x+a)/b^3+Si(2*b*x+2*a)/b^3-1/2*a^2*Si
(2*b*x+2*a)/b^3-2*Ci(b*x+a)*sin(b*x+a)/b^3+x^2*Ci(b*x+a)*sin(b*x+a)/b-cos(b
*x+a)*sin(b*x+a)/b^3-1/8*sin(2*b*x+2*a)/b^3
```

Rubi [A] (verified)

Time = 0.43 (sec) , antiderivative size = 185, normalized size of antiderivative = 1.00, number of steps used = 21, number of rules used = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 1.000, Rules used = {6649, 4669, 6873, 6874, 2718, 3377, 2717, 3380, 6655, 2715, 8, 3393, 3383, 6647, 4491, 12}

$$\int x^2 \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx = -\frac{a^2 \text{Si}(2a+2bx)}{2b^3} + \frac{a\,\text{CosIntegral}(2a+2bx)}{b^3} - \frac{2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^3} + \frac{\text{Si}(2a+2bx)}{b^3} + \frac{a\log(a+bx)}{b^3} - \frac{\sin(2a+2bx)}{8b^3} - \frac{a\cos(2a+2bx)}{4b^3} - \frac{\sin(a+bx)\cos(a+bx)}{b^3} + \frac{2x\,\text{CosIntegral}(a+bx)\cos(a+bx)}{b^2} + \frac{x\cos(2a+2bx)}{4b^2} + \frac{x^2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{x}{b^2}$$

```
[In] Int[x^2*Cos[a + b*x]*CosIntegral[a + b*x],x]
```

```
[Out] -(x/b^2) - (a*Cos[2*a + 2*b*x])/(4*b^3) + (x*Cos[2*a + 2*b*x])/(4*b^2) + (2
*x*Cos[a + b*x]*CosIntegral[a + b*x])/b^2 + (a*CosIntegral[2*a + 2*b*x])/b^
3 + (a*Log[a + b*x])/b^3 - (Cos[a + b*x]*Sin[a + b*x])/b^3 - (2*CosIntegral
[a + b*x]*Sin[a + b*x])/b^3 + (x^2*CosIntegral[a + b*x]*Sin[a + b*x])/b - S
in[2*a + 2*b*x]/(8*b^3) + SinIntegral[2*a + 2*b*x]/b^3 - (a^2*SinIntegral[2
*a + 2*b*x])/(2*b^3)
```

Rule 8

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

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 2715

```
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 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 2718

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

Rule 3377

```
Int[((c_.) + (d_.)*(x_))^(m_.)*sin[(e_.) + (f_.)*(x_)], x_Symbol] :> Simp[(
-(c + d*x)^m)*(Cos[e + f*x]/f), x] + Dist[d*(m/f), Int[(c + d*x)^(m - 1)*Co
s[e + f*x], x], x] /; FreeQ[{c, d, e, f}, x] && GtQ[m, 0]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 4669

```
Int[Cos[w_]^(p_.)*(u_.)*Sin[v_]^(p_.), x_Symbol] :> Dist[1/2^p, Int[u*Sin[2
*v]^p, x], x] /; EqQ[w, v] && IntegerQ[p]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6649

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

Rule 6655

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

Rule 6873

```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}\text{integral} &= \frac{x^2 \operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b} \\ &\quad - \frac{2\int x \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx}{b} - \int \frac{x^2\cos(a+bx)\sin(a+bx)}{a+bx}\,dx \\ &= \frac{2x\cos(a+bx)\operatorname{CosIntegral}(a+bx)}{b^2} + \frac{x^2 \operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b} \\ &\quad - \frac{1}{2}\int \frac{x^2\sin(2(a+bx))}{a+bx}\,dx - \frac{2\int \cos(a+bx)\operatorname{CosIntegral}(a+bx)\,dx}{b^2} \\ &\quad - \frac{2\int \frac{x\cos^2(a+bx)}{a+bx}\,dx}{b}\end{aligned}$$

$$= \frac{2x\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^2} - \frac{2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^3} + \frac{x^2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{1}{2}\int \frac{x^2\sin(2a+2bx)}{a+bx}\,dx + \frac{2\int \frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx}{b^2} - \frac{2\int \left(\frac{\cos^2(a+bx)}{b} - \frac{a\cos^2(a+bx)}{b(a+bx)}\right)dx}{b}$$

$$= \frac{2x\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^2} - \frac{2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^3} + \frac{x^2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{1}{2}\int \left(-\frac{a\sin(2a+2bx)}{b^2} + \frac{x\sin(2a+2bx)}{b} + \frac{a^2\sin(2a+2bx)}{b^2(a+bx)}\right)dx - \frac{2\int \cos^2(a+bx)\,dx}{b^2} + \frac{2\int \frac{\sin(2a+2bx)}{2(a+bx)}\,dx}{b^2} + \frac{(2a)\int \frac{\cos^2(a+bx)}{a+bx}\,dx}{b^2}$$

$$= \frac{2x\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^2} - \frac{\cos(a+bx)\sin(a+bx)}{b^3} - \frac{2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^3} + \frac{x^2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{\int 1\,dx}{b^2} + \frac{\int \frac{\sin(2a+2bx)}{a+bx}\,dx}{b^2} + \frac{a\int \sin(2a+2bx)\,dx}{2b^2} + \frac{(2a)\int \left(\frac{1}{2(a+bx)} + \frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{b^2} - \frac{a^2\int \frac{\sin(2a+2bx)}{a+bx}\,dx}{2b^2} - \frac{\int x\sin(2a+2bx)\,dx}{2b}$$

$$= -\frac{x}{b^2} - \frac{a\cos(2a+2bx)}{4b^3} + \frac{x\cos(2a+2bx)}{4b^2} + \frac{2x\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^2} + \frac{a\log(a+bx)}{b^3} - \frac{\cos(a+bx)\sin(a+bx)}{b^3} - \frac{2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^3} + \frac{x^2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} + \frac{\text{Si}(2a+2bx)}{b^3} - \frac{a^2\text{Si}(2a+2bx)}{2b^3} - \frac{\int \cos(2a+2bx)\,dx}{4b^2} + \frac{a\int \frac{\cos(2a+2bx)}{a+bx}\,dx}{b^2}$$

$$= -\frac{x}{b^2} - \frac{a\cos(2a+2bx)}{4b^3} + \frac{x\cos(2a+2bx)}{4b^2} + \frac{2x\cos(a+bx)\,\text{CosIntegral}(a+bx)}{b^2} + \frac{a\,\text{CosIntegral}(2a+2bx)}{b^3} + \frac{a\log(a+bx)}{b^3} - \frac{\cos(a+bx)\sin(a+bx)}{b^3} - \frac{2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b^3} + \frac{x^2\,\text{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{\sin(2a+2bx)}{8b^3} + \frac{\text{Si}(2a+2bx)}{b^3} - \frac{a^2\text{Si}(2a+2bx)}{2b^3}$$

Mathematica [A] (verified)

Time = 0.22 (sec) , antiderivative size = 123, normalized size of antiderivative = 0.66

$$\int x^2\cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx$$
$$=\frac{-8bx-2a\cos(2(a+bx))+2bx\cos(2(a+bx))+8a\,\text{CosIntegral}(2(a+bx))+8a\log(a+bx)+8\,\text{CosInteg}}{}$$

```
[In] Integrate[x^2*Cos[a + b*x]*CosIntegral[a + b*x],x]
```

```
[Out] (-8*b*x - 2*a*Cos[2*(a + b*x)] + 2*b*x*Cos[2*(a + b*x)] + 8*a*CosIntegral[2
*(a + b*x)] + 8*a*Log[a + b*x] + 8*CosIntegral[a + b*x]*(2*b*x*Cos[a + b*x]
 + (-2 + b^2*x^2)*Sin[a + b*x]) - 5*Sin[2*(a + b*x)] + 8*SinIntegral[2*(a +
 b*x)] - 4*a^2*SinIntegral[2*(a + b*x)])/(8*b^3)
```

Maple [A] (verified)

Time = 4.12 (sec) , antiderivative size = 170, normalized size of antiderivative = 0.92

method	result
derivativedivides	$\frac{\text{Ci}(bx+a)\left(a^2\sin(bx+a)-2a(\cos(bx+a)+(bx+a)\sin(bx+a))+(bx+a)^2\sin(bx+a)-2\sin(bx+a)+2(bx+a)\cos(bx+a)\right)-\frac{a^2}{}}{b^3}$
default	$\frac{\text{Ci}(bx+a)\left(a^2\sin(bx+a)-2a(\cos(bx+a)+(bx+a)\sin(bx+a))+(bx+a)^2\sin(bx+a)-2\sin(bx+a)+2(bx+a)\cos(bx+a)\right)-\frac{a^2}{}}{b^3}$

```
[In] int(x^2*Ci(b*x+a)*cos(b*x+a),x,method=_RETURNVERBOSE)
```

```
[Out] 1/b^3*(Ci(b*x+a)*(a^2*sin(b*x+a)-2*a*(cos(b*x+a)+(b*x+a)*sin(b*x+a))+(b*x+a
)^2*sin(b*x+a)-2*sin(b*x+a)+2*(b*x+a)*cos(b*x+a))-1/2*a^2*Si(2*b*x+2*a)-a*c
os(b*x+a)^2+1/2*cos(b*x+a)^2*(b*x+a)-5/4*sin(b*x+a)*cos(b*x+a)-5/4*b*x-5/4*
a+a*ln(b*x+a)+a*Ci(2*b*x+2*a)+Si(2*b*x+2*a))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 414 vs. 2(177) = 354.

Time = 0.29 (sec) , antiderivative size = 414, normalized size of antiderivative = 2.24

$$\int x^2\cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx$$
$$=\frac{4\,\pi^2b^2x\cos(bx+a)\,\text{C}(bx+a)-2\,b\cos\left(\frac{1}{2}\,\pi b^2x^2+\pi abx+\frac{1}{2}\,\pi a^2\right)\cos(bx+a)+2\left(\pi^2b^3x^2-2\,\pi^2b\right)\text{C}(bx+}{}$$

```
[In] integrate(x^2*fresnel_cos(b*x+a)*cos(b*x+a),x, algorithm="fricas")
```

```
[Out] 1/2*(4*pi^2*b^2*x*cos(b*x + a)*fresnel_cos(b*x + a) - 2*b*cos(1/2*pi*b^2*x^
2 + pi*a*b*x + 1/2*pi*a^2)*cos(b*x + a) + 2*(pi^2*b^3*x^2 - 2*pi^2*b)*fresn
el_cos(b*x + a)*sin(b*x + a) + sqrt(b^2)*((pi + 2*pi^2*a)*cos(1/2/pi) + (pi
^2*(a^2 - 2) + 2*pi*a + 1)*sin(1/2/pi))*fresnel_cos((pi*b*x + pi*a + 1)*sqr
t(b^2)/(pi*b)) - sqrt(b^2)*((pi - 2*pi^2*a)*cos(1/2/pi) + (pi^2*(a^2 - 2) -
 2*pi*a + 1)*sin(1/2/pi))*fresnel_cos((pi*b*x + pi*a - 1)*sqrt(b^2)/(pi*b))
 - sqrt(b^2)*((pi^2*(a^2 - 2) + 2*pi*a + 1)*cos(1/2/pi) - (pi + 2*pi^2*a)*s
in(1/2/pi))*fresnel_sin((pi*b*x + pi*a + 1)*sqrt(b^2)/(pi*b)) + sqrt(b^2)*(
(pi^2*(a^2 - 2) - 2*pi*a + 1)*cos(1/2/pi) - (pi - 2*pi^2*a)*sin(1/2/pi))*fr
esnel_sin((pi*b*x + pi*a - 1)*sqrt(b^2)/(pi*b)) - 2*(2*pi*b*cos(b*x + a) +
(pi*b^2*x - pi*a*b)*sin(b*x + a))*sin(1/2*pi*b^2*x^2 + pi*a*b*x + 1/2*pi*a^
2))/(pi^2*b^4)
```

Sympy [F]

$$\int x^2 \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx = \int x^2 \cos\left(a+bx\right)\text{Ci}\left(a+bx\right)dx$$

```
[In] integrate(x**2*Ci(b*x+a)*cos(b*x+a),x)
[Out] Integral(x**2*cos(a + b*x)*Ci(a + b*x), x)
```

Maxima [F]

$$\int x^2 \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx = \int x^2 \cos\left(bx+a\right)\text{C}\left(bx+a\right)\,dx$$

```
[In] integrate(x^2*fresnel_cos(b*x+a)*cos(b*x+a),x, algorithm="maxima")
[Out] integrate(x^2*cos(b*x + a)*fresnel_cos(b*x + a), x)
```

Giac [F]

$$\int x^2 \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx = \int x^2 \cos\left(bx+a\right)\text{C}\left(bx+a\right)\,dx$$

```
[In] integrate(x^2*fresnel_cos(b*x+a)*cos(b*x+a),x, algorithm="giac")
[Out] integrate(x^2*cos(b*x + a)*fresnel_cos(b*x + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int x^2 \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx = \int x^2\,\text{cosint}(a+b\,x)\,\cos\left(a+b\,x\right)\,dx$$

```
[In] int(x^2*cosint(a + b*x)*cos(a + b*x),x)
[Out] int(x^2*cosint(a + b*x)*cos(a + b*x), x)
```

3.128 $\int x \cos(a + bx) \operatorname{CosIntegral}(a + bx) \, dx$

Optimal result

Integrand size = 14, antiderivative size = 96

$$\int x \cos(a + bx) \operatorname{CosIntegral}(a + bx) \, dx = \frac{\cos(2a + 2bx)}{4b^2} + \frac{\cos(a + bx) \operatorname{CosIntegral}(a + bx)}{b^2} - \frac{\operatorname{CosIntegral}(2a + 2bx)}{2b^2} - \frac{\log(a + bx)}{2b^2} + \frac{x \operatorname{CosIntegral}(a + bx) \sin(a + bx)}{b} + \frac{a\operatorname{Si}(2a + 2bx)}{2b^2}$$

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

Rubi [A] (verified)

Time = 0.19 (sec) , antiderivative size = 96, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.643, Rules used = {6649, 4669, 6873, 6874, 2718, 3380, 6653, 3393, 3383}

$$\int x \cos(a + bx) \operatorname{CosIntegral}(a + bx) \, dx = -\frac{\operatorname{CosIntegral}(2a + 2bx)}{2b^2} + \frac{\operatorname{CosIntegral}(a + bx) \cos(a + bx)}{b^2} + \frac{a\operatorname{Si}(2a + 2bx)}{2b^2} - \frac{\log(a + bx)}{2b^2} + \frac{\cos(2a + 2bx)}{4b^2} + \frac{x \operatorname{CosIntegral}(a + bx) \sin(a + bx)}{b}$$

```
[In] Int[x*Cos[a + b*x]*CosIntegral[a + b*x],x]
```

```
[Out] Cos[2*a + 2*b*x]/(4*b^2) + (Cos[a + b*x]*CosIntegral[a + b*x])/b^2 - CosInt
egral[2*a + 2*b*x]/(2*b^2) - Log[a + b*x]/(2*b^2) + (x*CosIntegral[a + b*x]
*Sin[a + b*x])/b + (a*SinIntegral[2*a + 2*b*x])/(2*b^2)
```

Rule 2718

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

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3393

```
Int[((c_.) + (d_.)*(x_))^(m_)*sin[(e_.) + (f_.)*(x_)]^(n_), x_Symbol] :> In
t[ExpandTrigReduce[(c + d*x)^m, Sin[e + f*x]^n, x], x] /; FreeQ[{c, d, e, f
, m}, x] && IGtQ[n, 1] && ( !RationalQ[m] || (GeQ[m, -1] && LtQ[m, 1]))
```

Rule 4669

```
Int[Cos[w_]^(p_.)*(u_.)*Sin[v_]^(p_.), x_Symbol] :> Dist[1/2^p, Int[u*Sin[2
*v]^p, x], x] /; EqQ[w, v] && IntegerQ[p]
```

Rule 6649

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

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6873

```
Int[u_, x_Symbol] :> With[{v = NormalizeIntegrand[u, x]}, Int[v, x] /; v =!
= u]
```

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{x \operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b} \\
&\quad - \frac{\int \operatorname{CosIntegral}(a+bx)\sin(a+bx)\,dx}{b} - \int \frac{x\cos(a+bx)\sin(a+bx)}{a+bx}\,dx \\
&= \frac{\cos(a+bx)\operatorname{CosIntegral}(a+bx)}{b^2} + \frac{x \operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b} \\
&\quad - \frac{1}{2}\int \frac{x\sin(2(a+bx))}{a+bx}\,dx - \frac{\int \frac{\cos^2(a+bx)}{a+bx}\,dx}{b} \\
&= \frac{\cos(a+bx)\operatorname{CosIntegral}(a+bx)}{b^2} + \frac{x \operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b} \\
&\quad - \frac{1}{2}\int \frac{x\sin(2a+2bx)}{a+bx}\,dx - \frac{\int \left(\frac{1}{2(a+bx)} + \frac{\cos(2a+2bx)}{2(a+bx)}\right)dx}{b} \\
&= \frac{\cos(a+bx)\operatorname{CosIntegral}(a+bx)}{b^2} - \frac{\log(a+bx)}{2b^2} + \frac{x \operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b} \\
&\quad - \frac{1}{2}\int \left(\frac{\sin(2a+2bx)}{b} + \frac{a\sin(2a+2bx)}{b(-a-bx)}\right)dx - \frac{\int \frac{\cos(2a+2bx)}{a+bx}\,dx}{2b} \\
&= \frac{\cos(a+bx)\operatorname{CosIntegral}(a+bx)}{b^2} - \frac{\operatorname{CosIntegral}(2a+2bx)}{2b^2} - \frac{\log(a+bx)}{2b^2} \\
&\quad + \frac{x \operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{\int \sin(2a+2bx)\,dx}{2b} - \frac{a\int \frac{\sin(2a+2bx)}{-a-bx}\,dx}{2b} \\
&= \frac{\cos(2a+2bx)}{4b^2} + \frac{\cos(a+bx)\operatorname{CosIntegral}(a+bx)}{b^2} - \frac{\operatorname{CosIntegral}(2a+2bx)}{2b^2} \\
&\quad - \frac{\log(a+bx)}{2b^2} + \frac{x \operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b} + \frac{a\operatorname{Si}(2a+2bx)}{2b^2}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.12 (sec) , antiderivative size = 69, normalized size of antiderivative = 0.72

$$\int x\cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx = \frac{\cos(2(a+bx)) - 2\,\text{CosIntegral}(2(a+bx)) - 2\log(a+bx) + 4\,\text{CosIntegral}(a+bx)(\cos(a+bx)+bx\sin(a}{4b^2}$$

```
[In] Integrate[x*Cos[a + b*x]*CosIntegral[a + b*x],x]
```

```
[Out] (Cos[2*(a + b*x)] - 2*CosIntegral[2*(a + b*x)] - 2*Log[a + b*x] + 4*CosInte
gral[a + b*x]*(Cos[a + b*x] + b*x*Sin[a + b*x]) + 2*a*SinIntegral[2*(a + b*
x)])/(4*b^2)
```

Maple [A] (verified)

Time = 2.29 (sec) , antiderivative size = 82, normalized size of antiderivative = 0.85

method	result	size
derivativedivides	$\frac{\text{Ci}(bx+a)(-a\sin(bx+a)+\cos(bx+a)+(bx+a)\sin(bx+a))+\frac{a\ \text{Si}(2bx+2a)}{2}-\frac{\ln(bx+a)}{2}-\frac{\text{Ci}(2bx+2a)}{2}+\frac{\cos(bx+a)^2}{2}}{b^2}$	82
default	$\frac{\text{Ci}(bx+a)(-a\sin(bx+a)+\cos(bx+a)+(bx+a)\sin(bx+a))+\frac{a\ \text{Si}(2bx+2a)}{2}-\frac{\ln(bx+a)}{2}-\frac{\text{Ci}(2bx+2a)}{2}+\frac{\cos(bx+a)^2}{2}}{b^2}$	82

```
[In] int(x*Ci(b*x+a)*cos(b*x+a),x,method=_RETURNVERBOSE)
```

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

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 276 vs. $2(88) = 176$.

Time = 0.29 (sec) , antiderivative size = 276, normalized size of antiderivative = 2.88

$$\int x\cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx = \frac{2\,\pi b^2 x\,\text{C}\,(bx+a)\sin\,(bx+a) + 2\,\pi b\cos\,(bx+a)\,\text{C}\,(bx+a) - 2\,b\sin\left(\frac{1}{2}\,\pi b^2x^2 + \pi abx + \frac{1}{2}\,\pi a^2\right)\sin\,(bx+a)}{}$$

```
[In] integrate(x*fresnel_cos(b*x+a)*cos(b*x+a),x, algorithm="fricas")
```

```
[Out] 1/2*(2*pi*b^2*x*fresnel_cos(b*x + a)*sin(b*x + a) + 2*pi*b*cos(b*x + a)*fre
snel_cos(b*x + a) - 2*b*sin(1/2*pi*b^2*x^2 + pi*a*b*x + 1/2*pi*a^2)*sin(b*x
 + a) - sqrt(b^2)*(pi*cos(1/2/pi) + (pi*a + 1)*sin(1/2/pi))*fresnel_cos((pi
```

```
*b*x + pi*a + 1)*sqrt(b^2)/(pi*b)) - sqrt(b^2)*(pi*cos(1/2/pi) - (pi*a - 1)
*sin(1/2/pi))*fresnel_cos((pi*b*x + pi*a - 1)*sqrt(b^2)/(pi*b)) + sqrt(b^2)
*((pi*a + 1)*cos(1/2/pi) - pi*sin(1/2/pi))*fresnel_sin((pi*b*x + pi*a + 1)*
sqrt(b^2)/(pi*b)) - sqrt(b^2)*((pi*a - 1)*cos(1/2/pi) + pi*sin(1/2/pi))*fre
snel_sin((pi*b*x + pi*a - 1)*sqrt(b^2)/(pi*b)))/(pi*b^3)
```

Sympy [F]

$$\int x\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)\,dx=\int x\cos\left(a+bx\right)\mathrm{Ci}\left(a+bx\right)dx$$

```
[In] integrate(x*Ci(b*x+a)*cos(b*x+a),x)
[Out] Integral(x*cos(a + b*x)*Ci(a + b*x), x)
```

Maxima [F]

$$\int x\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)\,dx=\int x\cos\left(bx+a\right)\mathrm{C}\left(bx+a\right)\,dx$$

```
[In] integrate(x*fresnel_cos(b*x+a)*cos(b*x+a),x, algorithm="maxima")
[Out] integrate(x*cos(b*x + a)*fresnel_cos(b*x + a), x)
```

Giac [F]

$$\int x\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)\,dx=\int x\cos\left(bx+a\right)\mathrm{C}\left(bx+a\right)\,dx$$

```
[In] integrate(x*fresnel_cos(b*x+a)*cos(b*x+a),x, algorithm="giac")
[Out] integrate(x*cos(b*x + a)*fresnel_cos(b*x + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int x\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)\,dx=\int x\,\mathrm{cosint}(a+b\,x)\,\cos\left(a+b\,x\right)\,dx$$

```
[In] int(x*cosint(a + b*x)*cos(a + b*x),x)
[Out] int(x*cosint(a + b*x)*cos(a + b*x), x)
```

3.129 $\int \cos(a+bx) \operatorname{CosIntegral}(a+bx)\,dx$

Optimal result

Integrand size = 13, antiderivative size = 33

$$\int \cos(a+bx) \operatorname{CosIntegral}(a+bx)\,dx = \frac{\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{\operatorname{Si}(2a+2bx)}{2b}$$

```
[Out] -1/2*Si(2*b*x+2*a)/b+Ci(b*x+a)*sin(b*x+a)/b
```

Rubi [A] (verified)

Time = 0.04 (sec) , antiderivative size = 33, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.308, Rules used = {6647, 4491, 12, 3380}

$$\int \cos(a+bx) \operatorname{CosIntegral}(a+bx)\,dx = \frac{\operatorname{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{\operatorname{Si}(2a+2bx)}{2b}$$

```
[In] Int[Cos[a + b*x]*CosIntegral[a + b*x],x]
```

```
[Out] (CosIntegral[a + b*x]*Sin[a + b*x])/b - SinIntegral[2*a + 2*b*x]/(2*b)
```

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 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 4491

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*((c_.) + (d_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(n_.), x_Symbol] :> Int[ExpandTrigReduce[(c + d*x)^m, Sin[a + b*x
]^n*Cos[a + b*x]^p, x], x] /; FreeQ[{a, b, c, d, m}, x] && IGtQ[n, 0] && IG
tQ[p, 0]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{b} - \int \frac{\cos(a+bx)\sin(a+bx)}{a+bx}\,dx \\
&= \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{b} - \int \frac{\sin(2a+2bx)}{2(a+bx)}\,dx \\
&= \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{1}{2}\int \frac{\sin(2a+2bx)}{a+bx}\,dx \\
&= \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{\text{Si}(2a+2bx)}{2b}
\end{aligned}$$

Mathematica [A] (verified)

Time = 0.02 (sec) , antiderivative size = 32, normalized size of antiderivative = 0.97

$$\int \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx = \frac{\text{CosIntegral}(a+bx)\sin(a+bx)}{b} - \frac{\text{Si}(2(a+bx))}{2b}$$

```
[In] Integrate[Cos[a + b*x]*CosIntegral[a + b*x],x]
[Out] (CosIntegral[a + b*x]*Sin[a + b*x])/b - SinIntegral[2*(a + b*x)]/(2*b)
```

Maple [A] (verified)

Time = 1.06 (sec) , antiderivative size = 30, normalized size of antiderivative = 0.91

method	result	size
derivativedivides	$\frac{\text{Ci}(bx+a)\sin(bx+a)-\frac{\text{Si}(2bx+2a)}{2}}{b}$	30
default	$\frac{\text{Ci}(bx+a)\sin(bx+a)-\frac{\text{Si}(2bx+2a)}{2}}{b}$	30

```
[In] int(Ci(b*x+a)*cos(b*x+a),x,method=_RETURNVERBOSE)
[Out] 1/b*(Ci(b*x+a)*sin(b*x+a)-1/2*Si(2*b*x+2*a))
```

Fricas [B] (verification not implemented)

Leaf count of result is larger than twice the leaf count of optimal. 159 vs. $2(31) = 62$.

Time = 0.26 (sec) , antiderivative size = 159, normalized size of antiderivative = 4.82

$$\int \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx = \frac{2\,b\,\text{C}\,(bx+a)\sin\,(bx+a) - \sqrt{b^2}\cos\left(\frac{1}{2\,\pi}\right)\text{S}\left(\frac{(\pi bx+\pi a+1)\sqrt{b^2}}{\pi b}\right) + \sqrt{b^2}\cos\left(\frac{1}{2\,\pi}\right)\text{S}\left(\frac{(\pi bx+\pi a-1)\sqrt{b^2}}{\pi b}\right) + \sqrt{b^2}\,\text{C}\left(\frac{(\pi b}{}\right.}{2\,b^2}$$

```
[In] integrate(fresnel_cos(b*x+a)*cos(b*x+a),x, algorithm="fricas")
[Out] 1/2*(2*b*fresnel_cos(b*x + a)*sin(b*x + a) - sqrt(b^2)*cos(1/2/pi)*fresnel_
sin((pi*b*x + pi*a + 1)*sqrt(b^2)/(pi*b)) + sqrt(b^2)*cos(1/2/pi)*fresnel_s
in((pi*b*x + pi*a - 1)*sqrt(b^2)/(pi*b)) + sqrt(b^2)*fresnel_cos((pi*b*x +
pi*a + 1)*sqrt(b^2)/(pi*b))*sin(1/2/pi) - sqrt(b^2)*fresnel_cos((pi*b*x + p
i*a - 1)*sqrt(b^2)/(pi*b))*sin(1/2/pi))/b^2
```

Sympy [F]

$$\int \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx = \int \cos\,(a+bx)\,\text{Ci}\,(a+bx)\,dx$$

```
[In] integrate(Ci(b*x+a)*cos(b*x+a),x)
[Out] Integral(cos(a + b*x)*Ci(a + b*x), x)
```

Maxima [F]

$$\int \cos(a+bx)\,\text{CosIntegral}(a+bx)\,dx = \int \cos\,(bx+a)\,\text{C}\,(bx+a)\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)*cos(b*x+a),x, algorithm="maxima")
[Out] integrate(cos(b*x + a)*fresnel_cos(b*x + a), x)
```

Giac [F]

$$\int \cos(a+bx)\,\mathrm{CosIntegral}(a+bx)\,dx = \int \cos(bx+a)\,C(bx+a)\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)*cos(b*x+a),x, algorithm="giac")
[Out] integrate(cos(b*x + a)*fresnel_cos(b*x + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int \cos(a+bx)\,\mathrm{CosIntegral}(a+bx)\,dx = \int \mathrm{cosint}(a+b\,x)\,\cos(a+b\,x)\,dx$$

```
[In] int(cosint(a + b*x)*cos(a + b*x),x)
[Out] int(cosint(a + b*x)*cos(a + b*x), x)
```

3.130 $\int \frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{x}\,dx$

Optimal result

Integrand size = 16, antiderivative size = 16

$$\int \frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{x}\,dx = \text{Int}\left(\frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{x},x\right)$$

```
[Out] CannotIntegrate(Ci(b*x+a)*cos(b*x+a)/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.07 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{x}\,dx = \int \frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{x}\,dx$$

```
[In] Int[(Cos[a + b*x]*CosIntegral[a + b*x])/x,x]
```

```
[Out] Defer[Int][(Cos[a + b*x]*CosIntegral[a + b*x])/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 1.39 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{x}\,dx = \int \frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{x}\,dx$$

```
[In] Integrate[(Cos[a + b*x]*CosIntegral[a + b*x])/x,x]
[Out] Integrate[(Cos[a + b*x]*CosIntegral[a + b*x])/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.26 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{\text{Ci}\,(bx+a)\cos\,(bx+a)}{x}dx$$

```
[In] int(Ci(b*x+a)*cos(b*x+a)/x,x)
[Out] int(Ci(b*x+a)*cos(b*x+a)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.26 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{x}\,dx = \int \frac{\cos\,(bx+a)\,\text{C}\,(bx+a)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)*cos(b*x+a)/x,x, algorithm="fricas")
[Out] integral(cos(b*x + a)*fresnel_cos(b*x + a)/x, x)
```

Sympy [N/A]

Not integrable

Time = 0.98 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{\cos(a+bx)\,\text{CosIntegral}(a+bx)}{x}\,dx = \int \frac{\cos\,(a+bx)\,\text{Ci}\,(a+bx)}{x}\,dx$$

```
[In] integrate(Ci(b*x+a)*cos(b*x+a)/x,x)
[Out] Integral(cos(a + b*x)*Ci(a + b*x)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.37 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{x}\,dx = \int \frac{\cos(bx+a)\,\mathrm{C}(bx+a)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)*cos(b*x+a)/x,x, algorithm="maxima")
[Out] integrate(cos(b*x + a)*fresnel_cos(b*x + a)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{x}\,dx = \int \frac{\cos(bx+a)\,\mathrm{C}(bx+a)}{x}\,dx$$

```
[In] integrate(fresnel_cos(b*x+a)*cos(b*x+a)/x,x, algorithm="giac")
[Out] integrate(cos(b*x + a)*fresnel_cos(b*x + a)/x, x)
```

Mupad [N/A]

Not integrable

Time = 6.03 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\,\mathrm{CosIntegral}(a+bx)}{x}\,dx = \int \frac{\mathrm{cosint}(a+b\,x)\,\cos(a+b\,x)}{x}\,dx$$

```
[In] int((cosint(a + b*x)*cos(a + b*x))/x,x)
[Out] int((cosint(a + b*x)*cos(a + b*x))/x, x)
```

3.131 $\int x \operatorname{CosIntegral}(c+dx)\sin(a+bx)\,dx$

Optimal result

Integrand size = 14, antiderivative size = 371

$$\begin{aligned}\int x \operatorname{CosIntegral}(c+dx)\sin(a+bx)\,dx =& -\frac{c\cos\left(a-\frac{bc}{d}\right)\operatorname{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2bd} \\ &- \frac{x\cos(a+bx)\operatorname{CosIntegral}(c+dx)}{b} \\ &- \frac{c\cos\left(a-\frac{bc}{d}\right)\operatorname{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2bd} \\ &- \frac{\operatorname{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b^2} \\ &- \frac{\operatorname{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b^2} \\ &+ \frac{\operatorname{CosIntegral}(c+dx)\sin(a+bx)}{b^2} \\ &+ \frac{\sin(a-c+(b-d)x)}{2b(b-d)} + \frac{\sin(a+c+(b+d)x)}{2b(b+d)} \\ &- \frac{\cos\left(a-\frac{bc}{d}\right)\operatorname{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} \\ &+ \frac{c\sin\left(a-\frac{bc}{d}\right)\operatorname{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2bd} \\ &- \frac{\cos\left(a-\frac{bc}{d}\right)\operatorname{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2} \\ &+ \frac{c\sin\left(a-\frac{bc}{d}\right)\operatorname{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2bd}\end{aligned}$$

```
[Out] -1/2*c*Ci(c*(b-d)/d+(b-d)*x)*cos(a-b*c/d)/b/d-1/2*c*Ci(c*(b+d)/d+(b+d)*x)*c
os(a-b*c/d)/b/d-x*Ci(d*x+c)*cos(b*x+a)/b-1/2*cos(a-b*c/d)*Si(c*(b-d)/d+(b-d
)*x)/b^2-1/2*cos(a-b*c/d)*Si(c*(b+d)/d+(b+d)*x)/b^2-1/2*Ci(c*(b-d)/d+(b-d)*
x)*sin(a-b*c/d)/b^2-1/2*Ci(c*(b+d)/d+(b+d)*x)*sin(a-b*c/d)/b^2+1/2*c*Si(c*(
b-d)/d+(b-d)*x)*sin(a-b*c/d)/b/d+1/2*c*Si(c*(b+d)/d+(b+d)*x)*sin(a-b*c/d)/b
/d+Ci(d*x+c)*sin(b*x+a)/b^2+1/2*sin(a-c+(b-d)*x)/b/(b-d)+1/2*sin(a+c+(b+d)*
x)/b/(b+d)
```

Rubi [A] (verified)

Time = 0.72 (sec) , antiderivative size = 371, normalized size of antiderivative = 1.00, number of steps used = 24, number of rules used = 9, $\frac{\text{number of rules}}{\text{integrand size}} = 0.643$, Rules used = {6655, 4705, 6874, 2717, 3384, 3380, 3383, 6647, 4515}

$$\begin{aligned}\int x \,\text{CosIntegral}(c+dx)\sin(a+bx)\,dx = & -\frac{\sin\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b^2} \\ & -\frac{\sin\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b^2} \\ & +\frac{\sin(a+bx)\,\text{CosIntegral}(c+dx)}{b^2} \\ & -\frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b^2} \\ & -\frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b^2} \\ & -\frac{c\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2bd} \\ & -\frac{x\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b} \\ & -\frac{c\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2bd} \\ & +\frac{c\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2bd} \\ & +\frac{c\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2bd} \\ & +\frac{\sin(a+x(b-d)-c)}{2b(b-d)}+\frac{\sin(a+x(b+d)+c)}{2b(b+d)}\end{aligned}$$

```
[In] Int[x*CosIntegral[c + d*x]*Sin[a + b*x],x]
```

```
[Out] -1/2*(c*Cos[a - (b*c)/d]*CosIntegral[(c*(b - d))/d + (b - d)*x])/(b*d) - (x
*Cos[a + b*x]*CosIntegral[c + d*x])/b - (c*Cos[a - (b*c)/d]*CosIntegral[(c*
```

```
(b + d))/d + (b + d)*x])/(2*b*d) - (CosIntegral[(c*(b - d))/d + (b - d)*x]*
Sin[a - (b*c)/d])/(2*b^2) - (CosIntegral[(c*(b + d))/d + (b + d)*x]*Sin[a -
 (b*c)/d])/(2*b^2) + (CosIntegral[c + d*x]*Sin[a + b*x])/b^2 + Sin[a - c +
(b - d)*x]/(2*b*(b - d)) + Sin[a + c + (b + d)*x]/(2*b*(b + d)) - (Cos[a -
(b*c)/d]*SinIntegral[(c*(b - d))/d + (b - d)*x])/(2*b^2) + (c*Sin[a - (b*c)
/d]*SinIntegral[(c*(b - d))/d + (b - d)*x])/(2*b*d) - (Cos[a - (b*c)/d]*Sin
Integral[(c*(b + d))/d + (b + d)*x])/(2*b^2) + (c*Sin[a - (b*c)/d]*SinInteg
ral[(c*(b + d))/d + (b + d)*x])/(2*b*d)
```

Rule 2717

```
Int[sin[Pi/2 + (c_.) + (d_.)*(x_)], x_Symbol] :> Simp[Sin[c + d*x]/d, x] /;
 FreeQ[{c, d}, x]
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3384

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Dist[Cos[(d*
e - c*f)/d], Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Dist[Sin[(d*e - c*f
)/d], Int[Cos[c*(f/d) + f*x]/(c + d*x), x], x] /; FreeQ[{c, d, e, f}, x] &&
 NeQ[d*e - c*f, 0]
```

Rule 4515

```
Int[Cos[(c_.) + (d_.)*(x_)]^(q_.)*((e_.) + (f_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(p_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Sin[a + b*x
]^p*Cos[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] && IGtQ[p, 0]
 && IGtQ[q, 0]
```

Rule 4705

```
Int[Cos[(a_.) + (b_.)*(x_)]^(m_.)*Cos[(c_.) + (d_.)*(x_)]^(n_.)*(u_.), x_Sy
mbol] :> Int[ExpandTrigReduce[u, Cos[a + b*x]^m*Cos[c + d*x]^n, x], x] /; F
reeQ[{a, b, c, d}, x] && IGtQ[m, 0] && IGtQ[n, 0]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6655

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

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= -\frac{x\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b} + \frac{\int\cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx}{b} + \frac{d\int\frac{x\cos(a+bx)\cos(c+dx)}{c+dx}\,dx}{b}\\
&= -\frac{x\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b} + \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{b^2} - \frac{d\int\frac{\cos(c+dx)\sin(a+bx)}{c+dx}\,dx}{b^2} + \frac{d\int\left(\frac{x\cos(a-c+(b-d)x)}{2(c+dx)}+\frac{x\cos(a+c+(b+d)x)}{2(c+dx)}\right)dx}{b}\\
&= -\frac{x\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b} + \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{b^2} - \frac{d\int\left(\frac{\sin(a-c+(b-d)x)}{2(c+dx)}+\frac{\sin(a+c+(b+d)x)}{2(c+dx)}\right)dx}{b^2}\\
&\quad + \frac{d\int\frac{x\cos(a-c+(b-d)x)}{c+dx}\,dx}{2b} + \frac{d\int\frac{x\cos(a+c+(b+d)x)}{c+dx}\,dx}{2b}\\
&= -\frac{x\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b} + \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{b^2} - \frac{d\int\frac{\sin(a-c+(b-d)x)}{c+dx}\,dx}{2b^2} - \frac{d\int\frac{\sin(a+c+(b+d)x)}{c+dx}\,dx}{2b^2}\\
&\quad + \frac{d\int\left(\frac{\cos(a-c+(b-d)x)}{d}-\frac{c\cos(a-c+(b-d)x)}{d(c+dx)}\right)dx}{2b}\\
&\quad + \frac{d\int\left(\frac{\cos(a+c+(b+d)x)}{d}-\frac{c\cos(a+c+(b+d)x)}{d(c+dx)}\right)dx}{2b}
\end{aligned}$$

$$= -\frac{x\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b} + \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{b^2} + \frac{\int\cos(a-c+(b-d)x)\,dx}{2b} + \frac{\int\cos(a+c+(b+d)x)\,dx}{2b} - \frac{c\int\frac{\cos(a-c+(b-d)x)}{c+dx}\,dx}{2b} - \frac{c\int\frac{\cos(a+c+(b+d)x)}{c+dx}\,dx}{2b} - \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int\frac{\sin\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b^2} - \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int\frac{\sin\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b^2} - \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int\frac{\cos\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b^2} - \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int\frac{\cos\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b^2}$$

$$= -\frac{x\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b} - \frac{\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b^2} - \frac{\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b^2} + \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{b^2} + \frac{\sin(a-c+(b-d)x)}{2b(b-d)} + \frac{\sin(a+c+(b+d)x)}{2b(b+d)} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2} - \frac{\left(c\cos\left(a-\frac{bc}{d}\right)\right)\int\frac{\cos\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} - \frac{\left(c\cos\left(a-\frac{bc}{d}\right)\right)\int\frac{\cos\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b} + \frac{\left(c\sin\left(a-\frac{bc}{d}\right)\right)\int\frac{\sin\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} + \frac{\left(c\sin\left(a-\frac{bc}{d}\right)\right)\int\frac{\sin\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b}$$

$$= -\frac{c\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2bd} - \frac{x\cos(a+bx)\text{CosIntegral}(c+dx)}{b} - \frac{c\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2bd} - \frac{\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b^2} - \frac{\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b^2} + \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{b^2} + \frac{\sin(a-c+(b-d)x)}{2b(b-d)} + \frac{\sin(a+c+(b+d)x)}{2b(b+d)} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} + \frac{c\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2bd} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2} + \frac{c\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2bd}$$

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 4.57 (sec) , antiderivative size = 320, normalized size of antiderivative = 0.86

$$\int x\,\text{CosIntegral}(c+dx)\sin(a+bx)\,dx = -\frac{\frac{e^{-ia}\left(-ibde^{-ic}\left(\frac{e^{-i(b+d)x}}{b+d}+\frac{e^{i(2c-bx+dx)}}{b-d}\right)+(bc+id)e^{\frac{ibc}{d}}\text{ExpIntegralEi}\left(-\frac{i(b-d)(c+dx)}{d}\right)+(bc+id)e^{\frac{ibc}{d}}\text{ExpIntegralEi}\left(-\frac{i(b+d)(c+dx)}{d}\right)\right)}{d}+}{}$$

```
[In] Integrate[x*CosIntegral[c + d*x]*Sin[a + b*x],x]
```

```
[Out] -1/4*((((-I)*b*d*(1/((b + d)*E^(I*(b + d)*x)) + E^(I*(2*c - b*x + d*x))/(b
- d)))/E^(I*c) + (b*c + I*d)*E^((I*b*c)/d)*ExpIntegralEi[((-I)*(b - d)*(c +
 d*x))/d] + (b*c + I*d)*E^((I*b*c)/d)*ExpIntegralEi[((-I)*(b + d)*(c + d*x)
)/d])/(d*E^(I*a)) + (E^(I*a)*((I*b*d*(E^(I*(b - d)*x)/(b - d) + E^(I*(2*c +
 (b + d)*x))/(b + d)))/E^(I*c) + ((b*c - I*d)*ExpIntegralEi[(I*(b - d)*(c +
 d*x))/d])/E^((I*b*c)/d) + ((b*c - I*d)*ExpIntegralEi[(I*(b + d)*(c + d*x))
/d])/E^((I*b*c)/d)))/d + 4*CosIntegral[c + d*x]*(b*x*Cos[a + b*x] - Sin[a +
 b*x]))/b^2
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1241 vs. 2(351) = 702.

Time = 2.36 (sec) , antiderivative size = 1242, normalized size of antiderivative = 3.35

method	result	size
default	Expression too large to display	1242

```
[In] int(x*Ci(d*x+c)*sin(b*x+a),x,method=_RETURNVERBOSE)
```

```
[Out] (-Ci(d*x+c)/b*(-d/b*a*cos(1/d*b*(d*x+c)+(a*d-b*c)/d)-1/b*d*(sin(1/d*b*(d*x+
c)+(a*d-b*c)/d)-(1/d*b*(d*x+c)+(a*d-b*c)/d)*cos(1/d*b*(d*x+c)+(a*d-b*c)/d))
)+1/b*(-1/2*d^2/(b-d)*a*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*sin
((-a*d+b*c)/d)/d+Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*cos((-a*d+b*c
)/d)/d)+1/2*d^2/(b-d)*c*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*sin
((-a*d+b*c)/d)/d+Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*cos((-a*d+b*c
)/d)/d)+1/2/(b-d)*d*(a*d-b*c)*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/
d)*sin((-a*d+b*c)/d)/d+Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*cos((-a
*d+b*c)/d)/d)+1/2/(b-d)*d*sin((b-d)/d*(d*x+c)+(a*d-b*c)/d)-1/2*a*d^2/(b+d)*
(-Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci((b+d
)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d)-1/2*d^2*c/(b+d)*
(-Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci((b+d
)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d)+1/2*(a*d-b*c)*d/
(b+d)*(-Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d+C
i((b+d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d)+1/2/(b+d)*
d*sin((b+d)/d*(d*x+c)+(a*d-b*c)/d)-1/2/b*d^2*(-Si(-(b+d)/d*(d*x+c)-(a*d-b*c
)/d-(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci((b+d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+
b*c)/d)*sin((-a*d+b*c)/d)/d)-1/2/b*d^2*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-
a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d
)*sin((-a*d+b*c)/d)/d))/d
```

Fricas [A] (verification not implemented)

none

Time = 0.29 (sec) , antiderivative size = 451, normalized size of antiderivative = 1.22

$$\int x \,\mathrm{CosIntegral}(c+dx)\sin(a+bx)\,dx =$$

$$-\frac{2\,\pi bd^3x\cos\left(bx+a\right)\mathrm{C}\left(dx+c\right)-2\,\pi d^3\,\mathrm{C}\left(dx+c\right)\sin\left(bx+a\right)-2\,bd^2\cos\left(bx+a\right)\sin\left(\frac{1}{2}\,\pi d^2x^2+\pi cdx\right.}{}$$

```
[In] integrate(x*fresnel_cos(d*x+c)*sin(b*x+a),x, algorithm="fricas")
```

```
[Out] -1/2*(2*pi*b*d^3*x*cos(b*x + a)*fresnel_cos(d*x + c) - 2*pi*d^3*fresnel_cos
(d*x + c)*sin(b*x + a) - 2*b*d^2*cos(b*x + a)*sin(1/2*pi*d^2*x^2 + pi*c*d*x
```

```
 + 1/2*pi*c^2) + (pi*d^2*sin(a - b*c/d - 1/2*b^2/(pi*d^2)) + (pi*b*c*d + b^
2)*cos(a - b*c/d - 1/2*b^2/(pi*d^2)))*sqrt(d^2)*fresnel_cos((pi*d^2*x + pi*
c*d + b)*sqrt(d^2)/(pi*d^2)) + (pi*d^2*sin(a - b*c/d + 1/2*b^2/(pi*d^2)) +
(pi*b*c*d - b^2)*cos(a - b*c/d + 1/2*b^2/(pi*d^2)))*sqrt(d^2)*fresnel_cos((
pi*d^2*x + pi*c*d - b)*sqrt(d^2)/(pi*d^2)) + (pi*d^2*cos(a - b*c/d - 1/2*b^
2/(pi*d^2)) - (pi*b*c*d + b^2)*sin(a - b*c/d - 1/2*b^2/(pi*d^2)))*sqrt(d^2)
*fresnel_sin((pi*d^2*x + pi*c*d + b)*sqrt(d^2)/(pi*d^2)) - (pi*d^2*cos(a -
b*c/d + 1/2*b^2/(pi*d^2)) - (pi*b*c*d - b^2)*sin(a - b*c/d + 1/2*b^2/(pi*d^
2)))*sqrt(d^2)*fresnel_sin((pi*d^2*x + pi*c*d - b)*sqrt(d^2)/(pi*d^2)))/(pi
*b^2*d^3)
```

Sympy [F]

$$\int x \operatorname{CosIntegral}(c+dx)\sin(a+bx)\,dx = \int x\sin(a+bx)\operatorname{Ci}(c+dx)\,dx$$

```
[In] integrate(x*Ci(d*x+c)*sin(b*x+a),x)
[Out] Integral(x*sin(a + b*x)*Ci(c + d*x), x)
```

Maxima [F]

$$\int x \operatorname{CosIntegral}(c+dx)\sin(a+bx)\,dx = \int x\,\mathrm{C}(dx+c)\sin(bx+a)\,dx$$

```
[In] integrate(x*fresnel_cos(d*x+c)*sin(b*x+a),x, algorithm="maxima")
[Out] integrate(x*fresnel_cos(d*x + c)*sin(b*x + a), x)
```

Giac [F]

$$\int x \operatorname{CosIntegral}(c+dx)\sin(a+bx)\,dx = \int x\,\mathrm{C}(dx+c)\sin(bx+a)\,dx$$

```
[In] integrate(x*fresnel_cos(d*x+c)*sin(b*x+a),x, algorithm="giac")
[Out] integrate(x*fresnel_cos(d*x + c)*sin(b*x + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int x \operatorname{CosIntegral}(c+dx)\sin(a+bx)\,dx = \int x\,\mathrm{cosint}(c+d\,x)\,\sin\left(a+b\,x\right)\,dx$$

[In] int(x*cosint(c + d*x)*sin(a + b*x),x)

[Out] int(x*cosint(c + d*x)*sin(a + b*x), x)

3.132 $\int \text{CosIntegral}(c+dx)\sin(a+bx)\,dx$

Optimal result

Integrand size = 13, antiderivative size = 154

$$\int \text{CosIntegral}(c+dx)\sin(a+bx)\,dx = \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b} - \frac{\cos(a+bx)\text{CosIntegral}(c+dx)}{b} + \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b} - \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b} - \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b}$$

```
[Out] 1/2*Ci(c*(b-d)/d+(b-d)*x)*cos(a-b*c/d)/b+1/2*Ci(c*(b+d)/d+(b+d)*x)*cos(a-b*
c/d)/b-Ci(d*x+c)*cos(b*x+a)/b-1/2*Si(c*(b-d)/d+(b-d)*x)*sin(a-b*c/d)/b-1/2*
Si(c*(b+d)/d+(b+d)*x)*sin(a-b*c/d)/b
```

Rubi [A] (verified)

Time = 0.17 (sec) , antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.385$, Rules used

= {6653, 4514, 3384, 3380, 3383}

$$\int \text{CosIntegral}(c+dx)\sin(a+bx)\,dx = \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b} - \frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b} + \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b} - \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b} - \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b}$$

```
[In] Int[CosIntegral[c + d*x]*Sin[a + b*x],x]
```

```
[Out] (Cos[a - (b*c)/d]*CosIntegral[(c*(b - d))/d + (b - d)*x])/(2*b) - (Cos[a +
b*x]*CosIntegral[c + d*x])/b + (Cos[a - (b*c)/d]*CosIntegral[(c*(b + d))/d
+ (b + d)*x])/(2*b) - (Sin[a - (b*c)/d]*SinIntegral[(c*(b - d))/d + (b - d)
*x])/(2*b) - (Sin[a - (b*c)/d]*SinIntegral[(c*(b + d))/d + (b + d)*x])/(2*b
)
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3384

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Dist[Cos[(d*
e - c*f)/d], Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Dist[Sin[(d*e - c*f
)/d], Int[Cos[c*(f/d) + f*x]/(c + d*x), x], x] /; FreeQ[{c, d, e, f}, x] &&
 NeQ[d*e - c*f, 0]
```

Rule 4514

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*Cos[(c_.) + (d_.)*(x_)]^(q_.)*((e_.) + (f
_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Cos[a + b*x
]^p*Cos[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f}, x] && IGtQ[p, 0] &&
```

```
IGtQ[q, 0] && IntegerQ[m]
```

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= -\frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b}+\frac{d\int\frac{\cos(a+bx)\cos(c+dx)}{c+dx}\,dx}{b}\\
&= -\frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b}+\frac{d\int\left(\frac{\cos(a-c+(b-d)x)}{2(c+dx)}+\frac{\cos(a+c+(b+d)x)}{2(c+dx)}\right)dx}{b}\\
&= -\frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b}+\frac{d\int\frac{\cos(a-c+(b-d)x)}{c+dx}\,dx}{2b}+\frac{d\int\frac{\cos(a+c+(b+d)x)}{c+dx}\,dx}{2b}\\
&= -\frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b}+\frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int\frac{\cos\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b}\\
&\quad+\frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int\frac{\cos\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b}\\
&\quad-\frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int\frac{\sin\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b}-\frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int\frac{\sin\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b}\\
&= \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b}-\frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b}\\
&\quad+\frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b}\\
&\quad-\frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b}-\frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b}
\end{aligned}
$$

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.87 (sec) , antiderivative size = 144, normalized size of antiderivative = 0.94

$$\int \text{CosIntegral}(c+dx)\sin(a+bx)\,dx$$
$$=\frac{-4\cos(a+bx)\,\text{CosIntegral}(c+dx)+\left(\text{ExpIntegralEi}\left(-\frac{i(b-d)(c+dx)}{d}\right)+\text{ExpIntegralEi}\left(-\frac{i(b+d)(c+dx)}{d}\right)\right)}{}$$

```
[In] Integrate[CosIntegral[c + d*x]*Sin[a + b*x],x]
```

```
[Out] (-4*Cos[a + b*x]*CosIntegral[c + d*x] + (ExpIntegralEi[((-I)*(b - d)*(c + d
*x))/d] + ExpIntegralEi[((-I)*(b + d)*(c + d*x))/d])*(Cos[a - (b*c)/d] - I*
Sin[a - (b*c)/d]) + (ExpIntegralEi[(I*(b - d)*(c + d*x))/d] + ExpIntegralEi
[(I*(b + d)*(c + d*x))/d])*(Cos[a - (b*c)/d] + I*Sin[a - (b*c)/d]))/(4*b)
```

Maple [A] (verified)

Time = 1.50 (sec) , antiderivative size = 272, normalized size of antiderivative = 1.77

method	result
default	$\frac{-\frac{\text{Ci}(dx+c)d\cos\left(\frac{b(dx+c)}{d}+\frac{ad-bc}{d}\right)}{b}+\frac{d\left(\frac{d\left(-\frac{\text{Si}\left(-\left(-1+\frac{b}{d}\right)(dx+c)-a+\frac{bc}{d}-\frac{-ad+bc}{d}\right)\sin\left(\frac{-ad+bc}{d}\right)}{d}+\frac{\text{Ci}\left(\left(-1+\frac{b}{d}\right)(dx+c)+a-\frac{bc}{d}+\frac{-ad+bc}{d}\right)\text{co}}{d}\right.}{2}\right.}{}}{d}$

```
[In] int(Ci(d*x+c)*sin(b*x+a),x,method=_RETURNVERBOSE)
```

```
[Out] (-Ci(d*x+c)/b*d*cos(1/d*b*(d*x+c)+(a*d-b*c)/d)+1/b*d*(1/2*d*(-Si(-(-1+b/d)*
(d*x+c)-a+b*c/d-(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci((-1+b/d)*(d*x+c)+a-b*c
/d+(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d)+1/2*d*(-Si(-(1+b/d)*(d*x+c)-a+b*c/d-(
-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci((1+b/d)*(d*x+c)+a-b*c/d+(-a*d+b*c)/d)*c
os((-a*d+b*c)/d)/d)))/d
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 239, normalized size of antiderivative = 1.55

$$\int \text{CosIntegral}(c+dx)\sin(a+bx)\,dx =$$

$$-\frac{2\,d\cos\left(bx+a\right)\text{C}\left(dx+c\right)-\sqrt{d^2}\cos\left(a-\frac{bc}{d}-\frac{b^2}{2\,\pi d^2}\right)\text{C}\left(\frac{\left(\pi d^2x+\pi cd+b\right)\sqrt{d^2}}{\pi d^2}\right)-\sqrt{d^2}\cos\left(a-\frac{bc}{d}+\frac{b^2}{2\,\pi d^2}\right)\text{C}$$

```
[In] integrate(fresnel_cos(d*x+c)*sin(b*x+a),x, algorithm="fricas")
```

```
[Out] -1/2*(2*d*cos(b*x + a)*fresnel_cos(d*x + c) - sqrt(d^2)*cos(a - b*c/d - 1/2
*b^2/(pi*d^2))*fresnel_cos((pi*d^2*x + pi*c*d + b)*sqrt(d^2)/(pi*d^2)) - sq
rt(d^2)*cos(a - b*c/d + 1/2*b^2/(pi*d^2))*fresnel_cos((pi*d^2*x + pi*c*d -
b)*sqrt(d^2)/(pi*d^2)) - sqrt(d^2)*fresnel_sin((pi*d^2*x + pi*c*d - b)*sqrt
(d^2)/(pi*d^2))*sin(a - b*c/d + 1/2*b^2/(pi*d^2)) + sqrt(d^2)*fresnel_sin((
pi*d^2*x + pi*c*d + b)*sqrt(d^2)/(pi*d^2))*sin(a - b*c/d - 1/2*b^2/(pi*d^2)
))/(b*d)
```

Sympy [F]

$$\int \text{CosIntegral}(c+dx)\sin(a+bx)\,dx = \int \sin\left(a+bx\right)\text{Ci}\left(c+dx\right)\,dx$$

```
[In] integrate(Ci(d*x+c)*sin(b*x+a),x)
```

```
[Out] Integral(sin(a + b*x)*Ci(c + d*x), x)
```

Maxima [F]

$$\int \text{CosIntegral}(c+dx)\sin(a+bx)\,dx = \int \text{C}\left(dx+c\right)\sin\left(bx+a\right)\,dx$$

```
[In] integrate(fresnel_cos(d*x+c)*sin(b*x+a),x, algorithm="maxima")
```

```
[Out] integrate(fresnel_cos(d*x + c)*sin(b*x + a), x)
```

Giac [F]

$$\int \text{CosIntegral}(c+dx)\sin(a+bx)\,dx=\int \text{C}\left(dx+c\right)\sin\left(bx+a\right)\,dx$$

```
[In] integrate(fresnel_cos(d*x+c)*sin(b*x+a),x, algorithm="giac")
[Out] integrate(fresnel_cos(d*x + c)*sin(b*x + a), x)
```

Mupad [F(-1)]

Timed out.

$$\int \text{CosIntegral}(c+dx)\sin(a+bx)\,dx=\int \text{cosint}(c+d\,x)\,\sin\left(a+b\,x\right)\,dx$$

```
[In] int(cosint(c + d*x)*sin(a + b*x),x)
[Out] int(cosint(c + d*x)*sin(a + b*x), x)
```

3.133 $\int \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x}\,dx$

Optimal result

Integrand size = 16, antiderivative size = 16

$$\int \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x}\,dx = \text{Int}\left(\frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x},x\right)$$

```
[Out] CannotIntegrate(Ci(d*x+c)*sin(b*x+a)/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.13 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.000, Rules used = {}

$$\int \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x}\,dx = \int \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x}\,dx$$

```
[In] Int[(CosIntegral[c + d*x]*Sin[a + b*x])/x,x]
```

```
[Out] Defer[Int][(CosIntegral[c + d*x]*Sin[a + b*x])/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 14.91 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x}\,dx=\int \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x}\,dx$$

```
[In] Integrate[(CosIntegral[c + d*x]*Sin[a + b*x])/x,x]
[Out] Integrate[(CosIntegral[c + d*x]*Sin[a + b*x])/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.35 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{\text{Ci}\left(dx+c\right)\sin\left(bx+a\right)}{x}dx$$

```
[In] int(Ci(d*x+c)*sin(b*x+a)/x,x)
[Out] int(Ci(d*x+c)*sin(b*x+a)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x}\,dx=\int \frac{\text{C}\left(dx+c\right)\sin\left(bx+a\right)}{x}\,dx$$

```
[In] integrate(fresnel_cos(d*x+c)*sin(b*x+a)/x,x, algorithm="fricas")
[Out] integral(fresnel_cos(d*x + c)*sin(b*x + a)/x, x)
```

Sympy [N/A]

Not integrable

Time = 0.71 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x}\,dx=\int \frac{\sin\left(a+bx\right)\text{Ci}\left(c+dx\right)}{x}\,dx$$

```
[In] integrate(Ci(d*x+c)*sin(b*x+a)/x,x)
[Out] Integral(sin(a + b*x)*Ci(c + d*x)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.39 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x}\,dx = \int \frac{\mathrm{C}\,(dx+c)\sin\,(bx+a)}{x}\,dx$$

```
[In] integrate(fresnel_cos(d*x+c)*sin(b*x+a)/x,x, algorithm="maxima")
[Out] integrate(fresnel_cos(d*x + c)*sin(b*x + a)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.30 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x}\,dx = \int \frac{\mathrm{C}\,(dx+c)\sin\,(bx+a)}{x}\,dx$$

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

Mupad [N/A]

Not integrable

Time = 5.88 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{x}\,dx = \int \frac{\text{cosint}(c+d\,x)\,\sin\,(a+b\,x)}{x}\,dx$$

```
[In] int((cosint(c + d*x)*sin(a + b*x))/x,x)
[Out] int((cosint(c + d*x)*sin(a + b*x))/x, x)
```

3.134 $\int x \cos(a+bx) \operatorname{CosIntegral}(c+dx)\, dx$

Optimal result

Integrand size = 14, antiderivative size = 370

$$\begin{aligned}
\int x \cos(a+bx) \operatorname{CosIntegral}(c+dx)\, dx &= \frac{\cos(a-c+(b-d)x)}{2b(b-d)} + \frac{\cos(a+c+(b+d)x)}{2b(b+d)} \\
&- \frac{\cos\left(a-\frac{bc}{d}\right) \operatorname{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} \\
&+ \frac{\cos(a+bx) \operatorname{CosIntegral}(c+dx)}{b^2} \\
&- \frac{\cos\left(a-\frac{bc}{d}\right) \operatorname{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2} \\
&+ \frac{c \operatorname{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right) \sin\left(a-\frac{bc}{d}\right)}{2bd} \\
&+ \frac{c \operatorname{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right) \sin\left(a-\frac{bc}{d}\right)}{2bd} \\
&+ \frac{x \operatorname{CosIntegral}(c+dx) \sin(a+bx)}{b} \\
&+ \frac{c \cos\left(a-\frac{bc}{d}\right) \operatorname{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2bd} \\
&+ \frac{\sin\left(a-\frac{bc}{d}\right) \operatorname{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} \\
&+ \frac{c \cos\left(a-\frac{bc}{d}\right) \operatorname{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2bd} \\
&+ \frac{\sin\left(a-\frac{bc}{d}\right) \operatorname{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2}
\end{aligned}$$

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

Rubi [A] (verified)

Time = 0.66 (sec) , antiderivative size = 370, normalized size of antiderivative = 1.00, number of steps used = 24, number of rules used = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.714$, Rules used = {6649, 6874, 4670, 2718, 4515, 3384, 3380, 3383, 6653, 4514}

$$\begin{aligned}\int x\cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx = &-\frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b^2} \\ &+\frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b^2} \\ &-\frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b^2} \\ &+\frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b^2} \\ &+\frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b^2} \\ &+\frac{c\sin\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2bd} \\ &+\frac{c\sin\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2bd} \\ &+\frac{x\sin(a+bx)\,\text{CosIntegral}(c+dx)}{b} \\ &+\frac{c\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2bd} \\ &+\frac{c\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2bd} \\ &+\frac{\cos(a+x(b-d)-c)}{2b(b-d)}+\frac{\cos(a+x(b+d)+c)}{2b(b+d)}\end{aligned}$$

```
[In] Int[x*Cos[a + b*x]*CosIntegral[c + d*x],x]
```

```
[Out] Cos[a - c + (b - d)*x]/(2*b*(b - d)) + Cos[a + c + (b + d)*x]/(2*b*(b + d))
 - (Cos[a - (b*c)/d]*CosIntegral[(c*(b - d))/d + (b - d)*x])/(2*b^2) + (Cos
```

```
[a + b*x]*CosIntegral[c + d*x])/b^2 - (Cos[a - (b*c)/d]*CosIntegral[(c*(b +
 d))/d + (b + d)*x])/(2*b^2) + (c*CosIntegral[(c*(b - d))/d + (b - d)*x]*Si
n[a - (b*c)/d])/(2*b*d) + (c*CosIntegral[(c*(b + d))/d + (b + d)*x]*Sin[a -
 (b*c)/d])/(2*b*d) + (x*CosIntegral[c + d*x]*Sin[a + b*x])/b + (c*Cos[a - (
b*c)/d]*SinIntegral[(c*(b - d))/d + (b - d)*x])/(2*b*d) + (Sin[a - (b*c)/d]
*SinIntegral[(c*(b - d))/d + (b - d)*x])/(2*b^2) + (c*Cos[a - (b*c)/d]*SinI
ntegral[(c*(b + d))/d + (b + d)*x])/(2*b*d) + (Sin[a - (b*c)/d]*SinIntegral
[(c*(b + d))/d + (b + d)*x])/(2*b^2)
```

Rule 2718

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

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3384

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Dist[Cos[(d*
e - c*f)/d], Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Dist[Sin[(d*e - c*f
)/d], Int[Cos[c*(f/d) + f*x]/(c + d*x), x], x] /; FreeQ[{c, d, e, f}, x] &&
 NeQ[d*e - c*f, 0]
```

Rule 4514

```
Int[Cos[(a_.) + (b_.)*(x_)]^(p_.)*Cos[(c_.) + (d_.)*(x_)]^(q_.)*((e_.) + (f
_.)*(x_))^(m_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Cos[a + b*x
]^p*Cos[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f}, x] && IGtQ[p, 0] &&
 IGtQ[q, 0] && IntegerQ[m]
```

Rule 4515

```
Int[Cos[(c_.) + (d_.)*(x_)]^(q_.)*((e_.) + (f_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(p_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Sin[a + b*x
]^p*Cos[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] && IGtQ[p, 0]
 && IGtQ[q, 0]
```

Rule 4670

```
Int[Cos[w_]^(q_.)*Sin[v_]^(p_.), x_Symbol] :> Int[ExpandTrigReduce[Sin[v]^p
*Cos[w]^q, x], x] /; IGtQ[p, 0] && IGtQ[q, 0] && ((PolynomialQ[v, x] && Pol
ynomialQ[w, x]) || (BinomialQ[{v, w}, x] && IndependentQ[Cancel[v/w], x]))
```

Rule 6649

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

Rule 6653

```
Int[CosIntegral[(c_.) + (d_.)*(x_)]*Sin[(a_.) + (b_.)*(x_)], x_Symbol] :> S
imp[(-Cos[a + b*x])*(CosIntegral[c + d*x]/b), x] + Dist[d/b, Int[Cos[a + b*
x]*(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rule 6874

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\text{integral} &= \frac{x\,\text{CosIntegral}(c+dx)\sin(a+bx)}{b} \\
&\quad -\frac{\int \text{CosIntegral}(c+dx)\sin(a+bx)\,dx}{b}-\frac{d\int \frac{x\cos(c+dx)\sin(a+bx)}{c+dx}\,dx}{b} \\
&= \frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b^2}+\frac{x\,\text{CosIntegral}(c+dx)\sin(a+bx)}{b} \\
&\quad -\frac{d\int \frac{\cos(a+bx)\cos(c+dx)}{c+dx}\,dx}{b^2}-\frac{d\int \left(\frac{\cos(c+dx)\sin(a+bx)}{d}-\frac{c\cos(c+dx)\sin(a+bx)}{d(c+dx)}\right)dx}{b} \\
&= \frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b^2}+\frac{x\,\text{CosIntegral}(c+dx)\sin(a+bx)}{b} \\
&\quad -\frac{\int \cos(c+dx)\sin(a+bx)\,dx}{b}+\frac{c\int \frac{\cos(c+dx)\sin(a+bx)}{c+dx}\,dx}{b} \\
&\quad -\frac{d\int \left(\frac{\cos(a-c+(b-d)x)}{2(c+dx)}+\frac{\cos(a+c+(b+d)x)}{2(c+dx)}\right)dx}{b^2}
\end{aligned}$$

$$= \frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b^2} + \frac{x\,\text{CosIntegral}(c+dx)\sin(a+bx)}{b} - \frac{\int \left(\frac{1}{2}\sin(a-c+(b-d)x) + \frac{1}{2}\sin(a+c+(b+d)x)\right)\,dx}{b} + \frac{c\int \left(\frac{\sin(a-c+(b-d)x)}{2(c+dx)} + \frac{\sin(a+c+(b+d)x)}{2(c+dx)}\right)\,dx}{b} - \frac{d\int \frac{\cos(a-c+(b-d)x)}{c+dx}\,dx}{2b^2} - \frac{d\int \frac{\cos(a+c+(b+d)x)}{c+dx}\,dx}{2b^2}$$

$$= \frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b^2} + \frac{x\,\text{CosIntegral}(c+dx)\sin(a+bx)}{b} - \frac{\int \sin(a-c+(b-d)x)\,dx}{2b} - \frac{\int \sin(a+c+(b+d)x)\,dx}{2b} + \frac{c\int \frac{\sin(a-c+(b-d)x)}{c+dx}\,dx}{2b} + \frac{c\int \frac{\sin(a+c+(b+d)x)}{c+dx}\,dx}{2b} - \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b^2} - \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b^2} + \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b^2} + \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b^2}$$

$$= \frac{\cos(a-c+(b-d)x)}{2b(b-d)} + \frac{\cos(a+c+(b+d)x)}{2b(b+d)} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} + \frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{b^2} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2} + \frac{x\,\text{CosIntegral}(c+dx)\sin(a+bx)}{b} + \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} + \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2} + \frac{\left(c\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} + \frac{\left(c\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b} + \frac{\left(c\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} + \frac{\left(c\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b}$$

$$= \frac{\cos(a-c+(b-d)x)}{2b(b-d)} + \frac{\cos(a+c+(b+d)x)}{2b(b+d)} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} + \frac{\cos(a+bx)\text{CosIntegral}(c+dx)}{b^2} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2} + \frac{c\,\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2bd} + \frac{c\,\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2bd} + \frac{x\,\text{CosIntegral}(c+dx)\sin(a+bx)}{b} + \frac{c\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2bd} + \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b^2} + \frac{c\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2bd} + \frac{\sin\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b^2}$$

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 2.04 (sec) , antiderivative size = 393, normalized size of antiderivative = 1.06

$$\int x\cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx$$

$$= \frac{ie^{-ia}\left(-\left((bc-id)e^{2ia-\frac{ibc}{d}}\text{ExpIntegralEi}\left(\frac{i(b-d)(c+dx)}{d}\right)\right) + \frac{e^{-\frac{i(b+d)(c+dx)}{d}}\left(-ibde^{\frac{ibc}{d}}\left(d\left(-1+e^{2i(a+bx)}\right)+b\left(1+e^{2i(a+bx)}\right)\right)+\cdots\right.}{(b-\cdots}\right.}{4b^2d} + \frac{ie^{-ia}\left(-\frac{ibde^{i(c+(-b+d)x)}\left(b+d+be^{2i(a+bx)}-de^{2i(a+bx)}\right)}{(b-d)(b+d)} + (bc+id)e^{\frac{ibc}{d}}\text{ExpIntegralEi}\left(-\frac{i(b-d)(c+dx)}{d}\right) - (bc-id)e^{2ia\cdots}\right.}{4b^2d} + \frac{\text{CosIntegral}(c+dx)(\cos(a+bx)+bx\sin(a+bx))}{b^2}$$

```
[In] Integrate[x*Cos[a + b*x]*CosIntegral[c + d*x],x]
```

```
[Out] ((I/4)*(-((b*c - I*d)*E^((2*I)*a - (I*b*c)/d)*ExpIntegralEi[(I*(b - d)*(c +
 d*x))/d]) + ((-I)*b*d*E^((I*b*c)/d)*(d*(-1 + E^((2*I)*(a + b*x))) + b*(1 +
 E^((2*I)*(a + b*x)))) + (b*c + I*d)*(b^2 - d^2)*E^(I*(c + (2*b*c)/d + (b +
 d)*x))*ExpIntegralEi[((-I)*(b + d)*(c + d*x))/d])/((b - d)*(b + d)*E^((I*(
b + d)*(c + d*x))/d))))/(b^2*d*E^(I*a)) + ((I/4)*(((-I)*b*d*E^(I*(c + (-b +
```

```
 d)*x))*(b + d + b*E^((2*I)*(a + b*x)) - d*E^((2*I)*(a + b*x))))/((b - d)*(
b + d)) + (b*c + I*d)*E^((I*b*c)/d)*ExpIntegralEi[((-I)*(b - d)*(c + d*x))/
d] - (b*c - I*d)*E^((2*I)*a - (I*b*c)/d)*ExpIntegralEi[(I*(b + d)*(c + d*x)
)/d]))/(b^2*d*E^(I*a)) + (CosIntegral[c + d*x]*(Cos[a + b*x] + b*x*Sin[a +
b*x]))/b^2
```

Maple [B] (verified)

Leaf count of result is larger than twice the leaf count of optimal. 1243 vs. 2(350) = 700.

Time = 3.24 (sec) , antiderivative size = 1244, normalized size of antiderivative = 3.36

method	result	size
default	Expression too large to display	1244

```
[In] int(x*Ci(d*x+c)*cos(b*x+a),x,method=_RETURNVERBOSE)
```

```
[Out] (-Ci(d*x+c)/b*(d/b*a*sin(1/d*b*(d*x+c)+(a*d-b*c)/d)-1/b*d*(cos(1/d*b*(d*x+c
)+(a*d-b*c)/d)+(1/d*b*(d*x+c)+(a*d-b*c)/d)*sin(1/d*b*(d*x+c)+(a*d-b*c)/d)))
+1/b*(1/2*a*d^2/(b-d)*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*cos((
-a*d+b*c)/d)/d-Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*sin((-a*d+b*c)/
d)/d)-1/2*d^2*c/(b-d)*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*cos((
-a*d+b*c)/d)/d-Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*sin((-a*d+b*c)/
d)/d)-1/2*(a*d-b*c)*d/(b-d)*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)
*cos((-a*d+b*c)/d)/d-Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*sin((-a*d
+b*c)/d)/d)+1/2/(b-d)*d*cos((b-d)/d*(d*x+c)+(a*d-b*c)/d)+1/2*a*d^2/(b+d)*(-
Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci((b+d)/
d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d)+1/2*d^2*c/(b+d)*(-
Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci((b+d)/
d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d)-1/2*(a*d-b*c)*d/(b
+d)*(-Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci(
(b+d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d)+1/2/(b+d)*d*
cos((b+d)/d*(d*x+c)+(a*d-b*c)/d)-1/2/b*d^2*(-Si(-(b-d)/d*(d*x+c)-(a*d-b*c)/
d-(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci((b-d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*
c)/d)*cos((-a*d+b*c)/d)/d)-1/2/b*d^2*(-Si(-(b+d)/d*(d*x+c)-(a*d-b*c)/d-(-a*
d+b*c)/d)*sin((-a*d+b*c)/d)/d+Ci((b+d)/d*(d*x+c)+(a*d-b*c)/d+(-a*d+b*c)/d)*
cos((-a*d+b*c)/d)/d)))/d
```

Fricas [A] (verification not implemented)

none

Time = 0.28 (sec) , antiderivative size = 453, normalized size of antiderivative = 1.22

$$\int x\cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx$$
$$=\frac{2\,\pi bd^3x\,C\left(dx+c\right)\sin\left(bx+a\right)+2\,\pi d^3\cos\left(bx+a\right)C\left(dx+c\right)-2\,bd^2\sin\left(\frac{1}{2}\,\pi d^2x^2+\pi cdx+\frac{1}{2}\,\pi c^2\right)\sin\left(bx\right.}{}$$

```
[In] integrate(x*fresnel_cos(d*x+c)*cos(b*x+a),x, algorithm="fricas")
```

```
[Out] 1/2*(2*pi*b*d^3*x*fresnel_cos(d*x + c)*sin(b*x + a) + 2*pi*d^3*cos(b*x + a)
*fresnel_cos(d*x + c) - 2*b*d^2*sin(1/2*pi*d^2*x^2 + pi*c*d*x + 1/2*pi*c^2)
*sin(b*x + a) - (pi*d^2*cos(a - b*c/d - 1/2*b^2/(pi*d^2)) - (pi*b*c*d + b^2
)*sin(a - b*c/d - 1/2*b^2/(pi*d^2)))*sqrt(d^2)*fresnel_cos((pi*d^2*x + pi*c
*d + b)*sqrt(d^2)/(pi*d^2)) - (pi*d^2*cos(a - b*c/d + 1/2*b^2/(pi*d^2)) - (
pi*b*c*d - b^2)*sin(a - b*c/d + 1/2*b^2/(pi*d^2)))*sqrt(d^2)*fresnel_cos((p
i*d^2*x + pi*c*d - b)*sqrt(d^2)/(pi*d^2)) + (pi*d^2*sin(a - b*c/d - 1/2*b^2
/(pi*d^2)) + (pi*b*c*d + b^2)*cos(a - b*c/d - 1/2*b^2/(pi*d^2)))*sqrt(d^2)*
fresnel_sin((pi*d^2*x + pi*c*d + b)*sqrt(d^2)/(pi*d^2)) - (pi*d^2*sin(a - b
*c/d + 1/2*b^2/(pi*d^2)) + (pi*b*c*d - b^2)*cos(a - b*c/d + 1/2*b^2/(pi*d^2
)))*sqrt(d^2)*fresnel_sin((pi*d^2*x + pi*c*d - b)*sqrt(d^2)/(pi*d^2)))/(pi*
b^2*d^3)
```

Sympy [F]

$$\int x\cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx=\int x\cos\left(a+bx\right)\text{Ci}\left(c+dx\right)dx$$

```
[In] integrate(x*Ci(d*x+c)*cos(b*x+a),x)
```

```
[Out] Integral(x*cos(a + b*x)*Ci(c + d*x), x)
```

Maxima [F]

$$\int x\cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx=\int x\cos\left(bx+a\right)C\left(dx+c\right)\,dx$$

```
[In] integrate(x*fresnel_cos(d*x+c)*cos(b*x+a),x, algorithm="maxima")
```

```
[Out] integrate(x*cos(b*x + a)*fresnel_cos(d*x + c), x)
```

Giac [F]

$$\int x\cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx = \int x\cos(bx+a)\,C(dx+c)\,dx$$

```
[In] integrate(x*fresnel_cos(d*x+c)*cos(b*x+a),x, algorithm="giac")
[Out] integrate(x*cos(b*x + a)*fresnel_cos(d*x + c), x)
```

Mupad [F(-1)]

Timed out.

$$\int x\cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx = \int x\,\text{cosint}(c+d\,x)\,\cos(a+b\,x)\,dx$$

```
[In] int(x*cosint(c + d*x)*cos(a + b*x),x)
[Out] int(x*cosint(c + d*x)*cos(a + b*x), x)
```

3.135 $\int \cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx$

Optimal result

Integrand size = 13, antiderivative size = 153

$$\int \cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx = -\frac{\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b} - \frac{\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b} + \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{b} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b}$$

```
[Out] -1/2*cos(a-b*c/d)*Si(c*(b-d)/d+(b-d)*x)/b-1/2*cos(a-b*c/d)*Si(c*(b+d)/d+(b+
d)*x)/b-1/2*Ci(c*(b-d)/d+(b-d)*x)*sin(a-b*c/d)/b-1/2*Ci(c*(b+d)/d+(b+d)*x)*
sin(a-b*c/d)/b+Ci(d*x+c)*sin(b*x+a)/b
```

Rubi [A] (verified)

Time = 0.18 (sec) , antiderivative size = 153, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 5, $\frac{\text{number of rules}}{\text{integrand size}} = 0.385$, Rules used

$= \{6647, 4515, 3384, 3380, 3383\}$

$$\int \cos(a+bx)\,\mathrm{CosIntegral}(c+dx)\,dx = -\frac{\sin\left(a-\frac{bc}{d}\right)\mathrm{CosIntegral}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b} - \frac{\sin\left(a-\frac{bc}{d}\right)\mathrm{CosIntegral}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b} + \frac{\sin(a+bx)\,\mathrm{CosIntegral}(c+dx)}{b} - \frac{\cos\left(a-\frac{bc}{d}\right)\mathrm{Si}\left(x(b-d)+\frac{c(b-d)}{d}\right)}{2b} - \frac{\cos\left(a-\frac{bc}{d}\right)\mathrm{Si}\left(x(b+d)+\frac{c(b+d)}{d}\right)}{2b}$$

```
[In] Int[Cos[a + b*x]*CosIntegral[c + d*x],x]
```

```
[Out] -1/2*(CosIntegral[(c*(b - d))/d + (b - d)*x]*Sin[a - (b*c)/d])/b - (CosInte
gral[(c*(b + d))/d + (b + d)*x]*Sin[a - (b*c)/d])/(2*b) + (CosIntegral[c +
d*x]*Sin[a + b*x])/b - (Cos[a - (b*c)/d]*SinIntegral[(c*(b - d))/d + (b - d
)*x])/(2*b) - (Cos[a - (b*c)/d]*SinIntegral[(c*(b + d))/d + (b + d)*x])/(2*
b)
```

Rule 3380

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[SinInte
gral[e + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*e - c*f, 0]
```

Rule 3383

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Simp[CosInte
gral[e - Pi/2 + f*x]/d, x] /; FreeQ[{c, d, e, f}, x] && EqQ[d*(e - Pi/2) -
c*f, 0]
```

Rule 3384

```
Int[sin[(e_.) + (f_.)*(x_)]/((c_.) + (d_.)*(x_)), x_Symbol] :> Dist[Cos[(d*
e - c*f)/d], Int[Sin[c*(f/d) + f*x]/(c + d*x), x], x] + Dist[Sin[(d*e - c*f
)/d], Int[Cos[c*(f/d) + f*x]/(c + d*x), x], x] /; FreeQ[{c, d, e, f}, x] &&
 NeQ[d*e - c*f, 0]
```

Rule 4515

```
Int[Cos[(c_.) + (d_.)*(x_)]^(q_.)*((e_.) + (f_.)*(x_))^(m_.)*Sin[(a_.) + (b
_.)*(x_)]^(p_.), x_Symbol] :> Int[ExpandTrigReduce[(e + f*x)^m, Sin[a + b*x
]^p*Cos[c + d*x]^q, x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] && IGtQ[p, 0]
```

```
&& IGtQ[q, 0]
```

Rule 6647

```
Int[Cos[(a_.) + (b_.)*(x_)]*CosIntegral[(c_.) + (d_.)*(x_)], x_Symbol] :> S
imp[Sin[a + b*x]*(CosIntegral[c + d*x]/b), x] - Dist[d/b, Int[Sin[a + b*x]*
(Cos[c + d*x]/(c + d*x)), x], x] /; FreeQ[{a, b, c, d}, x]
```

Rubi steps

$$
\begin{aligned}
\text{integral} &= \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{b} - \frac{d\int \frac{\cos(c+dx)\sin(a+bx)}{c+dx}\,dx}{b} \\
&= \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{b} - \frac{d\int \left(\frac{\sin(a-c+(b-d)x)}{2(c+dx)} + \frac{\sin(a+c+(b+d)x)}{2(c+dx)}\right)dx}{b} \\
&= \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{b} - \frac{d\int \frac{\sin(a-c+(b-d)x)}{c+dx}\,dx}{2b} - \frac{d\int \frac{\sin(a+c+(b+d)x)}{c+dx}\,dx}{2b} \\
&= \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{b} - \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} \\
&\quad - \frac{\left(d\cos\left(a-\frac{bc}{d}\right)\right)\int \frac{\sin\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b} \\
&\quad - \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b-d)}{d}+(b-d)x\right)}{c+dx}\,dx}{2b} - \frac{\left(d\sin\left(a-\frac{bc}{d}\right)\right)\int \frac{\cos\left(\frac{c(b+d)}{d}+(b+d)x\right)}{c+dx}\,dx}{2b} \\
&= -\frac{\text{CosIntegral}\left(\frac{c(b-d)}{d}+(b-d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b} \\
&\quad - \frac{\text{CosIntegral}\left(\frac{c(b+d)}{d}+(b+d)x\right)\sin\left(a-\frac{bc}{d}\right)}{2b} + \frac{\text{CosIntegral}(c+dx)\sin(a+bx)}{b} \\
&\quad - \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b-d)}{d}+(b-d)x\right)}{2b} - \frac{\cos\left(a-\frac{bc}{d}\right)\text{Si}\left(\frac{c(b+d)}{d}+(b+d)x\right)}{2b}
\end{aligned}
$$

Mathematica [C] (verified)

Result contains complex when optimal does not.

Time = 0.88 (sec) , antiderivative size = 153, normalized size of antiderivative = 1.00

$$\int \cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx$$

$$= \frac{ie^{-\frac{i(bc+ad)}{d}}\left(-e^{\frac{2ibc}{d}}\,\text{ExpIntegralEi}\left(-\frac{i(b-d)(c+dx)}{d}\right)+e^{2ia}\,\text{ExpIntegralEi}\left(\frac{i(b-d)(c+dx)}{d}\right)-e^{\frac{2ibc}{d}}\,\text{ExpIntegralEi} \cdots}{4b}$$

```
[In] Integrate[Cos[a + b*x]*CosIntegral[c + d*x],x]
```

```
[Out] ((I*(-(E^(((2*I)*b*c)/d)*ExpIntegralEi[((-I)*(b - d)*(c + d*x))/d]) + E^((2
*I)*a)*ExpIntegralEi[(I*(b - d)*(c + d*x))/d] - E^(((2*I)*b*c)/d)*ExpIntegr
alEi[((-I)*(b + d)*(c + d*x))/d] + E^((2*I)*a)*ExpIntegralEi[(I*(b + d)*(c
+ d*x))/d]))/E^((I*(b*c + a*d))/d) + 4*CosIntegral[c + d*x]*Sin[a + b*x])/(
4*b)
```

Maple [A] (verified)

Time = 1.93 (sec) , antiderivative size = 274, normalized size of antiderivative = 1.79

method	result
default	$\frac{\frac{\text{Ci}(dx+c)d\sin\left(\frac{b(dx+c)}{d}+\frac{ad-bc}{d}\right)}{b}-\frac{d\left(\frac{d\left(-\frac{\text{Si}\left(-\left(-1+\frac{b}{d}\right)(dx+c)-a+\frac{bc}{d}-\frac{-ad+bc}{d}\right)\cos\left(\frac{-ad+bc}{d}\right)}{d}-\frac{\text{Ci}\left(\left(-1+\frac{b}{d}\right)(dx+c)+a-\frac{bc}{d}+\frac{-ad+bc}{d}\right)\sin\left(\cdots\right.}{d}\right.}{2}\cdots\right.}{\cdots}}{d}$

```
[In] int(Ci(d*x+c)*cos(b*x+a),x,method=_RETURNVERBOSE)
```

```
[Out] (Ci(d*x+c)/b*d*sin(1/d*b*(d*x+c)+(a*d-b*c)/d)-1/b*d*(1/2*d*(-Si(-(-1+b/d)*(
d*x+c)-a+b*c/d-(-a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci((-1+b/d)*(d*x+c)+a-b*c/
d+(-a*d+b*c)/d)*sin((-a*d+b*c)/d)/d)+1/2*d*(-Si(-(1+b/d)*(d*x+c)-a+b*c/d-(-
a*d+b*c)/d)*cos((-a*d+b*c)/d)/d-Ci((1+b/d)*(d*x+c)+a-b*c/d+(-a*d+b*c)/d)*si
n((-a*d+b*c)/d)/d)))/d
```

Fricas [A] (verification not implemented)

none

Time = 0.26 (sec) , antiderivative size = 239, normalized size of antiderivative = 1.56

$$\int \cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx$$
$$= \frac{2\,d\,\text{C}\,(dx+c)\sin\,(bx+a) - \sqrt{d^2}\cos\left(a-\frac{bc}{d}-\frac{b^2}{2\,\pi d^2}\right)\text{S}\left(\frac{(\pi d^2x+\pi cd+b)\sqrt{d^2}}{\pi d^2}\right) + \sqrt{d^2}\cos\left(a-\frac{bc}{d}+\frac{b^2}{2\,\pi d^2}\right)\text{S}\left(\frac{(\pi\cdots}{\cdots}\right)\cdots}{2\cdots}$$

```
[In] integrate(fresnel_cos(d*x+c)*cos(b*x+a),x, algorithm="fricas")
```

```
[Out] 1/2*(2*d*fresnel_cos(d*x + c)*sin(b*x + a) - sqrt(d^2)*cos(a - b*c/d - 1/2*
b^2/(pi*d^2))*fresnel_sin((pi*d^2*x + pi*c*d + b)*sqrt(d^2)/(pi*d^2)) + sqr
t(d^2)*cos(a - b*c/d + 1/2*b^2/(pi*d^2))*fresnel_sin((pi*d^2*x + pi*c*d - b
)*sqrt(d^2)/(pi*d^2)) - sqrt(d^2)*fresnel_cos((pi*d^2*x + pi*c*d - b)*sqrt(
d^2)/(pi*d^2))*sin(a - b*c/d + 1/2*b^2/(pi*d^2)) - sqrt(d^2)*fresnel_cos((p
i*d^2*x + pi*c*d + b)*sqrt(d^2)/(pi*d^2))*sin(a - b*c/d - 1/2*b^2/(pi*d^2))
)/(b*d)
```

Sympy [F]

$$\int \cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx = \int \cos\,(a+bx)\,\text{Ci}\,(c+dx)\,dx$$

```
[In] integrate(Ci(d*x+c)*cos(b*x+a),x)
```

```
[Out] Integral(cos(a + b*x)*Ci(c + d*x), x)
```

Maxima [F]

$$\int \cos(a+bx)\,\text{CosIntegral}(c+dx)\,dx = \int \cos\,(bx+a)\,\text{C}\,(dx+c)\,dx$$

```
[In] integrate(fresnel_cos(d*x+c)*cos(b*x+a),x, algorithm="maxima")
```

```
[Out] integrate(cos(b*x + a)*fresnel_cos(d*x + c), x)
```

Giac [F]

$$\int \cos(a+bx)\,\mathrm{CosIntegral}(c+dx)\,dx = \int \cos(bx+a)\,C(dx+c)\,dx$$

```
[In] integrate(fresnel_cos(d*x+c)*cos(b*x+a),x, algorithm="giac")
[Out] integrate(cos(b*x + a)*fresnel_cos(d*x + c), x)
```

Mupad [F(-1)]

Timed out.

$$\int \cos(a+bx)\,\mathrm{CosIntegral}(c+dx)\,dx = \int \mathrm{cosint}(c+d\,x)\,\cos(a+b\,x)\,dx$$

```
[In] int(cosint(c + d*x)*cos(a + b*x),x)
[Out] int(cosint(c + d*x)*cos(a + b*x), x)
```

3.136 $\int \frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{x}\,dx$

Optimal result

Integrand size = 16, antiderivative size = 16

$$\int \frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{x}\,dx = \text{Int}\left(\frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{x},x\right)$$

```
[Out] CannotIntegrate(Ci(d*x+c)*cos(b*x+a)/x,x)
```

Rubi [N/A]

Not integrable

Time = 0.08 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00, number of steps used = 0, number of rules used = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.000$, Rules used = {}

$$\int \frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{x}\,dx = \int \frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{x}\,dx$$

```
[In] Int[(Cos[a + b*x]*CosIntegral[c + d*x])/x,x]
[Out] Defer[Int][(Cos[a + b*x]*CosIntegral[c + d*x])/x, x]
```

Rubi steps

$$\text{integral} = \int \frac{\cos(a+bx)\,\text{CosIntegral}(c+dx)}{x}\,dx$$

Mathematica [N/A]

Not integrable

Time = 9.20 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\,\mathrm{CosIntegral}(c+dx)}{x}\,dx = \int \frac{\cos(a+bx)\,\mathrm{CosIntegral}(c+dx)}{x}\,dx$$

```
[In] Integrate[(Cos[a + b*x]*CosIntegral[c + d*x])/x,x]
[Out] Integrate[(Cos[a + b*x]*CosIntegral[c + d*x])/x, x]
```

Maple [N/A] (verified)

Not integrable

Time = 0.34 (sec) , antiderivative size = 16, normalized size of antiderivative = 1.00

$$\int \frac{\mathrm{Ci}\left(dx+c\right)\cos\left(bx+a\right)}{x}dx$$

```
[In] int(Ci(d*x+c)*cos(b*x+a)/x,x)
[Out] int(Ci(d*x+c)*cos(b*x+a)/x,x)
```

Fricas [N/A]

Not integrable

Time = 0.25 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\,\mathrm{CosIntegral}(c+dx)}{x}\,dx = \int \frac{\cos\left(bx+a\right)\mathrm{C}\left(dx+c\right)}{x}\,dx$$

```
[In] integrate(fresnel_cos(d*x+c)*cos(b*x+a)/x,x, algorithm="fricas")
[Out] integral(cos(b*x + a)*fresnel_cos(d*x + c)/x, x)
```

Sympy [N/A]

Not integrable

Time = 0.69 (sec) , antiderivative size = 15, normalized size of antiderivative = 0.94

$$\int \frac{\cos(a+bx)\,\mathrm{CosIntegral}(c+dx)}{x}\,dx = \int \frac{\cos\left(a+bx\right)\mathrm{Ci}\left(c+dx\right)}{x}\,dx$$

```
[In] integrate(Ci(d*x+c)*cos(b*x+a)/x,x)
[Out] Integral(cos(a + b*x)*Ci(c + d*x)/x, x)
```

Maxima [N/A]

Not integrable

Time = 0.37 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\,\mathrm{CosIntegral}(c+dx)}{x}\,dx = \int \frac{\cos(bx+a)\,\mathrm{C}\,(dx+c)}{x}\,dx$$

```
[In] integrate(fresnel_cos(d*x+c)*cos(b*x+a)/x,x, algorithm="maxima")
[Out] integrate(cos(b*x + a)*fresnel_cos(d*x + c)/x, x)
```

Giac [N/A]

Not integrable

Time = 0.27 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\,\mathrm{CosIntegral}(c+dx)}{x}\,dx = \int \frac{\cos(bx+a)\,\mathrm{C}\,(dx+c)}{x}\,dx$$

```
[In] integrate(fresnel_cos(d*x+c)*cos(b*x+a)/x,x, algorithm="giac")
[Out] integrate(cos(b*x + a)*fresnel_cos(d*x + c)/x, x)
```

Mupad [N/A]

Not integrable

Time = 5.20 (sec) , antiderivative size = 18, normalized size of antiderivative = 1.12

$$\int \frac{\cos(a+bx)\,\mathrm{CosIntegral}(c+dx)}{x}\,dx = \int \frac{\mathrm{cosint}(c+d\,x)\,\cos(a+b\,x)}{x}\,dx$$

```
[In] int((cosint(c + d*x)*cos(a + b*x))/x,x)
[Out] int((cosint(c + d*x)*cos(a + b*x))/x, x)
```

CHAPTER 4

APPENDIX

4.1 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.

Mathematica and Rubi grading function

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)

(* Nasser: April 7,2022. add second output which gives reason for the grade *)
(*                       Small rewrite of logic in main function to make it*)
(*                       match Maple's logic. No change in functionality otherwise*)

(* ::Subsection:: *)
(*GradeAntiderivative[result,optimal]*)


(* ::Text:: *)
(*If result and optimal are mathematical expressions, *)
```

```
(*          GradeAntiderivative[result,optimal] returns*)
(*  "F" if the result fails to integrate an expression that*)
(*      is integrable*)
(*  "C" if result involves higher level functions than necessary*)
(*  "B" if result is more than twice the size of the optimal*)
(*      antiderivative*)
(*  "A" if result can be considered optimal*)


GradeAntiderivative[result_,optimal_] := Module[{expnResult,expnOptimal,leafCountResult,leafCou
    expnResult  = ExpnType[result];
    expnOptimal = ExpnType[optimal];
    leafCountResult = LeafCount[result];
    leafCountOptimal = LeafCount[optimal];

    (*Print["expnResult=",expnResult," expnOptimal=",expnOptimal];*)
    If[expnResult<=expnOptimal,
        If[Not[FreeQ[result,Complex]], (*result contains complex*)
            If[Not[FreeQ[optimal,Complex]], (*optimal contains complex*)
                If[leafCountResult<=2*leafCountOptimal,
                    finalresult={"A",""}
                    ,(*ELSE*)
                    finalresult={"B","Both result and optimal contain complex but leaf count is
                  ]
            ,(*ELSE*)
                finalresult={"C","Result contains complex when optimal does not."}
            ]
        ,(*ELSE*)(*result does not contains complex*)
            If[leafCountResult<=2*leafCountOptimal,
               finalresult={"A",""}
            ,(*ELSE*)
               finalresult={"B","Leaf count is larger than twice the leaf count of optimal. $"<
              ]
        ]
    ,(*ELSE*) (*expnResult>expnOptimal*)
        If[FreeQ[result,Integrate] && FreeQ[result,Int],
            finalresult={"C","Result contains higher order function than in optimal. Order "<>T
            ,
            finalresult={"F","Contains unresolved integral."}
        ]
    ];

    finalresult
]

(* ::Text:: *)
(*The following summarizes the type number assigned an *)
```

```
(*expression based on the functions it involves*)
(*1 = rational function*)
(*2 = algebraic function*)
(*3 = elementary function*)
(*4 = special function*)
(*5 = hyperpergeometric function*)
(*6 = appell function*)
(*7 = rootsum function*)
(*8 = integrate function*)
(*9 = unknown function*)


ExpnType[expn_] :=
  If[AtomQ[expn],
    1,
  If[ListQ[expn],
    Max[Map[ExpnType,expn]],
  If[Head[expn]===Power,
    If[IntegerQ[expn[[2]]],
      ExpnType[expn[[1]]],
    If[Head[expn[[2]]]===Rational,
      If[IntegerQ[expn[[1]]] || Head[expn[[1]]]===Rational,
        1,
      Max[ExpnType[expn[[1]]],2]],
    Max[ExpnType[expn[[1]]],ExpnType[expn[[2]]],3]]],
  If[Head[expn]===Plus || Head[expn]===Times,
    Max[ExpnType[First[expn]],ExpnType[Rest[expn]]],
  If[ElementaryFunctionQ[Head[expn]],
    Max[3,ExpnType[expn[[1]]]],
  If[SpecialFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],4]],
  If[HypergeometricFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],5]],
  If[AppellFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],6]],
  If[Head[expn]===RootSum,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
  If[Head[expn]===Integrate || Head[expn]===Int,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],8]],
  9]]]]]]]]]]


ElementaryFunctionQ[func_] :=
  MemberQ[{
  Exp,Log,
  Sin,Cos,Tan,Cot,Sec,Csc,
  ArcSin,ArcCos,ArcTan,ArcCot,ArcSec,ArcCsc,
```

```
  Sinh,Cosh,Tanh,Coth,Sech,Csch,
  ArcSinh,ArcCosh,ArcTanh,ArcCoth,ArcSech,ArcCsch
},func]


SpecialFunctionQ[func_] :=
  MemberQ[{
  Erf, Erfc, Erfi,
  FresnelS, FresnelC,
  ExpIntegralE, ExpIntegralEi, LogIntegral,
  SinIntegral, CosIntegral, SinhIntegral, CoshIntegral,
  Gamma, LogGamma, PolyGamma,
  Zeta, PolyLog, ProductLog,
  EllipticF, EllipticE, EllipticPi
},func]


HypergeometricFunctionQ[func_] :=
  MemberQ[{Hypergeometric1F1,Hypergeometric2F1,HypergeometricPFQ},func]


AppellFunctionQ[func_] :=
  MemberQ[{AppellF1},func]
```

Maple grading function

```
# File: GradeAntiderivative.mpl
# Original version thanks to Albert Rich emailed on 03/21/2017

#Nasser 03/22/2017  Use Maple leaf count instead since buildin
#Nasser 03/23/2017  missing 'ln' for ElementaryFunctionQ added
#Nasser 03/24/2017  corrected the check for complex result
#Nasser 10/27/2017  check for leafsize and do not call ExpnType()
#                   if leaf size is "too large". Set at 500,000
#Nasser 12/22/2019  Added debug flag, added 'dilog' to special functions
#                   see problem 156, file Apostol_Problems
#Nasser 4/07/2022   add second output which gives reason for the grade

GradeAntiderivative := proc(result,optimal)
local leaf_count_result,
        leaf_count_optimal,
        ExpnType_result,
        ExpnType_optimal,
        debug:=false;

        leaf_count_result:=leafcount(result);
```

```
        #do NOT call ExpnType() if leaf size is too large. Recursion problem
        if leaf_count_result > 500000 then
            return "B","result has leaf size over 500,000. Avoiding possible recursion issues
        fi;

        leaf_count_optimal := leafcount(optimal);
        ExpnType_result  := ExpnType(result);
        ExpnType_optimal := ExpnType(optimal);

        if debug then
            print("ExpnType_result",ExpnType_result," ExpnType_optimal=",ExpnType_optimal);
        fi;

# If result and optimal are mathematical expressions,
#  GradeAntiderivative[result,optimal] returns
#   "F" if the result fails to integrate an expression that
#       is integrable
#   "C" if result involves higher level functions than necessary
#   "B" if result is more than twice the size of the optimal
#       antiderivative
#   "A" if result can be considered optimal

    #This check below actually is not needed, since I only
    #call this grading only for passed integrals. i.e. I check
    #for "F" before calling this. But no harm of keeping it here.
    #just in case.


    if not type(result,freeof('int')) then
        return "F","Result contains unresolved integral";
    fi;


    if ExpnType_result<=ExpnType_optimal then
        if debug then
             print("ExpnType_result<=ExpnType_optimal");
        fi;
        if is_contains_complex(result) then
            if is_contains_complex(optimal) then
                if debug then
                        print("both result and optimal complex");
                fi;
                if leaf_count_result<=2*leaf_count_optimal then
                    return "A"," ";
                else
                   return "B",cat("Both result and optimal contain complex but leaf count of
                                convert(leaf_count_result,string)," vs. $2 (",
```

```
                                    convert(leaf_count_optimal,string)," ) = ",convert(2*leaf_co
                   end if
               else #result contains complex but optimal is not
                   if debug then
                           print("result contains complex but optimal is not");
                   fi;
                   return "C","Result contains complex when optimal does not.";
               fi;
           else # result do not contain complex
                # this assumes optimal do not as well. No check is needed here.
               if debug then
                      print("result do not contain complex, this assumes optimal do not as well")
               fi;
               if leaf_count_result<=2*leaf_count_optimal then
                   if debug then
                       print("leaf_count_result<=2*leaf_count_optimal");
                   fi;
                   return "A"," ";
               else
                   if debug then
                       print("leaf_count_result>2*leaf_count_optimal");
                   fi;
                   return "B",cat("Leaf count of result is larger than twice the leaf count of opt
                                   convert(leaf_count_result,string),"$ vs. $2(",
                                   convert(leaf_count_optimal,string),")=",convert(2*leaf_count
               fi;
           fi;
       else #ExpnType(result) > ExpnType(optimal)
           if debug then
               print("ExpnType(result) > ExpnType(optimal)");
           fi;
           return "C",cat("Result contains higher order function than in optimal. Order ",
                        convert(ExpnType_result,string)," vs. order ",
                        convert(ExpnType_optimal,string),".");
       fi;

end proc:

#
# is_contains_complex(result)
# takes expressions and returns true if it contains "I" else false
#
#Nasser 032417
is_contains_complex:= proc(expression)
  return (has(expression,I));
end proc:
```

```
# The following summarizes the type number assigned an expression
# based on the functions it involves
# 1 = rational function
# 2 = algebraic function
# 3 = elementary function
# 4 = special function
# 5 = hyperpergeometric function
# 6 = appell function
# 7 = rootsum function
# 8 = integrate function
# 9 = unknown function

ExpnType := proc(expn)
  if type(expn,'atomic') then
    1
  elif type(expn,'list') then
    apply(max,map(ExpnType,expn))
  elif type(expn,'sqrt') then
    if type(op(1,expn),'rational') then
       1
    else
       max(2,ExpnType(op(1,expn)))
    end if
  elif type(expn,'`^`') then
    if type(op(2,expn),'integer') then
      ExpnType(op(1,expn))
    elif type(op(2,expn),'rational') then
      if type(op(1,expn),'rational') then
         1
      else
         max(2,ExpnType(op(1,expn)))
      end if
    else
         max(3,ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    end if
  elif type(expn,'`+`') or type(expn,'`*`') then
    max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
  elif ElementaryFunctionQ(op(0,expn)) then
    max(3,ExpnType(op(1,expn)))
  elif SpecialFunctionQ(op(0,expn)) then
    max(4,apply(max,map(ExpnType,[op(expn)])))
  elif HypergeometricFunctionQ(op(0,expn)) then
    max(5,apply(max,map(ExpnType,[op(expn)])))
  elif AppellFunctionQ(op(0,expn)) then
    max(6,apply(max,map(ExpnType,[op(expn)])))
  elif op(0,expn)='int' then
    max(8,apply(max,map(ExpnType,[op(expn)]))) else
```

```
  9
  end if
end proc:


ElementaryFunctionQ := proc(func)
  member(func,[
        exp,log,ln,
        sin,cos,tan,cot,sec,csc,
        arcsin,arccos,arctan,arccot,arcsec,arccsc,
        sinh,cosh,tanh,coth,sech,csch,
        arcsinh,arccosh,arctanh,arccoth,arcsech,arccsch])
end proc:

SpecialFunctionQ := proc(func)
  member(func,[
        erf,erfc,erfi,
        FresnelS,FresnelC,
        Ei,Ei,Li,Si,Ci,Shi,Chi,
        GAMMA,lnGAMMA,Psi,Zeta,polylog,dilog,LambertW,
        EllipticF,EllipticE,EllipticPi])
end proc:

HypergeometricFunctionQ := proc(func)
  member(func,[Hypergeometric1F1,hypergeom,HypergeometricPFQ])
end proc:

AppellFunctionQ := proc(func)
  member(func,[AppellF1])
end proc:

# u is a sum or product.  rest(u) returns all but the
# first term or factor of u.
rest := proc(u) local v;
  if nops(u)=2 then
     op(2,u)
  else
     apply(op(0,u),op(2..nops(u),u))
  end if
end proc:

#leafcount(u) returns the number of nodes in u.
#Nasser 3/23/17  Replaced by build-in leafCount from package in Maple
leafcount := proc(u)
   MmaTranslator[Mma][LeafCount](u);
end proc:
```

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)),ExpnTy
    elif isinstance(expn,Add) or isinstance(expn,Mul): #type(expn,'`+`') or type(expn,'`*`')
        m1 = expnType(expn.args[0])
        m2 = expnType(list(expn.args[1:]))
        return max(m1,m2)   #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.func):   #ElementaryFunctionQ(op(0,expn))
        return max(3,expnType(expn.args[0]))   #max(3,ExpnType(op(1,expn)))
    elif is_special_function(expn.func): #SpecialFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(4,m1)    #max(4,apply(max,map(ExpnType,[op(expn)])))
    elif is_hypergeometric_function(expn.func): #HypergeometricFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(5,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif is_appell_function(expn.func):
        m1 = max(map(expnType, list(expn.args)))
        return max(6,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif isinstance(expn,RootSum):
        m1 = max(map(expnType, list(expn.args))) #Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
        return max(7,m1)
    elif str(expn).find("Integral") != -1:
```

```
        m1 = max(map(expnType, list(expn.args)))
        return max(8,m1)    #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
def grade_antiderivative(result,optimal):

    #print ("Enter grade_antiderivative for sagemath")
    #print("Enter grade_antiderivative, result=",result," optimal=",optimal)

    leaf_count_result  = leaf_count(result)
    leaf_count_optimal = leaf_count(optimal)

    #print("leaf_count_result=",leaf_count_result)
    #print("leaf_count_optimal=",leaf_count_optimal)

    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if str(result).find("Integral") != -1:
        grade = "F"
        grade_annotation =""
    else:
        if expnType_result <= expnType_optimal:
            if result.has(I):
                if optimal.has(I): #both result and optimal complex
                    if leaf_count_result <= 2*leaf_count_optimal:
                        grade = "A"
                        grade_annotation =""
                    else:
                        grade = "B"
                        grade_annotation ="Both result and optimal contain complex but leaf count of result is large
                else: #result contains complex but optimal is not
                    grade = "C"
                    grade_annotation ="Result contains complex when optimal does not."
            else: # result do not contain complex, this assumes optimal do not as well
                if leaf_count_result <= 2*leaf_count_optimal:
                    grade = "A"
                    grade_annotation =""
                else:
                    grade = "B"
                    grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(le
        else:
            grade = "C"
            grade_annotation ="Result contains higher order function than in optimal. Order "+str(ExpnType_
```

```
   #print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)

   return grade, grade_annotation
```

SageMath grading function

```
#Dec 24, 2019. Nasser: Ported original Maple grading function by
#          Albert Rich to use with Sagemath. This is used to
#          grade Fricas, Giac and Maxima results.
#Dec 24, 2019. Nasser: Added 'exp_integral_e' and 'sng', 'sin_integral'
#          'arctan2','floor','abs','log_integral'
#June 4, 2022  Made default grade_annotation "none" instead of "" due
#          issue later when reading the file.
#July 14, 2022. Added ellipticF. This is until they fix sagemath, then remove it.

from sage.all import *
from sage.symbolic.operators import add_vararg, mul_vararg

debug=False;

def tree_size(expr):
   r"""
   Return the tree size of this expression.
   """
   #print("Enter tree_size, expr is ",expr)

   if expr not in SR:
      # deal with lists, tuples, vectors
      return 1 + sum(tree_size(a) for a in expr)
   expr = SR(expr)
   x, aa = expr.operator(), expr.operands()
   if x is None:
      return 1
   else:
      return 1 + sum(tree_size(a) for a in aa)

def is_sqrt(expr):
   if expr.operator() == operator.pow:   #isinstance(expr,Pow):
      if expr.operands()[1]==1/2: #expr.args[1] == Rational(1,2):
         if debug: print ("expr is sqrt")
         return True
      else:
         return False
   else:
      return False
```

```
def is_elementary_function(func):
    #debug=False
    m = func.name() in ['exp','log','ln',
            'sin','cos','tan','cot','sec','csc',
            'arcsin','arccos','arctan','arccot','arcsec','arccsc',
            'sinh','cosh','tanh','coth','sech','csch',
            'arcsinh','arccosh','arctanh','arccoth','arcsech','arccsch','sgn',
        'arctan2','floor','abs'
        ]
    if debug:
        if m:
            print ("func ", func , " is elementary_function")
        else:
            print ("func ", func , " is NOT elementary_function")


    return m

def is_special_function(func):
    #debug=False
    if debug:
        print ("type(func)=", type(func))

    m= func.name() in ['erf','erfc','erfi','fresnel_sin','fresnel_cos','Ei',
           'Ei','Li','Si','sin_integral','Ci','cos_integral','Shi','sinh_integral'
           'Chi','cosh_integral','gamma','log_gamma','psi,zeta',
           'polylog','lambert_w','elliptic_f','elliptic_e','ellipticF',
           'elliptic_pi','exp_integral_e','log_integral']

    if debug:
        print ("m=",m)
        if m:
            print ("func ", func ," is special_function")
        else:
            print ("func ", func ," is NOT special_function")


    return m


def is_hypergeometric_function(func):
    return func.name() in ['hypergeometric','hypergeometric_M','hypergeometric_U']

def is_appell_function(func):
    return func.name() in ['hypergeometric']   #[appellf1] can't find this in sagemath
```

```
def is_atom(expn):

    #debug=False
    if debug:
        print ("Enter is_atom, expn=",expn)

    if not hasattr(expn, 'parent'):
        return False


    #thanks to answer at https://ask.sagemath.org/question/49179/what-is-sagemath-equivalent-to-atomic-t
    try:
        if expn.parent() is SR:
            return expn.operator() is None
        if expn.parent() in (ZZ, QQ, AA, QQbar):
            return expn in expn.parent() # Should always return True
        if hasattr(expn.parent(),"base_ring") and hasattr(expn.parent(),"gens"):
            return expn in expn.parent().base_ring() or expn in expn.parent().gens()

        return False

    except AttributeError as error:
        print("Exception,AttributeError in  is_atom")
        print ("cought exception" , type(error).__name__ )
        return False


def expnType(expn):

    if debug:
        print (">>>>>Enter expnType, expn=", expn)
        print (">>>>>is_atom(expn)=", is_atom(expn))

    if is_atom(expn):
        return 1
    elif type(expn)==list:   #isinstance(expn,list):
        return max(map(expnType, expn))   #apply(max,map(ExpnType,expn))
    elif  is_sqrt(expn):
        if  type(expn.operands()[0])==Rational: #type(isinstance(expn.args[0],Rational):
            return 1
        else:
            return max(2,expnType(expn.operands()[0]))  #max(2,expnType(expn.args[0]))
    elif expn.operator() == operator.pow:   #isinstance(expn,Pow)
        if type(expn.operands()[1])==Integer:  #isinstance(expn.args[1],Integer)
            return expnType(expn.operands()[0])   #expnType(expn.args[0])
        elif type(expn.operands()[1])==Rational:  #isinstance(expn.args[1],Rational)
            if type(expn.operands()[0])==Rational: #isinstance(expn.args[0],Rational)
```

```
            return 1
        else:
            return max(2,expnType(expn.operands()[0]))  #max(2,expnType(expn.args[0]))
    else:
        return max(3,expnType(expn.operands()[0]),expnType(expn.operands()[1]))  #max(3,expnType(expn.
elif expn.operator() == add_vararg or expn.operator() == mul_vararg: #isinstance(expn,Add) or isinst
    m1 = expnType(expn.operands()[0]) #expnType(expn.args[0])
    m2 = expnType(expn.operands()[1:]) #expnType(list(expn.args[1:]))
    return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
elif is_elementary_function(expn.operator()):  #is_elementary_function(expn.func)
    return max(3,expnType(expn.operands()[0]))
elif is_special_function(expn.operator()): #is_special_function(expn.func)
    m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
    return max(4,m1)   #max(4,m1)
elif is_hypergeometric_function(expn.operator()): #is_hypergeometric_function(expn.func)
    m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
    return max(5,m1)   #max(5,m1)
elif is_appell_function(expn.operator()):
    m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
    return max(6,m1)   #max(6,m1)
elif str(expn).find("Integral") != -1: #this will never happen, since it
        #is checked before calling the grading function that is passed.
        #but kept it here.
    m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(expn.args)))
    return max(8,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
else:
    return 9

#main function
def grade_antiderivative(result,optimal):


    if debug:
        print ("Enter grade_antiderivative for sagemath")
        print("Enter grade_antiderivative, result=",result)
        print("Enter grade_antiderivative, optimal=",optimal)
        print("type(anti)=",type(result))
        print("type(optimal)=",type(optimal))

    leaf_count_result  = tree_size(result) #leaf_count(result)
    leaf_count_optimal = tree_size(optimal) #leaf_count(optimal)

    #if debug: print ("leaf_count_result=", leaf_count_result, "leaf_count_optimal=",leaf_count_optimal)


    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)
```

```
if debug: print ("expnType_result=", expnType_result, "expnType_optimal=",expnType_optimal)

if expnType_result <= expnType_optimal:
    if result.has(I):
        if optimal.has(I): #both result and optimal complex
            if leaf_count_result <= 2*leaf_count_optimal:
                grade = "A"
                grade_annotation ="none"
            else:
                grade = "B"
                grade_annotation ="Both result and optimal contain complex but leaf count of result is larger th
        else: #result contains complex but optimal is not
            grade = "C"
            grade_annotation ="Result contains complex when optimal does not."
    else: # result do not contain complex, this assumes optimal do not as well
        if leaf_count_result <= 2*leaf_count_optimal:
            grade = "A"
            grade_annotation ="none"
        else:
            grade = "B"
            grade_annotation ="Leaf count of result is larger than twice the leaf count of optimal. "+str(leaf_c
else:
    grade = "C"
    grade_annotation ="Result contains higher order function than in optimal. Order "+str(expnType_result


print("Before returning. grade=",grade, " grade_annotation=",grade_annotation)

return grade, grade_annotation
```