Computer algebra independent integration tests

1-Algebraic-functions/1.2-Trinomial-products/1.2.2-Quartic/1.2.2.5-P-x-a+b-x^2+c-x^4-^p

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Contents

Chapter 1

Introduction

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

The number of integrals in this report is [111]. This is test number [42].

1.1 Listing of CAS systems tested

The following systems were tested at this time.

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

Maxima, Fricas and Giac/Xcas were called from inside SageMath. This was done using SageMath integrate command by changing the name of the algorithm to use the different CAS systems.

Sympy was called directly using Python.

1.2 Results

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

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

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

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

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

System	solved	Failed
Rubi	% 100.00 (111)	% 0.00 (0)
Mathematica	% 92.79 (103)	% 7.21 (8)
Maple	% 100.00 (111)	% 0.00 (0)
Maxima	% 74.77 (83)	% 25.23 (28)
Fricas	% 74.77 (83)	% 25.23 (28)
Sympy	% 42.34 (47)	% 57.66 (64)
Giac	% 90.09 (100)	% 9.91 (11)
Mupad	% 95.50 (106)	% 4.50 (5)

Table 1.1: Percentage solved for each CAS

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

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

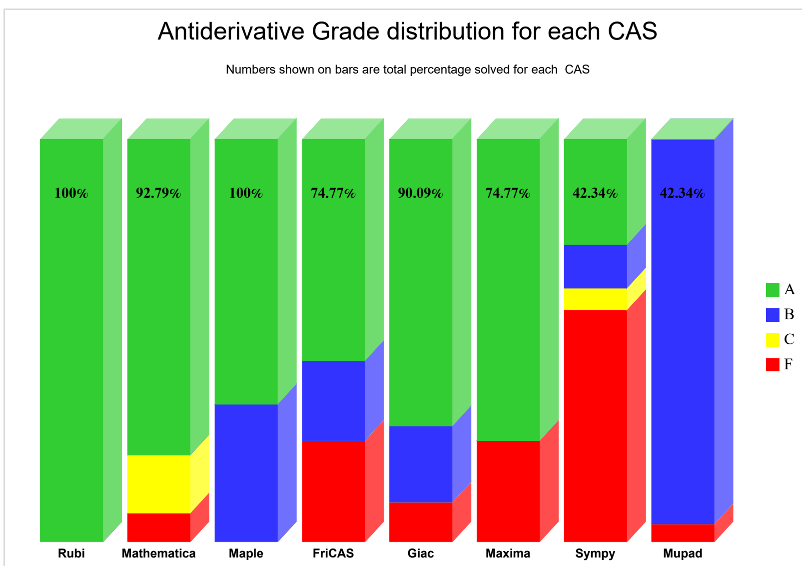
Table 1.2: Description of grading applied to integration result

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

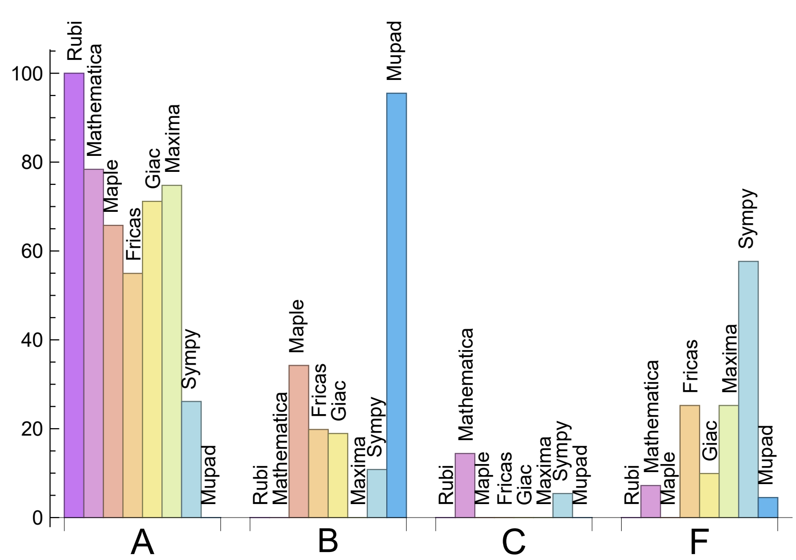
System	% A grade	% B grade	% C grade	% F grade
Rubi	100.00	0.00	0.00	0.00
Mathematica	78.38	0.00	14.41	7.21
Maple	65.77	34.23	0.00	0.00
Maxima	74.77	0.00	0.00	25.23
Fricas	54.95	19.82	0.00	25.23
Sympy	26.13	10.81	5.41	57.66
Giac	71.17	18.92	0.00	9.91
Mupad	0.00	95.50	0.00	4.50

Table 1.3: Antiderivative Grade distribution of each CAS

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



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



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

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

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

System	Number failed	Percentage normal failure	Percentage time-out failure	Percentage exception failure
Rubi	0	0.00 %	0.00 %	0.00 %
Mathematica	8	0.00 %	100.00 %	0.00 %
Maple	0	0.00 %	0.00 %	0.00 %
Maxima	28	100.00 %	0.00 %	0.00 %
Fricas	28	17.86 %	82.14 %	0.00 %
Sympy	64	12.50 %	87.50 %	0.00 %
Giac	11	45.45 %	54.55 %	0.00 %
Mupad	5	100.00 %	0.00 %	0.00 %

Table 1.4: Time and leaf size performance for each CAS

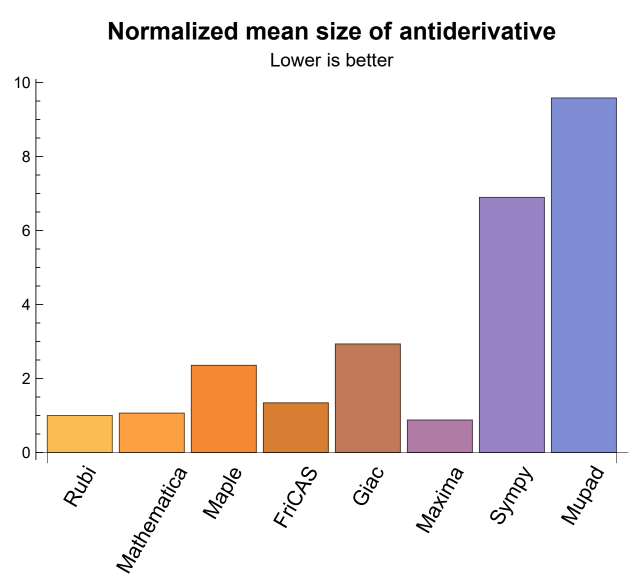
1.3 Performance

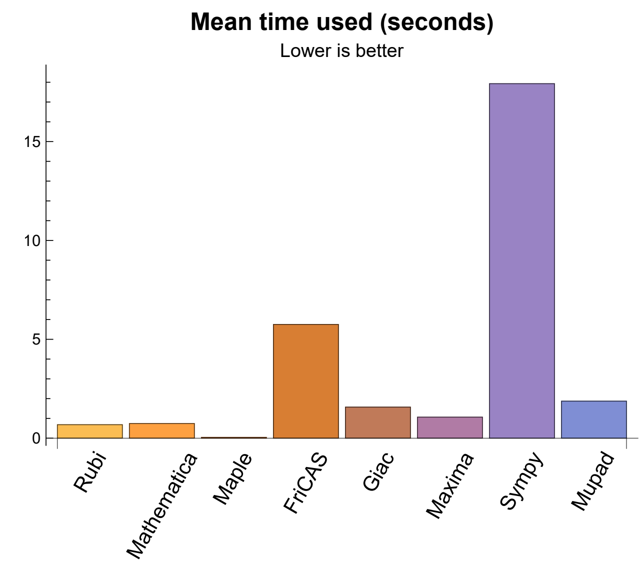
The table below summarizes the performance of each CAS system in terms of CPU time and leaf size of results.

System	Mean time (sec)	Mean size	Normalized mean	Median size	Normalized median
Rubi	0.68	217.75	1.00	140.00	1.00
Mathematica	0.74	239.05	1.06	146.00	1.02
Maple	0.04	883.14	2.36	186.00	1.54
Maxima	1.06	100.89	0.88	88.00	0.87
Fricas	5.75	172.94	1.34	106.00	1.11
Sympy	17.93	711.77	6.90	165.00	1.21
Giac	1.57	934.38	2.93	117.50	1.00
Mupad	1.87	5695.50	9.58	132.00	1.00

Table 1.5: Time and leaf size performance for each CAS

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





1.4 list of integrals that has no closed form antiderivative

{}

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

Rubi {}

Mathematica {}

Maple {}

Maxima {}

Fricas {}

Sympy {}

Giac {}

Mupad {}

1.6 list of integrals solved by CAS but failed verification

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

Rubi {}

Mathematica {15, 16, 17, 31, 32, 33, 34, 35, 47, 48, 49, 50, 51}

Maple Verification phase not implemented yet.

Maxima Verification phase not implemented yet.

Fricas Verification phase not implemented yet.

Sympy Verification phase not implemented yet.

Giac Verification phase not implemented yet.

Mupad Verification phase not implemented yet.

1.7 Timing

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

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

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

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

1.8 Verification

A verification phase was applied on the result of integration for Rubi and Mathematica. Future version of this report will implement verification for the other CAS systems. For the integrals whose result was not run through a verification phase, it is assumed that the antiderivative produced was correct.

Verification phase has 3 minutes time out. An integral whose result was not verified could still be correct. Further investigation is needed on those integrals which failed verifications. Such integrals are marked in the summary table below and also in each integral separate section so they are easy to identify and locate.

1.9 Important notes about some of the results

1.9.1 Important note about Maxima results

Since these integrals are run in a batch mode, using an automated script, and by using sagemath (SageMath uses Maxima), then any integral where Maxima needs an interactive response from the user to answer a question during evaluation of the integral in order to complete the integration, will fail and is counted as failed.

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

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

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

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

```
'besselexpand : true'
'display2d : false'
'domain : complex'
'keepfloat : true'
```

```
'load(to_poly_solve)'
'load(simplify_sum)'
'load(abs_integrate)' 'load(diag)'
```

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

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

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

1.9.2 Important note about FriCAS and Giac/XCAS results

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

These will fail With error `Exception raised: NotImplementedError`

The number of such cases seems to be very small. About 1 or 2 percent of all integrals.

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

1.9.3 Important note about finding leaf size of antiderivative

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

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

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

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

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

  except Exception as ee:
         leafCount =1
```

1.9.4 Important note about Mupad results

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

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

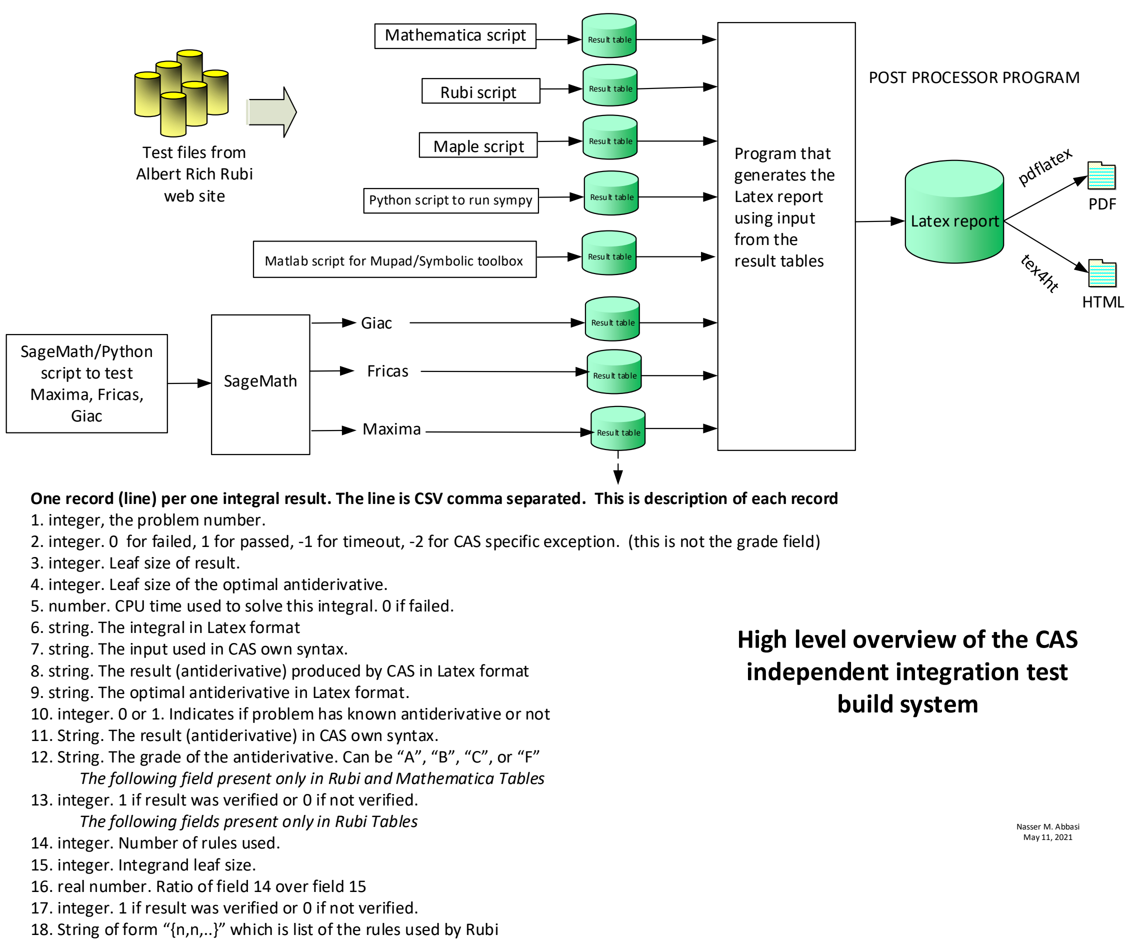
The following is an example of using Matlab's symbolic toolbox (Mupad) to solve an integral

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

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

1.10 Design of the test system

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



Chapter 2

detailed summary tables of results

2.1 List of integrals sorted by grade for each CAS

2.1.1 Rubi

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111 }

B grade: { }

C grade: { }

F grade: { }

2.1.2 Mathematica

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102 }

B grade: { }

C grade: { 15, 16, 17, 18, 19, 31, 32, 33, 34, 35, 47, 48, 49, 50, 51, 105 }

F grade: { 103, 104, 106, 107, 108, 109, 110, 111 }

2.1.3 Maple

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 20, 26, 27, 28, 31, 32, 33, 34, 42, 43, 44, 47, 48, 49, 50, 51, 61, 62, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 105, 108, 109, 110, 111 }

B grade: { 11, 12, 13, 14, 18, 19, 21, 22, 23, 24, 25, 29, 30, 35, 36, 37, 38, 39, 40, 41, 45, 46, 52, 53, 54, 55, 56, 57, 58, 59, 60, 64, 65, 66, 103, 104, 106, 107 }

C grade: { }

F grade: { }

2.1.4 Maxima

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 60, 61, 62, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 108, 109, 110, 111 }

B grade: { }

C grade: { }

F grade: { 20, 21, 22, 23, 24, 25, 36, 37, 38, 39, 40, 41, 52, 53, 54, 55, 56, 57, 58, 59, 64, 65, 66, 103, 104, 105, 106, 107 }

2.1.5 FriCAS

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 31, 32, 33, 34, 35, 47, 48, 49, 60, 61, 62, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 108, 109, 110, 111 }

B grade: { 26, 27, 28, 29, 30, 42, 43, 44, 45, 46, 50, 51, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102 }

C grade: { }

F grade: { 20, 21, 22, 23, 24, 25, 36, 37, 38, 39, 40, 41, 52, 53, 54, 55, 56, 57, 58, 59, 64, 65, 66, 103, 104, 105, 106, 107 }

2.1.6 Sympy

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 60, 61, 62, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 85, 91, 97 }

B grade: { 10, 11, 26, 27, 42, 43, 80, 81, 82, 86, 92, 98 }

C grade: { 15, 16, 31, 32, 47, 48 }

F grade: { 12, 13, 14, 17, 18, 19, 20, 21, 22, 23, 24, 25, 28, 29, 30, 33, 34, 35, 36, 37, 38, 39, 40, 41, 44, 45, 46, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 64, 65, 66, 83, 84, 87, 88, 89, 90, 93, 94, 95, 96, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111 }

2.1.7 Giac

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 60, 61, 62, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102 }

B grade: { 20, 21, 22, 23, 24, 25, 36, 37, 38, 39, 52, 53, 54, 55, 64, 65, 66, 108, 109, 110, 111 }

C grade: { }

F grade: { 40, 41, 56, 57, 58, 59, 103, 104, 105, 106, 107 }

2.1.8 Mupad

A grade: { }

B grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 108, 109, 110, 111 }

C grade: { }

F grade: { 103, 104, 105, 106, 107 }

2.2 Detailed conclusion table per each integral for all CAS systems

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

In this table,the column **normalized size** is defined as $\frac{\text{antiderivative leaf size}}{\text{optimal antiderivative leaf size}}$

Problem 1	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	50	50	50	41	40	40	46	43	40
normalized size	1	1.00	1.00	0.82	0.80	0.80	0.92	0.86	0.80
time (sec)	N/A	0.041	0.002	0.000	1.249	0.509	0.064	0.320	0.027

Problem 2	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	69	58	57	61	65	64	59
normalized size	1	1.00	1.00	0.84	0.83	0.88	0.94	0.93	0.86
time (sec)	N/A	0.045	0.021	0.002	1.207	0.789	0.069	0.244	0.033

Problem 3	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	88	75	74	82	83	85	78
normalized size	1	1.00	1.00	0.85	0.84	0.93	0.94	0.97	0.89
time (sec)	N/A	0.073	0.019	0.002	1.559	0.502	0.074	0.218	0.662

Problem 4	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	105	90	89	103	102	106	95
normalized size	1	1.00	1.00	0.86	0.85	0.98	0.97	1.01	0.90
time (sec)	N/A	0.095	0.034	0.002	1.643	0.695	0.079	0.360	0.659

Problem 5	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	122	105	104	124	121	127	112
normalized size	1	1.00	1.00	0.86	0.85	1.02	0.99	1.04	0.92
time (sec)	N/A	0.111	0.038	0.001	1.174	0.901	0.083	0.319	0.058

Problem 6	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	97	95	94	100	116	106	94
normalized size	1	1.00	0.87	0.85	0.84	0.89	1.04	0.95	0.84
time (sec)	N/A	0.126	0.049	0.001	1.060	1.094	0.084	0.389	0.056

Problem 7	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	154	154	154	139	138	151	165	157	138
normalized size	1	1.00	1.00	0.90	0.90	0.98	1.07	1.02	0.90
time (sec)	N/A	0.130	0.045	0.000	1.027	0.447	0.093	0.256	0.697

Problem 8	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	196	196	196	183	182	202	209	208	182
normalized size	1	1.00	1.00	0.93	0.93	1.03	1.07	1.06	0.93
time (sec)	N/A	0.168	0.057	0.000	1.400	0.783	0.102	0.299	0.716

Problem 9	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	234	234	234	219	218	253	258	259	220
normalized size	1	1.00	1.00	0.94	0.93	1.08	1.10	1.11	0.94
time (sec)	N/A	0.238	0.083	0.000	1.138	0.831	0.110	0.258	0.114

Problem 10	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	50	58	43	43	515	51	51
normalized size	1	1.00	1.11	1.29	0.96	0.96	11.44	1.13	1.13
time (sec)	N/A	0.032	0.018	0.012	1.125	1.600	3.147	0.251	0.709

Problem 11	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	58	86	51	51	2195	59	63
normalized size	1	1.00	1.14	1.69	1.00	1.00	43.04	1.16	1.24
time (sec)	N/A	0.057	0.026	0.009	1.122	1.018	110.122	0.306	0.715

Problem 12	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	68	114	61	61	0	69	75
normalized size	1	1.00	1.19	2.00	1.07	1.07	0.00	1.21	1.32
time (sec)	N/A	0.072	0.032	0.008	1.355	1.481	0.000	0.310	0.742

Problem 13	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	81	145	72	72	0	80	90
normalized size	1	1.00	1.27	2.27	1.12	1.12	0.00	1.25	1.41
time (sec)	N/A	0.147	0.045	0.010	1.238	4.816	0.000	0.434	0.815

Problem 14	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	98	179	88	88	0	96	108
normalized size	1	1.00	1.29	2.36	1.16	1.16	0.00	1.26	1.42
time (sec)	N/A	0.192	0.064	0.009	1.245	18.713	0.000	0.261	1.190

Problem 15	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	C	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	92	92	98	92	65	65	923	67	118
normalized size	1	1.00	1.07	1.00	0.71	0.71	10.03	0.73	1.28
time (sec)	N/A	0.077	0.178	0.007	2.209	0.933	2.887	0.378	0.242

Problem 16	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	C	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	121	148	75	75	3589	77	159
normalized size	1	1.00	1.16	1.42	0.72	0.72	34.51	0.74	1.53
time (sec)	N/A	0.085	0.138	0.003	2.579	0.997	98.602	0.228	0.951

Problem 17	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	127	127	150	204	83	83	0	85	199
normalized size	1	1.00	1.18	1.61	0.65	0.65	0.00	0.67	1.57
time (sec)	N/A	0.101	0.481	0.003	2.385	1.299	0.000	0.291	1.127

Problem 18	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	B	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	136	136	165	241	92	92	0	94	1209
normalized size	1	1.00	1.21	1.77	0.68	0.68	0.00	0.69	8.89
time (sec)	N/A	0.140	0.603	0.006	2.618	4.555	0.000	0.301	6.108

Problem 19	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	B	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	151	151	187	303	106	106	0	108	1509
normalized size	1	1.00	1.24	2.01	0.70	0.70	0.00	0.72	9.99
time (sec)	N/A	0.176	0.582	0.006	2.367	17.273	0.000	0.307	7.805

Problem 20	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	189	189	194	231	0	0	0	1248	1308
normalized size	1	1.00	1.03	1.22	0.00	0.00	0.00	6.60	6.92
time (sec)	N/A	0.211	0.251	0.034	0.000	0.000	0.000	4.590	1.316

Problem 21	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	211	211	234	616	0	0	0	1618	3942
normalized size	1	1.00	1.11	2.92	0.00	0.00	0.00	7.67	18.68
time (sec)	N/A	0.240	0.219	0.031	0.000	0.000	0.000	3.540	2.139

Problem 22	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	245	245	280	866	0	0	0	3272	15179
normalized size	1	1.00	1.14	3.53	0.00	0.00	0.00	13.36	61.96
time (sec)	N/A	0.159	0.289	0.033	0.000	0.000	0.000	2.827	2.539

Problem 23	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	290	290	383	1132	0	0	0	5201	5981
normalized size	1	1.00	1.32	3.90	0.00	0.00	0.00	17.93	20.62
time (sec)	N/A	0.725	0.500	0.042	0.000	0.000	0.000	4.908	1.749

Problem 24	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	321	321	441	1435	0	0	0	6096	11383
normalized size	1	1.00	1.37	4.47	0.00	0.00	0.00	18.99	35.46
time (sec)	N/A	0.534	0.647	0.043	0.000	0.000	0.000	3.720	2.030

Problem 25	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	545	545	816	3835	0	0	0	11831	49150
normalized size	1	1.00	1.50	7.04	0.00	0.00	0.00	21.71	90.18
time (sec)	N/A	4.213	1.293	0.080	0.000	0.000	0.000	7.208	4.306

Problem 26	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	94	94	90	122	83	169	604	93	84
normalized size	1	1.00	0.96	1.30	0.88	1.80	6.43	0.99	0.89
time (sec)	N/A	0.052	0.054	0.019	1.677	1.317	3.565	0.230	0.088

Problem 27	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	112	182	106	217	2689	115	107
normalized size	1	1.00	0.97	1.58	0.92	1.89	23.38	1.00	0.93
time (sec)	N/A	0.140	0.080	0.018	1.068	1.464	118.426	0.252	0.104

Problem 28	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	138	138	134	242	127	262	0	136	128
normalized size	1	1.00	0.97	1.75	0.92	1.90	0.00	0.99	0.93
time (sec)	N/A	0.154	0.054	0.023	0.971	1.855	0.000	0.253	0.136

Problem 29	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	150	150	159	302	145	304	0	158	146
normalized size	1	1.00	1.06	2.01	0.97	2.03	0.00	1.05	0.97
time (sec)	N/A	0.214	0.072	0.017	1.183	5.398	0.000	0.298	0.870

Problem 30	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	162	162	185	362	163	346	0	179	164
normalized size	1	1.00	1.14	2.23	1.01	2.14	0.00	1.10	1.01
time (sec)	N/A	0.232	0.086	0.020	1.349	25.374	0.000	0.316	0.583

Problem 31	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	C	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	140	140	146	146	96	154	952	100	149
normalized size	1	1.00	1.04	1.04	0.69	1.10	6.80	0.71	1.06
time (sec)	N/A	0.098	0.489	0.014	2.417	1.089	3.495	0.239	0.252

Problem 32	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	C	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	165	165	186	214	120	212	4106	128	201
normalized size	1	1.00	1.13	1.30	0.73	1.28	24.88	0.78	1.22
time (sec)	N/A	0.129	0.419	0.013	2.391	0.928	108.823	0.234	0.315

Problem 33	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	179	179	200	260	135	239	0	142	237
normalized size	1	1.00	1.12	1.45	0.75	1.34	0.00	0.79	1.32
time (sec)	N/A	0.141	0.434	0.016	2.581	1.475	0.000	0.308	1.154

Problem 34	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	187	187	234	328	143	255	0	155	1547
normalized size	1	1.00	1.25	1.75	0.76	1.36	0.00	0.83	8.27
time (sec)	N/A	0.167	0.606	0.015	2.951	4.343	0.000	0.318	5.349

Problem 35	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	B	A	A	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	194	194	243	374	155	279	0	169	1894
normalized size	1	1.00	1.25	1.93	0.80	1.44	0.00	0.87	9.76
time (sec)	N/A	0.197	0.659	0.015	2.628	19.792	0.000	0.305	8.177

Problem 36	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	330	330	341	1237	0	0	0	3434	2382
normalized size	1	1.00	1.03	3.75	0.00	0.00	0.00	10.41	7.22
time (sec)	N/A	0.745	0.756	0.145	0.000	0.000	0.000	5.020	1.504

Problem 37	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	368	368	398	1813	0	0	0	5164	4707
normalized size	1	1.00	1.08	4.93	0.00	0.00	0.00	14.03	12.79
time (sec)	N/A	0.870	1.170	0.179	0.000	0.000	0.000	6.669	1.709

Problem 38	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	386	386	421	2310	0	0	0	5579	7373
normalized size	1	1.00	1.09	5.98	0.00	0.00	0.00	14.45	19.10
time (sec)	N/A	0.490	1.296	0.175	0.000	0.000	0.000	6.114	1.771

Problem 39	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	439	439	489	1801	0	0	0	7502	13024
normalized size	1	1.00	1.11	4.10	0.00	0.00	0.00	17.09	29.67
time (sec)	N/A	1.894	1.882	0.070	0.000	0.000	0.000	8.028	2.306

Problem 40	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	468	468	524	1917	0	0	0	0	18449
normalized size	1	1.00	1.12	4.10	0.00	0.00	0.00	0.00	39.42
time (sec)	N/A	1.118	2.112	0.049	0.000	0.000	0.000	0.000	3.116

Problem 41	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	770	770	935	4570	0	0	0	0	82785
normalized size	1	1.00	1.21	5.94	0.00	0.00	0.00	0.00	107.51
time (sec)	N/A	7.835	5.697	0.104	0.000	0.000	0.000	0.000	13.909

Problem 42	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	143	143	128	186	121	307	668	123	118
normalized size	1	1.00	0.90	1.30	0.85	2.15	4.67	0.86	0.83
time (sec)	N/A	0.076	0.098	0.020	1.062	1.495	3.687	0.334	0.092

Problem 43	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	175	175	161	278	155	389	2822	157	151
normalized size	1	1.00	0.92	1.59	0.89	2.22	16.13	0.90	0.86
time (sec)	N/A	0.224	0.126	0.023	1.098	1.917	124.287	0.353	0.113

Problem 44	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	204	204	193	370	188	470	0	190	182
normalized size	1	1.00	0.95	1.81	0.92	2.30	0.00	0.93	0.89
time (sec)	N/A	0.252	0.084	0.022	1.082	2.865	0.000	0.394	0.847

Problem 45	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	224	224	231	462	214	544	0	224	209
normalized size	1	1.00	1.03	2.06	0.96	2.43	0.00	1.00	0.93
time (sec)	N/A	0.307	0.118	0.022	1.065	6.125	0.000	0.333	0.248

Problem 46	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	239	239	261	554	238	616	0	257	233
normalized size	1	1.00	1.09	2.32	1.00	2.58	0.00	1.08	0.97
time (sec)	N/A	0.345	0.129	0.021	1.117	27.719	0.000	0.370	0.616

Problem 47	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	C	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	185	185	186	180	137	278	1103	131	185
normalized size	1	1.00	1.01	0.97	0.74	1.50	5.96	0.71	1.00
time (sec)	N/A	0.117	0.746	0.017	2.554	0.734	3.615	0.362	0.260

Problem 48	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	C	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	223	223	235	264	173	384	4496	171	249
normalized size	1	1.00	1.05	1.18	0.78	1.72	20.16	0.77	1.12
time (sec)	N/A	0.215	0.592	0.017	2.568	0.893	117.113	0.365	1.008

Problem 49	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	243	243	259	322	200	435	0	198	295
normalized size	1	1.00	1.07	1.33	0.82	1.79	0.00	0.81	1.21
time (sec)	N/A	0.227	0.658	0.019	2.606	2.172	0.000	0.379	1.170

Problem 50	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	B	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	263	263	303	396	217	485	0	228	1611
normalized size	1	1.00	1.15	1.51	0.83	1.84	0.00	0.87	6.13
time (sec)	N/A	0.263	0.904	0.023	3.147	5.214	0.000	0.388	5.453

Problem 51	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	B	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	269	269	325	454	229	521	0	255	1963
normalized size	1	1.00	1.21	1.69	0.85	1.94	0.00	0.95	7.30
time (sec)	N/A	0.286	0.977	0.019	2.120	23.869	0.000	0.375	8.217

Problem 52	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	474	474	488	3725	0	0	0	3397	4225
normalized size	1	1.00	1.03	7.86	0.00	0.00	0.00	7.17	8.91
time (sec)	N/A	2.193	1.911	0.359	0.000	0.000	0.000	13.320	2.344

Problem 53	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	621	621	625	7858	0	0	0	5288	8689
normalized size	1	1.00	1.01	12.65	0.00	0.00	0.00	8.52	13.99
time (sec)	N/A	4.512	3.609	0.616	0.000	0.000	0.000	10.792	3.265

Problem 54	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	646	646	661	10222	0	0	0	5439	13431
normalized size	1	1.00	1.02	15.82	0.00	0.00	0.00	8.42	20.79
time (sec)	N/A	3.299	4.293	0.448	0.000	0.000	0.000	10.391	4.558

Problem 55	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	679	679	845	3492	0	0	0	6861	23811
normalized size	1	1.00	1.24	5.14	0.00	0.00	0.00	10.10	35.07
time (sec)	N/A	4.182	6.548	0.096	0.000	0.000	0.000	13.218	5.347

Problem 56	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	728	728	980	3824	0	0	0	0	36653
normalized size	1	1.00	1.35	5.25	0.00	0.00	0.00	0.00	50.35
time (sec)	N/A	2.733	6.674	0.063	0.000	0.000	0.000	0.000	7.160

Problem 57	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	1150	1144	1590	6026	0	0	0	0	114377
normalized size	1	0.99	1.38	5.24	0.00	0.00	0.00	0.00	99.46
time (sec)	N/A	8.164	7.480	0.125	0.000	0.000	0.000	0.000	20.572

Problem 58	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	645	645	775	3107	0	0	0	0	53538
normalized size	1	1.00	1.20	4.82	0.00	0.00	0.00	0.00	83.00
time (sec)	N/A	3.367	4.405	0.089	0.000	0.000	0.000	0.000	8.852

Problem 59	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	1177	1179	1649	6130	0	0	0	0	97905
normalized size	1	1.00	1.40	5.21	0.00	0.00	0.00	0.00	83.18
time (sec)	N/A	7.926	7.346	0.129	0.000	0.000	0.000	0.000	17.175

Problem 60	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	416	416	416	829	418	463	503	478	398
normalized size	1	1.00	1.00	1.99	1.00	1.11	1.21	1.15	0.96
time (sec)	N/A	0.629	0.122	0.003	0.517	0.809	0.161	0.428	0.383

Problem 61	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	259	259	259	354	251	285	309	295	246
normalized size	1	1.00	1.00	1.37	0.97	1.10	1.19	1.14	0.95
time (sec)	N/A	0.332	0.046	0.002	0.698	0.696	0.125	0.306	0.948

Problem 62	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	154	154	154	161	138	151	165	157	138
normalized size	1	1.00	1.00	1.05	0.90	0.98	1.07	1.02	0.90
time (sec)	N/A	0.152	0.032	0.001	0.588	0.725	0.096	0.284	0.089

Problem 63	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	20	17	16	16	15	17	16
normalized size	1	1.00	1.00	0.85	0.80	0.80	0.75	0.85	0.80
time (sec)	N/A	0.033	0.002	0.001	0.617	0.896	0.090	1.774	0.027

Problem 64	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	211	211	234	616	0	0	0	1620	3942
normalized size	1	1.00	1.11	2.92	0.00	0.00	0.00	7.68	18.68
time (sec)	N/A	0.318	0.059	0.024	0.000	0.000	0.000	4.239	1.174

Problem 65	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	368	368	398	1813	0	0	0	5164	4707
normalized size	1	1.00	1.08	4.93	0.00	0.00	0.00	14.03	12.79
time (sec)	N/A	0.923	1.197	0.140	0.000	0.000	0.000	11.929	1.523

Problem 66	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	621	621	625	7858	0	0	0	5288	8689
normalized size	1	1.00	1.01	12.65	0.00	0.00	0.00	8.52	13.99
time (sec)	N/A	4.594	3.584	0.381	0.000	0.000	0.000	6.426	3.161

Problem 67	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	4	4	4	5	4	4	3	5	4
normalized size	1	1.00	1.00	1.25	1.00	1.00	0.75	1.25	1.00
time (sec)	N/A	0.011	0.001	0.002	0.430	0.774	0.069	0.307	0.018

Problem 68	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	14	14	16	18	14	14	12	17	14
normalized size	1	1.00	1.14	1.29	1.00	1.00	0.86	1.21	1.00
time (sec)	N/A	0.024	0.004	0.003	0.436	1.301	0.121	0.331	0.728

Problem 69	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	31	31	30	35	27	27	26	30	27
normalized size	1	1.00	0.97	1.13	0.87	0.87	0.84	0.97	0.87
time (sec)	N/A	0.052	0.012	0.003	0.455	1.187	0.146	0.278	0.037

Problem 70	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	45	58	43	43	41	49	44
normalized size	1	1.00	0.88	1.14	0.84	0.84	0.80	0.96	0.86
time (sec)	N/A	0.085	0.025	0.003	0.448	1.239	0.176	0.248	0.038

Problem 71	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	68	87	62	62	63	74	64
normalized size	1	1.00	1.00	1.28	0.91	0.91	0.93	1.09	0.94
time (sec)	N/A	0.117	0.018	0.002	0.436	1.209	0.209	0.230	0.034

Problem 72	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	92	92	92	122	84	84	88	105	87
normalized size	1	1.00	1.00	1.33	0.91	0.91	0.96	1.14	0.95
time (sec)	N/A	0.149	0.032	0.003	0.463	0.896	0.247	0.267	0.038

Problem 73	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	11	11	11	12	11	11	8	13	8
normalized size	1	1.00	1.00	1.09	1.00	1.00	0.73	1.18	0.73
time (sec)	N/A	0.010	0.003	0.004	0.429	0.926	0.107	0.279	0.083

Problem 74	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	23	29	22	22	29	26	22
normalized size	1	1.00	1.05	1.32	1.00	1.00	1.32	1.18	1.00
time (sec)	N/A	0.021	0.007	0.004	0.437	0.829	0.283	0.285	0.799

Problem 75	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	30	45	29	29	44	33	29
normalized size	1	1.00	1.03	1.55	1.00	1.00	1.52	1.14	1.00
time (sec)	N/A	0.050	0.013	0.006	0.434	0.951	0.510	0.250	0.071

Problem 76	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	47	47	44	69	45	45	66	49	45
normalized size	1	1.00	0.94	1.47	0.96	0.96	1.40	1.04	0.96
time (sec)	N/A	0.068	0.019	0.006	0.448	0.837	0.858	0.228	0.764

Problem 77	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	67	98	62	62	94	69	63
normalized size	1	1.00	1.02	1.48	0.94	0.94	1.42	1.05	0.95
time (sec)	N/A	0.085	0.023	0.008	0.444	0.825	1.531	0.293	0.074

Problem 78	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	91	134	84	84	122	97	86
normalized size	1	1.00	1.01	1.49	0.93	0.93	1.36	1.08	0.96
time (sec)	N/A	0.107	0.036	0.007	0.441	0.816	2.591	0.388	0.084

Problem 79	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	29	20	19	19	19	22	19
normalized size	1	1.00	1.00	0.69	0.66	0.66	0.66	0.76	0.66
time (sec)	N/A	0.021	0.007	0.008	0.439	0.899	0.141	0.237	0.078

Problem 80	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	39	44	32	32	304	38	38
normalized size	1	1.00	0.93	1.05	0.76	0.76	7.24	0.90	0.90
time (sec)	N/A	0.052	0.019	0.006	0.444	0.751	1.760	0.287	0.843

Problem 81	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	47	47	44	65	37	37	716	43	47
normalized size	1	1.00	0.94	1.38	0.79	0.79	15.23	0.91	1.00
time (sec)	N/A	0.064	0.021	0.006	0.436	0.928	12.723	0.367	0.111

Problem 82	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	55	89	47	47	1389	53	59
normalized size	1	1.00	0.96	1.56	0.82	0.82	24.37	0.93	1.04
time (sec)	N/A	0.079	0.025	0.007	0.438	0.926	91.466	0.374	0.820

Problem 83	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	71	120	62	62	0	68	78
normalized size	1	1.00	0.96	1.62	0.84	0.84	0.00	0.92	1.05
time (sec)	N/A	0.107	0.033	0.007	0.450	1.032	0.000	0.328	0.880

Problem 84	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	96	96	91	156	82	82	0	90	99
normalized size	1	1.00	0.95	1.62	0.85	0.85	0.00	0.94	1.03
time (sec)	N/A	0.137	0.046	0.009	0.449	1.300	0.000	0.243	0.883

Problem 85	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	42	33	32	45	34	36	32
normalized size	1	1.00	0.91	0.72	0.70	0.98	0.74	0.78	0.70
time (sec)	N/A	0.051	0.022	0.010	0.436	0.946	0.260	0.252	0.049

Problem 86	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	66	74	57	93	1188	66	64
normalized size	1	1.00	0.93	1.04	0.80	1.31	16.73	0.93	0.90
time (sec)	N/A	0.174	0.047	0.010	0.439	0.971	10.543	0.256	0.807

Problem 87	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	77	110	68	116	0	77	79
normalized size	1	1.00	0.94	1.34	0.83	1.41	0.00	0.94	0.96
time (sec)	N/A	0.199	0.061	0.010	0.461	1.100	0.000	0.251	0.842

Problem 88	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	90	146	81	141	0	90	94
normalized size	1	1.00	0.95	1.54	0.85	1.48	0.00	0.95	0.99
time (sec)	N/A	0.221	0.049	0.013	0.444	2.419	0.000	0.329	0.876

Problem 89	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	106	106	102	182	92	164	0	101	108
normalized size	1	1.00	0.96	1.72	0.87	1.55	0.00	0.95	1.02
time (sec)	N/A	0.266	0.057	0.010	0.442	11.237	0.000	0.289	1.364

Problem 90	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	118	221	108	200	0	117	127
normalized size	1	1.00	0.97	1.81	0.89	1.64	0.00	0.96	1.04
time (sec)	N/A	0.315	0.063	0.013	0.450	66.478	0.000	0.367	1.673

Problem 91	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	56	56	48	40	42	72	46	46	42
normalized size	1	1.00	0.86	0.71	0.75	1.29	0.82	0.82	0.75
time (sec)	N/A	0.057	0.024	0.010	0.433	0.740	0.291	0.351	0.046

Problem 92	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	80	90	75	153	1255	85	79
normalized size	1	1.00	0.90	1.01	0.84	1.72	14.10	0.96	0.89
time (sec)	N/A	0.260	0.051	0.013	0.454	0.723	10.508	0.381	0.101

Problem 93	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	97	134	91	191	0	101	97
normalized size	1	1.00	0.92	1.28	0.87	1.82	0.00	0.96	0.92
time (sec)	N/A	0.320	0.074	0.013	0.442	0.880	0.000	0.322	0.828

Problem 94	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	114	178	107	229	0	117	115
normalized size	1	1.00	0.97	1.52	0.91	1.96	0.00	1.00	0.98
time (sec)	N/A	0.246	0.055	0.015	0.440	2.548	0.000	0.380	0.905

Problem 95	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	131	131	136	222	123	267	0	133	133
normalized size	1	1.00	1.04	1.69	0.94	2.04	0.00	1.02	1.02
time (sec)	N/A	0.280	0.062	0.013	0.454	11.825	0.000	0.328	1.332

Problem 96	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	147	147	153	266	139	305	0	149	151
normalized size	1	1.00	1.04	1.81	0.95	2.07	0.00	1.01	1.03
time (sec)	N/A	0.330	0.083	0.014	0.452	70.058	0.000	0.394	1.680

Problem 97	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	60	47	52	103	53	56	52
normalized size	1	1.00	0.88	0.69	0.76	1.51	0.78	0.82	0.76
time (sec)	N/A	0.058	0.031	0.013	0.442	0.655	0.305	0.400	0.046

Problem 98	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	97	106	88	211	1034	98	90
normalized size	1	1.00	0.92	1.01	0.84	2.01	9.85	0.93	0.86
time (sec)	N/A	0.196	0.089	0.014	0.441	0.938	8.787	0.311	0.093

Problem 99	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	121	158	108	267	0	118	113
normalized size	1	1.00	0.99	1.30	0.89	2.19	0.00	0.97	0.93
time (sec)	N/A	0.222	0.051	0.015	0.442	1.241	0.000	0.326	0.126

Problem 100	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	141	141	144	210	126	321	0	136	131
normalized size	1	1.00	1.02	1.49	0.89	2.28	0.00	0.96	0.93
time (sec)	N/A	0.253	0.074	0.017	0.447	2.534	0.000	0.320	0.881

Problem 101	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	169	262	145	376	0	155	152
normalized size	1	1.00	1.07	1.66	0.92	2.38	0.00	0.98	0.96
time (sec)	N/A	0.289	0.090	0.016	0.450	12.105	0.000	0.365	1.392

Problem 102	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	177	177	195	314	163	430	0	173	170
normalized size	1	1.00	1.10	1.77	0.92	2.43	0.00	0.98	0.96
time (sec)	N/A	0.343	0.108	0.017	0.462	70.992	0.000	0.430	1.755

Problem 103	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	B	F	F	F	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	717	717	0	3038	0	0	0	0	-1
normalized size	1	1.00	0.00	4.24	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.596	0.000	0.019	0.000	1.554	0.000	0.000	0.000

Problem 104	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	B	F	F	F	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	505	505	0	1585	0	0	0	0	-1
normalized size	1	1.00	0.00	3.14	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.279	0.000	0.014	0.000	1.514	0.000	0.000	0.000

Problem 105	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	359	359	526	453	0	0	0	0	-1
normalized size	1	1.00	1.47	1.26	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.159	1.382	0.011	0.000	0.984	0.000	0.000	0.000

Problem 106	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	B	F	F	F	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	447	447	0	1005	0	0	0	0	-1
normalized size	1	1.00	0.00	2.25	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.273	0.000	0.026	0.000	0.607	0.000	0.000	0.000

Problem 107	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	B	F	F	F(-1)	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	680	680	0	1395	0	0	0	0	-1
normalized size	1	1.00	0.00	2.05	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.515	0.000	0.057	0.000	0.962	0.000	0.000	0.000

Problem 108	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	A	A	A	F	B	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	0	18	17	17	0	60	17
normalized size	1	1.00	0.00	0.95	0.89	0.89	0.00	3.16	0.89
time (sec)	N/A	0.018	0.000	0.005	0.633	0.715	0.000	1.911	0.987

Problem 109	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	A	A	A	F	B	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	0	52	51	82	0	142	51
normalized size	1	1.00	0.00	0.91	0.89	1.44	0.00	2.49	0.89
time (sec)	N/A	0.067	0.000	0.005	0.638	0.825	0.000	2.012	0.928

Problem 110	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	A	A	A	F	B	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	0	53	49	80	0	136	51
normalized size	1	1.00	0.00	0.93	0.86	1.40	0.00	2.39	0.89
time (sec)	N/A	0.080	0.000	0.005	0.630	0.608	0.000	1.946	0.957

Problem 111	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	A	A	A	F	B	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	0	63	94	92	0	166	62
normalized size	1	1.00	0.00	0.91	1.36	1.33	0.00	2.41	0.90
time (sec)	N/A	0.091	0.000	0.005	0.678	0.754	0.000	2.099	0.977

2.3 Detailed conclusion table specific for Rubi results

The following table is specific to Rubi. It gives additional statistics for each integral. the column **steps** is the number of steps used by Rubi to obtain the antiderivative. The **rules** column is the number of unique rules used. The **integrand size** column is the leaf size of the integrand. Finally the ratio $\frac{\text{number of rules}}{\text{integrand size}}$ is given. The larger this ratio is, the harder the integral was to solve. In this test, problem number [47] had the largest ratio of [.6875]

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	2	1	1.00	18	0.056
2	A	2	1	1.00	23	0.043
3	A	2	1	1.00	28	0.036
4	A	2	1	1.00	33	0.030
5	A	2	1	1.00	38	0.026
6	A	2	1	1.00	20	0.050
7	A	2	1	1.00	25	0.040
8	A	2	1	1.00	30	0.033
9	A	2	1	1.00	35	0.029
10	A	10	7	1.00	18	0.389
11	A	9	7	1.00	23	0.304
12	A	8	6	1.00	28	0.214
13	A	10	7	1.00	33	0.212
14	A	12	8	1.00	38	0.210
15	A	15	8	1.00	16	0.500
16	A	14	8	1.00	21	0.381
17	A	15	7	1.00	26	0.269
18	A	17	8	1.00	31	0.258
19	A	19	9	1.00	36	0.250
20	A	9	7	1.00	20	0.350
21	A	8	7	1.00	25	0.280
22	A	9	8	1.00	30	0.267
23	A	11	9	1.00	35	0.257
24	A	13	10	1.00	40	0.250
25	A	13	10	1.00	55	0.182
26	A	12	9	1.00	18	0.500
27	A	11	9	1.00	23	0.391
28	A	10	8	1.00	28	0.286
29	A	10	8	1.00	33	0.242
30	A	11	9	1.00	38	0.237
31	A	17	10	1.00	16	0.625
32	A	16	10	1.00	21	0.476
33	A	15	9	1.00	26	0.346
34	A	15	9	1.00	31	0.290
35	A	16	10	1.00	36	0.278

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
36	A	11	9	1.00	20	0.450
37	A	10	9	1.00	25	0.360
38	A	9	8	1.00	30	0.267
39	A	9	8	1.00	35	0.229
40	A	10	9	1.00	40	0.225
41	A	13	11	1.00	55	0.200
42	A	14	10	1.00	18	0.556
43	A	13	9	1.00	23	0.391
44	A	12	9	1.00	28	0.321
45	A	12	10	1.00	33	0.303
46	A	13	11	1.00	38	0.290
47	A	19	11	1.00	16	0.688
48	A	18	10	1.00	21	0.476
49	A	17	10	1.00	26	0.385
50	A	17	11	1.00	31	0.355
51	A	18	12	1.00	36	0.333
52	A	13	10	1.00	20	0.500
53	A	12	9	1.00	25	0.360
54	A	11	9	1.00	30	0.300
55	A	11	10	1.00	35	0.286
56	A	12	11	1.00	40	0.275
57	A	11	9	0.99	55	0.164
58	A	11	10	1.00	50	0.200
59	A	13	10	1.00	50	0.200
60	A	2	1	1.00	63	0.016
61	A	2	1	1.00	63	0.016
62	A	2	1	1.00	61	0.016
63	A	2	1	1.00	63	0.016
64	A	9	8	1.00	63	0.127
65	A	11	10	1.00	63	0.159
66	A	13	10	1.00	63	0.159
67	A	2	2	1.00	26	0.077
68	A	3	2	1.00	31	0.065
69	A	3	2	1.00	36	0.056
70	A	3	2	1.00	41	0.049
71	A	3	2	1.00	46	0.043

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
72	A	3	2	1.00	51	0.039
73	A	4	3	1.00	21	0.143
74	A	4	3	1.00	26	0.115
75	A	6	4	1.00	31	0.129
76	A	6	4	1.00	36	0.111
77	A	6	4	1.00	41	0.098
78	A	6	4	1.00	46	0.087
79	A	3	2	1.00	16	0.125
80	A	3	2	1.00	21	0.095
81	A	3	2	1.00	26	0.077
82	A	3	2	1.00	31	0.065
83	A	3	2	1.00	36	0.056
84	A	3	2	1.00	41	0.049
85	A	3	2	1.00	26	0.077
86	A	3	2	1.00	31	0.065
87	A	3	2	1.00	36	0.056
88	A	3	2	1.00	41	0.049
89	A	3	2	1.00	46	0.043
90	A	3	2	1.00	51	0.039
91	A	9	5	1.00	21	0.238
92	A	9	5	1.00	26	0.192
93	A	9	5	1.00	31	0.161
94	A	3	2	1.00	36	0.056
95	A	3	2	1.00	41	0.049
96	A	3	2	1.00	46	0.043
97	A	3	2	1.00	16	0.125
98	A	3	2	1.00	21	0.095
99	A	3	2	1.00	26	0.077
100	A	3	2	1.00	31	0.065
101	A	3	2	1.00	36	0.056
102	A	3	2	1.00	41	0.049
103	A	12	10	1.00	32	0.312
104	A	10	10	1.00	32	0.312
105	A	8	8	1.00	32	0.250
106	A	7	7	1.00	32	0.219
107	A	9	8	1.00	32	0.250

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
108	A	1	1	1.00	28	0.036
109	A	5	5	1.00	31	0.161
110	A	5	5	1.00	33	0.152
111	A	4	4	1.00	36	0.111

Chapter 3

Listing of integrals

3.1 $\int (d+ex)\left(a+bx^2+cx^4\right)\,dx$

Optimal. Leaf size=50

$$adx+\frac{1}{2}aex^2+\frac{1}{3}bdx^3+\frac{1}{4}bex^4+\frac{1}{5}cdx^5+\frac{1}{6}cex^6$$

```
[Out] a*d*x+1/2*a*e*x^2+1/3*b*d*x^3+1/4*b*e*x^4+1/5*c*d*x^5+1/6*c*e*x^6
```

Rubi [A] time = 0.04, antiderivative size = 50, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {1671}

$$adx+\frac{1}{2}aex^2+\frac{1}{3}bdx^3+\frac{1}{4}bex^4+\frac{1}{5}cdx^5+\frac{1}{6}cex^6$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)*(a + b*x^2 + c*x^4),x]
```

```
[Out] a*d*x + (a*e*x^2)/2 + (b*d*x^3)/3 + (b*e*x^4)/4 + (c*d*x^5)/5 + (c*e*x^6)/6
```

Rule 1671

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[Expa
ndIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && Poly
Q[Pq, x] && IGtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int (d+ex)\left(a+bx^2+cx^4\right)\,dx &= \int \left(ad+aex+bdx^2+bex^3+cdx^4+cex^5\right)\,dx\\ &= adx+\frac{1}{2}aex^2+\frac{1}{3}bdx^3+\frac{1}{4}bex^4+\frac{1}{5}cdx^5+\frac{1}{6}cex^6\end{aligned}$$

Mathematica [A] time = 0.00, size = 50, normalized size = 1.00

$$adx+\frac{1}{2}aex^2+\frac{1}{3}bdx^3+\frac{1}{4}bex^4+\frac{1}{5}cdx^5+\frac{1}{6}cex^6$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)*(a + b*x^2 + c*x^4),x]
```

```
[Out] a*d*x + (a*e*x^2)/2 + (b*d*x^3)/3 + (b*e*x^4)/4 + (c*d*x^5)/5 + (c*e*x^6)/6
```

fricas [A] time = 0.51, size = 40, normalized size = 0.80

$$\frac{1}{6}x^6ec + \frac{1}{5}x^5dc + \frac{1}{4}x^4eb + \frac{1}{3}x^3db + \frac{1}{2}x^2ea + xda$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(c*x^4+b*x^2+a),x, algorithm="fricas")
[Out] 1/6*x^6*e*c + 1/5*x^5*d*c + 1/4*x^4*e*b + 1/3*x^3*d*b + 1/2*x^2*e*a + x*d*a
```

giac [A] time = 0.32, size = 43, normalized size = 0.86

$$\frac{1}{6}\,cx^6e + \frac{1}{5}\,cdx^5 + \frac{1}{4}\,bx^4e + \frac{1}{3}\,bdx^3 + \frac{1}{2}\,ax^2e + adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(c*x^4+b*x^2+a),x, algorithm="giac")
[Out] 1/6*c*x^6*e + 1/5*c*d*x^5 + 1/4*b*x^4*e + 1/3*b*d*x^3 + 1/2*a*x^2*e + a*d*x
```

maple [A] time = 0.00, size = 41, normalized size = 0.82

$$\frac{1}{6}ce\,x^6 + \frac{1}{5}cd\,x^5 + \frac{1}{4}be\,x^4 + \frac{1}{3}bd\,x^3 + \frac{1}{2}ae\,x^2 + adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(c*x^4+b*x^2+a),x)
[Out] a*d*x+1/2*a*e*x^2+1/3*b*d*x^3+1/4*b*e*x^4+1/5*c*d*x^5+1/6*c*e*x^6
```

maxima [A] time = 1.25, size = 40, normalized size = 0.80

$$\frac{1}{6}\,cex^6 + \frac{1}{5}\,cdx^5 + \frac{1}{4}\,bex^4 + \frac{1}{3}\,bdx^3 + \frac{1}{2}\,aex^2 + adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(c*x^4+b*x^2+a),x, algorithm="maxima")
[Out] 1/6*c*e*x^6 + 1/5*c*d*x^5 + 1/4*b*e*x^4 + 1/3*b*d*x^3 + 1/2*a*e*x^2 + a*d*x
```

mupad [B] time = 0.03, size = 40, normalized size = 0.80

$$\frac{c\,e\,x^6}{6} + \frac{c\,d\,x^5}{5} + \frac{b\,e\,x^4}{4} + \frac{b\,d\,x^3}{3} + \frac{a\,e\,x^2}{2} + a\,d\,x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x)*(a + b*x^2 + c*x^4),x)
[Out] a*d*x + (a*e*x^2)/2 + (b*d*x^3)/3 + (b*e*x^4)/4 + (c*d*x^5)/5 + (c*e*x^6)/6
```

sympy [A] time = 0.06, size = 46, normalized size = 0.92

$$adx + \frac{aex^2}{2} + \frac{bdx^3}{3} + \frac{bex^4}{4} + \frac{cdx^5}{5} + \frac{cex^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(c*x**4+b*x**2+a),x)
[Out] a*d*x + a*e*x**2/2 + b*d*x**3/3 + b*e*x**4/4 + c*d*x**5/5 + c*e*x**6/6
```

3.2 $\int \left(d+ex+fx^2\right)\left(a+bx^2+cx^4\right)\,dx$

Optimal. Leaf size=69

$$\frac{1}{3}x^3(af+bd)+adx+\frac{1}{2}aex^2+\frac{1}{5}x^5(bf+cd)+\frac{1}{4}bex^4+\frac{1}{6}cex^6+\frac{1}{7}cfx^7$$

```
[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*b*e*x^4+1/5*(b*f+c*d)*x^5+1/6*c*e*x
^6+1/7*c*f*x^7
```

Rubi [A] time = 0.04, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043, Rules used = {1657}

$$\frac{1}{3}x^3(af+bd)+adx+\frac{1}{2}aex^2+\frac{1}{5}x^5(bf+cd)+\frac{1}{4}bex^4+\frac{1}{6}cex^6+\frac{1}{7}cfx^7$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)*(a + b*x^2 + c*x^4),x]
```

```
[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + (b*e*x^4)/4 + ((c*d + b*f)*x^5)
/5 + (c*e*x^6)/6 + (c*f*x^7)/7
```

Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rubi steps

$$\begin{aligned}\int \left(d+ex+fx^2\right)\left(a+bx^2+cx^4\right)\,dx &= \int \left(ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6\right)\,dx\\ &= adx+\frac{1}{2}aex^2+\frac{1}{3}(bd+af)x^3+\frac{1}{4}bex^4+\frac{1}{5}(cd+bf)x^5+\frac{1}{6}cex^6+\frac{1}{7}cf\end{aligned}$$

Mathematica [A] time = 0.02, size = 69, normalized size = 1.00

$$\frac{1}{3}x^3(af+bd)+adx+\frac{1}{2}aex^2+\frac{1}{5}x^5(bf+cd)+\frac{1}{4}bex^4+\frac{1}{6}cex^6+\frac{1}{7}cfx^7$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2)*(a + b*x^2 + c*x^4),x]
```

```
[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + (b*e*x^4)/4 + ((c*d + b*f)*x^5)
/5 + (c*e*x^6)/6 + (c*f*x^7)/7
```

fricas [A] time = 0.79, size = 61, normalized size = 0.88

$$\frac{1}{7}x^7fc+\frac{1}{6}x^6ec+\frac{1}{5}x^5dc+\frac{1}{5}x^5fb+\frac{1}{4}x^4eb+\frac{1}{3}x^3db+\frac{1}{3}x^3fa+\frac{1}{2}x^2ea+xda$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(c*x^4+b*x^2+a),x, algorithm="fricas")
```

```
[Out] 1/7*x^7*f*c + 1/6*x^6*e*c + 1/5*x^5*d*c + 1/5*x^5*f*b + 1/4*x^4*e*b + 1/3*x
^3*d*b + 1/3*x^3*f*a + 1/2*x^2*e*a + x*d*a
```

giac [A] time = 0.24, size = 64, normalized size = 0.93

$$\frac{1}{7}\,cfx^7+\frac{1}{6}\,cx^6e+\frac{1}{5}\,cdx^5+\frac{1}{5}\,bfx^5+\frac{1}{4}\,bx^4e+\frac{1}{3}\,bdx^3+\frac{1}{3}\,afx^3+\frac{1}{2}\,ax^2e+adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(c*x^4+b*x^2+a),x, algorithm="giac")
```

```
[Out] 1/7*c*f*x^7 + 1/6*c*x^6*e + 1/5*c*d*x^5 + 1/5*b*f*x^5 + 1/4*b*x^4*e + 1/3*b
*d*x^3 + 1/3*a*f*x^3 + 1/2*a*x^2*e + a*d*x
```

maple [A] time = 0.00, size = 58, normalized size = 0.84

$$\frac{cf\,x^7}{7}+\frac{ce\,x^6}{6}+\frac{be\,x^4}{4}+\frac{\left(bf+cd\right)x^5}{5}+\frac{ae\,x^2}{2}+adx+\frac{\left(af+bd\right)x^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)*(c*x^4+b*x^2+a),x)
```

```
[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*b*e*x^4+1/5*(b*f+c*d)*x^5+1/6*c*e*x
^6+1/7*c*f*x^7
```

maxima [A] time = 1.21, size = 57, normalized size = 0.83

$$\frac{1}{7}\,cfx^7+\frac{1}{6}\,cex^6+\frac{1}{4}\,bex^4+\frac{1}{5}\left(cd+bf\right)x^5+\frac{1}{2}\,aex^2+\frac{1}{3}\left(bd+af\right)x^3+adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(c*x^4+b*x^2+a),x, algorithm="maxima")
```

```
[Out] 1/7*c*f*x^7 + 1/6*c*e*x^6 + 1/4*b*e*x^4 + 1/5*(c*d + b*f)*x^5 + 1/2*a*e*x^2
 + 1/3*(b*d + a*f)*x^3 + a*d*x
```

mupad [B] time = 0.03, size = 59, normalized size = 0.86

$$\frac{c\,f\,x^7}{7}+\frac{c\,e\,x^6}{6}+\left(\frac{c\,d}{5}+\frac{b\,f}{5}\right)\,x^5+\frac{b\,e\,x^4}{4}+\left(\frac{b\,d}{3}+\frac{a\,f}{3}\right)\,x^3+\frac{a\,e\,x^2}{2}+a\,d\,x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2)*(a + b*x^2 + c*x^4),x)
```

```
[Out] x^3*((b*d)/3 + (a*f)/3) + x^5*((c*d)/5 + (b*f)/5) + a*d*x + (a*e*x^2)/2 + (
b*e*x^4)/4 + (c*e*x^6)/6 + (c*f*x^7)/7
```

sympy [A] time = 0.07, size = 65, normalized size = 0.94

$$adx+\frac{aex^2}{2}+\frac{bex^4}{4}+\frac{cex^6}{6}+\frac{cfx^7}{7}+x^5\left(\frac{bf}{5}+\frac{cd}{5}\right)+x^3\left(\frac{af}{3}+\frac{bd}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)*(c*x**4+b*x**2+a),x)
```

```
[Out] a*d*x + a*e*x**2/2 + b*e*x**4/4 + c*e*x**6/6 + c*f*x**7/7 + x**5*(b*f/5 + c
*d/5) + x**3*(a*f/3 + b*d/3)
```

3.3 $\int \left(d+ex+fx^2+gx^3\right)\left(a+bx^2+cx^4\right)\,dx$

Optimal. Leaf size=88

$$\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{5}x^5(bf+cd)+\frac{1}{6}x^6(bg+ce)+\frac{1}{7}cfx^7+\frac{1}{8}cgx^8$$

```
[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*(a*g+b*e)*x^4+1/5*(b*f+c*d)*x^5+1/6
*(b*g+c*e)*x^6+1/7*c*f*x^7+1/8*c*g*x^8
```

Rubi [A] time = 0.07, antiderivative size = 88, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.036, Rules used = {1671}

$$\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{5}x^5(bf+cd)+\frac{1}{6}x^6(bg+ce)+\frac{1}{7}cfx^7+\frac{1}{8}cgx^8$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4),x]
```

```
[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + ((b*e + a*g)*x^4)/4 + ((c*d + b
*f)*x^5)/5 + ((c*e + b*g)*x^6)/6 + (c*f*x^7)/7 + (c*g*x^8)/8
```

Rule 1671

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[Expa
ndIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && Poly
Q[Pq, x] && IGtQ[p, 0]
```

Rubi steps

$$\int \left(d+ex+fx^2+gx^3\right)\left(a+bx^2+cx^4\right)\,dx=\int \left(ad+aex+(bd+af)x^2+(be+ag)x^3+(cd+bf)x^4+(ce+\right.$$
$$=adx+\frac{1}{2}aex^2+\frac{1}{3}(bd+af)x^3+\frac{1}{4}(be+ag)x^4+\frac{1}{5}(cd+bf)x^5+$$

Mathematica [A] time = 0.02, size = 88, normalized size = 1.00

$$\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{5}x^5(bf+cd)+\frac{1}{6}x^6(bg+ce)+\frac{1}{7}cfx^7+\frac{1}{8}cgx^8$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4),x]
```

```
[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + ((b*e + a*g)*x^4)/4 + ((c*d + b
*f)*x^5)/5 + ((c*e + b*g)*x^6)/6 + (c*f*x^7)/7 + (c*g*x^8)/8
```

fricas [A] time = 0.50, size = 82, normalized size = 0.93

$$\frac{1}{8}x^8gc+\frac{1}{7}x^7fc+\frac{1}{6}x^6ec+\frac{1}{6}x^6gb+\frac{1}{5}x^5dc+\frac{1}{5}x^5fb+\frac{1}{4}x^4eb+\frac{1}{4}x^4ga+\frac{1}{3}x^3db+\frac{1}{3}x^3fa+\frac{1}{2}x^2ea+xda$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a),x, algorithm="fricas")
```

```
[Out] 1/8*x^8*g*c + 1/7*x^7*f*c + 1/6*x^6*e*c + 1/6*x^6*g*b + 1/5*x^5*d*c + 1/5*x
^5*f*b + 1/4*x^4*e*b + 1/4*x^4*g*a + 1/3*x^3*d*b + 1/3*x^3*f*a + 1/2*x^2*e*
a + x*d*a
```

giac [A] time = 0.22, size = 85, normalized size = 0.97

$$\frac{1}{8}cgx^8+\frac{1}{7}cfx^7+\frac{1}{6}bgx^6+\frac{1}{6}cx^6e+\frac{1}{5}cdx^5+\frac{1}{5}bfx^5+\frac{1}{4}agx^4+\frac{1}{4}bx^4e+\frac{1}{3}bdx^3+\frac{1}{3}afx^3+\frac{1}{2}ax^2e+adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a),x, algorithm="giac")
```

```
[Out] 1/8*c*g*x^8 + 1/7*c*f*x^7 + 1/6*b*g*x^6 + 1/6*c*x^6*e + 1/5*c*d*x^5 + 1/5*b
*f*x^5 + 1/4*a*g*x^4 + 1/4*b*x^4*e + 1/3*b*d*x^3 + 1/3*a*f*x^3 + 1/2*a*x^2*
e + a*d*x
```

maple [A] time = 0.00, size = 75, normalized size = 0.85

$$\frac{cg\,x^8}{8}+\frac{cf\,x^7}{7}+\frac{(bg+ce)\,x^6}{6}+\frac{(bf+cd)\,x^5}{5}+\frac{ae\,x^2}{2}+\frac{(ag+be)\,x^4}{4}+adx+\frac{(af+bd)\,x^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a),x)
```

```
[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*(a*g+b*e)*x^4+1/5*(b*f+c*d)*x^5+1/6
*(b*g+c*e)*x^6+1/7*c*f*x^7+1/8*c*g*x^8
```

maxima [A] time = 1.56, size = 74, normalized size = 0.84

$$\frac{1}{8}cgx^8+\frac{1}{7}cfx^7+\frac{1}{6}(ce+bg)x^6+\frac{1}{5}(cd+bf)x^5+\frac{1}{4}(be+ag)x^4+\frac{1}{2}aex^2+\frac{1}{3}(bd+af)x^3+adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a),x, algorithm="maxima")
```

```
[Out] 1/8*c*g*x^8 + 1/7*c*f*x^7 + 1/6*(c*e + b*g)*x^6 + 1/5*(c*d + b*f)*x^5 + 1/4
*(b*e + a*g)*x^4 + 1/2*a*e*x^2 + 1/3*(b*d + a*f)*x^3 + a*d*x
```

mupad [B] time = 0.66, size = 78, normalized size = 0.89

$$\frac{c\,g\,x^8}{8}+\frac{c\,f\,x^7}{7}+\left(\frac{c\,e}{6}+\frac{b\,g}{6}\right)\,x^6+\left(\frac{c\,d}{5}+\frac{b\,f}{5}\right)\,x^5+\left(\frac{b\,e}{4}+\frac{a\,g}{4}\right)\,x^4+\left(\frac{b\,d}{3}+\frac{a\,f}{3}\right)\,x^3+\frac{a\,e\,x^2}{2}+a\,d\,x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3),x)
```

```
[Out] x^3*((b*d)/3 + (a*f)/3) + x^4*((b*e)/4 + (a*g)/4) + x^5*((c*d)/5 + (b*f)/5)
 + x^6*((c*e)/6 + (b*g)/6) + (c*g*x^8)/8 + a*d*x + (a*e*x^2)/2 + (c*f*x^7)/
7
```

sympy [A] time = 0.07, size = 83, normalized size = 0.94

$$adx+\frac{aex^2}{2}+\frac{cfx^7}{7}+\frac{cgx^8}{8}+x^6\left(\frac{bg}{6}+\frac{ce}{6}\right)+x^5\left(\frac{bf}{5}+\frac{cd}{5}\right)+x^4\left(\frac{ag}{4}+\frac{be}{4}\right)+x^3\left(\frac{af}{3}+\frac{bd}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)*(c*x**4+b*x**2+a),x)
```

```
[Out] a*d*x + a*e*x**2/2 + c*f*x**7/7 + c*g*x**8/8 + x**6*(b*g/6 + c*e/6) + x**5*
(b*f/5 + c*d/5) + x**4*(a*g/4 + b*e/4) + x**3*(a*f/3 + b*d/3)
```

3.4 $\int \left(a+bx^2+cx^4\right)\left(d+ex+fx^2+gx^3+hx^4\right)dx$

Optimal. Leaf size=105

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{6}x^6(bg+ce)+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}cgx^8+\frac{1}{9}chx^9$$

```
[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*(a*g+b*e)*x^4+1/5*(a*h+b*f+c*d)*x^5
+1/6*(b*g+c*e)*x^6+1/7*(b*h+c*f)*x^7+1/8*c*g*x^8+1/9*c*h*x^9
```

Rubi [A] time = 0.09, antiderivative size = 105, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.030, Rules used = {1671}

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{6}x^6(bg+ce)+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}cgx^8+\frac{1}{9}chx^9$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3 + h*x^4),x]
```

```
[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + ((b*e + a*g)*x^4)/4 + ((c*d + b
*f + a*h)*x^5)/5 + ((c*e + b*g)*x^6)/6 + ((c*f + b*h)*x^7)/7 + (c*g*x^8)/8
+ (c*h*x^9)/9
```

Rule 1671

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[Expa
ndIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && Poly
Q[Pq, x] && IGtQ[p, 0]
```

Rubi steps

$$\int \left(a+bx^2+cx^4\right)\left(d+ex+fx^2+gx^3+hx^4\right)dx = \int \left(ad+aex+(bd+af)x^2+(be+ag)x^3+(cd+bf+ah\right.$$
$$= adx+\frac{1}{2}aex^2+\frac{1}{3}(bd+af)x^3+\frac{1}{4}(be+ag)x^4+\frac{1}{5}(cd+bf$$

Mathematica [A] time = 0.03, size = 105, normalized size = 1.00

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{6}x^6(bg+ce)+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}cgx^8+\frac{1}{9}chx^9$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3 + h*x^4),x]
```

```
[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + ((b*e + a*g)*x^4)/4 + ((c*d + b
*f + a*h)*x^5)/5 + ((c*e + b*g)*x^6)/6 + ((c*f + b*h)*x^7)/7 + (c*g*x^8)/8
+ (c*h*x^9)/9
```

fricas [A] time = 0.70, size = 103, normalized size = 0.98

$$\frac{1}{9}x^9hc+\frac{1}{8}x^8gc+\frac{1}{7}x^7fc+\frac{1}{7}x^7hb+\frac{1}{6}x^6ec+\frac{1}{6}x^6gb+\frac{1}{5}x^5dc+\frac{1}{5}x^5fb+\frac{1}{5}x^5ha+\frac{1}{4}x^4eb+\frac{1}{4}x^4ga+\frac{1}{3}x^3db+\frac{1}{3}x^3fa+\frac{1}{2}x^2ea$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)*(h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="fricas")
```

```
[Out] 1/9*x^9*h*c + 1/8*x^8*g*c + 1/7*x^7*f*c + 1/7*x^7*h*b + 1/6*x^6*e*c + 1/6*x
^6*g*b + 1/5*x^5*d*c + 1/5*x^5*f*b + 1/5*x^5*h*a + 1/4*x^4*e*b + 1/4*x^4*g*
a + 1/3*x^3*d*b + 1/3*x^3*f*a + 1/2*x^2*e*a + x*d*a
```

giac [A] time = 0.36, size = 106, normalized size = 1.01

$$\frac{1}{9}chx^9+\frac{1}{8}cgx^8+\frac{1}{7}cfx^7+\frac{1}{7}bhx^7+\frac{1}{6}bgx^6+\frac{1}{6}cx^6e+\frac{1}{5}cdx^5+\frac{1}{5}bfx^5+\frac{1}{5}ahx^5+\frac{1}{4}agx^4+\frac{1}{4}bx^4e+\frac{1}{3}bdx^3+\frac{1}{3}afx^3+\frac{1}{2}a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)*(h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="giac")
```

```
[Out] 1/9*c*h*x^9 + 1/8*c*g*x^8 + 1/7*c*f*x^7 + 1/7*b*h*x^7 + 1/6*b*g*x^6 + 1/6*c
*x^6*e + 1/5*c*d*x^5 + 1/5*b*f*x^5 + 1/5*a*h*x^5 + 1/4*a*g*x^4 + 1/4*b*x^4*
e + 1/3*b*d*x^3 + 1/3*a*f*x^3 + 1/2*a*x^2*e + a*d*x
```

maple [A] time = 0.00, size = 90, normalized size = 0.86

$$\frac{ch\,x^9}{9}+\frac{cg\,x^8}{8}+\frac{\left(bh+cf\right)x^7}{7}+\frac{\left(bg+ce\right)x^6}{6}+\frac{\left(ah+bf+cd\right)x^5}{5}+\frac{ae\,x^2}{2}+\frac{\left(ag+be\right)x^4}{4}+adx+\frac{\left(af+bd\right)x^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((c*x^4+b*x^2+a)*(h*x^4+g*x^3+f*x^2+e*x+d),x)
```

```
[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*(a*g+b*e)*x^4+1/5*(a*h+b*f+c*d)*x^5
+1/6*(b*g+c*e)*x^6+1/7*(b*h+c*f)*x^7+1/8*c*g*x^8+1/9*c*h*x^9
```

maxima [A] time = 1.64, size = 89, normalized size = 0.85

$$\frac{1}{9}chx^9+\frac{1}{8}cgx^8+\frac{1}{7}\left(cf+bh\right)x^7+\frac{1}{6}\left(ce+bg\right)x^6+\frac{1}{5}\left(cd+bf+ah\right)x^5+\frac{1}{4}\left(be+ag\right)x^4+\frac{1}{2}aex^2+\frac{1}{3}\left(bd+af\right)x^3+adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)*(h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="maxima")
```

```
[Out] 1/9*c*h*x^9 + 1/8*c*g*x^8 + 1/7*(c*f + b*h)*x^7 + 1/6*(c*e + b*g)*x^6 + 1/5
*(c*d + b*f + a*h)*x^5 + 1/4*(b*e + a*g)*x^4 + 1/2*a*e*x^2 + 1/3*(b*d + a*f
)*x^3 + a*d*x
```

mupad [B] time = 0.66, size = 95, normalized size = 0.90

$$\frac{c\,h\,x^9}{9}+\frac{c\,g\,x^8}{8}+\left(\frac{c\,f}{7}+\frac{b\,h}{7}\right)\,x^7+\left(\frac{c\,e}{6}+\frac{b\,g}{6}\right)\,x^6+\left(\frac{c\,d}{5}+\frac{b\,f}{5}+\frac{a\,h}{5}\right)\,x^5+\left(\frac{b\,e}{4}+\frac{a\,g}{4}\right)\,x^4+\left(\frac{b\,d}{3}+\frac{a\,f}{3}\right)\,x^3+\frac{a\,e\,x^2}{2}+a\,d$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3 + h*x^4),x)
```

```
[Out] x^5*((c*d)/5 + (b*f)/5 + (a*h)/5) + x^3*((b*d)/3 + (a*f)/3) + x^4*((b*e)/4
+ (a*g)/4) + x^6*((c*e)/6 + (b*g)/6) + x^7*((c*f)/7 + (b*h)/7) + (c*g*x^8)/
8 + (c*h*x^9)/9 + a*d*x + (a*e*x^2)/2
```

sympy [A] time = 0.08, size = 102, normalized size = 0.97

$$adx+\frac{aex^2}{2}+\frac{cgx^8}{8}+\frac{chx^9}{9}+x^7\left(\frac{bh}{7}+\frac{cf}{7}\right)+x^6\left(\frac{bg}{6}+\frac{ce}{6}\right)+x^5\left(\frac{ah}{5}+\frac{bf}{5}+\frac{cd}{5}\right)+x^4\left(\frac{ag}{4}+\frac{be}{4}\right)+x^3\left(\frac{af}{3}+\frac{bd}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x**4+b*x**2+a)*(h*x**4+g*x**3+f*x**2+e*x+d),x)
```

```
[Out] a*d*x + a*e*x**2/2 + c*g*x**8/8 + c*h*x**9/9 + x**7*(b*h/7 + c*f/7) + x**6*
(b*g/6 + c*e/6) + x**5*(a*h/5 + b*f/5 + c*d/5) + x**4*(a*g/4 + b*e/4) + x**
3*(a*f/3 + b*d/3)
```

3.5 $\int \left(a+bx^2+cx^4\right)\left(d+ex+fx^2+gx^3+hx^4+ix^5\right)\,dx$

Optimal. Leaf size=122

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{6}x^6(ai+bg+ce)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}x^8(bi+cg)+\frac{1}{9}chx^9+$$

```
[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*(a*g+b*e)*x^4+1/5*(a*h+b*f+c*d)*x^5
+1/6*(a*i+b*g+c*e)*x^6+1/7*(b*h+c*f)*x^7+1/8*(b*i+c*g)*x^8+1/9*c*h*x^9+1/10
*c*i*x^10
```

Rubi [A] time = 0.11, antiderivative size = 122, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.026, Rules used = {1671}

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{6}x^6(ai+bg+ce)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}x^8(bi+cg)+\frac{1}{9}chx^9+$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5),x]
```

```
[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + ((b*e + a*g)*x^4)/4 + ((c*d + b
*f + a*h)*x^5)/5 + ((c*e + b*g + a*i)*x^6)/6 + ((c*f + b*h)*x^7)/7 + ((c*g
+ b*i)*x^8)/8 + (c*h*x^9)/9 + (c*i*x^10)/10
```

Rule 1671

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[Expa
ndIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && Poly
Q[Pq, x] && IGtQ[p, 0]
```

Rubi steps

$$\int \left(a+bx^2+cx^4\right)\left(d+ex+fx^2+gx^3+hx^4+5x^5\right)\,dx=\int \left(ad+aex+(bd+af)x^2+(be+ag)x^3+(cd+b\right.$$

$$=adx+\frac{1}{2}aex^2+\frac{1}{3}(bd+af)x^3+\frac{1}{4}(be+ag)x^4+\frac{1}{5}(c$$

Mathematica [A] time = 0.04, size = 122, normalized size = 1.00

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{6}x^6(ai+bg+ce)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}x^8(bi+cg)+\frac{1}{9}chx^9+$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5),x]
```

```
[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + ((b*e + a*g)*x^4)/4 + ((c*d + b
*f + a*h)*x^5)/5 + ((c*e + b*g + a*i)*x^6)/6 + ((c*f + b*h)*x^7)/7 + ((c*g
+ b*i)*x^8)/8 + (c*h*x^9)/9 + (c*i*x^10)/10
```

fricas [A] time = 0.90, size = 124, normalized size = 1.02

$$\frac{1}{10}x^{10}ic+\frac{1}{9}x^9hc+\frac{1}{8}x^8gc+\frac{1}{8}x^8ib+\frac{1}{7}x^7fc+\frac{1}{7}x^7hb+\frac{1}{6}x^6ec+\frac{1}{6}x^6gb+\frac{1}{6}x^6ia+\frac{1}{5}x^5dc+\frac{1}{5}x^5fb+\frac{1}{5}x^5ha+\frac{1}{4}x^4eb+\frac{1}{4}x^4g$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="fri
cas")
```

```
[Out] 1/10*x^10*i*c + 1/9*x^9*h*c + 1/8*x^8*g*c + 1/8*x^8*i*b + 1/7*x^7*f*c + 1/7
*x^7*h*b + 1/6*x^6*e*c + 1/6*x^6*g*b + 1/6*x^6*i*a + 1/5*x^5*d*c + 1/5*x^5*
f*b + 1/5*x^5*h*a + 1/4*x^4*e*b + 1/4*x^4*g*a + 1/3*x^3*d*b + 1/3*x^3*f*a +
 1/2*x^2*e*a + x*d*a
```

giac [A] time = 0.32, size = 127, normalized size = 1.04

$$\frac{1}{10}cix^{10}+\frac{1}{9}chx^9+\frac{1}{8}cgx^8+\frac{1}{8}bix^8+\frac{1}{7}cfx^7+\frac{1}{7}bhx^7+\frac{1}{6}bgx^6+\frac{1}{6}aix^6+\frac{1}{6}cx^6e+\frac{1}{5}cdx^5+\frac{1}{5}bfx^5+\frac{1}{5}ahx^5+\frac{1}{4}agx^4+\frac{1}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="gia
c")
```

```
[Out] 1/10*c*i*x^10 + 1/9*c*h*x^9 + 1/8*c*g*x^8 + 1/8*b*i*x^8 + 1/7*c*f*x^7 + 1/7
*b*h*x^7 + 1/6*b*g*x^6 + 1/6*a*i*x^6 + 1/6*c*x^6*e + 1/5*c*d*x^5 + 1/5*b*f*
x^5 + 1/5*a*h*x^5 + 1/4*a*g*x^4 + 1/4*b*x^4*e + 1/3*b*d*x^3 + 1/3*a*f*x^3 +
 1/2*a*x^2*e + a*d*x
```

maple [A] time = 0.00, size = 105, normalized size = 0.86

$$\frac{cix^{10}}{10}+\frac{chx^9}{9}+\frac{(bi+cg)x^8}{8}+\frac{(bh+cf)x^7}{7}+\frac{(ai+bg+ce)x^6}{6}+\frac{(ah+bf+cd)x^5}{5}+\frac{aex^2}{2}+\frac{(ag+be)x^4}{4}+adx+\frac{(af$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((c*x^4+b*x^2+a)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d),x)
```

```
[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*(a*g+b*e)*x^4+1/5*(a*h+b*f+c*d)*x^5
+1/6*(a*i+b*g+c*e)*x^6+1/7*(b*h+c*f)*x^7+1/8*(b*i+c*g)*x^8+1/9*c*h*x^9+1/10
*c*i*x^10
```

maxima [A] time = 1.17, size = 104, normalized size = 0.85

$$\frac{1}{10}cix^{10}+\frac{1}{9}chx^9+\frac{1}{8}(cg+bi)x^8+\frac{1}{7}(cf+bh)x^7+\frac{1}{6}(ce+bg+ai)x^6+\frac{1}{5}(cd+bf+ah)x^5+\frac{1}{4}(be+ag)x^4+\frac{1}{2}aex^2+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="max
ima")
```

```
[Out] 1/10*c*i*x^10 + 1/9*c*h*x^9 + 1/8*(c*g + b*i)*x^8 + 1/7*(c*f + b*h)*x^7 + 1
/6*(c*e + b*g + a*i)*x^6 + 1/5*(c*d + b*f + a*h)*x^5 + 1/4*(b*e + a*g)*x^4
+ 1/2*a*e*x^2 + 1/3*(b*d + a*f)*x^3 + a*d*x
```

mupad [B] time = 0.06, size = 112, normalized size = 0.92

$$\frac{cix^{10}}{10}+\frac{chx^9}{9}+\left(\frac{cg}{8}+\frac{bi}{8}\right)x^8+\left(\frac{cf}{7}+\frac{bh}{7}\right)x^7+\left(\frac{ce}{6}+\frac{bg}{6}+\frac{ai}{6}\right)x^6+\left(\frac{cd}{5}+\frac{bf}{5}+\frac{ah}{5}\right)x^5+\left(\frac{be}{4}+\frac{ag}{4}\right)x^4+\left(\frac{bd}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5),x)
```

```
[Out] x^5*((c*d)/5 + (b*f)/5 + (a*h)/5) + x^6*((c*e)/6 + (b*g)/6 + (a*i)/6) + x^3
*((b*d)/3 + (a*f)/3) + x^4*((b*e)/4 + (a*g)/4) + x^7*((c*f)/7 + (b*h)/7) +
x^8*((c*g)/8 + (b*i)/8) + (c*h*x^9)/9 + (c*i*x^10)/10 + a*d*x + (a*e*x^2)/2
```

sympy [A] time = 0.08, size = 121, normalized size = 0.99

$$adx+\frac{aex^2}{2}+\frac{chx^9}{9}+\frac{cix^{10}}{10}+x^8\left(\frac{bi}{8}+\frac{cg}{8}\right)+x^7\left(\frac{bh}{7}+\frac{cf}{7}\right)+x^6\left(\frac{ai}{6}+\frac{bg}{6}+\frac{ce}{6}\right)+x^5\left(\frac{ah}{5}+\frac{bf}{5}+\frac{cd}{5}\right)+x^4\left(\frac{ag}{4}+\frac{be}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x**4+b*x**2+a)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d),x)
```

```
[Out] a*d*x + a*e*x**2/2 + c*h*x**9/9 + c*i*x**10/10 + x**8*(b*i/8 + c*g/8) + x**
7*(b*h/7 + c*f/7) + x**6*(a*i/6 + b*g/6 + c*e/6) + x**5*(a*h/5 + b*f/5 + c*
d/5) + x**4*(a*g/4 + b*e/4) + x**3*(a*f/3 + b*d/3)
```

3.6 $\int (d+ex)\left(a+bx^2+cx^4\right)^2\,dx$

Optimal. Leaf size=112

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{5}dx^5\left(2ac+b^2\right)+\frac{1}{6}ex^6\left(2ac+b^2\right)+\frac{2}{3}abdx^3+\frac{1}{2}abex^4+\frac{2}{7}bcdx^7+\frac{1}{4}bcex^8+\frac{1}{9}c^2dx^9+\frac{1}{10}c^2ex^{10}$$

```
[Out] a^2*d*x+1/2*a^2*e*x^2+2/3*a*b*d*x^3+1/2*a*b*e*x^4+1/5*(2*a*c+b^2)*d*x^5+1/6
*(2*a*c+b^2)*e*x^6+2/7*b*c*d*x^7+1/4*b*c*e*x^8+1/9*c^2*d*x^9+1/10*c^2*e*x^1
0
```

Rubi [A] time = 0.13, antiderivative size = 112, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.050$, Rules used = {1671}

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{5}dx^5\left(2ac+b^2\right)+\frac{1}{6}ex^6\left(2ac+b^2\right)+\frac{2}{3}abdx^3+\frac{1}{2}abex^4+\frac{2}{7}bcdx^7+\frac{1}{4}bcex^8+\frac{1}{9}c^2dx^9+\frac{1}{10}c^2ex^{10}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)*(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] a^2*d*x + (a^2*e*x^2)/2 + (2*a*b*d*x^3)/3 + (a*b*e*x^4)/2 + ((b^2 + 2*a*c)*
d*x^5)/5 + ((b^2 + 2*a*c)*e*x^6)/6 + (2*b*c*d*x^7)/7 + (b*c*e*x^8)/4 + (c^2
*d*x^9)/9 + (c^2*e*x^10)/10
```

Rule 1671

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[Expa
ndIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && Poly
Q[Pq, x] && IGtQ[p, 0]
```

Rubi steps

$$\begin{aligned}\int (d+ex)\left(a+bx^2+cx^4\right)^2\,dx &= \int \left(a^2d+a^2ex+2abdx^2+2abex^3+\left(b^2+2ac\right)dx^4+\left(b^2+2ac\right)ex^5+2bcdx^6+\right.\\ &= a^2dx+\frac{1}{2}a^2ex^2+\frac{2}{3}abdx^3+\frac{1}{2}abex^4+\frac{1}{5}\left(b^2+2ac\right)dx^5+\frac{1}{6}\left(b^2+2ac\right)ex^6+\frac{2}{7}b\end{aligned}$$

Mathematica [A] time = 0.05, size = 97, normalized size = 0.87

$$\frac{630a^2x(2d+ex)+42a\left(5bx^3(4d+3ex)+2cx^5(6d+5ex)\right)+42b^2x^5(6d+5ex)+45bcx^7(8d+7ex)+14c^2x^9(10d}{1260}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)*(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] (630*a^2*x*(2*d + e*x) + 42*b^2*x^5*(6*d + 5*e*x) + 45*b*c*x^7*(8*d + 7*e*x
) + 14*c^2*x^9*(10*d + 9*e*x) + 42*a*(5*b*x^3*(4*d + 3*e*x) + 2*c*x^5*(6*d
+ 5*e*x)))/1260
```

fricas [A] time = 1.09, size = 100, normalized size = 0.89

$$\frac{1}{10}x^{10}ec^2+\frac{1}{9}x^9dc^2+\frac{1}{4}x^8ecb+\frac{2}{7}x^7dcb+\frac{1}{6}x^6eb^2+\frac{1}{3}x^6eca+\frac{1}{5}x^5db^2+\frac{2}{5}x^5dca+\frac{1}{2}x^4eba+\frac{2}{3}x^3dba+\frac{1}{2}x^2ea^2+xda^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="fricas")
```

```
[Out] 1/10*x^10*e*c^2 + 1/9*x^9*d*c^2 + 1/4*x^8*e*c*b + 2/7*x^7*d*c*b + 1/6*x^6*e
*b^2 + 1/3*x^6*e*c*a + 1/5*x^5*d*b^2 + 2/5*x^5*d*c*a + 1/2*x^4*e*b*a + 2/3*
x^3*d*b*a + 1/2*x^2*e*a^2 + x*d*a^2
```

giac [A] time = 0.39, size = 106, normalized size = 0.95

$$\frac{1}{10}c^2x^{10}e+\frac{1}{9}c^2dx^9+\frac{1}{4}bcx^8e+\frac{2}{7}bcdx^7+\frac{1}{6}b^2x^6e+\frac{1}{3}acx^6e+\frac{1}{5}b^2dx^5+\frac{2}{5}acdx^5+\frac{1}{2}abx^4e+\frac{2}{3}abdx^3+\frac{1}{2}a^2x^2e+a^2dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="giac")
```

```
[Out] 1/10*c^2*x^10*e + 1/9*c^2*d*x^9 + 1/4*b*c*x^8*e + 2/7*b*c*d*x^7 + 1/6*b^2*x
^6*e + 1/3*a*c*x^6*e + 1/5*b^2*d*x^5 + 2/5*a*c*d*x^5 + 1/2*a*b*x^4*e + 2/3*
a*b*d*x^3 + 1/2*a^2*x^2*e + a^2*d*x
```

maple [A] time = 0.00, size = 95, normalized size = 0.85

$$\frac{c^2e\,x^{10}}{10}+\frac{c^2d\,x^9}{9}+\frac{bce\,x^8}{4}+\frac{2bcd\,x^7}{7}+\frac{abe\,x^4}{2}+\frac{\left(2ac+b^2\right)e\,x^6}{6}+\frac{2abd\,x^3}{3}+\frac{\left(2ac+b^2\right)d\,x^5}{5}+\frac{a^2e\,x^2}{2}+a^2dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(c*x^4+b*x^2+a)^2,x)
```

```
[Out] a^2*d*x+1/2*a^2*e*x^2+2/3*a*b*d*x^3+1/2*a*b*e*x^4+1/5*(2*a*c+b^2)*d*x^5+1/6
*(2*a*c+b^2)*e*x^6+2/7*b*c*d*x^7+1/4*b*c*e*x^8+1/9*c^2*d*x^9+1/10*c^2*e*x^1
0
```

maxima [A] time = 1.06, size = 94, normalized size = 0.84

$$\frac{1}{10}c^2ex^{10}+\frac{1}{9}c^2dx^9+\frac{1}{4}bcex^8+\frac{2}{7}bcdx^7+\frac{1}{6}\left(b^2+2\,ac\right)ex^6+\frac{1}{2}abex^4+\frac{1}{5}\left(b^2+2\,ac\right)dx^5+\frac{2}{3}abdx^3+\frac{1}{2}a^2ex^2+a^2dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="maxima")
```

```
[Out] 1/10*c^2*e*x^10 + 1/9*c^2*d*x^9 + 1/4*b*c*e*x^8 + 2/7*b*c*d*x^7 + 1/6*(b^2
+ 2*a*c)*e*x^6 + 1/2*a*b*e*x^4 + 1/5*(b^2 + 2*a*c)*d*x^5 + 2/3*a*b*d*x^3 +
1/2*a^2*e*x^2 + a^2*d*x
```

mupad [B] time = 0.06, size = 94, normalized size = 0.84

$$\frac{a^2\,e\,x^2}{2}+\frac{c^2\,d\,x^9}{9}+\frac{c^2\,e\,x^{10}}{10}+\frac{d\,x^5\,\left(b^2+2\,a\,c\right)}{5}+\frac{e\,x^6\,\left(b^2+2\,a\,c\right)}{6}+a^2\,d\,x+\frac{2\,a\,b\,d\,x^3}{3}+\frac{a\,b\,e\,x^4}{2}+\frac{2\,b\,c\,d\,x^7}{7}+\frac{b\,c\,e\,x^8}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x)*(a + b*x^2 + c*x^4)^2,x)
```

```
[Out] (a^2*e*x^2)/2 + (c^2*d*x^9)/9 + (c^2*e*x^10)/10 + (d*x^5*(2*a*c + b^2))/5 +
 (e*x^6*(2*a*c + b^2))/6 + a^2*d*x + (2*a*b*d*x^3)/3 + (a*b*e*x^4)/2 + (2*b
*c*d*x^7)/7 + (b*c*e*x^8)/4
```

sympy [A] time = 0.08, size = 116, normalized size = 1.04

$$a^2dx+\frac{a^2ex^2}{2}+\frac{2abdx^3}{3}+\frac{abex^4}{2}+\frac{2bcdx^7}{7}+\frac{bcex^8}{4}+\frac{c^2dx^9}{9}+\frac{c^2ex^{10}}{10}+x^6\left(\frac{ace}{3}+\frac{b^2e}{6}\right)+x^5\left(\frac{2acd}{5}+\frac{b^2d}{5}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(c*x**4+b*x**2+a)**2,x)

[Out] a**2*d*x + a**2*e*x**2/2 + 2*a*b*d*x**3/3 + a*b*e*x**4/2 + 2*b*c*d*x**7/7 +
 b*c*e*x**8/4 + c**2*d*x**9/9 + c**2*e*x**10/10 + x**6*(a*c*e/3 + b**2*e/6)
 + x**5*(2*a*c*d/5 + b**2*d/5)
```

3.7 $\int \left(d+ex+fx^2\right)\left(a+bx^2+cx^4\right)^2\,dx$

Optimal. Leaf size=154

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{7}x^7\left(2acf+b^2f+2bcd\right)+\frac{1}{5}x^5\left(2abf+2acd+b^2d\right)+\frac{1}{6}ex^6\left(2ac+b^2\right)+\frac{1}{3}ax^3(af+2bd)+\frac{1}{2}abex^4$$

```
[Out] a^2*d*x+1/2*a^2*e*x^2+1/3*a*(a*f+2*b*d)*x^3+1/2*a*b*e*x^4+1/5*(2*a*b*f+2*a*
c*d+b^2*d)*x^5+1/6*(2*a*c+b^2)*e*x^6+1/7*(2*a*c*f+b^2*f+2*b*c*d)*x^7+1/4*b*
c*e*x^8+1/9*c*(2*b*f+c*d)*x^9+1/10*c^2*e*x^10+1/11*c^2*f*x^11
```

Rubi [A] time = 0.13, antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.040, Rules used = {1657}

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{7}x^7\left(2acf+b^2f+2bcd\right)+\frac{1}{5}x^5\left(2abf+2acd+b^2d\right)+\frac{1}{6}ex^6\left(2ac+b^2\right)+\frac{1}{3}ax^3(af+2bd)+\frac{1}{2}abex^4$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)*(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*b*e*x^4)/2 + ((b^2*d
 + 2*a*c*d + 2*a*b*f)*x^5)/5 + ((b^2 + 2*a*c)*e*x^6)/6 + ((2*b*c*d + b^2*f
+ 2*a*c*f)*x^7)/7 + (b*c*e*x^8)/4 + (c*(c*d + 2*b*f)*x^9)/9 + (c^2*e*x^10)/
10 + (c^2*f*x^11)/11
```

Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rubi steps

$$\int \left(d+ex+fx^2\right)\left(a+bx^2+cx^4\right)^2\,dx = \int \left(a^2d+a^2ex+a(2bd+af)x^2+2abex^3+\left(b^2d+2acd+2abf\right)x^4+\right.$$
$$= a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{3}a(2bd+af)x^3+\frac{1}{2}abex^4+\frac{1}{5}\left(b^2d+2acd+2abf\right)$$

Mathematica [A] time = 0.05, size = 154, normalized size = 1.00

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{7}x^7\left(2acf+b^2f+2bcd\right)+\frac{1}{5}x^5\left(2abf+2acd+b^2d\right)+\frac{1}{6}ex^6\left(2ac+b^2\right)+\frac{1}{3}ax^3(af+2bd)+\frac{1}{2}abex^4$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2)*(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*b*e*x^4)/2 + ((b^2*d
 + 2*a*c*d + 2*a*b*f)*x^5)/5 + ((b^2 + 2*a*c)*e*x^6)/6 + ((2*b*c*d + b^2*f
+ 2*a*c*f)*x^7)/7 + (b*c*e*x^8)/4 + (c*(c*d + 2*b*f)*x^9)/9 + (c^2*e*x^10)/
10 + (c^2*f*x^11)/11
```

fricas [A] time = 0.45, size = 151, normalized size = 0.98

$$\frac{1}{11}x^{11}fc^2+\frac{1}{10}x^{10}ec^2+\frac{1}{9}x^9dc^2+\frac{2}{9}x^9fcb+\frac{1}{4}x^8ecb+\frac{2}{7}x^7dcb+\frac{1}{7}x^7fb^2+\frac{2}{7}x^7fca+\frac{1}{6}x^6eb^2+\frac{1}{3}x^6eca+\frac{1}{5}x^5db^2+\frac{2}{5}x^5dca$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="fricas")
```

```
[Out] 1/11*x^11*f*c^2 + 1/10*x^10*e*c^2 + 1/9*x^9*d*c^2 + 2/9*x^9*f*c*b + 1/4*x^8
*e*c*b + 2/7*x^7*d*c*b + 1/7*x^7*f*b^2 + 2/7*x^7*f*c*a + 1/6*x^6*e*b^2 + 1/
3*x^6*e*c*a + 1/5*x^5*d*b^2 + 2/5*x^5*d*c*a + 2/5*x^5*f*b*a + 1/2*x^4*e*b*a
 + 2/3*x^3*d*b*a + 1/3*x^3*f*a^2 + 1/2*x^2*e*a^2 + x*d*a^2
```

giac [A] time = 0.26, size = 157, normalized size = 1.02

$$\frac{1}{11}c^2fx^{11}+\frac{1}{10}c^2x^{10}e+\frac{1}{9}c^2dx^9+\frac{2}{9}bcfx^9+\frac{1}{4}bcx^8e+\frac{2}{7}bcdx^7+\frac{1}{7}b^2fx^7+\frac{2}{7}acfx^7+\frac{1}{6}b^2x^6e+\frac{1}{3}acx^6e+\frac{1}{5}b^2dx^5+\frac{2}{5}acd$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="giac")
```

```
[Out] 1/11*c^2*f*x^11 + 1/10*c^2*x^10*e + 1/9*c^2*d*x^9 + 2/9*b*c*f*x^9 + 1/4*b*c
*x^8*e + 2/7*b*c*d*x^7 + 1/7*b^2*f*x^7 + 2/7*a*c*f*x^7 + 1/6*b^2*x^6*e + 1/
3*a*c*x^6*e + 1/5*b^2*d*x^5 + 2/5*a*c*d*x^5 + 2/5*a*b*f*x^5 + 1/2*a*b*x^4*e
 + 2/3*a*b*d*x^3 + 1/3*a^2*f*x^3 + 1/2*a^2*x^2*e + a^2*d*x
```

maple [A] time = 0.00, size = 139, normalized size = 0.90

$$\frac{c^2f\,x^{11}}{11}+\frac{c^2e\,x^{10}}{10}+\frac{bce\,x^8}{4}+\frac{\left(2fbc+c^2d\right)x^9}{9}+\frac{abe\,x^4}{2}+\frac{\left(2ac+b^2\right)e\,x^6}{6}+\frac{\left(2bcd+\left(2ac+b^2\right)f\right)x^7}{7}+\frac{a^2e\,x^2}{2}+\frac{(2abf+(}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x)
```

```
[Out] 1/11*c^2*f*x^11+1/10*c^2*e*x^10+1/9*(2*b*c*f+c^2*d)*x^9+1/4*b*c*e*x^8+1/7*(
2*b*c*d+f*(2*a*c+b^2))*x^7+1/6*(2*a*c+b^2)*e*x^6+1/5*(d*(2*a*c+b^2)+2*a*b*f
)*x^5+1/2*a*b*e*x^4+1/3*(a^2*f+2*a*b*d)*x^3+1/2*a^2*e*x^2+a^2*d*x
```

maxima [A] time = 1.03, size = 138, normalized size = 0.90

$$\frac{1}{11}c^2fx^{11}+\frac{1}{10}c^2ex^{10}+\frac{1}{4}bcex^8+\frac{1}{9}\left(c^2d+2\,bcf\right)x^9+\frac{1}{6}\left(b^2+2\,ac\right)ex^6+\frac{1}{7}\left(2\,bcd+\left(b^2+2\,ac\right)f\right)x^7+\frac{1}{2}abex^4+\frac{1}{5}\left(2\,a\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="maxima")
```

```
[Out] 1/11*c^2*f*x^11 + 1/10*c^2*e*x^10 + 1/4*b*c*e*x^8 + 1/9*(c^2*d + 2*b*c*f)*x
^9 + 1/6*(b^2 + 2*a*c)*e*x^6 + 1/7*(2*b*c*d + (b^2 + 2*a*c)*f)*x^7 + 1/2*a*
b*e*x^4 + 1/5*(2*a*b*f + (b^2 + 2*a*c)*d)*x^5 + 1/2*a^2*e*x^2 + a^2*d*x + 1
/3*(2*a*b*d + a^2*f)*x^3
```

mupad [B] time = 0.70, size = 138, normalized size = 0.90

$$x^5\left(\frac{d\,b^2}{5}+\frac{2\,a\,f\,b}{5}+\frac{2\,a\,c\,d}{5}\right)+x^7\left(\frac{f\,b^2}{7}+\frac{2\,c\,d\,b}{7}+\frac{2\,a\,c\,f}{7}\right)+x^3\left(\frac{f\,a^2}{3}+\frac{2\,b\,d\,a}{3}\right)+x^9\left(\frac{d\,c^2}{9}+\frac{2\,b\,f\,c}{9}\right)+\frac{a^2\,e\,x^2}{2}+\frac{c^2\,e}{1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2)*(a + b*x^2 + c*x^4)^2,x)
```

```
[Out] x^5*((b^2*d)/5 + (2*a*c*d)/5 + (2*a*b*f)/5) + x^7*((b^2*f)/7 + (2*b*c*d)/7
+ (2*a*c*f)/7) + x^3*((a^2*f)/3 + (2*a*b*d)/3) + x^9*((c^2*d)/9 + (2*b*c*f)
/9) + (a^2*e*x^2)/2 + (c^2*e*x^10)/10 + (c^2*f*x^11)/11 + (e*x^6*(2*a*c + b
^2))/6 + a^2*d*x + (a*b*e*x^4)/2 + (b*c*e*x^8)/4
```

sympy [A] time = 0.09, size = 165, normalized size = 1.07

$$a^2dx+\frac{a^2ex^2}{2}+\frac{abex^4}{2}+\frac{bcex^8}{4}+\frac{c^2ex^{10}}{10}+\frac{c^2fx^{11}}{11}+x^9\left(\frac{2bcf}{9}+\frac{c^2d}{9}\right)+x^7\left(\frac{2acf}{7}+\frac{b^2f}{7}+\frac{2bcd}{7}\right)+x^6\left(\frac{ace}{3}+\frac{b^2e}{6}\right)+x^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)*(c*x**4+b*x**2+a)**2,x)
```

```
[Out] a**2*d*x + a**2*e*x**2/2 + a*b*e*x**4/2 + b*c*e*x**8/4 + c**2*e*x**10/10 +
c**2*f*x**11/11 + x**9*(2*b*c*f/9 + c**2*d/9) + x**7*(2*a*c*f/7 + b**2*f/7
+ 2*b*c*d/7) + x**6*(a*c*e/3 + b**2*e/6) + x**5*(2*a*b*f/5 + 2*a*c*d/5 + b*
*2*d/5) + x**3*(a**2*f/3 + 2*a*b*d/3)
```

3.8 $\int (d+ex+fx^2+gx^3)(a+bx^2+cx^4)^2\,dx$

Optimal. Leaf size=196

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{7}x^7\left(2acf+b^2f+2bcd\right)+\frac{1}{5}x^5\left(2abf+2acd+b^2d\right)+\frac{1}{8}x^8\left(2acg+b^2g+2bce\right)+\frac{1}{6}x^6\left(2abg+2ace$$

```
[Out] a^2*d*x+1/2*a^2*e*x^2+1/3*a*(a*f+2*b*d)*x^3+1/4*a*(a*g+2*b*e)*x^4+1/5*(2*a*
b*f+2*a*c*d+b^2*d)*x^5+1/6*(2*a*b*g+2*a*c*e+b^2*e)*x^6+1/7*(2*a*c*f+b^2*f+2
*b*c*d)*x^7+1/8*(2*a*c*g+b^2*g+2*b*c*e)*x^8+1/9*c*(2*b*f+c*d)*x^9+1/10*c*(2
*b*g+c*e)*x^10+1/11*c^2*f*x^11+1/12*c^2*g*x^12
```

Rubi [A] time = 0.17, antiderivative size = 196, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.033, Rules used = {1671}

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{7}x^7\left(2acf+b^2f+2bcd\right)+\frac{1}{5}x^5\left(2abf+2acd+b^2d\right)+\frac{1}{8}x^8\left(2acg+b^2g+2bce\right)+\frac{1}{6}x^6\left(2abg+2ace$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*(2*b*e + a*g)*x^4)/4
 + ((b^2*d + 2*a*c*d + 2*a*b*f)*x^5)/5 + ((b^2*e + 2*a*c*e + 2*a*b*g)*x^6)/
6 + ((2*b*c*d + b^2*f + 2*a*c*f)*x^7)/7 + ((2*b*c*e + b^2*g + 2*a*c*g)*x^8)
/8 + (c*(c*d + 2*b*f)*x^9)/9 + (c*(c*e + 2*b*g)*x^10)/10 + (c^2*f*x^11)/11
+ (c^2*g*x^12)/12
```

Rule 1671

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[Expa
ndIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && Poly
Q[Pq, x] && IGtQ[p, 0]
```

Rubi steps

$$\int \left(d+ex+fx^2+gx^3\right)\left(a+bx^2+cx^4\right)^2\,dx = \int \left(a^2d+a^2ex+a(2bd+af)x^2+a(2be+ag)x^3+\left(b^2d+2acd+\right.\right.$$

$$= a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{3}a(2bd+af)x^3+\frac{1}{4}a(2be+ag)x^4+\frac{1}{5}\left(b^2d+2a\right.$$

Mathematica [A] time = 0.06, size = 196, normalized size = 1.00

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{7}x^7\left(2acf+b^2f+2bcd\right)+\frac{1}{5}x^5\left(2abf+2acd+b^2d\right)+\frac{1}{8}x^8\left(2acg+b^2g+2bce\right)+\frac{1}{6}x^6\left(2abg+2ace$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*(2*b*e + a*g)*x^4)/4
 + ((b^2*d + 2*a*c*d + 2*a*b*f)*x^5)/5 + ((b^2*e + 2*a*c*e + 2*a*b*g)*x^6)/
6 + ((2*b*c*d + b^2*f + 2*a*c*f)*x^7)/7 + ((2*b*c*e + b^2*g + 2*a*c*g)*x^8)
/8 + (c*(c*d + 2*b*f)*x^9)/9 + (c*(c*e + 2*b*g)*x^10)/10 + (c^2*f*x^11)/11
+ (c^2*g*x^12)/12
```

fricas [A] time = 0.78, size = 202, normalized size = 1.03

$$\frac{1}{12}x^{12}gc^2+\frac{1}{11}x^{11}fc^2+\frac{1}{10}x^{10}ec^2+\frac{1}{5}x^{10}gcb+\frac{1}{9}x^9dc^2+\frac{2}{9}x^9fcb+\frac{1}{4}x^8ecb+\frac{1}{8}x^8gb^2+\frac{1}{4}x^8gca+\frac{2}{7}x^7dcb+\frac{1}{7}x^7fb^2+\frac{2}{7}x^7fc$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="fricas")
```

```
[Out] 1/12*x^12*g*c^2 + 1/11*x^11*f*c^2 + 1/10*x^10*e*c^2 + 1/5*x^10*g*c*b + 1/9*
x^9*d*c^2 + 2/9*x^9*f*c*b + 1/4*x^8*e*c*b + 1/8*x^8*g*b^2 + 1/4*x^8*g*c*a +
 2/7*x^7*d*c*b + 1/7*x^7*f*b^2 + 2/7*x^7*f*c*a + 1/6*x^6*e*b^2 + 1/3*x^6*e*
c*a + 1/3*x^6*g*b*a + 1/5*x^5*d*b^2 + 2/5*x^5*d*c*a + 2/5*x^5*f*b*a + 1/2*x
^4*e*b*a + 1/4*x^4*g*a^2 + 2/3*x^3*d*b*a + 1/3*x^3*f*a^2 + 1/2*x^2*e*a^2 +
x*d*a^2
```

giac [A] time = 0.30, size = 208, normalized size = 1.06

$$\frac{1}{12}c^2gx^{12}+\frac{1}{11}c^2fx^{11}+\frac{1}{5}bcgx^{10}+\frac{1}{10}c^2x^{10}e+\frac{1}{9}c^2dx^9+\frac{2}{9}bcfx^9+\frac{1}{8}b^2gx^8+\frac{1}{4}acgx^8+\frac{1}{4}bcx^8e+\frac{2}{7}bcdx^7+\frac{1}{7}b^2fx^7$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="giac")
```

```
[Out] 1/12*c^2*g*x^12 + 1/11*c^2*f*x^11 + 1/5*b*c*g*x^10 + 1/10*c^2*x^10*e + 1/9*
c^2*d*x^9 + 2/9*b*c*f*x^9 + 1/8*b^2*g*x^8 + 1/4*a*c*g*x^8 + 1/4*b*c*x^8*e +
 2/7*b*c*d*x^7 + 1/7*b^2*f*x^7 + 2/7*a*c*f*x^7 + 1/3*a*b*g*x^6 + 1/6*b^2*x^
6*e + 1/3*a*c*x^6*e + 1/5*b^2*d*x^5 + 2/5*a*c*d*x^5 + 2/5*a*b*f*x^5 + 1/4*a
^2*g*x^4 + 1/2*a*b*x^4*e + 2/3*a*b*d*x^3 + 1/3*a^2*f*x^3 + 1/2*a^2*x^2*e +
a^2*d*x
```

maple [A] time = 0.00, size = 183, normalized size = 0.93

$$\frac{c^2gx^{12}}{12}+\frac{c^2fx^{11}}{11}+\frac{\left(2gbc+ec^2\right)x^{10}}{10}+\frac{\left(2fbc+c^2d\right)x^9}{9}+\frac{\left(2bce+\left(2ac+b^2\right)g\right)x^8}{8}+\frac{\left(2bcd+\left(2ac+b^2\right)f\right)x^7}{7}+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x)
```

```
[Out] 1/12*c^2*g*x^12+1/11*c^2*f*x^11+1/10*(2*b*c*g+c^2*e)*x^10+1/9*(2*b*c*f+c^2*
d)*x^9+1/8*(2*b*c*e+g*(2*a*c+b^2))*x^8+1/7*(2*b*c*d+(2*a*c+b^2)*f)*x^7+1/6*
(e*(2*a*c+b^2)+2*a*b*g)*x^6+1/5*(2*a*b*f+(2*a*c+b^2)*d)*x^5+1/4*(a^2*g+2*a*
b*e)*x^4+1/3*(a^2*f+2*a*b*d)*x^3+1/2*a^2*e*x^2+a^2*d*x
```

maxima [A] time = 1.40, size = 182, normalized size = 0.93

$$\frac{1}{12}c^2gx^{12}+\frac{1}{11}c^2fx^{11}+\frac{1}{10}\left(c^2e+2bcg\right)x^{10}+\frac{1}{9}\left(c^2d+2bcf\right)x^9+\frac{1}{8}\left(2bce+\left(b^2+2ac\right)g\right)x^8+\frac{1}{7}\left(2bcd+\left(b^2+2\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="maxima")
```

```
[Out] 1/12*c^2*g*x^12 + 1/11*c^2*f*x^11 + 1/10*(c^2*e + 2*b*c*g)*x^10 + 1/9*(c^2*
d + 2*b*c*f)*x^9 + 1/8*(2*b*c*e + (b^2 + 2*a*c)*g)*x^8 + 1/7*(2*b*c*d + (b^
2 + 2*a*c)*f)*x^7 + 1/6*(2*a*b*g + (b^2 + 2*a*c)*e)*x^6 + 1/5*(2*a*b*f + (b
^2 + 2*a*c)*d)*x^5 + 1/2*a^2*e*x^2 + 1/4*(2*a*b*e + a^2*g)*x^4 + a^2*d*x +
1/3*(2*a*b*d + a^2*f)*x^3
```

mupad [B] time = 0.72, size = 182, normalized size = 0.93

$$x^5\left(\frac{db^2}{5}+\frac{2afb}{5}+\frac{2acd}{5}\right)+x^6\left(\frac{eb^2}{6}+\frac{agb}{3}+\frac{ace}{3}\right)+x^7\left(\frac{fb^2}{7}+\frac{2cdb}{7}+\frac{2acf}{7}\right)+x^8\left(\frac{gb^2}{8}+\frac{ceb}{4}+\frac{acg}{4}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*x^2 + c*x^4)^2*(d + e*x + f*x^2 + g*x^3),x)
```

```
[Out] x^5*((b^2*d)/5 + (2*a*c*d)/5 + (2*a*b*f)/5) + x^6*((b^2*e)/6 + (a*c*e)/3 +
(a*b*g)/3) + x^7*((b^2*f)/7 + (2*b*c*d)/7 + (2*a*c*f)/7) + x^8*((b^2*g)/8 +
 (b*c*e)/4 + (a*c*g)/4) + x^3*((a^2*f)/3 + (2*a*b*d)/3) + x^4*((a^2*g)/4 +
(a*b*e)/2) + x^9*((c^2*d)/9 + (2*b*c*f)/9) + x^10*((c^2*e)/10 + (b*c*g)/5)
+ (a^2*e*x^2)/2 + (c^2*f*x^11)/11 + (c^2*g*x^12)/12 + a^2*d*x
```

sympy [A] time = 0.10, size = 209, normalized size = 1.07

$$a^2dx+\frac{a^2ex^2}{2}+\frac{c^2fx^{11}}{11}+\frac{c^2gx^{12}}{12}+x^{10}\left(\frac{bcg}{5}+\frac{c^2e}{10}\right)+x^9\left(\frac{2bcf}{9}+\frac{c^2d}{9}\right)+x^8\left(\frac{acg}{4}+\frac{b^2g}{8}+\frac{bce}{4}\right)+x^7\left(\frac{2acf}{7}+\frac{b^2f}{7}+\frac{2bc}{7}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)*(c*x**4+b*x**2+a)**2,x)
```

```
[Out] a**2*d*x + a**2*e*x**2/2 + c**2*f*x**11/11 + c**2*g*x**12/12 + x**10*(b*c*g
/5 + c**2*e/10) + x**9*(2*b*c*f/9 + c**2*d/9) + x**8*(a*c*g/4 + b**2*g/8 +
b*c*e/4) + x**7*(2*a*c*f/7 + b**2*f/7 + 2*b*c*d/7) + x**6*(a*b*g/3 + a*c*e/
3 + b**2*e/6) + x**5*(2*a*b*f/5 + 2*a*c*d/5 + b**2*d/5) + x**4*(a**2*g/4 +
a*b*e/2) + x**3*(a**2*f/3 + 2*a*b*d/3)
```

3.9 $\int \left(a+bx^2+cx^4\right)^2 \left(d+ex+fx^2+gx^3+hx^4\right) dx$

Optimal. Leaf size=234

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{9}x^9\left(2c(ah+bf)+b^2h+c^2d\right)+\frac{1}{7}x^7\left(2b(ah+cd)+2acf+b^2f\right)+\frac{1}{5}x^5\left(2abf+a(ah+2cd)+b^{\cdots}\right.$$

```
[Out] a^2*d*x+1/2*a^2*e*x^2+1/3*a*(a*f+2*b*d)*x^3+1/4*a*(a*g+2*b*e)*x^4+1/5*(b^2*
d+2*a*b*f+a*(a*h+2*c*d))*x^5+1/6*(2*a*b*g+2*a*c*e+b^2*e)*x^6+1/7*(b^2*f+2*a
*c*f+2*b*(a*h+c*d))*x^7+1/8*(2*a*c*g+b^2*g+2*b*c*e)*x^8+1/9*(c^2*d+b^2*h+2*
c*(a*h+b*f))*x^9+1/10*c*(2*b*g+c*e)*x^10+1/11*c*(2*b*h+c*f)*x^11+1/12*c^2*g
*x^12+1/13*c^2*h*x^13
```

Rubi [A] time = 0.24, antiderivative size = 234, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.029$, Rules used = {1671}

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{9}x^9\left(2c(ah+bf)+b^2h+c^2d\right)+\frac{1}{7}x^7\left(2b(ah+cd)+2acf+b^2f\right)+\frac{1}{5}x^5\left(2abf+a(ah+2cd)+b^{\cdots}\right.$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*x^2 + c*x^4)^2*(d + e*x + f*x^2 + g*x^3 + h*x^4),x]
```

```
[Out] a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*(2*b*e + a*g)*x^4)/4
 + ((b^2*d + 2*a*b*f + a*(2*c*d + a*h))*x^5)/5 + ((b^2*e + 2*a*c*e + 2*a*b*
g)*x^6)/6 + ((b^2*f + 2*a*c*f + 2*b*(c*d + a*h))*x^7)/7 + ((2*b*c*e + b^2*g
 + 2*a*c*g)*x^8)/8 + ((c^2*d + b^2*h + 2*c*(b*f + a*h))*x^9)/9 + (c*(c*e +
2*b*g)*x^10)/10 + (c*(c*f + 2*b*h)*x^11)/11 + (c^2*g*x^12)/12 + (c^2*h*x^13
)/13
```

Rule 1671

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[Expa
ndIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && Poly
Q[Pq, x] && IGtQ[p, 0]
```

Rubi steps

$$\int \left(a+bx^2+cx^4\right)^2\left(d+ex+fx^2+gx^3+hx^4\right) dx = \int \left(a^2d+a^2ex+a(2bd+af)x^2+a(2be+ag)x^3+\left(b^2d\cdots\right.\right.$$
$$= a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{3}a(2bd+af)x^3+\frac{1}{4}a(2be+ag)x^4+\frac{1}{5}\cdots$$

Mathematica [A] time = 0.08, size = 234, normalized size = 1.00

$$\frac{1}{5}x^5\left(a^2h+2abf+2acd+b^2d\right)+a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{9}x^9\left(2ach+b^2h+2bcf+c^2d\right)+\frac{1}{7}x^7\left(2abh+2acf+b^2f+2b\cdots\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*x^2 + c*x^4)^2*(d + e*x + f*x^2 + g*x^3 + h*x^4),x]
```

```
[Out] a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*(2*b*e + a*g)*x^4)/4
 + ((b^2*d + 2*a*c*d + 2*a*b*f + a^2*h)*x^5)/5 + ((b^2*e + 2*a*c*e + 2*a*b*
g)*x^6)/6 + ((2*b*c*d + b^2*f + 2*a*c*f + 2*a*b*h)*x^7)/7 + ((2*b*c*e + b^2
*g + 2*a*c*g)*x^8)/8 + ((c^2*d + 2*b*c*f + b^2*h + 2*a*c*h)*x^9)/9 + (c*(c*
e + 2*b*g)*x^10)/10 + (c*(c*f + 2*b*h)*x^11)/11 + (c^2*g*x^12)/12 + (c^2*h*
x^13)/13
```

fricas [A] time = 0.83, size = 253, normalized size = 1.08

$$\frac{1}{13}x^{13}hc^2+\frac{1}{12}x^{12}gc^2+\frac{1}{11}x^{11}fc^2+\frac{2}{11}x^{11}hcb+\frac{1}{10}x^{10}ec^2+\frac{1}{5}x^{10}gcb+\frac{1}{9}x^9dc^2+\frac{2}{9}x^9fcb+\frac{1}{9}x^9hb^2+\frac{2}{9}x^9hca+\frac{1}{4}x^8ecb+\frac{1}{8}x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)^2*(h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="fricas"
)
```

```
[Out] 1/13*x^13*h*c^2 + 1/12*x^12*g*c^2 + 1/11*x^11*f*c^2 + 2/11*x^11*h*c*b + 1/1
0*x^10*e*c^2 + 1/5*x^10*g*c*b + 1/9*x^9*d*c^2 + 2/9*x^9*f*c*b + 1/9*x^9*h*b
^2 + 2/9*x^9*h*c*a + 1/4*x^8*e*c*b + 1/8*x^8*g*b^2 + 1/4*x^8*g*c*a + 2/7*x^
7*d*c*b + 1/7*x^7*f*b^2 + 2/7*x^7*f*c*a + 2/7*x^7*h*b*a + 1/6*x^6*e*b^2 + 1
/3*x^6*e*c*a + 1/3*x^6*g*b*a + 1/5*x^5*d*b^2 + 2/5*x^5*d*c*a + 2/5*x^5*f*b*
a + 1/5*x^5*h*a^2 + 1/2*x^4*e*b*a + 1/4*x^4*g*a^2 + 2/3*x^3*d*b*a + 1/3*x^3
*f*a^2 + 1/2*x^2*e*a^2 + x*d*a^2
```

giac [A] time = 0.26, size = 259, normalized size = 1.11

$$\frac{1}{13}c^2hx^{13}+\frac{1}{12}c^2gx^{12}+\frac{1}{11}c^2fx^{11}+\frac{2}{11}bchx^{11}+\frac{1}{5}bcgx^{10}+\frac{1}{10}c^2x^{10}e+\frac{1}{9}c^2dx^9+\frac{2}{9}bcfx^9+\frac{1}{9}b^2hx^9+\frac{2}{9}achx^9+\frac{1}{8}b^2gx^8$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)^2*(h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="giac")
```

```
[Out] 1/13*c^2*h*x^13 + 1/12*c^2*g*x^12 + 1/11*c^2*f*x^11 + 2/11*b*c*h*x^11 + 1/5
*b*c*g*x^10 + 1/10*c^2*x^10*e + 1/9*c^2*d*x^9 + 2/9*b*c*f*x^9 + 1/9*b^2*h*x
^9 + 2/9*a*c*h*x^9 + 1/8*b^2*g*x^8 + 1/4*a*c*g*x^8 + 1/4*b*c*x^8*e + 2/7*b*
c*d*x^7 + 1/7*b^2*f*x^7 + 2/7*a*c*f*x^7 + 2/7*a*b*h*x^7 + 1/3*a*b*g*x^6 + 1
/6*b^2*x^6*e + 1/3*a*c*x^6*e + 1/5*b^2*d*x^5 + 2/5*a*c*d*x^5 + 2/5*a*b*f*x^
5 + 1/5*a^2*h*x^5 + 1/4*a^2*g*x^4 + 1/2*a*b*x^4*e + 2/3*a*b*d*x^3 + 1/3*a^2
*f*x^3 + 1/2*a^2*x^2*e + a^2*d*x
```

maple [A] time = 0.00, size = 219, normalized size = 0.94

$$\frac{c^2h\,x^{13}}{13}+\frac{c^2g\,x^{12}}{12}+\frac{\left(2bch+c^2f\right)x^{11}}{11}+\frac{\left(2gbc+e\,c^2\right)x^{10}}{10}+\frac{\left(2bcf+c^2d+\left(2ac+b^2\right)h\right)x^9}{9}+\frac{\left(2bce+\left(2ac+b^2\right)g\right)x^8}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((c*x^4+b*x^2+a)^2*(h*x^4+g*x^3+f*x^2+e*x+d),x)
```

```
[Out] 1/13*c^2*h*x^13+1/12*c^2*g*x^12+1/11*(2*b*c*h+c^2*f)*x^11+1/10*(2*b*c*g+c^2
*e)*x^10+1/9*((2*a*c+b^2)*h+2*f*b*c+c^2*d)*x^9+1/8*(2*b*c*e+(2*a*c+b^2)*g)*
x^8+1/7*(2*a*b*h+(2*a*c+b^2)*f+2*b*c*d)*x^7+1/6*(2*a*b*g+(2*a*c+b^2)*e)*x^6
+1/5*(a^2*h+2*a*b*f+(2*a*c+b^2)*d)*x^5+1/4*(a^2*g+2*a*b*e)*x^4+1/3*(a^2*f+2
*a*b*d)*x^3+1/2*a^2*e*x^2+a^2*d*x
```

maxima [A] time = 1.14, size = 218, normalized size = 0.93

$$\frac{1}{13}c^2hx^{13}+\frac{1}{12}c^2gx^{12}+\frac{1}{11}\left(c^2f+2\,bch\right)x^{11}+\frac{1}{10}\left(c^2e+2\,bcg\right)x^{10}+\frac{1}{9}\left(c^2d+2\,bcf+\left(b^2+2\,ac\right)h\right)x^9+\frac{1}{8}\left(2\,bce+\left(b^2\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)^2*(h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="maxima"
)
```

```
[Out] 1/13*c^2*h*x^13 + 1/12*c^2*g*x^12 + 1/11*(c^2*f + 2*b*c*h)*x^11 + 1/10*(c^2
*e + 2*b*c*g)*x^10 + 1/9*(c^2*d + 2*b*c*f + (b^2 + 2*a*c)*h)*x^9 + 1/8*(2*b
*c*e + (b^2 + 2*a*c)*g)*x^8 + 1/7*(2*b*c*d + 2*a*b*h + (b^2 + 2*a*c)*f)*x^7
```

```
 + 1/6*(2*a*b*g + (b^2 + 2*a*c)*e)*x^6 + 1/5*(2*a*b*f + a^2*h + (b^2 + 2*a*
c)*d)*x^5 + 1/2*a^2*e*x^2 + 1/4*(2*a*b*e + a^2*g)*x^4 + a^2*d*x + 1/3*(2*a*
b*d + a^2*f)*x^3
```

mupad [B] time = 0.11, size = 220, normalized size = 0.94

$$x^6\left(\frac{e\,b^2}{6}+\frac{a\,g\,b}{3}+\frac{a\,c\,e}{3}\right)+x^8\left(\frac{g\,b^2}{8}+\frac{c\,e\,b}{4}+\frac{a\,c\,g}{4}\right)+x^3\left(\frac{f\,a^2}{3}+\frac{2\,b\,d\,a}{3}\right)+x^4\left(\frac{g\,a^2}{4}+\frac{b\,e\,a}{2}\right)+x^{10}\left(\frac{e\,c^2}{10}+\frac{b\,g\,c}{5}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*x^2 + c*x^4)^2*(d + e*x + f*x^2 + g*x^3 + h*x^4),x)
```

```
[Out] x^6*((b^2*e)/6 + (a*c*e)/3 + (a*b*g)/3) + x^8*((b^2*g)/8 + (b*c*e)/4 + (a*c
*g)/4) + x^3*((a^2*f)/3 + (2*a*b*d)/3) + x^4*((a^2*g)/4 + (a*b*e)/2) + x^10
*((c^2*e)/10 + (b*c*g)/5) + x^11*((c^2*f)/11 + (2*b*c*h)/11) + x^5*((b^2*d)
/5 + (a^2*h)/5 + (2*a*c*d)/5 + (2*a*b*f)/5) + x^7*((b^2*f)/7 + (2*b*c*d)/7
+ (2*a*c*f)/7 + (2*a*b*h)/7) + x^9*((c^2*d)/9 + (b^2*h)/9 + (2*b*c*f)/9 + (
2*a*c*h)/9) + (a^2*e*x^2)/2 + (c^2*g*x^12)/12 + (c^2*h*x^13)/13 + a^2*d*x
```

sympy [A] time = 0.11, size = 258, normalized size = 1.10

$$a^2dx+\frac{a^2ex^2}{2}+\frac{c^2gx^{12}}{12}+\frac{c^2hx^{13}}{13}+x^{11}\left(\frac{2bch}{11}+\frac{c^2f}{11}\right)+x^{10}\left(\frac{bcg}{5}+\frac{c^2e}{10}\right)+x^9\left(\frac{2ach}{9}+\frac{b^2h}{9}+\frac{2bcf}{9}+\frac{c^2d}{9}\right)+x^8\left(\frac{acg}{4}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x**4+b*x**2+a)**2*(h*x**4+g*x**3+f*x**2+e*x+d),x)
```

```
[Out] a**2*d*x + a**2*e*x**2/2 + c**2*g*x**12/12 + c**2*h*x**13/13 + x**11*(2*b*c
*h/11 + c**2*f/11) + x**10*(b*c*g/5 + c**2*e/10) + x**9*(2*a*c*h/9 + b**2*h
/9 + 2*b*c*f/9 + c**2*d/9) + x**8*(a*c*g/4 + b**2*g/8 + b*c*e/4) + x**7*(2*
a*b*h/7 + 2*a*c*f/7 + b**2*f/7 + 2*b*c*d/7) + x**6*(a*b*g/3 + a*c*e/3 + b**
2*e/6) + x**5*(a**2*h/5 + 2*a*b*f/5 + 2*a*c*d/5 + b**2*d/5) + x**4*(a**2*g/
4 + a*b*e/2) + x**3*(a**2*f/3 + 2*a*b*d/3)
```

3.10 $\int \frac{d+ex}{4-5x^2+x^4} dx$

Optimal. Leaf size=45

$$-\frac{1}{6}d\tanh^{-1}\left(\frac{x}{2}\right)+\frac{1}{3}d\tanh^{-1}(x)-\frac{1}{6}e\log\left(1-x^2\right)+\frac{1}{6}e\log\left(4-x^2\right)$$

```
[Out] -1/6*d*arctanh(1/2*x)+1/3*d*arctanh(x)-1/6*e*ln(-x^2+1)+1/6*e*ln(-x^2+4)
```

Rubi [A] time = 0.03, antiderivative size = 45, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 7, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.389, Rules used = {1673, 12, 1093, 207, 1107, 616, 31}

$$-\frac{1}{6}d\tanh^{-1}\left(\frac{x}{2}\right)+\frac{1}{3}d\tanh^{-1}(x)-\frac{1}{6}e\log\left(1-x^2\right)+\frac{1}{6}e\log\left(4-x^2\right)$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)/(4 - 5*x^2 + x^4),x]
```

```
[Out] -(d*ArcTanh[x/2])/6 + (d*ArcTanh[x])/3 - (e*Log[1 - x^2])/6 + (e*Log[4 - x^
2])/6
```

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 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1093

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(-1), x_Symbol] :> With[{q = Rt[b^
2 - 4*a*c, 2]}, Dist[c/q, Int[1/(b/2 - q/2 + c*x^2), x], x] - Dist[c/q, Int
[1/(b/2 + q/2 + c*x^2), x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c,
0] && PosQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}\int \frac{d+ex}{4-5x^2+x^4}\,dx &= \int \frac{d}{4-5x^2+x^4}\,dx + \int \frac{ex}{4-5x^2+x^4}\,dx\\ &= d\int \frac{1}{4-5x^2+x^4}\,dx + e\int \frac{x}{4-5x^2+x^4}\,dx\\ &= \frac{1}{3}d\int \frac{1}{-4+x^2}\,dx - \frac{1}{3}d\int \frac{1}{-1+x^2}\,dx + \frac{1}{2}e\,\mathrm{Subst}\left(\int \frac{1}{4-5x+x^2}\,dx, x, x^2\right)\\ &= -\frac{1}{6}d\tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}d\tanh^{-1}(x) + \frac{1}{6}e\,\mathrm{Subst}\left(\int \frac{1}{-4+x}\,dx, x, x^2\right) - \frac{1}{6}e\,\mathrm{Subst}\left(\int \frac{1}{-1+x}\right.\\ &= -\frac{1}{6}d\tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}d\tanh^{-1}(x) - \frac{1}{6}e\log\left(1-x^2\right) + \frac{1}{6}e\log\left(4-x^2\right)\end{aligned}$$

Mathematica [A] time = 0.02, size = 50, normalized size = 1.11

$$\frac{1}{12}(-2(d+e)\log(1-x)+(d+2e)\log(2-x)+2(d-e)\log(x+1)-(d-2e)\log(x+2))$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)/(4 - 5*x^2 + x^4),x]
```

```
[Out] (-2*(d + e)*Log[1 - x] + (d + 2*e)*Log[2 - x] + 2*(d - e)*Log[1 + x] - (d -
 2*e)*Log[2 + x])/12
```

fricas [A] time = 1.60, size = 43, normalized size = 0.96

$$-\frac{1}{12}(d-2e)\log(x+2)+\frac{1}{6}(d-e)\log(x+1)-\frac{1}{6}(d+e)\log(x-1)+\frac{1}{12}(d+2e)\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")
```

```
[Out] -1/12*(d - 2*e)*log(x + 2) + 1/6*(d - e)*log(x + 1) - 1/6*(d + e)*log(x - 1
) + 1/12*(d + 2*e)*log(x - 2)
```

giac [A] time = 0.25, size = 51, normalized size = 1.13

$$-\frac{1}{12}(d-2e)\log(|x+2|)+\frac{1}{6}(d-e)\log(|x+1|)-\frac{1}{6}(d+e)\log(|x-1|)+\frac{1}{12}(d+2e)\log(|x-2|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")
```

```
[Out] -1/12*(d - 2*e)*log(abs(x + 2)) + 1/6*(d - e)*log(abs(x + 1)) - 1/6*(d + e)
*log(abs(x - 1)) + 1/12*(d + 2*e)*log(abs(x - 2))
```

maple [A] time = 0.01, size = 58, normalized size = 1.29

$$-\frac{d\ln(x+2)}{12}+\frac{d\ln(x-2)}{12}-\frac{d\ln(x-1)}{6}+\frac{d\ln(x+1)}{6}+\frac{e\ln(x+2)}{6}+\frac{e\ln(x-2)}{6}-\frac{e\ln(x-1)}{6}-\frac{e\ln(x+1)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 1/12*ln(x-2)*d+1/6*ln(x-2)*e+1/6*ln(x+1)*d-1/6*ln(x+1)*e-1/6*ln(x-1)*d-1/6*
ln(x-1)*e-1/12*ln(2+x)*d+1/6*ln(2+x)*e
```

maxima [A] time = 1.13, size = 43, normalized size = 0.96

$$-\frac{1}{12}(d-2e)\log(x+2)+\frac{1}{6}(d-e)\log(x+1)-\frac{1}{6}(d+e)\log(x-1)+\frac{1}{12}(d+2e)\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")
```

```
[Out] -1/12*(d - 2*e)*log(x + 2) + 1/6*(d - e)*log(x + 1) - 1/6*(d + e)*log(x - 1
) + 1/12*(d + 2*e)*log(x - 2)
```

mupad [B] time = 0.71, size = 51, normalized size = 1.13

$$\ln(x+1)\left(\frac{d}{6}-\frac{e}{6}\right)-\ln(x-1)\left(\frac{d}{6}+\frac{e}{6}\right)+\ln(x-2)\left(\frac{d}{12}+\frac{e}{6}\right)-\ln(x+2)\left(\frac{d}{12}-\frac{e}{6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x)/(x^4 - 5*x^2 + 4),x)
```

```
[Out] log(x + 1)*(d/6 - e/6) - log(x - 1)*(d/6 + e/6) + log(x - 2)*(d/12 + e/6) -
 log(x + 2)*(d/12 - e/6)
```

sympy [B] time = 3.15, size = 515, normalized size = 11.44

$$-\frac{(d-2e)\log\left(x+\frac{-35d^4e+\frac{51d^4(d-2e)}{2}-180d^2e^3-90d^2e^2(d-2e)+41d^2e(d-2e)^2-\frac{15d^2(d-2e)^3}{2}+320e^5-96e^4(d-2e)-80e^3(d-2e)^2+24e^2(d-2e)^3}{9d^5-160d^3e^2+256de^4}\right)}{12}+\frac{(d}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] -(d - 2*e)*log(x + (-35*d**4*e + 51*d**4*(d - 2*e)/2 - 180*d**2*e**3 - 90*d
**2*e**2*(d - 2*e) + 41*d**2*e*(d - 2*e)**2 - 15*d**2*(d - 2*e)**3/2 + 320*
e**5 - 96*e**4*(d - 2*e) - 80*e**3*(d - 2*e)**2 + 24*e**2*(d - 2*e)**3)/(9*
d**5 - 160*d**3*e**2 + 256*d*e**4))/12 + (d - e)*log(x + (-35*d**4*e - 51*d
**4*(d - e) - 180*d**2*e**3 + 180*d**2*e**2*(d - e) + 164*d**2*e*(d - e)**2
 + 60*d**2*(d - e)**3 + 320*e**5 + 192*e**4*(d - e) - 320*e**3*(d - e)**2 -
 192*e**2*(d - e)**3)/(9*d**5 - 160*d**3*e**2 + 256*d*e**4))/6 - (d + e)*lo
g(x + (-35*d**4*e + 51*d**4*(d + e) - 180*d**2*e**3 - 180*d**2*e**2*(d + e)
 + 164*d**2*e*(d + e)**2 - 60*d**2*(d + e)**3 + 320*e**5 - 192*e**4*(d + e)
 - 320*e**3*(d + e)**2 + 192*e**2*(d + e)**3)/(9*d**5 - 160*d**3*e**2 + 256
*d*e**4))/6 + (d + 2*e)*log(x + (-35*d**4*e - 51*d**4*(d + 2*e)/2 - 180*d**
2*e**3 + 90*d**2*e**2*(d + 2*e) + 41*d**2*e*(d + 2*e)**2 + 15*d**2*(d + 2*e
)**3/2 + 320*e**5 + 96*e**4*(d + 2*e) - 80*e**3*(d + 2*e)**2 - 24*e**2*(d +
 2*e)**3)/(9*d**5 - 160*d**3*e**2 + 256*d*e**4))/12
```

3.11 $\int \frac{d+ex+fx^2}{4-5x^2+x^4}\,dx$

Optimal. Leaf size=51

$$-\frac{1}{6}(d+4f)\tanh^{-1}\left(\frac{x}{2}\right)+\frac{1}{3}(d+f)\tanh^{-1}(x)-\frac{1}{6}e\log\left(1-x^2\right)+\frac{1}{6}e\log\left(4-x^2\right)$$

```
[Out] -1/6*(d+4*f)*arctanh(1/2*x)+1/3*(d+f)*arctanh(x)-1/6*e*ln(-x^2+1)+1/6*e*ln(
-x^2+4)
```

Rubi [A] time = 0.06, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.304, Rules used = {1673, 1166, 207, 12, 1107, 616, 31}

$$-\frac{1}{6}(d+4f)\tanh^{-1}\left(\frac{x}{2}\right)+\frac{1}{3}(d+f)\tanh^{-1}(x)-\frac{1}{6}e\log\left(1-x^2\right)+\frac{1}{6}e\log\left(4-x^2\right)$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4),x]
```

```
[Out] -((d + 4*f)*ArcTanh[x/2])/6 + ((d + f)*ArcTanh[x])/3 - (e*Log[1 - x^2])/6 +
 (e*Log[4 - x^2])/6
```

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 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}\int \frac{d+ex+fx^2}{4-5x^2+x^4}\,dx &= \int \frac{ex}{4-5x^2+x^4}\,dx+\int \frac{d+fx^2}{4-5x^2+x^4}\,dx\\ &= e\int \frac{x}{4-5x^2+x^4}\,dx-\frac{1}{3}(d+f)\int \frac{1}{-1+x^2}\,dx+\frac{1}{3}(d+4f)\int \frac{1}{-4+x^2}\,dx\\ &= -\frac{1}{6}(d+4f)\tanh^{-1}\left(\frac{x}{2}\right)+\frac{1}{3}(d+f)\tanh^{-1}(x)+\frac{1}{2}e\,\mathrm{Subst}\left(\int \frac{1}{4-5x+x^2}\,dx,x,x^2\right)\\ &= -\frac{1}{6}(d+4f)\tanh^{-1}\left(\frac{x}{2}\right)+\frac{1}{3}(d+f)\tanh^{-1}(x)+\frac{1}{6}e\,\mathrm{Subst}\left(\int \frac{1}{-4+x}\,dx,x,x^2\right)-\frac{1}{6}e\,\mathrm{Subst}\\ &= -\frac{1}{6}(d+4f)\tanh^{-1}\left(\frac{x}{2}\right)+\frac{1}{3}(d+f)\tanh^{-1}(x)-\frac{1}{6}e\log\left(1-x^2\right)+\frac{1}{6}e\log\left(4-x^2\right)\end{aligned}$$

Mathematica [A] time = 0.03, size = 58, normalized size = 1.14

$$\frac{1}{12}(-2\log(1-x)(d+e+f)+\log(2-x)(d+2e+4f)+2\log(x+1)(d-e+f)-\log(x+2)(d-2e+4f))$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4),x]
```

```
[Out] (-2*(d + e + f)*Log[1 - x] + (d + 2*e + 4*f)*Log[2 - x] + 2*(d - e + f)*Log
[1 + x] - (d - 2*e + 4*f)*Log[2 + x])/12
```

fricas [A] time = 1.02, size = 51, normalized size = 1.00

$$-\frac{1}{12}\left(d-2e+4f\right)\log(x+2)+\frac{1}{6}\left(d-e+f\right)\log(x+1)-\frac{1}{6}\left(d+e+f\right)\log(x-1)+\frac{1}{12}\left(d+2e+4f\right)\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")
```

```
[Out] -1/12*(d - 2*e + 4*f)*log(x + 2) + 1/6*(d - e + f)*log(x + 1) - 1/6*(d + e
+ f)*log(x - 1) + 1/12*(d + 2*e + 4*f)*log(x - 2)
```

giac [A] time = 0.31, size = 59, normalized size = 1.16

$$-\frac{1}{12}\left(d+4f-2e\right)\log(|x+2|)+\frac{1}{6}\left(d+f-e\right)\log(|x+1|)-\frac{1}{6}\left(d+f+e\right)\log(|x-1|)+\frac{1}{12}\left(d+4f+2e\right)\log(|x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")
```

```
[Out] -1/12*(d + 4*f - 2*e)*log(abs(x + 2)) + 1/6*(d + f - e)*log(abs(x + 1)) - 1
/6*(d + f + e)*log(abs(x - 1)) + 1/12*(d + 4*f + 2*e)*log(abs(x - 2))
```

maple [B] time = 0.01, size = 86, normalized size = 1.69

$$-\frac{d\ln(x+2)}{12}+\frac{d\ln(x-2)}{12}-\frac{d\ln(x-1)}{6}+\frac{d\ln(x+1)}{6}+\frac{e\ln(x+2)}{6}+\frac{e\ln(x-2)}{6}-\frac{e\ln(x-1)}{6}-\frac{e\ln(x+1)}{6}-\frac{f\ln(x}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 1/12*d*ln(x-2)+1/6*e*ln(x-2)+1/3*ln(x-2)*f+1/6*d*ln(x+1)-1/6*e*ln(x+1)+1/6*
ln(x+1)*f-1/6*d*ln(x-1)-1/6*e*ln(x-1)-1/6*ln(x-1)*f-1/12*d*ln(x+2)+1/6*e*ln
(x+2)-1/3*ln(x+2)*f
```

maxima [A] time = 1.12, size = 51, normalized size = 1.00

$$-\frac{1}{12}\left(d-2e+4f\right)\log\left(x+2\right)+\frac{1}{6}\left(d-e+f\right)\log\left(x+1\right)-\frac{1}{6}\left(d+e+f\right)\log\left(x-1\right)+\frac{1}{12}\left(d+2e+4f\right)\log\left(x-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")
```

```
[Out] -1/12*(d - 2*e + 4*f)*log(x + 2) + 1/6*(d - e + f)*log(x + 1) - 1/6*(d + e
+ f)*log(x - 1) + 1/12*(d + 2*e + 4*f)*log(x - 2)
```

mupad [B] time = 0.71, size = 63, normalized size = 1.24

$$\ln\left(x+1\right)\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}\right)-\ln\left(x-1\right)\left(\frac{d}{6}+\frac{e}{6}+\frac{f}{6}\right)+\ln\left(x-2\right)\left(\frac{d}{12}+\frac{e}{6}+\frac{f}{3}\right)-\ln\left(x+2\right)\left(\frac{d}{12}-\frac{e}{6}+\frac{f}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2)/(x^4 - 5*x^2 + 4),x)
```

```
[Out] log(x + 1)*(d/6 - e/6 + f/6) - log(x - 1)*(d/6 + e/6 + f/6) + log(x - 2)*(d
/12 + e/6 + f/3) - log(x + 2)*(d/12 - e/6 + f/3)
```

sympy [B] time = 110.12, size = 2195, normalized size = 43.04

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] -(d - 2*e + 4*f)*log(x + (-35*d**5*e + 51*d**5*(d - 2*e + 4*f)/2 - 820*d**4
*e*f + 90*d**4*f*(d - 2*e + 4*f) - 180*d**3*e**3 - 90*d**3*e**2*(d - 2*e +
4*f) - 4100*d**3*e*f**2 + 41*d**3*e*(d - 2*e + 4*f)**2 + 42*d**3*f**2*(d -
2*e + 4*f) - 15*d**3*(d - 2*e + 4*f)**3/2 - 432*d**2*e**2*f*(d - 2*e + 4*f)
 - 8000*d**2*e*f**3 + 240*d**2*e*f*(d - 2*e + 4*f)**2 - 240*d**2*f**3*(d -
2*e + 4*f) - 12*d**2*f*(d - 2*e + 4*f)**3 + 320*d*e**5 - 96*d*e**4*(d - 2*e
 + 4*f) + 720*d*e**3*f**2 - 80*d*e**3*(d - 2*e + 4*f)**2 - 1080*d*e**2*f**2
*(d - 2*e + 4*f) + 24*d*e**2*(d - 2*e + 4*f)**3 - 6400*d*e*f**4 + 492*d*e*f
**2*(d - 2*e + 4*f)**2 - 576*d*f**4*(d - 2*e + 4*f) + 30*d*f**2*(d - 2*e +
4*f)**3 + 512*e**5*f - 128*e**3*f*(d - 2*e + 4*f)**2 - 576*e**2*f**3*(d - 2
*e + 4*f) - 1472*e*f**5 + 320*e*f**3*(d - 2*e + 4*f)**2 - 480*f**5*(d - 2*e
 + 4*f) + 48*f**3*(d - 2*e + 4*f)**3)/(9*d**6 + 45*d**5*f - 160*d**4*e**2 -
 36*d**4*f**2 - 1312*d**3*e**2*f - 360*d**3*f**3 + 256*d**2*e**4 - 3840*d**
2*e**2*f**2 - 144*d**2*f**4 + 1280*d*e**4*f - 5248*d*e**2*f**3 + 720*d*f**5
 + 1024*e**4*f**2 - 2560*e**2*f**4 + 576*f**6))/12 + (d - e + f)*log(x + (-
35*d**5*e - 51*d**5*(d - e + f) - 820*d**4*e*f - 180*d**4*f*(d - e + f) - 1
80*d**3*e**3 + 180*d**3*e**2*(d - e + f) - 4100*d**3*e*f**2 + 164*d**3*e*(d
 - e + f)**2 - 84*d**3*f**2*(d - e + f) + 60*d**3*(d - e + f)**3 + 864*d**2
*e**2*f*(d - e + f) - 8000*d**2*e*f**3 + 960*d**2*e*f*(d - e + f)**2 + 480*
d**2*f**3*(d - e + f) + 96*d**2*f*(d - e + f)**3 + 320*d*e**5 + 192*d*e**4*
(d - e + f) + 720*d*e**3*f**2 - 320*d*e**3*(d - e + f)**2 + 2160*d*e**2*f**
2*(d - e + f) - 192*d*e**2*(d - e + f)**3 - 6400*d*e*f**4 + 1968*d*e*f**2*(
d - e + f)**2 + 1152*d*f**4*(d - e + f) - 240*d*f**2*(d - e + f)**3 + 512*e
```

```
**5*f - 512*e**3*f*(d - e + f)**2 + 1152*e**2*f**3*(d - e + f) - 1472*e*f**
5 + 1280*e*f**3*(d - e + f)**2 + 960*f**5*(d - e + f) - 384*f**3*(d - e + f
)**3)/(9*d**6 + 45*d**5*f - 160*d**4*e**2 - 36*d**4*f**2 - 1312*d**3*e**2*f
 - 360*d**3*f**3 + 256*d**2*e**4 - 3840*d**2*e**2*f**2 - 144*d**2*f**4 + 12
80*d*e**4*f - 5248*d*e**2*f**3 + 720*d*f**5 + 1024*e**4*f**2 - 2560*e**2*f*
*4 + 576*f**6))/6 - (d + e + f)*log(x + (-35*d**5*e + 51*d**5*(d + e + f) -
 820*d**4*e*f + 180*d**4*f*(d + e + f) - 180*d**3*e**3 - 180*d**3*e**2*(d +
 e + f) - 4100*d**3*e*f**2 + 164*d**3*e*(d + e + f)**2 + 84*d**3*f**2*(d +
e + f) - 60*d**3*(d + e + f)**3 - 864*d**2*e**2*f*(d + e + f) - 8000*d**2*e
*f**3 + 960*d**2*e*f*(d + e + f)**2 - 480*d**2*f**3*(d + e + f) - 96*d**2*f
*(d + e + f)**3 + 320*d*e**5 - 192*d*e**4*(d + e + f) + 720*d*e**3*f**2 - 3
20*d*e**3*(d + e + f)**2 - 2160*d*e**2*f**2*(d + e + f) + 192*d*e**2*(d + e
 + f)**3 - 6400*d*e*f**4 + 1968*d*e*f**2*(d + e + f)**2 - 1152*d*f**4*(d +
e + f) + 240*d*f**2*(d + e + f)**3 + 512*e**5*f - 512*e**3*f*(d + e + f)**2
 - 1152*e**2*f**3*(d + e + f) - 1472*e*f**5 + 1280*e*f**3*(d + e + f)**2 -
960*f**5*(d + e + f) + 384*f**3*(d + e + f)**3)/(9*d**6 + 45*d**5*f - 160*d
**4*e**2 - 36*d**4*f**2 - 1312*d**3*e**2*f - 360*d**3*f**3 + 256*d**2*e**4
- 3840*d**2*e**2*f**2 - 144*d**2*f**4 + 1280*d*e**4*f - 5248*d*e**2*f**3 +
720*d*f**5 + 1024*e**4*f**2 - 2560*e**2*f**4 + 576*f**6))/6 + (d + 2*e + 4*
f)*log(x + (-35*d**5*e - 51*d**5*(d + 2*e + 4*f)/2 - 820*d**4*e*f - 90*d**4
*f*(d + 2*e + 4*f) - 180*d**3*e**3 + 90*d**3*e**2*(d + 2*e + 4*f) - 4100*d*
*3*e*f**2 + 41*d**3*e*(d + 2*e + 4*f)**2 - 42*d**3*f**2*(d + 2*e + 4*f) + 1
5*d**3*(d + 2*e + 4*f)**3/2 + 432*d**2*e**2*f*(d + 2*e + 4*f) - 8000*d**2*e
*f**3 + 240*d**2*e*f*(d + 2*e + 4*f)**2 + 240*d**2*f**3*(d + 2*e + 4*f) + 1
2*d**2*f*(d + 2*e + 4*f)**3 + 320*d*e**5 + 96*d*e**4*(d + 2*e + 4*f) + 720*
d*e**3*f**2 - 80*d*e**3*(d + 2*e + 4*f)**2 + 1080*d*e**2*f**2*(d + 2*e + 4*
f) - 24*d*e**2*(d + 2*e + 4*f)**3 - 6400*d*e*f**4 + 492*d*e*f**2*(d + 2*e +
 4*f)**2 + 576*d*f**4*(d + 2*e + 4*f) - 30*d*f**2*(d + 2*e + 4*f)**3 + 512*
e**5*f - 128*e**3*f*(d + 2*e + 4*f)**2 + 576*e**2*f**3*(d + 2*e + 4*f) - 14
72*e*f**5 + 320*e*f**3*(d + 2*e + 4*f)**2 + 480*f**5*(d + 2*e + 4*f) - 48*f
**3*(d + 2*e + 4*f)**3)/(9*d**6 + 45*d**5*f - 160*d**4*e**2 - 36*d**4*f**2
- 1312*d**3*e**2*f - 360*d**3*f**3 + 256*d**2*e**4 - 3840*d**2*e**2*f**2 -
144*d**2*f**4 + 1280*d*e**4*f - 5248*d*e**2*f**3 + 720*d*f**5 + 1024*e**4*f
**2 - 2560*e**2*f**4 + 576*f**6))/12
```

3.12 $\int \frac{d+ex+fx^2+gx^3}{4-5x^2+x^4} dx$

Optimal. Leaf size=57

$$-\frac{1}{6}(d+4f)\tanh^{-1}\left(\frac{x}{2}\right)+\frac{1}{3}(d+f)\tanh^{-1}(x)-\frac{1}{6}(e+g)\log\left(1-x^2\right)+\frac{1}{6}(e+4g)\log\left(4-x^2\right)$$

```
[Out] -1/6*(d+4*f)*arctanh(1/2*x)+1/3*(d+f)*arctanh(x)-1/6*(e+g)*ln(-x^2+1)+1/6*(
e+4*g)*ln(-x^2+4)
```

Rubi [A] time = 0.07, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 6, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}} = 0.214$, Rules used = {1673, 1166, 207, 1247, 632, 31}

$$-\frac{1}{6}(d+4f)\tanh^{-1}\left(\frac{x}{2}\right)+\frac{1}{3}(d+f)\tanh^{-1}(x)-\frac{1}{6}(e+g)\log\left(1-x^2\right)+\frac{1}{6}(e+4g)\log\left(4-x^2\right)$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4),x]
```

```
[Out] -((d + 4*f)*ArcTanh[x/2])/6 + ((d + f)*ArcTanh[x])/3 - ((e + g)*Log[1 - x^2
])/6 + ((e + 4*g)*Log[4 - x^2])/6
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 632

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> W
ith[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/
2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x
], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a
*c, 0] && NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
```

```
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 && !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3}{4-5x^2+x^4}\,dx = \int \frac{d+fx^2}{4-5x^2+x^4}\,dx + \int \frac{x\left(e+gx^2\right)}{4-5x^2+x^4}\,dx$$
$$= \frac{1}{2}\text{Subst}\left(\int \frac{e+gx}{4-5x+x^2}\,dx, x, x^2\right) - \frac{1}{3}(d+f)\int \frac{1}{-1+x^2}\,dx + \frac{1}{3}(d+4f)\int \frac{1}{-4+x^2}$$
$$= -\frac{1}{6}(d+4f)\tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}(d+f)\tanh^{-1}(x) + \frac{1}{6}(-e-g)\,\text{Subst}\left(\int \frac{1}{-1+x}\,dx, x, x^2\right.$$
$$= -\frac{1}{6}(d+4f)\tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}(d+f)\tanh^{-1}(x) - \frac{1}{6}(e+g)\log\left(1-x^2\right) + \frac{1}{6}(e+4g)\,\text{log}$$

Mathematica [A] time = 0.03, size = 68, normalized size = 1.19

$$\frac{1}{12}(-2\log(1-x)(d+e+f+g)+\log(2-x)(d+2e+4f+8g)+2\log(x+1)(d-e+f-g)-\log(x+2)(d-2e+4f-8g))$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4),x]
```

```
[Out] (-2*(d + e + f + g)*Log[1 - x] + (d + 2*e + 4*f + 8*g)*Log[2 - x] + 2*(d -
e + f - g)*Log[1 + x] - (d - 2*e + 4*f - 8*g)*Log[2 + x])/12
```

fricas [A] time = 1.48, size = 61, normalized size = 1.07

$$-\frac{1}{12}\left(d-2e+4f-8g\right)\log\left(x+2\right)+\frac{1}{6}\left(d-e+f-g\right)\log\left(x+1\right)-\frac{1}{6}\left(d+e+f+g\right)\log\left(x-1\right)+\frac{1}{12}\left(d+2e+4\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")
```

```
[Out] -1/12*(d - 2*e + 4*f - 8*g)*log(x + 2) + 1/6*(d - e + f - g)*log(x + 1) - 1
/6*(d + e + f + g)*log(x - 1) + 1/12*(d + 2*e + 4*f + 8*g)*log(x - 2)
```

giac [A] time = 0.31, size = 69, normalized size = 1.21

$$-\frac{1}{12}\left(d+4f-8g-2e\right)\log\left(|x+2|\right)+\frac{1}{6}\left(d+f-g-e\right)\log\left(|x+1|\right)-\frac{1}{6}\left(d+f+g+e\right)\log\left(|x-1|\right)+\frac{1}{12}\left(d+4f\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")
```

```
[Out] -1/12*(d + 4*f - 8*g - 2*e)*log(abs(x + 2)) + 1/6*(d + f - g - e)*log(abs(x
 + 1)) - 1/6*(d + f + g + e)*log(abs(x - 1)) + 1/12*(d + 4*f + 8*g + 2*e)*l
og(abs(x - 2))
```

maple [B] time = 0.01, size = 114, normalized size = 2.00

$$-\frac{d\ln\left(x+2\right)}{12}+\frac{d\ln\left(x-2\right)}{12}-\frac{d\ln\left(x-1\right)}{6}+\frac{d\ln\left(x+1\right)}{6}+\frac{e\ln\left(x+2\right)}{6}+\frac{e\ln\left(x-2\right)}{6}-\frac{e\ln\left(x-1\right)}{6}-\frac{e\ln\left(x+1\right)}{6}-\frac{f\ln\left(x\right.}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

[Out] 1/12*d*ln(x-2)+1/6*e*ln(x-2)+1/3*f*ln(x-2)+2/3*ln(x-2)*g+1/6*d*ln(x+1)-1/6*
e*ln(x+1)+1/6*f*ln(x+1)-1/6*ln(x+1)*g-1/6*d*ln(x-1)-1/6*e*ln(x-1)-1/6*f*ln(
x-1)-1/6*ln(x-1)*g-1/12*d*ln(x+2)+1/6*e*ln(x+2)-1/3*f*ln(x+2)+2/3*ln(x+2)*g

maxima [A] time = 1.35, size = 61, normalized size = 1.07

$$-\frac{1}{12}\left(d-2e+4f-8g\right)\log\left(x+2\right)+\frac{1}{6}\left(d-e+f-g\right)\log\left(x+1\right)-\frac{1}{6}\left(d+e+f+g\right)\log\left(x-1\right)+\frac{1}{12}\left(d+2e+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")

[Out] -1/12*(d - 2*e + 4*f - 8*g)*log(x + 2) + 1/6*(d - e + f - g)*log(x + 1) - 1
/6*(d + e + f + g)*log(x - 1) + 1/12*(d + 2*e + 4*f + 8*g)*log(x - 2)

mupad [B] time = 0.74, size = 75, normalized size = 1.32

$$\ln\left(x+1\right)\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}-\frac{g}{6}\right)-\ln\left(x-1\right)\left(\frac{d}{6}+\frac{e}{6}+\frac{f}{6}+\frac{g}{6}\right)+\ln\left(x-2\right)\left(\frac{d}{12}+\frac{e}{6}+\frac{f}{3}+\frac{2g}{3}\right)-\ln\left(x+2\right)\left(\frac{d}{12}-\frac{e}{6}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3)/(x^4 - 5*x^2 + 4),x)

[Out] log(x + 1)*(d/6 - e/6 + f/6 - g/6) - log(x - 1)*(d/6 + e/6 + f/6 + g/6) + l
og(x - 2)*(d/12 + e/6 + f/3 + (2*g)/3) - log(x + 2)*(d/12 - e/6 + f/3 - (2*
g)/3)

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)

[Out] Timed out

3.13 $\int \frac{d+ex+fx^2+gx^3+hx^4}{4-5x^2+x^4} dx$

Optimal. Leaf size=64

$$-\frac{1}{6}\tanh^{-1}\left(\frac{x}{2}\right)(d+4f+16h)+\frac{1}{3}\tanh^{-1}(x)(d+f+h)-\frac{1}{6}(e+g)\log\left(1-x^2\right)+\frac{1}{6}(e+4g)\log\left(4-x^2\right)+hx$$

```
[Out] h*x-1/6*(d+4*f+16*h)*arctanh(1/2*x)+1/3*(d+f+h)*arctanh(x)-1/6*(e+g)*ln(-x^
2+1)+1/6*(e+4*g)*ln(-x^2+4)
```

Rubi [A] time = 0.15, antiderivative size = 64, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 7, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.212, Rules used = {1673, 1676, 1166, 207, 1247, 632, 31}

$$-\frac{1}{6}\tanh^{-1}\left(\frac{x}{2}\right)(d+4f+16h)+\frac{1}{3}\tanh^{-1}(x)(d+f+h)-\frac{1}{6}(e+g)\log\left(1-x^2\right)+\frac{1}{6}(e+4g)\log\left(4-x^2\right)+hx$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(4 - 5*x^2 + x^4),x]
```

```
[Out] h*x - ((d + 4*f + 16*h)*ArcTanh[x/2])/6 + ((d + f + h)*ArcTanh[x])/3 - ((e
+ g)*Log[1 - x^2])/6 + ((e + 4*g)*Log[4 - x^2])/6
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 632

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> W
ith[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/
2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x
], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a
*c, 0] && NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
```

```
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1676

```
Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> Int[ExpandInte
grand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1
```

Rubi steps

$$\begin{aligned}\int \frac{d+ex+fx^2+gx^3+hx^4}{4-5x^2+x^4}\,dx &= \int \frac{x\left(e+gx^2\right)}{4-5x^2+x^4}\,dx+\int \frac{d+fx^2+hx^4}{4-5x^2+x^4}\,dx\\ &= \frac{1}{2}\operatorname{Subst}\left(\int \frac{e+gx}{4-5x+x^2}\,dx,x,x^2\right)+\int \left(h+\frac{d-4h+(f+5h)x^2}{4-5x^2+x^4}\right)dx\\ &= hx+\frac{1}{6}(-e-g)\operatorname{Subst}\left(\int \frac{1}{-1+x}\,dx,x,x^2\right)+\frac{1}{6}(e+4g)\operatorname{Subst}\left(\int \frac{1}{-4+x}\,d\right.\\ &= hx-\frac{1}{6}(e+g)\log\left(1-x^2\right)+\frac{1}{6}(e+4g)\log\left(4-x^2\right)-\frac{1}{3}(d+f+h)\int \frac{1}{-1+}\\ &= hx-\frac{1}{6}(d+4f+16h)\tanh^{-1}\left(\frac{x}{2}\right)+\frac{1}{3}(d+f+h)\tanh^{-1}(x)-\frac{1}{6}(e+g)\log\end{aligned}$$

Mathematica [A] time = 0.05, size = 81, normalized size = 1.27

$$\frac{1}{12}(-2\log(1-x)(d+e+f+g+h)+\log(2-x)(d+2(e+2f+4g+8h))+2\log(x+1)(d-e+f-g+h)-\log(x+2)(d-2e+4f$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(4 - 5*x^2 + x^4),x]
```

```
[Out] (12*h*x - 2*(d + e + f + g + h)*Log[1 - x] + (d + 2*(e + 2*f + 4*g + 8*h))*
Log[2 - x] + 2*(d - e + f - g + h)*Log[1 + x] - (d - 2*e + 4*f - 8*g + 16*h
)*Log[2 + x])/12
```

fricas [A] time = 4.82, size = 72, normalized size = 1.12

$$hx-\frac{1}{12}\left(d-2e+4f-8g+16h\right)\log\left(x+2\right)+\frac{1}{6}\left(d-e+f-g+h\right)\log\left(x+1\right)-\frac{1}{6}\left(d+e+f+g+h\right)\log\left(x-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")
```

```
[Out] h*x - 1/12*(d - 2*e + 4*f - 8*g + 16*h)*log(x + 2) + 1/6*(d - e + f - g + h
)*log(x + 1) - 1/6*(d + e + f + g + h)*log(x - 1) + 1/12*(d + 2*e + 4*f + 8
*g + 16*h)*log(x - 2)
```

giac [A] time = 0.43, size = 80, normalized size = 1.25

$$hx-\frac{1}{12}\left(d+4f-8g+16h-2e\right)\log\left(|x+2|\right)+\frac{1}{6}\left(d+f-g+h-e\right)\log\left(|x+1|\right)-\frac{1}{6}\left(d+f+g+h+e\right)\log\left(|\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")
```

```
[Out] h*x - 1/12*(d + 4*f - 8*g + 16*h - 2*e)*log(abs(x + 2)) + 1/6*(d + f - g +
h - e)*log(abs(x + 1)) - 1/6*(d + f + g + h + e)*log(abs(x - 1)) + 1/12*(d
+ 4*f + 8*g + 16*h + 2*e)*log(abs(x - 2))
```

maple [B] time = 0.01, size = 145, normalized size = 2.27

$$-\frac{d\ln(x+2)}{12}+\frac{d\ln(x-2)}{12}-\frac{d\ln(x-1)}{6}+\frac{d\ln(x+1)}{6}+\frac{e\ln(x+2)}{6}+\frac{e\ln(x-2)}{6}-\frac{e\ln(x-1)}{6}-\frac{e\ln(x+1)}{6}-\frac{f\ln(x}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] h*x+1/12*d*ln(x-2)+1/6*e*ln(x-2)+1/3*f*ln(x-2)+2/3*g*ln(x-2)+4/3*ln(x-2)*h+
1/6*d*ln(x+1)-1/6*e*ln(x+1)+1/6*f*ln(x+1)-1/6*g*ln(x+1)+1/6*ln(x+1)*h-1/6*d
*ln(x-1)-1/6*e*ln(x-1)-1/6*f*ln(x-1)-1/6*g*ln(x-1)-1/6*ln(x-1)*h-1/12*d*ln(
x+2)+1/6*e*ln(x+2)-1/3*f*ln(x+2)+2/3*g*ln(x+2)-4/3*ln(x+2)*h
```

maxima [A] time = 1.24, size = 72, normalized size = 1.12

$$hx-\frac{1}{12}\left(d-2e+4f-8g+16h\right)\log(x+2)+\frac{1}{6}\left(d-e+f-g+h\right)\log(x+1)-\frac{1}{6}\left(d+e+f+g+h\right)\log(x-1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")
```

```
[Out] h*x - 1/12*(d - 2*e + 4*f - 8*g + 16*h)*log(x + 2) + 1/6*(d - e + f - g + h
)*log(x + 1) - 1/6*(d + e + f + g + h)*log(x - 1) + 1/12*(d + 2*e + 4*f + 8
*g + 16*h)*log(x - 2)
```

mupad [B] time = 0.81, size = 90, normalized size = 1.41

$$hx-\ln(x-1)\left(\frac{d}{6}+\frac{e}{6}+\frac{f}{6}+\frac{g}{6}+\frac{h}{6}\right)+\ln(x+1)\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}-\frac{g}{6}+\frac{h}{6}\right)+\ln(x-2)\left(\frac{d}{12}+\frac{e}{6}+\frac{f}{3}+\frac{2g}{3}+\frac{4h}{3}\right)-\ln$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^4 - 5*x^2 + 4),x)
```

```
[Out] h*x - log(x - 1)*(d/6 + e/6 + f/6 + g/6 + h/6) + log(x + 1)*(d/6 - e/6 + f/
6 - g/6 + h/6) + log(x - 2)*(d/12 + e/6 + f/3 + (2*g)/3 + (4*h)/3) - log(x
+ 2)*(d/12 - e/6 + f/3 - (2*g)/3 + (4*h)/3)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] Timed out
```

3.14 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{4-5x^2+x^4} dx$

Optimal. Leaf size=76

$$-\frac{1}{6}\tanh^{-1}\left(\frac{x}{2}\right)(d+4f+16h)+\frac{1}{3}\tanh^{-1}(x)(d+f+h)-\frac{1}{6}\log\left(1-x^2\right)(e+g+i)+\frac{1}{6}\log\left(4-x^2\right)(e+4g+16i)+hx+\frac{ix^2}{2}$$

[Out] h*x+1/2*i*x^2-1/6*(d+4*f+16*h)*arctanh(1/2*x)+1/3*(d+f+h)*arctanh(x)-1/6*(e+g+i)*ln(-x^2+1)+1/6*(e+4*g+16*i)*ln(-x^2+4)

Rubi [A] time = 0.19, antiderivative size = 76, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 8, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.210, Rules used = {1673, 1676, 1166, 207, 1663, 1657, 632, 31}

$$-\frac{1}{6}\tanh^{-1}\left(\frac{x}{2}\right)(d+4f+16h)+\frac{1}{3}\tanh^{-1}(x)(d+f+h)-\frac{1}{6}\log\left(1-x^2\right)(e+g+i)+\frac{1}{6}\log\left(4-x^2\right)(e+4g+16i)+hx+\frac{ix^2}{2}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(4 - 5*x^2 + x^4),x]

[Out] h*x + (i*x^2)/2 - ((d + 4*f + 16*h)*ArcTanh[x/2])/6 + ((d + f + h)*ArcTanh[x])/3 - ((e + g + i)*Log[1 - x^2])/6 + ((e + 4*g + 16*i)*Log[4 - x^2])/6

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 632

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> W
ith[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/
2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x
], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a
*c, 0] && NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
```

```
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1676

```
Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> Int[ExpandInte
grand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+14x^5}{4-5x^2+x^4}\,dx = \int \frac{x\left(e+gx^2+14x^4\right)}{4-5x^2+x^4}\,dx + \int \frac{d+fx^2+hx^4}{4-5x^2+x^4}\,dx$$

$$= \frac{1}{2}\operatorname{Subst}\left(\int \frac{e+gx+14x^2}{4-5x+x^2}\,dx, x, x^2\right) + \int \left(h + \frac{d-4h+(f+5h)x^2}{4-5x^2+x^4}\right) d$$

$$= hx + \frac{1}{2}\operatorname{Subst}\left(\int \left(14 - \frac{56-e-(70+g)x}{4-5x+x^2}\right) dx, x, x^2\right) + \int \frac{d-4h+(f}{4-5x^2}$$

$$= hx + 7x^2 - \frac{1}{2}\operatorname{Subst}\left(\int \frac{56-e-(70+g)x}{4-5x+x^2}\,dx, x, x^2\right) - \frac{1}{3}(d+f+h)\int$$

$$= hx + 7x^2 - \frac{1}{6}(d+4f+16h)\tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}(d+f+h)\tanh^{-1}(x) - \frac{1}{6}($$

$$= hx + 7x^2 - \frac{1}{6}(d+4f+16h)\tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}(d+f+h)\tanh^{-1}(x) - \frac{1}{6}($$

Mathematica [A] time = 0.06, size = 98, normalized size = 1.29

$$\frac{1}{12}\left(-2\log(1-x)(d+e+f+g+h+i) + \log(2-x)(d+2e+4(f+2g+4h+8i)) + 2\log(x+1)(d-e+f-g\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(4 - 5*x^2 + x^4),x]
```

```
[Out] (12*h*x + 6*i*x^2 - 2*(d + e + f + g + h + i)*Log[1 - x] + (d + 2*e + 4*(f
+ 2*g + 4*h + 8*i))*Log[2 - x] + 2*(d - e + f - g + h - i)*Log[1 + x] - (d
- 2*(e - 2*f + 4*g - 8*h + 16*i))*Log[2 + x])/12
```

fricas [A] time = 18.71, size = 88, normalized size = 1.16

$$\frac{1}{2}ix^2 + hx - \frac{1}{12}\left(d-2e+4f-8g+16h-32i\right)\log(x+2) + \frac{1}{6}\left(d-e+f-g+h-i\right)\log(x+1) - \frac{1}{6}\left(d+e+f+g\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="frica
s")
```

```
[Out] 1/2*i*x^2 + h*x - 1/12*(d - 2*e + 4*f - 8*g + 16*h - 32*i)*log(x + 2) + 1/6
*(d - e + f - g + h - i)*log(x + 1) - 1/6*(d + e + f + g + h + i)*log(x - 1
) + 1/12*(d + 2*e + 4*f + 8*g + 16*h + 32*i)*log(x - 2)
```

giac [A] time = 0.26, size = 96, normalized size = 1.26

$$\frac{1}{2}\,ix^2+hx-\frac{1}{12}\left(d+4\,f-8\,g+16\,h-32\,i-2\,e\right)\log\left(|x+2|\right)+\frac{1}{6}\left(d+f-g+h-i-e\right)\log\left(|x+1|\right)-\frac{1}{6}\left(d+f+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac"
)
```

```
[Out] 1/2*i*x^2 + h*x - 1/12*(d + 4*f - 8*g + 16*h - 32*i - 2*e)*log(abs(x + 2))
+ 1/6*(d + f - g + h - i - e)*log(abs(x + 1)) - 1/6*(d + f + g + h + i + e)
*log(abs(x - 1)) + 1/12*(d + 4*f + 8*g + 16*h + 32*i + 2*e)*log(abs(x - 2))
```

maple [B] time = 0.01, size = 179, normalized size = 2.36

$$\frac{i\,x^2}{2}-\frac{d\ln\left(x+2\right)}{12}+\frac{d\ln\left(x-2\right)}{12}-\frac{d\ln\left(x-1\right)}{6}+\frac{d\ln\left(x+1\right)}{6}+\frac{e\ln\left(x+2\right)}{6}+\frac{e\ln\left(x-2\right)}{6}-\frac{e\ln\left(x-1\right)}{6}-\frac{e\ln\left(x+1\right)}{6}-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 8/3*ln(x+2)*i-1/6*ln(x-1)*i-1/6*ln(x+1)*i+8/3*ln(x-2)*i-4/3*h*ln(x+2)-1/6*h
*ln(x-1)+1/6*h*ln(x+1)+4/3*h*ln(x-2)-1/6*g*ln(x-1)+2/3*g*ln(x+2)+2/3*g*ln(x
-2)-1/6*g*ln(x+1)-1/12*d*ln(x+2)+1/6*e*ln(x+2)-1/6*e*ln(x-1)-1/6*d*ln(x-1)-
1/6*e*ln(x+1)+1/6*d*ln(x+1)+1/12*d*ln(x-2)+1/6*e*ln(x-2)+1/3*f*ln(x-2)+1/6*
f*ln(x+1)-1/6*f*ln(x-1)-1/3*f*ln(x+2)+1/2*i*x^2+h*x
```

maxima [A] time = 1.25, size = 88, normalized size = 1.16

$$\frac{1}{2}\,ix^2+hx-\frac{1}{12}\left(d-2\,e+4\,f-8\,g+16\,h-32\,i\right)\log\left(x+2\right)+\frac{1}{6}\left(d-e+f-g+h-i\right)\log\left(x+1\right)-\frac{1}{6}\left(d+e+f\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxim
a")
```

```
[Out] 1/2*i*x^2 + h*x - 1/12*(d - 2*e + 4*f - 8*g + 16*h - 32*i)*log(x + 2) + 1/6
*(d - e + f - g + h - i)*log(x + 1) - 1/6*(d + e + f + g + h + i)*log(x - 1
) + 1/12*(d + 2*e + 4*f + 8*g + 16*h + 32*i)*log(x - 2)
```

mupad [B] time = 1.19, size = 108, normalized size = 1.42

$$h\,x+\frac{i\,x^2}{2}-\ln\left(x-1\right)\,\left(\frac{d}{6}+\frac{e}{6}+\frac{f}{6}+\frac{g}{6}+\frac{h}{6}+\frac{i}{6}\right)+\ln\left(x+1\right)\,\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}-\frac{g}{6}+\frac{h}{6}-\frac{i}{6}\right)+\ln\left(x-2\right)\,\left(\frac{d}{12}+\frac{e}{6}+\frac{f}{3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^4 - 5*x^2 + 4),x)
```

```
[Out] h*x + (i*x^2)/2 - log(x - 1)*(d/6 + e/6 + f/6 + g/6 + h/6 + i/6) + log(x +
1)*(d/6 - e/6 + f/6 - g/6 + h/6 - i/6) + log(x - 2)*(d/12 + e/6 + f/3 + (2*
g)/3 + (4*h)/3 + (8*i)/3) - log(x + 2)*(d/12 - e/6 + f/3 - (2*g)/3 + (4*h)/
3 - (8*i)/3)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] Timed out
```

3.15 $\int \frac{d+ex}{1+x^2+x^4}\,dx$

Optimal. Leaf size=92

$$-\frac{1}{4}d\log\left(x^2-x+1\right)+\frac{1}{4}d\log\left(x^2+x+1\right)-\frac{d\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{d\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{e\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{\sqrt{3}}$$

```
[Out] -1/4*d*ln(x^2-x+1)+1/4*d*ln(x^2+x+1)-1/6*d*arctan(1/3*(1-2*x)*3^(1/2))*3^(1
/2)+1/6*d*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/3*e*arctan(1/3*(2*x^2+1)*3^
(1/2))*3^(1/2)
```

Rubi [A] time = 0.08, antiderivative size = 92, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 8, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {1673, 12, 1094, 634, 618, 204, 628, 1107}

$$-\frac{1}{4}d\log\left(x^2-x+1\right)+\frac{1}{4}d\log\left(x^2+x+1\right)-\frac{d\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{d\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{e\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)/(1 + x^2 + x^4),x]
```

```
[Out] -(d*ArcTan[(1 - 2*x)/Sqrt[3]])/(2*Sqrt[3]) + (d*ArcTan[(1 + 2*x)/Sqrt[3]])/
(2*Sqrt[3]) + (e*ArcTan[(1 + 2*x^2)/Sqrt[3]])/Sqrt[3] - (d*Log[1 - x + x^2]
)/4 + (d*Log[1 + x + 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 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1094

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(-1), x_Symbol] :> With[{q = Rt[a/
c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int[(r - x)/(q - r*x
 + x^2), x], x] + Dist[1/(2*c*q*r), Int[(r + x)/(q + r*x + x^2), x], x]]] /
; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}\int \frac{d+ex}{1+x^2+x^4}\,dx &= \int \frac{d}{1+x^2+x^4}\,dx+\int \frac{ex}{1+x^2+x^4}\,dx\\ &= d\int \frac{1}{1+x^2+x^4}\,dx+e\int \frac{x}{1+x^2+x^4}\,dx\\ &= \frac{1}{2}d\int \frac{1-x}{1-x+x^2}\,dx+\frac{1}{2}d\int \frac{1+x}{1+x+x^2}\,dx+\frac{1}{2}e\,\text{Subst}\left(\int \frac{1}{1+x+x^2}\,dx,x,x^2\right)\\ &= \frac{1}{4}d\int \frac{1}{1-x+x^2}\,dx-\frac{1}{4}d\int \frac{-1+2x}{1-x+x^2}\,dx+\frac{1}{4}d\int \frac{1}{1+x+x^2}\,dx+\frac{1}{4}d\int \frac{1+2x}{1+x+x^2}\,dx-\\ &= \frac{e\tan^{-1}\left(\frac{1+2x^2}{\sqrt{3}}\right)}{\sqrt{3}}-\frac{1}{4}d\log\left(1-x+x^2\right)+\frac{1}{4}d\log\left(1+x+x^2\right)-\frac{1}{2}d\,\text{Subst}\left(\int \frac{1}{-3-x^2}\,dx,x\right.\\ &= -\frac{d\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{d\tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{e\tan^{-1}\left(\frac{1+2x^2}{\sqrt{3}}\right)}{\sqrt{3}}-\frac{1}{4}d\log\left(1-x+x^2\right)+\frac{1}{4}d\log\left(1+\right.\end{aligned}$$

Mathematica [C] time = 0.18, size = 98, normalized size = 1.07

$$\frac{1}{6}i\left(\sqrt{6-6i\sqrt{3}}\,d\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}-i\right)x\right)-\sqrt{6+6i\sqrt{3}}\,d\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}+i\right)x\right)+2i\sqrt{3}e\tan^{-1}\left(\frac{\sqrt{3}}{2x^2+1}\right)\right)$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x)/(1 + x^2 + x^4),x]
```

```
[Out] (I/6)*(Sqrt[6 - (6*I)*Sqrt[3]]*d*ArcTan[((-I + Sqrt[3])*x)/2] - Sqrt[6 + (6
*I)*Sqrt[3]]*d*ArcTan[((I + Sqrt[3])*x)/2] + (2*I)*Sqrt[3]*e*ArcTan[Sqrt[3]
/(1 + 2*x^2)])
```

fricas [A] time = 0.93, size = 65, normalized size = 0.71

$$\frac{1}{6}\sqrt{3}(d-2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)+\frac{1}{6}\sqrt{3}(d+2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{1}{4}d\log\left(x^2+x+1\right)-\frac{1}{4}d\log\left(\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4+x^2+1),x, algorithm="fricas")
```

```
[Out] 1/6*sqrt(3)*(d - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + 2*e)
*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*d*log(x^2 + x + 1) - 1/4*d*log(x^2 - x
 + 1)
```

giac [A] time = 0.38, size = 67, normalized size = 0.73

$$\frac{1}{6}\sqrt{3}(d-2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)+\frac{1}{6}\sqrt{3}(d+2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{1}{4}d\log\left(x^2+x+1\right)-\frac{1}{4}d\log\left(x^2 -\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4+x^2+1),x, algorithm="giac")
```

```
[Out] 1/6*sqrt(3)*(d - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + 2*e)
*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*d*log(x^2 + x + 1) - 1/4*d*log(x^2 - x
 + 1)
```

maple [A] time = 0.01, size = 92, normalized size = 1.00

$$\frac{\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{6}+\frac{\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{6}-\frac{d\ln\left(x^2-x+1\right)}{4}+\frac{d\ln\left(x^2+x+1\right)}{4}-\frac{\sqrt{3}\,e\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{3}+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)/(x^4+x^2+1),x)
```

```
[Out] 1/4*d*ln(x^2+x+1)+1/6*d*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)-1/3*3^(1/2)*arc
tan(1/3*(1+2*x)*3^(1/2))*e-1/4*d*ln(x^2-x+1)+1/6*3^(1/2)*arctan(1/3*(2*x-1)
*3^(1/2))*d+1/3*3^(1/2)*arctan(1/3*(2*x-1)*3^(1/2))*e
```

maxima [A] time = 2.21, size = 65, normalized size = 0.71

$$\frac{1}{6}\sqrt{3}(d-2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)+\frac{1}{6}\sqrt{3}(d+2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{1}{4}d\log\left(x^2+x+1\right)-\frac{1}{4}d\log\left(x^2 -\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4+x^2+1),x, algorithm="maxima")
```

```
[Out] 1/6*sqrt(3)*(d - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + 2*e)
*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*d*log(x^2 + x + 1) - 1/4*d*log(x^2 - x
 + 1)
```

mupad [B] time = 0.24, size = 118, normalized size = 1.28

$$-\ln\left(x-\frac{1}{2}-\frac{\sqrt{3}\,1\mathrm{i}}{2}\right)\left(\frac{d}{4}+\frac{\sqrt{3}\,d\,1\mathrm{i}}{12}+\frac{\sqrt{3}\,e\,1\mathrm{i}}{6}\right)+\ln\left(x+\frac{1}{2}-\frac{\sqrt{3}\,1\mathrm{i}}{2}\right)\left(\frac{d}{4}-\frac{\sqrt{3}\,d\,1\mathrm{i}}{12}+\frac{\sqrt{3}\,e\,1\mathrm{i}}{6}\right)+\ln\left(x-\frac{1}{2}+\frac{\sqrt{3}\,1}{2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x)/(x^2 + x^4 + 1),x)
```

```
[Out] log(x - (3^(1/2)*1i)/2 + 1/2)*(d/4 - (3^(1/2)*d*1i)/12 + (3^(1/2)*e*1i)/6)
- log(x - (3^(1/2)*1i)/2 - 1/2)*(d/4 + (3^(1/2)*d*1i)/12 + (3^(1/2)*e*1i)/6
) + log(x + (3^(1/2)*1i)/2 - 1/2)*((3^(1/2)*d*1i)/12 - d/4 + (3^(1/2)*e*1i)
/6) + log(x + (3^(1/2)*1i)/2 + 1/2)*(d/4 + (3^(1/2)*d*1i)/12 - (3^(1/2)*e*1
i)/6)
```

sympy [C] time = 2.89, size = 923, normalized size = 10.03

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x**4+x**2+1),x)
```

```
[Out] (-d/4 - sqrt(3)*I*(d + 2*e)/12)*log(x + (-7*d**4*e + 6*d**4*(-d/4 - sqrt(3)
*I*(d + 2*e)/12) - 15*d**2*e**3 - 18*d**2*e**2*(-d/4 - sqrt(3)*I*(d + 2*e)/
12) + 60*d**2*e*(-d/4 - sqrt(3)*I*(d + 2*e)/12)**2 + 72*d**2*(-d/4 - sqrt(3
)*I*(d + 2*e)/12)**3 + 4*e**5 + 24*e**4*(-d/4 - sqrt(3)*I*(d + 2*e)/12) + 4
8*e**3*(-d/4 - sqrt(3)*I*(d + 2*e)/12)**2 + 288*e**2*(-d/4 - sqrt(3)*I*(d +
 2*e)/12)**3)/(3*d**5 - 8*d**3*e**2 - 16*d*e**4)) + (-d/4 + sqrt(3)*I*(d +
2*e)/12)*log(x + (-7*d**4*e + 6*d**4*(-d/4 + sqrt(3)*I*(d + 2*e)/12) - 15*d
**2*e**3 - 18*d**2*e**2*(-d/4 + sqrt(3)*I*(d + 2*e)/12) + 60*d**2*e*(-d/4 +
 sqrt(3)*I*(d + 2*e)/12)**2 + 72*d**2*(-d/4 + sqrt(3)*I*(d + 2*e)/12)**3 +
4*e**5 + 24*e**4*(-d/4 + sqrt(3)*I*(d + 2*e)/12) + 48*e**3*(-d/4 + sqrt(3)*
I*(d + 2*e)/12)**2 + 288*e**2*(-d/4 + sqrt(3)*I*(d + 2*e)/12)**3)/(3*d**5 -
 8*d**3*e**2 - 16*d*e**4)) + (d/4 - sqrt(3)*I*(d - 2*e)/12)*log(x + (-7*d**
4*e + 6*d**4*(d/4 - sqrt(3)*I*(d - 2*e)/12) - 15*d**2*e**3 - 18*d**2*e**2*(
d/4 - sqrt(3)*I*(d - 2*e)/12) + 60*d**2*e*(d/4 - sqrt(3)*I*(d - 2*e)/12)**2
 + 72*d**2*(d/4 - sqrt(3)*I*(d - 2*e)/12)**3 + 4*e**5 + 24*e**4*(d/4 - sqrt
(3)*I*(d - 2*e)/12) + 48*e**3*(d/4 - sqrt(3)*I*(d - 2*e)/12)**2 + 288*e**2*
(d/4 - sqrt(3)*I*(d - 2*e)/12)**3)/(3*d**5 - 8*d**3*e**2 - 16*d*e**4)) + (d
/4 + sqrt(3)*I*(d - 2*e)/12)*log(x + (-7*d**4*e + 6*d**4*(d/4 + sqrt(3)*I*(
d - 2*e)/12) - 15*d**2*e**3 - 18*d**2*e**2*(d/4 + sqrt(3)*I*(d - 2*e)/12) +
 60*d**2*e*(d/4 + sqrt(3)*I*(d - 2*e)/12)**2 + 72*d**2*(d/4 + sqrt(3)*I*(d
- 2*e)/12)**3 + 4*e**5 + 24*e**4*(d/4 + sqrt(3)*I*(d - 2*e)/12) + 48*e**3*(
d/4 + sqrt(3)*I*(d - 2*e)/12)**2 + 288*e**2*(d/4 + sqrt(3)*I*(d - 2*e)/12)*
*3)/(3*d**5 - 8*d**3*e**2 - 16*d*e**4))
```

3.16 $\int \frac{d+ex+fx^2}{1+x^2+x^4}\,dx$

Optimal. Leaf size=104

$$-\frac{1}{4}(d-f)\log\left(x^2-x+1\right)+\frac{1}{4}(d-f)\log\left(x^2+x+1\right)-\frac{(d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(d+f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{e\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{\sqrt{3}}$$

```
[Out] -1/4*(d-f)*ln(x^2-x+1)+1/4*(d-f)*ln(x^2+x+1)-1/6*(d+f)*arctan(1/3*(1-2*x)*3
^(1/2))*3^(1/2)+1/6*(d+f)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/3*e*arctan(
1/3*(2*x^2+1)*3^(1/2))*3^(1/2)
```

Rubi [A] time = 0.08, antiderivative size = 104, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 8, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.381, Rules used = {1673, 1169, 634, 618, 204, 628, 12, 1107}

$$-\frac{1}{4}(d-f)\log\left(x^2-x+1\right)+\frac{1}{4}(d-f)\log\left(x^2+x+1\right)-\frac{(d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(d+f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{e\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)/(1 + x^2 + x^4),x]
```

```
[Out] -((d + f)*ArcTan[(1 - 2*x)/Sqrt[3]])/(2*Sqrt[3]) + ((d + f)*ArcTan[(1 + 2*x
)/Sqrt[3]])/(2*Sqrt[3]) + (e*ArcTan[(1 + 2*x^2)/Sqrt[3]])/Sqrt[3] - ((d - f
)*Log[1 - x + x^2])/4 + ((d - f)*Log[1 + x + 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 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$
\begin{aligned}
\int \frac{d+ex+fx^2}{1+x^2+x^4}\,dx &= \int \frac{ex}{1+x^2+x^4}\,dx + \int \frac{d+fx^2}{1+x^2+x^4}\,dx \\
&= \frac{1}{2}\int \frac{d-(d-f)x}{1-x+x^2}\,dx + \frac{1}{2}\int \frac{d+(d-f)x}{1+x+x^2}\,dx + e\int \frac{x}{1+x^2+x^4}\,dx \\
&= \frac{1}{2}e\,\text{Subst}\left(\int \frac{1}{1+x+x^2}\,dx, x, x^2\right) + \frac{1}{4}(d-f)\int \frac{1+2x}{1+x+x^2}\,dx + \frac{1}{4}(-d+f)\int \frac{-1+2x}{1-x+x} \\
&= -\frac{1}{4}(d-f)\log\left(1-x+x^2\right) + \frac{1}{4}(d-f)\log\left(1+x+x^2\right) - e\,\text{Subst}\left(\int \frac{1}{-3-x^2}\,dx, x, 1+ \right. \\
&= -\frac{(d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}} + \frac{(d+f)\tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{2\sqrt{3}} + \frac{e\tan^{-1}\left(\frac{1+2x^2}{\sqrt{3}}\right)}{\sqrt{3}} - \frac{1}{4}(d-f)\log\left(1-x+\right.
\end{aligned}
$$

Mathematica [C] time = 0.14, size = 121, normalized size = 1.16

$$
\frac{\left(2id+\left(\sqrt{3}-i\right)f\right)\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}-i\right)x\right)}{\sqrt{6+6i\sqrt{3}}}+\frac{\left(\left(\sqrt{3}+i\right)f-2id\right)\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}+i\right)x\right)}{\sqrt{6-6i\sqrt{3}}}-\frac{e\tan^{-1}\left(\frac{\sqrt{3}}{2x^2+1}\right)}{\sqrt{3}}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x + f*x^2)/(1 + x^2 + x^4),x]

[Out] (((2*I)*d + (-I + Sqrt[3])*f)*ArcTan[((-I + Sqrt[3])*x)/2])/Sqrt[6 + (6*I)*
Sqrt[3]] + (((-2*I)*d + (I + Sqrt[3])*f)*ArcTan[((I + Sqrt[3])*x)/2])/Sqrt[
6 - (6*I)*Sqrt[3]] - (e*ArcTan[Sqrt[3]/(1 + 2*x^2)])/Sqrt[3]
```

fricas [A] time = 1.00, size = 75, normalized size = 0.72

$$
\frac{1}{6}\sqrt{3}\left(d-2e+f\right)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)+\frac{1}{6}\sqrt{3}\left(d+2e+f\right)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{1}{4}\left(d-f\right)\log\left(x^2+x\right.
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="fricas")
```

```
[Out] 1/6*sqrt(3)*(d - 2*e + f)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d +
2*e + f)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*(d - f)*log(x^2 + x + 1) - 1/4
*(d - f)*log(x^2 - x + 1)
```

giac [**A**] time = 0.23, size = 77, normalized size = 0.74

$$\frac{1}{6}\sqrt{3}\left(d+f-2e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{6}\sqrt{3}\left(d+f+2e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x-1\right)\right)+\frac{1}{4}\left(d-f\right)\log\left(x^2+x+1\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="giac")
```

```
[Out] 1/6*sqrt(3)*(d + f - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d +
f + 2*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*(d - f)*log(x^2 + x + 1) - 1/4
*(d - f)*log(x^2 - x + 1)
```

maple [**A**] time = 0.00, size = 148, normalized size = 1.42

$$\frac{\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{6}+\frac{\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{6}-\frac{d\ln\left(x^2-x+1\right)}{4}+\frac{d\ln\left(x^2+x+1\right)}{4}-\frac{\sqrt{3}\,e\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{3}+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)/(x^4+x^2+1),x)
```

```
[Out] 1/4*d*ln(x^2+x+1)-1/4*ln(x^2+x+1)*f+1/6*3^(1/2)*d*arctan(1/3*(2*x+1)*3^(1/2
))-1/3*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))+1/6*3^(1/2)*arctan(1/3*(2*x+1)
*3^(1/2))*f+1/4*ln(x^2-x+1)*f-1/4*d*ln(x^2-x+1)+1/6*3^(1/2)*d*arctan(1/3*(2
*x-1)*3^(1/2))+1/3*3^(1/2)*e*arctan(1/3*(2*x-1)*3^(1/2))+1/6*3^(1/2)*arctan
(1/3*(2*x-1)*3^(1/2))*f
```

maxima [**A**] time = 2.58, size = 75, normalized size = 0.72

$$\frac{1}{6}\sqrt{3}\left(d-2e+f\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{6}\sqrt{3}\left(d+2e+f\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x-1\right)\right)+\frac{1}{4}\left(d-f\right)\log\left(x^2+x+1\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="maxima")
```

```
[Out] 1/6*sqrt(3)*(d - 2*e + f)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d +
2*e + f)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*(d - f)*log(x^2 + x + 1) - 1/4
*(d - f)*log(x^2 - x + 1)
```

mupad [**B**] time = 0.95, size = 159, normalized size = 1.53

$$-\ln\left(x-\frac{1}{2}-\frac{\sqrt{3}\,1\mathrm{i}}{2}\right)\left(\frac{d}{4}-\frac{f}{4}+\frac{\sqrt{3}\,d\,1\mathrm{i}}{12}+\frac{\sqrt{3}\,e\,1\mathrm{i}}{6}+\frac{\sqrt{3}\,f\,1\mathrm{i}}{12}\right)-\ln\left(x+\frac{1}{2}-\frac{\sqrt{3}\,1\mathrm{i}}{2}\right)\left(\frac{f}{4}-\frac{d}{4}+\frac{\sqrt{3}\,d\,1\mathrm{i}}{12}-\frac{\sqrt{3}\,e\,1\mathrm{i}}{6}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2)/(x^2 + x^4 + 1),x)
```

```
[Out] log(x + (3^(1/2)*1i)/2 - 1/2)*(f/4 - d/4 + (3^(1/2)*d*1i)/12 + (3^(1/2)*e*1
i)/6 + (3^(1/2)*f*1i)/12) - log(x - (3^(1/2)*1i)/2 + 1/2)*(f/4 - d/4 + (3^(
1/2)*d*1i)/12 - (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12) - log(x - (3^(1/2)*1i
)/2 - 1/2)*(d/4 - f/4 + (3^(1/2)*d*1i)/12 + (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1
i)/12) + log(x + (3^(1/2)*1i)/2 + 1/2)*(d/4 - f/4 + (3^(1/2)*d*1i)/12 - (3^
(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12)
```

<u>**sympy**</u> **[C]** time = 98.60, size = 3589, normalized size = 34.51

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(x**4+x**2+1),x)
```

```
[Out] (-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)*log(x + (-7*d**5*e + 6*d**5*(-d/4
 + f/4 - sqrt(3)*I*(d + 2*e + f)/12) + 25*d**4*e*f + 18*d**4*f*(-d/4 + f/4
- sqrt(3)*I*(d + 2*e + f)/12) - 15*d**3*e**3 - 18*d**3*e**2*(-d/4 + f/4 - s
qrt(3)*I*(d + 2*e + f)/12) - 25*d**3*e*f**2 + 60*d**3*e*(-d/4 + f/4 - sqrt(
3)*I*(d + 2*e + f)/12)**2 - 42*d**3*f**2*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e +
 f)/12) + 72*d**3*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**3 + 108*d**2*e
**2*f*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12) + 20*d**2*e*f**3 - 144*d**2
*e*f*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**2 - 12*d**2*f**3*(-d/4 + f/
4 - sqrt(3)*I*(d + 2*e + f)/12) - 144*d**2*f*(-d/4 + f/4 - sqrt(3)*I*(d + 2
*e + f)/12)**3 + 4*d*e**5 + 24*d*e**4*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)
/12) + 15*d*e**3*f**2 + 48*d*e**3*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)
**2 - 54*d*e**2*f**2*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12) + 288*d*e**2
*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**3 - 20*d*e*f**4 + 180*d*e*f**2*
(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**2 + 36*d*f**4*(-d/4 + f/4 - sqrt
(3)*I*(d + 2*e + f)/12) - 72*d*f**2*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/1
2)**3 - 8*e**5*f - 96*e**3*f*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**2 +
 36*e**2*f**3*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12) + 11*e*f**5 - 48*e*
f**3*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**2 - 6*f**5*(-d/4 + f/4 - sq
rt(3)*I*(d + 2*e + f)/12) + 144*f**3*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/
12)**3)/(3*d**6 - 3*d**5*f - 8*d**4*e**2 - 3*d**4*f**2 + 40*d**3*e**2*f + 6
*d**3*f**3 - 16*d**2*e**4 - 48*d**2*e**2*f**2 - 3*d**2*f**4 + 16*d*e**4*f +
 40*d*e**2*f**3 - 3*d*f**5 - 16*e**4*f**2 - 8*e**2*f**4 + 3*f**6)) + (-d/4
+ f/4 + sqrt(3)*I*(d + 2*e + f)/12)*log(x + (-7*d**5*e + 6*d**5*(-d/4 + f/4
 + sqrt(3)*I*(d + 2*e + f)/12) + 25*d**4*e*f + 18*d**4*f*(-d/4 + f/4 + sqrt
(3)*I*(d + 2*e + f)/12) - 15*d**3*e**3 - 18*d**3*e**2*(-d/4 + f/4 + sqrt(3)
*I*(d + 2*e + f)/12) - 25*d**3*e*f**2 + 60*d**3*e*(-d/4 + f/4 + sqrt(3)*I*(
d + 2*e + f)/12)**2 - 42*d**3*f**2*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12
) + 72*d**3*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12)**3 + 108*d**2*e**2*f*
(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12) + 20*d**2*e*f**3 - 144*d**2*e*f*(
-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12)**2 - 12*d**2*f**3*(-d/4 + f/4 + sq
rt(3)*I*(d + 2*e + f)/12) - 144*d**2*f*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f
)/12)**3 + 4*d*e**5 + 24*d*e**4*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12) +
 15*d*e**3*f**2 + 48*d*e**3*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12)**2 -
54*d*e**2*f**2*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12) + 288*d*e**2*(-d/4
 + f/4 + sqrt(3)*I*(d + 2*e + f)/12)**3 - 20*d*e*f**4 + 180*d*e*f**2*(-d/4
+ f/4 + sqrt(3)*I*(d + 2*e + f)/12)**2 + 36*d*f**4*(-d/4 + f/4 + sqrt(3)*I*
(d + 2*e + f)/12) - 72*d*f**2*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12)**3
- 8*e**5*f - 96*e**3*f*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12)**2 + 36*e*
*2*f**3*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12) + 11*e*f**5 - 48*e*f**3*(
-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12)**2 - 6*f**5*(-d/4 + f/4 + sqrt(3)*
I*(d + 2*e + f)/12) + 144*f**3*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12)**3
)/(3*d**6 - 3*d**5*f - 8*d**4*e**2 - 3*d**4*f**2 + 40*d**3*e**2*f + 6*d**3*
f**3 - 16*d**2*e**4 - 48*d**2*e**2*f**2 - 3*d**2*f**4 + 16*d*e**4*f + 40*d*
e**2*f**3 - 3*d*f**5 - 16*e**4*f**2 - 8*e**2*f**4 + 3*f**6)) + (d/4 - f/4 -
 sqrt(3)*I*(d - 2*e + f)/12)*log(x + (-7*d**5*e + 6*d**5*(d/4 - f/4 - sqrt(
3)*I*(d - 2*e + f)/12) + 25*d**4*e*f + 18*d**4*f*(d/4 - f/4 - sqrt(3)*I*(d
- 2*e + f)/12) - 15*d**3*e**3 - 18*d**3*e**2*(d/4 - f/4 - sqrt(3)*I*(d - 2*
e + f)/12) - 25*d**3*e*f**2 + 60*d**3*e*(d/4 - f/4 - sqrt(3)*I*(d - 2*e + f
)/12)**2 - 42*d**3*f**2*(d/4 - f/4 - sqrt(3)*I*(d - 2*e + f)/12) + 72*d**3*
(d/4 - f/4 - sqrt(3)*I*(d - 2*e + f)/12)**3 + 108*d**2*e**2*f*(d/4 - f/4 -
sqrt(3)*I*(d - 2*e + f)/12) + 20*d**2*e*f**3 - 144*d**2*e*f*(d/4 - f/4 - sq
rt(3)*I*(d - 2*e + f)/12)**2 - 12*d**2*f**3*(d/4 - f/4 - sqrt(3)*I*(d - 2*e
```

```
 + f)/12) - 144*d**2*f*(d/4 - f/4 - sqrt(3)*I*(d - 2*e + f)/12)**3 + 4*d*e*
*5 + 24*d*e**4*(d/4 - f/4 - sqrt(3)*I*(d - 2*e + f)/12) + 15*d*e**3*f**2 +
48*d*e**3*(d/4 - f/4 - sqrt(3)*I*(d - 2*e + f)/12)**2 - 54*d*e**2*f**2*(d/4
 - f/4 - sqrt(3)*I*(d - 2*e + f)/12) + 288*d*e**2*(d/4 - f/4 - sqrt(3)*I*(d
 - 2*e + f)/12)**3 - 20*d*e*f**4 + 180*d*e*f**2*(d/4 - f/4 - sqrt(3)*I*(d -
 2*e + f)/12)**2 + 36*d*f**4*(d/4 - f/4 - sqrt(3)*I*(d - 2*e + f)/12) - 72*
d*f**2*(d/4 - f/4 - sqrt(3)*I*(d - 2*e + f)/12)**3 - 8*e**5*f - 96*e**3*f*(
d/4 - f/4 - sqrt(3)*I*(d - 2*e + f)/12)**2 + 36*e**2*f**3*(d/4 - f/4 - sqrt
(3)*I*(d - 2*e + f)/12) + 11*e*f**5 - 48*e*f**3*(d/4 - f/4 - sqrt(3)*I*(d -
 2*e + f)/12)**2 - 6*f**5*(d/4 - f/4 - sqrt(3)*I*(d - 2*e + f)/12) + 144*f*
*3*(d/4 - f/4 - sqrt(3)*I*(d - 2*e + f)/12)**3)/(3*d**6 - 3*d**5*f - 8*d**4
*e**2 - 3*d**4*f**2 + 40*d**3*e**2*f + 6*d**3*f**3 - 16*d**2*e**4 - 48*d**2
*e**2*f**2 - 3*d**2*f**4 + 16*d*e**4*f + 40*d*e**2*f**3 - 3*d*f**5 - 16*e**
4*f**2 - 8*e**2*f**4 + 3*f**6)) + (d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12)*
log(x + (-7*d**5*e + 6*d**5*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12) + 25*d
**4*e*f + 18*d**4*f*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12) - 15*d**3*e**3
 - 18*d**3*e**2*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12) - 25*d**3*e*f**2 +
 60*d**3*e*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12)**2 - 42*d**3*f**2*(d/4
- f/4 + sqrt(3)*I*(d - 2*e + f)/12) + 72*d**3*(d/4 - f/4 + sqrt(3)*I*(d - 2
*e + f)/12)**3 + 108*d**2*e**2*f*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12) +
 20*d**2*e*f**3 - 144*d**2*e*f*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12)**2
- 12*d**2*f**3*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12) - 144*d**2*f*(d/4 -
 f/4 + sqrt(3)*I*(d - 2*e + f)/12)**3 + 4*d*e**5 + 24*d*e**4*(d/4 - f/4 + s
qrt(3)*I*(d - 2*e + f)/12) + 15*d*e**3*f**2 + 48*d*e**3*(d/4 - f/4 + sqrt(3
)*I*(d - 2*e + f)/12)**2 - 54*d*e**2*f**2*(d/4 - f/4 + sqrt(3)*I*(d - 2*e +
 f)/12) + 288*d*e**2*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12)**3 - 20*d*e*f
**4 + 180*d*e*f**2*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12)**2 + 36*d*f**4*
(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12) - 72*d*f**2*(d/4 - f/4 + sqrt(3)*I
*(d - 2*e + f)/12)**3 - 8*e**5*f - 96*e**3*f*(d/4 - f/4 + sqrt(3)*I*(d - 2*
e + f)/12)**2 + 36*e**2*f**3*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12) + 11*
e*f**5 - 48*e*f**3*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12)**2 - 6*f**5*(d/
4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12) + 144*f**3*(d/4 - f/4 + sqrt(3)*I*(d
- 2*e + f)/12)**3)/(3*d**6 - 3*d**5*f - 8*d**4*e**2 - 3*d**4*f**2 + 40*d**3
*e**2*f + 6*d**3*f**3 - 16*d**2*e**4 - 48*d**2*e**2*f**2 - 3*d**2*f**4 + 16
*d*e**4*f + 40*d*e**2*f**3 - 3*d*f**5 - 16*e**4*f**2 - 8*e**2*f**4 + 3*f**6
))
```

3.17 $\int \frac{d+ex+fx^2+gx^3}{1+x^2+x^4}\,dx$

Optimal. Leaf size=127

$$-\frac{1}{4}(d-f)\log\left(x^2-x+1\right)+\frac{1}{4}(d-f)\log\left(x^2+x+1\right)-\frac{(d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(d+f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(2e-g)\tan^{-1}}{2\sqrt{3}}$$

```
[Out] -1/4*(d-f)*ln(x^2-x+1)+1/4*(d-f)*ln(x^2+x+1)+1/4*g*ln(x^4+x^2+1)-1/6*(d+f)*
arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/6*(d+f)*arctan(1/3*(1+2*x)*3^(1/2))*3
^(1/2)+1/6*(2*e-g)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)
```

Rubi [A] time = 0.10, antiderivative size = 127, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 7, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.269, Rules used = {1673, 1169, 634, 618, 204, 628, 1247}

$$-\frac{1}{4}(d-f)\log\left(x^2-x+1\right)+\frac{1}{4}(d-f)\log\left(x^2+x+1\right)-\frac{(d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(d+f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(2e-g)\tan^{-1}}{2\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4),x]
```

```
[Out] -((d + f)*ArcTan[(1 - 2*x)/Sqrt[3]])/(2*Sqrt[3]) + ((d + f)*ArcTan[(1 + 2*x
)/Sqrt[3]])/(2*Sqrt[3]) + ((2*e - g)*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(2*Sqrt[3
]) - ((d - f)*Log[1 - x + x^2])/4 + ((d - f)*Log[1 + x + x^2])/4 + (g*Log[1
 + x^2 + x^4])/4
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
```

```
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$
\begin{aligned}
\int \frac{d+ex+fx^2+gx^3}{1+x^2+x^4}\,dx &= \int \frac{d+fx^2}{1+x^2+x^4}\,dx+\int \frac{x\left(e+gx^2\right)}{1+x^2+x^4}\,dx\\
&= \frac{1}{2}\int \frac{d-(d-f)x}{1-x+x^2}\,dx+\frac{1}{2}\int \frac{d+(d-f)x}{1+x+x^2}\,dx+\frac{1}{2}\text{Subst}\left(\int \frac{e+gx}{1+x+x^2}\,dx,x,x^2\right)\\
&= \frac{1}{4}(d-f)\int \frac{1+2x}{1+x+x^2}\,dx+\frac{1}{4}(-d+f)\int \frac{-1+2x}{1-x+x^2}\,dx+\frac{1}{4}(d+f)\int \frac{1}{1-x+x^2}\,dx\\
&= -\frac{1}{4}(d-f)\log\left(1-x+x^2\right)+\frac{1}{4}(d-f)\log\left(1+x+x^2\right)+\frac{1}{4}g\log\left(1+x^2+x^4\right)+\frac{1}{2}(-\\
&= -\frac{(d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(d+f)\tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(2e-g)\tan^{-1}\left(\frac{1+2x^2}{\sqrt{3}}\right)}{2\sqrt{3}}-\frac{1}{4}(d-f)\log
\end{aligned}
$$

Mathematica [C] time = 0.48, size = 150, normalized size = 1.18

$$\frac{2\left(\sqrt{2+2i\sqrt{3}}\,\left(\left(\sqrt{3}+i\right)f-2id\right)\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}+i\right)x\right)+(2g-4e)\tan^{-1}\left(\frac{\sqrt{3}}{2x^2+1}\right)+\sqrt{3}g\log\left(x^4+x^2+1\right)\right)+2\sqrt{}}{8\sqrt{3}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4),x]
```

```
[Out] (2*Sqrt[2 - (2*I)*Sqrt[3]]*((2*I)*d + (-I + Sqrt[3])*f)*ArcTan[((-I + Sqrt[
3])*x)/2] + 2*(Sqrt[2 + (2*I)*Sqrt[3]]*((-2*I)*d + (I + Sqrt[3])*f)*ArcTan[
((I + Sqrt[3])*x)/2] + (-4*e + 2*g)*ArcTan[Sqrt[3]/(1 + 2*x^2)] + Sqrt[3]*g
*Log[1 + x^2 + x^4]))/(8*Sqrt[3])
```

fricas [A] time = 1.30, size = 83, normalized size = 0.65

$$\frac{1}{6}\sqrt{3}\left(d-2e+f+g\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{6}\sqrt{3}\left(d+2e+f-g\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x-1\right)\right)+\frac{1}{4}\left(d-f+g\right)\log$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="fricas")
```

```
[Out] 1/6*sqrt(3)*(d - 2*e + f + g)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(
d + 2*e + f - g)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*(d - f + g)*log(x^2 +
x + 1) - 1/4*(d - f - g)*log(x^2 - x + 1)
```

giac [A] time = 0.29, size = 85, normalized size = 0.67

$$\frac{1}{6}\sqrt{3}\left(d+f+g-2e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{6}\sqrt{3}\left(d+f-g+2e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x-1\right)\right)+\frac{1}{4}\left(d-f+g\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="giac")
```

```
[Out] 1/6*sqrt(3)*(d + f + g - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(
d + f - g + 2*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*(d - f + g)*log(x^2 +
x + 1) - 1/4*(d - f - g)*log(x^2 - x + 1)
```

maple [A] time = 0.00, size = 204, normalized size = 1.61

$$\frac{\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{6}+\frac{\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{6}-\frac{d\ln\left(x^{2}-x+1\right)}{4}+\frac{d\ln\left(x^{2}+x+1\right)}{4}-\frac{\sqrt{3}\,e\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right.}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x)
```

```
[Out] 1/4*d*ln(x^2+x+1)-1/4*f*ln(x^2+x+1)+1/4*ln(x^2+x+1)*g+1/6*3^(1/2)*d*arctan(
1/3*(2*x+1)*3^(1/2))-1/3*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))+1/6*3^(1/2)*
f*arctan(1/3*(2*x+1)*3^(1/2))+1/6*3^(1/2)*arctan(1/3*(2*x+1)*3^(1/2))*g+1/4
*f*ln(x^2-x+1)-1/4*d*ln(x^2-x+1)+1/4*ln(x^2-x+1)*g+1/6*3^(1/2)*d*arctan(1/3
*(2*x-1)*3^(1/2))+1/3*3^(1/2)*e*arctan(1/3*(2*x-1)*3^(1/2))+1/6*3^(1/2)*f*a
rctan(1/3*(2*x-1)*3^(1/2))-1/6*3^(1/2)*arctan(1/3*(2*x-1)*3^(1/2))*g
```

maxima [A] time = 2.39, size = 83, normalized size = 0.65

$$\frac{1}{6}\sqrt{3}\left(d-2e+f+g\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{6}\sqrt{3}\left(d+2e+f-g\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x-1\right)\right)+\frac{1}{4}\left(d-f+g\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="maxima")
```

```
[Out] 1/6*sqrt(3)*(d - 2*e + f + g)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(
d + 2*e + f - g)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*(d - f + g)*log(x^2 +
x + 1) - 1/4*(d - f - g)*log(x^2 - x + 1)
```

mupad [B] time = 1.13, size = 199, normalized size = 1.57

$$-\ln\left(x-\frac{1}{2}-\frac{\sqrt{3}\,1\mathrm{i}}{2}\right)\left(\frac{d}{4}-\frac{f}{4}-\frac{g}{4}+\frac{\sqrt{3}\,d\,1\mathrm{i}}{12}+\frac{\sqrt{3}\,e\,1\mathrm{i}}{6}+\frac{\sqrt{3}\,f\,1\mathrm{i}}{12}-\frac{\sqrt{3}\,g\,1\mathrm{i}}{12}\right)-\ln\left(x+\frac{1}{2}-\frac{\sqrt{3}\,1\mathrm{i}}{2}\right)\left(\frac{f}{4}-\frac{d}{4}-\frac{g}{4}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3)/(x^2 + x^4 + 1),x)
```

```
[Out] log(x + (3^(1/2)*1i)/2 - 1/2)*(f/4 - d/4 + g/4 + (3^(1/2)*d*1i)/12 + (3^(1/
2)*e*1i)/6 + (3^(1/2)*f*1i)/12 - (3^(1/2)*g*1i)/12) - log(x - (3^(1/2)*1i)/
2 + 1/2)*(f/4 - d/4 - g/4 + (3^(1/2)*d*1i)/12 - (3^(1/2)*e*1i)/6 + (3^(1/2)
*f*1i)/12 + (3^(1/2)*g*1i)/12) - log(x - (3^(1/2)*1i)/2 - 1/2)*(d/4 - f/4 -
 g/4 + (3^(1/2)*d*1i)/12 + (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12 - (3^(1/2)*
g*1i)/12) + log(x + (3^(1/2)*1i)/2 + 1/2)*(d/4 - f/4 + g/4 + (3^(1/2)*d*1i)
/12 - (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12 + (3^(1/2)*g*1i)/12)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(x**4+x**2+1),x)
```

```
[Out] Timed out
```

3.18 $\int \frac{d+ex+fx^2+gx^3+hx^4}{1+x^2+x^4}\,dx$

Optimal. Leaf size=136

$$-\frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}}+\frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}}-\frac{1}{4}(d-f)\log\left(x^2-x+1\right)+\frac{1}{4}(d-f)\log\left(x^2+x+1\right)+\frac{(2}{}$$

```
[Out] h*x-1/4*(d-f)*ln(x^2-x+1)+1/4*(d-f)*ln(x^2+x+1)+1/4*g*ln(x^4+x^2+1)-1/6*(d+
f-2*h)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/6*(d+f-2*h)*arctan(1/3*(1+2*x)
*3^(1/2))*3^(1/2)+1/6*(2*e-g)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)
```

Rubi [A] time = 0.14, antiderivative size = 136, normalized size of antiderivative = 1.00, number of steps used = 17, number of rules used = 8, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.258, Rules used = {1673, 1676, 1169, 634, 618, 204, 628, 1247}

$$-\frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}}+\frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}}-\frac{1}{4}(d-f)\log\left(x^2-x+1\right)+\frac{1}{4}(d-f)\log\left(x^2+x+1\right)+\frac{(2}{}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4),x]
```

```
[Out] h*x - ((d + f - 2*h)*ArcTan[(1 - 2*x)/Sqrt[3]])/(2*Sqrt[3]) + ((d + f - 2*h
)*ArcTan[(1 + 2*x)/Sqrt[3]])/(2*Sqrt[3]) + ((2*e - g)*ArcTan[(1 + 2*x^2)/Sq
rt[3]])/(2*Sqrt[3]) - ((d - f)*Log[1 - x + x^2])/4 + ((d - f)*Log[1 + x + x
^2])/4 + (g*Log[1 + x^2 + x^4])/4
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
```

```
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1676

```
Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> Int[ExpandInte
grand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1
```

Rubi steps

$$\begin{aligned}
\int \frac{d+ex+fx^2+gx^3+hx^4}{1+x^2+x^4}\,dx &= \int \frac{x\left(e+gx^2\right)}{1+x^2+x^4}\,dx+\int \frac{d+fx^2+hx^4}{1+x^2+x^4}\,dx\\
&= \frac{1}{2}\operatorname{Subst}\left(\int \frac{e+gx}{1+x+x^2}\,dx,x,x^2\right)+\int \left(h+\frac{d-h+(f-h)x^2}{1+x^2+x^4}\right)dx\\
&= hx+\frac{1}{4}(2e-g)\operatorname{Subst}\left(\int \frac{1}{1+x+x^2}\,dx,x,x^2\right)+\frac{1}{4}g\operatorname{Subst}\left(\int \frac{1+2x}{1+x+x^2}\,dx,x\right.\\
&= hx+\frac{1}{4}g\log\left(1+x^2+x^4\right)+\frac{1}{2}\int \frac{d-h-(d-f)x}{1-x+x^2}\,dx+\frac{1}{2}\int \frac{d-h+(d-f)x}{1+x+x^2}\\
&= hx+\frac{(2e-g)\tan^{-1}\left(\frac{1+2x^2}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{1}{4}g\log\left(1+x^2+x^4\right)+\frac{1}{4}(d-f)\int \frac{1+2x}{1+x+x^2}\,d\\
&= hx+\frac{(2e-g)\tan^{-1}\left(\frac{1+2x^2}{\sqrt{3}}\right)}{2\sqrt{3}}-\frac{1}{4}(d-f)\log\left(1-x+x^2\right)+\frac{1}{4}(d-f)\log\left(1+x\right.\\
&= hx-\frac{(d+f-2h)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(d+f-2h)\tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(2e-g)\tan^{-1}\left(\right.}{2\sqrt{3}}
\end{aligned}$$

Mathematica [C] time = 0.60, size = 165, normalized size = 1.21

$$\frac{1}{24}\left(4\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}-i\right)x\right)\left(\left(\sqrt{3}+3i\right)d+\left(\sqrt{3}-3i\right)f-2\sqrt{3}h\right)+4\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}+i\right)x\right)\left(\left(\sqrt{3}-3i\right)d+\left(\sqrt{3}+\right.\right.\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4),x]
```

```
[Out] (24*h*x + 4*((3*I + Sqrt[3])*d + (-3*I + Sqrt[3])*f - 2*Sqrt[3]*h)*ArcTan[(
(-I + Sqrt[3])*x)/2] + 4*((-3*I + Sqrt[3])*d + (3*I + Sqrt[3])*f - 2*Sqrt[3
]*h)*ArcTan[((I + Sqrt[3])*x)/2] - 8*Sqrt[3]*e*ArcTan[Sqrt[3]/(1 + 2*x^2)]
+ 4*Sqrt[3]*g*ArcTan[Sqrt[3]/(1 + 2*x^2)] + 6*g*Log[1 + x^2 + x^4])/24
```

fricas [A] time = 4.56, size = 92, normalized size = 0.68

$$\frac{1}{6}\sqrt{3}\left(d-2e+f+g-2h\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{6}\sqrt{3}\left(d+2e+f-g-2h\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x-1\right)\right)+hx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="fricas")
```

```
[Out] 1/6*sqrt(3)*(d - 2*e + f + g - 2*h)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqr
t(3)*(d + 2*e + f - g - 2*h)*arctan(1/3*sqrt(3)*(2*x - 1)) + h*x + 1/4*(d -
 f + g)*log(x^2 + x + 1) - 1/4*(d - f - g)*log(x^2 - x + 1)
```

giac [A] time = 0.30, size = 94, normalized size = 0.69

$$\frac{1}{6}\sqrt{3}\left(d+f+g-2h-2e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{6}\sqrt{3}\left(d+f-g-2h+2e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x-1\right)\right)+hx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="giac")
```

```
[Out] 1/6*sqrt(3)*(d + f + g - 2*h - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqr
t(3)*(d + f - g - 2*h + 2*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + h*x + 1/4*(d -
 f + g)*log(x^2 + x + 1) - 1/4*(d - f - g)*log(x^2 - x + 1)
```

maple [B] time = 0.01, size = 241, normalized size = 1.77

$$\frac{\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{6}+\frac{\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{6}-\frac{d\ln\left(x^{2}-x+1\right)}{4}+\frac{d\ln\left(x^{2}+x+1\right)}{4}-\frac{\sqrt{3}\,e\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x)
```

```
[Out] h*x+1/4*d*ln(x^2+x+1)-1/4*f*ln(x^2+x+1)+1/4*g*ln(x^2+x+1)+1/6*3^(1/2)*d*arc
tan(1/3*(2*x+1)*3^(1/2))-1/3*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))+1/6*3^(1
/2)*f*arctan(1/3*(2*x+1)*3^(1/2))+1/6*3^(1/2)*g*arctan(1/3*(2*x+1)*3^(1/2))
-1/3*3^(1/2)*arctan(1/3*(2*x+1)*3^(1/2))*h+1/4*f*ln(x^2-x+1)-1/4*d*ln(x^2-x
+1)+1/4*g*ln(x^2-x+1)+1/6*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+1/3*3^(1/2)
*e*arctan(1/3*(2*x-1)*3^(1/2))+1/6*3^(1/2)*f*arctan(1/3*(2*x-1)*3^(1/2))-1/
6*3^(1/2)*g*arctan(1/3*(2*x-1)*3^(1/2))-1/3*3^(1/2)*arctan(1/3*(2*x-1)*3^(1
/2))*h
```

maxima [A] time = 2.62, size = 92, normalized size = 0.68

$$\frac{1}{6}\sqrt{3}\left(d-2e+f+g-2h\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{6}\sqrt{3}\left(d+2e+f-g-2h\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x-1\right)\right)+hx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="maxima")
```

```
[Out] 1/6*sqrt(3)*(d - 2*e + f + g - 2*h)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqr
t(3)*(d + 2*e + f - g - 2*h)*arctan(1/3*sqrt(3)*(2*x - 1)) + h*x + 1/4*(d -
 f + g)*log(x^2 + x + 1) - 1/4*(d - f - g)*log(x^2 - x + 1)
```

mupad [B] time = 6.11, size = 1209, normalized size = 8.89

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^2 + x^4 + 1),x)
```

```
[Out] log(d*f*9i - d*e*6i + d*g*3i - d*h*3i + e*h*6i + f*h*3i - g*h*3i - 3*3^(1/2
)*d^2 - d^2*x*6i - f^2*x*3i - d^2*3i - f^2*6i + 2*3^(1/2)*d*e + 3*3^(1/2)*d
*f - 3^(1/2)*d*g - 4*3^(1/2)*e*f + 3*3^(1/2)*d*h + 2*3^(1/2)*e*h + 2*3^(1/2
)*f*g - 3*3^(1/2)*f*h - 3^(1/2)*g*h + d*f*x*9i - e*f*x*6i + d*h*x*3i + e*h*
x*6i + f*g*x*3i - f*h*x*3i - g*h*x*3i + 3*3^(1/2)*f^2*x - 3*3^(1/2)*d*f*x -
 2*3^(1/2)*d*g*x - 2*3^(1/2)*e*f*x + 3*3^(1/2)*d*h*x - 2*3^(1/2)*e*h*x + 3^
(1/2)*f*g*x - 3*3^(1/2)*f*h*x + 3^(1/2)*g*h*x + 4*3^(1/2)*d*e*x)*(d/4 - f/4
 + g/4 - (3^(1/2)*d*1i)/12 + (3^(1/2)*e*1i)/6 - (3^(1/2)*f*1i)/12 - (3^(1/2
)*g*1i)/12 + (3^(1/2)*h*1i)/6) - log(d*g*3i - d*f*9i - d*e*6i + d*h*3i + e*
h*6i - f*h*3i - g*h*3i - 3*3^(1/2)*d^2 - d^2*x*6i - f^2*x*3i + d^2*3i + f^2
*6i - 2*3^(1/2)*d*e + 3*3^(1/2)*d*f + 3^(1/2)*d*g + 4*3^(1/2)*e*f + 3*3^(1/
2)*d*h - 2*3^(1/2)*e*h - 2*3^(1/2)*f*g - 3*3^(1/2)*f*h + 3^(1/2)*g*h + d*f*
x*9i + e*f*x*6i + d*h*x*3i - e*h*x*6i - f*g*x*3i - f*h*x*3i + g*h*x*3i - 3*
3^(1/2)*f^2*x + 3*3^(1/2)*d*f*x - 2*3^(1/2)*d*g*x - 2*3^(1/2)*e*f*x - 3*3^(
1/2)*d*h*x - 2*3^(1/2)*e*h*x + 3^(1/2)*f*g*x + 3*3^(1/2)*f*h*x + 3^(1/2)*g*
h*x + 4*3^(1/2)*d*e*x)*(d/4 - f/4 - g/4 + (3^(1/2)*d*1i)/12 + (3^(1/2)*e*1i
)/6 + (3^(1/2)*f*1i)/12 - (3^(1/2)*g*1i)/12 - (3^(1/2)*h*1i)/6) + log(d*f*9
i - d*e*6i + d*g*3i - d*h*3i + e*h*6i + f*h*3i - g*h*3i + 3*3^(1/2)*d^2 - d
^2*x*6i - f^2*x*3i - d^2*3i - f^2*6i - 2*3^(1/2)*d*e - 3*3^(1/2)*d*f + 3^(1
/2)*d*g + 4*3^(1/2)*e*f - 3*3^(1/2)*d*h - 2*3^(1/2)*e*h - 2*3^(1/2)*f*g + 3
*3^(1/2)*f*h + 3^(1/2)*g*h + d*f*x*9i - e*f*x*6i + d*h*x*3i + e*h*x*6i + f*
g*x*3i - f*h*x*3i - g*h*x*3i - 3*3^(1/2)*f^2*x + 3*3^(1/2)*d*f*x + 2*3^(1/2
)*d*g*x + 2*3^(1/2)*e*f*x - 3*3^(1/2)*d*h*x + 2*3^(1/2)*e*h*x - 3^(1/2)*f*g
*x + 3*3^(1/2)*f*h*x - 3^(1/2)*g*h*x - 4*3^(1/2)*d*e*x)*(d/4 - f/4 + g/4 +
(3^(1/2)*d*1i)/12 - (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12 + (3^(1/2)*g*1i)/1
2 - (3^(1/2)*h*1i)/6) + log(d*g*3i - d*f*9i - d*e*6i + d*h*3i + e*h*6i - f*
h*3i - g*h*3i + 3*3^(1/2)*d^2 - d^2*x*6i - f^2*x*3i + d^2*3i + f^2*6i + 2*3
^(1/2)*d*e - 3*3^(1/2)*d*f - 3^(1/2)*d*g - 4*3^(1/2)*e*f - 3*3^(1/2)*d*h +
2*3^(1/2)*e*h + 2*3^(1/2)*f*g + 3*3^(1/2)*f*h - 3^(1/2)*g*h + d*f*x*9i + e*
f*x*6i + d*h*x*3i - e*h*x*6i - f*g*x*3i - f*h*x*3i + g*h*x*3i + 3*3^(1/2)*f
^2*x - 3*3^(1/2)*d*f*x + 2*3^(1/2)*d*g*x + 2*3^(1/2)*e*f*x + 3*3^(1/2)*d*h*
x + 2*3^(1/2)*e*h*x - 3^(1/2)*f*g*x - 3*3^(1/2)*f*h*x - 3^(1/2)*g*h*x - 4*3
^(1/2)*d*e*x)*(f/4 - d/4 + g/4 + (3^(1/2)*d*1i)/12 + (3^(1/2)*e*1i)/6 + (3^
(1/2)*f*1i)/12 - (3^(1/2)*g*1i)/12 - (3^(1/2)*h*1i)/6) + h*x
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(x**4+x**2+1),x)
```

```
[Out] Timed out
```

3.19 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{1+x^2+x^4}\,dx$

Optimal. Leaf size=151

$$-\frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}}+\frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}}-\frac{1}{4}(d-f)\log\left(x^2-x+1\right)+\frac{1}{4}(d-f)\log\left(x^2+x+1\right)+\frac{\text{ta}}{}$$

```
[Out] h*x+1/2*i*x^2-1/4*(d-f)*ln(x^2-x+1)+1/4*(d-f)*ln(x^2+x+1)+1/4*(g-i)*ln(x^4+
x^2+1)-1/6*(d+f-2*h)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/6*(d+f-2*h)*arct
an(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/6*(2*e-g-i)*arctan(1/3*(2*x^2+1)*3^(1/2))
*3^(1/2)
```

Rubi [A] time = 0.18, antiderivative size = 151, normalized size of antiderivative = 1.00, number of steps used = 19, number of rules used = 9, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {1673, 1676, 1169, 634, 618, 204, 628, 1663, 1657}

$$-\frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}}+\frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}}-\frac{1}{4}(d-f)\log\left(x^2-x+1\right)+\frac{1}{4}(d-f)\log\left(x^2+x+1\right)+\frac{\text{ta}}{}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4),x]
```

```
[Out] h*x + (i*x^2)/2 - ((d + f - 2*h)*ArcTan[(1 - 2*x)/Sqrt[3]])/(2*Sqrt[3]) + (
(d + f - 2*h)*ArcTan[(1 + 2*x)/Sqrt[3]])/(2*Sqrt[3]) + ((2*e - g - i)*ArcTa
n[(1 + 2*x^2)/Sqrt[3]])/(2*Sqrt[3]) - ((d - f)*Log[1 - x + x^2])/4 + ((d -
f)*Log[1 + x + x^2])/4 + ((g - i)*Log[1 + x^2 + x^4])/4
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
```

```
(d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 && !PolyQ[Pq, x^2]
```

Rule 1676

```
Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> Int[ExpandInte
grand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+19x^5}{1+x^2+x^4}\,dx = \int \frac{x\left(e+gx^2+19x^4\right)}{1+x^2+x^4}\,dx + \int \frac{d+fx^2+hx^4}{1+x^2+x^4}\,dx$$

$$= \frac{1}{2}\text{Subst}\left(\int \frac{e+gx+19x^2}{1+x+x^2}\,dx, x, x^2\right) + \int \left(h+\frac{d-h+(f-h)x^2}{1+x^2+x^4}\right)dx$$

$$= hx + \frac{1}{2}\text{Subst}\left(\int \left(19-\frac{19-e+(19-g)x}{1+x+x^2}\right)dx, x, x^2\right) + \int \frac{d-h+(f-}{1+x^2+}$$

$$= hx + \frac{19x^2}{2} + \frac{1}{2}\int \frac{d-h-(d-f)x}{1-x+x^2}\,dx + \frac{1}{2}\int \frac{d-h+(d-f)x}{1+x+x^2}\,dx - \frac{1}{2}\text{S}$$

$$= hx + \frac{19x^2}{2} + \frac{1}{4}(d-f)\int \frac{1+2x}{1+x+x^2}\,dx + \frac{1}{4}(-d+f)\int \frac{-1+2x}{1-x+x^2}\,dx -$$

$$= hx + \frac{19x^2}{2} - \frac{1}{4}(d-f)\log\left(1-x+x^2\right) + \frac{1}{4}(d-f)\log\left(1+x+x^2\right) - \frac{1}{4}($$

$$= hx + \frac{19x^2}{2} - \frac{(d+f-2h)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}} + \frac{(d+f-2h)\tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{2\sqrt{3}} - \frac{(}{}$$

Mathematica [C] time = 0.58, size = 187, normalized size = 1.24

$$\frac{1}{12}\left(\left(1+i\sqrt{3}\right)\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}-i\right)x\right)\left(2\sqrt{3}d-\left(\sqrt{3}+3i\right)f-\left(\sqrt{3}-3i\right)h\right)+\left(\sqrt{3}+i\right)\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}+i\right)x\right)\left(-2i\right.\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4),x]
```

```
[Out] (6*x*(2*h + i*x) + (1 + I*Sqrt[3])*(2*Sqrt[3]*d - (3*I + Sqrt[3])*f - (-3*I
 + Sqrt[3])*h)*ArcTan[((-I + Sqrt[3])*x)/2] + (I + Sqrt[3])*((-2*I)*Sqrt[3]
*d + (3 + I*Sqrt[3])*f + I*(3*I + Sqrt[3])*h)*ArcTan[((I + Sqrt[3])*x)/2] -
 2*Sqrt[3]*(2*e - g - i)*ArcTan[Sqrt[3]/(1 + 2*x^2)] + 3*(g - i)*Log[1 + x^
2 + x^4])/12
```

fricas [A] time = 17.27, size = 106, normalized size = 0.70

$$\frac{1}{2}\,ix^2+\frac{1}{6}\,\sqrt{3}\left(d-2\,e+f+g-2\,h+i\right)\arctan\left(\frac{1}{3}\,\sqrt{3}\,(2\,x+1)\right)+\frac{1}{6}\,\sqrt{3}\left(d+2\,e+f-g-2\,h-i\right)\arctan\left(\frac{1}{3}\,\sqrt{3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="fricas"
)
```

```
[Out] 1/2*i*x^2 + 1/6*sqrt(3)*(d - 2*e + f + g - 2*h + i)*arctan(1/3*sqrt(3)*(2*x
 + 1)) + 1/6*sqrt(3)*(d + 2*e + f - g - 2*h - i)*arctan(1/3*sqrt(3)*(2*x -
1)) + h*x + 1/4*(d - f + g - i)*log(x^2 + x + 1) - 1/4*(d - f - g + i)*log(
x^2 - x + 1)
```

giac [A] time = 0.31, size = 108, normalized size = 0.72

$$\frac{1}{2}\,ix^2+\frac{1}{6}\,\sqrt{3}\left(d+f+g-2\,h+i-2\,e\right)\arctan\left(\frac{1}{3}\,\sqrt{3}\,(2\,x+1)\right)+\frac{1}{6}\,\sqrt{3}\left(d+f-g-2\,h-i+2\,e\right)\arctan\left(\frac{1}{3}\,\sqrt{3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="giac")
```

```
[Out] 1/2*i*x^2 + 1/6*sqrt(3)*(d + f + g - 2*h + i - 2*e)*arctan(1/3*sqrt(3)*(2*x
 + 1)) + 1/6*sqrt(3)*(d + f - g - 2*h - i + 2*e)*arctan(1/3*sqrt(3)*(2*x -
1)) + h*x + 1/4*(d - f + g - i)*log(x^2 + x + 1) - 1/4*(d - f - g + i)*log(
x^2 - x + 1)
```

maple [B] time = 0.01, size = 303, normalized size = 2.01

$$\frac{i\,x^2}{2}+\frac{\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{6}+\frac{\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{6}-\frac{d\ln\left(x^2-x+1\right)}{4}+\frac{d\ln\left(x^2+x+1\right)}{4}-\frac{\sqrt{3}\,e\arctan\left(\frac{(2x}{}\right.}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x)
```

```
[Out] 1/2*i*x^2+h*x+1/4*d*ln(x^2+x+1)-1/4*f*ln(x^2+x+1)+1/4*g*ln(x^2+x+1)-1/4*ln(
x^2+x+1)*i+1/6*3^(1/2)*d*arctan(1/3*(2*x+1)*3^(1/2))-1/3*3^(1/2)*e*arctan(1
/3*(2*x+1)*3^(1/2))+1/6*3^(1/2)*f*arctan(1/3*(2*x+1)*3^(1/2))+1/6*3^(1/2)*g
*arctan(1/3*(2*x+1)*3^(1/2))-1/3*3^(1/2)*h*arctan(1/3*(2*x+1)*3^(1/2))+1/6*
3^(1/2)*arctan(1/3*(2*x+1)*3^(1/2))*i+1/4*g*ln(x^2-x+1)-1/4*ln(x^2-x+1)*i+1
/4*f*ln(x^2-x+1)-1/4*d*ln(x^2-x+1)+1/6*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2)
)+1/3*3^(1/2)*e*arctan(1/3*(2*x-1)*3^(1/2))+1/6*3^(1/2)*f*arctan(1/3*(2*x-1
)*3^(1/2))-1/6*3^(1/2)*g*arctan(1/3*(2*x-1)*3^(1/2))-1/3*3^(1/2)*h*arctan(1
/3*(2*x-1)*3^(1/2))-1/6*3^(1/2)*arctan(1/3*(2*x-1)*3^(1/2))*i
```

maxima [A] time = 2.37, size = 106, normalized size = 0.70

$$\frac{1}{2}\,ix^2+\frac{1}{6}\,\sqrt{3}\left(d-2\,e+f+g-2\,h+i\right)\arctan\left(\frac{1}{3}\,\sqrt{3}\,(2\,x+1)\right)+\frac{1}{6}\,\sqrt{3}\left(d+2\,e+f-g-2\,h-i\right)\arctan\left(\frac{1}{3}\,\sqrt{3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="maxima"
)
```

```
[Out] 1/2*i*x^2 + 1/6*sqrt(3)*(d - 2*e + f + g - 2*h + i)*arctan(1/3*sqrt(3)*(2*x
 + 1)) + 1/6*sqrt(3)*(d + 2*e + f - g - 2*h - i)*arctan(1/3*sqrt(3)*(2*x -
1)) + h*x + 1/4*(d - f + g - i)*log(x^2 + x + 1) - 1/4*(d - f - g + i)*log(
x^2 - x + 1)
```

mupad [B] time = 7.80, size = 1509, normalized size = 9.99

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^2 + x^4 + 1),x)
```

```
[Out] h*x - log(d*g*3i - d*f*9i - d*e*6i + d*h*3i + d*i*3i + e*h*6i - f*h*3i - g*
h*3i - h*i*3i - 3*3^(1/2)*d^2 - d^2*x*6i - f^2*x*3i + d^2*3i + f^2*6i - 2*3
^(1/2)*d*e + 3*3^(1/2)*d*f + 3^(1/2)*d*g + 4*3^(1/2)*e*f + 3*3^(1/2)*d*h +
3^(1/2)*d*i - 2*3^(1/2)*e*h - 2*3^(1/2)*f*g - 3*3^(1/2)*f*h - 2*3^(1/2)*f*i
 + 3^(1/2)*g*h + 3^(1/2)*h*i + d*f*x*9i + e*f*x*6i + d*h*x*3i - e*h*x*6i -
f*g*x*3i - f*h*x*3i - f*i*x*3i + g*h*x*3i + h*i*x*3i - 3*3^(1/2)*f^2*x + 3*
3^(1/2)*d*f*x - 2*3^(1/2)*d*g*x - 2*3^(1/2)*e*f*x - 3*3^(1/2)*d*h*x - 2*3^(
1/2)*d*i*x - 2*3^(1/2)*e*h*x + 3^(1/2)*f*g*x + 3*3^(1/2)*f*h*x + 3^(1/2)*f*
i*x + 3^(1/2)*g*h*x + 3^(1/2)*h*i*x + 4*3^(1/2)*d*e*x)*(d/4 - f/4 - g/4 + i
/4 + (3^(1/2)*d*1i)/12 + (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12 - (3^(1/2)*g*
1i)/12 - (3^(1/2)*h*1i)/6 - (3^(1/2)*i*1i)/12) - log(d*e*6i + d*f*9i - d*g*
3i - d*h*3i - d*i*3i - e*h*6i + f*h*3i + g*h*3i + h*i*3i - 3*3^(1/2)*d^2 +
d^2*x*6i + f^2*x*3i - d^2*3i - f^2*6i - 2*3^(1/2)*d*e + 3*3^(1/2)*d*f + 3^(
1/2)*d*g + 4*3^(1/2)*e*f + 3*3^(1/2)*d*h + 3^(1/2)*d*i - 2*3^(1/2)*e*h - 2*
3^(1/2)*f*g - 3*3^(1/2)*f*h - 2*3^(1/2)*f*i + 3^(1/2)*g*h + 3^(1/2)*h*i - d
*f*x*9i - e*f*x*6i - d*h*x*3i + e*h*x*6i + f*g*x*3i + f*h*x*3i + f*i*x*3i -
 g*h*x*3i - h*i*x*3i - 3*3^(1/2)*f^2*x + 3*3^(1/2)*d*f*x - 2*3^(1/2)*d*g*x
- 2*3^(1/2)*e*f*x - 3*3^(1/2)*d*h*x - 2*3^(1/2)*d*i*x - 2*3^(1/2)*e*h*x + 3
^(1/2)*f*g*x + 3*3^(1/2)*f*h*x + 3^(1/2)*f*i*x + 3^(1/2)*g*h*x + 3^(1/2)*h*
i*x + 4*3^(1/2)*d*e*x)*(d/4 - f/4 - g/4 + i/4 - (3^(1/2)*d*1i)/12 - (3^(1/2
)*e*1i)/6 - (3^(1/2)*f*1i)/12 + (3^(1/2)*g*1i)/12 + (3^(1/2)*h*1i)/6 + (3^(
1/2)*i*1i)/12) - log(d*f*9i - d*e*6i + d*g*3i - d*h*3i + d*i*3i + e*h*6i +
f*h*3i - g*h*3i - h*i*3i - 3*3^(1/2)*d^2 - d^2*x*6i - f^2*x*3i - d^2*3i - f
^2*6i + 2*3^(1/2)*d*e + 3*3^(1/2)*d*f - 3^(1/2)*d*g - 4*3^(1/2)*e*f + 3*3^(
1/2)*d*h - 3^(1/2)*d*i + 2*3^(1/2)*e*h + 2*3^(1/2)*f*g - 3*3^(1/2)*f*h + 2*
3^(1/2)*f*i - 3^(1/2)*g*h - 3^(1/2)*h*i + d*f*x*9i - e*f*x*6i + d*h*x*3i +
e*h*x*6i + f*g*x*3i - f*h*x*3i + f*i*x*3i - g*h*x*3i - h*i*x*3i + 3*3^(1/2)
*f^2*x - 3*3^(1/2)*d*f*x - 2*3^(1/2)*d*g*x - 2*3^(1/2)*e*f*x + 3*3^(1/2)*d*
h*x - 2*3^(1/2)*d*i*x - 2*3^(1/2)*e*h*x + 3^(1/2)*f*g*x - 3*3^(1/2)*f*h*x +
 3^(1/2)*f*i*x + 3^(1/2)*g*h*x + 3^(1/2)*h*i*x + 4*3^(1/2)*d*e*x)*(f/4 - d/
4 - g/4 + i/4 + (3^(1/2)*d*1i)/12 - (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12 +
(3^(1/2)*g*1i)/12 - (3^(1/2)*h*1i)/6 + (3^(1/2)*i*1i)/12) + log(d*f*9i - d*
e*6i + d*g*3i - d*h*3i + d*i*3i + e*h*6i + f*h*3i - g*h*3i - h*i*3i + 3*3^(
1/2)*d^2 - d^2*x*6i - f^2*x*3i - d^2*3i - f^2*6i - 2*3^(1/2)*d*e - 3*3^(1/2
)*d*f + 3^(1/2)*d*g + 4*3^(1/2)*e*f - 3*3^(1/2)*d*h + 3^(1/2)*d*i - 2*3^(1/
2)*e*h - 2*3^(1/2)*f*g + 3*3^(1/2)*f*h - 2*3^(1/2)*f*i + 3^(1/2)*g*h + 3^(1
/2)*h*i + d*f*x*9i - e*f*x*6i + d*h*x*3i + e*h*x*6i + f*g*x*3i - f*h*x*3i +
 f*i*x*3i - g*h*x*3i - h*i*x*3i - 3*3^(1/2)*f^2*x + 3*3^(1/2)*d*f*x + 2*3^(
1/2)*d*g*x + 2*3^(1/2)*e*f*x - 3*3^(1/2)*d*h*x + 2*3^(1/2)*d*i*x + 2*3^(1/2
)*e*h*x - 3^(1/2)*f*g*x + 3*3^(1/2)*f*h*x - 3^(1/2)*f*i*x - 3^(1/2)*g*h*x -
 3^(1/2)*h*i*x - 4*3^(1/2)*d*e*x)*(d/4 - f/4 + g/4 - i/4 + (3^(1/2)*d*1i)/1
2 - (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12 + (3^(1/2)*g*1i)/12 - (3^(1/2)*h*1
i)/6 + (3^(1/2)*i*1i)/12) + (i*x^2)/2
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4+x**2+1),x)
```

```
[Out] Timed out
```

3.20 $\int \frac{d+ex}{a+bx^2+cx^4}\,dx$

Optimal. Leaf size=189

$$\frac{\sqrt{2}\sqrt{c}\,d\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{b^2-4ac}\sqrt{b-\sqrt{b^2-4ac}}}-\frac{\sqrt{2}\sqrt{c}\,d\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{b^2-4ac}\sqrt{\sqrt{b^2-4ac}+b}}-\frac{e\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

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

Rubi [A] time = 0.21, antiderivative size = 189, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.350, Rules used = {1673, 12, 1093, 205, 1107, 618, 206}

$$\frac{\sqrt{2}\sqrt{c}\,d\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{b^2-4ac}\sqrt{b-\sqrt{b^2-4ac}}}-\frac{\sqrt{2}\sqrt{c}\,d\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{b^2-4ac}\sqrt{\sqrt{b^2-4ac}+b}}-\frac{e\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)/(a + b*x^2 + c*x^4),x]
```

```
[Out] (Sqrt[2]*Sqrt[c]*d*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])
/(Sqrt[b^2 - 4*a*c]*Sqrt[b - Sqrt[b^2 - 4*a*c]]) - (Sqrt[2]*Sqrt[c]*d*ArcTa
n[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(Sqrt[b^2 - 4*a*c]*Sqrt
[b + Sqrt[b^2 - 4*a*c]]) - (e*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/Sqr
t[b^2 - 4*a*c]
```

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 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1093

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(-1), x_Symbol] :> With[{q = Rt[b^
2 - 4*a*c, 2]}, Dist[c/q, Int[1/(b/2 - q/2 + c*x^2), x], x] - Dist[c/q, Int
```

```
[1/(b/2 + q/2 + c*x^2), x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c,
0] && PosQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$
\begin{aligned}
\int \frac{d+ex}{a+bx^2+cx^4}\,dx &= \int \frac{d}{a+bx^2+cx^4}\,dx+\int \frac{ex}{a+bx^2+cx^4}\,dx\\
&= d\int \frac{1}{a+bx^2+cx^4}\,dx+e\int \frac{x}{a+bx^2+cx^4}\,dx\\
&= \frac{(cd)\int \frac{1}{\frac{b}{2}-\frac{1}{2}\sqrt{b^2-4ac}+cx^2}\,dx}{\sqrt{b^2-4ac}}-\frac{(cd)\int \frac{1}{\frac{b}{2}+\frac{1}{2}\sqrt{b^2-4ac}+cx^2}\,dx}{\sqrt{b^2-4ac}}+\frac{1}{2}e\,\text{Subst}\left(\int \frac{1}{a+bx+cx^2}\,dx,x,\right.\\
&= \frac{\sqrt{2}\sqrt{c}\,d\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{b^2-4ac}\sqrt{b-\sqrt{b^2-4ac}}}-\frac{\sqrt{2}\sqrt{c}\,d\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)}{\sqrt{b^2-4ac}\sqrt{b+\sqrt{b^2-4ac}}}-e\,\text{Subst}\left(\int \frac{1}{b^2-4ac-x\right.\\
&= \frac{\sqrt{2}\sqrt{c}\,d\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{b^2-4ac}\sqrt{b-\sqrt{b^2-4ac}}}-\frac{\sqrt{2}\sqrt{c}\,d\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)}{\sqrt{b^2-4ac}\sqrt{b+\sqrt{b^2-4ac}}}-\frac{e\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}
\end{aligned}
$$

Mathematica [A] time = 0.25, size = 194, normalized size = 1.03

$$
\frac{\frac{2\sqrt{2}\sqrt{c}\,d\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{b-\sqrt{b^2-4ac}}}-\frac{2\sqrt{2}\sqrt{c}\,d\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{\sqrt{b^2-4ac}+b}}+e\left(\log\left(\sqrt{b^2-4ac}-b-2cx^2\right)-\log\left(\sqrt{b^2-4ac}+b+2c\right.\right.}{2\sqrt{b^2-4ac}}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)/(a + b*x^2 + c*x^4),x]
```

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

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x^4+b*x^2+a),x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 4.59, size = 1248, normalized size = 6.60

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x^4+b*x^2+a),x, algorithm="giac")
```

```
[Out] 1/4*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4 - 8*sqrt(2)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*a*b^2*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c
 - 2*b^4*c + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^2 + 8*sqrt(2)
*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*
a*c)*c)*b^2*c^2 + 16*a*b^2*c^2 + 2*b^3*c^2 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*a*c^3 - 32*a^2*c^3 - 8*a*b*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c + sqrt(b^2 - 4*a*c)*c)*b^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sq
rt(b^2 - 4*a*c)*c)*a*b*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*b^2*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*b*c^2 + 2*(b^2 - 4*a*c)*b^2*c - 8*(b^2 - 4*a*c)*a*c^2 - 2*(b^2 - 4*a*c)*
b*c^2)*d*arctan(2*sqrt(1/2)*x/sqrt((b + sqrt(b^2 - 4*a*c))/c))/((a*b^4 - 8*
a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*a
bs(c)) + 1/4*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4 - 8*sqrt(2)*sqrt(
b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)
*c)*b^3*c + 2*b^4*c + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c^2 +
8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^2 + sqrt(2)*sqrt(b*c - sqrt
(b^2 - 4*a*c)*c)*b^2*c^2 - 16*a*b^2*c^2 - 2*b^3*c^2 - 4*sqrt(2)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*a*c^3 + 32*a^2*c^3 + 8*a*b*c^3 + sqrt(2)*sqrt(b^2 - 4*
a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*b^2*c + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2
- 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b^2*c + 8*(b^2 - 4*a*c)*a*c^2 + 2*(b^2
- 4*a*c)*b*c^2)*d*arctan(2*sqrt(1/2)*x/sqrt((b - sqrt(b^2 - 4*a*c))/c))/((a
*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a
^2*c^3)*abs(c)) - 1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c)
*e*log(x^2 + 1/2*(b + sqrt(b^2 - 4*a*c))/c)/((b^4 - 8*a*b^2*c - 2*b^3*c + 1
6*a^2*c^2 + 8*a*b*c^2 + b^2*c^2 - 4*a*c^3)*c^2) + 1/2*(b^2*c^2 - 4*a*c^3 -
2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(b - sqrt(b^2 - 4*a*c))/c)
/((b^4 - 8*a*b^2*c - 2*b^3*c + 16*a^2*c^2 + 8*a*b*c^2 + b^2*c^2 - 4*a*c^3)*
c^2)
```

maple [A] time = 0.03, size = 231, normalized size = 1.22

$$\frac{2\sqrt{-4ac+b^2}\,\sqrt{2}\,cd\,\mathrm{arctanh}\left(\frac{\sqrt{2}\,cx}{\sqrt{\left(-b+\sqrt{-4ac+b^2}\right)c}}\right)}{\left(8ac-2b^2\right)\sqrt{\left(-b+\sqrt{-4ac+b^2}\right)c}}+\frac{2\sqrt{-4ac+b^2}\,\sqrt{2}\,cd\arctan\left(\frac{\sqrt{2}\,cx}{\sqrt{\left(b+\sqrt{-4ac+b^2}\right)c}}\right)}{\left(8ac-2b^2\right)\sqrt{\left(b+\sqrt{-4ac+b^2}\right)c}}-\frac{\sqrt{-4ac+b^2}\,e\,\mathrm{l}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)/(c*x^4+b*x^2+a),x)
```

```
[Out] -(-4*a*c+b^2)^(1/2)/(8*a*c-2*b^2)*e*ln(-2*c*x^2+(-4*a*c+b^2)^(1/2)-b)+2*c*(
-4*a*c+b^2)^(1/2)/(8*a*c-2*b^2)*d*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)
*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+(-4*a*c+b^2)^(1/2)/
(8*a*c-2*b^2)*e*ln(2*c*x^2+(-4*a*c+b^2)^(1/2)+b)+2*c*(-4*a*c+b^2)^(1/2)/(8*
a*c-2*b^2)*d*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-
4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)
```

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

$$\int \frac{ex + d}{cx^4 + bx^2 + a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x^4+b*x^2+a),x, algorithm="maxima")
```

```
[Out] integrate((e*x + d)/(c*x^4 + b*x^2 + a), x)
```

mupad [B] time = 1.32, size = 1308, normalized size = 6.92

$$\sum_{k=1}^{4} \ln\Big(c^2\,\Big(d\,e^2 + e^3\,x + \mathrm{root}\Big(128\,a^2\,b^2\,c\,z^4 - 256\,a^3\,c^2\,z^4 - 16\,a\,b^4\,z^4 + 16\,a\,b\,c\,d^2\,z^2 - 32\,a^2\,c\,e^2\,z^2 + 8\,a\,b^2\,e^2\,z^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x)/(a + b*x^2 + c*x^4),x)
```

```
[Out] symsum(log(c^2*(d*e^2 + e^3*x + 4*root(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4
- 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*
b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z
, k)^2*b^2*d - 8*root(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 +
16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*
a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)^3*b^3*x - 16
*root(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2
 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*
b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)^2*a*c*d + 2*root(128*a^2*b^2
*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z
^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d
^2*e^2 - c*d^4 - a*e^4, z, k)*b*e^2*x - 4*root(128*a^2*b^2*c*z^4 - 256*a^3*
c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*
z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 -
a*e^4, z, k)*c*d^2*x - 4*root(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^
4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z
^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)^2*b^
2*e*x + 4*root(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*
c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2
*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)*b*d*e + 32*root(128
*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2
*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e
*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)^3*a*b*c*x + 16*root(128*a^2*b^2*c*z^4
 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8
*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2
 - c*d^4 - a*e^4, z, k)^2*a*c*e*x))*root(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^
4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 -
4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4,
 z, k), k, 1, 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x**4+b*x**2+a),x)
```

```
[Out] Timed out
```

3.21 $\int \frac{d+ex+fx^2}{a+bx^2+cx^4} dx$

Optimal. Leaf size=211

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}}+f\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}}-\frac{e\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

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

Rubi [A] time = 0.24, antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 7, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {1673, 1166, 205, 12, 1107, 618, 206}

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}}+f\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}}-\frac{e\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4),x]
```

```
[Out] ((f + (2*c*d - b*f)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b -
Sqrt[b^2 - 4*a*c]]])/(Sqrt[2]*Sqrt[c]*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((f -
(2*c*d - b*f)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b
^2 - 4*a*c]]])/(Sqrt[2]*Sqrt[c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - (e*ArcTanh[(
b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/Sqrt[b^2 - 4*a*c]
```

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 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2}{a+bx^2+cx^4}\,dx = \int \frac{ex}{a+bx^2+cx^4}\,dx + \int \frac{d+fx^2}{a+bx^2+cx^4}\,dx$$
$$= e\int \frac{x}{a+bx^2+cx^4}\,dx + \frac{1}{2}\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\int \frac{1}{\frac{b}{2}+\frac{1}{2}\sqrt{b^2-4ac}+cx^2}\,dx + \frac{1}{2}\left(f+\frac{2cd}{\sqrt{b^2}}\right.$$
$$= \frac{\left(f+\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b+\sqrt{b^2-4ac}}} + \frac{1}{2}e\,\mathrm{Subst}\Bigg(\int$$
$$= \frac{\left(f+\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b+\sqrt{b^2-4ac}}} - e\,\mathrm{Subst}\Bigg(\int$$
$$= \frac{\left(f+\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b+\sqrt{b^2-4ac}}} - \frac{e\tanh^{-1}\left(\frac{b\ldots}{\sqrt{\ldots}}\right.}{\sqrt{b^2-4\ldots}}$$

Mathematica [A] time = 0.22, size = 234, normalized size = 1.11

$$\frac{\frac{\sqrt{2}\left(f\left(\sqrt{b^2-4ac}-b\right)+2cd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{2}\left(f\left(\sqrt{b^2-4ac}+b\right)-2cd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}} + e\log\left(\sqrt{b^2-4ac}-b-2cx^2\right) - \ldots}{2\sqrt{b^2-4ac}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4),x]
```

```
[Out] ((Sqrt[2]*(2*c*d + (-b + Sqrt[b^2 - 4*a*c])*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/S
qrt[b - Sqrt[b^2 - 4*a*c]]])/(Sqrt[c]*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[
2]*(-2*c*d + (b + Sqrt[b^2 - 4*a*c])*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b +
 Sqrt[b^2 - 4*a*c]]])/(Sqrt[c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + e*Log[-b + Sq
```

```
rt[b^2 - 4*a*c] - 2*c*x^2] - e*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(2*Sqr
t[b^2 - 4*a*c])
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 3.54, size = 1618, normalized size = 7.67

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="giac")
```

```
[Out] -1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*
(b + sqrt(b^2 - 4*a*c))/c)/((b^4 - 8*a*b^2*c - 2*b^3*c + 16*a^2*c^2 + 8*a*b
*c^2 + b^2*c^2 - 4*a*c^3)*c^2) + 1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sq
rt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(b - sqrt(b^2 - 4*a*c))/c)/((b^4 - 8*a*b^2*
c - 2*b^3*c + 16*a^2*c^2 + 8*a*b*c^2 + b^2*c^2 - 4*a*c^3)*c^2) + 1/4*((sqrt
(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4
*a*c)*c)*a*b^2*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c - 2*b^4*
c + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^2 + 8*sqrt(2)*sqrt(b*c
 + sqrt(b^2 - 4*a*c)*c)*a*b*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b
^2*c^2 + 16*a*b^2*c^2 - 2*b^3*c^2 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*a*c^3 - 32*a^2*c^3 + 8*a*b*c^3 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sq
rt(b^2 - 4*a*c)*c)*b^3 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 -
4*a*c)*c)*a*b*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*b^2*c + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b*c^2
+ 2*(b^2 - 4*a*c)*b^2*c - 8*(b^2 - 4*a*c)*a*c^2 + 2*(b^2 - 4*a*c)*b*c^2)*d
+ 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^
2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*
a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*c^2 - 2
*(b^2 - 4*a*c)*a*c^2)*f)*arctan(2*sqrt(1/2)*x/sqrt((b + sqrt(b^2 - 4*a*c))/
c))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^
2 - 4*a^2*c^3)*abs(c)) + 1/4*((sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4
- 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c - 2*sqrt(2)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*b^3*c + 2*b^4*c + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a
*c)*c)*a^2*c^2 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^2 + sqrt(2
)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^2 - 16*a*b^2*c^2 - 2*b^3*c^2 - 4*sq
rt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*c^3 + 32*a^2*c^3 + 8*a*b*c^3 + sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3 - 4*sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c - 2*sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c + sqrt(2)*sqrt(b^2 - 4*a*c)*sqr
t(b*c - sqrt(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b^2*c + 8*(b^2 - 4*a*c
)*a*c^2 + 2*(b^2 - 4*a*c)*b*c^2)*d + 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqrt(b^2
 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b
*c - sqrt(b^2 - 4*a*c)*c)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*f)*arctan(2*sqrt(1
/2)*x/sqrt((b - sqrt(b^2 - 4*a*c))/c))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c +
16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*abs(c))
```

maple [B] time = 0.03, size = 616, normalized size = 2.92

$$-\frac{2\sqrt{2}\,acf\,\mathrm{arctanh}\left(\frac{\sqrt{2}\,cx}{\sqrt{\left(-b+\sqrt{-4ac+b^2}\right)c}}\right)}{\left(4ac-b^2\right)\sqrt{\left(-b+\sqrt{-4ac+b^2}\right)c}}+\frac{2\sqrt{2}\,acf\,\arctan\left(\frac{\sqrt{2}\,cx}{\sqrt{\left(b+\sqrt{-4ac+b^2}\right)c}}\right)}{\left(4ac-b^2\right)\sqrt{\left(b+\sqrt{-4ac+b^2}\right)c}}+\frac{\sqrt{2}\,b^2f\,\mathrm{arctanh}\left(\frac{\sqrt{2}\,cx}{\sqrt{\left(-b+\sqrt{-4ac+b^2}\right)}}\right)}{2\left(4ac-b^2\right)\sqrt{\left(-b+\sqrt{-4ac+b^2}\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)/(c*x^4+b*x^2+a),x)
```

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

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

$$\int \frac{fx^2+ex+d}{cx^4+bx^2+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="maxima")
```

```
[Out] integrate((f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a), x)
```

mupad [B] time = 2.14, size = 3942, normalized size = 18.68

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2)/(a + b*x^2 + c*x^4),x)
```

```
[Out] symsum(log(c^2*d*e^2 - c^2*d^2*f + c^2*e^3*x - a*c*f^3 - 8*root(16*a*b^4*c*
z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c
^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 +
32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z +
 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a
*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^
4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^3*b^3*c^2*x + b*c*d*f^2 - 16*roo
t(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z
^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c
^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^
2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*
d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2
*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*a*c^3*d - 4*root(
```

```
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*c^3*d^2*x + 4*root(16
*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 +
 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d
^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*
e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^
2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2
 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*b^2*c^2*d + 32*root(1
6*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
+ 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*
d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c
*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e
^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^
2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^3*a*b*c^3*x + 16*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*a*c^3*e*x + 4*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*a*c^2*f^2*x + 2*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*b*c^2*e^2*x - 2*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*b^2*c*f^2*x - 4*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*b^2*c^2*e*x + 4*roo
t(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z
^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c
^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^
2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*
d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2
*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*b*c^2*d*e - 8*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
```

```
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*a*c^2*e*f + b*c*e*f^2
*x - 2*c^2*d*e*f*x + 4*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*
c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*
a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2
 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z -
 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f
^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4,
 z, k)*b*c^2*d*f*x)*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3
*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b
^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 +
4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16
*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3
+ b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z,
 k), k, 1, 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(c*x**4+b*x**2+a),x)
```

```
[Out] Timed out
```

3.22 $\int \frac{d+ex+fx^2+gx^3}{a+bx^2+cx^4}\,dx$

Optimal. Leaf size=245

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}}+f\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}}-\frac{(2ce-bg)\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{2c\sqrt{b^2-4ac}}+\frac{g\log(a+}{4}$$

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

Rubi [A] time = 0.16, antiderivative size = 245, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.267, Rules used = {1673, 1166, 205, 1247, 634, 618, 206, 628}

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}}+f\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}}-\frac{(2ce-bg)\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{2c\sqrt{b^2-4ac}}+\frac{g\log(a+}{4}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4),x]
```

```
[Out] ((f + (2*c*d - b*f)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b -
Sqrt[b^2 - 4*a*c]]])/(Sqrt[2]*Sqrt[c]*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((f -
(2*c*d - b*f)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b
^2 - 4*a*c]]])/(Sqrt[2]*Sqrt[c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - ((2*c*e - b*
g)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(2*c*Sqrt[b^2 - 4*a*c]) + (g*L
og[a + b*x^2 + c*x^4])/(4*c)
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3}{a+bx^2+cx^4}\,dx = \int \frac{d+fx^2}{a+bx^2+cx^4}\,dx + \int \frac{x\left(e+gx^2\right)}{a+bx^2+cx^4}\,dx$$

$$= \frac{1}{2}\text{Subst}\left(\int \frac{e+gx}{a+bx+cx^2}\,dx, x, x^2\right) + \frac{1}{2}\left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\int \frac{1}{\frac{b}{2}+\frac{1}{2}\sqrt{b^2-4ac}+c\cdots}$$

$$= \frac{\left(f+\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b+\sqrt{b^2-4ac}}} + \frac{g\,\text{Subs}\cdots}{\cdots}$$

$$= \frac{\left(f+\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b+\sqrt{b^2-4ac}}} + \frac{g\log\left(\cdots\right.}{\cdots}$$

$$= \frac{\left(f+\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b+\sqrt{b^2-4ac}}} - \frac{(2ce-\cdots}{\cdots}$$

Mathematica [A] time = 0.29, size = 280, normalized size = 1.14

$$\frac{\frac{2\sqrt{2}\sqrt{c}\left(f\left(\sqrt{b^2-4ac}-b\right)+2cd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{b-\sqrt{b^2-4ac}}} + \frac{2\sqrt{2}\sqrt{c}\left(f\left(\sqrt{b^2-4ac}+b\right)-2cd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{\sqrt{b^2-4ac}+b}} + \left(g\left(\sqrt{b^2-4ac}-b\right)+2c\cdots\right.}{4c\sqrt{b^2-4ac}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4),x]
```

```
[Out] ((2*Sqrt[2]*Sqrt[c]*(2*c*d + (-b + Sqrt[b^2 - 4*a*c])*f)*ArcTan[(Sqrt[2]*Sq
rt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/Sqrt[b - Sqrt[b^2 - 4*a*c]] + (2*Sqr
t[2]*Sqrt[c]*(-2*c*d + (b + Sqrt[b^2 - 4*a*c])*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x
)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/Sqrt[b + Sqrt[b^2 - 4*a*c]] + (2*c*e + (-b
+ Sqrt[b^2 - 4*a*c])*g)*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2] + (-2*c*e + (
b + Sqrt[b^2 - 4*a*c])*g)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(4*c*Sqrt[b
^2 - 4*a*c])
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 2.83, size = 3272, normalized size = 13.36

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="giac")
```

```
[Out] 1/4*g*log(abs(c*x^4 + b*x^2 + a))/c + 1/8*((2*b^4*c^2 - 16*a*b^2*c^3 + 32*a
^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4 + 8*
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c + 2*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c - 16*sqrt(2)*sqr
t(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c^2 - 8*sqrt(2)*sqrt(b^2
 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^2 - sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sq
rt(b*c - sqrt(b^2 - 4*a*c)*c)*a*c^3 - 2*(b^2 - 4*a*c)*b^2*c^2 + 8*(b^2 - 4*
a*c)*a*c^3)*c^2*f + 2*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c^2 - 8*
sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^3 - 2*sqrt(2)*sqrt(b*c - sq
rt(b^2 - 4*a*c)*c)*b^3*c^3 + 2*b^4*c^3 + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4
*a*c)*c)*a^2*c^4 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^4 + sqrt
(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^4 - 16*a*b^2*c^4 - 4*sqrt(2)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a*c^5 + 32*a^2*c^5 - 2*(b^2 - 4*a*c)*b^2*c^3 +
8*(b^2 - 4*a*c)*a*c^4)*d*abs(c) + 2*(2*b^3*c^5 - 8*a*b*c^6 - sqrt(2)*sqrt(b
^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^3 + 4*sqrt(2)*sqrt(b^2 -
4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c
)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c - sqrt(b^2 - 4*a*c)*c)*b*c^5 - 2*(b^2 - 4*a*c)*b*c^5)*d - (2*b^4*c^4 -
8*a*b^2*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4
*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^
3 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^3 - s
qrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^4 - 2*(b^2 -
 4*a*c)*b^2*c^4)*f)*arctan(2*sqrt(1/2)*x/sqrt((b*c + sqrt(b^2*c^2 - 4*a*c^3
))/c^2))/((a*b^4*c^2 - 8*a^2*b^2*c^3 - 2*a*b^3*c^3 + 16*a^3*c^4 + 8*a^2*b*c
^4 + a*b^2*c^4 - 4*a^2*c^5)*c^2) - 1/8*((2*b^4*c^2 - 16*a*b^2*c^3 + 32*a^2*
c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4 + 8*sqr
t(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c + 2*sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c - 16*sqrt(2)*sqrt(b
^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^2 - 8*sqrt(2)*sqrt(b^2 -
4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
```

```
b*c + sqrt(b^2 - 4*a*c)*c)*a*c^3 - 2*(b^2 - 4*a*c)*b^2*c^2 + 8*(b^2 - 4*a*c
)*a*c^3)*c^2*f - 2*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c^2 - 8*sqr
t(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^3 - 2*sqrt(2)*sqrt(b*c + sqrt(
b^2 - 4*a*c)*c)*b^3*c^3 - 2*b^4*c^3 + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*
c)*c)*a^2*c^4 + 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^4 + sqrt(2)
*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^4 + 16*a*b^2*c^4 - 4*sqrt(2)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a*c^5 - 32*a^2*c^5 + 2*(b^2 - 4*a*c)*b^2*c^3 - 8*(
b^2 - 4*a*c)*a*c^4)*d*abs(c) + 2*(2*b^3*c^5 - 8*a*b*c^6 - sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^3 + 4*sqrt(2)*sqrt(b^2 - 4*a
*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*s
qrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
 + sqrt(b^2 - 4*a*c)*c)*b*c^5 - 2*(b^2 - 4*a*c)*b*c^5)*d - (2*b^4*c^4 - 8*a
*b^2*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c^
2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^3 +
 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^3 - sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^4 - 2*(b^2 - 4*
a*c)*b^2*c^4)*f)*arctan(2*sqrt(1/2)*x/sqrt((b*c - sqrt(b^2*c^2 - 4*a*c^3))/
c^2))/((a*b^4*c^2 - 8*a^2*b^2*c^3 - 2*a*b^3*c^3 + 16*a^3*c^4 + 8*a^2*b*c^4
+ a*b^2*c^4 - 4*a^2*c^5)*c^2) - 1/16*((b^6 - 8*a*b^4*c - 2*b^5*c + 16*a^2*b
^2*c^2 + 8*a*b^3*c^2 + b^4*c^2 - 4*a*b^2*c^3 - (b^5 - 8*a*b^3*c - 2*b^4*c +
 16*a^2*b*c^2 + 8*a*b^2*c^2 + b^3*c^2 - 4*a*b*c^3)*sqrt(b^2 - 4*a*c))*g*abs
(c) - 2*(b^5*c - 8*a*b^3*c^2 - 2*b^4*c^2 + 16*a^2*b*c^3 + 8*a*b^2*c^3 + b^3
*c^3 - 4*a*b*c^4 - (b^4*c - 8*a*b^2*c^2 - 2*b^3*c^2 + 16*a^2*c^3 + 8*a*b*c^
3 + b^2*c^3 - 4*a*c^4)*sqrt(b^2 - 4*a*c))*abs(c)*e + (b^6*c - 8*a*b^4*c^2 -
 2*b^5*c^2 + 16*a^2*b^2*c^3 + 8*a*b^3*c^3 + b^4*c^3 - 4*a*b^2*c^4 + (b^5*c
- 4*a*b^3*c^2 - 2*b^4*c^2 + b^3*c^3)*sqrt(b^2 - 4*a*c))*g - 2*(b^5*c^2 - 8*
a*b^3*c^3 - 2*b^4*c^3 + 16*a^2*b*c^4 + 8*a*b^2*c^4 + b^3*c^4 - 4*a*b*c^5 -
(b^4*c^2 - 4*a*b^2*c^3 - 2*b^3*c^3 + b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2
 + 1/2*(b*c + sqrt(b^2*c^2 - 4*a*c^3))/c^2)/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3
*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(c)) - 1/16*(
(b^6 - 8*a*b^4*c - 2*b^5*c + 16*a^2*b^2*c^2 + 8*a*b^3*c^2 + b^4*c^2 - 4*a*b
^2*c^3 + (b^5 - 8*a*b^3*c - 2*b^4*c + 16*a^2*b*c^2 + 8*a*b^2*c^2 + b^3*c^2
- 4*a*b*c^3)*sqrt(b^2 - 4*a*c))*g*abs(c) - 2*(b^5*c - 8*a*b^3*c^2 - 2*b^4*c
^2 + 16*a^2*b*c^3 + 8*a*b^2*c^3 + b^3*c^3 - 4*a*b*c^4 + (b^4*c - 8*a*b^2*c^
2 - 2*b^3*c^2 + 16*a^2*c^3 + 8*a*b*c^3 + b^2*c^3 - 4*a*c^4)*sqrt(b^2 - 4*a*
c))*abs(c)*e + (b^6*c - 8*a*b^4*c^2 - 2*b^5*c^2 + 16*a^2*b^2*c^3 + 8*a*b^3*
c^3 + b^4*c^3 - 4*a*b^2*c^4 + (b^5*c - 4*a*b^3*c^2 - 2*b^4*c^2 + b^3*c^3)*s
qrt(b^2 - 4*a*c))*g - 2*(b^5*c^2 - 8*a*b^3*c^3 - 2*b^4*c^3 + 16*a^2*b*c^4 +
 8*a*b^2*c^4 + b^3*c^4 - 4*a*b*c^5 + (b^4*c^2 - 4*a*b^2*c^3 - 2*b^3*c^3 + b
^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(b*c - sqrt(b^2*c^2 - 4*a*c^3))
/c^2)/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*
c^2 - 4*a^2*c^3)*c^2*abs(c))
```

maple [B] time = 0.03, size = 866, normalized size = 3.53

$$-\frac{2\sqrt{2}\,acf\,\mathrm{arctanh}\left(\frac{\sqrt{2}\,cx}{\sqrt{\left(-b+\sqrt{-4ac+b^2}\right)c}}\right)}{\left(4ac-b^2\right)\sqrt{\left(-b+\sqrt{-4ac+b^2}\right)c}}+\frac{2\sqrt{2}\,acf\arctan\left(\frac{\sqrt{2}\,cx}{\sqrt{\left(b+\sqrt{-4ac+b^2}\right)c}}\right)}{\left(4ac-b^2\right)\sqrt{\left(b+\sqrt{-4ac+b^2}\right)c}}+\frac{\sqrt{2}\,b^2f\,\mathrm{arctanh}\left(\frac{\sqrt{2}\,cx}{\sqrt{\left(-b+\sqrt{-4ac+b^2}\right)\cdots}}\cdots\right)}{2\left(4ac-b^2\right)\sqrt{\left(-b+\sqrt{-4ac+b^2}\cdots\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x)
```

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

```
2/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-
b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f*b^2-1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2
)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^
2)^(1/2))*c)^(1/2)*c*x)*b*f+c*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/
2)*c*x)*d+1/(4*a*c-b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*g*a-1/4/(4*a*c-b^2
)/c*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*g*b^2-1/4*(-4*a*c+b^2)^(1/2)/(4*a*c-b^
2)/c*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*b*g+1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2
)*e*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+2/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*a*c*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)
-1/2/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b^2*f*arctan(2^(1
/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2
)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b*f*arctan(2^(1/2)/((b+(-4*a*c+b
^2)^(1/2))*c)^(1/2)*c*x)+(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c
*x)
```

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

$$\int \frac{gx^3 + fx^2 + ex + d}{cx^4 + bx^2 + a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="maxima")
```

```
[Out] integrate((g*x^3 + f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a), x)
```

mupad [B] time = 2.54, size = 15179, normalized size = 61.96

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4),x)
```

```
[Out] symsum(log(c^2*d*e^2 + b^2*d*g^2 - c^2*d^2*f + c^2*e^3*x - a*c*f^3 - 8*root
(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2
*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a
*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*
f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16
*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*
z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c
*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*
a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z
+ 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4
*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*
d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e
^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*
a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2
*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*
d^4, z, k)^3*b^3*c^2*x - a*c*d*g^2 + b*c*d*f^2 - a*b*f*g^2 - a*b*g^3*x - 16
*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^
2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 +
 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b
*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2
 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2
*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^
2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z
+ 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2
*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*
z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a
```

^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^
2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2
 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^
2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 -
 c^3*d^4, z, k)^2*a*c^3*d - 4*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 -
 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g
*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40
*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^
3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 3
2*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z
 + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2
*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*
b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16
*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*
d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e
*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 +
2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f
^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*
c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*c^3*d^2*x - 2*root(128*a^2*b^2
*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*
a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f
*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*
a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2
*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^
4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4
*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*
g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*
g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f
*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*
b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b
*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^
2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2
*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*b
^3*g^2*x + b^2*e*g^2*x + c^2*d^2*g*x + 4*root(128*a^2*b^2*c^3*z^4 - 16*a*b^
4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 25
6*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e
*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2
- 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*
g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^
2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z -
 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e
*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d
^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g
 + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*
a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2
*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^
2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2
*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)^2*b^2*c^2*d + 32*ro
ot(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c
^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16
*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^
2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 +
16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^
2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b
*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 1
6*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*
z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z -
 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*
c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d

```
*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 -
2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e
^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^
3*d^4, z, k)^3*a*b*c^3*x + 16*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 -
 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g
*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40
*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^
3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 3
2*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z
 + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2
*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*
b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16
*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*
d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e
*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 +
2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f
^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*
c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)^2*a*c^3*e*x + 4*root(128*a^2*b
^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 1
6*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d
*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 +
8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d
^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*
b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z -
 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^
2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*
e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e
*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 +
2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a
*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*
g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c
^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)
*a*c^2*f^2*x + 2*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*
z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2
*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^
2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4
*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2
*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2
*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*
a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e
*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z
- 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2
*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*
d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f
 - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*
c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2
*e^4 - a^3*g^4 - c^3*d^4, z, k)*b*c^2*e^2*x - 2*root(128*a^2*b^2*c^3*z^4 -
16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z
^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*
b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e
^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a
^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 -
 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^
2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^
2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*
a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*
c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e
*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2
+ 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2
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*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 -
b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*b^2*c*f^2*x
+ 8*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2
*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^
2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^
2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*
z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*
c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16
*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2
*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*
d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g
^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g -
4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a
*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*
f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a
*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^
4 - c^3*d^4, z, k)^2*b^3*c*g*x - 2*b*c*d*e*g + 2*a*c*e*f*g - 4*root(128*a^2
*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 +
 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2
*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2
+ 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3
*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*
a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z
 - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*
e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^
3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d
*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2
+ 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3
*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^
2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b
*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z,
k)^2*b^2*c^2*e*x + 4*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*
c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32
*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*
c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2
 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3
*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2
*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z
+ 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d
^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^
3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4
*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*
b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d
^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 -
b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a
*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*b*c^2*d*e + 8*root(128*a^2*b^2*c^3*z^4
- 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g
*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*
a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2
*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96
*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2
 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*
e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*
a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 1
6*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*
b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2
*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^
2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c
^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2
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- b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*a*c^2*d*g
- 8*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2
*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^
2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^
2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*
z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*
c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16
*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2
*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*
d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g
^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g -
4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a
*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*
f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a
*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^
4 - c^3*d^4, z, k)*a*c^2*e*f - 4*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^
4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^
3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 +
 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2
*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2
- 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*
g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*
c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z -
 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z +
 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b
*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^
2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3
 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*
b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a
^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*b^2*c*d*g + a*c*e*g^2*x + b
*c*e*f^2*x - a*c*f^2*g*x - 2*b*c*e^2*g*x - 2*c^2*d*e*f*x + 10*root(128*a^2*
b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 +
16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*
d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 +
 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*
d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a
*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z
- 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e
^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3
*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*
e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 +
 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*
a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2
*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*
c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k
)*a*b*c*g^2*x + 4*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4
*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^
2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g
^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 -
4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^
2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^
2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4
*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*
e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z
 - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^
2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2
*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*
f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2
*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^
```

```
2*e^4 - a^3*g^4 - c^3*d^4, z, k)*b*c^2*d*f*x - 8*root(128*a^2*b^2*c^3*z^4 -
 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*
z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a
*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*
e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*
a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2
- 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e
^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a
^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16
*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b
*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*
e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2
 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^
2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 -
 b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*a*c^2*e*g*x
 - 32*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a
^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*
z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*
a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^
2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^
3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z -
16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f
^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*
c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2
*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g
- 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4
*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^
2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 -
 a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*
g^4 - c^3*d^4, z, k)^2*a*b*c^2*g*x + 4*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*
c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*
a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g
*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 -
64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^
2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*
c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 1
6*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f
^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2
*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g +
 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*
c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b
*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2
- a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g
^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*a*b*c*f*g)*root(128*a
^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3
 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c
^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^
2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c
^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 -
4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2
*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^
2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*
b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c
*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^
2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f +
 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*
e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 -
 b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z
, k), k, 1, 4)
```

<u>**sympy**</u> **[F(-1)]** time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a),x)
```

```
[Out] Timed out
```

3.23 $\int \frac{d+ex+fx^2+gx^3+hx^4}{a+bx^2+cx^4}\,dx$

Optimal. Leaf size=290

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}}-bh+cf\right)}{\sqrt{2}\,c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)\left(-\frac{-2ach+b^2h-bcf+2c^2d}{\sqrt{b^2-4ac}}-bh+cf\right)}{\sqrt{2}\,c^{3/2}\sqrt{\sqrt{b^2-4ac}+b}}-(2ce$$

```
[Out] h*x/c+1/4*g*ln(c*x^4+b*x^2+a)/c-1/2*(-b*g+2*c*e)*arctanh((2*c*x^2+b)/(-4*a*
c+b^2)^(1/2))/c/(-4*a*c+b^2)^(1/2)+1/2*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+
b^2)^(1/2))^(1/2))*(c*f-b*h+(2*c^2*d+b^2*h-c*(2*a*h+b*f))/(-4*a*c+b^2)^(1/2
))/c^(3/2)*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/2*arctan(x*2^(1/2)*c^(1/2
)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*(c*f-b*h+(2*a*c*h-b^2*h+b*c*f-2*c^2*d)/(-4*
a*c+b^2)^(1/2))/c^(3/2)*2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 0.73, antiderivative size = 290, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.257, Rules used = {1673, 1676, 1166, 205, 1247, 634, 618, 206, 628}

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}}-bh+cf\right)}{\sqrt{2}\,c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)\left(-\frac{-2ach+b^2h-bcf+2c^2d}{\sqrt{b^2-4ac}}-bh+cf\right)}{\sqrt{2}\,c^{3/2}\sqrt{\sqrt{b^2-4ac}+b}}-(2ce$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4),x]
```

```
[Out] (h*x)/c + ((c*f - b*h + (2*c^2*d + b^2*h - c*(b*f + 2*a*h))/Sqrt[b^2 - 4*a*
c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(Sqrt[2]*c^(3/
2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((c*f - b*h - (2*c^2*d - b*c*f + b^2*h -
2*a*c*h)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 -
4*a*c]]])/(Sqrt[2]*c^(3/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - ((2*c*e - b*g)*Ar
cTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(2*c*Sqrt[b^2 - 4*a*c]) + (g*Log[a
+ b*x^2 + c*x^4])/(4*c)
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1676

```
Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> Int[ExpandInte
grand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4}{a+bx^2+cx^4}\,dx = \int \frac{x\left(e+gx^2\right)}{a+bx^2+cx^4}\,dx + \int \frac{d+fx^2+hx^4}{a+bx^2+cx^4}\,dx$$

$$= \frac{1}{2}\operatorname{Subst}\left(\int \frac{e+gx}{a+bx+cx^2}\,dx, x, x^2\right) + \int \left(\frac{h}{c} + \frac{cd-ah+(cf-bh)x^2}{c\left(a+bx^2+cx^4\right)}\right) dx$$

$$= \frac{hx}{c} + \frac{\int \frac{cd-ah+(cf-bh)x^2}{a+bx^2+cx^4}\,dx}{c} + \frac{g\operatorname{Subst}\left(\int \frac{b+2cx}{a+bx+cx^2}\,dx, x, x^2\right)}{4c} + \frac{(2ce-bg)\operatorname{Subst}\left(\right.}{}$$

$$= \frac{hx}{c} + \frac{g\log\left(a+bx^2+cx^4\right)}{4c} - \frac{(2ce-bg)\operatorname{Subst}\left(\int \frac{1}{b^2-4ac-x^2}\,dx, x, b+2cx^2\right)}{2c} +$$

$$= \frac{hx}{c} + \frac{\left(cf-bh+\frac{2c^2d+b^2h-c(bf+2ah)}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\,c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(cf-bh-\frac{2c^2d-bcf+}{\sqrt{b^2-}}\right.}{\sqrt{2}\,c^{3/2}}$$

Mathematica [A] time = 0.50, size = 383, normalized size = 1.32

$$\frac{\frac{2\sqrt{2}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(c\left(f\sqrt{b^2-4ac}-2ah-bf\right)+bh\left(b-\sqrt{b^2-4ac}\right)+2c^2d\right)}{\sqrt{b^2-4ac}\sqrt{b-\sqrt{b^2-4ac}}}-\frac{2\sqrt{2}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)\left(-c\left(f\sqrt{b^2-4ac}+2ah+bf\right)+bh\left(\sqrt{b^2-4ac}\right.\right.}{\sqrt{b^2-4ac}\sqrt{\sqrt{b^2-4ac}+b}}}{4c^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4),x]
```

```
[Out] (4*Sqrt[c]*h*x + (2*Sqrt[2]*(2*c^2*d + b*(b - Sqrt[b^2 - 4*a*c])*h + c*(-(b
*f) + Sqrt[b^2 - 4*a*c]*f - 2*a*h))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqr
t[b^2 - 4*a*c]]])/(Sqrt[b^2 - 4*a*c]*Sqrt[b - Sqrt[b^2 - 4*a*c]]) - (2*Sqrt
[2]*(2*c^2*d + b*(b + Sqrt[b^2 - 4*a*c])*h - c*(b*f + Sqrt[b^2 - 4*a*c]*f +
 2*a*h))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(Sqrt[b^2
 - 4*a*c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + (Sqrt[c]*(2*c*e + (-b + Sqrt[b^2 -
 4*a*c])*g)*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/Sqrt[b^2 - 4*a*c] + (Sqr
t[c]*(-2*c*e + (b + Sqrt[b^2 - 4*a*c])*g)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x
^2])/Sqrt[b^2 - 4*a*c])/(4*c^(3/2))
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 4.91, size = 5201, normalized size = 17.93

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="giac")
```

```
[Out] h*x/c + 1/4*g*log(abs(c*x^4 + b*x^2 + a))/c + 1/8*((2*b^4*c^3 - 16*a*b^2*c^
4 + 32*a^2*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*
b^4*c + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c
^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^2 -
16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c^3 - 8*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^3 - sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^3 + 4*sqrt(2)*sqrt(b
^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*c^4 - 2*(b^2 - 4*a*c)*b^2*c^3
 + 8*(b^2 - 4*a*c)*a*c^4)*c^2*f - (2*b^5*c^2 - 16*a*b^3*c^3 + 32*a^2*b*c^4
- sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^5 + 8*sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^3*c + 2*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c - 16*sqrt(2)*sqrt(b^2 -
 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b*c^2 - 8*sqrt(2)*sqrt(b^2 - 4*
a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*
sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^3 - 2*(b^2 - 4*a*c)*b^3*c^2 + 8*(b^2 - 4*a
*c)*a*b*c^3)*c^2*h + 2*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c^3 - 8
*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 - 2*sqrt(2)*sqrt(b*c - s
qrt(b^2 - 4*a*c)*c)*b^3*c^4 + 2*b^4*c^4 + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 -
4*a*c)*c)*a^2*c^5 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^5 + sqr
t(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^5 - 16*a*b^2*c^5 - 4*sqrt(2)*sqr
t(b*c - sqrt(b^2 - 4*a*c)*c)*a*c^6 + 32*a^2*c^6 - 2*(b^2 - 4*a*c)*b^2*c^4 +
```

```
8*(b^2 - 4*a*c)*a*c^5)*d*abs(c) - 2*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*
c)*a*b^4*c^2 - 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 2*sq
rt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 + 2*a*b^4*c^3 + 16*sqrt(2)*
sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^4 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4
*a*c)*c)*a^2*b*c^4 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 - 16
*a^2*b^2*c^4 - 4*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c^5 + 32*a^3*c
^5 - 2*(b^2 - 4*a*c)*a*b^2*c^3 + 8*(b^2 - 4*a*c)*a^2*c^4)*h*abs(c) + 2*(2*b
^3*c^6 - 8*a*b*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)
*c)*b^3*c^4 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a
*b*c^5 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^
5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b*c^6 - 2*(b^
2 - 4*a*c)*b*c^6)*d - (2*b^4*c^5 - 8*a*b^2*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*
sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
 - sqrt(b^2 - 4*a*c)*c)*b^3*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt
(b^2 - 4*a*c)*c)*b^2*c^5 - 2*(b^2 - 4*a*c)*b^2*c^5)*f + (2*b^5*c^4 - 12*a*b
^3*c^5 + 16*a^2*b*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a
*c)*c)*b^5*c^2 + 6*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a*b^3*c^3 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b
^4*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b*
c^4 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4
 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^4 + 2*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^5 - 2*(b^2 -
4*a*c)*b^3*c^4 + 4*(b^2 - 4*a*c)*a*b*c^5)*h)*arctan(2*sqrt(1/2)*x/sqrt((b*c
^3 + sqrt(b^2*c^6 - 4*a*c^7))/c^4))/((a*b^4*c^3 - 8*a^2*b^2*c^4 - 2*a*b^3*c
^4 + 16*a^3*c^5 + 8*a^2*b*c^5 + a*b^2*c^5 - 4*a^2*c^6)*c^2) - 1/8*((2*b^4*c
^3 - 16*a*b^2*c^4 + 32*a^2*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(
b^2 - 4*a*c)*c)*b^4*c + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4
*a*c)*c)*a*b^2*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*
c)*c)*b^3*c^2 - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c
)*a^2*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b
*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^3 +
4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*c^4 - 2*(b^2
- 4*a*c)*b^2*c^3 + 8*(b^2 - 4*a*c)*a*c^4)*c^2*f - (2*b^5*c^2 - 16*a*b^3*c^3
 + 32*a^2*b*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)
*b^5 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c
+ 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c - 16*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^2 - 8*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^2 - sqrt(2)*sq
rt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^2 + 4*sqrt(2)*sqrt(b^
2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^3 - 2*(b^2 - 4*a*c)*b^3*c^
2 + 8*(b^2 - 4*a*c)*a*b*c^3)*c^2*h - 2*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c
)*c)*b^4*c^3 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 - 2*sqrt
(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^4 - 2*b^4*c^4 + 16*sqrt(2)*sqrt(b
*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^5 + 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*a*b*c^5 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^5 + 16*a*b^2*c^5
 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*c^6 - 32*a^2*c^6 + 2*(b^2 -
4*a*c)*b^2*c^4 - 8*(b^2 - 4*a*c)*a*c^5)*d*abs(c) + 2*(sqrt(2)*sqrt(b*c + sq
rt(b^2 - 4*a*c)*c)*a*b^4*c^2 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^
2*b^2*c^3 - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 - 2*a*b^4*c
^3 + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^4 + 8*sqrt(2)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c
)*a*b^2*c^4 + 16*a^2*b^2*c^4 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^
2*c^5 - 32*a^3*c^5 + 2*(b^2 - 4*a*c)*a*b^2*c^3 - 8*(b^2 - 4*a*c)*a^2*c^4)*h
*abs(c) + 2*(2*b^3*c^6 - 8*a*b*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + s
qrt(b^2 - 4*a*c)*c)*b^3*c^4 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b
^2 - 4*a*c)*c)*a*b*c^5 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 -
4*a*c)*c)*b^2*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*b*c^6 - 2*(b^2 - 4*a*c)*b*c^6)*d - (2*b^4*c^5 - 8*a*b^2*c^6 - sqrt(2)*sq
```

```
rt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c^3 + 4*sqrt(2)*sqrt(b^
2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 + 2*sqrt(2)*sqrt(b^2 -
 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^5 - 2*(b^2 - 4*a*c)*b^2*c^5)*f + (2*
b^5*c^4 - 12*a*b^3*c^5 + 16*a^2*b*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
+ sqrt(b^2 - 4*a*c)*c)*b^5*c^2 + 6*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*a*b^3*c^3 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b
^2 - 4*a*c)*c)*b^4*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 -
4*a*c)*c)*a^2*b*c^4 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*a*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c
)*b^3*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b
*c^5 - 2*(b^2 - 4*a*c)*b^3*c^4 + 4*(b^2 - 4*a*c)*a*b*c^5)*h)*arctan(2*sqrt(
1/2)*x/sqrt((b*c^3 - sqrt(b^2*c^6 - 4*a*c^7))/c^4))/((a*b^4*c^3 - 8*a^2*b^2
*c^4 - 2*a*b^3*c^4 + 16*a^3*c^5 + 8*a^2*b*c^5 + a*b^2*c^5 - 4*a^2*c^6)*c^2)
 - 1/16*((b^6 - 8*a*b^4*c - 2*b^5*c + 16*a^2*b^2*c^2 + 8*a*b^3*c^2 + b^4*c^
2 - 4*a*b^2*c^3 - (b^5 - 8*a*b^3*c - 2*b^4*c + 16*a^2*b*c^2 + 8*a*b^2*c^2 +
 b^3*c^2 - 4*a*b*c^3)*sqrt(b^2 - 4*a*c))*g*abs(c) - 2*(b^5*c - 8*a*b^3*c^2
- 2*b^4*c^2 + 16*a^2*b*c^3 + 8*a*b^2*c^3 + b^3*c^3 - 4*a*b*c^4 - (b^4*c - 8
*a*b^2*c^2 - 2*b^3*c^2 + 16*a^2*c^3 + 8*a*b*c^3 + b^2*c^3 - 4*a*c^4)*sqrt(b
^2 - 4*a*c))*abs(c)*e + (b^6*c - 8*a*b^4*c^2 - 2*b^5*c^2 + 16*a^2*b^2*c^3 +
 8*a*b^3*c^3 + b^4*c^3 - 4*a*b^2*c^4 + (b^5*c - 4*a*b^3*c^2 - 2*b^4*c^2 + b
^3*c^3)*sqrt(b^2 - 4*a*c))*g - 2*(b^5*c^2 - 8*a*b^3*c^3 - 2*b^4*c^3 + 16*a^
2*b*c^4 + 8*a*b^2*c^4 + b^3*c^4 - 4*a*b*c^5 - (b^4*c^2 - 4*a*b^2*c^3 - 2*b^
3*c^3 + b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(b*c^3 + sqrt(b^2*c^6
- 4*a*c^7))/c^4)/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c
^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(c)) - 1/16*((b^6 - 8*a*b^4*c - 2*b^5*c
+ 16*a^2*b^2*c^2 + 8*a*b^3*c^2 + b^4*c^2 - 4*a*b^2*c^3 + (b^5 - 8*a*b^3*c -
 2*b^4*c + 16*a^2*b*c^2 + 8*a*b^2*c^2 + b^3*c^2 - 4*a*b*c^3)*sqrt(b^2 - 4*a
*c))*g*abs(c) - 2*(b^5*c - 8*a*b^3*c^2 - 2*b^4*c^2 + 16*a^2*b*c^3 + 8*a*b^2
*c^3 + b^3*c^3 - 4*a*b*c^4 + (b^4*c - 8*a*b^2*c^2 - 2*b^3*c^2 + 16*a^2*c^3
+ 8*a*b*c^3 + b^2*c^3 - 4*a*c^4)*sqrt(b^2 - 4*a*c))*abs(c)*e + (b^6*c - 8*a
*b^4*c^2 - 2*b^5*c^2 + 16*a^2*b^2*c^3 + 8*a*b^3*c^3 + b^4*c^3 - 4*a*b^2*c^4
 + (b^5*c - 4*a*b^3*c^2 - 2*b^4*c^2 + b^3*c^3)*sqrt(b^2 - 4*a*c))*g - 2*(b^
5*c^2 - 8*a*b^3*c^3 - 2*b^4*c^3 + 16*a^2*b*c^4 + 8*a*b^2*c^4 + b^3*c^4 - 4*
a*b*c^5 + (b^4*c^2 - 4*a*b^2*c^3 - 2*b^3*c^3 + b^2*c^4)*sqrt(b^2 - 4*a*c))*
e)*log(x^2 + 1/2*(b*c^3 - sqrt(b^2*c^6 - 4*a*c^7))/c^4)/((a*b^4 - 8*a^2*b^2
*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(
c))
```

maple [B] time = 0.04, size = 1132, normalized size = 3.90

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x)
```

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

```
ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*g-1/4*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*b/c*g
*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*e*ln(2
*c*x^2+b+(-4*a*c+b^2)^(1/2))+1/2*(-4*a*c+b^2)/(4*a*c-b^2)/c*2^(1/2)/((b+(-4
*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c
*x)*b*h-1/2*(-4*a*c+b^2)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/
2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f-(-4*a*c+b^2)^(1/2
)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*a*h+1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)/c*2
^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/
2))*c)^(1/2)*c*x)*b^2*h-1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(-4*
a*c+b^2)^(1/2))*c)^(1/2)*b*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2
)*c*x)+(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1
/2)*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="maxima")
```

```
[Out] h*x/c + integrate((c*g*x^3 + c*e*x + (c*f - b*h)*x^2 + c*d - a*h)/(c*x^4 +
b*x^2 + a), x)/c
```

mupad [B] time = 1.75, size = 5981, normalized size = 20.62

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4),x)
```

```
[Out] symsum(log((x*(c^3*e^3 + c^3*d^2*g + b^3*e*h^2 - a*b*c*g^3 - 2*c^3*d*e*f +
a*c^2*e*g^2 + b*c^2*e*f^2 - a*c^2*f^2*g - 2*b*c^2*e^2*g + b^2*c*e*g^2 - a*b
^2*g*h^2 + a^2*c*g*h^2 - 2*a*b*c*e*h^2 + 2*b*c^2*d*e*h - 2*a*c^2*d*g*h + 2*
a*c^2*e*f*h - 2*b^2*c*e*f*h + 2*a*b*c*f*g*h))/c - root(128*a^2*b^2*c^4*z^4
- 16*a*b^4*c^3*z^4 - 256*a^3*c^5*z^4 - 128*a^2*b^2*c^3*g*z^3 + 16*a*b^4*c^2
*g*z^3 + 256*a^3*c^4*g*z^3 + 32*a^2*b*c^3*e*g*z^2 + 32*a^2*b*c^3*d*h*z^2 -
8*a*b^3*c^2*e*g*z^2 - 8*a*b^3*c^2*d*h*z^2 + 16*a*b^2*c^3*d*f*z^2 + 8*a*b^4*
c*f*h*z^2 - 48*a^2*b^2*c^2*f*h*z^2 - 48*a^3*b*c^2*h^2*z^2 + 28*a^2*b^3*c*h^
2*z^2 + 16*a^2*b*c^3*f^2*z^2 - 4*a*b^3*c^2*f^2*z^2 + 8*a*b^2*c^3*e^2*z^2 +
64*a^3*c^3*f*h*z^2 - 64*a^2*c^4*d*f*z^2 - 4*a*b^4*c*g^2*z^2 + 16*a*b*c^4*d^
2*z^2 + 40*a^2*b^2*c^2*g^2*z^2 - 96*a^3*c^3*g^2*z^2 - 32*a^2*c^4*e^2*z^2 -
4*b^3*c^3*d^2*z^2 - 4*a*b^5*h^2*z^2 + 8*a^2*b^2*c*f*g*h*z + 32*a^2*b*c^2*e*
f*h*z - 8*a*b^2*c^2*d*f*g*z + 8*a*b^2*c^2*d*e*h*z - 8*a*b^3*c*e*f*h*z - 20*
a^2*b^2*c*e*h^2*z - 16*a^2*b*c^2*e*g^2*z - 4*a*b^2*c^2*e^2*g*z + 4*a*b^2*c^
2*e*f^2*z - 32*a^3*c^2*f*g*h*z + 32*a^2*c^3*d*f*g*z - 32*a^2*c^3*d*e*h*z +
16*a^3*b*c*g*h^2*z + 4*a*b^3*c*e*g^2*z - 16*a*b*c^3*d^2*g*z - 4*a^2*b^3*g*h
^2*z + 16*a^3*c^2*e*h^2*z + 16*a^2*c^3*e^2*g*z + 4*b^3*c^2*d^2*g*z - 16*a^2
*c^3*e*f^2*z - 4*b^2*c^3*d^2*e*z - 4*a^2*b^2*c*g^3*z + 4*a*b^4*e*h^2*z + 16
*a*c^4*d^2*e*z + 16*a^3*c^2*g^3*z - 4*a^2*b*c*e*f*g*h - 4*a*b*c^2*d*e*f*g +
 8*a^2*c^2*d*e*g*h - 2*a^2*b*c*d*g^2*h + 2*a*b^2*c*e^2*f*h - 4*a*b^2*c*d*f^
2*h - 2*a^2*b*c*d*f*h^2 - 2*a*b*c^2*d^2*f*h + 2*a*b^2*c*d*f*g^2 - 2*a*b*c^2
*d*e^2*h - 4*a^2*c^2*e^2*f*h + 2*a^2*b^2*e*g*h^2 + 4*a^2*c^2*e*f^2*g + 4*a^
2*c^2*d*f^2*h - 4*a^2*c^2*d*f*g^2 + 2*b^2*c^2*d^2*e*g + 3*a^2*b*c*e^2*h^2 +
 4*a*b^2*c*d^2*h^2 + 3*a*b*c^2*d^2*g^2 + 4*a^3*c*f*g^2*h - 4*a^3*c*e*g*h^2
+ 2*b^3*c*d^2*f*h + 2*a*b^3*d*f*h^2 - 4*a*c^3*d^2*e*g + 2*a^2*b*c*f^3*h + 4
*a*c^3*d*e^2*f + 2*a^2*b*c*e*g^3 + 2*a*b*c^2*e^3*g + 2*a*b*c^2*d*f^3 + 2*a^
3*b*f*h^3 + 4*a^3*c*d*h^3 + 4*a*c^3*d^3*h + 2*b*c^3*d^3*f - a^2*b*c*f^2*g^2
 - a*b^2*c*e^2*g^2 - a*b*c^2*e^2*f^2 - 6*a^2*c^2*d^2*h^2 - 2*a^2*c^2*e^2*g^
2 - 2*a^3*c*f^2*h^2 - 2*b^2*c^2*d^3*h - 2*a^2*b^2*d*h^3 - 2*a*c^3*d^2*f^2 -
```

```
a^2*b^2*f^2*h^2 - b^2*c^2*d^2*f^2 - a^3*b*g^2*h^2 - b^3*c*d^2*g^2 - a*b^3*
e^2*h^2 - b*c^3*d^2*e^2 - b^4*d^2*h^2 - a^2*c^2*f^4 - a^3*c*g^4 - a*c^3*e^4
 - a^4*h^4 - c^4*d^4, z, k)*(root(128*a^2*b^2*c^4*z^4 - 16*a*b^4*c^3*z^4 -
256*a^3*c^5*z^4 - 128*a^2*b^2*c^3*g*z^3 + 16*a*b^4*c^2*g*z^3 + 256*a^3*c^4*
g*z^3 + 32*a^2*b*c^3*e*g*z^2 + 32*a^2*b*c^3*d*h*z^2 - 8*a*b^3*c^2*e*g*z^2 -
 8*a*b^3*c^2*d*h*z^2 + 16*a*b^2*c^3*d*f*z^2 + 8*a*b^4*c*f*h*z^2 - 48*a^2*b^
2*c^2*f*h*z^2 - 48*a^3*b*c^2*h^2*z^2 + 28*a^2*b^3*c*h^2*z^2 + 16*a^2*b*c^3*
f^2*z^2 - 4*a*b^3*c^2*f^2*z^2 + 8*a*b^2*c^3*e^2*z^2 + 64*a^3*c^3*f*h*z^2 -
64*a^2*c^4*d*f*z^2 - 4*a*b^4*c*g^2*z^2 + 16*a*b*c^4*d^2*z^2 + 40*a^2*b^2*c^
2*g^2*z^2 - 96*a^3*c^3*g^2*z^2 - 32*a^2*c^4*e^2*z^2 - 4*b^3*c^3*d^2*z^2 - 4
*a*b^5*h^2*z^2 + 8*a^2*b^2*c*f*g*h*z + 32*a^2*b*c^2*e*f*h*z - 8*a*b^2*c^2*d
*f*g*z + 8*a*b^2*c^2*d*e*h*z - 8*a*b^3*c*e*f*h*z - 20*a^2*b^2*c*e*h^2*z - 1
6*a^2*b*c^2*e*g^2*z - 4*a*b^2*c^2*e^2*g*z + 4*a*b^2*c^2*e*f^2*z - 32*a^3*c^
2*f*g*h*z + 32*a^2*c^3*d*f*g*z - 32*a^2*c^3*d*e*h*z + 16*a^3*b*c*g*h^2*z +
4*a*b^3*c*e*g^2*z - 16*a*b*c^3*d^2*g*z - 4*a^2*b^3*g*h^2*z + 16*a^3*c^2*e*h
^2*z + 16*a^2*c^3*e^2*g*z + 4*b^3*c^2*d^2*g*z - 16*a^2*c^3*e*f^2*z - 4*b^2*
c^3*d^2*e*z - 4*a^2*b^2*c*g^3*z + 4*a*b^4*e*h^2*z + 16*a*c^4*d^2*e*z + 16*a
^3*c^2*g^3*z - 4*a^2*b*c*e*f*g*h - 4*a*b*c^2*d*e*f*g + 8*a^2*c^2*d*e*g*h -
2*a^2*b*c*d*g^2*h + 2*a*b^2*c*e^2*f*h - 4*a*b^2*c*d*f^2*h - 2*a^2*b*c*d*f*h
^2 - 2*a*b*c^2*d^2*f*h + 2*a*b^2*c*d*f*g^2 - 2*a*b*c^2*d*e^2*h - 4*a^2*c^2*
e^2*f*h + 2*a^2*b^2*e*g*h^2 + 4*a^2*c^2*e*f^2*g + 4*a^2*c^2*d*f^2*h - 4*a^2
*c^2*d*f*g^2 + 2*b^2*c^2*d^2*e*g + 3*a^2*b*c*e^2*h^2 + 4*a*b^2*c*d^2*h^2 +
3*a*b*c^2*d^2*g^2 + 4*a^3*c*f*g^2*h - 4*a^3*c*e*g*h^2 + 2*b^3*c*d^2*f*h + 2
*a*b^3*d*f*h^2 - 4*a*c^3*d^2*e*g + 2*a^2*b*c*f^3*h + 4*a*c^3*d*e^2*f + 2*a^
2*b*c*e*g^3 + 2*a*b*c^2*e^3*g + 2*a*b*c^2*d*f^3 + 2*a^3*b*f*h^3 + 4*a^3*c*d
*h^3 + 4*a*c^3*d^3*h + 2*b*c^3*d^3*f - a^2*b*c*f^2*g^2 - a*b^2*c*e^2*g^2 -
a*b*c^2*e^2*f^2 - 6*a^2*c^2*d^2*h^2 - 2*a^2*c^2*e^2*g^2 - 2*a^3*c*f^2*h^2 -
 2*b^2*c^2*d^3*h - 2*a^2*b^2*d*h^3 - 2*a*c^3*d^2*f^2 - a^2*b^2*f^2*h^2 - b^
2*c^2*d^2*f^2 - a^3*b*g^2*h^2 - b^3*c*d^2*g^2 - a*b^3*e^2*h^2 - b*c^3*d^2*e
^2 - b^4*d^2*h^2 - a^2*c^2*f^4 - a^3*c*g^4 - a*c^3*e^4 - a^4*h^4 - c^4*d^4,
 z, k)*((x*(4*b^2*c^3*e - 8*b^3*c^2*g - 16*a*c^4*e + 32*a*b*c^3*g))/c - (4*
b^2*c^3*d + 16*a^2*c^3*h - 16*a*c^4*d - 4*a*b^2*c^2*h)/c + (root(128*a^2*b^
2*c^4*z^4 - 16*a*b^4*c^3*z^4 - 256*a^3*c^5*z^4 - 128*a^2*b^2*c^3*g*z^3 + 16
*a*b^4*c^2*g*z^3 + 256*a^3*c^4*g*z^3 + 32*a^2*b*c^3*e*g*z^2 + 32*a^2*b*c^3*
d*h*z^2 - 8*a*b^3*c^2*e*g*z^2 - 8*a*b^3*c^2*d*h*z^2 + 16*a*b^2*c^3*d*f*z^2
+ 8*a*b^4*c*f*h*z^2 - 48*a^2*b^2*c^2*f*h*z^2 - 48*a^3*b*c^2*h^2*z^2 + 28*a^
2*b^3*c*h^2*z^2 + 16*a^2*b*c^3*f^2*z^2 - 4*a*b^3*c^2*f^2*z^2 + 8*a*b^2*c^3*
e^2*z^2 + 64*a^3*c^3*f*h*z^2 - 64*a^2*c^4*d*f*z^2 - 4*a*b^4*c*g^2*z^2 + 16*
a*b*c^4*d^2*z^2 + 40*a^2*b^2*c^2*g^2*z^2 - 96*a^3*c^3*g^2*z^2 - 32*a^2*c^4*
e^2*z^2 - 4*b^3*c^3*d^2*z^2 - 4*a*b^5*h^2*z^2 + 8*a^2*b^2*c*f*g*h*z + 32*a^
2*b*c^2*e*f*h*z - 8*a*b^2*c^2*d*f*g*z + 8*a*b^2*c^2*d*e*h*z - 8*a*b^3*c*e*f
*h*z - 20*a^2*b^2*c*e*h^2*z - 16*a^2*b*c^2*e*g^2*z - 4*a*b^2*c^2*e^2*g*z +
4*a*b^2*c^2*e*f^2*z - 32*a^3*c^2*f*g*h*z + 32*a^2*c^3*d*f*g*z - 32*a^2*c^3*
d*e*h*z + 16*a^3*b*c*g*h^2*z + 4*a*b^3*c*e*g^2*z - 16*a*b*c^3*d^2*g*z - 4*a
^2*b^3*g*h^2*z + 16*a^3*c^2*e*h^2*z + 16*a^2*c^3*e^2*g*z + 4*b^3*c^2*d^2*g*
z - 16*a^2*c^3*e*f^2*z - 4*b^2*c^3*d^2*e*z - 4*a^2*b^2*c*g^3*z + 4*a*b^4*e*
h^2*z + 16*a*c^4*d^2*e*z + 16*a^3*c^2*g^3*z - 4*a^2*b*c*e*f*g*h - 4*a*b*c^2
*d*e*f*g + 8*a^2*c^2*d*e*g*h - 2*a^2*b*c*d*g^2*h + 2*a*b^2*c*e^2*f*h - 4*a*
b^2*c*d*f^2*h - 2*a^2*b*c*d*f*h^2 - 2*a*b*c^2*d^2*f*h + 2*a*b^2*c*d*f*g^2 -
 2*a*b*c^2*d*e^2*h - 4*a^2*c^2*e^2*f*h + 2*a^2*b^2*e*g*h^2 + 4*a^2*c^2*e*f^
2*g + 4*a^2*c^2*d*f^2*h - 4*a^2*c^2*d*f*g^2 + 2*b^2*c^2*d^2*e*g + 3*a^2*b*c
*e^2*h^2 + 4*a*b^2*c*d^2*h^2 + 3*a*b*c^2*d^2*g^2 + 4*a^3*c*f*g^2*h - 4*a^3*
c*e*g*h^2 + 2*b^3*c*d^2*f*h + 2*a*b^3*d*f*h^2 - 4*a*c^3*d^2*e*g + 2*a^2*b*c
*f^3*h + 4*a*c^3*d*e^2*f + 2*a^2*b*c*e*g^3 + 2*a*b*c^2*e^3*g + 2*a*b*c^2*d*
f^3 + 2*a^3*b*f*h^3 + 4*a^3*c*d*h^3 + 4*a*c^3*d^3*h + 2*b*c^3*d^3*f - a^2*b
*c*f^2*g^2 - a*b^2*c*e^2*g^2 - a*b*c^2*e^2*f^2 - 6*a^2*c^2*d^2*h^2 - 2*a^2*
c^2*e^2*g^2 - 2*a^3*c*f^2*h^2 - 2*b^2*c^2*d^3*h - 2*a^2*b^2*d*h^3 - 2*a*c^3
*d^2*f^2 - a^2*b^2*f^2*h^2 - b^2*c^2*d^2*f^2 - a^3*b*g^2*h^2 - b^3*c*d^2*g^
2 - a*b^3*e^2*h^2 - b*c^3*d^2*e^2 - b^4*d^2*h^2 - a^2*c^2*f^4 - a^3*c*g^4 -
```

```
 a*c^3*e^4 - a^4*h^4 - c^4*d^4, z, k)*x*(8*b^3*c^3 - 32*a*b*c^4))/c) - (4*b
*c^3*d*e + 8*a*c^3*d*g - 8*a*c^3*e*f - 4*b^2*c^2*d*g - 8*a^2*c^2*g*h + 4*a*
b*c^2*e*h + 4*a*b*c^2*f*g)/c + (x*(4*c^4*d^2 + 2*b^4*h^2 - 4*a*c^3*f^2 - 2*
b*c^3*e^2 + 2*b^3*c*g^2 + 2*b^2*c^2*f^2 + 4*a^2*c^2*h^2 - 4*b*c^3*d*f - 8*a
*c^3*d*h + 8*a*c^3*e*g - 4*b^3*c*f*h - 10*a*b*c^2*g^2 - 8*a*b^2*c*h^2 + 4*b
^2*c^2*d*h + 12*a*b*c^2*f*h))/c) - (a*c^2*f^3 - a^2*b*h^3 - c^3*d*e^2 + c^3
*d^2*f - b^3*d*h^2 + a*c^2*d*g^2 - b*c^2*d*f^2 - b^2*c*d*g^2 + a*b^2*f*h^2
+ a*c^2*e^2*h - b*c^2*d^2*h + a^2*c*f*h^2 - a^2*c*g^2*h + 2*a*b*c*d*h^2 + a
*b*c*f*g^2 - 2*a*b*c*f^2*h + 2*b*c^2*d*e*g - 2*a*c^2*d*f*h - 2*a*c^2*e*f*g
+ 2*b^2*c*d*f*h)/c)*root(128*a^2*b^2*c^4*z^4 - 16*a*b^4*c^3*z^4 - 256*a^3*c
^5*z^4 - 128*a^2*b^2*c^3*g*z^3 + 16*a*b^4*c^2*g*z^3 + 256*a^3*c^4*g*z^3 + 3
2*a^2*b*c^3*e*g*z^2 + 32*a^2*b*c^3*d*h*z^2 - 8*a*b^3*c^2*e*g*z^2 - 8*a*b^3*
c^2*d*h*z^2 + 16*a*b^2*c^3*d*f*z^2 + 8*a*b^4*c*f*h*z^2 - 48*a^2*b^2*c^2*f*h
*z^2 - 48*a^3*b*c^2*h^2*z^2 + 28*a^2*b^3*c*h^2*z^2 + 16*a^2*b*c^3*f^2*z^2 -
 4*a*b^3*c^2*f^2*z^2 + 8*a*b^2*c^3*e^2*z^2 + 64*a^3*c^3*f*h*z^2 - 64*a^2*c^
4*d*f*z^2 - 4*a*b^4*c*g^2*z^2 + 16*a*b*c^4*d^2*z^2 + 40*a^2*b^2*c^2*g^2*z^2
 - 96*a^3*c^3*g^2*z^2 - 32*a^2*c^4*e^2*z^2 - 4*b^3*c^3*d^2*z^2 - 4*a*b^5*h^
2*z^2 + 8*a^2*b^2*c*f*g*h*z + 32*a^2*b*c^2*e*f*h*z - 8*a*b^2*c^2*d*f*g*z +
8*a*b^2*c^2*d*e*h*z - 8*a*b^3*c*e*f*h*z - 20*a^2*b^2*c*e*h^2*z - 16*a^2*b*c
^2*e*g^2*z - 4*a*b^2*c^2*e^2*g*z + 4*a*b^2*c^2*e*f^2*z - 32*a^3*c^2*f*g*h*z
 + 32*a^2*c^3*d*f*g*z - 32*a^2*c^3*d*e*h*z + 16*a^3*b*c*g*h^2*z + 4*a*b^3*c
*e*g^2*z - 16*a*b*c^3*d^2*g*z - 4*a^2*b^3*g*h^2*z + 16*a^3*c^2*e*h^2*z + 16
*a^2*c^3*e^2*g*z + 4*b^3*c^2*d^2*g*z - 16*a^2*c^3*e*f^2*z - 4*b^2*c^3*d^2*e
*z - 4*a^2*b^2*c*g^3*z + 4*a*b^4*e*h^2*z + 16*a*c^4*d^2*e*z + 16*a^3*c^2*g^
3*z - 4*a^2*b*c*e*f*g*h - 4*a*b*c^2*d*e*f*g + 8*a^2*c^2*d*e*g*h - 2*a^2*b*c
*d*g^2*h + 2*a*b^2*c*e^2*f*h - 4*a*b^2*c*d*f^2*h - 2*a^2*b*c*d*f*h^2 - 2*a*
b*c^2*d^2*f*h + 2*a*b^2*c*d*f*g^2 - 2*a*b*c^2*d*e^2*h - 4*a^2*c^2*e^2*f*h +
 2*a^2*b^2*e*g*h^2 + 4*a^2*c^2*e*f^2*g + 4*a^2*c^2*d*f^2*h - 4*a^2*c^2*d*f*
g^2 + 2*b^2*c^2*d^2*e*g + 3*a^2*b*c*e^2*h^2 + 4*a*b^2*c*d^2*h^2 + 3*a*b*c^2
*d^2*g^2 + 4*a^3*c*f*g^2*h - 4*a^3*c*e*g*h^2 + 2*b^3*c*d^2*f*h + 2*a*b^3*d*
f*h^2 - 4*a*c^3*d^2*e*g + 2*a^2*b*c*f^3*h + 4*a*c^3*d*e^2*f + 2*a^2*b*c*e*g
^3 + 2*a*b*c^2*e^3*g + 2*a*b*c^2*d*f^3 + 2*a^3*b*f*h^3 + 4*a^3*c*d*h^3 + 4*
a*c^3*d^3*h + 2*b*c^3*d^3*f - a^2*b*c*f^2*g^2 - a*b^2*c*e^2*g^2 - a*b*c^2*e
^2*f^2 - 6*a^2*c^2*d^2*h^2 - 2*a^2*c^2*e^2*g^2 - 2*a^3*c*f^2*h^2 - 2*b^2*c^
2*d^3*h - 2*a^2*b^2*d*h^3 - 2*a*c^3*d^2*f^2 - a^2*b^2*f^2*h^2 - b^2*c^2*d^2
*f^2 - a^3*b*g^2*h^2 - b^3*c*d^2*g^2 - a*b^3*e^2*h^2 - b*c^3*d^2*e^2 - b^4*
d^2*h^2 - a^2*c^2*f^4 - a^3*c*g^4 - a*c^3*e^4 - a^4*h^4 - c^4*d^4, z, k), k
, 1, 4) + (h*x)/c
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a),x)
```

```
[Out] Timed out
```

3.24 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{a+bx^2+cx^4} dx$

Optimal. Leaf size=321

$$-\frac{\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)\left(-2aci+b^2i-bcg+2c^2e\right)}{2c^2\sqrt{b^2-4ac}}+\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}}-bh+cf\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\tan^{-1}\left(\frac{\cdots}{\sqrt{\cdots}}\right)\cdots}{\cdots}$$

```
[Out] h*x/c+1/2*i*x^2/c+1/4*(-b*i+c*g)*ln(c*x^4+b*x^2+a)/c^2-1/2*(-2*a*c*i+b^2*i-
b*c*g+2*c^2*e)*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/c^2/(-4*a*c+b^2)^(1/
2)+1/2*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))*(c*f-b*h+(2*c
^2*d+b^2*h-c*(2*a*h+b*f))/(-4*a*c+b^2)^(1/2))/c^(3/2)*2^(1/2)/(b-(-4*a*c+b^
2)^(1/2))^(1/2)+1/2*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*
(c*f-b*h+(2*a*c*h-b^2*h+b*c*f-2*c^2*d)/(-4*a*c+b^2)^(1/2))/c^(3/2)*2^(1/2)/
(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 0.53, antiderivative size = 321, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 10, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {1673, 1676, 1166, 205, 1663, 1657, 634, 618, 206, 628}

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}}-bh+cf\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)\left(-\frac{-2ach+b^2h-bcf+2c^2d}{\sqrt{b^2-4ac}}-bh+cf\right)}{\sqrt{2}c^{3/2}\sqrt{\sqrt{b^2-4ac}+b}}-\frac{\tanh\cdots}{\cdots}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4),x]
```

```
[Out] (h*x)/c + (i*x^2)/(2*c) + ((c*f - b*h + (2*c^2*d + b^2*h - c*(b*f + 2*a*h))
/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]]
)/(Sqrt[2]*c^(3/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((c*f - b*h - (2*c^2*d -
b*c*f + b^2*h - 2*a*c*h)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt
[b + Sqrt[b^2 - 4*a*c]]])/(Sqrt[2]*c^(3/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - (
(2*c^2*e - b*c*g + b^2*i - 2*a*c*i)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]
])/(2*c^2*Sqrt[b^2 - 4*a*c]) + ((c*g - b*i)*Log[a + b*x^2 + c*x^4])/(4*c^2)
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
```

```
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1676

```
Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> Int[ExpandInte
grand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+24x^5}{a+bx^2+cx^4}\,dx = \int \frac{x\left(e+gx^2+24x^4\right)}{a+bx^2+cx^4}\,dx + \int \frac{d+fx^2+hx^4}{a+bx^2+cx^4}\,dx$$

$$= \frac{1}{2}\text{Subst}\left(\int \frac{e+gx+24x^2}{a+bx+cx^2}\,dx, x, x^2\right) + \int \left(\frac{h}{c} + \frac{cd-ah+(cf-bh)}{c\left(a+bx^2+cx^4\right)}\right.$$

$$= \frac{hx}{c} + \frac{1}{2}\text{Subst}\left(\int \left(\frac{24}{c} - \frac{24a-ce+(24b-cg)x}{c\left(a+bx+cx^2\right)}\right) dx, x, x^2\right) + \frac{\int \frac{cd-}{}}{}$$

$$= \frac{hx}{c} + \frac{12x^2}{c} - \frac{\text{Subst}\left(\int \frac{24a-ce+(24b-cg)x}{a+bx+cx^2}\,dx, x, x^2\right)}{2c} + \frac{\left(cf-bh-\frac{2c^2d-b}{\sqrt{}}\right.}{}$$

$$= \frac{hx}{c} + \frac{12x^2}{c} + \frac{\left(cf-bh+\frac{2c^2d+b^2h-c(bf+2ah)}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{(}{}$$

$$= \frac{hx}{c} + \frac{12x^2}{c} + \frac{\left(cf-bh+\frac{2c^2d+b^2h-c(bf+2ah)}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{(}{}$$

$$= \frac{hx}{c} + \frac{12x^2}{c} + \frac{\left(cf-bh+\frac{2c^2d+b^2h-c(bf+2ah)}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{(}{}$$

Mathematica [**A**] time = 0.65, size = 441, normalized size = 1.37

$$\frac{2\sqrt{2}\sqrt{c}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(c\left(f\sqrt{b^2-4ac}-2ah-bf\right)+bh\left(b-\sqrt{b^2-4ac}\right)+2c^2d\right)}{\sqrt{b^2-4ac}\sqrt{b-\sqrt{b^2-4ac}}} - \frac{2\sqrt{2}\sqrt{c}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)\left(-c\left(f\sqrt{b^2-4ac}+2ah+bf\right)+bh\left(\sqrt{}\right.\right.}{\sqrt{b^2-4ac}\sqrt{\sqrt{b^2-4ac}+b}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4),x]
```

```
[Out] (4*c*h*x + 2*c*i*x^2 + (2*Sqrt[2]*Sqrt[c]*(2*c^2*d + b*(b - Sqrt[b^2 - 4*a*
c])*h + c*(-(b*f) + Sqrt[b^2 - 4*a*c]*f - 2*a*h))*ArcTan[(Sqrt[2]*Sqrt[c]*x
)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(Sqrt[b^2 - 4*a*c]*Sqrt[b - Sqrt[b^2 - 4*a*
c]]) - (2*Sqrt[2]*Sqrt[c]*(2*c^2*d + b*(b + Sqrt[b^2 - 4*a*c])*h - c*(b*f +
 Sqrt[b^2 - 4*a*c]*f + 2*a*h))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2
 - 4*a*c]]])/(Sqrt[b^2 - 4*a*c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((2*c^2*e +
b*(b - Sqrt[b^2 - 4*a*c])*i + c*(-(b*g) + Sqrt[b^2 - 4*a*c]*g - 2*a*i))*Log
[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/Sqrt[b^2 - 4*a*c] - ((2*c^2*e + b*(b +
Sqrt[b^2 - 4*a*c])*i - c*(b*g + Sqrt[b^2 - 4*a*c]*g + 2*a*i))*Log[b + Sqrt[
b^2 - 4*a*c] + 2*c*x^2])/Sqrt[b^2 - 4*a*c])/(4*c^2)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="fri
cas")
```

[Out] Timed out

giac [B] time = 3.72, size = 6096, normalized size = 18.99

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="gia
c")
```

```
[Out] 1/4*(c*g - b*i)*log(abs(c*x^4 + b*x^2 + a))/c^2 + 1/2*(c*i*x^2 + 2*c*h*x)/c
^2 + 1/8*((2*b^4*c^3 - 16*a*b^2*c^4 + 32*a^2*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c
)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
 - sqrt(b^2 - 4*a*c)*c)*b^3*c^2 - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - s
qrt(b^2 - 4*a*c)*c)*a^2*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b
^2 - 4*a*c)*c)*a*b*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*
a*c)*c)*b^2*c^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*
c)*a*c^4 - 2*(b^2 - 4*a*c)*b^2*c^3 + 8*(b^2 - 4*a*c)*a*c^4)*c^2*f - (2*b^5*
c^2 - 16*a*b^3*c^3 + 32*a^2*b*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sq
rt(b^2 - 4*a*c)*c)*b^5 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 -
4*a*c)*c)*a*b^3*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c
)*c)*b^4*c - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a
^2*b*c^2 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^
2*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^2 +
 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^3 - 2*(b
^2 - 4*a*c)*b^3*c^2 + 8*(b^2 - 4*a*c)*a*b*c^3)*c^2*h + 2*(sqrt(2)*sqrt(b*c
- sqrt(b^2 - 4*a*c)*c)*b^4*c^3 - 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*
a*b^2*c^4 - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^4 + 2*b^4*c^4 +
 16*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c^5 + 8*sqrt(2)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*a*b*c^5 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*
c^5 - 16*a*b^2*c^5 - 4*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*c^6 + 32*a
^2*c^6 - 2*(b^2 - 4*a*c)*b^2*c^4 + 8*(b^2 - 4*a*c)*a*c^5)*d*abs(c) - 2*(sqr
t(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 - 8*sqrt(2)*sqrt(b*c - sqrt(
b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b
^3*c^3 + 2*a*b^4*c^3 + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^4 +
 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 + sqrt(2)*sqrt(b*c - s
qrt(b^2 - 4*a*c)*c)*a*b^2*c^4 - 16*a^2*b^2*c^4 - 4*sqrt(2)*sqrt(b*c - sqrt(
b^2 - 4*a*c)*c)*a^2*c^5 + 32*a^3*c^5 - 2*(b^2 - 4*a*c)*a*b^2*c^3 + 8*(b^2 -
 4*a*c)*a^2*c^4)*h*abs(c) + 2*(2*b^3*c^6 - 8*a*b*c^7 - sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^4 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^5 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*b*c^6 - 2*(b^2 - 4*a*c)*b*c^6)*d - (2*b^4*c^5 - 8*a*b^
2*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c^3 +
 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 + 2*
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^4 - sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^5 - 2*(b^2 - 4*a*c
)*b^2*c^5)*f + (2*b^5*c^4 - 12*a*b^3*c^5 + 16*a^2*b*c^6 - sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^5*c^2 + 6*sqrt(2)*sqrt(b^2 - 4*a
*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - s
qrt(b^2 - 4*a*c)*c)*b^3*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b
^2 - 4*a*c)*c)*a*b*c^5 - 2*(b^2 - 4*a*c)*b^3*c^4 + 4*(b^2 - 4*a*c)*a*b*c^5)
*h)*arctan(2*sqrt(1/2)*x/sqrt((b*c^5 + sqrt(b^2*c^10 - 4*a*c^11))/c^6))/((a
*b^4*c^3 - 8*a^2*b^2*c^4 - 2*a*b^3*c^4 + 16*a^3*c^5 + 8*a^2*b*c^5 + a*b^2*c
^5 - 4*a^2*c^6)*c^2) - 1/8*((2*b^4*c^3 - 16*a*b^2*c^4 + 32*a^2*c^5 - sqrt(2
)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c + 8*sqrt(2)*sqrt(
```

```
b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^2 + 2*sqrt(2)*sqrt(b^2
 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^2 - 16*sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b
*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c +
sqrt(b^2 - 4*a*c)*c)*a*c^4 - 2*(b^2 - 4*a*c)*b^2*c^3 + 8*(b^2 - 4*a*c)*a*c^
4)*c^2*f - (2*b^5*c^2 - 16*a*b^3*c^3 + 32*a^2*b*c^4 - sqrt(2)*sqrt(b^2 - 4*
a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
+ sqrt(b^2 - 4*a*c)*c)*b^4*c - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt
(b^2 - 4*a*c)*c)*a^2*b*c^2 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^
2 - 4*a*c)*c)*a*b^2*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4
*a*c)*c)*b^3*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*a*b*c^3 - 2*(b^2 - 4*a*c)*b^3*c^2 + 8*(b^2 - 4*a*c)*a*b*c^3)*c^2*h - 2*
(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c^3 - 8*sqrt(2)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*a*b^2*c^4 - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3
*c^4 - 2*b^4*c^4 + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^5 + 8*s
qrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^5 + sqrt(2)*sqrt(b*c + sqrt(b^
2 - 4*a*c)*c)*b^2*c^5 + 16*a*b^2*c^5 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*
c)*c)*a*c^6 - 32*a^2*c^6 + 2*(b^2 - 4*a*c)*b^2*c^4 - 8*(b^2 - 4*a*c)*a*c^5)
*d*abs(c) + 2*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 - 8*sqrt(2
)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 2*sqrt(2)*sqrt(b*c + sqrt(b
^2 - 4*a*c)*c)*a*b^3*c^3 - 2*a*b^4*c^3 + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4
*a*c)*c)*a^3*c^4 + 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 + sq
rt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 + 16*a^2*b^2*c^4 - 4*sqrt(2
)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^5 - 32*a^3*c^5 + 2*(b^2 - 4*a*c)*a*
b^2*c^3 - 8*(b^2 - 4*a*c)*a^2*c^4)*h*abs(c) + 2*(2*b^3*c^6 - 8*a*b*c^7 - sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^4 + 4*sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^5 + 2*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^5 - sqrt(2)*sqrt(b^2 -
4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b*c^6 - 2*(b^2 - 4*a*c)*b*c^6)*d - (
2*b^4*c^5 - 8*a*b^2*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4
*a*c)*c)*b^4*c^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*a*b^2*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)
*b^3*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^
5 - 2*(b^2 - 4*a*c)*b^2*c^5)*f + (2*b^5*c^4 - 12*a*b^3*c^5 + 16*a^2*b*c^6 -
 sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^2 + 6*sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 + 2*sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c^3 - 8*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 - 4*sqrt(2)*sqrt(b^
2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^5 - 2*(b^2 - 4*a*c)*b^3*c^4 + 4*(b^2
 - 4*a*c)*a*b*c^5)*h)*arctan(2*sqrt(1/2)*x/sqrt((b*c^5 - sqrt(b^2*c^10 - 4*
a*c^11))/c^6))/((a*b^4*c^3 - 8*a^2*b^2*c^4 - 2*a*b^3*c^4 + 16*a^3*c^5 + 8*a
^2*b*c^5 + a*b^2*c^5 - 4*a^2*c^6)*c^2) + 1/16*(b^7*c - 10*a*b^5*c^2 - 2*b^6
*c^2 + 32*a^2*b^3*c^3 + 12*a*b^4*c^3 + b^5*c^3 - 32*a^3*b*c^4 - 16*a^2*b^2*
c^4 - 6*a*b^3*c^4 + 8*a^2*b*c^5 + (b^7 - 10*a*b^5*c - 2*b^6*c + 32*a^2*b^3*
c^2 + 12*a*b^4*c^2 + b^5*c^2 - 32*a^3*b*c^3 - 16*a^2*b^2*c^3 - 6*a*b^3*c^3
+ 8*a^2*b*c^4 - (b^6 - 10*a*b^4*c - 2*b^5*c + 32*a^2*b^2*c^2 + 12*a*b^3*c^2
 + b^4*c^2 - 32*a^3*c^3 - 16*a^2*b*c^3 - 6*a*b^2*c^3 + 8*a^2*c^4)*sqrt(b^2
- 4*a*c))*abs(c) - (b^6*c - 6*a*b^4*c^2 - 2*b^5*c^2 + 8*a^2*b^2*c^3 + 4*a*b
^3*c^3 + b^4*c^3 - 2*a*b^2*c^4)*sqrt(b^2 - 4*a*c))*i*log(x^2 + 1/2*(b*c^5 +
 sqrt(b^2*c^10 - 4*a*c^11))/c^6)/((a*b^4*c - 8*a^2*b^2*c^2 - 2*a*b^3*c^2 +
16*a^3*c^3 + 8*a^2*b*c^3 + a*b^2*c^3 - 4*a^2*c^4)*c^2*abs(c)) + 1/16*(b^7*c
 - 10*a*b^5*c^2 - 2*b^6*c^2 + 32*a^2*b^3*c^3 + 12*a*b^4*c^3 + b^5*c^3 - 32*
a^3*b*c^4 - 16*a^2*b^2*c^4 - 6*a*b^3*c^4 + 8*a^2*b*c^5 + (b^7 - 10*a*b^5*c
- 2*b^6*c + 32*a^2*b^3*c^2 + 12*a*b^4*c^2 + b^5*c^2 - 32*a^3*b*c^3 - 16*a^2
*b^2*c^3 - 6*a*b^3*c^3 + 8*a^2*b*c^4 + (b^6 - 10*a*b^4*c - 2*b^5*c + 32*a^2
```

```
*b^2*c^2 + 12*a*b^3*c^2 + b^4*c^2 - 32*a^3*c^3 - 16*a^2*b*c^3 - 6*a*b^2*c^3
 + 8*a^2*c^4)*sqrt(b^2 - 4*a*c))*abs(c) + (b^6*c - 6*a*b^4*c^2 - 2*b^5*c^2
+ 8*a^2*b^2*c^3 + 4*a*b^3*c^3 + b^4*c^3 - 2*a*b^2*c^4)*sqrt(b^2 - 4*a*c))*i
*log(x^2 + 1/2*(b*c^5 - sqrt(b^2*c^10 - 4*a*c^11))/c^6)/((a*b^4*c - 8*a^2*b
^2*c^2 - 2*a*b^3*c^2 + 16*a^3*c^3 + 8*a^2*b*c^3 + a*b^2*c^3 - 4*a^2*c^4)*c^
2*abs(c)) - 1/16*((b^6 - 8*a*b^4*c - 2*b^5*c + 16*a^2*b^2*c^2 + 8*a*b^3*c^2
 + b^4*c^2 - 4*a*b^2*c^3 - (b^5 - 8*a*b^3*c - 2*b^4*c + 16*a^2*b*c^2 + 8*a*
b^2*c^2 + b^3*c^2 - 4*a*b*c^3)*sqrt(b^2 - 4*a*c))*g*abs(c) - 2*(b^5*c - 8*a
*b^3*c^2 - 2*b^4*c^2 + 16*a^2*b*c^3 + 8*a*b^2*c^3 + b^3*c^3 - 4*a*b*c^4 - (
b^4*c - 8*a*b^2*c^2 - 2*b^3*c^2 + 16*a^2*c^3 + 8*a*b*c^3 + b^2*c^3 - 4*a*c^
4)*sqrt(b^2 - 4*a*c))*abs(c)*e + (b^6*c - 8*a*b^4*c^2 - 2*b^5*c^2 + 16*a^2*
b^2*c^3 + 8*a*b^3*c^3 + b^4*c^3 - 4*a*b^2*c^4 - (b^5*c - 4*a*b^3*c^2 - 2*b^
4*c^2 + b^3*c^3)*sqrt(b^2 - 4*a*c))*g - 2*(b^5*c^2 - 8*a*b^3*c^3 - 2*b^4*c^
3 + 16*a^2*b*c^4 + 8*a*b^2*c^4 + b^3*c^4 - 4*a*b*c^5 - (b^4*c^2 - 4*a*b^2*c
^3 - 2*b^3*c^3 + b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(b*c^5 + sqrt
(b^2*c^10 - 4*a*c^11))/c^6)/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2
+ 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(c)) - 1/16*((b^6 - 8*a*b^4*c
 - 2*b^5*c + 16*a^2*b^2*c^2 + 8*a*b^3*c^2 + b^4*c^2 - 4*a*b^2*c^3 + (b^5 -
8*a*b^3*c - 2*b^4*c + 16*a^2*b*c^2 + 8*a*b^2*c^2 + b^3*c^2 - 4*a*b*c^3)*sqr
t(b^2 - 4*a*c))*g*abs(c) - 2*(b^5*c - 8*a*b^3*c^2 - 2*b^4*c^2 + 16*a^2*b*c^
3 + 8*a*b^2*c^3 + b^3*c^3 - 4*a*b*c^4 + (b^4*c - 8*a*b^2*c^2 - 2*b^3*c^2 +
16*a^2*c^3 + 8*a*b*c^3 + b^2*c^3 - 4*a*c^4)*sqrt(b^2 - 4*a*c))*abs(c)*e + (
b^6*c - 8*a*b^4*c^2 - 2*b^5*c^2 + 16*a^2*b^2*c^3 + 8*a*b^3*c^3 + b^4*c^3 -
4*a*b^2*c^4 + (b^5*c - 4*a*b^3*c^2 - 2*b^4*c^2 + b^3*c^3)*sqrt(b^2 - 4*a*c)
)*g - 2*(b^5*c^2 - 8*a*b^3*c^3 - 2*b^4*c^3 + 16*a^2*b*c^4 + 8*a*b^2*c^4 + b
^3*c^4 - 4*a*b*c^5 + (b^4*c^2 - 4*a*b^2*c^3 - 2*b^3*c^3 + b^2*c^4)*sqrt(b^2
 - 4*a*c))*e)*log(x^2 + 1/2*(b*c^5 - sqrt(b^2*c^10 - 4*a*c^11))/c^6)/((a*b^
4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*
c^3)*c^2*abs(c))
```

maple [B] time = 0.04, size = 1435, normalized size = 4.47

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x)
```

```
[Out] -1/2*(-4*a*c+b^2)/(4*a*c-b^2)/c*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*a
rctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*h+1/2*(-4*a*c+b^2)^
(1/2)/(4*a*c-b^2)/c*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/
2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^2*h+1/2*(-4*a*c+b^2)/(4*a*c-b^2
)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b/c*h*arctan(2^(1/2)/((b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*c*x)+1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*b^2/c*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*
c)^(1/2)*c*x)-1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^
(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*f+
c*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*
arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*d-1/2*(-4*a*c+b^2)^(
1/2)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b*f*arctan(2^(1/2
)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1
/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*c*x)+1/2*(-4*a*c+b^2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f-1/2
*(-4*a*c+b^2)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*f*arctan
(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+1/4*(-4*a*c+b^2)^(1/2)/(4*a*
c-b^2)*b/c*g*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))-1/4*(-4*a*c+b^2)^(1/2)/(4*a*
c-b^2)*b/c*g*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+1/c*h*x-1/2*(-4*a*c+b^2)^(1/2
)/(4*a*c-b^2)*e*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))+1/2*(-4*a*c+b^2)^(1/2)/(4
*a*c-b^2)*e*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))-(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)
*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*a*h*arctan(2^(1/2)/((b+(-4*a*c+b^
```

```
2)^(1/2))*c)^(1/2)*c*x)-(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x
)*a*h-1/4*(-4*a*c+b^2)/(4*a*c-b^2)/c*g*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))-1/
4*(-4*a*c+b^2)/(4*a*c-b^2)/c*g*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+1/2*i*x^2/c
+1/4*(-4*a*c+b^2)/(4*a*c-b^2)/c^2*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*b*i+1/2
*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)/c*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*a*i-1/4
*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)/c^2*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*b^2*i
+1/4*(-4*a*c+b^2)/(4*a*c-b^2)/c^2*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*b*i-1/2*
(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)/c*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*a*i+1/4*(
-4*a*c+b^2)^(1/2)/(4*a*c-b^2)/c^2*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*b^2*i
```

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

$$\frac{ix^2 + 2\,hx}{2\,c} - \frac{-\int \frac{\left(cg-bi\right)x^3+\left(cf-bh\right)x^2+cd-ah+\left(ce-ai\right)x}{cx^4+bx^2+a}\,dx}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="max
ima")
```

```
[Out] 1/2*(i*x^2 + 2*h*x)/c - integrate(-((c*g - b*i)*x^3 + (c*f - b*h)*x^2 + c*d
 - a*h + (c*e - a*i)*x)/(c*x^4 + b*x^2 + a), x)/c
```

mupad [B] time = 2.03, size = 11383, normalized size = 35.46

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4),x)
```

```
[Out] symsum(log((x*(c^4*e^3 - a^3*c*i^3 + c^4*d^2*g + b^4*e*i^2 + a^2*b^2*i^3 +
b^2*c^2*e*g^2 + 3*a^2*c^2*e*i^2 + a^2*c^2*g*h^2 + 2*b^2*c^2*e^2*i - a^2*c^2
*g^2*i - 2*c^4*d*e*f - a*b*c^2*g^3 + a*c^3*e*g^2 + b*c^3*e*f^2 - a*c^3*f^2*
g - 2*b*c^3*e^2*g - 3*a*c^3*e^2*i - b*c^3*d^2*i + b^3*c*e*h^2 - a*b^3*g*i^2
 - 2*a*b*c^2*e*h^2 - 3*a*b^2*c*e*i^2 - a*b^2*c*g*h^2 + 2*a*b^2*c*g^2*i + a^
2*b*c*h^2*i - 2*b^2*c^2*e*f*h - 2*a^2*c^2*f*h*i + 2*b*c^3*d*e*h + 2*a*c^3*d
*f*i - 2*a*c^3*d*g*h + 2*a*c^3*e*f*h - 2*b^3*c*e*g*i + 2*a*b*c^2*e*g*i + 2*
a*b*c^2*f*g*h))/c^2 - (a*c^3*f^3 - c^4*d*e^2 + c^4*d^2*f - b^4*d*i^2 - b^2*
c^2*d*g^2 - a^2*c^2*d*i^2 + a^2*c^2*f*h^2 - a^2*c^2*g^2*h - a^2*b^2*h*i^2 -
 a^2*b*c*h^3 + a*c^3*d*g^2 - b*c^3*d*f^2 + a*c^3*e^2*h - b*c^3*d^2*h - b^3*
c*d*h^2 + a*b^3*f*i^2 + a^3*c*h*i^2 + 2*a*b*c^2*d*h^2 + a*b*c^2*f*g^2 + 3*a
*b^2*c*d*i^2 - 2*a*b*c^2*f^2*h + a*b^2*c*f*h^2 - 2*a^2*b*c*f*i^2 - 2*b^2*c^
2*d*e*i + 2*b^2*c^2*d*f*h - 2*a^2*c^2*e*h*i + 2*a^2*c^2*f*g*i + 2*b*c^3*d*e
*g + 2*a*c^3*d*e*i - 2*a*c^3*d*f*h - 2*a*c^3*e*f*g + 2*b^3*c*d*g*i - 4*a*b*
c^2*d*g*i + 2*a*b*c^2*e*f*i - 2*a*b^2*c*f*g*i + 2*a^2*b*c*g*h*i)/c^2 - root
(128*a^2*b^2*c^5*z^4 - 16*a*b^4*c^4*z^4 - 256*a^3*c^6*z^4 + 128*a^2*b^3*c^3
*i*z^3 - 128*a^2*b^2*c^4*g*z^3 - 256*a^3*b*c^4*i*z^3 - 16*a*b^5*c^2*i*z^3 +
 16*a*b^4*c^3*g*z^3 + 256*a^3*c^5*g*z^3 + 160*a^3*b*c^3*g*i*z^2 + 8*a*b^4*c
^2*f*h*z^2 + 8*a*b^4*c^2*e*i*z^2 + 32*a^2*b*c^4*e*g*z^2 + 32*a^2*b*c^4*d*h*
z^2 - 8*a*b^3*c^3*e*g*z^2 - 8*a*b^3*c^3*d*h*z^2 + 16*a*b^2*c^4*d*f*z^2 + 8*
a*b^5*c*g*i*z^2 - 72*a^2*b^3*c^2*g*i*z^2 - 48*a^2*b^2*c^3*f*h*z^2 - 48*a^2*
b^2*c^3*e*i*z^2 + 32*a^2*b^4*c*i^2*z^2 - 48*a^3*b*c^3*h^2*z^2 - 4*a*b^4*c^2
*g^2*z^2 + 16*a^2*b*c^4*f^2*z^2 - 4*a*b^3*c^3*f^2*z^2 + 8*a*b^2*c^4*e^2*z^2
 + 64*a^3*c^4*f*h*z^2 + 64*a^3*c^4*e*i*z^2 - 64*a^2*c^5*d*f*z^2 - 4*a*b^5*c
*h^2*z^2 + 16*a*b*c^5*d^2*z^2 - 56*a^3*b^2*c^2*i^2*z^2 + 28*a^2*b^3*c^2*h^2
*z^2 + 40*a^2*b^2*c^3*g^2*z^2 - 32*a^4*c^3*i^2*z^2 - 96*a^3*c^4*g^2*z^2 - 3
2*a^2*c^5*e^2*z^2 - 4*b^3*c^4*d^2*z^2 - 4*a*b^6*i^2*z^2 + 32*a^2*b*c^3*e*f*
h*z - 32*a^2*b*c^3*d*f*i*z - 8*a*b^3*c^2*e*f*h*z + 8*a*b^3*c^2*d*f*i*z - 8*
a*b^2*c^3*d*f*g*z + 8*a*b^2*c^3*d*e*h*z - 8*a*b^4*c*e*g*i*z + 40*a^2*b^2*c^
```

```
2*e*g*i*z + 8*a^2*b^2*c^2*f*g*h*z - 8*a^2*b^2*c^2*d*h*i*z + 4*a^3*b^2*c*h^2
*i*z - 32*a^3*b*c^2*g^2*i*z + 12*a^3*b^2*c*g*i^2*z + 8*a^2*b^3*c*g^2*i*z +
16*a^3*b*c^2*g*h^2*z - 4*a^2*b^3*c*g*h^2*z + 32*a^3*b*c^2*e*i^2*z - 24*a^2*
b^3*c*e*i^2*z - 16*a^2*b*c^3*e^2*i*z + 4*a*b^3*c^2*e^2*i*z + 20*a*b^2*c^3*d
^2*i*z - 16*a^2*b*c^3*e*g^2*z + 4*a*b^3*c^2*e*g^2*z - 4*a*b^2*c^3*e^2*g*z +
 4*a*b^2*c^3*e*f^2*z - 32*a^3*c^3*f*g*h*z - 32*a^3*c^3*e*g*i*z + 32*a^3*c^3
*d*h*i*z + 32*a^2*c^4*d*f*g*z - 32*a^2*c^4*d*e*h*z + 4*a*b^4*c*e*h^2*z - 16
*a*b*c^4*d^2*g*z - 4*a^2*b^2*c^2*f^2*i*z - 20*a^2*b^2*c^2*e*h^2*z - 4*a^2*b
^2*c^2*g^3*z - 16*a^4*c^2*h^2*i*z + 16*a^4*c^2*g*i^2*z + 16*a^3*c^3*f^2*i*z
 - 4*a^2*b^4*g*i^2*z - 4*b^4*c^2*d^2*i*z + 16*a^3*c^3*e*h^2*z - 16*a^2*c^4*
d^2*i*z + 16*a^2*c^4*e^2*g*z + 4*b^3*c^3*d^2*g*z - 16*a^2*c^4*e*f^2*z - 4*b
^2*c^4*d^2*e*z + 4*a*b^5*e*i^2*z - 16*a^4*b*c*i^3*z + 16*a*c^5*d^2*e*z + 4*
a^3*b^3*i^3*z + 16*a^3*c^3*g^3*z + 4*a^2*b^2*c*d*g*h*i + 12*a^2*b*c^2*d*f*g
*i - 4*a^2*b*c^2*e*f*g*h - 4*a^2*b*c^2*d*e*h*i + 4*a*b^2*c^2*d*e*f*i - 4*a^
3*b*c*f*g*h*i - 4*a*b^3*c*d*f*g*i - 4*a*b*c^3*d*e*f*g + 2*a^2*b^2*c*f^2*g*i
 - 4*a^2*b^2*c*e*g^2*i - 2*a^2*b*c^2*e^2*g*i - 8*a*b^2*c^2*d^2*g*i + 2*a^2*
b^2*c*e*g*h^2 - 2*a^2*b*c^2*e*f^2*i - 8*a^2*b^2*c*d*f*i^2 - 2*a^2*b*c^2*d*g
^2*h + 2*a*b^2*c^2*e^2*f*h - 4*a*b^2*c^2*d*f^2*h - 2*a^2*b*c^2*d*f*h^2 + 2*
a*b^2*c^2*d*f*g^2 + 8*a^3*c^2*e*f*h*i - 8*a^3*c^2*d*g*h*i + 8*a^2*c^3*d*e*g
*h - 8*a^2*c^3*d*e*f*i - 2*a^3*b*c*e*h^2*i + 6*a^3*b*c*d*h*i^2 - 2*a^3*b*c*
e*g*i^2 + 2*a*b^3*c*e^2*g*i + 6*a*b*c^3*d^2*e*i + 2*a*b^3*c*d*f*h^2 - 2*a*b
*c^3*d^2*f*h - 2*a*b*c^3*d*e^2*h + 4*a^2*b^2*c*e^2*i^2 - 5*a^2*b*c^2*d^2*i^
2 + 3*a^2*b*c^2*e^2*h^2 + 4*a*b^2*c^2*d^2*h^2 - 4*a^3*c^2*f^2*g*i + 2*a^3*b
^2*f*h*i^2 + 4*a^3*c^2*f*g^2*h + 4*a^3*c^2*e*g^2*i - 4*a^3*c^2*e*g*h^2 + 4*
a^2*c^3*d^2*g*i + 2*a^2*b^3*e*g*i^2 - 2*a^2*b^3*d*h*i^2 + 4*a^3*c^2*d*f*i^2
 - 4*a^2*c^3*e^2*f*h + 2*b^3*c^2*d^2*f*h - 2*b^3*c^2*d^2*e*i + 4*a^2*c^3*e*
f^2*g + 4*a^2*c^3*d*f^2*h - 4*a^2*c^3*d*f*g^2 + 3*a^3*b*c*f^2*i^2 + 2*b^2*c
^3*d^2*e*g + 2*a^2*b*c^2*f^3*h - 2*a*b^2*c^2*e^3*i + 5*a*b^3*c*d^2*i^2 - 2*
a^2*b^2*c*d*h^3 + 2*a^2*b*c^2*e*g^3 + 3*a*b*c^3*d^2*g^2 + 4*a^4*c*g*h^2*i -
 4*a^4*c*f*h*i^2 + 2*b^4*c*d^2*g*i + 2*a^3*b*c*g^3*i + 2*a*b^4*d*f*i^2 - 4*
a*c^4*d^2*e*g + 2*a^3*b*c*f*h^3 + 4*a*c^4*d*e^2*f + 2*a*b*c^3*e^3*g + 2*a*b
*c^3*d*f^3 - a^2*b^2*c*f^2*h^2 - a^2*b*c^2*f^2*g^2 - a*b^2*c^2*e^2*g^2 + 2*
a^4*b*g*i^3 + 4*a^4*c*e*i^3 + 4*a*c^4*d^3*h + 2*b*c^4*d^3*f - a^3*b*c*g^2*h
^2 - a*b^3*c*e^2*h^2 - 6*a^3*c^2*e^2*i^2 - 2*a^3*c^2*f^2*h^2 - a*b*c^3*e^2*
f^2 - 6*a^2*c^3*d^2*h^2 - 2*a^2*c^3*e^2*g^2 - 2*a^4*c*g^2*i^2 + 4*a^2*c^3*e
^3*i - 2*b^2*c^3*d^3*h - 2*a^3*b^2*e*i^3 + 4*a^3*c^2*d*h^3 - 2*a*c^4*d^2*f^
2 - a^3*b^2*g^2*i^2 - a^2*b^3*f^2*i^2 - b^3*c^2*d^2*g^2 - b^2*c^3*d^2*f^2 -
 a^4*b*h^2*i^2 - b^4*c*d^2*h^2 - a*b^4*e^2*i^2 - b*c^4*d^2*e^2 - b^5*d^2*i^
2 - a^3*c^2*g^4 - a^2*c^3*f^4 - a^4*c*h^4 - a*c^4*e^4 - a^5*i^4 - c^5*d^4,
z, l)*(root(128*a^2*b^2*c^5*z^4 - 16*a*b^4*c^4*z^4 - 256*a^3*c^6*z^4 + 128*
a^2*b^3*c^3*i*z^3 - 128*a^2*b^2*c^4*g*z^3 - 256*a^3*b*c^4*i*z^3 - 16*a*b^5*
c^2*i*z^3 + 16*a*b^4*c^3*g*z^3 + 256*a^3*c^5*g*z^3 + 160*a^3*b*c^3*g*i*z^2
+ 8*a*b^4*c^2*f*h*z^2 + 8*a*b^4*c^2*e*i*z^2 + 32*a^2*b*c^4*e*g*z^2 + 32*a^2
*b*c^4*d*h*z^2 - 8*a*b^3*c^3*e*g*z^2 - 8*a*b^3*c^3*d*h*z^2 + 16*a*b^2*c^4*d
*f*z^2 + 8*a*b^5*c*g*i*z^2 - 72*a^2*b^3*c^2*g*i*z^2 - 48*a^2*b^2*c^3*f*h*z^
2 - 48*a^2*b^2*c^3*e*i*z^2 + 32*a^2*b^4*c*i^2*z^2 - 48*a^3*b*c^3*h^2*z^2 -
4*a*b^4*c^2*g^2*z^2 + 16*a^2*b*c^4*f^2*z^2 - 4*a*b^3*c^3*f^2*z^2 + 8*a*b^2*
c^4*e^2*z^2 + 64*a^3*c^4*f*h*z^2 + 64*a^3*c^4*e*i*z^2 - 64*a^2*c^5*d*f*z^2
- 4*a*b^5*c*h^2*z^2 + 16*a*b*c^5*d^2*z^2 - 56*a^3*b^2*c^2*i^2*z^2 + 28*a^2*
b^3*c^2*h^2*z^2 + 40*a^2*b^2*c^3*g^2*z^2 - 32*a^4*c^3*i^2*z^2 - 96*a^3*c^4*
g^2*z^2 - 32*a^2*c^5*e^2*z^2 - 4*b^3*c^4*d^2*z^2 - 4*a*b^6*i^2*z^2 + 32*a^2
*b*c^3*e*f*h*z - 32*a^2*b*c^3*d*f*i*z - 8*a*b^3*c^2*e*f*h*z + 8*a*b^3*c^2*d
*f*i*z - 8*a*b^2*c^3*d*f*g*z + 8*a*b^2*c^3*d*e*h*z - 8*a*b^4*c*e*g*i*z + 40
*a^2*b^2*c^2*e*g*i*z + 8*a^2*b^2*c^2*f*g*h*z - 8*a^2*b^2*c^2*d*h*i*z + 4*a^
3*b^2*c*h^2*i*z - 32*a^3*b*c^2*g^2*i*z + 12*a^3*b^2*c*g*i^2*z + 8*a^2*b^3*c
*g^2*i*z + 16*a^3*b*c^2*g*h^2*z - 4*a^2*b^3*c*g*h^2*z + 32*a^3*b*c^2*e*i^2*
z - 24*a^2*b^3*c*e*i^2*z - 16*a^2*b*c^3*e^2*i*z + 4*a*b^3*c^2*e^2*i*z + 20*
a*b^2*c^3*d^2*i*z - 16*a^2*b*c^3*e*g^2*z + 4*a*b^3*c^2*e*g^2*z - 4*a*b^2*c^
3*e^2*g*z + 4*a*b^2*c^3*e*f^2*z - 32*a^3*c^3*f*g*h*z - 32*a^3*c^3*e*g*i*z +
```

32*a^3*c^3*d*h*i*z + 32*a^2*c^4*d*f*g*z - 32*a^2*c^4*d*e*h*z + 4*a*b^4*c*e
*h^2*z - 16*a*b*c^4*d^2*g*z - 4*a^2*b^2*c^2*f^2*i*z - 20*a^2*b^2*c^2*e*h^2*
z - 4*a^2*b^2*c^2*g^3*z - 16*a^4*c^2*h^2*i*z + 16*a^4*c^2*g*i^2*z + 16*a^3*
c^3*f^2*i*z - 4*a^2*b^4*g*i^2*z - 4*b^4*c^2*d^2*i*z + 16*a^3*c^3*e*h^2*z -
16*a^2*c^4*d^2*i*z + 16*a^2*c^4*e^2*g*z + 4*b^3*c^3*d^2*g*z - 16*a^2*c^4*e*
f^2*z - 4*b^2*c^4*d^2*e*z + 4*a*b^5*e*i^2*z - 16*a^4*b*c*i^3*z + 16*a*c^5*d
^2*e*z + 4*a^3*b^3*i^3*z + 16*a^3*c^3*g^3*z + 4*a^2*b^2*c*d*g*h*i + 12*a^2*
b*c^2*d*f*g*i - 4*a^2*b*c^2*e*f*g*h - 4*a^2*b*c^2*d*e*h*i + 4*a*b^2*c^2*d*e
*f*i - 4*a^3*b*c*f*g*h*i - 4*a*b^3*c*d*f*g*i - 4*a*b*c^3*d*e*f*g + 2*a^2*b^
2*c*f^2*g*i - 4*a^2*b^2*c*e*g^2*i - 2*a^2*b*c^2*e^2*g*i - 8*a*b^2*c^2*d^2*g
*i + 2*a^2*b^2*c*e*g*h^2 - 2*a^2*b*c^2*e*f^2*i - 8*a^2*b^2*c*d*f*i^2 - 2*a^
2*b*c^2*d*g^2*h + 2*a*b^2*c^2*e^2*f*h - 4*a*b^2*c^2*d*f^2*h - 2*a^2*b*c^2*d
*f*h^2 + 2*a*b^2*c^2*d*f*g^2 + 8*a^3*c^2*e*f*h*i - 8*a^3*c^2*d*g*h*i + 8*a^
2*c^3*d*e*g*h - 8*a^2*c^3*d*e*f*i - 2*a^3*b*c*e*h^2*i + 6*a^3*b*c*d*h*i^2 -
2*a^3*b*c*e*g*i^2 + 2*a*b^3*c*e^2*g*i + 6*a*b*c^3*d^2*e*i + 2*a*b^3*c*d*f*
h^2 - 2*a*b*c^3*d^2*f*h - 2*a*b*c^3*d*e^2*h + 4*a^2*b^2*c*e^2*i^2 - 5*a^2*b
*c^2*d^2*i^2 + 3*a^2*b*c^2*e^2*h^2 + 4*a*b^2*c^2*d^2*h^2 - 4*a^3*c^2*f^2*g*
i + 2*a^3*b^2*f*h*i^2 + 4*a^3*c^2*f*g^2*h + 4*a^3*c^2*e*g^2*i - 4*a^3*c^2*e
*g*h^2 + 4*a^2*c^3*d^2*g*i + 2*a^2*b^3*e*g*i^2 - 2*a^2*b^3*d*h*i^2 + 4*a^3*
c^2*d*f*i^2 - 4*a^2*c^3*e^2*f*h + 2*b^3*c^2*d^2*f*h - 2*b^3*c^2*d^2*e*i + 4
*a^2*c^3*e*f^2*g + 4*a^2*c^3*d*f^2*h - 4*a^2*c^3*d*f*g^2 + 3*a^3*b*c*f^2*i^
2 + 2*b^2*c^3*d^2*e*g + 2*a^2*b*c^2*f^3*h - 2*a*b^2*c^2*e^3*i + 5*a*b^3*c*d
^2*i^2 - 2*a^2*b^2*c*d*h^3 + 2*a^2*b*c^2*e*g^3 + 3*a*b*c^3*d^2*g^2 + 4*a^4*
c*g*h^2*i - 4*a^4*c*f*h*i^2 + 2*b^4*c*d^2*g*i + 2*a^3*b*c*g^3*i + 2*a*b^4*d
*f*i^2 - 4*a*c^4*d^2*e*g + 2*a^3*b*c*f*h^3 + 4*a*c^4*d*e^2*f + 2*a*b*c^3*e^
3*g + 2*a*b*c^3*d*f^3 - a^2*b^2*c*f^2*h^2 - a^2*b*c^2*f^2*g^2 - a*b^2*c^2*e
^2*g^2 + 2*a^4*b*g*i^3 + 4*a^4*c*e*i^3 + 4*a*c^4*d^3*h + 2*b*c^4*d^3*f - a^
3*b*c*g^2*h^2 - a*b^3*c*e^2*h^2 - 6*a^3*c^2*e^2*i^2 - 2*a^3*c^2*f^2*h^2 - a
*b*c^3*e^2*f^2 - 6*a^2*c^3*d^2*h^2 - 2*a^2*c^3*e^2*g^2 - 2*a^4*c*g^2*i^2 +
4*a^2*c^3*e^3*i - 2*b^2*c^3*d^3*h - 2*a^3*b^2*e*i^3 + 4*a^3*c^2*d*h^3 - 2*a
*c^4*d^2*f^2 - a^3*b^2*g^2*i^2 - a^2*b^3*f^2*i^2 - b^3*c^2*d^2*g^2 - b^2*c^
3*d^2*f^2 - a^4*b*h^2*i^2 - b^4*c*d^2*h^2 - a*b^4*e^2*i^2 - b*c^4*d^2*e^2 -
b^5*d^2*i^2 - a^3*c^2*g^4 - a^2*c^3*f^4 - a^4*c*h^4 - a*c^4*e^4 - a^5*i^4
- c^5*d^4, z, l)*((x*(4*b^2*c^4*e - 8*b^3*c^3*g + 16*a^2*c^4*i + 8*b^4*c^2*
i - 16*a*c^5*e + 32*a*b*c^4*g - 36*a*b^2*c^3*i))/c^2 - (4*b^2*c^4*d + 16*a^
2*c^4*h - 16*a*c^5*d - 4*a*b^2*c^3*h)/c^2 + (root(128*a^2*b^2*c^5*z^4 - 16*
a*b^4*c^4*z^4 - 256*a^3*c^6*z^4 + 128*a^2*b^3*c^3*i*z^3 - 128*a^2*b^2*c^4*g
*z^3 - 256*a^3*b*c^4*i*z^3 - 16*a*b^5*c^2*i*z^3 + 16*a*b^4*c^3*g*z^3 + 256*
a^3*c^5*g*z^3 + 160*a^3*b*c^3*g*i*z^2 + 8*a*b^4*c^2*f*h*z^2 + 8*a*b^4*c^2*e
*i*z^2 + 32*a^2*b*c^4*e*g*z^2 + 32*a^2*b*c^4*d*h*z^2 - 8*a*b^3*c^3*e*g*z^2
- 8*a*b^3*c^3*d*h*z^2 + 16*a*b^2*c^4*d*f*z^2 + 8*a*b^5*c*g*i*z^2 - 72*a^2*b
^3*c^2*g*i*z^2 - 48*a^2*b^2*c^3*f*h*z^2 - 48*a^2*b^2*c^3*e*i*z^2 + 32*a^2*b
^4*c*i^2*z^2 - 48*a^3*b*c^3*h^2*z^2 - 4*a*b^4*c^2*g^2*z^2 + 16*a^2*b*c^4*f^
2*z^2 - 4*a*b^3*c^3*f^2*z^2 + 8*a*b^2*c^4*e^2*z^2 + 64*a^3*c^4*f*h*z^2 + 64
*a^3*c^4*e*i*z^2 - 64*a^2*c^5*d*f*z^2 - 4*a*b^5*c*h^2*z^2 + 16*a*b*c^5*d^2*
z^2 - 56*a^3*b^2*c^2*i^2*z^2 + 28*a^2*b^3*c^2*h^2*z^2 + 40*a^2*b^2*c^3*g^2*
z^2 - 32*a^4*c^3*i^2*z^2 - 96*a^3*c^4*g^2*z^2 - 32*a^2*c^5*e^2*z^2 - 4*b^3*
c^4*d^2*z^2 - 4*a*b^6*i^2*z^2 + 32*a^2*b*c^3*e*f*h*z - 32*a^2*b*c^3*d*f*i*z
- 8*a*b^3*c^2*e*f*h*z + 8*a*b^3*c^2*d*f*i*z - 8*a*b^2*c^3*d*f*g*z + 8*a*b^
2*c^3*d*e*h*z - 8*a*b^4*c*e*g*i*z + 40*a^2*b^2*c^2*e*g*i*z + 8*a^2*b^2*c^2*
f*g*h*z - 8*a^2*b^2*c^2*d*h*i*z + 4*a^3*b^2*c*h^2*i*z - 32*a^3*b*c^2*g^2*i*
z + 12*a^3*b^2*c*g*i^2*z + 8*a^2*b^3*c*g^2*i*z + 16*a^3*b*c^2*g*h^2*z - 4*a
^2*b^3*c*g*h^2*z + 32*a^3*b*c^2*e*i^2*z - 24*a^2*b^3*c*e*i^2*z - 16*a^2*b*c
^3*e^2*i*z + 4*a*b^3*c^2*e^2*i*z + 20*a*b^2*c^3*d^2*i*z - 16*a^2*b*c^3*e*g^
2*z + 4*a*b^3*c^2*e*g^2*z - 4*a*b^2*c^3*e^2*g*z + 4*a*b^2*c^3*e*f^2*z - 32*
a^3*c^3*f*g*h*z - 32*a^3*c^3*e*g*i*z + 32*a^3*c^3*d*h*i*z + 32*a^2*c^4*d*f*
g*z - 32*a^2*c^4*d*e*h*z + 4*a*b^4*c*e*h^2*z - 16*a*b*c^4*d^2*g*z - 4*a^2*b
^2*c^2*f^2*i*z - 20*a^2*b^2*c^2*e*h^2*z - 4*a^2*b^2*c^2*g^3*z - 16*a^4*c^2*
h^2*i*z + 16*a^4*c^2*g*i^2*z + 16*a^3*c^3*f^2*i*z - 4*a^2*b^4*g*i^2*z - 4*b

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^4*c^2*d^2*i*z + 16*a^3*c^3*e*h^2*z - 16*a^2*c^4*d^2*i*z + 16*a^2*c^4*e^2*g
*z + 4*b^3*c^3*d^2*g*z - 16*a^2*c^4*e*f^2*z - 4*b^2*c^4*d^2*e*z + 4*a*b^5*e
*i^2*z - 16*a^4*b*c*i^3*z + 16*a*c^5*d^2*e*z + 4*a^3*b^3*i^3*z + 16*a^3*c^3
*g^3*z + 4*a^2*b^2*c*d*g*h*i + 12*a^2*b*c^2*d*f*g*i - 4*a^2*b*c^2*e*f*g*h -
 4*a^2*b*c^2*d*e*h*i + 4*a*b^2*c^2*d*e*f*i - 4*a^3*b*c*f*g*h*i - 4*a*b^3*c*
d*f*g*i - 4*a*b*c^3*d*e*f*g + 2*a^2*b^2*c*f^2*g*i - 4*a^2*b^2*c*e*g^2*i - 2
*a^2*b*c^2*e^2*g*i - 8*a*b^2*c^2*d^2*g*i + 2*a^2*b^2*c*e*g*h^2 - 2*a^2*b*c^
2*e*f^2*i - 8*a^2*b^2*c*d*f*i^2 - 2*a^2*b*c^2*d*g^2*h + 2*a*b^2*c^2*e^2*f*h
 - 4*a*b^2*c^2*d*f^2*h - 2*a^2*b*c^2*d*f*h^2 + 2*a*b^2*c^2*d*f*g^2 + 8*a^3*
c^2*e*f*h*i - 8*a^3*c^2*d*g*h*i + 8*a^2*c^3*d*e*g*h - 8*a^2*c^3*d*e*f*i - 2
*a^3*b*c*e*h^2*i + 6*a^3*b*c*d*h*i^2 - 2*a^3*b*c*e*g*i^2 + 2*a*b^3*c*e^2*g*
i + 6*a*b*c^3*d^2*e*i + 2*a*b^3*c*d*f*h^2 - 2*a*b*c^3*d^2*f*h - 2*a*b*c^3*d
*e^2*h + 4*a^2*b^2*c*e^2*i^2 - 5*a^2*b*c^2*d^2*i^2 + 3*a^2*b*c^2*e^2*h^2 +
4*a*b^2*c^2*d^2*h^2 - 4*a^3*c^2*f^2*g*i + 2*a^3*b^2*f*h*i^2 + 4*a^3*c^2*f*g
^2*h + 4*a^3*c^2*e*g^2*i - 4*a^3*c^2*e*g*h^2 + 4*a^2*c^3*d^2*g*i + 2*a^2*b^
3*e*g*i^2 - 2*a^2*b^3*d*h*i^2 + 4*a^3*c^2*d*f*i^2 - 4*a^2*c^3*e^2*f*h + 2*b
^3*c^2*d^2*f*h - 2*b^3*c^2*d^2*e*i + 4*a^2*c^3*e*f^2*g + 4*a^2*c^3*d*f^2*h
- 4*a^2*c^3*d*f*g^2 + 3*a^3*b*c*f^2*i^2 + 2*b^2*c^3*d^2*e*g + 2*a^2*b*c^2*f
^3*h - 2*a*b^2*c^2*e^3*i + 5*a*b^3*c*d^2*i^2 - 2*a^2*b^2*c*d*h^3 + 2*a^2*b*
c^2*e*g^3 + 3*a*b*c^3*d^2*g^2 + 4*a^4*c*g*h^2*i - 4*a^4*c*f*h*i^2 + 2*b^4*c
*d^2*g*i + 2*a^3*b*c*g^3*i + 2*a*b^4*d*f*i^2 - 4*a*c^4*d^2*e*g + 2*a^3*b*c*
f*h^3 + 4*a*c^4*d*e^2*f + 2*a*b*c^3*e^3*g + 2*a*b*c^3*d*f^3 - a^2*b^2*c*f^2
*h^2 - a^2*b*c^2*f^2*g^2 - a*b^2*c^2*e^2*g^2 + 2*a^4*b*g*i^3 + 4*a^4*c*e*i^
3 + 4*a*c^4*d^3*h + 2*b*c^4*d^3*f - a^3*b*c*g^2*h^2 - a*b^3*c*e^2*h^2 - 6*a
^3*c^2*e^2*i^2 - 2*a^3*c^2*f^2*h^2 - a*b*c^3*e^2*f^2 - 6*a^2*c^3*d^2*h^2 -
2*a^2*c^3*e^2*g^2 - 2*a^4*c*g^2*i^2 + 4*a^2*c^3*e^3*i - 2*b^2*c^3*d^3*h - 2
*a^3*b^2*e*i^3 + 4*a^3*c^2*d*h^3 - 2*a*c^4*d^2*f^2 - a^3*b^2*g^2*i^2 - a^2*
b^3*f^2*i^2 - b^3*c^2*d^2*g^2 - b^2*c^3*d^2*f^2 - a^4*b*h^2*i^2 - b^4*c*d^2
*h^2 - a*b^4*e^2*i^2 - b*c^4*d^2*e^2 - b^5*d^2*i^2 - a^3*c^2*g^4 - a^2*c^3*
f^4 - a^4*c*h^4 - a*c^4*e^4 - a^5*i^4 - c^5*d^4, z, l)*x*(8*b^3*c^4 - 32*a*
b*c^5))/c^2) - (4*b*c^4*d*e + 8*a*c^4*d*g - 8*a*c^4*e*f - 4*b^2*c^3*d*g + 4
*b^3*c^2*d*i + 8*a^2*c^3*f*i - 8*a^2*c^3*g*h - 4*a*b^2*c^2*f*i + 4*a^2*b*c^
2*h*i - 12*a*b*c^3*d*i + 4*a*b*c^3*e*h + 4*a*b*c^3*f*g)/c^2 + (x*(4*c^5*d^2
 + 2*b^5*i^2 - 4*a*c^4*f^2 - 2*b*c^4*e^2 + 2*b^4*c*h^2 + 2*b^2*c^3*f^2 + 4*
a^2*c^3*h^2 + 2*b^3*c^2*g^2 - 8*a*b^2*c^2*h^2 + 6*a^2*b*c^2*i^2 - 4*b*c^4*d
*f - 8*a*c^4*d*h + 8*a*c^4*e*g - 4*b^4*c*g*i - 10*a*b*c^3*g^2 - 10*a*b^3*c*
i^2 + 4*b^2*c^3*d*h - 4*b^3*c^2*f*h - 8*a^2*c^3*g*i + 20*a*b^2*c^2*g*i - 4*
a*b*c^3*e*i + 12*a*b*c^3*f*h))/c^2))*root(128*a^2*b^2*c^5*z^4 - 16*a*b^4*c^
4*z^4 - 256*a^3*c^6*z^4 + 128*a^2*b^3*c^3*i*z^3 - 128*a^2*b^2*c^4*g*z^3 - 2
56*a^3*b*c^4*i*z^3 - 16*a*b^5*c^2*i*z^3 + 16*a*b^4*c^3*g*z^3 + 256*a^3*c^5*
g*z^3 + 160*a^3*b*c^3*g*i*z^2 + 8*a*b^4*c^2*f*h*z^2 + 8*a*b^4*c^2*e*i*z^2 +
 32*a^2*b*c^4*e*g*z^2 + 32*a^2*b*c^4*d*h*z^2 - 8*a*b^3*c^3*e*g*z^2 - 8*a*b^
3*c^3*d*h*z^2 + 16*a*b^2*c^4*d*f*z^2 + 8*a*b^5*c*g*i*z^2 - 72*a^2*b^3*c^2*g
*i*z^2 - 48*a^2*b^2*c^3*f*h*z^2 - 48*a^2*b^2*c^3*e*i*z^2 + 32*a^2*b^4*c*i^2
*z^2 - 48*a^3*b*c^3*h^2*z^2 - 4*a*b^4*c^2*g^2*z^2 + 16*a^2*b*c^4*f^2*z^2 -
4*a*b^3*c^3*f^2*z^2 + 8*a*b^2*c^4*e^2*z^2 + 64*a^3*c^4*f*h*z^2 + 64*a^3*c^4
*e*i*z^2 - 64*a^2*c^5*d*f*z^2 - 4*a*b^5*c*h^2*z^2 + 16*a*b*c^5*d^2*z^2 - 56
*a^3*b^2*c^2*i^2*z^2 + 28*a^2*b^3*c^2*h^2*z^2 + 40*a^2*b^2*c^3*g^2*z^2 - 32
*a^4*c^3*i^2*z^2 - 96*a^3*c^4*g^2*z^2 - 32*a^2*c^5*e^2*z^2 - 4*b^3*c^4*d^2*
z^2 - 4*a*b^6*i^2*z^2 + 32*a^2*b*c^3*e*f*h*z - 32*a^2*b*c^3*d*f*i*z - 8*a*b
^3*c^2*e*f*h*z + 8*a*b^3*c^2*d*f*i*z - 8*a*b^2*c^3*d*f*g*z + 8*a*b^2*c^3*d*
e*h*z - 8*a*b^4*c*e*g*i*z + 40*a^2*b^2*c^2*e*g*i*z + 8*a^2*b^2*c^2*f*g*h*z
- 8*a^2*b^2*c^2*d*h*i*z + 4*a^3*b^2*c*h^2*i*z - 32*a^3*b*c^2*g^2*i*z + 12*a
^3*b^2*c*g*i^2*z + 8*a^2*b^3*c*g^2*i*z + 16*a^3*b*c^2*g*h^2*z - 4*a^2*b^3*c
*g*h^2*z + 32*a^3*b*c^2*e*i^2*z - 24*a^2*b^3*c*e*i^2*z - 16*a^2*b*c^3*e^2*i
*z + 4*a*b^3*c^2*e^2*i*z + 20*a*b^2*c^3*d^2*i*z - 16*a^2*b*c^3*e*g^2*z + 4*
a*b^3*c^2*e*g^2*z - 4*a*b^2*c^3*e^2*g*z + 4*a*b^2*c^3*e*f^2*z - 32*a^3*c^3*
f*g*h*z - 32*a^3*c^3*e*g*i*z + 32*a^3*c^3*d*h*i*z + 32*a^2*c^4*d*f*g*z - 32
*a^2*c^4*d*e*h*z + 4*a*b^4*c*e*h^2*z - 16*a*b*c^4*d^2*g*z - 4*a^2*b^2*c^2*f
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^2*i*z - 20*a^2*b^2*c^2*e*h^2*z - 4*a^2*b^2*c^2*g^3*z - 16*a^4*c^2*h^2*i*z
+ 16*a^4*c^2*g*i^2*z + 16*a^3*c^3*f^2*i*z - 4*a^2*b^4*g*i^2*z - 4*b^4*c^2*d
^2*i*z + 16*a^3*c^3*e*h^2*z - 16*a^2*c^4*d^2*i*z + 16*a^2*c^4*e^2*g*z + 4*b
^3*c^3*d^2*g*z - 16*a^2*c^4*e*f^2*z - 4*b^2*c^4*d^2*e*z + 4*a*b^5*e*i^2*z -
 16*a^4*b*c*i^3*z + 16*a*c^5*d^2*e*z + 4*a^3*b^3*i^3*z + 16*a^3*c^3*g^3*z +
 4*a^2*b^2*c*d*g*h*i + 12*a^2*b*c^2*d*f*g*i - 4*a^2*b*c^2*e*f*g*h - 4*a^2*b
*c^2*d*e*h*i + 4*a*b^2*c^2*d*e*f*i - 4*a^3*b*c*f*g*h*i - 4*a*b^3*c*d*f*g*i
- 4*a*b*c^3*d*e*f*g + 2*a^2*b^2*c*f^2*g*i - 4*a^2*b^2*c*e*g^2*i - 2*a^2*b*c
^2*e^2*g*i - 8*a*b^2*c^2*d^2*g*i + 2*a^2*b^2*c*e*g*h^2 - 2*a^2*b*c^2*e*f^2*
i - 8*a^2*b^2*c*d*f*i^2 - 2*a^2*b*c^2*d*g^2*h + 2*a*b^2*c^2*e^2*f*h - 4*a*b
^2*c^2*d*f^2*h - 2*a^2*b*c^2*d*f*h^2 + 2*a*b^2*c^2*d*f*g^2 + 8*a^3*c^2*e*f*
h*i - 8*a^3*c^2*d*g*h*i + 8*a^2*c^3*d*e*g*h - 8*a^2*c^3*d*e*f*i - 2*a^3*b*c
*e*h^2*i + 6*a^3*b*c*d*h*i^2 - 2*a^3*b*c*e*g*i^2 + 2*a*b^3*c*e^2*g*i + 6*a*
b*c^3*d^2*e*i + 2*a*b^3*c*d*f*h^2 - 2*a*b*c^3*d^2*f*h - 2*a*b*c^3*d*e^2*h +
 4*a^2*b^2*c*e^2*i^2 - 5*a^2*b*c^2*d^2*i^2 + 3*a^2*b*c^2*e^2*h^2 + 4*a*b^2*
c^2*d^2*h^2 - 4*a^3*c^2*f^2*g*i + 2*a^3*b^2*f*h*i^2 + 4*a^3*c^2*f*g^2*h + 4
*a^3*c^2*e*g^2*i - 4*a^3*c^2*e*g*h^2 + 4*a^2*c^3*d^2*g*i + 2*a^2*b^3*e*g*i^
2 - 2*a^2*b^3*d*h*i^2 + 4*a^3*c^2*d*f*i^2 - 4*a^2*c^3*e^2*f*h + 2*b^3*c^2*d
^2*f*h - 2*b^3*c^2*d^2*e*i + 4*a^2*c^3*e*f^2*g + 4*a^2*c^3*d*f^2*h - 4*a^2*
c^3*d*f*g^2 + 3*a^3*b*c*f^2*i^2 + 2*b^2*c^3*d^2*e*g + 2*a^2*b*c^2*f^3*h - 2
*a*b^2*c^2*e^3*i + 5*a*b^3*c*d^2*i^2 - 2*a^2*b^2*c*d*h^3 + 2*a^2*b*c^2*e*g^
3 + 3*a*b*c^3*d^2*g^2 + 4*a^4*c*g*h^2*i - 4*a^4*c*f*h*i^2 + 2*b^4*c*d^2*g*i
 + 2*a^3*b*c*g^3*i + 2*a*b^4*d*f*i^2 - 4*a*c^4*d^2*e*g + 2*a^3*b*c*f*h^3 +
4*a*c^4*d*e^2*f + 2*a*b*c^3*e^3*g + 2*a*b*c^3*d*f^3 - a^2*b^2*c*f^2*h^2 - a
^2*b*c^2*f^2*g^2 - a*b^2*c^2*e^2*g^2 + 2*a^4*b*g*i^3 + 4*a^4*c*e*i^3 + 4*a*
c^4*d^3*h + 2*b*c^4*d^3*f - a^3*b*c*g^2*h^2 - a*b^3*c*e^2*h^2 - 6*a^3*c^2*e
^2*i^2 - 2*a^3*c^2*f^2*h^2 - a*b*c^3*e^2*f^2 - 6*a^2*c^3*d^2*h^2 - 2*a^2*c^
3*e^2*g^2 - 2*a^4*c*g^2*i^2 + 4*a^2*c^3*e^3*i - 2*b^2*c^3*d^3*h - 2*a^3*b^2
*e*i^3 + 4*a^3*c^2*d*h^3 - 2*a*c^4*d^2*f^2 - a^3*b^2*g^2*i^2 - a^2*b^3*f^2*
i^2 - b^3*c^2*d^2*g^2 - b^2*c^3*d^2*f^2 - a^4*b*h^2*i^2 - b^4*c*d^2*h^2 - a
*b^4*e^2*i^2 - b*c^4*d^2*e^2 - b^5*d^2*i^2 - a^3*c^2*g^4 - a^2*c^3*f^4 - a^
4*c*h^4 - a*c^4*e^4 - a^5*i^4 - c^5*d^4, z, l), l, 1, 4) + (h*x)/c + (i*x^2
)/(2*c)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a),x)
[Out] Timed out
```

3.25 $\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{a+bx^2+cx^4}\,dx$

Optimal. Leaf size=545

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{c^2\left(2a^2m+3abk+b^2h\right)-b^2c(4am+bk)-c^3(2ah+bf)+b^4m+2c^4d}{\sqrt{b^2-4ac}}-c^2(ak+bh)+bc(2am+bk)+b^3(-m)+c^3f\right)}{\sqrt{2}\,c^{7/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

```
[Out] (c^2*h+b^2*m-c*(a*m+b*k))*x/c^3+1/2*(-b*l+c*j)*x^2/c^2+1/3*(-b*m+c*k)*x^3/c
^2+1/4*l*x^4/c+1/5*m*x^5/c+1/4*(c^2*g+b^2*l-c*(a*l+b*j))*ln(c*x^4+b*x^2+a)/
c^3-1/2*(2*c^3*e-c^2*(2*a*j+b*g)-b^3*l+b*c*(3*a*l+b*j))*arctanh((2*c*x^2+b)
/(-4*a*c+b^2)^(1/2))/c^3/(-4*a*c+b^2)^(1/2)+1/2*arctan(x*2^(1/2)*c^(1/2)/(b
-(-4*a*c+b^2)^(1/2))^(1/2))*(c^3*f-c^2*(a*k+b*h)-b^3*m+b*c*(2*a*m+b*k)+(2*c
^4*d-c^3*(2*a*h+b*f)+b^4*m-b^2*c*(4*a*m+b*k)+c^2*(2*a^2*m+3*a*b*k+b^2*h))/(
-4*a*c+b^2)^(1/2))/c^(7/2)*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/2*arctan(
x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*(c^3*f-c^2*(a*k+b*h)-b^3*m+
b*c*(2*a*m+b*k)+(-2*c^4*d+c^3*(2*a*h+b*f)-b^4*m+b^2*c*(4*a*m+b*k)-c^2*(2*a^
2*m+3*a*b*k+b^2*h))/(-4*a*c+b^2)^(1/2))/c^(7/2)*2^(1/2)/(b+(-4*a*c+b^2)^(1/
2))^(1/2)
```

Rubi [A] time = 4.21, antiderivative size = 545, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 10, integrand size = 55, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$, Rules used = {1673, 1676, 1166, 205, 1663, 1657, 634, 618, 206, 628}

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{c^2\left(2a^2m+3abk+b^2h\right)-b^2c(4am+bk)-c^3(2ah+bf)+b^4m+2c^4d}{\sqrt{b^2-4ac}}-c^2(ak+bh)+bc(2am+bk)+b^3(-m)+c^3f\right)}{\sqrt{2}\,c^{7/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a +
b*x^2 + c*x^4),x]
```

```
[Out] ((c^2*h + b^2*m - c*(b*k + a*m))*x)/c^3 + ((c*j - b*l)*x^2)/(2*c^2) + ((c*k
 - b*m)*x^3)/(3*c^2) + (l*x^4)/(4*c) + (m*x^5)/(5*c) + ((c^3*f - c^2*(b*h +
 a*k) - b^3*m + b*c*(b*k + 2*a*m) + (2*c^4*d - c^3*(b*f + 2*a*h) + b^4*m -
b^2*c*(b*k + 4*a*m) + c^2*(b^2*h + 3*a*b*k + 2*a^2*m))/Sqrt[b^2 - 4*a*c])*A
rcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(Sqrt[2]*c^(7/2)*Sq
rt[b - Sqrt[b^2 - 4*a*c]]) + ((c^3*f - c^2*(b*h + a*k) - b^3*m + b*c*(b*k +
 2*a*m) - (2*c^4*d - c^3*(b*f + 2*a*h) + b^4*m - b^2*c*(b*k + 4*a*m) + c^2*
(b^2*h + 3*a*b*k + 2*a^2*m))/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/
Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(Sqrt[2]*c^(7/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]])
 - ((2*c^3*e - c^2*(b*g + 2*a*j) - b^3*l + b*c*(b*j + 3*a*l))*ArcTanh[(b +
2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(2*c^3*Sqrt[b^2 - 4*a*c]) + ((c^2*g + b^2*l -
c*(b*j + a*l))*Log[a + b*x^2 + c*x^4])/(4*c^3)
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1676

```
Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> Int[ExpandInte
grand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{a+bx^2+cx^4}\,dx = \int \frac{x\left(e+gx^2+jx^4+lx^6\right)}{a+bx^2+cx^4}\,dx + \int \frac{d+fx^2+hx^4+kx}{a+bx^2+cx}$$

$$= \frac{1}{2}\operatorname{Subst}\left(\int \frac{e+gx+jx^2+lx^3}{a+bx+cx^2}\,dx, x, x^2\right) + \int \left(\frac{c^2h+}{}\right.$$

$$= \frac{\left(c^2h+b^2m-c(bk+am)\right)x}{c^3} + \frac{(ck-bm)x^3}{3c^2} + \frac{mx^5}{5c} +$$

$$= \frac{\left(c^2h+b^2m-c(bk+am)\right)x}{c^3} + \frac{(cj-bl)x^2}{2c^2} + \frac{(ck-bm)}{3c^2}$$

$$= \frac{\left(c^2h+b^2m-c(bk+am)\right)x}{c^3} + \frac{(cj-bl)x^2}{2c^2} + \frac{(ck-bm)}{3c^2}$$

$$= \frac{\left(c^2h+b^2m-c(bk+am)\right)x}{c^3} + \frac{(cj-bl)x^2}{2c^2} + \frac{(ck-bm)}{3c^2}$$

$$= \frac{\left(c^2h+b^2m-c(bk+am)\right)x}{c^3} + \frac{(cj-bl)x^2}{2c^2} + \frac{(ck-bm)}{3c^2}$$

Mathematica [**A**] time = 1.29, size = 816, normalized size = 1.50

$$\frac{mx^5}{5c}+\frac{lx^4}{4c}+\frac{(ck-bm)x^3}{3c^2}+\frac{(cj-bl)x^2}{2c^2}+\frac{\left(mb^2+c^2h-c(bk+am)\right)x}{c^3}+\frac{\left(2dc^4+\left(-bf+\sqrt{b^2-4ac}\,f-2ah\right)c^3+\left(2m\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)
/(a + b*x^2 + c*x^4),x]
```

```
[Out] ((c^2*h + b^2*m - c*(b*k + a*m))*x)/c^3 + ((c*j - b*l)*x^2)/(2*c^2) + ((c*k
 - b*m)*x^3)/(3*c^2) + (l*x^4)/(4*c) + (m*x^5)/(5*c) + ((2*c^4*d + c^3*(-(b
*f) + Sqrt[b^2 - 4*a*c]*f - 2*a*h) + b^3*(b - Sqrt[b^2 - 4*a*c])*m + c^2*(b
^2*h - b*Sqrt[b^2 - 4*a*c]*h + 3*a*b*k - a*Sqrt[b^2 - 4*a*c]*k + 2*a^2*m) +
 b*c*(-(b^2*k) + b*Sqrt[b^2 - 4*a*c]*k - 4*a*b*m + 2*a*Sqrt[b^2 - 4*a*c]*m)
)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(Sqrt[2]*c^(7/2)
*Sqrt[b^2 - 4*a*c]*Sqrt[b - Sqrt[b^2 - 4*a*c]]) - ((2*c^4*d - c^3*(b*f + Sq
rt[b^2 - 4*a*c]*f + 2*a*h) + b^3*(b + Sqrt[b^2 - 4*a*c])*m + c^2*(b^2*h + b
*Sqrt[b^2 - 4*a*c]*h + 3*a*b*k + a*Sqrt[b^2 - 4*a*c]*k + 2*a^2*m) - b*c*(b^
2*k + b*Sqrt[b^2 - 4*a*c]*k + 4*a*b*m + 2*a*Sqrt[b^2 - 4*a*c]*m))*ArcTan[(S
qrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(Sqrt[2]*c^(7/2)*Sqrt[b^2 -
 4*a*c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((2*c^3*e + c^2*(-(b*g) + Sqrt[b^2 -
 4*a*c]*g - 2*a*j) + b^2*(-b + Sqrt[b^2 - 4*a*c])*l + c*(b^2*j - b*Sqrt[b^2
 - 4*a*c]*j + 3*a*b*l - a*Sqrt[b^2 - 4*a*c]*l))*Log[-b + Sqrt[b^2 - 4*a*c]
- 2*c*x^2])/(4*c^3*Sqrt[b^2 - 4*a*c]) + ((-2*c^3*e + c^2*(b*g + Sqrt[b^2 -
4*a*c]*g + 2*a*j) + b^2*(b + Sqrt[b^2 - 4*a*c])*l - c*(b^2*j + b*Sqrt[b^2 -
 4*a*c]*j + 3*a*b*l + a*Sqrt[b^2 - 4*a*c]*l))*Log[b + Sqrt[b^2 - 4*a*c] + 2
*c*x^2])/(4*c^3*Sqrt[b^2 - 4*a*c])
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)
,x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 7.21, size = 11831, normalized size = 21.71

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)
,x, algorithm="giac")
```

```
[Out] -1/8*((2*b^4*c^5 - 16*a*b^2*c^6 + 32*a^2*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sq
rt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c^3 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c -
 sqrt(b^2 - 4*a*c)*c)*b^3*c^4 - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqr
t(b^2 - 4*a*c)*c)*a^2*c^5 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2
 - 4*a*c)*c)*a*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*
c)*c)*b^2*c^5 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)
*a*c^6 - 2*(b^2 - 4*a*c)*b^2*c^5 + 8*(b^2 - 4*a*c)*a*c^6)*c^2*f - (2*b^5*c^
4 - 16*a*b^3*c^5 + 32*a^2*b*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt
(b^2 - 4*a*c)*c)*b^5*c^2 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2
- 4*a*c)*c)*a*b^3*c^3 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4
*a*c)*c)*b^4*c^3 - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c
)*c)*a^2*b*c^4 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3
*c^4 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^5
- 2*(b^2 - 4*a*c)*b^3*c^4 + 8*(b^2 - 4*a*c)*a*b*c^5)*c^2*h + (2*b^6*c^3 - 1
8*a*b^4*c^4 + 48*a^2*b^2*c^5 - 32*a^3*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c - sqrt(b^2 - 4*a*c)*c)*b^6*c + 9*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - s
qrt(b^2 - 4*a*c)*c)*a*b^4*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt
(b^2 - 4*a*c)*c)*b^5*c^2 - 24*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2
 - 4*a*c)*c)*a^2*b^2*c^3 - 10*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2
 - 4*a*c)*c)*a*b^3*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*
a*c)*c)*b^4*c^3 + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)
*c)*a^3*c^4 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a
^2*b*c^4 + 5*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^
2*c^4 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c^5
 - 2*(b^2 - 4*a*c)*b^4*c^3 + 10*(b^2 - 4*a*c)*a*b^2*c^4 - 8*(b^2 - 4*a*c)*a
^2*c^5)*c^2*k - (2*b^7*c^2 - 20*a*b^5*c^3 + 64*a^2*b^3*c^4 - 64*a^3*b*c^5 -
 sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^7 + 10*sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c + 2*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^6*c - 32*sqrt(2)*sqrt(b^2 -
 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 - 12*sqrt(2)*sqrt(b^2 -
 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 - sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^5*c^2 + 32*sqrt(2)*sqrt(b^2 - 4*a*c)*s
qrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqr
t(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 6*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c - sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 - 2*(b^2 - 4*a*c)*b^5*c^2 + 12*(b^2 - 4*
a*c)*a*b^3*c^3 - 16*(b^2 - 4*a*c)*a^2*b*c^4)*c^2*m - 2*(sqrt(2)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*b^4*c^5 - 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*
b^2*c^6 - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^6 + 2*b^4*c^6 + 1
```

```
6*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c^7 + 8*sqrt(2)*sqrt(b*c - sq
rt(b^2 - 4*a*c)*c)*a*b*c^7 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^
7 - 16*a*b^2*c^7 - 4*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*c^8 + 32*a^2
*c^8 - 2*(b^2 - 4*a*c)*b^2*c^6 + 8*(b^2 - 4*a*c)*a*c^7)*d*abs(c) + 2*(sqrt(
2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^4 - 8*sqrt(2)*sqrt(b*c - sqrt(b^
2 - 4*a*c)*c)*a^2*b^2*c^5 - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^3
*c^5 + 2*a*b^4*c^5 + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^6 + 8
*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b*c^6 + sqrt(2)*sqrt(b*c - sqr
t(b^2 - 4*a*c)*c)*a*b^2*c^6 - 16*a^2*b^2*c^6 - 4*sqrt(2)*sqrt(b*c - sqrt(b^
2 - 4*a*c)*c)*a^2*c^7 + 32*a^3*c^7 - 2*(b^2 - 4*a*c)*a*b^2*c^5 + 8*(b^2 - 4
*a*c)*a^2*c^6)*h*abs(c) - 2*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*
c^3 - 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^4 - 2*sqrt(2)*sqr
t(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^4 + 2*a*b^5*c^4 + 16*sqrt(2)*sqrt(b*c
- sqrt(b^2 - 4*a*c)*c)*a^3*b*c^5 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a^2*b^2*c^5 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^3*c^5 - 16*a^2*
b^3*c^5 - 4*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b*c^6 + 32*a^3*b*c^
6 - 2*(b^2 - 4*a*c)*a*b^3*c^4 + 8*(b^2 - 4*a*c)*a^2*b*c^5)*k*abs(c) + 2*(sq
rt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^6*c^2 - 9*sqrt(2)*sqrt(b*c - sqrt
(b^2 - 4*a*c)*c)*a^2*b^4*c^3 - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*
b^5*c^3 + 2*a*b^6*c^3 + 24*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*
c^4 + 10*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^4 + sqrt(2)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^4 - 18*a^2*b^4*c^4 - 16*sqrt(2)*sqrt(b*
c - sqrt(b^2 - 4*a*c)*c)*a^4*c^5 - 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a^3*b*c^5 - 5*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^5 + 48*a^
3*b^2*c^5 + 4*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^6 - 32*a^4*c^6
- 2*(b^2 - 4*a*c)*a*b^4*c^3 + 10*(b^2 - 4*a*c)*a^2*b^2*c^4 - 8*(b^2 - 4*a*c
)*a^3*c^5)*m*abs(c) + 2*(2*b^3*c^8 - 8*a*b*c^9 - sqrt(2)*sqrt(b^2 - 4*a*c)*
sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^6 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^7 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c -
 sqrt(b^2 - 4*a*c)*c)*b^2*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b
^2 - 4*a*c)*c)*b*c^8 - 2*(b^2 - 4*a*c)*b*c^8)*d - (2*b^4*c^7 - 8*a*b^2*c^8
- sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c^5 + 4*sqr
t(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^6 + 2*sqrt(2
)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^6 - sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^7 - 2*(b^2 - 4*a*c)*b^2*
c^7)*f + (2*b^5*c^6 - 12*a*b^3*c^7 + 16*a^2*b*c^8 - sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^5*c^4 + 6*sqrt(2)*sqrt(b^2 - 4*a*c)*sq
rt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^3*c^5 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c^5 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c -
 sqrt(b^2 - 4*a*c)*c)*a^2*b*c^6 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sq
rt(b^2 - 4*a*c)*c)*a*b^2*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^
2 - 4*a*c)*c)*b^3*c^6 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4
*a*c)*c)*a*b*c^7 - 2*(b^2 - 4*a*c)*b^3*c^6 + 4*(b^2 - 4*a*c)*a*b*c^7)*h - (
2*b^6*c^5 - 14*a*b^4*c^6 + 24*a^2*b^2*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c - sqrt(b^2 - 4*a*c)*c)*b^6*c^3 + 7*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c -
 sqrt(b^2 - 4*a*c)*c)*a*b^4*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sq
rt(b^2 - 4*a*c)*c)*b^5*c^4 - 12*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b
^2 - 4*a*c)*c)*a^2*b^2*c^5 - 6*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^
2 - 4*a*c)*c)*a*b^3*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4
*a*c)*c)*b^4*c^5 + 3*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)
*c)*a*b^2*c^6 - 2*(b^2 - 4*a*c)*b^4*c^5 + 6*(b^2 - 4*a*c)*a*b^2*c^6)*k + (2
*b^7*c^4 - 16*a*b^5*c^5 + 36*a^2*b^3*c^6 - 16*a^3*b*c^7 - sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^7*c^2 + 8*sqrt(2)*sqrt(b^2 - 4*a
*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c^3 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^6*c^3 - 18*sqrt(2)*sqrt(b^2 - 4*a*c)*sqr
t(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^4 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
- sqrt(b^2 - 4*a*c)*c)*b^5*c^4 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqr
t(b^2 - 4*a*c)*c)*a^3*b*c^5 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b
```

```
^2 - 4*a*c)*c)*a^2*b^2*c^5 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^
2 - 4*a*c)*c)*a*b^3*c^5 - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 -
 4*a*c)*c)*a^2*b*c^6 - 2*(b^2 - 4*a*c)*b^5*c^4 + 8*(b^2 - 4*a*c)*a*b^3*c^5
- 4*(b^2 - 4*a*c)*a^2*b*c^6)*m)*arctan(2*sqrt(1/2)*x/sqrt((b*c^11 + sqrt(b^
2*c^22 - 4*a*c^23))/c^12))/((a*b^4*c^5 - 8*a^2*b^2*c^6 - 2*a*b^3*c^6 + 16*a
^3*c^7 + 8*a^2*b*c^7 + a*b^2*c^7 - 4*a^2*c^8)*c^2) - 1/8*((2*b^4*c^5 - 16*a
*b^2*c^6 + 32*a^2*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*b^4*c^3 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c
)*a*b^2*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b
^3*c^4 - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c
^5 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^5 -
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^5 + 4*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*c^6 - 2*(b^2 - 4*a*c
)*b^2*c^5 + 8*(b^2 - 4*a*c)*a*c^6)*c^2*f - (2*b^5*c^4 - 16*a*b^3*c^5 + 32*a
^2*b*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^
2 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 +
 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c^3 - 16*s
qrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 - 8*sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 - sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^4 + 4*sqrt(2)*sqrt(b
^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^5 - 2*(b^2 - 4*a*c)*b^3*c
^4 + 8*(b^2 - 4*a*c)*a*b*c^5)*c^2*h + (2*b^6*c^3 - 18*a*b^4*c^4 + 48*a^2*b^
2*c^5 - 32*a^3*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*b^6*c + 9*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b
^4*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^
2 - 24*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^
3 - 10*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3
- sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c^3 + 16*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^4 + 8*sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 + 5*sqrt(2)*sq
rt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 - 4*sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^5 - 2*(b^2 - 4*a*c)*b^4*
c^3 + 10*(b^2 - 4*a*c)*a*b^2*c^4 - 8*(b^2 - 4*a*c)*a^2*c^5)*c^2*k - (2*b^7*
c^2 - 20*a*b^5*c^3 + 64*a^2*b^3*c^4 - 64*a^3*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a
*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^7 + 10*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
+ sqrt(b^2 - 4*a*c)*c)*b^6*c - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt
(b^2 - 4*a*c)*c)*a^2*b^3*c^2 - 12*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt
(b^2 - 4*a*c)*c)*a*b^4*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*b^5*c^2 + 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*
a*c)*c)*a^3*b*c^3 + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*
c)*c)*a^2*b^2*c^3 + 6*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c
)*c)*a*b^3*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c
)*a^2*b*c^4 - 2*(b^2 - 4*a*c)*b^5*c^2 + 12*(b^2 - 4*a*c)*a*b^3*c^3 - 16*(b^
2 - 4*a*c)*a^2*b*c^4)*c^2*m - 2*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^
4*c^5 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^6 - 2*sqrt(2)*sqr
t(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^6 - 2*b^4*c^6 + 16*sqrt(2)*sqrt(b*c + sq
rt(b^2 - 4*a*c)*c)*a^2*c^7 + 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*
c^7 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^7 + 16*a*b^2*c^7 - 4*sq
rt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*c^8 - 32*a^2*c^8 + 2*(b^2 - 4*a*c)*
b^2*c^6 - 8*(b^2 - 4*a*c)*a*c^7)*d*abs(c) + 2*(sqrt(2)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*a*b^4*c^4 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c
^5 - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^5 - 2*a*b^4*c^5 + 16
*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^6 + 8*sqrt(2)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*a^2*b*c^6 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2
*c^6 + 16*a^2*b^2*c^6 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^7 -
 32*a^3*c^7 + 2*(b^2 - 4*a*c)*a*b^2*c^5 - 8*(b^2 - 4*a*c)*a^2*c^6)*h*abs(c)
 - 2*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c^3 - 8*sqrt(2)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^4 - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*
```

c)*c)*a*b^4*c^4 - 2*a*b^5*c^4 + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*
a^3*b*c^5 + 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^5 + sqrt(2)
*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^5 + 16*a^2*b^3*c^5 - 4*sqrt(2)*sqr
t(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^6 - 32*a^3*b*c^6 + 2*(b^2 - 4*a*c)*a*b
^3*c^4 - 8*(b^2 - 4*a*c)*a^2*b*c^5)*k*abs(c) + 2*(sqrt(2)*sqrt(b*c + sqrt(b
^2 - 4*a*c)*c)*a*b^6*c^2 - 9*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^
4*c^3 - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c^3 - 2*a*b^6*c^3 +
24*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^4 + 10*sqrt(2)*sqrt(b
*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^4 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c
)*c)*a*b^4*c^4 + 18*a^2*b^4*c^4 - 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c
)*a^4*c^5 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^5 - 5*sqrt(2)
*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^5 - 48*a^3*b^2*c^5 + 4*sqrt(2)*s
qrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^6 + 32*a^4*c^6 + 2*(b^2 - 4*a*c)*a*b^4
c^3 - 10(b^2 - 4*a*c)*a^2*b^2*c^4 + 8*(b^2 - 4*a*c)*a^3*c^5)*m*abs(c) + 2
*(2*b^3*c^8 - 8*a*b*c^9 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4
*a*c)*c)*b^3*c^6 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*a*b*c^7 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b
^2*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b*c^8 -
2*(b^2 - 4*a*c)*b*c^8)*d - (2*b^4*c^7 - 8*a*b^2*c^8 - sqrt(2)*sqrt(b^2 - 4*
a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c^5 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^6 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqr
t(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c +
sqrt(b^2 - 4*a*c)*c)*b^2*c^7 - 2*(b^2 - 4*a*c)*b^2*c^7)*f + (2*b^5*c^6 - 1
2*a*b^3*c^7 + 16*a^2*b*c^8 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*b^5*c^4 + 6*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*a*b^3*c^5 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*b^4*c^5 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
^2*b*c^6 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^
2*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^6 +
2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^7 - 2*(b
^2 - 4*a*c)*b^3*c^6 + 4*(b^2 - 4*a*c)*a*b*c^7)*h - (2*b^6*c^5 - 14*a*b^4*c^
6 + 24*a^2*b^2*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*b^6*c^3 + 7*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
*b^4*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*
c^4 - 12*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*
c^5 - 6*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^5
- sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c^5 + 3*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^6 - 2*(b^2
- 4*a*c)*b^4*c^5 + 6*(b^2 - 4*a*c)*a*b^2*c^6)*k + (2*b^7*c^4 - 16*a*b^5*c^5
+ 36*a^2*b^3*c^6 - 16*a^3*b*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*b^7*c^2 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*a*b^5*c^3 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 -
4*a*c)*c)*b^6*c^3 - 18*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*
c)*c)*a^2*b^3*c^4 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c
)*c)*a*b^4*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*
b^5*c^4 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b
*c^5 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*
c^5 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^5
- 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^6 -
2*(b^2 - 4*a*c)*b^5*c^4 + 8*(b^2 - 4*a*c)*a*b^3*c^5 - 4*(b^2 - 4*a*c)*a^2*b
*c^6)*m)*arctan(2*sqrt(1/2)*x/sqrt((b*c^11 - sqrt(b^2*c^22 - 4*a*c^23))/c^1
2))/((a*b^4*c^5 - 8*a^2*b^2*c^6 - 2*a*b^3*c^6 + 16*a^3*c^7 + 8*a^2*b*c^7 +
a*b^2*c^7 - 4*a^2*c^8)*c^2) + 1/4*(c^2*g - b*c*j + b^2*l - a*c*l)*log(abs(c
*x^4 + b*x^2 + a))/c^3 - 1/16*((b^6*c^2 - 8*a*b^4*c^3 - 2*b^5*c^3 + 16*a^2*
b^2*c^4 + 8*a*b^3*c^4 + b^4*c^4 - 4*a*b^2*c^5 - (b^5*c^2 - 8*a*b^3*c^3 - 2*
b^4*c^3 + 16*a^2*b*c^4 + 8*a*b^2*c^4 + b^3*c^4 - 4*a*b*c^5)*sqrt(b^2 - 4*a*
c))*g*abs(c) - (b^7*c - 10*a*b^5*c^2 - 2*b^6*c^2 + 32*a^2*b^3*c^3 + 12*a*b^
4*c^3 + b^5*c^3 - 32*a^3*b*c^4 - 16*a^2*b^2*c^4 - 6*a*b^3*c^4 + 8*a^2*b*c^5
- (b^6*c - 10*a*b^4*c^2 - 2*b^5*c^2 + 32*a^2*b^2*c^3 + 12*a*b^3*c^3 + b^4*

```
c^3 - 32*a^3*c^4 - 16*a^2*b*c^4 - 6*a*b^2*c^4 + 8*a^2*c^5)*sqrt(b^2 - 4*a*c
))*j*abs(c) + (b^8 - 11*a*b^6*c - 2*b^7*c + 40*a^2*b^4*c^2 + 14*a*b^5*c^2 +
 b^6*c^2 - 48*a^3*b^2*c^3 - 24*a^2*b^3*c^3 - 7*a*b^4*c^3 + 12*a^2*b^2*c^4 -
 (b^7 - 11*a*b^5*c - 2*b^6*c + 40*a^2*b^3*c^2 + 14*a*b^4*c^2 + b^5*c^2 - 48
*a^3*b*c^3 - 24*a^2*b^2*c^3 - 7*a*b^3*c^3 + 12*a^2*b*c^4)*sqrt(b^2 - 4*a*c)
)*l*abs(c) - 2*(b^5*c^3 - 8*a*b^3*c^4 - 2*b^4*c^4 + 16*a^2*b*c^5 + 8*a*b^2*
c^5 + b^3*c^5 - 4*a*b*c^6 - (b^4*c^3 - 8*a*b^2*c^4 - 2*b^3*c^4 + 16*a^2*c^5
 + 8*a*b*c^5 + b^2*c^5 - 4*a*c^6)*sqrt(b^2 - 4*a*c))*abs(c)*e + (b^6*c^3 -
8*a*b^4*c^4 - 2*b^5*c^4 + 16*a^2*b^2*c^5 + 8*a*b^3*c^5 + b^4*c^5 - 4*a*b^2*
c^6 - (b^5*c^3 - 4*a*b^3*c^4 - 2*b^4*c^4 + b^3*c^5)*sqrt(b^2 - 4*a*c))*g -
(b^7*c^2 - 10*a*b^5*c^3 - 2*b^6*c^3 + 32*a^2*b^3*c^4 + 12*a*b^4*c^4 + b^5*c
^4 - 32*a^3*b*c^5 - 16*a^2*b^2*c^5 - 6*a*b^3*c^5 + 8*a^2*b*c^6 - (b^6*c^2 -
 6*a*b^4*c^3 - 2*b^5*c^3 + 8*a^2*b^2*c^4 + 4*a*b^3*c^4 + b^4*c^4 - 2*a*b^2*
c^5)*sqrt(b^2 - 4*a*c))*j + (b^8*c - 11*a*b^6*c^2 - 2*b^7*c^2 + 40*a^2*b^4*
c^3 + 14*a*b^5*c^3 + b^6*c^3 - 48*a^3*b^2*c^4 - 24*a^2*b^3*c^4 - 7*a*b^4*c^
4 + 12*a^2*b^2*c^5 - (b^7*c - 7*a*b^5*c^2 - 2*b^6*c^2 + 12*a^2*b^3*c^3 + 6*
a*b^4*c^3 + b^5*c^3 - 3*a*b^3*c^4)*sqrt(b^2 - 4*a*c))*l - 2*(b^5*c^4 - 8*a*
b^3*c^5 - 2*b^4*c^5 + 16*a^2*b*c^6 + 8*a*b^2*c^6 + b^3*c^6 - 4*a*b*c^7 - (b
^4*c^4 - 4*a*b^2*c^5 - 2*b^3*c^5 + b^2*c^6)*sqrt(b^2 - 4*a*c))*e)*log(x^2 +
 1/2*(b*c^11 + sqrt(b^2*c^22 - 4*a*c^23))/c^12)/((a*b^4*c^2 - 8*a^2*b^2*c^3
 - 2*a*b^3*c^3 + 16*a^3*c^4 + 8*a^2*b*c^4 + a*b^2*c^4 - 4*a^2*c^5)*c^2*abs(
c)) - 1/16*((b^6*c^2 - 8*a*b^4*c^3 - 2*b^5*c^3 + 16*a^2*b^2*c^4 + 8*a*b^3*c
^4 + b^4*c^4 - 4*a*b^2*c^5 + (b^5*c^2 - 8*a*b^3*c^3 - 2*b^4*c^3 + 16*a^2*b*
c^4 + 8*a*b^2*c^4 + b^3*c^4 - 4*a*b*c^5)*sqrt(b^2 - 4*a*c))*g*abs(c) - (b^7
*c - 10*a*b^5*c^2 - 2*b^6*c^2 + 32*a^2*b^3*c^3 + 12*a*b^4*c^3 + b^5*c^3 - 3
2*a^3*b*c^4 - 16*a^2*b^2*c^4 - 6*a*b^3*c^4 + 8*a^2*b*c^5 + (b^6*c - 10*a*b^
4*c^2 - 2*b^5*c^2 + 32*a^2*b^2*c^3 + 12*a*b^3*c^3 + b^4*c^3 - 32*a^3*c^4 -
16*a^2*b*c^4 - 6*a*b^2*c^4 + 8*a^2*c^5)*sqrt(b^2 - 4*a*c))*j*abs(c) + (b^8
- 11*a*b^6*c - 2*b^7*c + 40*a^2*b^4*c^2 + 14*a*b^5*c^2 + b^6*c^2 - 48*a^3*b
^2*c^3 - 24*a^2*b^3*c^3 - 7*a*b^4*c^3 + 12*a^2*b^2*c^4 + (b^7 - 11*a*b^5*c
- 2*b^6*c + 40*a^2*b^3*c^2 + 14*a*b^4*c^2 + b^5*c^2 - 48*a^3*b*c^3 - 24*a^2
*b^2*c^3 - 7*a*b^3*c^3 + 12*a^2*b*c^4)*sqrt(b^2 - 4*a*c))*l*abs(c) - 2*(b^5
*c^3 - 8*a*b^3*c^4 - 2*b^4*c^4 + 16*a^2*b*c^5 + 8*a*b^2*c^5 + b^3*c^5 - 4*a
*b*c^6 + (b^4*c^3 - 8*a*b^2*c^4 - 2*b^3*c^4 + 16*a^2*c^5 + 8*a*b*c^5 + b^2*
c^5 - 4*a*c^6)*sqrt(b^2 - 4*a*c))*abs(c)*e + (b^6*c^3 - 8*a*b^4*c^4 - 2*b^5
*c^4 + 16*a^2*b^2*c^5 + 8*a*b^3*c^5 + b^4*c^5 - 4*a*b^2*c^6 + (b^5*c^3 - 4*
a*b^3*c^4 - 2*b^4*c^4 + b^3*c^5)*sqrt(b^2 - 4*a*c))*g - (b^7*c^2 - 10*a*b^5
*c^3 - 2*b^6*c^3 + 32*a^2*b^3*c^4 + 12*a*b^4*c^4 + b^5*c^4 - 32*a^3*b*c^5 -
 16*a^2*b^2*c^5 - 6*a*b^3*c^5 + 8*a^2*b*c^6 + (b^6*c^2 - 6*a*b^4*c^3 - 2*b^
5*c^3 + 8*a^2*b^2*c^4 + 4*a*b^3*c^4 + b^4*c^4 - 2*a*b^2*c^5)*sqrt(b^2 - 4*a
*c))*j + (b^8*c - 11*a*b^6*c^2 - 2*b^7*c^2 + 40*a^2*b^4*c^3 + 14*a*b^5*c^3
+ b^6*c^3 - 48*a^3*b^2*c^4 - 24*a^2*b^3*c^4 - 7*a*b^4*c^4 + 12*a^2*b^2*c^5
+ (b^7*c - 7*a*b^5*c^2 - 2*b^6*c^2 + 12*a^2*b^3*c^3 + 6*a*b^4*c^3 + b^5*c^3
 - 3*a*b^3*c^4)*sqrt(b^2 - 4*a*c))*l - 2*(b^5*c^4 - 8*a*b^3*c^5 - 2*b^4*c^5
 + 16*a^2*b*c^6 + 8*a*b^2*c^6 + b^3*c^6 - 4*a*b*c^7 + (b^4*c^4 - 4*a*b^2*c^
5 - 2*b^3*c^5 + b^2*c^6)*sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(b*c^11 - sqrt
(b^2*c^22 - 4*a*c^23))/c^12)/((a*b^4*c^2 - 8*a^2*b^2*c^3 - 2*a*b^3*c^3 + 16
*a^3*c^4 + 8*a^2*b*c^4 + a*b^2*c^4 - 4*a^2*c^5)*c^2*abs(c)) + 1/60*(12*c^4*
m*x^5 + 15*c^4*l*x^4 + 20*c^4*k*x^3 - 20*b*c^3*m*x^3 + 30*c^4*j*x^2 - 30*b*
c^3*l*x^2 + 60*c^4*h*x - 60*b*c^3*k*x + 60*b^2*c^2*m*x - 60*a*c^3*m*x)/c^5
```

maple [B] time = 0.08, size = 3835, normalized size = 7.04

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x)
```

```
[Out] 1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)/c*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1
/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^2*h+1/2*(-4*a*
```

```
c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b^2/c*h*a
rctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-2*c/(4*a*c-b^2)*2^(1/2)
/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))
*c)^(1/2)*c*x)*f*a-1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+
b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)
*b*f+c*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(
1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*d+2/(4*a*c-b^2)
*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*a*c*f*arctan(2^(1/2)/((b+(-4*a*c+
b^2)^(1/2))*c)^(1/2)*c*x)-1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(-
4*a*c+b^2)^(1/2))*c)^(1/2)*b*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1
/2)*c*x)+(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^
(1/2)*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/4/(4*a*c-b
^2)*b^2/c*g*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))-1/4/(4*a*c-b^2)*b^2/c*g*ln(-2*
c*x^2-b+(-4*a*c+b^2)^(1/2))+1/4*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*b/c*g*ln(-2*
c*x^2-b+(-4*a*c+b^2)^(1/2))-1/4*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*b/c*g*ln(2*c
*x^2+b+(-4*a*c+b^2)^(1/2))+1/2/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))
*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f*b^2-1/2/
(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b^2*f*arctan(2^(1/2)/(
(b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/2/c/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x
)*b^3*h+1/2/c/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2
^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*h+3/4/c^2*(-4*a*c+b^2)^(1/
2)/(4*a*c-b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*a*b*l-3/4/c^2*(-4*a*c+b^2)^
(1/2)/(4*a*c-b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*a*b*l-1/2/c^2/(4*a*c-b^
2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*c*x)*b^4*k+1/2/c^2/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^4*k
+2/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((
-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*h*a-2/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*
c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)
*b*h*a+1/2/c^3/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(
2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^5*m-1/2/c^3/(4*a*c-b^2)*2^(
1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*c*x)*b^5*m-2/c^2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)
*c*x)*a*b^2*m+3/2/c*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*a*b*k
+3/2/c*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(
1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*a*b*k-2/c^2*(-4
*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arcta
nh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*a*b^2*m-1/c^2*a*m*x+1/c^3
*b^2*m*x-1/c^2*b*k*x-1/3/c^2*x^3*b*m-1/2/c^2*x^2*b*l+1/c*h*x+1/(4*a*c-b^2)*
a*g*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))+1/(4*a*c-b^2)*a*g*ln(2*c*x^2+b+(-4*a*
c+b^2)^(1/2))-1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*e*ln(-2*c*x^2-b+(-4*a*c+b^
2)^(1/2))+1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*e*ln(2*c*x^2+b+(-4*a*c+b^2)^(1
/2))-(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2
)*a*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-(-4*a*c+b^2)^(1/
2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((
-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*a*h+5/2/c/(4*a*c-b^2)*2^(1/2)/((b+(-4*
a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*
x)*b^2*k*a-5/2/c/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arct
anh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^2*k*a+4/c/(4*a*c-b^2)*
2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*c*x)*a^2*b*m+1/c*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)
*c*x)*a^2*m-1/2/c^2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*k
+1/4*l*x^4/c+1/5*m*x^5/c+1/3/c*x^3*k+1/2/c*x^2*j+1/4/c^2/(4*a*c-b^2)*ln(-2*
c*x^2-b+(-4*a*c+b^2)^(1/2))*b^3*j+1/4/c^2/(4*a*c-b^2)*ln(2*c*x^2+b+(-4*a*c+
```

```
b^2)^(1/2))*b^3*j-1/c/(4*a*c-b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*a^2*l-1
/c/(4*a*c-b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*a^2*l-1/4/c^3/(4*a*c-b^2)*l
n(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*b^4*l-1/4/c^3/(4*a*c-b^2)*ln(-2*c*x^2-b+(-4
*a*c+b^2)^(1/2))*b^4*l+1/2/c^3*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+
(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1
/2)*c*x)*b^4*m+1/c*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*a^2
*m-1/2/c^2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*
c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*k+1/2/c
^3*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*
arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^4*m-3/c^2/(4*a*c-b^2
)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^
(1/2))*c)^(1/2)*c*x)*a*b^3*m+3/c^2/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*m*
a-4/c/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)
/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*a^2*b*m+2/(4*a*c-b^2)*2^(1/2)/((-b+
(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1
/2)*c*x)*a^2*k-2/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arcta
n(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*a^2*k+5/4/c^2/(4*a*c-b^2)*l
n(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*a*l*b^2+5/4/c^2/(4*a*c-b^2)*ln(2*c*x^2+b+(
-4*a*c+b^2)^(1/2))*a*l*b^2-1/c/(4*a*c-b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2)
)*b*j*a-1/c/(4*a*c-b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*b*j*a+1/2/c*(-4*a*
c+b^2)^(1/2)/(4*a*c-b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*a*j+1/4/c^3*(-4*
a*c+b^2)^(1/2)/(4*a*c-b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*b^3*l-1/4/c^2*
(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*b^2*j-1/2/
c*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*a*j-1/4/c
^3*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*b^3*l+1/
4/c^2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*b^2*j
```

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

$$\frac{12\,c^2mx^5 + 15\,c^2lx^4 + 20\left(c^2k - bcm\right)x^3 + 30\left(c^2j - bcl\right)x^2 + 60\left(c^2h - bck + \left(b^2 - ac\right)m\right)x}{60\,c^3} - \frac{-\int \frac{c^3d - ac^2h + abck + (\cdots}{\cdots}}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)
,x, algorithm="maxima")
```

```
[Out] 1/60*(12*c^2*m*x^5 + 15*c^2*l*x^4 + 20*(c^2*k - b*c*m)*x^3 + 30*(c^2*j - b*
c*l)*x^2 + 60*(c^2*h - b*c*k + (b^2 - a*c)*m)*x)/c^3 - integrate(-(c^3*d -
a*c^2*h + a*b*c*k + (c^3*g - b*c^2*j + (b^2*c - a*c^2)*l)*x^3 + (c^3*f - b*
c^2*h + (b^2*c - a*c^2)*k - (b^3 - 2*a*b*c)*m)*x^2 - (a*b^2 - a^2*c)*m + (c
^3*e - a*c^2*j + a*b*c*l)*x)/(c*x^4 + b*x^2 + a), x)/c^3
```

mupad [B] time = 4.31, size = 49150, normalized size = 90.18

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a +
b*x^2 + c*x^4),x)
```

```
[Out] x^2*(j/(2*c) - (b*l)/(2*c^2)) - x*((b*(k/c - (b*m)/c^2))/c - h/c + (a*m)/c^
2) + x^3*(k/(3*c) - (b*m)/(3*c^2)) + symsum(log((c^7*d*e^2 - a*c^6*f^3 - c^
7*d^2*f + b^7*d*m^2 + a^4*c^3*k^3 + a^4*b^3*m^3 + a^2*b*c^4*h^3 + b^2*c^5*d
*g^2 + b^3*c^4*d*h^2 + a^2*c^5*d*j^2 - a^2*c^5*f*h^2 + a^2*c^5*g^2*h + b^4*
c^3*d*j^2 - a^3*c^4*d*l^2 - b^2*c^5*d^2*k + b^5*c^2*d*k^2 + 3*a^2*c^5*f^2*k
 - 3*a^3*c^4*f*k^2 + a^2*c^5*e^2*m - a^3*c^4*h*j^2 + b^3*c^4*d^2*m + a^3*c^
4*h^2*k - a^4*c^3*f*m^2 + a^2*b^5*h*m^2 - a^3*c^4*g^2*m + a^4*c^3*h*l^2 - a
```

```
^3*b^4*k*m^2 + a^4*c^3*j^2*m + a^5*c^2*k*m^2 - a^5*c^2*l^2*m - a^3*b^2*c^2*
k^3 - a*c^6*d*g^2 + b*c^6*d*f^2 - a*c^6*e^2*h + b*c^6*d^2*h + a*c^6*d^2*k -
 2*a^5*b*c*m^3 + b^6*c*d*l^2 - a*b^6*f*m^2 - 2*a*b*c^5*d*h^2 - a*b*c^5*f*g^
2 + 2*a*b*c^5*f^2*h + a*b*c^5*e^2*k - 2*a*b*c^5*d^2*m - 6*a*b^5*c*d*m^2 - 2
*b^2*c^5*d*f*h - a*b^5*c*f*l^2 + 2*b^2*c^5*d*e*j - 2*b^3*c^4*d*e*l + 2*b^3*
c^4*d*f*k - 2*b^3*c^4*d*g*j - 2*a^2*c^5*d*f*m + 2*a^2*c^5*d*g*l - 2*a^2*c^5
*d*h*k - 2*a^2*c^5*e*f*l - 2*a^2*c^5*e*g*k + 2*a^2*c^5*e*h*j - 2*a^2*c^5*f*
g*j - 2*b^4*c^3*d*f*m + 2*b^4*c^3*d*g*l - 2*b^4*c^3*d*h*k + 2*b^5*c^2*d*h*m
 + 2*a^3*c^4*f*h*m - 2*a^3*c^4*g*h*l - 2*b^5*c^2*d*j*l + 2*a^3*c^4*d*k*m -
2*a^3*c^4*e*j*m + 2*a^3*c^4*e*k*l + 2*a^3*c^4*f*j*l + 2*a^3*c^4*g*j*k + 2*a
^4*c^3*g*l*m - 2*a^4*c^3*h*k*m - 2*a^4*c^3*j*k*l - 3*a*b^2*c^4*d*j^2 - a*b^
2*c^4*f*h^2 - 4*a*b^3*c^3*d*k^2 + 3*a^2*b*c^4*d*k^2 - a*b^3*c^3*f*j^2 - 5*a
*b^4*c^2*d*l^2 + 2*a^2*b*c^4*f*j^2 - 2*a*b^2*c^4*f^2*k - a*b^4*c^2*f*k^2 -
4*a^3*b*c^3*d*m^2 - a*b^2*c^4*e^2*m - 3*a^3*b*c^3*f*l^2 + 2*a*b^3*c^3*f^2*m
 - 5*a^2*b*c^4*f^2*m + 5*a^2*b^4*c*f*m^2 + a^2*b^4*c*h*l^2 - 4*a^3*b*c^3*h^
2*m - a^3*b*c^3*j^2*k - 4*a^3*b^3*c*h*m^2 + 5*a^4*b*c^2*h*m^2 - a^3*b^3*c*k
*l^2 + 2*a^4*b*c^2*k*l^2 + 2*a^3*b^3*c*k^2*m - 3*a^4*b*c^2*k^2*m + a^4*b^2*
c*k*m^2 + a^4*b^2*c*l^2*m - 2*b*c^6*d*e*g + 2*a*c^6*d*f*h + 2*a*c^6*e*f*g -
 2*a*c^6*d*e*j - 2*b^6*c*d*k*m + 6*a^2*b^2*c^3*d*l^2 + 3*a^2*b^2*c^3*f*k^2
+ 10*a^2*b^3*c^2*d*m^2 + a^2*b^2*c^3*h*j^2 + 4*a^2*b^3*c^2*f*l^2 - 2*a^2*b^
2*c^3*h^2*k + a^2*b^3*c^2*h*k^2 - 6*a^3*b^2*c^2*f*m^2 - 3*a^3*b^2*c^2*h*l^2
 + 2*a^2*b^3*c^2*h^2*m + 4*a*b*c^5*d*e*l - 4*a*b*c^5*d*f*k + 4*a*b*c^5*d*g*
j - 2*a*b*c^5*e*f*j + 2*a*b^5*c*f*k*m + 6*a*b^2*c^4*d*f*m - 6*a*b^2*c^4*d*g
*l + 6*a*b^2*c^4*d*h*k + 2*a*b^2*c^4*e*f*l + 2*a*b^2*c^4*f*g*j - 8*a*b^3*c^
3*d*h*m - 2*a*b^3*c^3*f*g*l + 2*a*b^3*c^3*f*h*k + 6*a^2*b*c^4*d*h*m + 2*a^2
*b*c^4*e*g*m - 2*a^2*b*c^4*e*h*l + 4*a^2*b*c^4*f*g*l - 2*a^2*b*c^4*f*h*k -
2*a^2*b*c^4*g*h*j + 8*a*b^3*c^3*d*j*l - 6*a^2*b*c^4*d*j*l - 2*a*b^4*c^2*f*h
*m + 10*a*b^4*c^2*d*k*m + 2*a*b^4*c^2*f*j*l + 8*a^3*b*c^3*f*k*m - 2*a^3*b*c
^3*g*k*l + 4*a^3*b*c^3*h*j*l - 2*a^2*b^4*c*h*k*m - 2*a^4*b*c^2*j*l*m + 4*a^
2*b^2*c^3*f*h*m + 2*a^2*b^2*c^3*g*h*l - 12*a^2*b^2*c^3*d*k*m - 6*a^2*b^2*c^
3*f*j*l - 8*a^2*b^3*c^2*f*k*m - 2*a^2*b^3*c^2*h*j*l + 4*a^3*b^2*c^2*h*k*m +
 2*a^3*b^2*c^2*j*k*l)/c^5 - root(128*a^2*b^2*c^8*z^4 - 16*a*b^4*c^7*z^4 - 2
56*a^3*c^9*z^4 + 384*a^3*b^2*c^6*l*z^3 - 144*a^2*b^4*c^5*l*z^3 + 128*a^2*b^
3*c^6*j*z^3 - 128*a^2*b^2*c^7*g*z^3 + 16*a*b^6*c^4*l*z^3 - 256*a^3*b*c^7*j*
z^3 - 16*a*b^5*c^5*j*z^3 + 16*a*b^4*c^6*g*z^3 - 256*a^4*c^7*l*z^3 + 256*a^3
*c^8*g*z^3 - 96*a^4*b*c^5*j*l*z^2 + 8*a*b^7*c^2*j*l*z^2 + 160*a^4*b*c^5*h*m
*z^2 - 8*a*b^7*c^2*h*m*z^2 + 8*a*b^6*c^3*h*k*z^2 - 8*a*b^6*c^3*g*l*z^2 + 8*
a*b^6*c^3*f*m*z^2 + 160*a^3*b*c^6*g*j*z^2 - 96*a^3*b*c^6*f*k*z^2 - 96*a^3*b
*c^6*e*l*z^2 - 96*a^3*b*c^6*d*m*z^2 + 8*a*b^5*c^4*g*j*z^2 - 8*a*b^5*c^4*f*k
*z^2 - 8*a*b^5*c^4*e*l*z^2 - 8*a*b^5*c^4*d*m*z^2 + 8*a*b^4*c^5*e*j*z^2 + 8*
a*b^4*c^5*d*k*z^2 + 8*a*b^4*c^5*f*h*z^2 + 32*a^2*b*c^7*e*g*z^2 + 32*a^2*b*c
^7*d*h*z^2 - 8*a*b^3*c^6*e*g*z^2 - 8*a*b^3*c^6*d*h*z^2 + 16*a*b^2*c^7*d*f*z
^2 + 8*a*b^8*c*k*m*z^2 - 304*a^4*b^2*c^4*k*m*z^2 + 264*a^3*b^4*c^3*k*m*z^2
- 80*a^2*b^6*c^2*k*m*z^2 + 184*a^3*b^3*c^4*j*l*z^2 - 72*a^2*b^5*c^3*j*l*z^2
 - 200*a^3*b^3*c^4*h*m*z^2 + 72*a^2*b^5*c^3*h*m*z^2 - 240*a^3*b^2*c^5*g*l*z
^2 + 144*a^3*b^2*c^5*h*k*z^2 + 144*a^3*b^2*c^5*f*m*z^2 + 80*a^2*b^4*c^4*g*l
*z^2 - 64*a^2*b^4*c^4*h*k*z^2 - 64*a^2*b^4*c^4*f*m*z^2 - 72*a^2*b^3*c^5*g*j
*z^2 + 56*a^2*b^3*c^5*f*k*z^2 + 56*a^2*b^3*c^5*e*l*z^2 + 56*a^2*b^3*c^5*d*m
*z^2 - 48*a^2*b^2*c^6*e*j*z^2 - 48*a^2*b^2*c^6*d*k*z^2 - 48*a^2*b^2*c^6*f*h
*z^2 - 112*a^5*b*c^4*m^2*z^2 + 44*a^2*b^7*c*m^2*z^2 + 80*a^4*b*c^5*k^2*z^2
- 4*a*b^7*c^2*k^2*z^2 - 4*a*b^6*c^3*j^2*z^2 - 48*a^3*b*c^6*h^2*z^2 - 4*a*b^
5*c^4*h^2*z^2 - 4*a*b^4*c^5*g^2*z^2 + 16*a^2*b*c^7*f^2*z^2 - 4*a*b^3*c^6*f^
2*z^2 + 8*a*b^2*c^7*e^2*z^2 + 64*a^5*c^5*k*m*z^2 + 192*a^4*c^6*g*l*z^2 - 64
*a^4*c^6*h*k*z^2 - 64*a^4*c^6*f*m*z^2 + 64*a^3*c^7*e*j*z^2 + 64*a^3*c^7*d*k
*z^2 + 64*a^3*c^7*f*h*z^2 - 4*a*b^8*c*l^2*z^2 - 64*a^2*c^8*d*f*z^2 + 16*a*b
*c^8*d^2*z^2 + 252*a^4*b^3*c^3*m^2*z^2 - 168*a^3*b^5*c^2*m^2*z^2 + 168*a^4*
b^2*c^4*l^2*z^2 - 132*a^3*b^4*c^3*l^2*z^2 + 40*a^2*b^6*c^2*l^2*z^2 - 100*a^
3*b^3*c^4*k^2*z^2 + 36*a^2*b^5*c^3*k^2*z^2 - 56*a^3*b^2*c^5*j^2*z^2 + 32*a^
2*b^4*c^4*j^2*z^2 + 28*a^2*b^3*c^5*h^2*z^2 + 40*a^2*b^2*c^6*g^2*z^2 - 96*a^
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5*c^5*l^2*z^2 - 32*a^4*c^6*j^2*z^2 - 96*a^3*c^7*g^2*z^2 - 32*a^2*c^8*e^2*z^
2 - 4*b^3*c^7*d^2*z^2 - 4*a*b^9*m^2*z^2 + 32*a^5*b*c^3*h*l*m*z + 8*a^2*b^6*
c*g*k*m*z + 96*a^4*b*c^4*e*k*m*z + 32*a^4*b*c^4*h*j*k*z + 32*a^4*b*c^4*g*j*
l*z + 32*a^4*b*c^4*f*j*m*z - 64*a^4*b*c^4*g*h*m*z - 8*a*b^6*c^2*e*j*l*z + 8
*a*b^6*c^2*e*h*m*z - 64*a^3*b*c^5*e*h*k*z + 64*a^3*b*c^5*e*g*l*z - 64*a^3*b
*c^5*e*f*m*z + 32*a^3*b*c^5*f*g*k*z - 32*a^3*b*c^5*d*h*l*z + 32*a^3*b*c^5*d
*g*m*z - 8*a*b^5*c^3*e*h*k*z + 8*a*b^5*c^3*e*g*l*z - 8*a*b^5*c^3*e*f*m*z -
8*a*b^4*c^4*e*g*j*z + 8*a*b^4*c^4*e*f*k*z - 8*a*b^4*c^4*d*f*l*z + 8*a*b^4*c
^4*d*e*m*z - 32*a^2*b*c^6*d*f*j*z + 32*a^2*b*c^6*d*e*k*z + 8*a*b^3*c^5*d*f*
j*z - 8*a*b^3*c^5*d*e*k*z + 32*a^2*b*c^6*e*f*h*z - 8*a*b^3*c^5*e*f*h*z - 8*
a*b^2*c^6*d*f*g*z + 8*a*b^2*c^6*d*e*h*z - 8*a*b^7*c*e*k*m*z - 40*a^5*b^2*c^
2*k*l*m*z + 48*a^4*b^3*c^2*j*k*m*z - 8*a^4*b^3*c^2*h*l*m*z + 104*a^4*b^2*c^
3*g*k*m*z - 56*a^3*b^4*c^2*g*k*m*z - 40*a^4*b^2*c^3*h*j*m*z + 8*a^4*b^2*c^3
*h*k*l*z + 8*a^4*b^2*c^3*f*l*m*z + 8*a^3*b^4*c^2*h*j*m*z - 152*a^3*b^3*c^3*
e*k*m*z + 64*a^2*b^5*c^2*e*k*m*z - 40*a^3*b^3*c^3*g*j*l*z - 8*a^3*b^3*c^3*h
*j*k*z - 8*a^3*b^3*c^3*f*j*m*z + 8*a^2*b^5*c^2*g*j*l*z + 48*a^3*b^3*c^3*g*h
*m*z - 8*a^2*b^5*c^2*g*h*m*z - 104*a^3*b^2*c^4*e*j*l*z + 56*a^2*b^4*c^3*e*j
*l*z + 8*a^3*b^2*c^4*f*j*k*z - 8*a^3*b^2*c^4*d*k*l*z + 8*a^3*b^2*c^4*d*j*m*
z + 104*a^3*b^2*c^4*e*h*m*z - 56*a^2*b^4*c^3*e*h*m*z - 40*a^3*b^2*c^4*g*h*k
*z - 40*a^3*b^2*c^4*f*g*m*z - 8*a^3*b^2*c^4*f*h*l*z + 8*a^2*b^4*c^3*g*h*k*z
 + 8*a^2*b^4*c^3*f*g*m*z + 48*a^2*b^3*c^4*e*h*k*z - 48*a^2*b^3*c^4*e*g*l*z
+ 48*a^2*b^3*c^4*e*f*m*z - 8*a^2*b^3*c^4*f*g*k*z + 8*a^2*b^3*c^4*d*h*l*z -
8*a^2*b^3*c^4*d*g*m*z + 40*a^2*b^2*c^5*e*g*j*z - 40*a^2*b^2*c^5*e*f*k*z + 4
0*a^2*b^2*c^5*d*f*l*z - 40*a^2*b^2*c^5*d*e*m*z - 8*a^2*b^2*c^5*d*h*j*z + 8*
a^2*b^2*c^5*d*g*k*z + 8*a^2*b^2*c^5*f*g*h*z + 8*a^4*b^4*c*k*l*m*z - 64*a^5*
b*c^3*j*k*m*z - 8*a^3*b^5*c*j*k*m*z - 32*a^6*b*c^2*l*m^2*z + 24*a^5*b^3*c*l
*m^2*z - 28*a^4*b^4*c*j*m^2*z + 16*a^5*b*c^3*k^2*l*z + 4*a^3*b^5*c*j*l^2*z
+ 48*a^5*b*c^3*g*m^2*z + 32*a^3*b^5*c*g*m^2*z - 4*a^2*b^6*c*g*l^2*z - 36*a^
2*b^6*c*e*m^2*z - 32*a^4*b*c^4*g*k^2*z - 16*a^3*b*c^5*f^2*l*z - 48*a^4*b*c^
4*e*l^2*z - 32*a^3*b*c^5*g^2*j*z - 4*a*b^4*c^4*e^2*l*z + 32*a^2*b*c^6*d^2*l
*z - 24*a*b^3*c^5*d^2*l*z + 4*a*b^6*c^2*e*k^2*z + 32*a^3*b*c^5*e*j^2*z + 16
*a^3*b*c^5*g*h^2*z - 16*a^2*b*c^6*e^2*j*z + 4*a*b^5*c^3*e*j^2*z + 4*a*b^3*c
^5*e^2*j*z + 20*a*b^2*c^6*d^2*j*z + 4*a*b^4*c^4*e*h^2*z - 16*a^2*b*c^6*e*g^
2*z + 4*a*b^3*c^5*e*g^2*z - 4*a*b^2*c^6*e^2*g*z + 4*a*b^2*c^6*e*f^2*z + 32*
a^6*c^3*k*l*m*z - 32*a^5*c^4*h*k*l*z + 32*a^5*c^4*h*j*m*z - 32*a^5*c^4*g*k*
m*z - 32*a^5*c^4*f*l*m*z - 32*a^4*c^5*f*j*k*z + 32*a^4*c^5*e*j*l*z + 32*a^4
*c^5*d*k*l*z - 32*a^4*c^5*d*j*m*z + 32*a^4*c^5*g*h*k*z + 32*a^4*c^5*f*h*l*z
 + 32*a^4*c^5*f*g*m*z - 32*a^4*c^5*e*h*m*z - 32*a^3*c^6*e*g*j*z + 32*a^3*c^
6*e*f*k*z + 32*a^3*c^6*d*h*j*z - 32*a^3*c^6*d*g*k*z - 32*a^3*c^6*d*f*l*z +
32*a^3*c^6*d*e*m*z - 32*a^3*c^6*f*g*h*z + 4*a*b^7*c*e*l^2*z + 32*a^2*c^7*d*
f*g*z - 32*a^2*c^7*d*e*h*z - 16*a*b*c^7*d^2*g*z + 52*a^5*b^2*c^2*j*m^2*z -
4*a^4*b^3*c^2*k^2*l*z + 36*a^4*b^2*c^3*j^2*l*z - 16*a^4*b^3*c^2*j*l^2*z - 8
*a^3*b^4*c^2*j^2*l*z - 20*a^4*b^2*c^3*j*k^2*z + 4*a^3*b^4*c^2*j*k^2*z - 76*
a^4*b^3*c^2*g*m^2*z - 60*a^4*b^2*c^3*g*l^2*z + 44*a^3*b^2*c^4*g^2*l*z + 28*
a^3*b^4*c^2*g*l^2*z - 8*a^2*b^4*c^3*g^2*l*z + 104*a^3*b^4*c^2*e*m^2*z - 100
*a^4*b^2*c^3*e*m^2*z + 24*a^3*b^3*c^3*g*k^2*z + 4*a^3*b^2*c^4*h^2*j*z - 4*a
^2*b^5*c^2*g*k^2*z + 4*a^2*b^3*c^4*f^2*l*z + 76*a^3*b^3*c^3*e*l^2*z - 32*a^
2*b^5*c^2*e*l^2*z + 20*a^2*b^2*c^5*e^2*l*z + 12*a^3*b^2*c^4*g*j^2*z + 8*a^2
*b^3*c^4*g^2*j*z - 4*a^2*b^4*c^3*g*j^2*z + 52*a^3*b^2*c^4*e*k^2*z - 28*a^2*
b^4*c^3*e*k^2*z - 4*a^2*b^2*c^5*f^2*j*z - 24*a^2*b^3*c^4*e*j^2*z - 4*a^2*b^
3*c^4*g*h^2*z - 20*a^2*b^2*c^5*e*h^2*z + 20*a^5*b^2*c^2*l^3*z + 4*a^3*b^3*c
^3*j^3*z - 4*a^2*b^2*c^5*g^3*z - 4*a^4*b^5*l*m^2*z - 16*a^6*c^3*j*m^2*z - 1
6*a^5*c^4*j^2*l*z + 4*a^3*b^6*j*m^2*z + 16*a^5*c^4*j*k^2*z + 48*a^5*c^4*g*l
^2*z - 48*a^4*c^5*g^2*l*z - 4*a^2*b^7*g*m^2*z + 16*a^5*c^4*e*m^2*z - 16*a^4
*c^5*h^2*j*z + 16*a^4*c^5*g*j^2*z - 16*a^3*c^6*e^2*l*z + 4*b^5*c^4*d^2*l*z
- 16*a^4*c^5*e*k^2*z + 16*a^3*c^6*f^2*j*z - 4*b^4*c^5*d^2*j*z - 16*a^2*c^7*
d^2*j*z - 4*a^4*b^4*c*l^3*z + 16*a^3*c^6*e*h^2*z - 16*a^4*b*c^4*j^3*z + 16*
a^2*c^7*e^2*g*z + 4*b^3*c^6*d^2*g*z - 16*a^2*c^7*e*f^2*z - 4*b^2*c^7*d^2*e*
z + 4*a*b^8*e*m^2*z + 16*a*c^8*d^2*e*z - 16*a^6*c^3*l^3*z + 16*a^3*c^6*g^3*
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z + 4*a^5*b^2*c*g*k*l*m + 12*a^5*b*c^2*g*j*k*m + 12*a^5*b*c^2*e*k*l*m - 4*a
^5*b*c^2*h*j*k*l - 4*a^5*b*c^2*f*j*l*m - 4*a^4*b^3*c*g*j*k*m - 4*a^4*b^3*c*
e*k*l*m - 4*a^5*b*c^2*g*h*l*m + 4*a^3*b^4*c*e*j*k*m - 4*a^3*b^4*c*f*h*k*m +
 12*a^4*b*c^3*d*j*k*l - 20*a^4*b*c^3*e*g*k*m + 12*a^4*b*c^3*f*h*j*l + 12*a^
4*b*c^3*e*h*j*m + 12*a^4*b*c^3*d*h*k*m - 4*a^4*b*c^3*g*h*j*k - 4*a^4*b*c^3*
f*g*k*l - 4*a^4*b*c^3*f*g*j*m - 4*a^4*b*c^3*e*h*k*l - 4*a^4*b*c^3*e*f*l*m -
 4*a^4*b*c^3*d*g*l*m - 4*a^2*b^5*c*e*g*k*m + 4*a^2*b^5*c*d*h*k*m - 20*a^3*b
*c^4*d*f*j*l - 4*a^3*b*c^4*e*f*j*k - 4*a^3*b*c^4*d*g*j*k - 4*a^3*b*c^4*d*e*
k*l - 4*a^3*b*c^4*d*e*j*m - 4*a*b^5*c^2*d*f*j*l + 12*a^3*b*c^4*e*g*h*k + 12
*a^3*b*c^4*e*f*g*m + 12*a^3*b*c^4*d*g*h*l + 12*a^3*b*c^4*d*f*h*m - 4*a^3*b*
c^4*f*g*h*j - 4*a^3*b*c^4*e*f*h*l + 4*a*b^5*c^2*d*f*h*m - 4*a*b^4*c^3*d*f*h
*k + 4*a*b^4*c^3*d*f*g*l + 12*a^2*b*c^5*d*f*g*j + 12*a^2*b*c^5*d*e*f*l - 4*
a^2*b*c^5*d*e*h*j - 4*a^2*b*c^5*d*e*g*k - 4*a*b^3*c^4*d*f*g*j - 4*a*b^3*c^4
*d*e*f*l - 4*a^2*b*c^5*e*f*g*h + 4*a*b^2*c^5*d*e*f*j - 4*a^6*b*c*j*k*l*m -
4*a*b^6*c*d*f*k*m - 4*a*b*c^6*d*e*f*g - 16*a^4*b^2*c^2*e*j*k*m + 4*a^4*b^2*
c^2*f*j*k*l + 4*a^4*b^2*c^2*d*j*l*m + 12*a^4*b^2*c^2*f*h*k*m + 4*a^4*b^2*c^
2*g*h*j*m + 4*a^4*b^2*c^2*e*h*l*m - 4*a^3*b^3*c^2*d*j*k*l + 20*a^3*b^3*c^2*
e*g*k*m - 16*a^3*b^3*c^2*d*h*k*m - 4*a^3*b^3*c^2*f*h*j*l - 4*a^3*b^3*c^2*e*
h*j*m - 40*a^3*b^2*c^3*d*f*k*m + 24*a^2*b^4*c^2*d*f*k*m - 16*a^3*b^2*c^3*d*
h*j*l + 12*a^3*b^2*c^3*e*g*j*l + 4*a^3*b^2*c^3*e*h*j*k + 4*a^3*b^2*c^3*e*f*
j*m + 4*a^3*b^2*c^3*d*g*k*l - 4*a^2*b^4*c^2*e*g*j*l + 4*a^2*b^4*c^2*d*h*j*l
 - 16*a^3*b^2*c^3*e*g*h*m + 4*a^3*b^2*c^3*f*g*h*l + 4*a^2*b^4*c^2*e*g*h*m +
 20*a^2*b^3*c^3*d*f*j*l - 16*a^2*b^3*c^3*d*f*h*m - 4*a^2*b^3*c^3*e*g*h*k -
4*a^2*b^3*c^3*e*f*g*m - 4*a^2*b^3*c^3*d*g*h*l - 16*a^2*b^2*c^4*d*f*g*l + 12
*a^2*b^2*c^4*d*f*h*k + 4*a^2*b^2*c^4*e*f*g*k + 4*a^2*b^2*c^4*d*g*h*j + 4*a^
2*b^2*c^4*d*e*h*l + 4*a^2*b^2*c^4*d*e*g*m + 2*a^5*b^2*c*j^2*k*m - 4*a^5*b^2
*c*h*k^2*m - 2*a^5*b*c^2*h^2*k*m + 2*a^4*b^3*c*h^2*k*m + 2*a^5*b^2*c*h*k*l^
2 + 2*a^5*b^2*c*f*l^2*m - 2*a^5*b*c^2*h*j^2*m + 2*a^3*b^4*c*g^2*k*m + 14*a^
4*b*c^3*f^2*k*m - 10*a^5*b*c^2*f*k^2*m - 8*a^5*b^2*c*g*j*m^2 - 8*a^5*b^2*c*
e*l*m^2 + 4*a^5*b^2*c*f*k*m^2 + 4*a^4*b^3*c*f*k^2*m - 2*a^5*b*c^2*g*k^2*l +
 2*a^2*b^5*c*f^2*k*m + 6*a^5*b*c^2*f*k*l^2 + 6*a^5*b*c^2*d*l^2*m - 2*a^5*b*
c^2*g*j*l^2 + 2*a^4*b^3*c*g*j*l^2 - 2*a^4*b^3*c*f*k*l^2 - 2*a^4*b^3*c*d*l^2
*m - 2*a^4*b*c^3*g^2*j*l - 14*a*b^5*c^2*d^2*k*m - 10*a^5*b*c^2*e*j*m^2 + 10
*a^4*b^3*c*e*j*m^2 - 10*a^3*b*c^4*d^2*k*m - 6*a^4*b^3*c*d*k*m^2 + 6*a^4*b*c
^3*g^2*h*m - 4*a^3*b^4*c*d*k^2*m - 2*a^5*b*c^2*d*k*m^2 + 14*a^5*b*c^2*f*h*m
^2 + 14*a^3*b*c^4*e^2*j*l - 10*a^4*b^3*c*f*h*m^2 - 10*a^4*b*c^3*f*h^2*m - 1
0*a^4*b*c^3*e*j^2*l - 2*a^4*b*c^3*g*h^2*l - 2*a^4*b*c^3*f*j^2*k - 2*a^4*b*c
^3*d*j^2*m - 2*a^3*b^4*c*e*j*l^2 + 2*a^3*b^4*c*d*k*l^2 + 2*a*b^5*c^2*e^2*j*
l - 12*a*b^4*c^3*d^2*j*l - 10*a^3*b*c^4*e^2*h*m + 6*a^4*b*c^3*e*j*k^2 + 2*a
^3*b^4*c*f*h*l^2 - 2*a*b^5*c^2*e^2*h*m - 12*a^3*b^4*c*e*g*m^2 + 12*a^3*b^4*
c*d*h*m^2 + 12*a*b^4*c^3*d^2*h*m + 6*a^3*b*c^4*f^2*g*l - 2*a^4*b*c^3*f*h*k^
2 - 2*a^3*b*c^4*f^2*h*k + 14*a^4*b*c^3*e*g*l^2 - 10*a^4*b*c^3*d*h*l^2 - 10*
a^3*b*c^4*e*g^2*l - 2*a^3*b*c^4*f*g^2*k - 2*a^3*b*c^4*d*g^2*m + 2*a^2*b^5*c
*e*g*l^2 - 2*a^2*b^5*c*d*h*l^2 + 2*a*b^4*c^3*e^2*h*k - 2*a*b^4*c^3*e^2*g*l
+ 2*a*b^4*c^3*e^2*f*m - 14*a^2*b^5*c*d*f*m^2 + 14*a^2*b*c^5*d^2*h*k - 10*a^
4*b*c^3*d*f*m^2 - 10*a^3*b*c^4*d*h^2*k - 10*a^2*b*c^5*d^2*g*l - 10*a*b^3*c^
4*d^2*h*k + 10*a*b^3*c^4*d^2*g*l - 6*a*b^3*c^4*d^2*f*m - 4*a*b^4*c^3*d*f^2*
m - 2*a^3*b*c^4*e*h^2*j - 2*a^2*b*c^5*d^2*f*m + 6*a^3*b*c^4*d*h*j^2 + 6*a^2
*b*c^5*e^2*f*k + 6*a^2*b*c^5*d*e^2*m - 2*a^3*b*c^4*e*g*j^2 - 2*a^2*b*c^5*e^
2*g*j + 2*a*b^3*c^4*e^2*g*j - 2*a*b^3*c^4*e^2*f*k - 2*a*b^3*c^4*d*e^2*m + 1
4*a^3*b*c^4*d*f*k^2 - 10*a^2*b*c^5*d*f^2*k - 8*a*b^2*c^5*d^2*g*j - 8*a*b^2*
c^5*d^2*e*l + 4*a*b^3*c^4*d*f^2*k + 4*a*b^2*c^5*d^2*f*k - 2*a^2*b*c^5*e*f^2
*j + 2*a*b^5*c^2*d*f*k^2 + 2*a*b^4*c^3*d*f*j^2 + 2*a*b^2*c^5*d*e^2*k - 2*a^
2*b*c^5*d*g^2*h + 2*a*b^2*c^5*e^2*f*h - 4*a*b^2*c^5*d*f^2*h - 2*a^2*b*c^5*d
*f*h^2 + 2*a*b^3*c^4*d*f*h^2 + 2*a*b^2*c^5*d*f*g^2 + 8*a^6*c^2*h*j*l*m - 8*
a^6*c^2*g*k*l*m - 8*a^5*c^3*f*j*k*l + 8*a^5*c^3*e*j*k*m - 8*a^5*c^3*d*j*l*m
 + 8*a^5*c^3*g*h*k*l - 8*a^5*c^3*g*h*j*m - 8*a^5*c^3*f*h*k*m + 8*a^5*c^3*f*
g*l*m - 8*a^5*c^3*e*h*l*m - 2*a^6*b*c*h*l^2*m + 8*a^4*c^4*f*g*j*k - 8*a^4*c
^4*e*h*j*k - 8*a^4*c^4*e*g*j*l + 8*a^4*c^4*e*f*k*l - 8*a^4*c^4*e*f*j*m + 8*
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a^4*c^4*d*h*j*l - 8*a^4*c^4*d*g*k*l + 8*a^4*c^4*d*g*j*m + 8*a^4*c^4*d*f*k*m
 + 8*a^4*c^4*d*e*l*m + 6*a^6*b*c*g*l*m^2 - 2*a^6*b*c*h*k*m^2 - 8*a^4*c^4*f*
g*h*l + 8*a^4*c^4*e*g*h*m + 2*a*b^6*c*e^2*k*m + 8*a^3*c^5*d*e*j*k + 8*a^3*c
^5*e*f*h*j - 8*a^3*c^5*e*f*g*k - 8*a^3*c^5*d*g*h*j - 8*a^3*c^5*d*f*h*k + 8*
a^3*c^5*d*f*g*l - 8*a^3*c^5*d*e*h*l - 8*a^3*c^5*d*e*g*m - 8*a^2*c^6*d*e*f*j
 + 8*a^2*c^6*d*e*g*h + 2*a*b^6*c*d*f*l^2 + 6*a*b*c^6*d^2*e*j - 2*a*b*c^6*d^
2*f*h - 2*a*b*c^6*d*e^2*h - 8*a^4*b^2*c^2*g^2*k*m - 10*a^3*b^3*c^2*f^2*k*m
+ 2*a^4*b^2*c^2*h^2*j*l + 18*a^3*b^2*c^3*e^2*k*m - 12*a^2*b^4*c^2*e^2*k*m -
 4*a^4*b^2*c^2*g*j^2*l + 2*a^3*b^3*c^2*g^2*j*l + 28*a^2*b^3*c^3*d^2*k*m + 1
4*a^4*b^2*c^2*d*k^2*m - 8*a^3*b^2*c^3*f^2*j*l + 2*a^4*b^2*c^2*g*j*k^2 + 2*a
^4*b^2*c^2*e*k^2*l - 2*a^3*b^3*c^2*g^2*h*m + 2*a^2*b^4*c^2*f^2*j*l - 10*a^2
*b^3*c^3*e^2*j*l - 8*a^4*b^2*c^2*d*k*l^2 + 4*a^4*b^2*c^2*e*j*l^2 + 4*a^3*b^
3*c^2*f*h^2*m + 4*a^3*b^3*c^2*e*j^2*l + 4*a^3*b^2*c^3*f^2*h*m - 2*a^2*b^4*c
^2*f^2*h*m + 18*a^2*b^2*c^4*d^2*j*l + 10*a^2*b^3*c^3*e^2*h*m - 8*a^4*b^2*c^
2*f*h*l^2 - 2*a^3*b^3*c^2*e*j*k^2 + 2*a^3*b^2*c^3*g^2*h*k + 2*a^3*b^2*c^3*f
*g^2*m - 22*a^4*b^2*c^2*d*h*m^2 - 22*a^2*b^2*c^4*d^2*h*m + 18*a^4*b^2*c^2*e
*g*m^2 + 16*a^3*b^2*c^3*d*h^2*m - 4*a^3*b^2*c^3*f*h^2*k - 4*a^2*b^4*c^2*d*h
^2*m + 2*a^3*b^3*c^2*f*h*k^2 + 2*a^3*b^2*c^3*d*j^2*k + 2*a^2*b^3*c^3*f^2*h*
k - 2*a^2*b^3*c^3*f^2*g*l - 10*a^3*b^3*c^2*e*g*l^2 + 10*a^3*b^3*c^2*d*h*l^2
 - 8*a^2*b^2*c^4*e^2*h*k - 8*a^2*b^2*c^4*e^2*f*m + 4*a^2*b^3*c^3*e*g^2*l +
4*a^2*b^2*c^4*e^2*g*l + 2*a^3*b^2*c^3*f*h*j^2 + 28*a^3*b^3*c^2*d*f*m^2 + 14
*a^2*b^2*c^4*d*f^2*m - 8*a^3*b^2*c^3*e*g*k^2 + 4*a^3*b^2*c^3*d*h*k^2 + 4*a^
2*b^3*c^3*d*h^2*k + 2*a^2*b^4*c^2*e*g*k^2 - 2*a^2*b^4*c^2*d*h*k^2 + 2*a^2*b
^2*c^4*f^2*g*j + 2*a^2*b^2*c^4*e*f^2*l + 18*a^3*b^2*c^3*d*f*l^2 - 12*a^2*b^
4*c^2*d*f*l^2 - 4*a^2*b^2*c^4*e*g^2*j + 2*a^2*b^3*c^3*e*g*j^2 - 2*a^2*b^3*c
^3*d*h*j^2 - 10*a^2*b^3*c^3*d*f*k^2 - 8*a^2*b^2*c^4*d*f*j^2 + 2*a^2*b^2*c^4
*e*g*h^2 + 4*a^5*b^2*c*h^2*m^2 - 2*a^4*b^2*c^2*h^3*m - 5*a^5*b*c^2*g^2*m^2
+ 5*a^4*b^3*c*g^2*m^2 + 3*a^5*b*c^2*h^2*l^2 + 6*a^3*b^4*c*f^2*m^2 - 2*a^3*b
^2*c^3*g^3*l + 2*a^2*b^3*c^3*f^3*m + 7*a^4*b*c^3*e^2*m^2 + 7*a^2*b^5*c*e^2*
m^2 - 5*a^4*b*c^3*f^2*l^2 + 3*a^4*b*c^3*g^2*k^2 - 2*a^4*b^2*c^2*f*k^3 - 2*a
^2*b^2*c^4*f^3*k + 7*a^3*b*c^4*d^2*l^2 + 7*a*b^5*c^2*d^2*l^2 - 5*a^3*b*c^4*
e^2*k^2 + 3*a^3*b*c^4*f^2*j^2 + 6*a*b^4*c^3*d^2*k^2 + 2*a^3*b^3*c^2*d*k^3 -
 2*a^3*b^2*c^3*e*j^3 - 5*a^2*b*c^5*d^2*j^2 + 5*a*b^3*c^4*d^2*j^2 + 3*a^2*b*
c^5*e^2*h^2 + 4*a*b^2*c^5*d^2*h^2 - 2*a^2*b^2*c^4*d*h^3 - 4*a^6*c^2*j^2*k*m
 + 2*a^6*b^2*j*l*m^2 + 4*a^6*c^2*j*k^2*l + 4*a^6*c^2*h*k^2*m - 4*a^6*c^2*h*
k*l^2 - 4*a^6*c^2*f*l^2*m + 4*a^5*c^3*g^2*k*m + 2*a^5*b^3*h*k*m^2 - 2*a^5*b
^3*g*l*m^2 + 4*a^6*c^2*g*j*m^2 + 4*a^6*c^2*f*k*m^2 + 4*a^6*c^2*e*l*m^2 - 4*
a^5*c^3*h^2*j*l + 4*a^5*c^3*h*j^2*k + 4*a^5*c^3*g*j^2*l + 4*a^5*c^3*f*j^2*m
 - 4*a^4*c^4*e^2*k*m + 2*a^4*b^4*g*j*m^2 - 2*a^4*b^4*f*k*m^2 + 2*a^4*b^4*e*
l*m^2 - 4*a^5*c^3*g*j*k^2 - 4*a^5*c^3*e*k^2*l - 4*a^5*c^3*d*k^2*m + 4*a^4*c
^4*f^2*j*l + 4*a^5*c^3*e*j*l^2 + 4*a^5*c^3*d*k*l^2 + 4*a^4*c^4*f^2*h*m + 2*
b^6*c^2*d^2*j*l - 2*a^3*b^5*e*j*m^2 + 2*a^3*b^5*d*k*m^2 + 4*a^5*c^3*f*h*l^2
 - 4*a^4*c^4*g^2*h*k - 4*a^4*c^4*f*g^2*m - 4*a^3*c^5*d^2*j*l - 2*b^6*c^2*d^
2*h*m + 2*a^3*b^5*f*h*m^2 + 12*a^5*c^3*d*h*m^2 - 12*a^4*c^4*d*h^2*m + 12*a^
3*c^5*d^2*h*m - 4*a^5*c^3*e*g*m^2 + 4*a^4*c^4*g*h^2*j + 4*a^4*c^4*f*h^2*k +
 4*a^4*c^4*e*h^2*l - 4*a^4*c^4*d*j^2*k + 3*a^6*b*c*j^2*m^2 - 4*a^4*c^4*f*h*
j^2 + 4*a^3*c^5*e^2*h*k + 4*a^3*c^5*e^2*g*l + 4*a^3*c^5*e^2*f*m + 2*b^5*c^3
*d^2*h*k - 2*b^5*c^3*d^2*g*l + 2*b^5*c^3*d^2*f*m + 2*a^5*b*c^2*j^3*l + 2*a^
2*b^6*e*g*m^2 - 2*a^2*b^6*d*h*m^2 + 4*a^4*c^4*e*g*k^2 + 4*a^4*c^4*d*h*k^2 -
 4*a^3*c^5*f^2*g*j - 4*a^3*c^5*e*f^2*l - 4*a^3*c^5*d*f^2*m - 4*a^4*c^4*d*f*
l^2 + 4*a^3*c^5*e*g^2*j + 4*a^3*c^5*d*g^2*k + 2*b^4*c^4*d^2*g*j - 2*b^4*c^4
*d^2*f*k + 2*b^4*c^4*d^2*e*l - 6*a^3*b*c^4*f^3*m + 4*a^3*c^5*f*g^2*h + 4*a^
2*c^6*d^2*g*j + 4*a^2*c^6*d^2*f*k + 4*a^2*c^6*d^2*e*l - 2*a^5*b^2*c*g*l^3 +
 2*a^5*b*c^2*h*k^3 + 2*a^4*b*c^3*h^3*k - 4*a^3*c^5*e*g*h^2 + 4*a^3*c^5*d*f*
j^2 - 4*a^2*c^6*d*e^2*k - 2*b^3*c^5*d^2*e*j + 8*a^5*b^2*c*d*m^3 + 8*a*b^6*c
*d^2*m^2 + 8*a*b^2*c^5*d^3*m - 6*a^5*b*c^2*e*l^3 - 6*a^2*b*c^5*e^3*l - 4*a^
2*c^6*e^2*f*h + 2*b^3*c^5*d^2*f*h + 2*a^4*b^3*c*e*l^3 + 2*a^4*b*c^3*g*j^3 +
 2*a^3*b*c^4*g^3*j + 2*a*b^3*c^4*e^3*l + 4*a^2*c^6*e*f^2*g + 4*a^2*c^6*d*f^
2*h - 6*a^4*b*c^3*d*k^3 - 4*a^2*c^6*d*f*g^2 + 2*b^2*c^6*d^2*e*g - 2*a*b^2*c

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^5*e^3*j + 2*a^3*b*c^4*f*h^3 + 2*a^2*b*c^5*f^3*h + 2*a^2*b*c^5*e*g^3 + 3*a*
b*c^6*d^2*g^2 - 9*a^4*b^2*c^2*f^2*m^2 + 4*a^4*b^2*c^2*g^2*l^2 - 14*a^3*b^3*
c^2*e^2*m^2 + 5*a^3*b^3*c^2*f^2*l^2 - 20*a^2*b^4*c^2*d^2*m^2 + 16*a^3*b^2*c
^3*d^2*m^2 - 9*a^3*b^2*c^3*e^2*l^2 + 6*a^2*b^4*c^2*e^2*l^2 + 4*a^3*b^2*c^3*
f^2*k^2 - 14*a^2*b^3*c^3*d^2*l^2 + 5*a^2*b^3*c^3*e^2*k^2 - 9*a^2*b^2*c^4*d^
2*k^2 + 4*a^2*b^2*c^4*e^2*j^2 + 4*a^7*c*k*l^2*m - 4*a^7*c*j*l*m^2 + 2*b^7*c
*d^2*k*m + 2*a^6*b*c*k^3*m + 2*a^6*b*c*j*l^3 + 2*a*b^7*d*f*m^2 - 6*a^6*b*c*
f*m^3 - 6*a*b*c^6*d^3*k - 4*a*c^7*d^2*e*g + 4*a*c^7*d*e^2*f + 2*a*b*c^6*e^3
*g + 2*a*b*c^6*d*f^3 - a^5*b^2*c*j^2*l^2 - a^5*b*c^2*j^2*k^2 - a^4*b^3*c*h^
2*l^2 - a^3*b^4*c*g^2*l^2 - a^4*b*c^3*h^2*j^2 - a^2*b^5*c*f^2*l^2 - a*b^5*c
^2*e^2*k^2 - a^3*b*c^4*g^2*h^2 - a*b^4*c^3*e^2*j^2 - a^2*b*c^5*f^2*g^2 - a*
b^3*c^4*e^2*h^2 - a*b^2*c^5*e^2*g^2 + 2*a^7*b*k*m^3 + 4*a^7*c*h*m^3 + 4*a*c
^7*d^3*h + 2*b*c^7*d^3*f - a^6*b*c*k^2*l^2 - 2*a^6*c^2*j^2*l^2 - 6*a^6*c^2*
h^2*m^2 - a*b^6*c*e^2*l^2 - 6*a^5*c^3*g^2*l^2 - 2*a^5*c^3*h^2*k^2 - 2*a^5*c
^3*f^2*m^2 - 6*a^4*c^4*f^2*k^2 - 6*a^4*c^4*d^2*m^2 - 2*a^4*c^4*g^2*j^2 - 2*
a^4*c^4*e^2*l^2 - 6*a^3*c^5*e^2*j^2 - 2*a^3*c^5*d^2*k^2 - 2*a^3*c^5*f^2*h^2
 - a*b*c^6*e^2*f^2 - 6*a^2*c^6*d^2*h^2 - 2*a^2*c^6*e^2*g^2 - a^4*b^2*c^2*h^
2*k^2 - a^3*b^3*c^2*g^2*k^2 - a^3*b^2*c^3*g^2*j^2 - a^2*b^4*c^2*f^2*k^2 - a
^2*b^3*c^3*f^2*j^2 - a^2*b^2*c^4*f^2*h^2 - 2*a^7*c*k^2*m^2 + 4*a^5*c^3*h^3*
m - 2*a^6*b^2*h*m^3 + 4*a^6*c^2*g*l^3 + 4*a^4*c^4*g^3*l - 2*b^4*c^4*d^3*m +
 2*a^5*b^3*f*m^3 - 4*a^6*c^2*d*m^3 + 4*a^5*c^3*f*k^3 + 4*a^3*c^5*f^3*k - 4*
a^2*c^6*d^3*m + 2*b^3*c^5*d^3*k - 2*a^4*b^4*d*m^3 + 4*a^4*c^4*e*j^3 + 4*a^2
*c^6*e^3*j - 2*b^2*c^6*d^3*h + 4*a^3*c^5*d*h^3 - 2*a*c^7*d^2*f^2 - a^6*b^2*
k^2*m^2 - a^5*b^3*j^2*m^2 - a^4*b^4*h^2*m^2 - a^3*b^5*g^2*m^2 - a^2*b^6*f^2
*m^2 - b^6*c^2*d^2*k^2 - b^5*c^3*d^2*j^2 - b^4*c^4*d^2*h^2 - b^3*c^5*d^2*g^
2 - b^2*c^6*d^2*f^2 - a^7*b*l^2*m^2 - b^7*c*d^2*l^2 - a*b^7*e^2*m^2 - b*c^7
*d^2*e^2 - b^8*d^2*m^2 - a^6*c^2*k^4 - a^5*c^3*j^4 - a^4*c^4*h^4 - a^3*c^5*
g^4 - a^2*c^6*f^4 - a^7*c*l^4 - a*c^7*e^4 - a^8*m^4 - c^8*d^4, z, k1)*(root
(128*a^2*b^2*c^8*z^4 - 16*a*b^4*c^7*z^4 - 256*a^3*c^9*z^4 + 384*a^3*b^2*c^6
*l*z^3 - 144*a^2*b^4*c^5*l*z^3 + 128*a^2*b^3*c^6*j*z^3 - 128*a^2*b^2*c^7*g*
z^3 + 16*a*b^6*c^4*l*z^3 - 256*a^3*b*c^7*j*z^3 - 16*a*b^5*c^5*j*z^3 + 16*a*
b^4*c^6*g*z^3 - 256*a^4*c^7*l*z^3 + 256*a^3*c^8*g*z^3 - 96*a^4*b*c^5*j*l*z^
2 + 8*a*b^7*c^2*j*l*z^2 + 160*a^4*b*c^5*h*m*z^2 - 8*a*b^7*c^2*h*m*z^2 + 8*a
*b^6*c^3*h*k*z^2 - 8*a*b^6*c^3*g*l*z^2 + 8*a*b^6*c^3*f*m*z^2 + 160*a^3*b*c^
6*g*j*z^2 - 96*a^3*b*c^6*f*k*z^2 - 96*a^3*b*c^6*e*l*z^2 - 96*a^3*b*c^6*d*m*
z^2 + 8*a*b^5*c^4*g*j*z^2 - 8*a*b^5*c^4*f*k*z^2 - 8*a*b^5*c^4*e*l*z^2 - 8*a
*b^5*c^4*d*m*z^2 + 8*a*b^4*c^5*e*j*z^2 + 8*a*b^4*c^5*d*k*z^2 + 8*a*b^4*c^5*
f*h*z^2 + 32*a^2*b*c^7*e*g*z^2 + 32*a^2*b*c^7*d*h*z^2 - 8*a*b^3*c^6*e*g*z^2
 - 8*a*b^3*c^6*d*h*z^2 + 16*a*b^2*c^7*d*f*z^2 + 8*a*b^8*c*k*m*z^2 - 304*a^4
*b^2*c^4*k*m*z^2 + 264*a^3*b^4*c^3*k*m*z^2 - 80*a^2*b^6*c^2*k*m*z^2 + 184*a
^3*b^3*c^4*j*l*z^2 - 72*a^2*b^5*c^3*j*l*z^2 - 200*a^3*b^3*c^4*h*m*z^2 + 72*
a^2*b^5*c^3*h*m*z^2 - 240*a^3*b^2*c^5*g*l*z^2 + 144*a^3*b^2*c^5*h*k*z^2 + 1
44*a^3*b^2*c^5*f*m*z^2 + 80*a^2*b^4*c^4*g*l*z^2 - 64*a^2*b^4*c^4*h*k*z^2 -
64*a^2*b^4*c^4*f*m*z^2 - 72*a^2*b^3*c^5*g*j*z^2 + 56*a^2*b^3*c^5*f*k*z^2 +
56*a^2*b^3*c^5*e*l*z^2 + 56*a^2*b^3*c^5*d*m*z^2 - 48*a^2*b^2*c^6*e*j*z^2 -
48*a^2*b^2*c^6*d*k*z^2 - 48*a^2*b^2*c^6*f*h*z^2 - 112*a^5*b*c^4*m^2*z^2 + 4
4*a^2*b^7*c*m^2*z^2 + 80*a^4*b*c^5*k^2*z^2 - 4*a*b^7*c^2*k^2*z^2 - 4*a*b^6*
c^3*j^2*z^2 - 48*a^3*b*c^6*h^2*z^2 - 4*a*b^5*c^4*h^2*z^2 - 4*a*b^4*c^5*g^2*
z^2 + 16*a^2*b*c^7*f^2*z^2 - 4*a*b^3*c^6*f^2*z^2 + 8*a*b^2*c^7*e^2*z^2 + 64
*a^5*c^5*k*m*z^2 + 192*a^4*c^6*g*l*z^2 - 64*a^4*c^6*h*k*z^2 - 64*a^4*c^6*f*
m*z^2 + 64*a^3*c^7*e*j*z^2 + 64*a^3*c^7*d*k*z^2 + 64*a^3*c^7*f*h*z^2 - 4*a*
b^8*c*l^2*z^2 - 64*a^2*c^8*d*f*z^2 + 16*a*b*c^8*d^2*z^2 + 252*a^4*b^3*c^3*m
^2*z^2 - 168*a^3*b^5*c^2*m^2*z^2 + 168*a^4*b^2*c^4*l^2*z^2 - 132*a^3*b^4*c^
3*l^2*z^2 + 40*a^2*b^6*c^2*l^2*z^2 - 100*a^3*b^3*c^4*k^2*z^2 + 36*a^2*b^5*c
^3*k^2*z^2 - 56*a^3*b^2*c^5*j^2*z^2 + 32*a^2*b^4*c^4*j^2*z^2 + 28*a^2*b^3*c
^5*h^2*z^2 + 40*a^2*b^2*c^6*g^2*z^2 - 96*a^5*c^5*l^2*z^2 - 32*a^4*c^6*j^2*z
^2 - 96*a^3*c^7*g^2*z^2 - 32*a^2*c^8*e^2*z^2 - 4*b^3*c^7*d^2*z^2 - 4*a*b^9*
m^2*z^2 + 32*a^5*b*c^3*h*l*m*z + 8*a^2*b^6*c*g*k*m*z + 96*a^4*b*c^4*e*k*m*z
 + 32*a^4*b*c^4*h*j*k*z + 32*a^4*b*c^4*g*j*l*z + 32*a^4*b*c^4*f*j*m*z - 64*
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a^4*b*c^4*g*h*m*z - 8*a*b^6*c^2*e*j*l*z + 8*a*b^6*c^2*e*h*m*z - 64*a^3*b*c^5*e*h*k*z + 64*a^3*b*c^5*e*g*l*z - 64*a^3*b*c^5*e*f*m*z + 32*a^3*b*c^5*f*g*k*z - 32*a^3*b*c^5*d*h*l*z + 32*a^3*b*c^5*d*g*m*z - 8*a*b^5*c^3*e*h*k*z + 8*a*b^5*c^3*e*g*l*z - 8*a*b^5*c^3*e*f*m*z - 8*a*b^4*c^4*e*g*j*z + 8*a*b^4*c^4*e*f*k*z - 8*a*b^4*c^4*d*f*l*z + 8*a*b^4*c^4*d*e*m*z - 32*a^2*b*c^6*d*f*j*z + 32*a^2*b*c^6*d*e*k*z + 8*a*b^3*c^5*d*f*j*z - 8*a*b^3*c^5*d*e*k*z + 32*a^2*b*c^6*e*f*h*z - 8*a*b^3*c^5*e*f*h*z - 8*a*b^2*c^6*d*f*g*z + 8*a*b^2*c^6*d*e*h*z - 8*a*b^7*c*e*k*m*z - 40*a^5*b^2*c^2*k*l*m*z + 48*a^4*b^3*c^2*j*k*m*z - 8*a^4*b^3*c^2*h*l*m*z + 104*a^4*b^2*c^3*g*k*m*z - 56*a^3*b^4*c^2*g*k*m*z - 40*a^4*b^2*c^3*h*j*m*z + 8*a^4*b^2*c^3*h*k*l*z + 8*a^4*b^2*c^3*f*l*m*z + 8*a^3*b^4*c^2*h*j*m*z - 152*a^3*b^3*c^3*e*k*m*z + 64*a^2*b^5*c^2*e*k*m*z - 40*a^3*b^3*c^3*g*j*l*z - 8*a^3*b^3*c^3*h*j*k*z - 8*a^3*b^3*c^3*f*j*m*z + 8*a^2*b^5*c^2*g*j*l*z + 48*a^3*b^3*c^3*g*h*m*z - 8*a^2*b^5*c^2*g*h*m*z - 104*a^3*b^2*c^4*e*j*l*z + 56*a^2*b^4*c^3*e*j*l*z + 8*a^3*b^2*c^4*f*j*k*z - 8*a^3*b^2*c^4*d*k*l*z + 8*a^3*b^2*c^4*d*j*m*z + 104*a^3*b^2*c^4*e*h*m*z - 56*a^2*b^4*c^3*e*h*m*z - 40*a^3*b^2*c^4*g*h*k*z - 40*a^3*b^2*c^4*f*g*m*z - 8*a^3*b^2*c^4*f*h*l*z + 8*a^2*b^4*c^3*g*h*k*z + 8*a^2*b^4*c^3*f*g*m*z + 48*a^2*b^3*c^4*e*h*k*z - 48*a^2*b^3*c^4*e*g*l*z + 48*a^2*b^3*c^4*e*f*m*z - 8*a^2*b^3*c^4*f*g*k*z + 8*a^2*b^3*c^4*d*h*l*z - 8*a^2*b^3*c^4*d*g*m*z + 40*a^2*b^2*c^5*e*g*j*z - 40*a^2*b^2*c^5*e*f*k*z + 40*a^2*b^2*c^5*d*f*l*z - 40*a^2*b^2*c^5*d*e*m*z - 8*a^2*b^2*c^5*d*h*j*z + 8*a^2*b^2*c^5*d*g*k*z + 8*a^2*b^2*c^5*f*g*h*z + 8*a^4*b^4*c*k*l*m*z - 64*a^5*b*c^3*j*k*m*z - 8*a^3*b^5*c*j*k*m*z - 32*a^6*b*c^2*l*m^2*z + 24*a^5*b^3*c*l*m^2*z - 28*a^4*b^4*c*j*m^2*z + 16*a^5*b*c^3*k^2*l*z + 4*a^3*b^5*c*j*l^2*z + 48*a^5*b*c^3*g*m^2*z + 32*a^3*b^5*c*g*m^2*z - 4*a^2*b^6*c*g*l^2*z - 36*a^2*b^6*c*e*m^2*z - 32*a^4*b*c^4*g*k^2*z - 16*a^3*b*c^5*f^2*l*z - 48*a^4*b*c^4*e*l^2*z - 32*a^3*b*c^5*g^2*j*z - 4*a*b^4*c^4*e^2*l*z + 32*a^2*b*c^6*d^2*l*z - 24*a*b^3*c^5*d^2*l*z + 4*a*b^6*c^2*e*k^2*z + 32*a^3*b*c^5*e*j^2*z + 16*a^3*b*c^5*g*h^2*z - 16*a^2*b*c^6*e^2*j*z + 4*a*b^5*c^3*e*j^2*z + 4*a*b^3*c^5*e^2*j*z + 20*a*b^2*c^6*d^2*j*z + 4*a*b^4*c^4*e*h^2*z - 16*a^2*b*c^6*e*g^2*z + 4*a*b^3*c^5*e*g^2*z - 4*a*b^2*c^6*e^2*g*z + 4*a*b^2*c^6*e*f^2*z + 32*a^6*c^3*k*l*m*z - 32*a^5*c^4*h*k*l*z + 32*a^5*c^4*h*j*m*z - 32*a^5*c^4*g*k*m*z - 32*a^5*c^4*f*l*m*z - 32*a^4*c^5*f*j*k*z + 32*a^4*c^5*e*j*l*z + 32*a^4*c^5*d*k*l*z - 32*a^4*c^5*d*j*m*z + 32*a^4*c^5*g*h*k*z + 32*a^4*c^5*f*h*l*z + 32*a^4*c^5*f*g*m*z - 32*a^4*c^5*e*h*m*z - 32*a^3*c^6*e*g*j*z + 32*a^3*c^6*e*f*k*z + 32*a^3*c^6*d*h*j*z - 32*a^3*c^6*d*g*k*z - 32*a^3*c^6*d*f*l*z + 32*a^3*c^6*d*e*m*z - 32*a^3*c^6*f*g*h*z + 4*a*b^7*c*e*l^2*z + 32*a^2*c^7*d*f*g*z - 32*a^2*c^7*d*e*h*z - 16*a*b*c^7*d^2*g*z + 52*a^5*b^2*c^2*j*m^2*z - 4*a^4*b^3*c^2*k^2*l*z + 36*a^4*b^2*c^3*j^2*l*z - 16*a^4*b^3*c^2*j*l^2*z - 8*a^3*b^4*c^2*j^2*l*z - 20*a^4*b^2*c^3*j*k^2*z + 4*a^3*b^4*c^2*j*k^2*z - 76*a^4*b^3*c^2*g*m^2*z - 60*a^4*b^2*c^3*g*l^2*z + 44*a^3*b^2*c^4*g^2*l*z + 28*a^3*b^4*c^2*g*l^2*z - 8*a^2*b^4*c^3*g^2*l*z + 104*a^3*b^4*c^2*e*m^2*z - 100*a^4*b^2*c^3*e*m^2*z + 24*a^3*b^3*c^3*g*k^2*z + 4*a^3*b^2*c^4*h^2*j*z - 4*a^2*b^5*c^2*g*k^2*z + 4*a^2*b^3*c^4*f^2*l*z + 76*a^3*b^3*c^3*e*l^2*z - 32*a^2*b^5*c^2*e*l^2*z + 20*a^2*b^2*c^5*e^2*l*z + 12*a^3*b^2*c^4*g*j^2*z + 8*a^2*b^3*c^4*g^2*j*z - 4*a^2*b^4*c^3*g*j^2*z + 52*a^3*b^2*c^4*e*k^2*z - 28*a^2*b^4*c^3*e*k^2*z - 4*a^2*b^2*c^5*f^2*j*z - 24*a^2*b^3*c^4*e*j^2*z - 4*a^2*b^3*c^4*g*h^2*z - 20*a^2*b^2*c^5*e*h^2*z + 20*a^5*b^2*c^2*l^3*z + 4*a^3*b^3*c^3*j^3*z - 4*a^2*b^2*c^5*g^3*z - 4*a^4*b^5*l*m^2*z - 16*a^6*c^3*j*m^2*z - 16*a^5*c^4*j^2*l*z + 4*a^3*b^6*j*m^2*z + 16*a^5*c^4*j*k^2*z + 48*a^5*c^4*g*l^2*z - 48*a^4*c^5*g^2*l*z - 4*a^2*b^7*g*m^2*z + 16*a^5*c^4*e*m^2*z - 16*a^4*c^5*h^2*j*z + 16*a^4*c^5*g*j^2*z - 16*a^3*c^6*e^2*l*z + 4*b^5*c^4*d^2*l*z - 16*a^4*c^5*e*k^2*z + 16*a^3*c^6*f^2*j*z - 4*b^4*c^5*d^2*j*z - 16*a^2*c^7*d^2*j*z - 4*a^4*b^4*c*l^3*z + 16*a^3*c^6*e*h^2*z - 16*a^4*b*c^4*j^3*z + 16*a^2*c^7*e^2*g*z + 4*b^3*c^6*d^2*g*z - 16*a^2*c^7*e*f^2*z - 4*b^2*c^7*d^2*e*z + 4*a*b^8*e*m^2*z + 16*a*c^8*d^2*e*z - 16*a^6*c^3*l^3*z + 16*a^3*c^6*g^3*z + 4*a^5*b^2*c*g*k*l*m + 12*a^5*b*c^2*g*j*k*m + 12*a^5*b*c^2*e*k*l*m - 4*a^5*b*c^2*h*j*k*l - 4*a^5*b*c^2*f*j*l*m - 4*a^4*b^3*c*g*j*k*m - 4*a^4*b^3*c*e*k*l*m - 4*a^5*b*c^2*g*h*l*m + 4*a^3*b^4*c*e*j*k*m - 4*a^3*b^4*c*f*h*k*m + 12*a^4*b*c^3*d*j*k*l - 20*a^4*b

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*c^3*e*g*k*m + 12*a^4*b*c^3*f*h*j*l + 12*a^4*b*c^3*e*h*j*m + 12*a^4*b*c^3*d
*h*k*m - 4*a^4*b*c^3*g*h*j*k - 4*a^4*b*c^3*f*g*k*l - 4*a^4*b*c^3*f*g*j*m -
4*a^4*b*c^3*e*h*k*l - 4*a^4*b*c^3*e*f*l*m - 4*a^4*b*c^3*d*g*l*m - 4*a^2*b^5
*c*e*g*k*m + 4*a^2*b^5*c*d*h*k*m - 20*a^3*b*c^4*d*f*j*l - 4*a^3*b*c^4*e*f*j
*k - 4*a^3*b*c^4*d*g*j*k - 4*a^3*b*c^4*d*e*k*l - 4*a^3*b*c^4*d*e*j*m - 4*a*
b^5*c^2*d*f*j*l + 12*a^3*b*c^4*e*g*h*k + 12*a^3*b*c^4*e*f*g*m + 12*a^3*b*c^
4*d*g*h*l + 12*a^3*b*c^4*d*f*h*m - 4*a^3*b*c^4*f*g*h*j - 4*a^3*b*c^4*e*f*h*
l + 4*a*b^5*c^2*d*f*h*m - 4*a*b^4*c^3*d*f*h*k + 4*a*b^4*c^3*d*f*g*l + 12*a^
2*b*c^5*d*f*g*j + 12*a^2*b*c^5*d*e*f*l - 4*a^2*b*c^5*d*e*h*j - 4*a^2*b*c^5*
d*e*g*k - 4*a*b^3*c^4*d*f*g*j - 4*a*b^3*c^4*d*e*f*l - 4*a^2*b*c^5*e*f*g*h +
 4*a*b^2*c^5*d*e*f*j - 4*a^6*b*c*j*k*l*m - 4*a*b^6*c*d*f*k*m - 4*a*b*c^6*d*
e*f*g - 16*a^4*b^2*c^2*e*j*k*m + 4*a^4*b^2*c^2*f*j*k*l + 4*a^4*b^2*c^2*d*j*
l*m + 12*a^4*b^2*c^2*f*h*k*m + 4*a^4*b^2*c^2*g*h*j*m + 4*a^4*b^2*c^2*e*h*l*
m - 4*a^3*b^3*c^2*d*j*k*l + 20*a^3*b^3*c^2*e*g*k*m - 16*a^3*b^3*c^2*d*h*k*m
 - 4*a^3*b^3*c^2*f*h*j*l - 4*a^3*b^3*c^2*e*h*j*m - 40*a^3*b^2*c^3*d*f*k*m +
 24*a^2*b^4*c^2*d*f*k*m - 16*a^3*b^2*c^3*d*h*j*l + 12*a^3*b^2*c^3*e*g*j*l +
 4*a^3*b^2*c^3*e*h*j*k + 4*a^3*b^2*c^3*e*f*j*m + 4*a^3*b^2*c^3*d*g*k*l - 4*
a^2*b^4*c^2*e*g*j*l + 4*a^2*b^4*c^2*d*h*j*l - 16*a^3*b^2*c^3*e*g*h*m + 4*a^
3*b^2*c^3*f*g*h*l + 4*a^2*b^4*c^2*e*g*h*m + 20*a^2*b^3*c^3*d*f*j*l - 16*a^2
*b^3*c^3*d*f*h*m - 4*a^2*b^3*c^3*e*g*h*k - 4*a^2*b^3*c^3*e*f*g*m - 4*a^2*b^
3*c^3*d*g*h*l - 16*a^2*b^2*c^4*d*f*g*l + 12*a^2*b^2*c^4*d*f*h*k + 4*a^2*b^2
*c^4*e*f*g*k + 4*a^2*b^2*c^4*d*g*h*j + 4*a^2*b^2*c^4*d*e*h*l + 4*a^2*b^2*c^
4*d*e*g*m + 2*a^5*b^2*c*j^2*k*m - 4*a^5*b^2*c*h*k^2*m - 2*a^5*b*c^2*h^2*k*m
 + 2*a^4*b^3*c*h^2*k*m + 2*a^5*b^2*c*h*k*l^2 + 2*a^5*b^2*c*f*l^2*m - 2*a^5*
b*c^2*h*j^2*m + 2*a^3*b^4*c*g^2*k*m + 14*a^4*b*c^3*f^2*k*m - 10*a^5*b*c^2*f
*k^2*m - 8*a^5*b^2*c*g*j*m^2 - 8*a^5*b^2*c*e*l*m^2 + 4*a^5*b^2*c*f*k*m^2 +
4*a^4*b^3*c*f*k^2*m - 2*a^5*b*c^2*g*k^2*l + 2*a^2*b^5*c*f^2*k*m + 6*a^5*b*c
^2*f*k*l^2 + 6*a^5*b*c^2*d*l^2*m - 2*a^5*b*c^2*g*j*l^2 + 2*a^4*b^3*c*g*j*l^
2 - 2*a^4*b^3*c*f*k*l^2 - 2*a^4*b^3*c*d*l^2*m - 2*a^4*b*c^3*g^2*j*l - 14*a*
b^5*c^2*d^2*k*m - 10*a^5*b*c^2*e*j*m^2 + 10*a^4*b^3*c*e*j*m^2 - 10*a^3*b*c^
4*d^2*k*m - 6*a^4*b^3*c*d*k*m^2 + 6*a^4*b*c^3*g^2*h*m - 4*a^3*b^4*c*d*k^2*m
 - 2*a^5*b*c^2*d*k*m^2 + 14*a^5*b*c^2*f*h*m^2 + 14*a^3*b*c^4*e^2*j*l - 10*a
^4*b^3*c*f*h*m^2 - 10*a^4*b*c^3*f*h^2*m - 10*a^4*b*c^3*e*j^2*l - 2*a^4*b*c^
3*g*h^2*l - 2*a^4*b*c^3*f*j^2*k - 2*a^4*b*c^3*d*j^2*m - 2*a^3*b^4*c*e*j*l^2
 + 2*a^3*b^4*c*d*k*l^2 + 2*a*b^5*c^2*e^2*j*l - 12*a*b^4*c^3*d^2*j*l - 10*a^
3*b*c^4*e^2*h*m + 6*a^4*b*c^3*e*j*k^2 + 2*a^3*b^4*c*f*h*l^2 - 2*a*b^5*c^2*e
^2*h*m - 12*a^3*b^4*c*e*g*m^2 + 12*a^3*b^4*c*d*h*m^2 + 12*a*b^4*c^3*d^2*h*m
 + 6*a^3*b*c^4*f^2*g*l - 2*a^4*b*c^3*f*h*k^2 - 2*a^3*b*c^4*f^2*h*k + 14*a^4
*b*c^3*e*g*l^2 - 10*a^4*b*c^3*d*h*l^2 - 10*a^3*b*c^4*e*g^2*l - 2*a^3*b*c^4*
f*g^2*k - 2*a^3*b*c^4*d*g^2*m + 2*a^2*b^5*c*e*g*l^2 - 2*a^2*b^5*c*d*h*l^2 +
 2*a*b^4*c^3*e^2*h*k - 2*a*b^4*c^3*e^2*g*l + 2*a*b^4*c^3*e^2*f*m - 14*a^2*b
^5*c*d*f*m^2 + 14*a^2*b*c^5*d^2*h*k - 10*a^4*b*c^3*d*f*m^2 - 10*a^3*b*c^4*d
*h^2*k - 10*a^2*b*c^5*d^2*g*l - 10*a*b^3*c^4*d^2*h*k + 10*a*b^3*c^4*d^2*g*l
 - 6*a*b^3*c^4*d^2*f*m - 4*a*b^4*c^3*d*f^2*m - 2*a^3*b*c^4*e*h^2*j - 2*a^2*
b*c^5*d^2*f*m + 6*a^3*b*c^4*d*h*j^2 + 6*a^2*b*c^5*e^2*f*k + 6*a^2*b*c^5*d*e
^2*m - 2*a^3*b*c^4*e*g*j^2 - 2*a^2*b*c^5*e^2*g*j + 2*a*b^3*c^4*e^2*g*j - 2*
a*b^3*c^4*e^2*f*k - 2*a*b^3*c^4*d*e^2*m + 14*a^3*b*c^4*d*f*k^2 - 10*a^2*b*c
^5*d*f^2*k - 8*a*b^2*c^5*d^2*g*j - 8*a*b^2*c^5*d^2*e*l + 4*a*b^3*c^4*d*f^2*
k + 4*a*b^2*c^5*d^2*f*k - 2*a^2*b*c^5*e*f^2*j + 2*a*b^5*c^2*d*f*k^2 + 2*a*b
^4*c^3*d*f*j^2 + 2*a*b^2*c^5*d*e^2*k - 2*a^2*b*c^5*d*g^2*h + 2*a*b^2*c^5*e^
2*f*h - 4*a*b^2*c^5*d*f^2*h - 2*a^2*b*c^5*d*f*h^2 + 2*a*b^3*c^4*d*f*h^2 + 2
*a*b^2*c^5*d*f*g^2 + 8*a^6*c^2*h*j*l*m - 8*a^6*c^2*g*k*l*m - 8*a^5*c^3*f*j*
k*l + 8*a^5*c^3*e*j*k*m - 8*a^5*c^3*d*j*l*m + 8*a^5*c^3*g*h*k*l - 8*a^5*c^3
*g*h*j*m - 8*a^5*c^3*f*h*k*m + 8*a^5*c^3*f*g*l*m - 8*a^5*c^3*e*h*l*m - 2*a^
6*b*c*h*l^2*m + 8*a^4*c^4*f*g*j*k - 8*a^4*c^4*e*h*j*k - 8*a^4*c^4*e*g*j*l +
 8*a^4*c^4*e*f*k*l - 8*a^4*c^4*e*f*j*m + 8*a^4*c^4*d*h*j*l - 8*a^4*c^4*d*g*
k*l + 8*a^4*c^4*d*g*j*m + 8*a^4*c^4*d*f*k*m + 8*a^4*c^4*d*e*l*m + 6*a^6*b*c
*g*l*m^2 - 2*a^6*b*c*h*k*m^2 - 8*a^4*c^4*f*g*h*l + 8*a^4*c^4*e*g*h*m + 2*a*
b^6*c*e^2*k*m + 8*a^3*c^5*d*e*j*k + 8*a^3*c^5*e*f*h*j - 8*a^3*c^5*e*f*g*k -
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 8*a^3*c^5*d*g*h*j - 8*a^3*c^5*d*f*h*k + 8*a^3*c^5*d*f*g*l - 8*a^3*c^5*d*e*
h*l - 8*a^3*c^5*d*e*g*m - 8*a^2*c^6*d*e*f*j + 8*a^2*c^6*d*e*g*h + 2*a*b^6*c
*d*f*l^2 + 6*a*b*c^6*d^2*e*j - 2*a*b*c^6*d^2*f*h - 2*a*b*c^6*d*e^2*h - 8*a^
4*b^2*c^2*g^2*k*m - 10*a^3*b^3*c^2*f^2*k*m + 2*a^4*b^2*c^2*h^2*j*l + 18*a^3
*b^2*c^3*e^2*k*m - 12*a^2*b^4*c^2*e^2*k*m - 4*a^4*b^2*c^2*g*j^2*l + 2*a^3*b
^3*c^2*g^2*j*l + 28*a^2*b^3*c^3*d^2*k*m + 14*a^4*b^2*c^2*d*k^2*m - 8*a^3*b^
2*c^3*f^2*j*l + 2*a^4*b^2*c^2*g*j*k^2 + 2*a^4*b^2*c^2*e*k^2*l - 2*a^3*b^3*c
^2*g^2*h*m + 2*a^2*b^4*c^2*f^2*j*l - 10*a^2*b^3*c^3*e^2*j*l - 8*a^4*b^2*c^2
*d*k*l^2 + 4*a^4*b^2*c^2*e*j*l^2 + 4*a^3*b^3*c^2*f*h^2*m + 4*a^3*b^3*c^2*e*
j^2*l + 4*a^3*b^2*c^3*f^2*h*m - 2*a^2*b^4*c^2*f^2*h*m + 18*a^2*b^2*c^4*d^2*
j*l + 10*a^2*b^3*c^3*e^2*h*m - 8*a^4*b^2*c^2*f*h*l^2 - 2*a^3*b^3*c^2*e*j*k^
2 + 2*a^3*b^2*c^3*g^2*h*k + 2*a^3*b^2*c^3*f*g^2*m - 22*a^4*b^2*c^2*d*h*m^2
- 22*a^2*b^2*c^4*d^2*h*m + 18*a^4*b^2*c^2*e*g*m^2 + 16*a^3*b^2*c^3*d*h^2*m
- 4*a^3*b^2*c^3*f*h^2*k - 4*a^2*b^4*c^2*d*h^2*m + 2*a^3*b^3*c^2*f*h*k^2 + 2
*a^3*b^2*c^3*d*j^2*k + 2*a^2*b^3*c^3*f^2*h*k - 2*a^2*b^3*c^3*f^2*g*l - 10*a
^3*b^3*c^2*e*g*l^2 + 10*a^3*b^3*c^2*d*h*l^2 - 8*a^2*b^2*c^4*e^2*h*k - 8*a^2
*b^2*c^4*e^2*f*m + 4*a^2*b^3*c^3*e*g^2*l + 4*a^2*b^2*c^4*e^2*g*l + 2*a^3*b^
2*c^3*f*h*j^2 + 28*a^3*b^3*c^2*d*f*m^2 + 14*a^2*b^2*c^4*d*f^2*m - 8*a^3*b^2
*c^3*e*g*k^2 + 4*a^3*b^2*c^3*d*h*k^2 + 4*a^2*b^3*c^3*d*h^2*k + 2*a^2*b^4*c^
2*e*g*k^2 - 2*a^2*b^4*c^2*d*h*k^2 + 2*a^2*b^2*c^4*f^2*g*j + 2*a^2*b^2*c^4*e
*f^2*l + 18*a^3*b^2*c^3*d*f*l^2 - 12*a^2*b^4*c^2*d*f*l^2 - 4*a^2*b^2*c^4*e*
g^2*j + 2*a^2*b^3*c^3*e*g*j^2 - 2*a^2*b^3*c^3*d*h*j^2 - 10*a^2*b^3*c^3*d*f*
k^2 - 8*a^2*b^2*c^4*d*f*j^2 + 2*a^2*b^2*c^4*e*g*h^2 + 4*a^5*b^2*c*h^2*m^2 -
 2*a^4*b^2*c^2*h^3*m - 5*a^5*b*c^2*g^2*m^2 + 5*a^4*b^3*c*g^2*m^2 + 3*a^5*b*
c^2*h^2*l^2 + 6*a^3*b^4*c*f^2*m^2 - 2*a^3*b^2*c^3*g^3*l + 2*a^2*b^3*c^3*f^3
*m + 7*a^4*b*c^3*e^2*m^2 + 7*a^2*b^5*c*e^2*m^2 - 5*a^4*b*c^3*f^2*l^2 + 3*a^
4*b*c^3*g^2*k^2 - 2*a^4*b^2*c^2*f*k^3 - 2*a^2*b^2*c^4*f^3*k + 7*a^3*b*c^4*d
^2*l^2 + 7*a*b^5*c^2*d^2*l^2 - 5*a^3*b*c^4*e^2*k^2 + 3*a^3*b*c^4*f^2*j^2 +
6*a*b^4*c^3*d^2*k^2 + 2*a^3*b^3*c^2*d*k^3 - 2*a^3*b^2*c^3*e*j^3 - 5*a^2*b*c
^5*d^2*j^2 + 5*a*b^3*c^4*d^2*j^2 + 3*a^2*b*c^5*e^2*h^2 + 4*a*b^2*c^5*d^2*h^
2 - 2*a^2*b^2*c^4*d*h^3 - 4*a^6*c^2*j^2*k*m + 2*a^6*b^2*j*l*m^2 + 4*a^6*c^2
*j*k^2*l + 4*a^6*c^2*h*k^2*m - 4*a^6*c^2*h*k*l^2 - 4*a^6*c^2*f*l^2*m + 4*a^
5*c^3*g^2*k*m + 2*a^5*b^3*h*k*m^2 - 2*a^5*b^3*g*l*m^2 + 4*a^6*c^2*g*j*m^2 +
 4*a^6*c^2*f*k*m^2 + 4*a^6*c^2*e*l*m^2 - 4*a^5*c^3*h^2*j*l + 4*a^5*c^3*h*j^
2*k + 4*a^5*c^3*g*j^2*l + 4*a^5*c^3*f*j^2*m - 4*a^4*c^4*e^2*k*m + 2*a^4*b^4
*g*j*m^2 - 2*a^4*b^4*f*k*m^2 + 2*a^4*b^4*e*l*m^2 - 4*a^5*c^3*g*j*k^2 - 4*a^
5*c^3*e*k^2*l - 4*a^5*c^3*d*k^2*m + 4*a^4*c^4*f^2*j*l + 4*a^5*c^3*e*j*l^2 +
 4*a^5*c^3*d*k*l^2 + 4*a^4*c^4*f^2*h*m + 2*b^6*c^2*d^2*j*l - 2*a^3*b^5*e*j*
m^2 + 2*a^3*b^5*d*k*m^2 + 4*a^5*c^3*f*h*l^2 - 4*a^4*c^4*g^2*h*k - 4*a^4*c^4
*f*g^2*m - 4*a^3*c^5*d^2*j*l - 2*b^6*c^2*d^2*h*m + 2*a^3*b^5*f*h*m^2 + 12*a
^5*c^3*d*h*m^2 - 12*a^4*c^4*d*h^2*m + 12*a^3*c^5*d^2*h*m - 4*a^5*c^3*e*g*m^
2 + 4*a^4*c^4*g*h^2*j + 4*a^4*c^4*f*h^2*k + 4*a^4*c^4*e*h^2*l - 4*a^4*c^4*d
*j^2*k + 3*a^6*b*c*j^2*m^2 - 4*a^4*c^4*f*h*j^2 + 4*a^3*c^5*e^2*h*k + 4*a^3*
c^5*e^2*g*l + 4*a^3*c^5*e^2*f*m + 2*b^5*c^3*d^2*h*k - 2*b^5*c^3*d^2*g*l + 2
*b^5*c^3*d^2*f*m + 2*a^5*b*c^2*j^3*l + 2*a^2*b^6*e*g*m^2 - 2*a^2*b^6*d*h*m^
2 + 4*a^4*c^4*e*g*k^2 + 4*a^4*c^4*d*h*k^2 - 4*a^3*c^5*f^2*g*j - 4*a^3*c^5*e
*f^2*l - 4*a^3*c^5*d*f^2*m - 4*a^4*c^4*d*f*l^2 + 4*a^3*c^5*e*g^2*j + 4*a^3*
c^5*d*g^2*k + 2*b^4*c^4*d^2*g*j - 2*b^4*c^4*d^2*f*k + 2*b^4*c^4*d^2*e*l - 6
*a^3*b*c^4*f^3*m + 4*a^3*c^5*f*g^2*h + 4*a^2*c^6*d^2*g*j + 4*a^2*c^6*d^2*f*
k + 4*a^2*c^6*d^2*e*l - 2*a^5*b^2*c*g*l^3 + 2*a^5*b*c^2*h*k^3 + 2*a^4*b*c^3
*h^3*k - 4*a^3*c^5*e*g*h^2 + 4*a^3*c^5*d*f*j^2 - 4*a^2*c^6*d*e^2*k - 2*b^3*
c^5*d^2*e*j + 8*a^5*b^2*c*d*m^3 + 8*a*b^6*c*d^2*m^2 + 8*a*b^2*c^5*d^3*m - 6
*a^5*b*c^2*e*l^3 - 6*a^2*b*c^5*e^3*l - 4*a^2*c^6*e^2*f*h + 2*b^3*c^5*d^2*f*
h + 2*a^4*b^3*c*e*l^3 + 2*a^4*b*c^3*g*j^3 + 2*a^3*b*c^4*g^3*j + 2*a*b^3*c^4
*e^3*l + 4*a^2*c^6*e*f^2*g + 4*a^2*c^6*d*f^2*h - 6*a^4*b*c^3*d*k^3 - 4*a^2*
c^6*d*f*g^2 + 2*b^2*c^6*d^2*e*g - 2*a*b^2*c^5*e^3*j + 2*a^3*b*c^4*f*h^3 + 2
*a^2*b*c^5*f^3*h + 2*a^2*b*c^5*e*g^3 + 3*a*b*c^6*d^2*g^2 - 9*a^4*b^2*c^2*f^
2*m^2 + 4*a^4*b^2*c^2*g^2*l^2 - 14*a^3*b^3*c^2*e^2*m^2 + 5*a^3*b^3*c^2*f^2*
l^2 - 20*a^2*b^4*c^2*d^2*m^2 + 16*a^3*b^2*c^3*d^2*m^2 - 9*a^3*b^2*c^3*e^2*l
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^2 + 6*a^2*b^4*c^2*e^2*l^2 + 4*a^3*b^2*c^3*f^2*k^2 - 14*a^2*b^3*c^3*d^2*l^2
 + 5*a^2*b^3*c^3*e^2*k^2 - 9*a^2*b^2*c^4*d^2*k^2 + 4*a^2*b^2*c^4*e^2*j^2 +
4*a^7*c*k*l^2*m - 4*a^7*c*j*l*m^2 + 2*b^7*c*d^2*k*m + 2*a^6*b*c*k^3*m + 2*a
^6*b*c*j*l^3 + 2*a*b^7*d*f*m^2 - 6*a^6*b*c*f*m^3 - 6*a*b*c^6*d^3*k - 4*a*c^
7*d^2*e*g + 4*a*c^7*d*e^2*f + 2*a*b*c^6*e^3*g + 2*a*b*c^6*d*f^3 - a^5*b^2*c
*j^2*l^2 - a^5*b*c^2*j^2*k^2 - a^4*b^3*c*h^2*l^2 - a^3*b^4*c*g^2*l^2 - a^4*
b*c^3*h^2*j^2 - a^2*b^5*c*f^2*l^2 - a*b^5*c^2*e^2*k^2 - a^3*b*c^4*g^2*h^2 -
 a*b^4*c^3*e^2*j^2 - a^2*b*c^5*f^2*g^2 - a*b^3*c^4*e^2*h^2 - a*b^2*c^5*e^2*
g^2 + 2*a^7*b*k*m^3 + 4*a^7*c*h*m^3 + 4*a*c^7*d^3*h + 2*b*c^7*d^3*f - a^6*b
*c*k^2*l^2 - 2*a^6*c^2*j^2*l^2 - 6*a^6*c^2*h^2*m^2 - a*b^6*c*e^2*l^2 - 6*a^
5*c^3*g^2*l^2 - 2*a^5*c^3*h^2*k^2 - 2*a^5*c^3*f^2*m^2 - 6*a^4*c^4*f^2*k^2 -
 6*a^4*c^4*d^2*m^2 - 2*a^4*c^4*g^2*j^2 - 2*a^4*c^4*e^2*l^2 - 6*a^3*c^5*e^2*
j^2 - 2*a^3*c^5*d^2*k^2 - 2*a^3*c^5*f^2*h^2 - a*b*c^6*e^2*f^2 - 6*a^2*c^6*d
^2*h^2 - 2*a^2*c^6*e^2*g^2 - a^4*b^2*c^2*h^2*k^2 - a^3*b^3*c^2*g^2*k^2 - a^
3*b^2*c^3*g^2*j^2 - a^2*b^4*c^2*f^2*k^2 - a^2*b^3*c^3*f^2*j^2 - a^2*b^2*c^4
*f^2*h^2 - 2*a^7*c*k^2*m^2 + 4*a^5*c^3*h^3*m - 2*a^6*b^2*h*m^3 + 4*a^6*c^2*
g*l^3 + 4*a^4*c^4*g^3*l - 2*b^4*c^4*d^3*m + 2*a^5*b^3*f*m^3 - 4*a^6*c^2*d*m
^3 + 4*a^5*c^3*f*k^3 + 4*a^3*c^5*f^3*k - 4*a^2*c^6*d^3*m + 2*b^3*c^5*d^3*k
- 2*a^4*b^4*d*m^3 + 4*a^4*c^4*e*j^3 + 4*a^2*c^6*e^3*j - 2*b^2*c^6*d^3*h + 4
*a^3*c^5*d*h^3 - 2*a*c^7*d^2*f^2 - a^6*b^2*k^2*m^2 - a^5*b^3*j^2*m^2 - a^4*
b^4*h^2*m^2 - a^3*b^5*g^2*m^2 - a^2*b^6*f^2*m^2 - b^6*c^2*d^2*k^2 - b^5*c^3
*d^2*j^2 - b^4*c^4*d^2*h^2 - b^3*c^5*d^2*g^2 - b^2*c^6*d^2*f^2 - a^7*b*l^2*
m^2 - b^7*c*d^2*l^2 - a*b^7*e^2*m^2 - b*c^7*d^2*e^2 - b^8*d^2*m^2 - a^6*c^2
*k^4 - a^5*c^3*j^4 - a^4*c^4*h^4 - a^3*c^5*g^4 - a^2*c^6*f^4 - a^7*c*l^4 -
a*c^7*e^4 - a^8*m^4 - c^8*d^4, z, k1)*((16*a^3*c^6*m - 16*a^2*c^7*h - 4*b^2
*c^7*d + 16*a*c^8*d - 20*a^2*b^2*c^5*m + 4*a*b^2*c^6*h - 4*a*b^3*c^5*k + 16
*a^2*b*c^6*k + 4*a*b^4*c^4*m)/c^5 + (x*(4*b^2*c^7*e - 8*b^3*c^6*g + 16*a^2*
c^7*j + 8*b^4*c^5*j - 8*b^5*c^4*l - 16*a*c^8*e + 32*a*b*c^7*g - 36*a*b^2*c^
6*j + 44*a*b^3*c^5*l - 48*a^2*b*c^6*l))/c^5 + (root(128*a^2*b^2*c^8*z^4 - 1
6*a*b^4*c^7*z^4 - 256*a^3*c^9*z^4 + 384*a^3*b^2*c^6*l*z^3 - 144*a^2*b^4*c^5
*l*z^3 + 128*a^2*b^3*c^6*j*z^3 - 128*a^2*b^2*c^7*g*z^3 + 16*a*b^6*c^4*l*z^3
 - 256*a^3*b*c^7*j*z^3 - 16*a*b^5*c^5*j*z^3 + 16*a*b^4*c^6*g*z^3 - 256*a^4*
c^7*l*z^3 + 256*a^3*c^8*g*z^3 - 96*a^4*b*c^5*j*l*z^2 + 8*a*b^7*c^2*j*l*z^2
+ 160*a^4*b*c^5*h*m*z^2 - 8*a*b^7*c^2*h*m*z^2 + 8*a*b^6*c^3*h*k*z^2 - 8*a*b
^6*c^3*g*l*z^2 + 8*a*b^6*c^3*f*m*z^2 + 160*a^3*b*c^6*g*j*z^2 - 96*a^3*b*c^6
*f*k*z^2 - 96*a^3*b*c^6*e*l*z^2 - 96*a^3*b*c^6*d*m*z^2 + 8*a*b^5*c^4*g*j*z^
2 - 8*a*b^5*c^4*f*k*z^2 - 8*a*b^5*c^4*e*l*z^2 - 8*a*b^5*c^4*d*m*z^2 + 8*a*b
^4*c^5*e*j*z^2 + 8*a*b^4*c^5*d*k*z^2 + 8*a*b^4*c^5*f*h*z^2 + 32*a^2*b*c^7*e
*g*z^2 + 32*a^2*b*c^7*d*h*z^2 - 8*a*b^3*c^6*e*g*z^2 - 8*a*b^3*c^6*d*h*z^2 +
 16*a*b^2*c^7*d*f*z^2 + 8*a*b^8*c*k*m*z^2 - 304*a^4*b^2*c^4*k*m*z^2 + 264*a
^3*b^4*c^3*k*m*z^2 - 80*a^2*b^6*c^2*k*m*z^2 + 184*a^3*b^3*c^4*j*l*z^2 - 72*
a^2*b^5*c^3*j*l*z^2 - 200*a^3*b^3*c^4*h*m*z^2 + 72*a^2*b^5*c^3*h*m*z^2 - 24
0*a^3*b^2*c^5*g*l*z^2 + 144*a^3*b^2*c^5*h*k*z^2 + 144*a^3*b^2*c^5*f*m*z^2 +
 80*a^2*b^4*c^4*g*l*z^2 - 64*a^2*b^4*c^4*h*k*z^2 - 64*a^2*b^4*c^4*f*m*z^2 -
 72*a^2*b^3*c^5*g*j*z^2 + 56*a^2*b^3*c^5*f*k*z^2 + 56*a^2*b^3*c^5*e*l*z^2 +
 56*a^2*b^3*c^5*d*m*z^2 - 48*a^2*b^2*c^6*e*j*z^2 - 48*a^2*b^2*c^6*d*k*z^2 -
 48*a^2*b^2*c^6*f*h*z^2 - 112*a^5*b*c^4*m^2*z^2 + 44*a^2*b^7*c*m^2*z^2 + 80
*a^4*b*c^5*k^2*z^2 - 4*a*b^7*c^2*k^2*z^2 - 4*a*b^6*c^3*j^2*z^2 - 48*a^3*b*c
^6*h^2*z^2 - 4*a*b^5*c^4*h^2*z^2 - 4*a*b^4*c^5*g^2*z^2 + 16*a^2*b*c^7*f^2*z
^2 - 4*a*b^3*c^6*f^2*z^2 + 8*a*b^2*c^7*e^2*z^2 + 64*a^5*c^5*k*m*z^2 + 192*a
^4*c^6*g*l*z^2 - 64*a^4*c^6*h*k*z^2 - 64*a^4*c^6*f*m*z^2 + 64*a^3*c^7*e*j*z
^2 + 64*a^3*c^7*d*k*z^2 + 64*a^3*c^7*f*h*z^2 - 4*a*b^8*c*l^2*z^2 - 64*a^2*c
^8*d*f*z^2 + 16*a*b*c^8*d^2*z^2 + 252*a^4*b^3*c^3*m^2*z^2 - 168*a^3*b^5*c^2
*m^2*z^2 + 168*a^4*b^2*c^4*l^2*z^2 - 132*a^3*b^4*c^3*l^2*z^2 + 40*a^2*b^6*c
^2*l^2*z^2 - 100*a^3*b^3*c^4*k^2*z^2 + 36*a^2*b^5*c^3*k^2*z^2 - 56*a^3*b^2*
c^5*j^2*z^2 + 32*a^2*b^4*c^4*j^2*z^2 + 28*a^2*b^3*c^5*h^2*z^2 + 40*a^2*b^2*
c^6*g^2*z^2 - 96*a^5*c^5*l^2*z^2 - 32*a^4*c^6*j^2*z^2 - 96*a^3*c^7*g^2*z^2
- 32*a^2*c^8*e^2*z^2 - 4*b^3*c^7*d^2*z^2 - 4*a*b^9*m^2*z^2 + 32*a^5*b*c^3*h
*l*m*z + 8*a^2*b^6*c*g*k*m*z + 96*a^4*b*c^4*e*k*m*z + 32*a^4*b*c^4*h*j*k*z
```

+ 32*a^4*b*c^4*g*j*l*z + 32*a^4*b*c^4*f*j*m*z - 64*a^4*b*c^4*g*h*m*z - 8*a*
b^6*c^2*e*j*l*z + 8*a*b^6*c^2*e*h*m*z - 64*a^3*b*c^5*e*h*k*z + 64*a^3*b*c^5
*e*g*l*z - 64*a^3*b*c^5*e*f*m*z + 32*a^3*b*c^5*f*g*k*z - 32*a^3*b*c^5*d*h*l
*z + 32*a^3*b*c^5*d*g*m*z - 8*a*b^5*c^3*e*h*k*z + 8*a*b^5*c^3*e*g*l*z - 8*a
*b^5*c^3*e*f*m*z - 8*a*b^4*c^4*e*g*j*z + 8*a*b^4*c^4*e*f*k*z - 8*a*b^4*c^4*
d*f*l*z + 8*a*b^4*c^4*d*e*m*z - 32*a^2*b*c^6*d*f*j*z + 32*a^2*b*c^6*d*e*k*z
 + 8*a*b^3*c^5*d*f*j*z - 8*a*b^3*c^5*d*e*k*z + 32*a^2*b*c^6*e*f*h*z - 8*a*b
^3*c^5*e*f*h*z - 8*a*b^2*c^6*d*f*g*z + 8*a*b^2*c^6*d*e*h*z - 8*a*b^7*c*e*k*
m*z - 40*a^5*b^2*c^2*k*l*m*z + 48*a^4*b^3*c^2*j*k*m*z - 8*a^4*b^3*c^2*h*l*m
*z + 104*a^4*b^2*c^3*g*k*m*z - 56*a^3*b^4*c^2*g*k*m*z - 40*a^4*b^2*c^3*h*j*
m*z + 8*a^4*b^2*c^3*h*k*l*z + 8*a^4*b^2*c^3*f*l*m*z + 8*a^3*b^4*c^2*h*j*m*z
 - 152*a^3*b^3*c^3*e*k*m*z + 64*a^2*b^5*c^2*e*k*m*z - 40*a^3*b^3*c^3*g*j*l*
z - 8*a^3*b^3*c^3*h*j*k*z - 8*a^3*b^3*c^3*f*j*m*z + 8*a^2*b^5*c^2*g*j*l*z +
 48*a^3*b^3*c^3*g*h*m*z - 8*a^2*b^5*c^2*g*h*m*z - 104*a^3*b^2*c^4*e*j*l*z +
 56*a^2*b^4*c^3*e*j*l*z + 8*a^3*b^2*c^4*f*j*k*z - 8*a^3*b^2*c^4*d*k*l*z + 8
*a^3*b^2*c^4*d*j*m*z + 104*a^3*b^2*c^4*e*h*m*z - 56*a^2*b^4*c^3*e*h*m*z - 4
0*a^3*b^2*c^4*g*h*k*z - 40*a^3*b^2*c^4*f*g*m*z - 8*a^3*b^2*c^4*f*h*l*z + 8*
a^2*b^4*c^3*g*h*k*z + 8*a^2*b^4*c^3*f*g*m*z + 48*a^2*b^3*c^4*e*h*k*z - 48*a
^2*b^3*c^4*e*g*l*z + 48*a^2*b^3*c^4*e*f*m*z - 8*a^2*b^3*c^4*f*g*k*z + 8*a^2
*b^3*c^4*d*h*l*z - 8*a^2*b^3*c^4*d*g*m*z + 40*a^2*b^2*c^5*e*g*j*z - 40*a^2*
b^2*c^5*e*f*k*z + 40*a^2*b^2*c^5*d*f*l*z - 40*a^2*b^2*c^5*d*e*m*z - 8*a^2*b
^2*c^5*d*h*j*z + 8*a^2*b^2*c^5*d*g*k*z + 8*a^2*b^2*c^5*f*g*h*z + 8*a^4*b^4*
c*k*l*m*z - 64*a^5*b*c^3*j*k*m*z - 8*a^3*b^5*c*j*k*m*z - 32*a^6*b*c^2*l*m^2
*z + 24*a^5*b^3*c*l*m^2*z - 28*a^4*b^4*c*j*m^2*z + 16*a^5*b*c^3*k^2*l*z + 4
*a^3*b^5*c*j*l^2*z + 48*a^5*b*c^3*g*m^2*z + 32*a^3*b^5*c*g*m^2*z - 4*a^2*b^
6*c*g*l^2*z - 36*a^2*b^6*c*e*m^2*z - 32*a^4*b*c^4*g*k^2*z - 16*a^3*b*c^5*f^
2*l*z - 48*a^4*b*c^4*e*l^2*z - 32*a^3*b*c^5*g^2*j*z - 4*a*b^4*c^4*e^2*l*z +
 32*a^2*b*c^6*d^2*l*z - 24*a*b^3*c^5*d^2*l*z + 4*a*b^6*c^2*e*k^2*z + 32*a^3
*b*c^5*e*j^2*z + 16*a^3*b*c^5*g*h^2*z - 16*a^2*b*c^6*e^2*j*z + 4*a*b^5*c^3*
e*j^2*z + 4*a*b^3*c^5*e^2*j*z + 20*a*b^2*c^6*d^2*j*z + 4*a*b^4*c^4*e*h^2*z
 - 16*a^2*b*c^6*e*g^2*z + 4*a*b^3*c^5*e*g^2*z - 4*a*b^2*c^6*e^2*g*z + 4*a*b^
2*c^6*e*f^2*z + 32*a^6*c^3*k*l*m*z - 32*a^5*c^4*h*k*l*z + 32*a^5*c^4*h*j*m*
z - 32*a^5*c^4*g*k*m*z - 32*a^5*c^4*f*l*m*z - 32*a^4*c^5*f*j*k*z + 32*a^4*c
^5*e*j*l*z + 32*a^4*c^5*d*k*l*z - 32*a^4*c^5*d*j*m*z + 32*a^4*c^5*g*h*k*z +
 32*a^4*c^5*f*h*l*z + 32*a^4*c^5*f*g*m*z - 32*a^4*c^5*e*h*m*z - 32*a^3*c^6*
e*g*j*z + 32*a^3*c^6*e*f*k*z + 32*a^3*c^6*d*h*j*z - 32*a^3*c^6*d*g*k*z - 32
*a^3*c^6*d*f*l*z + 32*a^3*c^6*d*e*m*z - 32*a^3*c^6*f*g*h*z + 4*a*b^7*c*e*l^
2*z + 32*a^2*c^7*d*f*g*z - 32*a^2*c^7*d*e*h*z - 16*a*b*c^7*d^2*g*z + 52*a^5
*b^2*c^2*j*m^2*z - 4*a^4*b^3*c^2*k^2*l*z + 36*a^4*b^2*c^3*j^2*l*z - 16*a^4*
b^3*c^2*j*l^2*z - 8*a^3*b^4*c^2*j^2*l*z - 20*a^4*b^2*c^3*j*k^2*z + 4*a^3*b^
4*c^2*j*k^2*z - 76*a^4*b^3*c^2*g*m^2*z - 60*a^4*b^2*c^3*g*l^2*z + 44*a^3*b^
2*c^4*g^2*l*z + 28*a^3*b^4*c^2*g*l^2*z - 8*a^2*b^4*c^3*g^2*l*z + 104*a^3*b^
4*c^2*e*m^2*z - 100*a^4*b^2*c^3*e*m^2*z + 24*a^3*b^3*c^3*g*k^2*z + 4*a^3*b^
2*c^4*h^2*j*z - 4*a^2*b^5*c^2*g*k^2*z + 4*a^2*b^3*c^4*f^2*l*z + 76*a^3*b^3*
c^3*e*l^2*z - 32*a^2*b^5*c^2*e*l^2*z + 20*a^2*b^2*c^5*e^2*l*z + 12*a^3*b^2*
c^4*g*j^2*z + 8*a^2*b^3*c^4*g^2*j*z - 4*a^2*b^4*c^3*g*j^2*z + 52*a^3*b^2*c^
4*e*k^2*z - 28*a^2*b^4*c^3*e*k^2*z - 4*a^2*b^2*c^5*f^2*j*z - 24*a^2*b^3*c^4
*e*j^2*z - 4*a^2*b^3*c^4*g*h^2*z - 20*a^2*b^2*c^5*e*h^2*z + 20*a^5*b^2*c^2*
l^3*z + 4*a^3*b^3*c^3*j^3*z - 4*a^2*b^2*c^5*g^3*z - 4*a^4*b^5*l*m^2*z - 16*
a^6*c^3*j*m^2*z - 16*a^5*c^4*j^2*l*z + 4*a^3*b^6*j*m^2*z + 16*a^5*c^4*j*k^2
*z + 48*a^5*c^4*g*l^2*z - 48*a^4*c^5*g^2*l*z - 4*a^2*b^7*g*m^2*z + 16*a^5*c
^4*e*m^2*z - 16*a^4*c^5*h^2*j*z + 16*a^4*c^5*g*j^2*z - 16*a^3*c^6*e^2*l*z +
 4*b^5*c^4*d^2*l*z - 16*a^4*c^5*e*k^2*z + 16*a^3*c^6*f^2*j*z - 4*b^4*c^5*d^
2*j*z - 16*a^2*c^7*d^2*j*z - 4*a^4*b^4*c*l^3*z + 16*a^3*c^6*e*h^2*z - 16*a^
4*b*c^4*j^3*z + 16*a^2*c^7*e^2*g*z + 4*b^3*c^6*d^2*g*z - 16*a^2*c^7*e*f^2*z
 - 4*b^2*c^7*d^2*e*z + 4*a*b^8*e*m^2*z + 16*a*c^8*d^2*e*z - 16*a^6*c^3*l^3*
z + 16*a^3*c^6*g^3*z + 4*a^5*b^2*c*g*k*l*m + 12*a^5*b*c^2*g*j*k*m + 12*a^5*
b*c^2*e*k*l*m - 4*a^5*b*c^2*h*j*k*l - 4*a^5*b*c^2*f*j*l*m - 4*a^4*b^3*c*g*j
*k*m - 4*a^4*b^3*c*e*k*l*m - 4*a^5*b*c^2*g*h*l*m + 4*a^3*b^4*c*e*j*k*m - 4*

a^3*b^4*c*f*h*k*m + 12*a^4*b*c^3*d*j*k*l - 20*a^4*b*c^3*e*g*k*m + 12*a^4*b*
c^3*f*h*j*l + 12*a^4*b*c^3*e*h*j*m + 12*a^4*b*c^3*d*h*k*m - 4*a^4*b*c^3*g*h
*j*k - 4*a^4*b*c^3*f*g*k*l - 4*a^4*b*c^3*f*g*j*m - 4*a^4*b*c^3*e*h*k*l - 4*
a^4*b*c^3*e*f*l*m - 4*a^4*b*c^3*d*g*l*m - 4*a^2*b^5*c*e*g*k*m + 4*a^2*b^5*c
*d*h*k*m - 20*a^3*b*c^4*d*f*j*l - 4*a^3*b*c^4*e*f*j*k - 4*a^3*b*c^4*d*g*j*k
 - 4*a^3*b*c^4*d*e*k*l - 4*a^3*b*c^4*d*e*j*m - 4*a*b^5*c^2*d*f*j*l + 12*a^3
*b*c^4*e*g*h*k + 12*a^3*b*c^4*e*f*g*m + 12*a^3*b*c^4*d*g*h*l + 12*a^3*b*c^4
*d*f*h*m - 4*a^3*b*c^4*f*g*h*j - 4*a^3*b*c^4*e*f*h*l + 4*a*b^5*c^2*d*f*h*m
- 4*a*b^4*c^3*d*f*h*k + 4*a*b^4*c^3*d*f*g*l + 12*a^2*b*c^5*d*f*g*j + 12*a^2
*b*c^5*d*e*f*l - 4*a^2*b*c^5*d*e*h*j - 4*a^2*b*c^5*d*e*g*k - 4*a*b^3*c^4*d*
f*g*j - 4*a*b^3*c^4*d*e*f*l - 4*a^2*b*c^5*e*f*g*h + 4*a*b^2*c^5*d*e*f*j - 4
*a^6*b*c*j*k*l*m - 4*a*b^6*c*d*f*k*m - 4*a*b*c^6*d*e*f*g - 16*a^4*b^2*c^2*e
*j*k*m + 4*a^4*b^2*c^2*f*j*k*l + 4*a^4*b^2*c^2*d*j*l*m + 12*a^4*b^2*c^2*f*h
*k*m + 4*a^4*b^2*c^2*g*h*j*m + 4*a^4*b^2*c^2*e*h*l*m - 4*a^3*b^3*c^2*d*j*k*
l + 20*a^3*b^3*c^2*e*g*k*m - 16*a^3*b^3*c^2*d*h*k*m - 4*a^3*b^3*c^2*f*h*j*l
 - 4*a^3*b^3*c^2*e*h*j*m - 40*a^3*b^2*c^3*d*f*k*m + 24*a^2*b^4*c^2*d*f*k*m
- 16*a^3*b^2*c^3*d*h*j*l + 12*a^3*b^2*c^3*e*g*j*l + 4*a^3*b^2*c^3*e*h*j*k +
 4*a^3*b^2*c^3*e*f*j*m + 4*a^3*b^2*c^3*d*g*k*l - 4*a^2*b^4*c^2*e*g*j*l + 4*
a^2*b^4*c^2*d*h*j*l - 16*a^3*b^2*c^3*e*g*h*m + 4*a^3*b^2*c^3*f*g*h*l + 4*a^
2*b^4*c^2*e*g*h*m + 20*a^2*b^3*c^3*d*f*j*l - 16*a^2*b^3*c^3*d*f*h*m - 4*a^2
*b^3*c^3*e*g*h*k - 4*a^2*b^3*c^3*e*f*g*m - 4*a^2*b^3*c^3*d*g*h*l - 16*a^2*b
^2*c^4*d*f*g*l + 12*a^2*b^2*c^4*d*f*h*k + 4*a^2*b^2*c^4*e*f*g*k + 4*a^2*b^2
*c^4*d*g*h*j + 4*a^2*b^2*c^4*d*e*h*l + 4*a^2*b^2*c^4*d*e*g*m + 2*a^5*b^2*c*
j^2*k*m - 4*a^5*b^2*c*h*k^2*m - 2*a^5*b*c^2*h^2*k*m + 2*a^4*b^3*c*h^2*k*m +
 2*a^5*b^2*c*h*k*l^2 + 2*a^5*b^2*c*f*l^2*m - 2*a^5*b*c^2*h*j^2*m + 2*a^3*b^
4*c*g^2*k*m + 14*a^4*b*c^3*f^2*k*m - 10*a^5*b*c^2*f*k^2*m - 8*a^5*b^2*c*g*j
*m^2 - 8*a^5*b^2*c*e*l*m^2 + 4*a^5*b^2*c*f*k*m^2 + 4*a^4*b^3*c*f*k^2*m - 2*
a^5*b*c^2*g*k^2*l + 2*a^2*b^5*c*f^2*k*m + 6*a^5*b*c^2*f*k*l^2 + 6*a^5*b*c^2
*d*l^2*m - 2*a^5*b*c^2*g*j*l^2 + 2*a^4*b^3*c*g*j*l^2 - 2*a^4*b^3*c*f*k*l^2
- 2*a^4*b^3*c*d*l^2*m - 2*a^4*b*c^3*g^2*j*l - 14*a*b^5*c^2*d^2*k*m - 10*a^5
*b*c^2*e*j*m^2 + 10*a^4*b^3*c*e*j*m^2 - 10*a^3*b*c^4*d^2*k*m - 6*a^4*b^3*c*
d*k*m^2 + 6*a^4*b*c^3*g^2*h*m - 4*a^3*b^4*c*d*k^2*m - 2*a^5*b*c^2*d*k*m^2 +
 14*a^5*b*c^2*f*h*m^2 + 14*a^3*b*c^4*e^2*j*l - 10*a^4*b^3*c*f*h*m^2 - 10*a^
4*b*c^3*f*h^2*m - 10*a^4*b*c^3*e*j^2*l - 2*a^4*b*c^3*g*h^2*l - 2*a^4*b*c^3*
f*j^2*k - 2*a^4*b*c^3*d*j^2*m - 2*a^3*b^4*c*e*j*l^2 + 2*a^3*b^4*c*d*k*l^2 +
 2*a*b^5*c^2*e^2*j*l - 12*a*b^4*c^3*d^2*j*l - 10*a^3*b*c^4*e^2*h*m + 6*a^4*
b*c^3*e*j*k^2 + 2*a^3*b^4*c*f*h*l^2 - 2*a*b^5*c^2*e^2*h*m - 12*a^3*b^4*c*e*
g*m^2 + 12*a^3*b^4*c*d*h*m^2 + 12*a*b^4*c^3*d^2*h*m + 6*a^3*b*c^4*f^2*g*l -
 2*a^4*b*c^3*f*h*k^2 - 2*a^3*b*c^4*f^2*h*k + 14*a^4*b*c^3*e*g*l^2 - 10*a^4*
b*c^3*d*h*l^2 - 10*a^3*b*c^4*e*g^2*l - 2*a^3*b*c^4*f*g^2*k - 2*a^3*b*c^4*d*
g^2*m + 2*a^2*b^5*c*e*g*l^2 - 2*a^2*b^5*c*d*h*l^2 + 2*a*b^4*c^3*e^2*h*k - 2
*a*b^4*c^3*e^2*g*l + 2*a*b^4*c^3*e^2*f*m - 14*a^2*b^5*c*d*f*m^2 + 14*a^2*b*
c^5*d^2*h*k - 10*a^4*b*c^3*d*f*m^2 - 10*a^3*b*c^4*d*h^2*k - 10*a^2*b*c^5*d^
2*g*l - 10*a*b^3*c^4*d^2*h*k + 10*a*b^3*c^4*d^2*g*l - 6*a*b^3*c^4*d^2*f*m -
 4*a*b^4*c^3*d*f^2*m - 2*a^3*b*c^4*e*h^2*j - 2*a^2*b*c^5*d^2*f*m + 6*a^3*b*
c^4*d*h*j^2 + 6*a^2*b*c^5*e^2*f*k + 6*a^2*b*c^5*d*e^2*m - 2*a^3*b*c^4*e*g*j
^2 - 2*a^2*b*c^5*e^2*g*j + 2*a*b^3*c^4*e^2*g*j - 2*a*b^3*c^4*e^2*f*k - 2*a*
b^3*c^4*d*e^2*m + 14*a^3*b*c^4*d*f*k^2 - 10*a^2*b*c^5*d*f^2*k - 8*a*b^2*c^5
*d^2*g*j - 8*a*b^2*c^5*d^2*e*l + 4*a*b^3*c^4*d*f^2*k + 4*a*b^2*c^5*d^2*f*k
- 2*a^2*b*c^5*e*f^2*j + 2*a*b^5*c^2*d*f*k^2 + 2*a*b^4*c^3*d*f*j^2 + 2*a*b^2
*c^5*d*e^2*k - 2*a^2*b*c^5*d*g^2*h + 2*a*b^2*c^5*e^2*f*h - 4*a*b^2*c^5*d*f^
2*h - 2*a^2*b*c^5*d*f*h^2 + 2*a*b^3*c^4*d*f*h^2 + 2*a*b^2*c^5*d*f*g^2 + 8*a
^6*c^2*h*j*l*m - 8*a^6*c^2*g*k*l*m - 8*a^5*c^3*f*j*k*l + 8*a^5*c^3*e*j*k*m
- 8*a^5*c^3*d*j*l*m + 8*a^5*c^3*g*h*k*l - 8*a^5*c^3*g*h*j*m - 8*a^5*c^3*f*h
*k*m + 8*a^5*c^3*f*g*l*m - 8*a^5*c^3*e*h*l*m - 2*a^6*b*c*h*l^2*m + 8*a^4*c^
4*f*g*j*k - 8*a^4*c^4*e*h*j*k - 8*a^4*c^4*e*g*j*l + 8*a^4*c^4*e*f*k*l - 8*a
^4*c^4*e*f*j*m + 8*a^4*c^4*d*h*j*l - 8*a^4*c^4*d*g*k*l + 8*a^4*c^4*d*g*j*m
+ 8*a^4*c^4*d*f*k*m + 8*a^4*c^4*d*e*l*m + 6*a^6*b*c*g*l*m^2 - 2*a^6*b*c*h*k
*m^2 - 8*a^4*c^4*f*g*h*l + 8*a^4*c^4*e*g*h*m + 2*a*b^6*c*e^2*k*m + 8*a^3*c^

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5*d*e*j*k + 8*a^3*c^5*e*f*h*j - 8*a^3*c^5*e*f*g*k - 8*a^3*c^5*d*g*h*j - 8*a
^3*c^5*d*f*h*k + 8*a^3*c^5*d*f*g*l - 8*a^3*c^5*d*e*h*l - 8*a^3*c^5*d*e*g*m
- 8*a^2*c^6*d*e*f*j + 8*a^2*c^6*d*e*g*h + 2*a*b^6*c*d*f*l^2 + 6*a*b*c^6*d^2
*e*j - 2*a*b*c^6*d^2*f*h - 2*a*b*c^6*d*e^2*h - 8*a^4*b^2*c^2*g^2*k*m - 10*a
^3*b^3*c^2*f^2*k*m + 2*a^4*b^2*c^2*h^2*j*l + 18*a^3*b^2*c^3*e^2*k*m - 12*a^
2*b^4*c^2*e^2*k*m - 4*a^4*b^2*c^2*g*j^2*l + 2*a^3*b^3*c^2*g^2*j*l + 28*a^2*
b^3*c^3*d^2*k*m + 14*a^4*b^2*c^2*d*k^2*m - 8*a^3*b^2*c^3*f^2*j*l + 2*a^4*b^
2*c^2*g*j*k^2 + 2*a^4*b^2*c^2*e*k^2*l - 2*a^3*b^3*c^2*g^2*h*m + 2*a^2*b^4*c
^2*f^2*j*l - 10*a^2*b^3*c^3*e^2*j*l - 8*a^4*b^2*c^2*d*k*l^2 + 4*a^4*b^2*c^2
*e*j*l^2 + 4*a^3*b^3*c^2*f*h^2*m + 4*a^3*b^3*c^2*e*j^2*l + 4*a^3*b^2*c^3*f^
2*h*m - 2*a^2*b^4*c^2*f^2*h*m + 18*a^2*b^2*c^4*d^2*j*l + 10*a^2*b^3*c^3*e^2
*h*m - 8*a^4*b^2*c^2*f*h*l^2 - 2*a^3*b^3*c^2*e*j*k^2 + 2*a^3*b^2*c^3*g^2*h*
k + 2*a^3*b^2*c^3*f*g^2*m - 22*a^4*b^2*c^2*d*h*m^2 - 22*a^2*b^2*c^4*d^2*h*m
 + 18*a^4*b^2*c^2*e*g*m^2 + 16*a^3*b^2*c^3*d*h^2*m - 4*a^3*b^2*c^3*f*h^2*k
- 4*a^2*b^4*c^2*d*h^2*m + 2*a^3*b^3*c^2*f*h*k^2 + 2*a^3*b^2*c^3*d*j^2*k + 2
*a^2*b^3*c^3*f^2*h*k - 2*a^2*b^3*c^3*f^2*g*l - 10*a^3*b^3*c^2*e*g*l^2 + 10*
a^3*b^3*c^2*d*h*l^2 - 8*a^2*b^2*c^4*e^2*h*k - 8*a^2*b^2*c^4*e^2*f*m + 4*a^2
*b^3*c^3*e*g^2*l + 4*a^2*b^2*c^4*e^2*g*l + 2*a^3*b^2*c^3*f*h*j^2 + 28*a^3*b
^3*c^2*d*f*m^2 + 14*a^2*b^2*c^4*d*f^2*m - 8*a^3*b^2*c^3*e*g*k^2 + 4*a^3*b^2
*c^3*d*h*k^2 + 4*a^2*b^3*c^3*d*h^2*k + 2*a^2*b^4*c^2*e*g*k^2 - 2*a^2*b^4*c^
2*d*h*k^2 + 2*a^2*b^2*c^4*f^2*g*j + 2*a^2*b^2*c^4*e*f^2*l + 18*a^3*b^2*c^3*
d*f*l^2 - 12*a^2*b^4*c^2*d*f*l^2 - 4*a^2*b^2*c^4*e*g^2*j + 2*a^2*b^3*c^3*e*
g*j^2 - 2*a^2*b^3*c^3*d*h*j^2 - 10*a^2*b^3*c^3*d*f*k^2 - 8*a^2*b^2*c^4*d*f*
j^2 + 2*a^2*b^2*c^4*e*g*h^2 + 4*a^5*b^2*c*h^2*m^2 - 2*a^4*b^2*c^2*h^3*m - 5
*a^5*b*c^2*g^2*m^2 + 5*a^4*b^3*c*g^2*m^2 + 3*a^5*b*c^2*h^2*l^2 + 6*a^3*b^4*
c*f^2*m^2 - 2*a^3*b^2*c^3*g^3*l + 2*a^2*b^3*c^3*f^3*m + 7*a^4*b*c^3*e^2*m^2
 + 7*a^2*b^5*c*e^2*m^2 - 5*a^4*b*c^3*f^2*l^2 + 3*a^4*b*c^3*g^2*k^2 - 2*a^4*
b^2*c^2*f*k^3 - 2*a^2*b^2*c^4*f^3*k + 7*a^3*b*c^4*d^2*l^2 + 7*a*b^5*c^2*d^2
*l^2 - 5*a^3*b*c^4*e^2*k^2 + 3*a^3*b*c^4*f^2*j^2 + 6*a*b^4*c^3*d^2*k^2 + 2*
a^3*b^3*c^2*d*k^3 - 2*a^3*b^2*c^3*e*j^3 - 5*a^2*b*c^5*d^2*j^2 + 5*a*b^3*c^4
*d^2*j^2 + 3*a^2*b*c^5*e^2*h^2 + 4*a*b^2*c^5*d^2*h^2 - 2*a^2*b^2*c^4*d*h^3
- 4*a^6*c^2*j^2*k*m + 2*a^6*b^2*j*l*m^2 + 4*a^6*c^2*j*k^2*l + 4*a^6*c^2*h*k
^2*m - 4*a^6*c^2*h*k*l^2 - 4*a^6*c^2*f*l^2*m + 4*a^5*c^3*g^2*k*m + 2*a^5*b^
3*h*k*m^2 - 2*a^5*b^3*g*l*m^2 + 4*a^6*c^2*g*j*m^2 + 4*a^6*c^2*f*k*m^2 + 4*a
^6*c^2*e*l*m^2 - 4*a^5*c^3*h^2*j*l + 4*a^5*c^3*h*j^2*k + 4*a^5*c^3*g*j^2*l
+ 4*a^5*c^3*f*j^2*m - 4*a^4*c^4*e^2*k*m + 2*a^4*b^4*g*j*m^2 - 2*a^4*b^4*f*k
*m^2 + 2*a^4*b^4*e*l*m^2 - 4*a^5*c^3*g*j*k^2 - 4*a^5*c^3*e*k^2*l - 4*a^5*c^
3*d*k^2*m + 4*a^4*c^4*f^2*j*l + 4*a^5*c^3*e*j*l^2 + 4*a^5*c^3*d*k*l^2 + 4*a
^4*c^4*f^2*h*m + 2*b^6*c^2*d^2*j*l - 2*a^3*b^5*e*j*m^2 + 2*a^3*b^5*d*k*m^2
+ 4*a^5*c^3*f*h*l^2 - 4*a^4*c^4*g^2*h*k - 4*a^4*c^4*f*g^2*m - 4*a^3*c^5*d^2
*j*l - 2*b^6*c^2*d^2*h*m + 2*a^3*b^5*f*h*m^2 + 12*a^5*c^3*d*h*m^2 - 12*a^4*
c^4*d*h^2*m + 12*a^3*c^5*d^2*h*m - 4*a^5*c^3*e*g*m^2 + 4*a^4*c^4*g*h^2*j +
4*a^4*c^4*f*h^2*k + 4*a^4*c^4*e*h^2*l - 4*a^4*c^4*d*j^2*k + 3*a^6*b*c*j^2*m
^2 - 4*a^4*c^4*f*h*j^2 + 4*a^3*c^5*e^2*h*k + 4*a^3*c^5*e^2*g*l + 4*a^3*c^5*
e^2*f*m + 2*b^5*c^3*d^2*h*k - 2*b^5*c^3*d^2*g*l + 2*b^5*c^3*d^2*f*m + 2*a^5
*b*c^2*j^3*l + 2*a^2*b^6*e*g*m^2 - 2*a^2*b^6*d*h*m^2 + 4*a^4*c^4*e*g*k^2 +
4*a^4*c^4*d*h*k^2 - 4*a^3*c^5*f^2*g*j - 4*a^3*c^5*e*f^2*l - 4*a^3*c^5*d*f^2
*m - 4*a^4*c^4*d*f*l^2 + 4*a^3*c^5*e*g^2*j + 4*a^3*c^5*d*g^2*k + 2*b^4*c^4*
d^2*g*j - 2*b^4*c^4*d^2*f*k + 2*b^4*c^4*d^2*e*l - 6*a^3*b*c^4*f^3*m + 4*a^3
*c^5*f*g^2*h + 4*a^2*c^6*d^2*g*j + 4*a^2*c^6*d^2*f*k + 4*a^2*c^6*d^2*e*l -
2*a^5*b^2*c*g*l^3 + 2*a^5*b*c^2*h*k^3 + 2*a^4*b*c^3*h^3*k - 4*a^3*c^5*e*g*h
^2 + 4*a^3*c^5*d*f*j^2 - 4*a^2*c^6*d*e^2*k - 2*b^3*c^5*d^2*e*j + 8*a^5*b^2*
c*d*m^3 + 8*a*b^6*c*d^2*m^2 + 8*a*b^2*c^5*d^3*m - 6*a^5*b*c^2*e*l^3 - 6*a^2
*b*c^5*e^3*l - 4*a^2*c^6*e^2*f*h + 2*b^3*c^5*d^2*f*h + 2*a^4*b^3*c*e*l^3 +
2*a^4*b*c^3*g*j^3 + 2*a^3*b*c^4*g^3*j + 2*a*b^3*c^4*e^3*l + 4*a^2*c^6*e*f^2
*g + 4*a^2*c^6*d*f^2*h - 6*a^4*b*c^3*d*k^3 - 4*a^2*c^6*d*f*g^2 + 2*b^2*c^6*
d^2*e*g - 2*a*b^2*c^5*e^3*j + 2*a^3*b*c^4*f*h^3 + 2*a^2*b*c^5*f^3*h + 2*a^2
*b*c^5*e*g^3 + 3*a*b*c^6*d^2*g^2 - 9*a^4*b^2*c^2*f^2*m^2 + 4*a^4*b^2*c^2*g^
2*l^2 - 14*a^3*b^3*c^2*e^2*m^2 + 5*a^3*b^3*c^2*f^2*l^2 - 20*a^2*b^4*c^2*d^2
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*m^2 + 16*a^3*b^2*c^3*d^2*m^2 - 9*a^3*b^2*c^3*e^2*l^2 + 6*a^2*b^4*c^2*e^2*l
^2 + 4*a^3*b^2*c^3*f^2*k^2 - 14*a^2*b^3*c^3*d^2*l^2 + 5*a^2*b^3*c^3*e^2*k^2
 - 9*a^2*b^2*c^4*d^2*k^2 + 4*a^2*b^2*c^4*e^2*j^2 + 4*a^7*c*k*l^2*m - 4*a^7*
c*j*l*m^2 + 2*b^7*c*d^2*k*m + 2*a^6*b*c*k^3*m + 2*a^6*b*c*j*l^3 + 2*a*b^7*d
*f*m^2 - 6*a^6*b*c*f*m^3 - 6*a*b*c^6*d^3*k - 4*a*c^7*d^2*e*g + 4*a*c^7*d*e^
2*f + 2*a*b*c^6*e^3*g + 2*a*b*c^6*d*f^3 - a^5*b^2*c*j^2*l^2 - a^5*b*c^2*j^2
*k^2 - a^4*b^3*c*h^2*l^2 - a^3*b^4*c*g^2*l^2 - a^4*b*c^3*h^2*j^2 - a^2*b^5*
c*f^2*l^2 - a*b^5*c^2*e^2*k^2 - a^3*b*c^4*g^2*h^2 - a*b^4*c^3*e^2*j^2 - a^2
*b*c^5*f^2*g^2 - a*b^3*c^4*e^2*h^2 - a*b^2*c^5*e^2*g^2 + 2*a^7*b*k*m^3 + 4*
a^7*c*h*m^3 + 4*a*c^7*d^3*h + 2*b*c^7*d^3*f - a^6*b*c*k^2*l^2 - 2*a^6*c^2*j
^2*l^2 - 6*a^6*c^2*h^2*m^2 - a*b^6*c*e^2*l^2 - 6*a^5*c^3*g^2*l^2 - 2*a^5*c^
3*h^2*k^2 - 2*a^5*c^3*f^2*m^2 - 6*a^4*c^4*f^2*k^2 - 6*a^4*c^4*d^2*m^2 - 2*a
^4*c^4*g^2*j^2 - 2*a^4*c^4*e^2*l^2 - 6*a^3*c^5*e^2*j^2 - 2*a^3*c^5*d^2*k^2
- 2*a^3*c^5*f^2*h^2 - a*b*c^6*e^2*f^2 - 6*a^2*c^6*d^2*h^2 - 2*a^2*c^6*e^2*g
^2 - a^4*b^2*c^2*h^2*k^2 - a^3*b^3*c^2*g^2*k^2 - a^3*b^2*c^3*g^2*j^2 - a^2*
b^4*c^2*f^2*k^2 - a^2*b^3*c^3*f^2*j^2 - a^2*b^2*c^4*f^2*h^2 - 2*a^7*c*k^2*m
^2 + 4*a^5*c^3*h^3*m - 2*a^6*b^2*h*m^3 + 4*a^6*c^2*g*l^3 + 4*a^4*c^4*g^3*l
- 2*b^4*c^4*d^3*m + 2*a^5*b^3*f*m^3 - 4*a^6*c^2*d*m^3 + 4*a^5*c^3*f*k^3 + 4
*a^3*c^5*f^3*k - 4*a^2*c^6*d^3*m + 2*b^3*c^5*d^3*k - 2*a^4*b^4*d*m^3 + 4*a^
4*c^4*e*j^3 + 4*a^2*c^6*e^3*j - 2*b^2*c^6*d^3*h + 4*a^3*c^5*d*h^3 - 2*a*c^7
*d^2*f^2 - a^6*b^2*k^2*m^2 - a^5*b^3*j^2*m^2 - a^4*b^4*h^2*m^2 - a^3*b^5*g^
2*m^2 - a^2*b^6*f^2*m^2 - b^6*c^2*d^2*k^2 - b^5*c^3*d^2*j^2 - b^4*c^4*d^2*h
^2 - b^3*c^5*d^2*g^2 - b^2*c^6*d^2*f^2 - a^7*b*l^2*m^2 - b^7*c*d^2*l^2 - a*
b^7*e^2*m^2 - b*c^7*d^2*e^2 - b^8*d^2*m^2 - a^6*c^2*k^4 - a^5*c^3*j^4 - a^4
*c^4*h^4 - a^3*c^5*g^4 - a^2*c^6*f^4 - a^7*c*l^4 - a*c^7*e^4 - a^8*m^4 - c^
8*d^4, z, k1)*x*(8*b^3*c^7 - 32*a*b*c^8))/c^5) - (4*b*c^7*d*e + 8*a*c^7*d*g
 - 8*a*c^7*e*f - 4*b^2*c^6*d*g - 8*a^2*c^6*g*h + 4*b^3*c^5*d*j - 8*a^2*c^6*
d*l + 8*a^2*c^6*e*k + 8*a^2*c^6*f*j - 4*b^4*c^4*d*l + 8*a^3*c^5*g*m + 8*a^3
*c^5*h*l - 8*a^3*c^5*j*k - 8*a^4*c^4*l*m + 16*a*b^2*c^5*d*l - 4*a*b^2*c^5*e
*k - 4*a*b^2*c^5*f*j + 4*a*b^3*c^4*e*m + 4*a*b^3*c^4*f*l - 12*a^2*b*c^5*e*m
 - 12*a^2*b*c^5*f*l + 4*a^2*b*c^5*g*k + 4*a^2*b*c^5*h*j + 4*a^3*b*c^4*j*m +
 4*a^3*b*c^4*k*l - 4*a^2*b^2*c^4*g*m - 4*a^2*b^2*c^4*h*l + 4*a*b*c^6*e*h +
4*a*b*c^6*f*g - 12*a*b*c^6*d*j)/c^5 + (x*(4*c^8*d^2 + 2*b^8*m^2 - 4*a*c^7*f
^2 - 2*b*c^7*e^2 + 2*b^7*c*l^2 + 2*b^2*c^6*f^2 + 4*a^2*c^6*h^2 + 2*b^3*c^5*
g^2 + 2*b^4*c^4*h^2 - 4*a^3*c^5*k^2 + 2*b^5*c^3*j^2 + 2*b^6*c^2*k^2 + 4*a^4
*c^4*m^2 - 8*a*b^2*c^5*h^2 - 10*a*b^3*c^4*j^2 + 6*a^2*b*c^5*j^2 - 12*a*b^4*
c^3*k^2 - 14*a*b^5*c^2*l^2 - 18*a^3*b*c^4*l^2 - 4*b*c^7*d*f - 8*a*c^7*d*h +
 8*a*c^7*e*g - 4*b^7*c*k*m + 18*a^2*b^2*c^4*k^2 + 28*a^2*b^3*c^3*l^2 + 40*a
^2*b^4*c^2*m^2 - 32*a^3*b^2*c^3*m^2 - 10*a*b*c^6*g^2 + 4*b^2*c^6*d*h - 16*a
*b^6*c*m^2 - 4*b^3*c^5*f*h - 4*b^3*c^5*d*k + 8*a^2*c^6*d*m - 8*a^2*c^6*e*l
+ 8*a^2*c^6*f*k - 8*a^2*c^6*g*j + 4*b^4*c^4*d*m + 4*b^4*c^4*f*k - 4*b^4*c^4
*g*j - 4*b^5*c^3*f*m + 4*b^5*c^3*g*l - 4*b^5*c^3*h*k - 8*a^3*c^5*h*m + 8*a^
3*c^5*j*l + 4*b^6*c^2*h*m - 4*b^6*c^2*j*l - 16*a*b^2*c^5*d*m + 4*a*b^2*c^5*
e*l - 16*a*b^2*c^5*f*k + 20*a*b^2*c^5*g*j + 20*a*b^3*c^4*f*m - 24*a*b^3*c^4
*g*l + 20*a*b^3*c^4*h*k - 20*a^2*b*c^5*f*m + 28*a^2*b*c^5*g*l - 20*a^2*b*c^
5*h*k - 24*a*b^4*c^3*h*m + 24*a*b^4*c^3*j*l + 28*a*b^5*c^2*k*m + 28*a^3*b*c
^4*k*m + 36*a^2*b^2*c^4*h*m - 32*a^2*b^2*c^4*j*l - 56*a^2*b^3*c^3*k*m + 12*
a*b*c^6*f*h + 12*a*b*c^6*d*k - 4*a*b*c^6*e*j))/c^5) + (x*(c^7*e^3 + c^7*d^2
*g + b^7*e*m^2 - a^3*c^4*j^3 + b^2*c^5*e*g^2 - a^3*b^3*c*l^3 + 2*a^4*b*c^2*
l^3 + b^3*c^4*e*h^2 + 3*a^2*c^5*e*j^2 + a^2*c^5*g*h^2 + 2*b^2*c^5*e^2*j + b
^4*c^3*e*j^2 - a^2*c^5*g^2*j + a^3*c^4*e*l^2 + b^2*c^5*d^2*l + b^5*c^2*e*k^
2 + a^2*c^5*f^2*l - a^3*c^4*g*k^2 - 2*b^3*c^4*e^2*l - a^3*c^4*h^2*l + a^4*c
^3*g*m^2 + a^2*b^5*j*m^2 - a^4*c^3*j*l^2 + a^4*c^3*k^2*l - a^3*b^4*l*m^2 -
a^5*c^2*l*m^2 - 2*c^7*d*e*f + a^2*b^2*c^3*j^3 - a*b*c^5*g^3 + a*c^6*e*g^2 +
 b*c^6*e*f^2 - a*c^6*f^2*g - 2*b*c^6*e^2*g - 3*a*c^6*e^2*j - b*c^6*d^2*j -
a*c^6*d^2*l + b^6*c*e*l^2 - a*b^6*g*m^2 - 2*a*b*c^5*e*h^2 + 5*a*b*c^5*e^2*l
 - 6*a*b^5*c*e*m^2 - 2*b^2*c^5*e*f*h - a*b^5*c*g*l^2 - 2*b^2*c^5*d*e*k + 2*
b^3*c^4*d*e*m + 2*b^3*c^4*e*f*k - 2*b^3*c^4*e*g*j + 2*a^2*c^5*d*g*m + 2*a^2
*c^5*d*h*l - 2*a^2*c^5*e*f*m - 2*a^2*c^5*e*g*l - 2*a^2*c^5*e*h*k + 2*a^2*c^
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5*f*g*k - 2*a^2*c^5*f*h*j - 2*a^2*c^5*d*j*k - 2*b^4*c^3*e*f*m + 2*b^4*c^3*e
*g*l - 2*b^4*c^3*e*h*k + 2*b^5*c^2*e*h*m - 2*a^3*c^4*g*h*m - 2*b^5*c^2*e*j*
l - 2*a^3*c^4*d*l*m + 2*a^3*c^4*e*k*m + 2*a^3*c^4*f*j*m - 2*a^3*c^4*f*k*l +
 2*a^3*c^4*g*j*l + 2*a^3*c^4*h*j*k + 2*a^4*c^3*h*l*m - 2*a^4*c^3*j*k*m - 3*
a*b^2*c^4*e*j^2 - a*b^2*c^4*g*h^2 - 4*a*b^3*c^3*e*k^2 + 3*a^2*b*c^4*e*k^2 +
 2*a*b^2*c^4*g^2*j - a*b^3*c^3*g*j^2 - 5*a*b^4*c^2*e*l^2 - a*b^4*c^2*g*k^2
+ a^2*b*c^4*h^2*j - 4*a^3*b*c^3*e*m^2 - 2*a*b^3*c^3*g^2*l + 4*a^2*b*c^4*g^2
*l - 5*a^3*b*c^3*g*l^2 + 5*a^2*b^4*c*g*m^2 - 2*a^3*b*c^3*j*k^2 + a^2*b^4*c*
j*l^2 + 3*a^3*b*c^3*j^2*l - 4*a^3*b^3*c*j*m^2 + 3*a^4*b*c^2*j*m^2 + 3*a^4*b
^2*c*l*m^2 + 2*b*c^6*d*e*h - 2*a*c^6*d*g*h + 2*a*c^6*e*f*h + 2*a*c^6*d*e*k
+ 2*a*c^6*d*f*j - 2*b^6*c*e*k*m + 6*a^2*b^2*c^3*e*l^2 + 3*a^2*b^2*c^3*g*k^2
 + 10*a^2*b^3*c^2*e*m^2 + 4*a^2*b^3*c^2*g*l^2 - 6*a^3*b^2*c^2*g*m^2 + a^2*b
^3*c^2*j*k^2 - 2*a^2*b^3*c^2*j^2*l - a^3*b^2*c^2*j*l^2 - a^3*b^2*c^2*k^2*l
+ 2*a*b*c^5*f*g*h - 4*a*b*c^5*d*e*m - 2*a*b*c^5*d*f*l + 2*a*b*c^5*d*g*k - 4
*a*b*c^5*e*f*k + 2*a*b*c^5*e*g*j + 2*a*b^5*c*g*k*m - 2*a*b^2*c^4*d*g*m + 6*
a*b^2*c^4*e*f*m - 4*a*b^2*c^4*e*g*l + 6*a*b^2*c^4*e*h*k - 2*a*b^2*c^4*f*g*k
 - 8*a*b^3*c^3*e*h*m + 2*a*b^3*c^3*f*g*m + 2*a*b^3*c^3*g*h*k + 6*a^2*b*c^4*
e*h*m - 4*a^2*b*c^4*f*g*m - 4*a^2*b*c^4*g*h*k + 8*a*b^3*c^3*e*j*l + 2*a^2*b
*c^4*d*j*m - 8*a^2*b*c^4*e*j*l + 2*a^2*b*c^4*f*j*k - 2*a*b^4*c^2*g*h*m + 10
*a*b^4*c^2*e*k*m + 2*a*b^4*c^2*g*j*l + 2*a^3*b*c^3*f*l*m + 6*a^3*b*c^3*g*k*
m - 4*a^3*b*c^3*h*j*m + 2*a^3*b*c^3*h*k*l - 2*a^2*b^4*c*j*k*m + 2*a^3*b^3*c
*k*l*m - 4*a^4*b*c^2*k*l*m + 6*a^2*b^2*c^3*g*h*m - 12*a^2*b^2*c^3*e*k*m - 2
*a^2*b^2*c^3*f*j*m - 4*a^2*b^2*c^3*g*j*l - 2*a^2*b^2*c^3*h*j*k - 8*a^2*b^3*
c^2*g*k*m + 2*a^2*b^3*c^2*h*j*m - 2*a^3*b^2*c^2*h*l*m + 6*a^3*b^2*c^2*j*k*m
))/c^5)*root(128*a^2*b^2*c^8*z^4 - 16*a*b^4*c^7*z^4 - 256*a^3*c^9*z^4 + 384
*a^3*b^2*c^6*l*z^3 - 144*a^2*b^4*c^5*l*z^3 + 128*a^2*b^3*c^6*j*z^3 - 128*a^
2*b^2*c^7*g*z^3 + 16*a*b^6*c^4*l*z^3 - 256*a^3*b*c^7*j*z^3 - 16*a*b^5*c^5*j
*z^3 + 16*a*b^4*c^6*g*z^3 - 256*a^4*c^7*l*z^3 + 256*a^3*c^8*g*z^3 - 96*a^4*
b*c^5*j*l*z^2 + 8*a*b^7*c^2*j*l*z^2 + 160*a^4*b*c^5*h*m*z^2 - 8*a*b^7*c^2*h
*m*z^2 + 8*a*b^6*c^3*h*k*z^2 - 8*a*b^6*c^3*g*l*z^2 + 8*a*b^6*c^3*f*m*z^2 +
160*a^3*b*c^6*g*j*z^2 - 96*a^3*b*c^6*f*k*z^2 - 96*a^3*b*c^6*e*l*z^2 - 96*a^
3*b*c^6*d*m*z^2 + 8*a*b^5*c^4*g*j*z^2 - 8*a*b^5*c^4*f*k*z^2 - 8*a*b^5*c^4*e
*l*z^2 - 8*a*b^5*c^4*d*m*z^2 + 8*a*b^4*c^5*e*j*z^2 + 8*a*b^4*c^5*d*k*z^2 +
8*a*b^4*c^5*f*h*z^2 + 32*a^2*b*c^7*e*g*z^2 + 32*a^2*b*c^7*d*h*z^2 - 8*a*b^3
*c^6*e*g*z^2 - 8*a*b^3*c^6*d*h*z^2 + 16*a*b^2*c^7*d*f*z^2 + 8*a*b^8*c*k*m*z
^2 - 304*a^4*b^2*c^4*k*m*z^2 + 264*a^3*b^4*c^3*k*m*z^2 - 80*a^2*b^6*c^2*k*m
*z^2 + 184*a^3*b^3*c^4*j*l*z^2 - 72*a^2*b^5*c^3*j*l*z^2 - 200*a^3*b^3*c^4*h
*m*z^2 + 72*a^2*b^5*c^3*h*m*z^2 - 240*a^3*b^2*c^5*g*l*z^2 + 144*a^3*b^2*c^5
*h*k*z^2 + 144*a^3*b^2*c^5*f*m*z^2 + 80*a^2*b^4*c^4*g*l*z^2 - 64*a^2*b^4*c^
4*h*k*z^2 - 64*a^2*b^4*c^4*f*m*z^2 - 72*a^2*b^3*c^5*g*j*z^2 + 56*a^2*b^3*c^
5*f*k*z^2 + 56*a^2*b^3*c^5*e*l*z^2 + 56*a^2*b^3*c^5*d*m*z^2 - 48*a^2*b^2*c^
6*e*j*z^2 - 48*a^2*b^2*c^6*d*k*z^2 - 48*a^2*b^2*c^6*f*h*z^2 - 112*a^5*b*c^4
*m^2*z^2 + 44*a^2*b^7*c*m^2*z^2 + 80*a^4*b*c^5*k^2*z^2 - 4*a*b^7*c^2*k^2*z^
2 - 4*a*b^6*c^3*j^2*z^2 - 48*a^3*b*c^6*h^2*z^2 - 4*a*b^5*c^4*h^2*z^2 - 4*a*
b^4*c^5*g^2*z^2 + 16*a^2*b*c^7*f^2*z^2 - 4*a*b^3*c^6*f^2*z^2 + 8*a*b^2*c^7*
e^2*z^2 + 64*a^5*c^5*k*m*z^2 + 192*a^4*c^6*g*l*z^2 - 64*a^4*c^6*h*k*z^2 - 6
4*a^4*c^6*f*m*z^2 + 64*a^3*c^7*e*j*z^2 + 64*a^3*c^7*d*k*z^2 + 64*a^3*c^7*f*
h*z^2 - 4*a*b^8*c*l^2*z^2 - 64*a^2*c^8*d*f*z^2 + 16*a*b*c^8*d^2*z^2 + 252*a
^4*b^3*c^3*m^2*z^2 - 168*a^3*b^5*c^2*m^2*z^2 + 168*a^4*b^2*c^4*l^2*z^2 - 13
2*a^3*b^4*c^3*l^2*z^2 + 40*a^2*b^6*c^2*l^2*z^2 - 100*a^3*b^3*c^4*k^2*z^2 +
36*a^2*b^5*c^3*k^2*z^2 - 56*a^3*b^2*c^5*j^2*z^2 + 32*a^2*b^4*c^4*j^2*z^2 +
28*a^2*b^3*c^5*h^2*z^2 + 40*a^2*b^2*c^6*g^2*z^2 - 96*a^5*c^5*l^2*z^2 - 32*a
^4*c^6*j^2*z^2 - 96*a^3*c^7*g^2*z^2 - 32*a^2*c^8*e^2*z^2 - 4*b^3*c^7*d^2*z^
2 - 4*a*b^9*m^2*z^2 + 32*a^5*b*c^3*h*l*m*z + 8*a^2*b^6*c*g*k*m*z + 96*a^4*b
*c^4*e*k*m*z + 32*a^4*b*c^4*h*j*k*z + 32*a^4*b*c^4*g*j*l*z + 32*a^4*b*c^4*f
*j*m*z - 64*a^4*b*c^4*g*h*m*z - 8*a*b^6*c^2*e*j*l*z + 8*a*b^6*c^2*e*h*m*z -
 64*a^3*b*c^5*e*h*k*z + 64*a^3*b*c^5*e*g*l*z - 64*a^3*b*c^5*e*f*m*z + 32*a^
3*b*c^5*f*g*k*z - 32*a^3*b*c^5*d*h*l*z + 32*a^3*b*c^5*d*g*m*z - 8*a*b^5*c^3
*e*h*k*z + 8*a*b^5*c^3*e*g*l*z - 8*a*b^5*c^3*e*f*m*z - 8*a*b^4*c^4*e*g*j*z

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+ 8*a*b^4*c^4*e*f*k*z - 8*a*b^4*c^4*d*f*l*z + 8*a*b^4*c^4*d*e*m*z - 32*a^2*
b*c^6*d*f*j*z + 32*a^2*b*c^6*d*e*k*z + 8*a*b^3*c^5*d*f*j*z - 8*a*b^3*c^5*d*
e*k*z + 32*a^2*b*c^6*e*f*h*z - 8*a*b^3*c^5*e*f*h*z - 8*a*b^2*c^6*d*f*g*z +
8*a*b^2*c^6*d*e*h*z - 8*a*b^7*c*e*k*m*z - 40*a^5*b^2*c^2*k*l*m*z + 48*a^4*b
^3*c^2*j*k*m*z - 8*a^4*b^3*c^2*h*l*m*z + 104*a^4*b^2*c^3*g*k*m*z - 56*a^3*b
^4*c^2*g*k*m*z - 40*a^4*b^2*c^3*h*j*m*z + 8*a^4*b^2*c^3*h*k*l*z + 8*a^4*b^2
*c^3*f*l*m*z + 8*a^3*b^4*c^2*h*j*m*z - 152*a^3*b^3*c^3*e*k*m*z + 64*a^2*b^5
*c^2*e*k*m*z - 40*a^3*b^3*c^3*g*j*l*z - 8*a^3*b^3*c^3*h*j*k*z - 8*a^3*b^3*c
^3*f*j*m*z + 8*a^2*b^5*c^2*g*j*l*z + 48*a^3*b^3*c^3*g*h*m*z - 8*a^2*b^5*c^2
*g*h*m*z - 104*a^3*b^2*c^4*e*j*l*z + 56*a^2*b^4*c^3*e*j*l*z + 8*a^3*b^2*c^4
*f*j*k*z - 8*a^3*b^2*c^4*d*k*l*z + 8*a^3*b^2*c^4*d*j*m*z + 104*a^3*b^2*c^4*
e*h*m*z - 56*a^2*b^4*c^3*e*h*m*z - 40*a^3*b^2*c^4*g*h*k*z - 40*a^3*b^2*c^4*
f*g*m*z - 8*a^3*b^2*c^4*f*h*l*z + 8*a^2*b^4*c^3*g*h*k*z + 8*a^2*b^4*c^3*f*g
*m*z + 48*a^2*b^3*c^4*e*h*k*z - 48*a^2*b^3*c^4*e*g*l*z + 48*a^2*b^3*c^4*e*f
*m*z - 8*a^2*b^3*c^4*f*g*k*z + 8*a^2*b^3*c^4*d*h*l*z - 8*a^2*b^3*c^4*d*g*m*
z + 40*a^2*b^2*c^5*e*g*j*z - 40*a^2*b^2*c^5*e*f*k*z + 40*a^2*b^2*c^5*d*f*l*
z - 40*a^2*b^2*c^5*d*e*m*z - 8*a^2*b^2*c^5*d*h*j*z + 8*a^2*b^2*c^5*d*g*k*z
+ 8*a^2*b^2*c^5*f*g*h*z + 8*a^4*b^4*c*k*l*m*z - 64*a^5*b*c^3*j*k*m*z - 8*a^
3*b^5*c*j*k*m*z - 32*a^6*b*c^2*l*m^2*z + 24*a^5*b^3*c*l*m^2*z - 28*a^4*b^4*
c*j*m^2*z + 16*a^5*b*c^3*k^2*l*z + 4*a^3*b^5*c*j*l^2*z + 48*a^5*b*c^3*g*m^2
*z + 32*a^3*b^5*c*g*m^2*z - 4*a^2*b^6*c*g*l^2*z - 36*a^2*b^6*c*e*m^2*z - 32
*a^4*b*c^4*g*k^2*z - 16*a^3*b*c^5*f^2*l*z - 48*a^4*b*c^4*e*l^2*z - 32*a^3*b
*c^5*g^2*j*z - 4*a*b^4*c^4*e^2*l*z + 32*a^2*b*c^6*d^2*l*z - 24*a*b^3*c^5*d^
2*l*z + 4*a*b^6*c^2*e*k^2*z + 32*a^3*b*c^5*e*j^2*z + 16*a^3*b*c^5*g*h^2*z -
 16*a^2*b*c^6*e^2*j*z + 4*a*b^5*c^3*e*j^2*z + 4*a*b^3*c^5*e^2*j*z + 20*a*b^
2*c^6*d^2*j*z + 4*a*b^4*c^4*e*h^2*z - 16*a^2*b*c^6*e*g^2*z + 4*a*b^3*c^5*e*
g^2*z - 4*a*b^2*c^6*e^2*g*z + 4*a*b^2*c^6*e*f^2*z + 32*a^6*c^3*k*l*m*z - 32
*a^5*c^4*h*k*l*z + 32*a^5*c^4*h*j*m*z - 32*a^5*c^4*g*k*m*z - 32*a^5*c^4*f*l
*m*z - 32*a^4*c^5*f*j*k*z + 32*a^4*c^5*e*j*l*z + 32*a^4*c^5*d*k*l*z - 32*a^
4*c^5*d*j*m*z + 32*a^4*c^5*g*h*k*z + 32*a^4*c^5*f*h*l*z + 32*a^4*c^5*f*g*m*
z - 32*a^4*c^5*e*h*m*z - 32*a^3*c^6*e*g*j*z + 32*a^3*c^6*e*f*k*z + 32*a^3*c
^6*d*h*j*z - 32*a^3*c^6*d*g*k*z - 32*a^3*c^6*d*f*l*z + 32*a^3*c^6*d*e*m*z -
 32*a^3*c^6*f*g*h*z + 4*a*b^7*c*e*l^2*z + 32*a^2*c^7*d*f*g*z - 32*a^2*c^7*d
*e*h*z - 16*a*b*c^7*d^2*g*z + 52*a^5*b^2*c^2*j*m^2*z - 4*a^4*b^3*c^2*k^2*l*
z + 36*a^4*b^2*c^3*j^2*l*z - 16*a^4*b^3*c^2*j*l^2*z - 8*a^3*b^4*c^2*j^2*l*z
 - 20*a^4*b^2*c^3*j*k^2*z + 4*a^3*b^4*c^2*j*k^2*z - 76*a^4*b^3*c^2*g*m^2*z
- 60*a^4*b^2*c^3*g*l^2*z + 44*a^3*b^2*c^4*g^2*l*z + 28*a^3*b^4*c^2*g*l^2*z
- 8*a^2*b^4*c^3*g^2*l*z + 104*a^3*b^4*c^2*e*m^2*z - 100*a^4*b^2*c^3*e*m^2*z
 + 24*a^3*b^3*c^3*g*k^2*z + 4*a^3*b^2*c^4*h^2*j*z - 4*a^2*b^5*c^2*g*k^2*z +
 4*a^2*b^3*c^4*f^2*l*z + 76*a^3*b^3*c^3*e*l^2*z - 32*a^2*b^5*c^2*e*l^2*z +
20*a^2*b^2*c^5*e^2*l*z + 12*a^3*b^2*c^4*g*j^2*z + 8*a^2*b^3*c^4*g^2*j*z - 4
*a^2*b^4*c^3*g*j^2*z + 52*a^3*b^2*c^4*e*k^2*z - 28*a^2*b^4*c^3*e*k^2*z - 4*
a^2*b^2*c^5*f^2*j*z - 24*a^2*b^3*c^4*e*j^2*z - 4*a^2*b^3*c^4*g*h^2*z - 20*a
^2*b^2*c^5*e*h^2*z + 20*a^5*b^2*c^2*l^3*z + 4*a^3*b^3*c^3*j^3*z - 4*a^2*b^2
*c^5*g^3*z - 4*a^4*b^5*l*m^2*z - 16*a^6*c^3*j*m^2*z - 16*a^5*c^4*j^2*l*z +
4*a^3*b^6*j*m^2*z + 16*a^5*c^4*j*k^2*z + 48*a^5*c^4*g*l^2*z - 48*a^4*c^5*g^
2*l*z - 4*a^2*b^7*g*m^2*z + 16*a^5*c^4*e*m^2*z - 16*a^4*c^5*h^2*j*z + 16*a^
4*c^5*g*j^2*z - 16*a^3*c^6*e^2*l*z + 4*b^5*c^4*d^2*l*z - 16*a^4*c^5*e*k^2*z
 + 16*a^3*c^6*f^2*j*z - 4*b^4*c^5*d^2*j*z - 16*a^2*c^7*d^2*j*z - 4*a^4*b^4*
c*l^3*z + 16*a^3*c^6*e*h^2*z - 16*a^4*b*c^4*j^3*z + 16*a^2*c^7*e^2*g*z + 4*
b^3*c^6*d^2*g*z - 16*a^2*c^7*e*f^2*z - 4*b^2*c^7*d^2*e*z + 4*a*b^8*e*m^2*z
+ 16*a*c^8*d^2*e*z - 16*a^6*c^3*l^3*z + 16*a^3*c^6*g^3*z + 4*a^5*b^2*c*g*k*
l*m + 12*a^5*b*c^2*g*j*k*m + 12*a^5*b*c^2*e*k*l*m - 4*a^5*b*c^2*h*j*k*l - 4
*a^5*b*c^2*f*j*l*m - 4*a^4*b^3*c*g*j*k*m - 4*a^4*b^3*c*e*k*l*m - 4*a^5*b*c^
2*g*h*l*m + 4*a^3*b^4*c*e*j*k*m - 4*a^3*b^4*c*f*h*k*m + 12*a^4*b*c^3*d*j*k*
l - 20*a^4*b*c^3*e*g*k*m + 12*a^4*b*c^3*f*h*j*l + 12*a^4*b*c^3*e*h*j*m + 12
*a^4*b*c^3*d*h*k*m - 4*a^4*b*c^3*g*h*j*k - 4*a^4*b*c^3*f*g*k*l - 4*a^4*b*c^
3*f*g*j*m - 4*a^4*b*c^3*e*h*k*l - 4*a^4*b*c^3*e*f*l*m - 4*a^4*b*c^3*d*g*l*m
 - 4*a^2*b^5*c*e*g*k*m + 4*a^2*b^5*c*d*h*k*m - 20*a^3*b*c^4*d*f*j*l - 4*a^3
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*b*c^4*e*f*j*k - 4*a^3*b*c^4*d*g*j*k - 4*a^3*b*c^4*d*e*k*l - 4*a^3*b*c^4*d*
e*j*m - 4*a*b^5*c^2*d*f*j*l + 12*a^3*b*c^4*e*g*h*k + 12*a^3*b*c^4*e*f*g*m +
 12*a^3*b*c^4*d*g*h*l + 12*a^3*b*c^4*d*f*h*m - 4*a^3*b*c^4*f*g*h*j - 4*a^3*
b*c^4*e*f*h*l + 4*a*b^5*c^2*d*f*h*m - 4*a*b^4*c^3*d*f*h*k + 4*a*b^4*c^3*d*f
*g*l + 12*a^2*b*c^5*d*f*g*j + 12*a^2*b*c^5*d*e*f*l - 4*a^2*b*c^5*d*e*h*j -
4*a^2*b*c^5*d*e*g*k - 4*a*b^3*c^4*d*f*g*j - 4*a*b^3*c^4*d*e*f*l - 4*a^2*b*c
^5*e*f*g*h + 4*a*b^2*c^5*d*e*f*j - 4*a^6*b*c*j*k*l*m - 4*a*b^6*c*d*f*k*m -
4*a*b*c^6*d*e*f*g - 16*a^4*b^2*c^2*e*j*k*m + 4*a^4*b^2*c^2*f*j*k*l + 4*a^4*
b^2*c^2*d*j*l*m + 12*a^4*b^2*c^2*f*h*k*m + 4*a^4*b^2*c^2*g*h*j*m + 4*a^4*b^
2*c^2*e*h*l*m - 4*a^3*b^3*c^2*d*j*k*l + 20*a^3*b^3*c^2*e*g*k*m - 16*a^3*b^3
*c^2*d*h*k*m - 4*a^3*b^3*c^2*f*h*j*l - 4*a^3*b^3*c^2*e*h*j*m - 40*a^3*b^2*c
^3*d*f*k*m + 24*a^2*b^4*c^2*d*f*k*m - 16*a^3*b^2*c^3*d*h*j*l + 12*a^3*b^2*c
^3*e*g*j*l + 4*a^3*b^2*c^3*e*h*j*k + 4*a^3*b^2*c^3*e*f*j*m + 4*a^3*b^2*c^3*
d*g*k*l - 4*a^2*b^4*c^2*e*g*j*l + 4*a^2*b^4*c^2*d*h*j*l - 16*a^3*b^2*c^3*e*
g*h*m + 4*a^3*b^2*c^3*f*g*h*l + 4*a^2*b^4*c^2*e*g*h*m + 20*a^2*b^3*c^3*d*f*
j*l - 16*a^2*b^3*c^3*d*f*h*m - 4*a^2*b^3*c^3*e*g*h*k - 4*a^2*b^3*c^3*e*f*g*
m - 4*a^2*b^3*c^3*d*g*h*l - 16*a^2*b^2*c^4*d*f*g*l + 12*a^2*b^2*c^4*d*f*h*k
 + 4*a^2*b^2*c^4*e*f*g*k + 4*a^2*b^2*c^4*d*g*h*j + 4*a^2*b^2*c^4*d*e*h*l +
4*a^2*b^2*c^4*d*e*g*m + 2*a^5*b^2*c*j^2*k*m - 4*a^5*b^2*c*h*k^2*m - 2*a^5*b
*c^2*h^2*k*m + 2*a^4*b^3*c*h^2*k*m + 2*a^5*b^2*c*h*k*l^2 + 2*a^5*b^2*c*f*l^
2*m - 2*a^5*b*c^2*h*j^2*m + 2*a^3*b^4*c*g^2*k*m + 14*a^4*b*c^3*f^2*k*m - 10
*a^5*b*c^2*f*k^2*m - 8*a^5*b^2*c*g*j*m^2 - 8*a^5*b^2*c*e*l*m^2 + 4*a^5*b^2*
c*f*k*m^2 + 4*a^4*b^3*c*f*k^2*m - 2*a^5*b*c^2*g*k^2*l + 2*a^2*b^5*c*f^2*k*m
 + 6*a^5*b*c^2*f*k*l^2 + 6*a^5*b*c^2*d*l^2*m - 2*a^5*b*c^2*g*j*l^2 + 2*a^4*
b^3*c*g*j*l^2 - 2*a^4*b^3*c*f*k*l^2 - 2*a^4*b^3*c*d*l^2*m - 2*a^4*b*c^3*g^2
*j*l - 14*a*b^5*c^2*d^2*k*m - 10*a^5*b*c^2*e*j*m^2 + 10*a^4*b^3*c*e*j*m^2 -
 10*a^3*b*c^4*d^2*k*m - 6*a^4*b^3*c*d*k*m^2 + 6*a^4*b*c^3*g^2*h*m - 4*a^3*b
^4*c*d*k^2*m - 2*a^5*b*c^2*d*k*m^2 + 14*a^5*b*c^2*f*h*m^2 + 14*a^3*b*c^4*e^
2*j*l - 10*a^4*b^3*c*f*h*m^2 - 10*a^4*b*c^3*f*h^2*m - 10*a^4*b*c^3*e*j^2*l
- 2*a^4*b*c^3*g*h^2*l - 2*a^4*b*c^3*f*j^2*k - 2*a^4*b*c^3*d*j^2*m - 2*a^3*b
^4*c*e*j*l^2 + 2*a^3*b^4*c*d*k*l^2 + 2*a*b^5*c^2*e^2*j*l - 12*a*b^4*c^3*d^2
*j*l - 10*a^3*b*c^4*e^2*h*m + 6*a^4*b*c^3*e*j*k^2 + 2*a^3*b^4*c*f*h*l^2 - 2
*a*b^5*c^2*e^2*h*m - 12*a^3*b^4*c*e*g*m^2 + 12*a^3*b^4*c*d*h*m^2 + 12*a*b^4
*c^3*d^2*h*m + 6*a^3*b*c^4*f^2*g*l - 2*a^4*b*c^3*f*h*k^2 - 2*a^3*b*c^4*f^2*
h*k + 14*a^4*b*c^3*e*g*l^2 - 10*a^4*b*c^3*d*h*l^2 - 10*a^3*b*c^4*e*g^2*l -
2*a^3*b*c^4*f*g^2*k - 2*a^3*b*c^4*d*g^2*m + 2*a^2*b^5*c*e*g*l^2 - 2*a^2*b^5
*c*d*h*l^2 + 2*a*b^4*c^3*e^2*h*k - 2*a*b^4*c^3*e^2*g*l + 2*a*b^4*c^3*e^2*f*
m - 14*a^2*b^5*c*d*f*m^2 + 14*a^2*b*c^5*d^2*h*k - 10*a^4*b*c^3*d*f*m^2 - 10
*a^3*b*c^4*d*h^2*k - 10*a^2*b*c^5*d^2*g*l - 10*a*b^3*c^4*d^2*h*k + 10*a*b^3
*c^4*d^2*g*l - 6*a*b^3*c^4*d^2*f*m - 4*a*b^4*c^3*d*f^2*m - 2*a^3*b*c^4*e*h^
2*j - 2*a^2*b*c^5*d^2*f*m + 6*a^3*b*c^4*d*h*j^2 + 6*a^2*b*c^5*e^2*f*k + 6*a
^2*b*c^5*d*e^2*m - 2*a^3*b*c^4*e*g*j^2 - 2*a^2*b*c^5*e^2*g*j + 2*a*b^3*c^4*
e^2*g*j - 2*a*b^3*c^4*e^2*f*k - 2*a*b^3*c^4*d*e^2*m + 14*a^3*b*c^4*d*f*k^2
- 10*a^2*b*c^5*d*f^2*k - 8*a*b^2*c^5*d^2*g*j - 8*a*b^2*c^5*d^2*e*l + 4*a*b^
3*c^4*d*f^2*k + 4*a*b^2*c^5*d^2*f*k - 2*a^2*b*c^5*e*f^2*j + 2*a*b^5*c^2*d*f
*k^2 + 2*a*b^4*c^3*d*f*j^2 + 2*a*b^2*c^5*d*e^2*k - 2*a^2*b*c^5*d*g^2*h + 2*
a*b^2*c^5*e^2*f*h - 4*a*b^2*c^5*d*f^2*h - 2*a^2*b*c^5*d*f*h^2 + 2*a*b^3*c^4
*d*f*h^2 + 2*a*b^2*c^5*d*f*g^2 + 8*a^6*c^2*h*j*l*m - 8*a^6*c^2*g*k*l*m - 8*
a^5*c^3*f*j*k*l + 8*a^5*c^3*e*j*k*m - 8*a^5*c^3*d*j*l*m + 8*a^5*c^3*g*h*k*l
 - 8*a^5*c^3*g*h*j*m - 8*a^5*c^3*f*h*k*m + 8*a^5*c^3*f*g*l*m - 8*a^5*c^3*e*
h*l*m - 2*a^6*b*c*h*l^2*m + 8*a^4*c^4*f*g*j*k - 8*a^4*c^4*e*h*j*k - 8*a^4*c
^4*e*g*j*l + 8*a^4*c^4*e*f*k*l - 8*a^4*c^4*e*f*j*m + 8*a^4*c^4*d*h*j*l - 8*
a^4*c^4*d*g*k*l + 8*a^4*c^4*d*g*j*m + 8*a^4*c^4*d*f*k*m + 8*a^4*c^4*d*e*l*m
 + 6*a^6*b*c*g*l*m^2 - 2*a^6*b*c*h*k*m^2 - 8*a^4*c^4*f*g*h*l + 8*a^4*c^4*e*
g*h*m + 2*a*b^6*c*e^2*k*m + 8*a^3*c^5*d*e*j*k + 8*a^3*c^5*e*f*h*j - 8*a^3*c
^5*e*f*g*k - 8*a^3*c^5*d*g*h*j - 8*a^3*c^5*d*f*h*k + 8*a^3*c^5*d*f*g*l - 8*
a^3*c^5*d*e*h*l - 8*a^3*c^5*d*e*g*m - 8*a^2*c^6*d*e*f*j + 8*a^2*c^6*d*e*g*h
 + 2*a*b^6*c*d*f*l^2 + 6*a*b*c^6*d^2*e*j - 2*a*b*c^6*d^2*f*h - 2*a*b*c^6*d*
e^2*h - 8*a^4*b^2*c^2*g^2*k*m - 10*a^3*b^3*c^2*f^2*k*m + 2*a^4*b^2*c^2*h^2*
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j*l + 18*a^3*b^2*c^3*e^2*k*m - 12*a^2*b^4*c^2*e^2*k*m - 4*a^4*b^2*c^2*g*j^2
*l + 2*a^3*b^3*c^2*g^2*j*l + 28*a^2*b^3*c^3*d^2*k*m + 14*a^4*b^2*c^2*d*k^2*
m - 8*a^3*b^2*c^3*f^2*j*l + 2*a^4*b^2*c^2*g*j*k^2 + 2*a^4*b^2*c^2*e*k^2*l -
 2*a^3*b^3*c^2*g^2*h*m + 2*a^2*b^4*c^2*f^2*j*l - 10*a^2*b^3*c^3*e^2*j*l - 8
*a^4*b^2*c^2*d*k*l^2 + 4*a^4*b^2*c^2*e*j*l^2 + 4*a^3*b^3*c^2*f*h^2*m + 4*a^
3*b^3*c^2*e*j^2*l + 4*a^3*b^2*c^3*f^2*h*m - 2*a^2*b^4*c^2*f^2*h*m + 18*a^2*
b^2*c^4*d^2*j*l + 10*a^2*b^3*c^3*e^2*h*m - 8*a^4*b^2*c^2*f*h*l^2 - 2*a^3*b^
3*c^2*e*j*k^2 + 2*a^3*b^2*c^3*g^2*h*k + 2*a^3*b^2*c^3*f*g^2*m - 22*a^4*b^2*
c^2*d*h*m^2 - 22*a^2*b^2*c^4*d^2*h*m + 18*a^4*b^2*c^2*e*g*m^2 + 16*a^3*b^2*
c^3*d*h^2*m - 4*a^3*b^2*c^3*f*h^2*k - 4*a^2*b^4*c^2*d*h^2*m + 2*a^3*b^3*c^2
*f*h*k^2 + 2*a^3*b^2*c^3*d*j^2*k + 2*a^2*b^3*c^3*f^2*h*k - 2*a^2*b^3*c^3*f^
2*g*l - 10*a^3*b^3*c^2*e*g*l^2 + 10*a^3*b^3*c^2*d*h*l^2 - 8*a^2*b^2*c^4*e^2
*h*k - 8*a^2*b^2*c^4*e^2*f*m + 4*a^2*b^3*c^3*e*g^2*l + 4*a^2*b^2*c^4*e^2*g*
l + 2*a^3*b^2*c^3*f*h*j^2 + 28*a^3*b^3*c^2*d*f*m^2 + 14*a^2*b^2*c^4*d*f^2*m
 - 8*a^3*b^2*c^3*e*g*k^2 + 4*a^3*b^2*c^3*d*h*k^2 + 4*a^2*b^3*c^3*d*h^2*k +
2*a^2*b^4*c^2*e*g*k^2 - 2*a^2*b^4*c^2*d*h*k^2 + 2*a^2*b^2*c^4*f^2*g*j + 2*a
^2*b^2*c^4*e*f^2*l + 18*a^3*b^2*c^3*d*f*l^2 - 12*a^2*b^4*c^2*d*f*l^2 - 4*a^
2*b^2*c^4*e*g^2*j + 2*a^2*b^3*c^3*e*g*j^2 - 2*a^2*b^3*c^3*d*h*j^2 - 10*a^2*
b^3*c^3*d*f*k^2 - 8*a^2*b^2*c^4*d*f*j^2 + 2*a^2*b^2*c^4*e*g*h^2 + 4*a^5*b^2
*c*h^2*m^2 - 2*a^4*b^2*c^2*h^3*m - 5*a^5*b*c^2*g^2*m^2 + 5*a^4*b^3*c*g^2*m^
2 + 3*a^5*b*c^2*h^2*l^2 + 6*a^3*b^4*c*f^2*m^2 - 2*a^3*b^2*c^3*g^3*l + 2*a^2
*b^3*c^3*f^3*m + 7*a^4*b*c^3*e^2*m^2 + 7*a^2*b^5*c*e^2*m^2 - 5*a^4*b*c^3*f^
2*l^2 + 3*a^4*b*c^3*g^2*k^2 - 2*a^4*b^2*c^2*f*k^3 - 2*a^2*b^2*c^4*f^3*k + 7
*a^3*b*c^4*d^2*l^2 + 7*a*b^5*c^2*d^2*l^2 - 5*a^3*b*c^4*e^2*k^2 + 3*a^3*b*c^
4*f^2*j^2 + 6*a*b^4*c^3*d^2*k^2 + 2*a^3*b^3*c^2*d*k^3 - 2*a^3*b^2*c^3*e*j^3
 - 5*a^2*b*c^5*d^2*j^2 + 5*a*b^3*c^4*d^2*j^2 + 3*a^2*b*c^5*e^2*h^2 + 4*a*b^
2*c^5*d^2*h^2 - 2*a^2*b^2*c^4*d*h^3 - 4*a^6*c^2*j^2*k*m + 2*a^6*b^2*j*l*m^2
 + 4*a^6*c^2*j*k^2*l + 4*a^6*c^2*h*k^2*m - 4*a^6*c^2*h*k*l^2 - 4*a^6*c^2*f*
l^2*m + 4*a^5*c^3*g^2*k*m + 2*a^5*b^3*h*k*m^2 - 2*a^5*b^3*g*l*m^2 + 4*a^6*c
^2*g*j*m^2 + 4*a^6*c^2*f*k*m^2 + 4*a^6*c^2*e*l*m^2 - 4*a^5*c^3*h^2*j*l + 4*
a^5*c^3*h*j^2*k + 4*a^5*c^3*g*j^2*l + 4*a^5*c^3*f*j^2*m - 4*a^4*c^4*e^2*k*m
 + 2*a^4*b^4*g*j*m^2 - 2*a^4*b^4*f*k*m^2 + 2*a^4*b^4*e*l*m^2 - 4*a^5*c^3*g*
j*k^2 - 4*a^5*c^3*e*k^2*l - 4*a^5*c^3*d*k^2*m + 4*a^4*c^4*f^2*j*l + 4*a^5*c
^3*e*j*l^2 + 4*a^5*c^3*d*k*l^2 + 4*a^4*c^4*f^2*h*m + 2*b^6*c^2*d^2*j*l - 2*
a^3*b^5*e*j*m^2 + 2*a^3*b^5*d*k*m^2 + 4*a^5*c^3*f*h*l^2 - 4*a^4*c^4*g^2*h*k
 - 4*a^4*c^4*f*g^2*m - 4*a^3*c^5*d^2*j*l - 2*b^6*c^2*d^2*h*m + 2*a^3*b^5*f*
h*m^2 + 12*a^5*c^3*d*h*m^2 - 12*a^4*c^4*d*h^2*m + 12*a^3*c^5*d^2*h*m - 4*a^
5*c^3*e*g*m^2 + 4*a^4*c^4*g*h^2*j + 4*a^4*c^4*f*h^2*k + 4*a^4*c^4*e*h^2*l -
 4*a^4*c^4*d*j^2*k + 3*a^6*b*c*j^2*m^2 - 4*a^4*c^4*f*h*j^2 + 4*a^3*c^5*e^2*
h*k + 4*a^3*c^5*e^2*g*l + 4*a^3*c^5*e^2*f*m + 2*b^5*c^3*d^2*h*k - 2*b^5*c^3
*d^2*g*l + 2*b^5*c^3*d^2*f*m + 2*a^5*b*c^2*j^3*l + 2*a^2*b^6*e*g*m^2 - 2*a^
2*b^6*d*h*m^2 + 4*a^4*c^4*e*g*k^2 + 4*a^4*c^4*d*h*k^2 - 4*a^3*c^5*f^2*g*j -
 4*a^3*c^5*e*f^2*l - 4*a^3*c^5*d*f^2*m - 4*a^4*c^4*d*f*l^2 + 4*a^3*c^5*e*g^
2*j + 4*a^3*c^5*d*g^2*k + 2*b^4*c^4*d^2*g*j - 2*b^4*c^4*d^2*f*k + 2*b^4*c^4
*d^2*e*l - 6*a^3*b*c^4*f^3*m + 4*a^3*c^5*f*g^2*h + 4*a^2*c^6*d^2*g*j + 4*a^
2*c^6*d^2*f*k + 4*a^2*c^6*d^2*e*l - 2*a^5*b^2*c*g*l^3 + 2*a^5*b*c^2*h*k^3 +
 2*a^4*b*c^3*h^3*k - 4*a^3*c^5*e*g*h^2 + 4*a^3*c^5*d*f*j^2 - 4*a^2*c^6*d*e^
2*k - 2*b^3*c^5*d^2*e*j + 8*a^5*b^2*c*d*m^3 + 8*a*b^6*c*d^2*m^2 + 8*a*b^2*c
^5*d^3*m - 6*a^5*b*c^2*e*l^3 - 6*a^2*b*c^5*e^3*l - 4*a^2*c^6*e^2*f*h + 2*b^
3*c^5*d^2*f*h + 2*a^4*b^3*c*e*l^3 + 2*a^4*b*c^3*g*j^3 + 2*a^3*b*c^4*g^3*j +
 2*a*b^3*c^4*e^3*l + 4*a^2*c^6*e*f^2*g + 4*a^2*c^6*d*f^2*h - 6*a^4*b*c^3*d*
k^3 - 4*a^2*c^6*d*f*g^2 + 2*b^2*c^6*d^2*e*g - 2*a*b^2*c^5*e^3*j + 2*a^3*b*c
^4*f*h^3 + 2*a^2*b*c^5*f^3*h + 2*a^2*b*c^5*e*g^3 + 3*a*b*c^6*d^2*g^2 - 9*a^
4*b^2*c^2*f^2*m^2 + 4*a^4*b^2*c^2*g^2*l^2 - 14*a^3*b^3*c^2*e^2*m^2 + 5*a^3*
b^3*c^2*f^2*l^2 - 20*a^2*b^4*c^2*d^2*m^2 + 16*a^3*b^2*c^3*d^2*m^2 - 9*a^3*b
^2*c^3*e^2*l^2 + 6*a^2*b^4*c^2*e^2*l^2 + 4*a^3*b^2*c^3*f^2*k^2 - 14*a^2*b^3
*c^3*d^2*l^2 + 5*a^2*b^3*c^3*e^2*k^2 - 9*a^2*b^2*c^4*d^2*k^2 + 4*a^2*b^2*c^
4*e^2*j^2 + 4*a^7*c*k*l^2*m - 4*a^7*c*j*l*m^2 + 2*b^7*c*d^2*k*m + 2*a^6*b*c
*k^3*m + 2*a^6*b*c*j*l^3 + 2*a*b^7*d*f*m^2 - 6*a^6*b*c*f*m^3 - 6*a*b*c^6*d^
```

```
3*k - 4*a*c^7*d^2*e*g + 4*a*c^7*d*e^2*f + 2*a*b*c^6*e^3*g + 2*a*b*c^6*d*f^3
 - a^5*b^2*c*j^2*l^2 - a^5*b*c^2*j^2*k^2 - a^4*b^3*c*h^2*l^2 - a^3*b^4*c*g^
2*l^2 - a^4*b*c^3*h^2*j^2 - a^2*b^5*c*f^2*l^2 - a*b^5*c^2*e^2*k^2 - a^3*b*c
^4*g^2*h^2 - a*b^4*c^3*e^2*j^2 - a^2*b*c^5*f^2*g^2 - a*b^3*c^4*e^2*h^2 - a*
b^2*c^5*e^2*g^2 + 2*a^7*b*k*m^3 + 4*a^7*c*h*m^3 + 4*a*c^7*d^3*h + 2*b*c^7*d
^3*f - a^6*b*c*k^2*l^2 - 2*a^6*c^2*j^2*l^2 - 6*a^6*c^2*h^2*m^2 - a*b^6*c*e^
2*l^2 - 6*a^5*c^3*g^2*l^2 - 2*a^5*c^3*h^2*k^2 - 2*a^5*c^3*f^2*m^2 - 6*a^4*c
^4*f^2*k^2 - 6*a^4*c^4*d^2*m^2 - 2*a^4*c^4*g^2*j^2 - 2*a^4*c^4*e^2*l^2 - 6*
a^3*c^5*e^2*j^2 - 2*a^3*c^5*d^2*k^2 - 2*a^3*c^5*f^2*h^2 - a*b*c^6*e^2*f^2 -
 6*a^2*c^6*d^2*h^2 - 2*a^2*c^6*e^2*g^2 - a^4*b^2*c^2*h^2*k^2 - a^3*b^3*c^2*
g^2*k^2 - a^3*b^2*c^3*g^2*j^2 - a^2*b^4*c^2*f^2*k^2 - a^2*b^3*c^3*f^2*j^2 -
 a^2*b^2*c^4*f^2*h^2 - 2*a^7*c*k^2*m^2 + 4*a^5*c^3*h^3*m - 2*a^6*b^2*h*m^3
+ 4*a^6*c^2*g*l^3 + 4*a^4*c^4*g^3*l - 2*b^4*c^4*d^3*m + 2*a^5*b^3*f*m^3 - 4
*a^6*c^2*d*m^3 + 4*a^5*c^3*f*k^3 + 4*a^3*c^5*f^3*k - 4*a^2*c^6*d^3*m + 2*b^
3*c^5*d^3*k - 2*a^4*b^4*d*m^3 + 4*a^4*c^4*e*j^3 + 4*a^2*c^6*e^3*j - 2*b^2*c
^6*d^3*h + 4*a^3*c^5*d*h^3 - 2*a*c^7*d^2*f^2 - a^6*b^2*k^2*m^2 - a^5*b^3*j^
2*m^2 - a^4*b^4*h^2*m^2 - a^3*b^5*g^2*m^2 - a^2*b^6*f^2*m^2 - b^6*c^2*d^2*k
^2 - b^5*c^3*d^2*j^2 - b^4*c^4*d^2*h^2 - b^3*c^5*d^2*g^2 - b^2*c^6*d^2*f^2
- a^7*b*l^2*m^2 - b^7*c*d^2*l^2 - a*b^7*e^2*m^2 - b*c^7*d^2*e^2 - b^8*d^2*m
^2 - a^6*c^2*k^4 - a^5*c^3*j^4 - a^4*c^4*h^4 - a^3*c^5*g^4 - a^2*c^6*f^4 -
a^7*c*l^4 - a*c^7*e^4 - a^8*m^4 - c^8*d^4, z, k1), k1, 1, 4) + (l*x^4)/(4*c
) + (m*x^5)/(5*c)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x**8+l*x**7+k*x**6+j*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+
b*x**2+a),x)
```

```
[Out] Timed out
```

3.26 $\int \frac{d+ex}{\left(4-5x^2+x^4\right)^2}\,dx$

Optimal. Leaf size=94

$$\frac{dx\left(17-5x^2\right)}{72\left(x^4-5x^2+4\right)}+\frac{19}{432}d\tanh^{-1}\left(\frac{x}{2}\right)-\frac{1}{54}d\tanh^{-1}(x)+\frac{1}{27}e\log\left(1-x^2\right)-\frac{1}{27}e\log\left(4-x^2\right)+\frac{e\left(5-2x^2\right)}{18\left(x^4-5x^2+4\right)}$$

```
[Out] 1/72*d*x*(-5*x^2+17)/(x^4-5*x^2+4)+1/18*e*(-2*x^2+5)/(x^4-5*x^2+4)+19/432*d
*arctanh(1/2*x)-1/54*d*arctanh(x)+1/27*e*ln(-x^2+1)-1/27*e*ln(-x^2+4)
```

Rubi [A] time = 0.05, antiderivative size = 94, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 9, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {1673, 12, 1092, 1166, 207, 1107, 614, 616, 31}

$$\frac{dx\left(17-5x^2\right)}{72\left(x^4-5x^2+4\right)}+\frac{19}{432}d\tanh^{-1}\left(\frac{x}{2}\right)-\frac{1}{54}d\tanh^{-1}(x)+\frac{e\left(5-2x^2\right)}{18\left(x^4-5x^2+4\right)}+\frac{1}{27}e\log\left(1-x^2\right)-\frac{1}{27}e\log\left(4-x^2\right)$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (d*x*(17 - 5*x^2))/(72*(4 - 5*x^2 + x^4)) + (e*(5 - 2*x^2))/(18*(4 - 5*x^2
+ x^4)) + (19*d*ArcTanh[x/2])/432 - (d*ArcTanh[x])/54 + (e*Log[1 - x^2])/27
 - (e*Log[4 - x^2])/27
```

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 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1092

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> -Simp[(x*(b^2 -
 2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)),
 x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(b^2 - 2*a*c + 2*(p + 1)*(b^2
 - 4*a*c) + b*c*(4*p + 7)*x^2)*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ
[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d+ex}{\left(4-5x^2+x^4\right)^2}\,dx &= \int \frac{d}{\left(4-5x^2+x^4\right)^2}\,dx + \int \frac{ex}{\left(4-5x^2+x^4\right)^2}\,dx \\
&= d\int \frac{1}{\left(4-5x^2+x^4\right)^2}\,dx + e\int \frac{x}{\left(4-5x^2+x^4\right)^2}\,dx \\
&= \frac{dx\left(17-5x^2\right)}{72\left(4-5x^2+x^4\right)} - \frac{1}{72}d\int \frac{-1+5x^2}{4-5x^2+x^4}\,dx + \frac{1}{2}e\,\text{Subst}\left(\int \frac{1}{\left(4-5x+x^2\right)^2}\,dx, x, x^2\right) \\
&= \frac{dx\left(17-5x^2\right)}{72\left(4-5x^2+x^4\right)} + \frac{e\left(5-2x^2\right)}{18\left(4-5x^2+x^4\right)} + \frac{1}{54}d\int \frac{1}{-1+x^2}\,dx - \frac{1}{216}(19d)\int \frac{1}{-4+x^2}\,d \\
&= \frac{dx\left(17-5x^2\right)}{72\left(4-5x^2+x^4\right)} + \frac{e\left(5-2x^2\right)}{18\left(4-5x^2+x^4\right)} + \frac{19}{432}d\tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}d\tanh^{-1}(x) - \frac{1}{27}e\,\text{Su} \\
&= \frac{dx\left(17-5x^2\right)}{72\left(4-5x^2+x^4\right)} + \frac{e\left(5-2x^2\right)}{18\left(4-5x^2+x^4\right)} + \frac{19}{432}d\tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}d\tanh^{-1}(x) + \frac{1}{27}e\,\text{lo}
\end{aligned}$$

Mathematica [A] time = 0.05, size = 90, normalized size = 0.96

$$\frac{1}{864}\left(\frac{12\left(dx\left(17-5x^2\right)+e\left(20-8x^2\right)\right)}{x^4-5x^2+4} + 8(d+4e)\log(1-x) - (19d+32e)\log(2-x) - 8(d-4e)\log(x+1) -\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((12*(e*(20 - 8*x^2) + d*x*(17 - 5*x^2)))/(4 - 5*x^2 + x^4) + 8*(d + 4*e)*L
og[1 - x] - (19*d + 32*e)*Log[2 - x] - 8*(d - 4*e)*Log[1 + x] + (19*d - 32*
e)*Log[2 + x])/864
```

fricas [B] time = 1.32, size = 169, normalized size = 1.80

$$-\frac{60\,dx^3 + 96\,ex^2 - 204\,dx - \left((19\,d - 32\,e)x^4 - 5\,(19\,d - 32\,e)x^2 + 76\,d - 128\,e\right)\log\left(x + 2\right) + 8\left((d - 4\,e)x^4 - 5\,(d\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] -1/864*(60*d*x^3 + 96*e*x^2 - 204*d*x - ((19*d - 32*e)*x^4 - 5*(19*d - 32*e
)*x^2 + 76*d - 128*e)*log(x + 2) + 8*((d - 4*e)*x^4 - 5*(d - 4*e)*x^2 + 4*d
 - 16*e)*log(x + 1) - 8*((d + 4*e)*x^4 - 5*(d + 4*e)*x^2 + 4*d + 16*e)*log(
x - 1) + ((19*d + 32*e)*x^4 - 5*(19*d + 32*e)*x^2 + 76*d + 128*e)*log(x - 2
) - 240*e)/(x^4 - 5*x^2 + 4)
```

giac [A] time = 0.23, size = 93, normalized size = 0.99

$$\frac{1}{864}\,(19\,d - 32\,e)\log\left(|x + 2|\right) - \frac{1}{108}\,(d - 4\,e)\log\left(|x + 1|\right) + \frac{1}{108}\,(d + 4\,e)\log\left(|x - 1|\right) - \frac{1}{864}\,(19\,d + 32\,e)\log\left(|x - 2|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] 1/864*(19*d - 32*e)*log(abs(x + 2)) - 1/108*(d - 4*e)*log(abs(x + 1)) + 1/1
08*(d + 4*e)*log(abs(x - 1)) - 1/864*(19*d + 32*e)*log(abs(x - 2)) - 1/72*(
5*d*x^3 + 8*x^2*e - 17*d*x - 20*e)/(x^4 - 5*x^2 + 4)
```

maple [A] time = 0.02, size = 122, normalized size = 1.30

$$\frac{19d\ln\left(x + 2\right)}{864} - \frac{19d\ln\left(x - 2\right)}{864} + \frac{d\ln\left(x - 1\right)}{108} - \frac{d\ln\left(x + 1\right)}{108} - \frac{e\ln\left(x + 2\right)}{27} - \frac{e\ln\left(x - 2\right)}{27} + \frac{e\ln\left(x - 1\right)}{27} + \frac{e\ln\left(x + 1\right)}{27} - \frac{}{144}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] -19/864*d*ln(x-2)-1/27*e*ln(x-2)-1/144/(x-2)*d-1/72/(x-2)*e-1/108*d*ln(x+1)
+1/27*e*ln(x+1)-1/36/(x+1)*d+1/36/(x+1)*e-1/36/(x-1)*d-1/36/(x-1)*e+1/108*d
*ln(x-1)+1/27*e*ln(x-1)-1/144/(x+2)*d+1/72/(x+2)*e+19/864*d*ln(x+2)-1/27*e*
ln(x+2)
```

maxima [A] time = 1.68, size = 83, normalized size = 0.88

$$\frac{1}{864}\,(19\,d - 32\,e)\log\left(x + 2\right) - \frac{1}{108}\,(d - 4\,e)\log\left(x + 1\right) + \frac{1}{108}\,(d + 4\,e)\log\left(x - 1\right) - \frac{1}{864}\,(19\,d + 32\,e)\log\left(x - 2\right) - \frac{5\,d}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] 1/864*(19*d - 32*e)*log(x + 2) - 1/108*(d - 4*e)*log(x + 1) + 1/108*(d + 4*
e)*log(x - 1) - 1/864*(19*d + 32*e)*log(x - 2) - 1/72*(5*d*x^3 + 8*e*x^2 -
17*d*x - 20*e)/(x^4 - 5*x^2 + 4)
```

mupad [B] time = 0.09, size = 84, normalized size = 0.89

$$\ln\left(x - 1\right)\left(\frac{d}{108} + \frac{e}{27}\right) - \ln\left(x + 1\right)\left(\frac{d}{108} - \frac{e}{27}\right) - \ln\left(x - 2\right)\left(\frac{19\,d}{864} + \frac{e}{27}\right) + \ln\left(x + 2\right)\left(\frac{19\,d}{864} - \frac{e}{27}\right) + \frac{-\frac{5\,d\,x^3}{72} - \frac{e\,x^2}{9} + \frac{17}{}}{x^4 - 5\,x^2 +}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x)/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 1)*(d/108 + e/27) - log(x + 1)*(d/108 - e/27) - log(x - 2)*((19*d)/
864 + e/27) + log(x + 2)*((19*d)/864 - e/27) + ((5*e)/18 + (17*d*x)/72 - (5
*d*x^3)/72 - (e*x^2)/9)/(x^4 - 5*x^2 + 4)
```

sympy [B] time = 3.57, size = 604, normalized size = 6.43

$$-\frac{(d-4e)\log\left(x+\frac{-6006260d^4e+2341251d^4(d-4e)-18247680d^2e^3+24099840d^2e^2(d-4e)+7387904d^2e(d-4e)^2-665280d^2(d-4e)^3+587202560}{1675971d^5-66150400d^3e^2+318767104de^4}\right.}{108}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] -(d - 4*e)*log(x + (-6006260*d**4*e + 2341251*d**4*(d - 4*e) - 18247680*d**
2*e**3 + 24099840*d**2*e**2*(d - 4*e) + 7387904*d**2*e*(d - 4*e)**2 - 66528
0*d**2*(d - 4*e)**3 + 587202560*e**5 - 12582912*e**4*(d - 4*e) - 36700160*e
**3*(d - 4*e)**2 + 786432*e**2*(d - 4*e)**3)/(1675971*d**5 - 66150400*d**3*
e**2 + 318767104*d*e**4))/108 + (d + 4*e)*log(x + (-6006260*d**4*e - 234125
1*d**4*(d + 4*e) - 18247680*d**2*e**3 - 24099840*d**2*e**2*(d + 4*e) + 7387
904*d**2*e*(d + 4*e)**2 + 665280*d**2*(d + 4*e)**3 + 587202560*e**5 + 12582
912*e**4*(d + 4*e) - 36700160*e**3*(d + 4*e)**2 - 786432*e**2*(d + 4*e)**3)
/(1675971*d**5 - 66150400*d**3*e**2 + 318767104*d*e**4))/108 + (19*d - 32*e
)*log(x + (-6006260*d**4*e - 2341251*d**4*(19*d - 32*e)/8 - 18247680*d**2*e
**3 - 3012480*d**2*e**2*(19*d - 32*e) + 115436*d**2*e*(19*d - 32*e)**2 + 10
395*d**2*(19*d - 32*e)**3/8 + 587202560*e**5 + 1572864*e**4*(19*d - 32*e) -
 573440*e**3*(19*d - 32*e)**2 - 1536*e**2*(19*d - 32*e)**3)/(1675971*d**5 -
 66150400*d**3*e**2 + 318767104*d*e**4))/864 - (19*d + 32*e)*log(x + (-6006
260*d**4*e + 2341251*d**4*(19*d + 32*e)/8 - 18247680*d**2*e**3 + 3012480*d*
*2*e**2*(19*d + 32*e) + 115436*d**2*e*(19*d + 32*e)**2 - 10395*d**2*(19*d +
 32*e)**3/8 + 587202560*e**5 - 1572864*e**4*(19*d + 32*e) - 573440*e**3*(19
*d + 32*e)**2 + 1536*e**2*(19*d + 32*e)**3)/(1675971*d**5 - 66150400*d**3*e
**2 + 318767104*d*e**4))/864 + (-5*d*x**3 + 17*d*x - 8*e*x**2 + 20*e)/(72*x
**4 - 360*x**2 + 288)
```

3.27 $\int \frac{d+ex+fx^2}{(4-5x^2+x^4)^2}\,dx$

Optimal. Leaf size=115

$$\frac{x\left(-\left(x^2(5d+8f)\right)+17d+20f\right)}{72\left(x^4-5x^2+4\right)}+\frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right)-\frac{1}{54}(d+7f)\tanh^{-1}(x)+\frac{1}{27}e\log\left(1-x^2\right)-\frac{1}{27}e\log\left(4\right.$$

```
[Out] 1/18*e*(-2*x^2+5)/(x^4-5*x^2+4)+1/72*x*(17*d+20*f-(5*d+8*f)*x^2)/(x^4-5*x^2
+4)+1/432*(19*d+52*f)*arctanh(1/2*x)-1/54*(d+7*f)*arctanh(x)+1/27*e*ln(-x^2
+1)-1/27*e*ln(-x^2+4)
```

Rubi [A] time = 0.14, antiderivative size = 115, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.391, Rules used = {1673, 1178, 1166, 207, 12, 1107, 614, 616, 31}

$$\frac{x\left(x^2(-(5d+8f))+17d+20f\right)}{72\left(x^4-5x^2+4\right)}+\frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right)-\frac{1}{54}(d+7f)\tanh^{-1}(x)+\frac{e\left(5-2x^2\right)}{18\left(x^4-5x^2+4\right)}+\frac{1}{27}e\log\left(\right.$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (e*(5 - 2*x^2))/(18*(4 - 5*x^2 + x^4)) + (x*(17*d + 20*f - (5*d + 8*f)*x^2)
)/(72*(4 - 5*x^2 + x^4)) + ((19*d + 52*f)*ArcTanh[x/2])/432 - ((d + 7*f)*Ar
cTanh[x])/54 + (e*Log[1 - x^2])/27 - (e*Log[4 - x^2])/27
```

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 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$
\begin{aligned}
\int \frac{d+ex+fx^2}{\left(4-5x^2+x^4\right)^2}\,dx &= \int \frac{ex}{\left(4-5x^2+x^4\right)^2}\,dx+\int \frac{d+fx^2}{\left(4-5x^2+x^4\right)^2}\,dx\\
&= \frac{x\left(17d+20f-(5d+8f)x^2\right)}{72\left(4-5x^2+x^4\right)}-\frac{1}{72}\int \frac{-d+20f+(5d+8f)x^2}{4-5x^2+x^4}\,dx+e\int \frac{x}{\left(4-5x^2+x\right.}\\
&= \frac{x\left(17d+20f-(5d+8f)x^2\right)}{72\left(4-5x^2+x^4\right)}+\frac{1}{2}e\,\mathrm{Subst}\left(\int \frac{1}{\left(4-5x+x^2\right)^2}\,dx,x,x^2\right)-\frac{1}{54}(-d-7f)\\
&= \frac{e\left(5-2x^2\right)}{18\left(4-5x^2+x^4\right)}+\frac{x\left(17d+20f-(5d+8f)x^2\right)}{72\left(4-5x^2+x^4\right)}+\frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right)-\frac{1}{54}\\
&= \frac{e\left(5-2x^2\right)}{18\left(4-5x^2+x^4\right)}+\frac{x\left(17d+20f-(5d+8f)x^2\right)}{72\left(4-5x^2+x^4\right)}+\frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right)-\frac{1}{54}\\
&= \frac{e\left(5-2x^2\right)}{18\left(4-5x^2+x^4\right)}+\frac{x\left(17d+20f-(5d+8f)x^2\right)}{72\left(4-5x^2+x^4\right)}+\frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right)-\frac{1}{54}
\end{aligned}
$$

Mathematica [A] time = 0.08, size = 112, normalized size = 0.97

$$
\frac{1}{864}\left(\frac{12\left(-5dx^3+17dx+e\left(20-8x^2\right)-8fx^3+20fx\right)}{x^4-5x^2+4}+8\log(1-x)(d+4e+7f)-\log(2-x)(19d+32e+5\right.
$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((12*(17*d*x + 20*f*x - 5*d*x^3 - 8*f*x^3 + e*(20 - 8*x^2)))/(4 - 5*x^2 + x
^4) + 8*(d + 4*e + 7*f)*Log[1 - x] - (19*d + 32*e + 52*f)*Log[2 - x] - 8*(d
 - 4*e + 7*f)*Log[1 + x] + (19*d - 32*e + 52*f)*Log[2 + x])/864
```

fricas [B] time = 1.46, size = 217, normalized size = 1.89

$$-\frac{12\left(5d+8f\right)x^3+96ex^2-12\left(17d+20f\right)x-\left(\left(19d-32e+52f\right)x^4-5\left(19d-32e+52f\right)x^2+76d-128e\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] -1/864*(12*(5*d + 8*f)*x^3 + 96*e*x^2 - 12*(17*d + 20*f)*x - ((19*d - 32*e
+ 52*f)*x^4 - 5*(19*d - 32*e + 52*f)*x^2 + 76*d - 128*e + 208*f)*log(x + 2)
 + 8*((d - 4*e + 7*f)*x^4 - 5*(d - 4*e + 7*f)*x^2 + 4*d - 16*e + 28*f)*log(
x + 1) - 8*((d + 4*e + 7*f)*x^4 - 5*(d + 4*e + 7*f)*x^2 + 4*d + 16*e + 28*f
)*log(x - 1) + ((19*d + 32*e + 52*f)*x^4 - 5*(19*d + 32*e + 52*f)*x^2 + 76*
d + 128*e + 208*f)*log(x - 2) - 240*e)/(x^4 - 5*x^2 + 4)
```

giac [A] time = 0.25, size = 115, normalized size = 1.00

$$\frac{1}{864}\left(19d+52f-32e\right)\log\left(|x+2|\right)-\frac{1}{108}\left(d+7f-4e\right)\log\left(|x+1|\right)+\frac{1}{108}\left(d+7f+4e\right)\log\left(|x-1|\right)-\frac{1}{864}\left(19d\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] 1/864*(19*d + 52*f - 32*e)*log(abs(x + 2)) - 1/108*(d + 7*f - 4*e)*log(abs(
x + 1)) + 1/108*(d + 7*f + 4*e)*log(abs(x - 1)) - 1/864*(19*d + 52*f + 32*e
)*log(abs(x - 2)) - 1/72*(5*d*x^3 + 8*f*x^3 + 8*x^2*e - 17*d*x - 20*f*x - 2
0*e)/(x^4 - 5*x^2 + 4)
```

maple [A] time = 0.02, size = 182, normalized size = 1.58

$$\frac{19d\ln\left(x+2\right)}{864}-\frac{19d\ln\left(x-2\right)}{864}+\frac{d\ln\left(x-1\right)}{108}-\frac{d\ln\left(x+1\right)}{108}-\frac{e\ln\left(x+2\right)}{27}-\frac{e\ln\left(x-2\right)}{27}+\frac{e\ln\left(x-1\right)}{27}+\frac{e\ln\left(x+1\right)}{27}+\frac{13f}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] -19/864*d*ln(x-2)-1/27*e*ln(x-2)-13/216*f*ln(x-2)-1/144/(x-2)*d-1/72/(x-2)*
e-1/36/(x-2)*f-1/108*d*ln(x+1)+1/27*e*ln(x+1)-7/108*f*ln(x+1)-1/36/(x+1)*d+
1/36/(x+1)*e-1/36/(x+1)*f-1/36/(x-1)*d-1/36/(x-1)*e-1/36/(x-1)*f+1/108*d*ln
(x-1)+1/27*e*ln(x-1)+7/108*f*ln(x-1)-1/144/(x+2)*d+1/72/(x+2)*e-1/36/(x+2)*
f+19/864*d*ln(x+2)-1/27*e*ln(x+2)+13/216*f*ln(x+2)
```

maxima [A] time = 1.07, size = 106, normalized size = 0.92

$$\frac{1}{864}\left(19d-32e+52f\right)\log\left(x+2\right)-\frac{1}{108}\left(d-4e+7f\right)\log\left(x+1\right)+\frac{1}{108}\left(d+4e+7f\right)\log\left(x-1\right)-\frac{1}{864}\left(19d+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] 1/864*(19*d - 32*e + 52*f)*log(x + 2) - 1/108*(d - 4*e + 7*f)*log(x + 1) +
1/108*(d + 4*e + 7*f)*log(x - 1) - 1/864*(19*d + 32*e + 52*f)*log(x - 2) -
1/72*((5*d + 8*f)*x^3 + 8*e*x^2 - (17*d + 20*f)*x - 20*e)/(x^4 - 5*x^2 + 4)
```

mupad [B] time = 0.10, size = 107, normalized size = 0.93

$$\ln(x-1)\left(\frac{d}{108}+\frac{e}{27}+\frac{7f}{108}\right)-\ln(x+1)\left(\frac{d}{108}-\frac{e}{27}+\frac{7f}{108}\right)-\ln(x-2)\left(\frac{19d}{864}+\frac{e}{27}+\frac{13f}{216}\right)+\ln(x+2)\left(\frac{19d}{864}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2)/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 1)*(d/108 + e/27 + (7*f)/108) - log(x + 1)*(d/108 - e/27 + (7*f)/10
8) - log(x - 2)*((19*d)/864 + e/27 + (13*f)/216) + log(x + 2)*((19*d)/864 -
 e/27 + (13*f)/216) + ((5*e)/18 - x^3*((5*d)/72 + f/9) - (e*x^2)/9 + x*((17
*d)/72 + (5*f)/18))/(x^4 - 5*x^2 + 4)
```

sympy [B] time = 118.43, size = 2689, normalized size = 23.38

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] -(d - 4*e + 7*f)*log(x + (-6006260*d**5*e + 2341251*d**5*(d - 4*e + 7*f) -
246016240*d**4*e*f + 31626180*d**4*f*(d - 4*e + 7*f) - 18247680*d**3*e**3 +
 24099840*d**3*e**2*(d - 4*e + 7*f) - 2758371200*d**3*e*f**2 + 7387904*d**3
*e*(d - 4*e + 7*f)**2 + 171122976*d**3*f**2*(d - 4*e + 7*f) - 665280*d**3*(
d - 4*e + 7*f)**3 + 298598400*d**2*e**3*f + 369487872*d**2*e**2*f*(d - 4*e
+ 7*f) - 13192256000*d**2*e*f**3 + 90885120*d**2*e*f*(d - 4*e + 7*f)**2 + 4
41486720*d**2*f**3*(d - 4*e + 7*f) - 5536512*d**2*f*(d - 4*e + 7*f)**3 + 58
7202560*d*e**5 - 12582912*d*e**4*(d - 4*e + 7*f) + 1353646080*d*e**3*f**2 -
 36700160*d*e**3*(d - 4*e + 7*f)**2 + 1448755200*d*e**2*f**2*(d - 4*e + 7*f
) + 786432*d*e**2*(d - 4*e + 7*f)**3 - 28282393600*d*e*f**4 + 362729472*d*e
*f**2*(d - 4*e + 7*f)**2 + 399575808*d*f**4*(d - 4*e + 7*f) - 10368000*d*f*
*2*(d - 4*e + 7*f)**3 + 2751463424*e**5*f + 251658240*e**4*f*(d - 4*e + 7*f
) - 530841600*e**3*f**3 - 171966464*e**3*f*(d - 4*e + 7*f)**2 + 1935212544*
e**2*f**3*(d - 4*e + 7*f) - 15728640*e**2*f*(d - 4*e + 7*f)**3 - 2188688998
4*e*f**5 + 483737600*e*f**3*(d - 4*e + 7*f)**2 - 212474880*f**5*(d - 4*e +
7*f) + 4534272*f**3*(d - 4*e + 7*f)**3)/(1675971*d**6 + 28507545*d**5*f - 6
6150400*d**4*e**2 + 168075324*d**4*f**2 - 1091117056*d**3*e**2*f + 38409552
0*d**3*f**3 + 318767104*d**2*e**4 - 6528860160*d**2*e**2*f**2 + 162082944*d
**2*f**4 + 3103784960*d*e**4*f - 17414619136*d*e**2*f**3 - 305130240*d*f**5
 + 6106906624*e**4*f**2 - 17414225920*e**2*f**4 + 67931136*f**6))/108 + (d
+ 4*e + 7*f)*log(x + (-6006260*d**5*e - 2341251*d**5*(d + 4*e + 7*f) - 2460
16240*d**4*e*f - 31626180*d**4*f*(d + 4*e + 7*f) - 18247680*d**3*e**3 - 240
99840*d**3*e**2*(d + 4*e + 7*f) - 2758371200*d**3*e*f**2 + 7387904*d**3*e*(
d + 4*e + 7*f)**2 - 171122976*d**3*f**2*(d + 4*e + 7*f) + 665280*d**3*(d +
4*e + 7*f)**3 + 298598400*d**2*e**3*f - 369487872*d**2*e**2*f*(d + 4*e + 7*
f) - 13192256000*d**2*e*f**3 + 90885120*d**2*e*f*(d + 4*e + 7*f)**2 - 44148
6720*d**2*f**3*(d + 4*e + 7*f) + 5536512*d**2*f*(d + 4*e + 7*f)**3 + 587202
560*d*e**5 + 12582912*d*e**4*(d + 4*e + 7*f) + 1353646080*d*e**3*f**2 - 367
00160*d*e**3*(d + 4*e + 7*f)**2 - 1448755200*d*e**2*f**2*(d + 4*e + 7*f) -
786432*d*e**2*(d + 4*e + 7*f)**3 - 28282393600*d*e*f**4 + 362729472*d*e*f**
2*(d + 4*e + 7*f)**2 - 399575808*d*f**4*(d + 4*e + 7*f) + 10368000*d*f**2*(
d + 4*e + 7*f)**3 + 2751463424*e**5*f - 251658240*e**4*f*(d + 4*e + 7*f) -
530841600*e**3*f**3 - 171966464*e**3*f*(d + 4*e + 7*f)**2 - 1935212544*e**2
*f**3*(d + 4*e + 7*f) + 15728640*e**2*f*(d + 4*e + 7*f)**3 - 21886889984*e*
f**5 + 483737600*e*f**3*(d + 4*e + 7*f)**2 + 212474880*f**5*(d + 4*e + 7*f)
 - 4534272*f**3*(d + 4*e + 7*f)**3)/(1675971*d**6 + 28507545*d**5*f - 66150
400*d**4*e**2 + 168075324*d**4*f**2 - 1091117056*d**3*e**2*f + 384095520*d*
*3*f**3 + 318767104*d**2*e**4 - 6528860160*d**2*e**2*f**2 + 162082944*d**2*
```

```
f**4 + 3103784960*d*e**4*f - 17414619136*d*e**2*f**3 - 305130240*d*f**5 + 6
106906624*e**4*f**2 - 17414225920*e**2*f**4 + 67931136*f**6))/108 + (19*d -
 32*e + 52*f)*log(x + (-6006260*d**5*e - 2341251*d**5*(19*d - 32*e + 52*f)/
8 - 246016240*d**4*e*f - 7906545*d**4*f*(19*d - 32*e + 52*f)/2 - 18247680*d
**3*e**3 - 3012480*d**3*e**2*(19*d - 32*e + 52*f) - 2758371200*d**3*e*f**2
+ 115436*d**3*e*(19*d - 32*e + 52*f)**2 - 21390372*d**3*f**2*(19*d - 32*e +
 52*f) + 10395*d**3*(19*d - 32*e + 52*f)**3/8 + 298598400*d**2*e**3*f - 461
85984*d**2*e**2*f*(19*d - 32*e + 52*f) - 13192256000*d**2*e*f**3 + 1420080*
d**2*e*f*(19*d - 32*e + 52*f)**2 - 55185840*d**2*f**3*(19*d - 32*e + 52*f)
+ 21627*d**2*f*(19*d - 32*e + 52*f)**3/2 + 587202560*d*e**5 + 1572864*d*e**
4*(19*d - 32*e + 52*f) + 1353646080*d*e**3*f**2 - 573440*d*e**3*(19*d - 32*
e + 52*f)**2 - 181094400*d*e**2*f**2*(19*d - 32*e + 52*f) - 1536*d*e**2*(19
*d - 32*e + 52*f)**3 - 28282393600*d*e*f**4 + 5667648*d*e*f**2*(19*d - 32*e
 + 52*f)**2 - 49946976*d*f**4*(19*d - 32*e + 52*f) + 20250*d*f**2*(19*d - 3
2*e + 52*f)**3 + 2751463424*e**5*f - 31457280*e**4*f*(19*d - 32*e + 52*f) -
 530841600*e**3*f**3 - 2686976*e**3*f*(19*d - 32*e + 52*f)**2 - 241901568*e
**2*f**3*(19*d - 32*e + 52*f) + 30720*e**2*f*(19*d - 32*e + 52*f)**3 - 2188
6889984*e*f**5 + 7558400*e*f**3*(19*d - 32*e + 52*f)**2 + 26559360*f**5*(19
*d - 32*e + 52*f) - 8856*f**3*(19*d - 32*e + 52*f)**3)/(1675971*d**6 + 2850
7545*d**5*f - 66150400*d**4*e**2 + 168075324*d**4*f**2 - 1091117056*d**3*e*
*2*f + 384095520*d**3*f**3 + 318767104*d**2*e**4 - 6528860160*d**2*e**2*f**
2 + 162082944*d**2*f**4 + 3103784960*d*e**4*f - 17414619136*d*e**2*f**3 - 3
05130240*d*f**5 + 6106906624*e**4*f**2 - 17414225920*e**2*f**4 + 67931136*f
**6))/864 - (19*d + 32*e + 52*f)*log(x + (-6006260*d**5*e + 2341251*d**5*(1
9*d + 32*e + 52*f)/8 - 246016240*d**4*e*f + 7906545*d**4*f*(19*d + 32*e + 5
2*f)/2 - 18247680*d**3*e**3 + 3012480*d**3*e**2*(19*d + 32*e + 52*f) - 2758
371200*d**3*e*f**2 + 115436*d**3*e*(19*d + 32*e + 52*f)**2 + 21390372*d**3*
f**2*(19*d + 32*e + 52*f) - 10395*d**3*(19*d + 32*e + 52*f)**3/8 + 29859840
0*d**2*e**3*f + 46185984*d**2*e**2*f*(19*d + 32*e + 52*f) - 13192256000*d**
2*e*f**3 + 1420080*d**2*e*f*(19*d + 32*e + 52*f)**2 + 55185840*d**2*f**3*(1
9*d + 32*e + 52*f) - 21627*d**2*f*(19*d + 32*e + 52*f)**3/2 + 587202560*d*e
**5 - 1572864*d*e**4*(19*d + 32*e + 52*f) + 1353646080*d*e**3*f**2 - 573440
*d*e**3*(19*d + 32*e + 52*f)**2 + 181094400*d*e**2*f**2*(19*d + 32*e + 52*f
) + 1536*d*e**2*(19*d + 32*e + 52*f)**3 - 28282393600*d*e*f**4 + 5667648*d*
e*f**2*(19*d + 32*e + 52*f)**2 + 49946976*d*f**4*(19*d + 32*e + 52*f) - 202
50*d*f**2*(19*d + 32*e + 52*f)**3 + 2751463424*e**5*f + 31457280*e**4*f*(19
*d + 32*e + 52*f) - 530841600*e**3*f**3 - 2686976*e**3*f*(19*d + 32*e + 52*
f)**2 + 241901568*e**2*f**3*(19*d + 32*e + 52*f) - 30720*e**2*f*(19*d + 32*
e + 52*f)**3 - 21886889984*e*f**5 + 7558400*e*f**3*(19*d + 32*e + 52*f)**2
- 26559360*f**5*(19*d + 32*e + 52*f) + 8856*f**3*(19*d + 32*e + 52*f)**3)/(
1675971*d**6 + 28507545*d**5*f - 66150400*d**4*e**2 + 168075324*d**4*f**2 -
 1091117056*d**3*e**2*f + 384095520*d**3*f**3 + 318767104*d**2*e**4 - 65288
60160*d**2*e**2*f**2 + 162082944*d**2*f**4 + 3103784960*d*e**4*f - 17414619
136*d*e**2*f**3 - 305130240*d*f**5 + 6106906624*e**4*f**2 - 17414225920*e**
2*f**4 + 67931136*f**6))/864 + (-8*e*x**2 + 20*e + x**3*(-5*d - 8*f) + x*(1
7*d + 20*f))/(72*x**4 - 360*x**2 + 288)
```

3.28 $\int \frac{d+ex+fx^2+gx^3}{\left(4-5x^2+x^4\right)^2}\,dx$

Optimal. Leaf size=138

$$\frac{x\left(-\left(x^2(5d+8f)\right)+17d+20f\right)}{72\left(x^4-5x^2+4\right)}+\frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right)-\frac{1}{54}(d+7f)\tanh^{-1}(x)+\frac{1}{54}(2e+5g)\log\left(1-x^2\right)-$$

```
[Out] 1/72*x*(17*d+20*f-(5*d+8*f)*x^2)/(x^4-5*x^2+4)+1/18*(5*e+8*g-(2*e+5*g)*x^2)
/(x^4-5*x^2+4)+1/432*(19*d+52*f)*arctanh(1/2*x)-1/54*(d+7*f)*arctanh(x)+1/5
4*(2*e+5*g)*ln(-x^2+1)-1/54*(2*e+5*g)*ln(-x^2+4)
```

Rubi [A] time = 0.15, antiderivative size = 138, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 8, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286, Rules used = {1673, 1178, 1166, 207, 1247, 638, 616, 31}

$$\frac{x\left(x^2(-(5d+8f))+17d+20f\right)}{72\left(x^4-5x^2+4\right)}+\frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right)-\frac{1}{54}(d+7f)\tanh^{-1}(x)+\frac{x^2(-(2e+5g))+5e+8g}{18\left(x^4-5x^2+4\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (x*(17*d + 20*f - (5*d + 8*f)*x^2))/(72*(4 - 5*x^2 + x^4)) + (5*e + 8*g - (
2*e + 5*g)*x^2)/(18*(4 - 5*x^2 + x^4)) + ((19*d + 52*f)*ArcTanh[x/2])/432 -
 ((d + 7*f)*ArcTanh[x])/54 + ((2*e + 5*g)*Log[1 - x^2])/54 - ((2*e + 5*g)*L
og[4 - x^2])/54
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
```

```
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3}{\left(4-5x^2+x^4\right)^2}\,dx = \int \frac{d+fx^2}{\left(4-5x^2+x^4\right)^2}\,dx + \int \frac{x\left(e+gx^2\right)}{\left(4-5x^2+x^4\right)^2}\,dx$$

$$= \frac{x\left(17d+20f-(5d+8f)x^2\right)}{72\left(4-5x^2+x^4\right)} - \frac{1}{72}\int \frac{-d+20f+(5d+8f)x^2}{4-5x^2+x^4}\,dx + \frac{1}{2}\text{Subst}\left(\int \frac{}{(4-}\right.$$

$$= \frac{x\left(17d+20f-(5d+8f)x^2\right)}{72\left(4-5x^2+x^4\right)} + \frac{5e+8g-(2e+5g)x^2}{18\left(4-5x^2+x^4\right)} - \frac{1}{54}(-d-7f)\int \frac{1}{-1+x^2}\,dx$$

$$= \frac{x\left(17d+20f-(5d+8f)x^2\right)}{72\left(4-5x^2+x^4\right)} + \frac{5e+8g-(2e+5g)x^2}{18\left(4-5x^2+x^4\right)} + \frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right)$$

$$= \frac{x\left(17d+20f-(5d+8f)x^2\right)}{72\left(4-5x^2+x^4\right)} + \frac{5e+8g-(2e+5g)x^2}{18\left(4-5x^2+x^4\right)} + \frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right)$$

Mathematica [A] time = 0.05, size = 134, normalized size = 0.97

$$\frac{1}{864}\left(\frac{12\left(-5dx^3+17dx+e\left(20-8x^2\right)-8fx^3+20fx-4g\left(5x^2-8\right)\right)}{x^4-5x^2+4}+8\log(1-x)(d+4e+7f+10g)-\log(2\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((12*(17*d*x + 20*f*x - 5*d*x^3 - 8*f*x^3 + e*(20 - 8*x^2) - 4*g*(-8 + 5*x^
2)))/(4 - 5*x^2 + x^4) + 8*(d + 4*e + 7*f + 10*g)*Log[1 - x] - (19*d + 32*e
```

```
 + 52*f + 80*g)*Log[2 - x] - 8*(d - 4*e + 7*f - 10*g)*Log[1 + x] + (19*d -
32*e + 52*f - 80*g)*Log[2 + x])/864
```

fricas [B] time = 1.85, size = 262, normalized size = 1.90

$$-\frac{12\left(5\,d+8\,f\right)x^3+48\left(2\,e+5\,g\right)x^2-12\left(17\,d+20\,f\right)x-\left(\left(19\,d-32\,e+52\,f-80\,g\right)x^4-5\left(19\,d-32\,e+52\,\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] -1/864*(12*(5*d + 8*f)*x^3 + 48*(2*e + 5*g)*x^2 - 12*(17*d + 20*f)*x - ((19
*d - 32*e + 52*f - 80*g)*x^4 - 5*(19*d - 32*e + 52*f - 80*g)*x^2 + 76*d - 1
28*e + 208*f - 320*g)*log(x + 2) + 8*((d - 4*e + 7*f - 10*g)*x^4 - 5*(d - 4
*e + 7*f - 10*g)*x^2 + 4*d - 16*e + 28*f - 40*g)*log(x + 1) - 8*((d + 4*e +
 7*f + 10*g)*x^4 - 5*(d + 4*e + 7*f + 10*g)*x^2 + 4*d + 16*e + 28*f + 40*g)
*log(x - 1) + ((19*d + 32*e + 52*f + 80*g)*x^4 - 5*(19*d + 32*e + 52*f + 80
*g)*x^2 + 76*d + 128*e + 208*f + 320*g)*log(x - 2) - 240*e - 384*g)/(x^4 -
5*x^2 + 4)
```

giac [A] time = 0.25, size = 136, normalized size = 0.99

$$\frac{1}{864}\left(19\,d+52\,f-80\,g-32\,e\right)\log\left(|x+2|\right)-\frac{1}{108}\left(d+7\,f-10\,g-4\,e\right)\log\left(|x+1|\right)+\frac{1}{108}\left(d+7\,f+10\,g+4\,e\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] 1/864*(19*d + 52*f - 80*g - 32*e)*log(abs(x + 2)) - 1/108*(d + 7*f - 10*g -
 4*e)*log(abs(x + 1)) + 1/108*(d + 7*f + 10*g + 4*e)*log(abs(x - 1)) - 1/86
4*(19*d + 52*f + 80*g + 32*e)*log(abs(x - 2)) - 1/72*(5*d*x^3 + 8*f*x^3 + 2
0*g*x^2 + 8*x^2*e - 17*d*x - 20*f*x - 32*g - 20*e)/(x^4 - 5*x^2 + 4)
```

maple [A] time = 0.02, size = 242, normalized size = 1.75

$$\frac{5g\ln\left(x-1\right)}{54}-\frac{5g\ln\left(x+2\right)}{54}-\frac{5g\ln\left(x-2\right)}{54}+\frac{5g\ln\left(x+1\right)}{54}+\frac{19d\ln\left(x+2\right)}{864}-\frac{e\ln\left(x+2\right)}{27}+\frac{e\ln\left(x-1\right)}{27}+\frac{d\ln\left(x-1\right)}{108}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 5/54*g*ln(x-1)-5/54*g*ln(x+2)-5/54*g*ln(x-2)+5/54*g*ln(x+1)+19/864*d*ln(x+2
)-1/27*e*ln(x+2)+1/27*e*ln(x-1)+1/108*d*ln(x-1)+1/27*e*ln(x+1)-1/108*d*ln(x
+1)-19/864*d*ln(x-2)-1/27*e*ln(x-2)-13/216*f*ln(x-2)-7/108*f*ln(x+1)+7/108*
f*ln(x-1)+13/216*f*ln(x+2)+1/18/(x+2)*g+1/36/(x+1)*g-1/36/(x-1)*g-1/18/(x-2
)*g-1/144/(x+2)*d+1/72/(x+2)*e-1/144/(x-2)*d-1/72/(x-2)*e-1/36/(x+1)*d+1/36
/(x+1)*e-1/36/(x-1)*d-1/36/(x-1)*e-1/36/(x-1)*f-1/36/(x+2)*f-1/36/(x-2)*f-1
/36/(x+1)*f
```

maxima [A] time = 0.97, size = 127, normalized size = 0.92

$$\frac{1}{864}\left(19\,d-32\,e+52\,f-80\,g\right)\log\left(x+2\right)-\frac{1}{108}\left(d-4\,e+7\,f-10\,g\right)\log\left(x+1\right)+\frac{1}{108}\left(d+4\,e+7\,f+10\,g\right)\log$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] 1/864*(19*d - 32*e + 52*f - 80*g)*log(x + 2) - 1/108*(d - 4*e + 7*f - 10*g)
*log(x + 1) + 1/108*(d + 4*e + 7*f + 10*g)*log(x - 1) - 1/864*(19*d + 32*e
+ 52*f + 80*g)*log(x - 2) - 1/72*((5*d + 8*f)*x^3 + 4*(2*e + 5*g)*x^2 - (17
*d + 20*f)*x - 20*e - 32*g)/(x^4 - 5*x^2 + 4)
```

mupad [B] time = 0.14, size = 128, normalized size = 0.93

$$\ln(x-1)\left(\frac{d}{108}+\frac{e}{27}+\frac{7f}{108}+\frac{5g}{54}\right)-\ln(x+1)\left(\frac{d}{108}-\frac{e}{27}+\frac{7f}{108}-\frac{5g}{54}\right)-\ln(x-2)\left(\frac{19d}{864}+\frac{e}{27}+\frac{13f}{216}+\frac{5g}{54}\right)+\mathrm{l}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3)/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 1)*(d/108 + e/27 + (7*f)/108 + (5*g)/54) - log(x + 1)*(d/108 - e/27
 + (7*f)/108 - (5*g)/54) - log(x - 2)*((19*d)/864 + e/27 + (13*f)/216 + (5*
g)/54) + log(x + 2)*((19*d)/864 - e/27 + (13*f)/216 - (5*g)/54) + ((5*e)/18
 + (4*g)/9 - x^3*((5*d)/72 + f/9) - x^2*(e/9 + (5*g)/18) + x*((17*d)/72 + (
5*f)/18))/(x^4 - 5*x^2 + 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

3.29 $\int \frac{d+ex+fx^2+gx^3+hx^4}{(4-5x^2+x^4)^2} dx$

Optimal. Leaf size=150

$$\frac{x\left(-\left(x^2(5d+8f+20h)\right)+17d+20f+32h\right)}{72\left(x^4-5x^2+4\right)}+\frac{1}{432}\tanh^{-1}\left(\frac{x}{2}\right)(19d+52f+112h)-\frac{1}{54}\tanh^{-1}(x)(d+7f+13h)+$$

```
[Out] 1/18*(5*e+8*g-(2*e+5*g)*x^2)/(x^4-5*x^2+4)+1/72*x*(17*d+20*f+32*h-(5*d+8*f+
20*h)*x^2)/(x^4-5*x^2+4)+1/432*(19*d+52*f+112*h)*arctanh(1/2*x)-1/54*(d+7*f
+13*h)*arctanh(x)+1/54*(2*e+5*g)*ln(-x^2+1)-1/54*(2*e+5*g)*ln(-x^2+4)
```

Rubi [A] time = 0.21, antiderivative size = 150, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 8, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.242, Rules used = {1673, 1678, 1166, 207, 1247, 638, 616, 31}

$$\frac{x\left(x^2(-(5d+8f+20h))+17d+20f+32h\right)}{72\left(x^4-5x^2+4\right)}+\frac{1}{432}\tanh^{-1}\left(\frac{x}{2}\right)(19d+52f+112h)-\frac{1}{54}\tanh^{-1}(x)(d+7f+13h)+$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (5*e + 8*g - (2*e + 5*g)*x^2)/(18*(4 - 5*x^2 + x^4)) + (x*(17*d + 20*f + 32
*h - (5*d + 8*f + 20*h)*x^2))/(72*(4 - 5*x^2 + x^4)) + ((19*d + 52*f + 112*
h)*ArcTanh[x/2])/432 - ((d + 7*f + 13*h)*ArcTanh[x])/54 + ((2*e + 5*g)*Log[
1 - x^2])/54 - ((2*e + 5*g)*Log[4 - x^2])/54
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
```

```
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4}{\left(4-5x^2+x^4\right)^2}\,dx = \int \frac{x\left(e+gx^2\right)}{\left(4-5x^2+x^4\right)^2}\,dx + \int \frac{d+fx^2+hx^4}{\left(4-5x^2+x^4\right)^2}\,dx$$

$$= \frac{x\left(17d+20f+32h-(5d+8f+20h)x^2\right)}{72\left(4-5x^2+x^4\right)} - \frac{1}{72}\int \frac{-d+20f+32h+(5d+8f}{4-5x^2+x^4}$$

$$= \frac{5e+8g-(2e+5g)x^2}{18\left(4-5x^2+x^4\right)} + \frac{x\left(17d+20f+32h-(5d+8f+20h)x^2\right)}{72\left(4-5x^2+x^4\right)} + \frac{1}{18}(-2e$$

$$= \frac{5e+8g-(2e+5g)x^2}{18\left(4-5x^2+x^4\right)} + \frac{x\left(17d+20f+32h-(5d+8f+20h)x^2\right)}{72\left(4-5x^2+x^4\right)} + \frac{1}{432}(19d$$

$$= \frac{5e+8g-(2e+5g)x^2}{18\left(4-5x^2+x^4\right)} + \frac{x\left(17d+20f+32h-(5d+8f+20h)x^2\right)}{72\left(4-5x^2+x^4\right)} + \frac{1}{432}(19d$$

Mathematica [A] time = 0.07, size = 159, normalized size = 1.06

$$\frac{1}{864}\left(-\frac{12\left(x\left(d\left(5x^2-17\right)+4f\left(2x^2-5\right)+4h\left(5x^2-8\right)\right)+4e\left(2x^2-5\right)+4g\left(5x^2-8\right)\right)}{x^4-5x^2+4}+8\log(1-x)(d+4e+\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((-12*(4*e*(-5 + 2*x^2) + 4*g*(-8 + 5*x^2) + x*(4*f*(-5 + 2*x^2) + d*(-17 +
 5*x^2) + 4*h*(-8 + 5*x^2))))/(4 - 5*x^2 + x^4) + 8*(d + 4*e + 7*f + 10*g +
 13*h)*Log[1 - x] - (19*d + 32*e + 52*f + 80*g + 112*h)*Log[2 - x] - 8*(d -
 4*e + 7*f - 10*g + 13*h)*Log[1 + x] + (19*d - 32*e + 52*f - 80*g + 112*h)*
Log[2 + x])/864
```

fricas [B] time = 5.40, size = 304, normalized size = 2.03

$$-\frac{12\left(5\,d+8\,f+20\,h\right)x^3+48\left(2\,e+5\,g\right)x^2-12\left(17\,d+20\,f+32\,h\right)x-\left(\left(19\,d-32\,e+52\,f-80\,g+112\,h\right)x^4\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] -1/864*(12*(5*d + 8*f + 20*h)*x^3 + 48*(2*e + 5*g)*x^2 - 12*(17*d + 20*f +
32*h)*x - ((19*d - 32*e + 52*f - 80*g + 112*h)*x^4 - 5*(19*d - 32*e + 52*f
- 80*g + 112*h)*x^2 + 76*d - 128*e + 208*f - 320*g + 448*h)*log(x + 2) + 8*
((d - 4*e + 7*f - 10*g + 13*h)*x^4 - 5*(d - 4*e + 7*f - 10*g + 13*h)*x^2 +
4*d - 16*e + 28*f - 40*g + 52*h)*log(x + 1) - 8*((d + 4*e + 7*f + 10*g + 13
*h)*x^4 - 5*(d + 4*e + 7*f + 10*g + 13*h)*x^2 + 4*d + 16*e + 28*f + 40*g +
52*h)*log(x - 1) + ((19*d + 32*e + 52*f + 80*g + 112*h)*x^4 - 5*(19*d + 32*
e + 52*f + 80*g + 112*h)*x^2 + 76*d + 128*e + 208*f + 320*g + 448*h)*log(x
- 2) - 240*e - 384*g)/(x^4 - 5*x^2 + 4)
```

giac [A] time = 0.30, size = 158, normalized size = 1.05

$$\frac{1}{864}\left(19\,d+52\,f-80\,g+112\,h-32\,e\right)\log\left(|x+2|\right)-\frac{1}{108}\left(d+7\,f-10\,g+13\,h-4\,e\right)\log\left(|x+1|\right)+\frac{1}{108}\left(d+7\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] 1/864*(19*d + 52*f - 80*g + 112*h - 32*e)*log(abs(x + 2)) - 1/108*(d + 7*f
- 10*g + 13*h - 4*e)*log(abs(x + 1)) + 1/108*(d + 7*f + 10*g + 13*h + 4*e)*
log(abs(x - 1)) - 1/864*(19*d + 52*f + 80*g + 112*h + 32*e)*log(abs(x - 2))
 - 1/72*(5*d*x^3 + 8*f*x^3 + 20*h*x^3 + 20*g*x^2 + 8*x^2*e - 17*d*x - 20*f*
x - 32*h*x - 32*g - 20*e)/(x^4 - 5*x^2 + 4)
```

maple [B] time = 0.02, size = 302, normalized size = 2.01

$$\frac{7h\ln\left(x+2\right)}{54}+\frac{13h\ln\left(x-1\right)}{108}-\frac{13h\ln\left(x+1\right)}{108}-\frac{7h\ln\left(x-2\right)}{54}+\frac{5g\ln\left(x-1\right)}{54}-\frac{5g\ln\left(x+2\right)}{54}-\frac{5g\ln\left(x-2\right)}{54}+\frac{5g\ln(}{54}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 7/54*h*ln(x+2)+13/108*h*ln(x-1)-13/108*h*ln(x+1)-7/54*h*ln(x-2)+5/54*g*ln(x
-1)-5/54*g*ln(x+2)-5/54*g*ln(x-2)+5/54*g*ln(x+1)+19/864*d*ln(x+2)-1/27*e*ln
(x+2)+1/27*e*ln(x-1)+1/108*d*ln(x-1)+1/27*e*ln(x+1)-1/108*d*ln(x+1)-19/864*
d*ln(x-2)-1/27*e*ln(x-2)-13/216*f*ln(x-2)-7/108*f*ln(x+1)+7/108*f*ln(x-1)+1
3/216*f*ln(x+2)-1/9/(x+2)*h-1/36/(x+1)*h-1/36/(x-1)*h-1/9/(x-2)*h+1/18/(x+2
)*g+1/36/(x+1)*g-1/36/(x-1)*g-1/18/(x-2)*g-1/144/(x+2)*d+1/72/(x+2)*e-1/144
/(x-2)*d-1/72/(x-2)*e-1/36/(x+1)*d+1/36/(x+1)*e-1/36/(x-1)*d-1/36/(x-1)*e-1
/36/(x-1)*f-1/36/(x+2)*f-1/36/(x-2)*f-1/36/(x+1)*f
```

maxima [A] time = 1.18, size = 145, normalized size = 0.97

$$\frac{1}{864}\left(19\,d-32\,e+52\,f-80\,g+112\,h\right)\log\left(x+2\right)-\frac{1}{108}\left(d-4\,e+7\,f-10\,g+13\,h\right)\log\left(x+1\right)+\frac{1}{108}\left(d+4\,e\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] 1/864*(19*d - 32*e + 52*f - 80*g + 112*h)*log(x + 2) - 1/108*(d - 4*e + 7*f
 - 10*g + 13*h)*log(x + 1) + 1/108*(d + 4*e + 7*f + 10*g + 13*h)*log(x - 1)
 - 1/864*(19*d + 32*e + 52*f + 80*g + 112*h)*log(x - 2) - 1/72*((5*d + 8*f
+ 20*h)*x^3 + 4*(2*e + 5*g)*x^2 - (17*d + 20*f + 32*h)*x - 20*e - 32*g)/(x^
4 - 5*x^2 + 4)
```

mupad [B] time = 0.87, size = 146, normalized size = 0.97

$$\frac{\left(-\frac{5\,d}{72}-\frac{f}{9}-\frac{5\,h}{18}\right)\,x^3+\left(-\frac{e}{9}-\frac{5\,g}{18}\right)\,x^2+\left(\frac{17\,d}{72}+\frac{5\,f}{18}+\frac{4\,h}{9}\right)\,x+\frac{5\,e}{18}+\frac{4\,g}{9}}{x^4-5\,x^2+4}+\ln\left(x-1\right)\,\left(\frac{d}{108}+\frac{e}{27}+\frac{7\,f}{108}+\frac{5\,g}{54}+\frac{13\,h}{108}\right)-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] ((5*e)/18 + (4*g)/9 - x^2*(e/9 + (5*g)/18) + x*((17*d)/72 + (5*f)/18 + (4*h
)/9) - x^3*((5*d)/72 + f/9 + (5*h)/18))/(x^4 - 5*x^2 + 4) + log(x - 1)*(d/1
08 + e/27 + (7*f)/108 + (5*g)/54 + (13*h)/108) - log(x + 1)*(d/108 - e/27 +
 (7*f)/108 - (5*g)/54 + (13*h)/108) - log(x - 2)*((19*d)/864 + e/27 + (13*f
)/216 + (5*g)/54 + (7*h)/54) + log(x + 2)*((19*d)/864 - e/27 + (13*f)/216 -
 (5*g)/54 + (7*h)/54)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

3.30 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(4-5x^2+x^4)^2} dx$

Optimal. Leaf size=162

$$\frac{x\left(-\left(x^2(5d+8f+20h)\right)+17d+20f+32h\right)}{72\left(x^4-5x^2+4\right)}+\frac{1}{432}\tanh^{-1}\left(\frac{x}{2}\right)(19d+52f+112h)-\frac{1}{54}\tanh^{-1}(x)(d+7f+13h)+$$

```
[Out] 1/72*x*(17*d+20*f+32*h-(5*d+8*f+20*h)*x^2)/(x^4-5*x^2+4)+1/18*(5*e+8*g+20*i
-(2*e+5*g+17*i)*x^2)/(x^4-5*x^2+4)+1/432*(19*d+52*f+112*h)*arctanh(1/2*x)-1
/54*(d+7*f+13*h)*arctanh(x)+1/54*(2*e+5*g+8*i)*ln(-x^2+1)-1/54*(2*e+5*g+8*i
)*ln(-x^2+4)
```

Rubi [A] time = 0.23, antiderivative size = 162, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.237, Rules used = {1673, 1678, 1166, 207, 1663, 1660, 12, 616, 31}

$$\frac{x\left(x^2(-(5d+8f+20h))+17d+20f+32h\right)}{72\left(x^4-5x^2+4\right)}+\frac{1}{432}\tanh^{-1}\left(\frac{x}{2}\right)(19d+52f+112h)-\frac{1}{54}\tanh^{-1}(x)(d+7f+13h)+$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (x*(17*d + 20*f + 32*h - (5*d + 8*f + 20*h)*x^2))/(72*(4 - 5*x^2 + x^4)) +
(5*e + 8*g + 20*i - (2*e + 5*g + 17*i)*x^2)/(18*(4 - 5*x^2 + x^4)) + ((19*d
 + 52*f + 112*h)*ArcTanh[x/2])/432 - ((d + 7*f + 13*h)*ArcTanh[x])/54 + ((2
*e + 5*g + 8*i)*Log[1 - x^2])/54 - ((2*e + 5*g + 8*i)*Log[4 - x^2])/54
```

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 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
```

```
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^
(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
 - 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+30x^5}{\left(4-5x^2+x^4\right)^2}\,dx = \int \frac{x\left(e+gx^2+30x^4\right)}{\left(4-5x^2+x^4\right)^2}\,dx + \int \frac{d+fx^2+hx^4}{\left(4-5x^2+x^4\right)^2}\,dx$$

$$= \frac{x\left(17d+20f+32h-(5d+8f+20h)x^2\right)}{72\left(4-5x^2+x^4\right)} - \frac{1}{72}\int \frac{-d+20f+32h}{4-}$$

$$= \frac{600+5e+8g-(510+2e+5g)x^2}{18\left(4-5x^2+x^4\right)} + \frac{x\left(17d+20f+32h-(5d+8\right.}{72\left(4-5x^2+x^4\right)}$$

$$= \frac{600+5e+8g-(510+2e+5g)x^2}{18\left(4-5x^2+x^4\right)} + \frac{x\left(17d+20f+32h-(5d+8\right.}{72\left(4-5x^2+x^4\right)}$$

$$= \frac{600+5e+8g-(510+2e+5g)x^2}{18\left(4-5x^2+x^4\right)} + \frac{x\left(17d+20f+32h-(5d+8\right.}{72\left(4-5x^2+x^4\right)}$$

$$= \frac{600+5e+8g-(510+2e+5g)x^2}{18\left(4-5x^2+x^4\right)} + \frac{x\left(17d+20f+32h-(5d+8\right.}{72\left(4-5x^2+x^4\right)}$$

Mathematica [A] time = 0.09, size = 185, normalized size = 1.14

$$\frac{-5dx^3+17dx-8ex^2+20e-8fx^3+20fx-20gx^2+32g-20hx^3+32hx-68ix^2+80i}{72\left(x^4-5x^2+4\right)}+\frac{1}{108}\log(1-x)(d+4e$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (20*e + 32*g + 80*i + 17*d*x + 20*f*x + 32*h*x - 8*e*x^2 - 20*g*x^2 - 68*i*
x^2 - 5*d*x^3 - 8*f*x^3 - 20*h*x^3)/(72*(4 - 5*x^2 + x^4)) + ((d + 4*e + 7*
f + 10*g + 13*h + 16*i)*Log[1 - x])/108 + ((-19*d - 32*e - 52*f - 80*g - 11
2*h - 128*i)*Log[2 - x])/864 + ((-d + 4*e - 7*f + 10*g - 13*h + 16*i)*Log[1
 + x])/108 + ((19*d - 32*e + 52*f - 80*g + 112*h - 128*i)*Log[2 + x])/864
```

fricas [B] time = 25.37, size = 346, normalized size = 2.14

$$-\frac{12\left(5d+8f+20h\right)x^3+48\left(2e+5g+17i\right)x^2-12\left(17d+20f+32h\right)x-\left(\left(19d-32e+52f-80g+11\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fri
cas")
```

```
[Out] -1/864*(12*(5*d + 8*f + 20*h)*x^3 + 48*(2*e + 5*g + 17*i)*x^2 - 12*(17*d +
20*f + 32*h)*x - ((19*d - 32*e + 52*f - 80*g + 112*h - 128*i)*x^4 - 5*(19*d
 - 32*e + 52*f - 80*g + 112*h - 128*i)*x^2 + 76*d - 128*e + 208*f - 320*g +
 448*h - 512*i)*log(x + 2) + 8*((d - 4*e + 7*f - 10*g + 13*h - 16*i)*x^4 -
5*(d - 4*e + 7*f - 10*g + 13*h - 16*i)*x^2 + 4*d - 16*e + 28*f - 40*g + 52*
h - 64*i)*log(x + 1) - 8*((d + 4*e + 7*f + 10*g + 13*h + 16*i)*x^4 - 5*(d +
 4*e + 7*f + 10*g + 13*h + 16*i)*x^2 + 4*d + 16*e + 28*f + 40*g + 52*h + 64
*i)*log(x - 1) + ((19*d + 32*e + 52*f + 80*g + 112*h + 128*i)*x^4 - 5*(19*d
 + 32*e + 52*f + 80*g + 112*h + 128*i)*x^2 + 76*d + 128*e + 208*f + 320*g +
 448*h + 512*i)*log(x - 2) - 240*e - 384*g - 960*i)/(x^4 - 5*x^2 + 4)
```

giac [A] time = 0.32, size = 179, normalized size = 1.10

$$\frac{1}{864}\left(19d+52f-80g+112h-128i-32e\right)\log\left(|x+2|\right)-\frac{1}{108}\left(d+7f-10g+13h-16i-4e\right)\log\left(|x+1|\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="gia
c")
```

```
[Out] 1/864*(19*d + 52*f - 80*g + 112*h - 128*i - 32*e)*log(abs(x + 2)) - 1/108*(
d + 7*f - 10*g + 13*h - 16*i - 4*e)*log(abs(x + 1)) + 1/108*(d + 7*f + 10*g
 + 13*h + 16*i + 4*e)*log(abs(x - 1)) - 1/864*(19*d + 52*f + 80*g + 112*h +
 128*i + 32*e)*log(abs(x - 2)) - 1/72*(5*d*x^3 + 8*f*x^3 + 20*h*x^3 + 20*g*
x^2 + 68*i*x^2 + 8*x^2*e - 17*d*x - 20*f*x - 32*h*x - 32*g - 80*i - 20*e)/(
x^4 - 5*x^2 + 4)
```

maple [B] time = 0.02, size = 362, normalized size = 2.23

$$-\frac{4i\ln(x+2)}{27}+\frac{4i\ln(x-1)}{27}+\frac{4i\ln(x+1)}{27}-\frac{4i\ln(x-2)}{27}+\frac{7h\ln(x+2)}{54}+\frac{13h\ln(x-1)}{108}-\frac{13h\ln(x+1)}{108}-\frac{7h\ln(x-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] -4/27*i*ln(x+2)+4/27*i*ln(x-1)+4/27*i*ln(x+1)-4/27*i*ln(x-2)+7/54*h*ln(x+2)
+13/108*h*ln(x-1)-13/108*h*ln(x+1)-7/54*h*ln(x-2)+5/54*g*ln(x-1)-5/54*g*ln(
x+2)-5/54*g*ln(x-2)+5/54*g*ln(x+1)+19/864*d*ln(x+2)-1/27*e*ln(x+2)+1/27*e*l
n(x-1)+1/108*d*ln(x-1)+1/27*e*ln(x+1)-1/108*d*ln(x+1)-19/864*d*ln(x-2)-1/27
*e*ln(x-2)-13/216*f*ln(x-2)-7/108*f*ln(x+1)+7/108*f*ln(x-1)+13/216*f*ln(x+2
)+2/9/(x+2)*i+1/36/(x+1)*i-1/36/(x-1)*i-2/9/(x-2)*i-1/9/(x+2)*h-1/36/(x+1)*
h-1/36/(x-1)*h-1/9/(x-2)*h+1/18/(x+2)*g+1/36/(x+1)*g-1/36/(x-1)*g-1/18/(x-2
)*g-1/144/(x+2)*d+1/72/(x+2)*e-1/144/(x-2)*d-1/72/(x-2)*e-1/36/(x+1)*d+1/36
/(x+1)*e-1/36/(x-1)*d-1/36/(x-1)*e-1/36/(x-1)*f-1/36/(x+2)*f-1/36/(x-2)*f-1
/36/(x+1)*f
```

maxima [A] time = 1.35, size = 163, normalized size = 1.01

$$\frac{1}{864}\left(19d-32e+52f-80g+112h-128i\right)\log(x+2)-\frac{1}{108}\left(d-4e+7f-10g+13h-16i\right)\log(x+1)+\frac{1}{10}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="max
ima")
```

```
[Out] 1/864*(19*d - 32*e + 52*f - 80*g + 112*h - 128*i)*log(x + 2) - 1/108*(d - 4
*e + 7*f - 10*g + 13*h - 16*i)*log(x + 1) + 1/108*(d + 4*e + 7*f + 10*g + 1
3*h + 16*i)*log(x - 1) - 1/864*(19*d + 32*e + 52*f + 80*g + 112*h + 128*i)*
log(x - 2) - 1/72*((5*d + 8*f + 20*h)*x^3 + 4*(2*e + 5*g + 17*i)*x^2 - (17*
d + 20*f + 32*h)*x - 20*e - 32*g - 80*i)/(x^4 - 5*x^2 + 4)
```

mupad [B] time = 0.58, size = 164, normalized size = 1.01

$$\frac{\left(-\frac{5d}{72}-\frac{f}{9}-\frac{5h}{18}\right)x^3+\left(-\frac{e}{9}-\frac{5g}{18}-\frac{17i}{18}\right)x^2+\left(\frac{17d}{72}+\frac{5f}{18}+\frac{4h}{9}\right)x+\frac{5e}{18}+\frac{4g}{9}+\frac{10i}{9}}{x^4-5x^2+4}+\ln(x-1)\left(\frac{d}{108}+\frac{e}{27}+\frac{7f}{108}+\frac{5}{5}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] ((5*e)/18 + (4*g)/9 + (10*i)/9 + x*((17*d)/72 + (5*f)/18 + (4*h)/9) - x^3*(
(5*d)/72 + f/9 + (5*h)/18) - x^2*(e/9 + (5*g)/18 + (17*i)/18))/(x^4 - 5*x^2
 + 4) + log(x - 1)*(d/108 + e/27 + (7*f)/108 + (5*g)/54 + (13*h)/108 + (4*i
)/27) - log(x + 1)*(d/108 - e/27 + (7*f)/108 - (5*g)/54 + (13*h)/108 - (4*i
```

```
)/27) - log(x - 2)*((19*d)/864 + e/27 + (13*f)/216 + (5*g)/54 + (7*h)/54 +
(4*i)/27) + log(x + 2)*((19*d)/864 - e/27 + (13*f)/216 - (5*g)/54 + (7*h)/5
4 - (4*i)/27)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

3.31 $\int \frac{d+ex}{(1+x^2+x^4)^2}\,dx$

Optimal. Leaf size=140

$$-\frac{1}{4}d\log\left(x^2-x+1\right)+\frac{1}{4}d\log\left(x^2+x+1\right)+\frac{dx\left(1-x^2\right)}{6\left(x^4+x^2+1\right)}-\frac{d\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}+\frac{d\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{3\sqrt{3}}+\frac{2e\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{3\sqrt{3}}+\frac{}{6}$$

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

Rubi [A] time = 0.10, antiderivative size = 140, normalized size of antiderivative = 1.00, number of steps used = 17, number of rules used = 10, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {1673, 12, 1092, 1169, 634, 618, 204, 628, 1107, 614}

$$\frac{dx\left(1-x^2\right)}{6\left(x^4+x^2+1\right)}-\frac{1}{4}d\log\left(x^2-x+1\right)+\frac{1}{4}d\log\left(x^2+x+1\right)-\frac{d\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}+\frac{d\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{3\sqrt{3}}+\frac{e\left(2x^2+1\right)}{6\left(x^4+x^2+1\right)}+\frac{2e\tan}{}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)/(1 + x^2 + x^4)^2,x]
```

```
[Out] (d*x*(1 - x^2))/(6*(1 + x^2 + x^4)) + (e*(1 + 2*x^2))/(6*(1 + x^2 + x^4)) -
 (d*ArcTan[(1 - 2*x)/Sqrt[3]])/(3*Sqrt[3]) + (d*ArcTan[(1 + 2*x)/Sqrt[3]])/
(3*Sqrt[3]) + (2*e*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - (d*Log[1 - x
+ x^2])/4 + (d*Log[1 + x + 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 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1092

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> -Simp[(x*(b^2 -
 2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)),
 x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(b^2 - 2*a*c + 2*(p + 1)*(b^2
 - 4*a*c) + b*c*(4*p + 7)*x^2)*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ
[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex}{\left(1+x^2+x^4\right)^2}\,dx = \int \frac{d}{\left(1+x^2+x^4\right)^2}\,dx + \int \frac{ex}{\left(1+x^2+x^4\right)^2}\,dx$$

$$= d\int \frac{1}{\left(1+x^2+x^4\right)^2}\,dx + e\int \frac{x}{\left(1+x^2+x^4\right)^2}\,dx$$

$$= \frac{dx\left(1-x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{6}d\int \frac{5-x^2}{1+x^2+x^4}\,dx + \frac{1}{2}e\,\text{Subst}\left(\int \frac{1}{\left(1+x+x^2\right)^2}\,dx, x, x^2\right)$$

$$= \frac{dx\left(1-x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{12}d\int \frac{5-6x}{1-x+x^2}\,dx + \frac{1}{12}d\int \frac{5+6x}{1+x+x^2}\,dx + \frac{1}{3}e\,\text{Su}$$

$$= \frac{dx\left(1-x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{6}d\int \frac{1}{1-x+x^2}\,dx + \frac{1}{6}d\int \frac{1}{1+x+x^2}\,dx - \frac{1}{4}d\int \frac{}{1}$$

$$= \frac{dx\left(1-x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{2e\tan^{-1}\left(\frac{1+2x^2}{\sqrt{3}}\right)}{3\sqrt{3}} - \frac{1}{4}d\log\left(1-x+x^2\right) + \frac{1}{4}d\log\left(1+\right.$$

$$= \frac{dx\left(1-x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} - \frac{d\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}} + \frac{d\tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{3\sqrt{3}} + \frac{2e\tan^{-1}\left(\frac{1+2x^2}{\sqrt{3}}\right)}{3\sqrt{3}} -$$

Mathematica [C] time = 0.49, size = 146, normalized size = 1.04

$$\frac{d\left(x-x^3\right)+2ex^2+e}{6\left(x^4+x^2+1\right)} - \frac{\left(\sqrt{3}-11i\right)d\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}-i\right)x\right)}{6\sqrt{6+6i\sqrt{3}}} - \frac{\left(\sqrt{3}+11i\right)d\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}+i\right)x\right)}{6\sqrt{6-6i\sqrt{3}}} - \frac{2e\tan^{-1}\left(\frac{\sqrt{3}}{2x^2+1}\right)}{3\sqrt{3}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x)/(1 + x^2 + x^4)^2,x]
```

```
[Out] (e + 2*e*x^2 + d*(x - x^3))/(6*(1 + x^2 + x^4)) - ((-11*I + Sqrt[3])*d*ArcT
an[((-I + Sqrt[3])*x)/2])/(6*Sqrt[6 + (6*I)*Sqrt[3]]) - ((11*I + Sqrt[3])*d
*ArcTan[((I + Sqrt[3])*x)/2])/(6*Sqrt[6 - (6*I)*Sqrt[3]]) - (2*e*ArcTan[Sqr
t[3]/(1 + 2*x^2)])/(3*Sqrt[3])
```

fricas [A] time = 1.09, size = 154, normalized size = 1.10

$$-\frac{6\,dx^3 - 12\,ex^2 - 4\,\sqrt{3}\left((d-2\,e)x^4 + (d-2\,e)x^2 + d - 2\,e\right)\arctan\left(\frac{1}{3}\,\sqrt{3}\,(2\,x+1)\right) - 4\,\sqrt{3}\left((d+2\,e)x^4 + (d+2\,e)\right.}{36}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4+x^2+1)^2,x, algorithm="fricas")
```

```
[Out] -1/36*(6*d*x^3 - 12*e*x^2 - 4*sqrt(3)*((d - 2*e)*x^4 + (d - 2*e)*x^2 + d -
2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) - 4*sqrt(3)*((d + 2*e)*x^4 + (d + 2*e)*x
^2 + d + 2*e)*arctan(1/3*sqrt(3)*(2*x - 1)) - 6*d*x - 9*(d*x^4 + d*x^2 + d)
*log(x^2 + x + 1) + 9*(d*x^4 + d*x^2 + d)*log(x^2 - x + 1) - 6*e)/(x^4 + x^
2 + 1)
```

giac [A] time = 0.24, size = 100, normalized size = 0.71

$$\frac{1}{9}\,\sqrt{3}\,(d-2\,e)\arctan\left(\frac{1}{3}\,\sqrt{3}\,(2\,x+1)\right)+\frac{1}{9}\,\sqrt{3}\,(d+2\,e)\arctan\left(\frac{1}{3}\,\sqrt{3}\,(2\,x-1)\right)+\frac{1}{4}\,d\log\left(x^2+x+1\right)-\frac{1}{4}\,d\log\left(x^2-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4+x^2+1)^2,x, algorithm="giac")
```

```
[Out] 1/9*sqrt(3)*(d - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/9*sqrt(3)*(d + 2*e)
*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*d*log(x^2 + x + 1) - 1/4*d*log(x^2 - x
 + 1) - 1/6*(d*x^3 - 2*x^2*e - d*x - e)/(x^4 + x^2 + 1)
```

maple [A] time = 0.01, size = 146, normalized size = 1.04

$$\frac{\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9}+\frac{\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9}-\frac{d\ln\left(x^2-x+1\right)}{4}+\frac{d\ln\left(x^2+x+1\right)}{4}-\frac{2\sqrt{3}\,e\arctan\left(\frac{(2x+1)\sqrt{}}{3}\right.}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)/(x^4+x^2+1)^2,x)
```

```
[Out] 1/4*((-1/3*d-1/3*e)*x-2/3*d+1/3*e)/(x^2+x+1)+1/4*d*ln(x^2+x+1)+1/9*3^(1/2)*
d*arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))-1/4
*((1/3*d-1/3*e)*x-2/3*d-1/3*e)/(x^2-x+1)-1/4*d*ln(x^2-x+1)+1/9*3^(1/2)*d*ar
ctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(1/2)*e*arctan(1/3*(2*x-1)*3^(1/2))
```

maxima [A] time = 2.42, size = 96, normalized size = 0.69

$$\frac{1}{9}\sqrt{3}\,(d-2\,e)\arctan\left(\frac{1}{3}\sqrt{3}\,(2\,x+1)\right)+\frac{1}{9}\sqrt{3}\,(d+2\,e)\arctan\left(\frac{1}{3}\sqrt{3}\,(2\,x-1)\right)+\frac{1}{4}\,d\log\left(x^2+x+1\right)-\frac{1}{4}\,d\log\left(\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4+x^2+1)^2,x, algorithm="maxima")
```

```
[Out] 1/9*sqrt(3)*(d - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/9*sqrt(3)*(d + 2*e)
*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*d*log(x^2 + x + 1) - 1/4*d*log(x^2 - x
 + 1) - 1/6*(d*x^3 - 2*e*x^2 - d*x - e)/(x^4 + x^2 + 1)
```

mupad [B] time = 0.25, size = 149, normalized size = 1.06

$$\frac{-\frac{d\,x^3}{6}+\frac{e\,x^2}{3}+\frac{d\,x}{6}+\frac{e}{6}}{x^4+x^2+1}-\ln\left(x-\frac{1}{2}-\frac{\sqrt{3}\,1\mathrm{i}}{2}\right)\left(\frac{d}{4}+\frac{\sqrt{3}\,d\,1\mathrm{i}}{18}+\frac{\sqrt{3}\,e\,1\mathrm{i}}{9}\right)+\ln\left(x+\frac{1}{2}-\frac{\sqrt{3}\,1\mathrm{i}}{2}\right)\left(\frac{d}{4}-\frac{\sqrt{3}\,d\,1\mathrm{i}}{18}+\frac{\sqrt{3}}{9}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x)/(x^2 + x^4 + 1)^2,x)
```

```
[Out] (e/6 + (d*x)/6 - (d*x^3)/6 + (e*x^2)/3)/(x^2 + x^4 + 1) - log(x - (3^(1/2)*
1i)/2 - 1/2)*(d/4 + (3^(1/2)*d*1i)/18 + (3^(1/2)*e*1i)/9) + log(x - (3^(1/2
)*1i)/2 + 1/2)*(d/4 - (3^(1/2)*d*1i)/18 + (3^(1/2)*e*1i)/9) + log(x + (3^(1
/2)*1i)/2 - 1/2)*((3^(1/2)*d*1i)/18 - d/4 + (3^(1/2)*e*1i)/9) + log(x + (3^
(1/2)*1i)/2 + 1/2)*(d/4 + (3^(1/2)*d*1i)/18 - (3^(1/2)*e*1i)/9)
```

sympy [C] time = 3.49, size = 952, normalized size = 6.80

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x**4+x**2+1)**2,x)
```

```
[Out] (-d/4 - sqrt(3)*I*(d + 2*e)/18)*log(x + (-10309*d**4*e + 1026*d**4*(-d/4 -
sqrt(3)*I*(d + 2*e)/18) - 7200*d**2*e**3 - 31536*d**2*e**2*(-d/4 - sqrt(3)*
I*(d + 2*e)/18) + 108432*d**2*e*(-d/4 - sqrt(3)*I*(d + 2*e)/18)**2 + 163296
```

```
*d**2*(-d/4 - sqrt(3)*I*(d + 2*e)/18)**3 + 1792*e**5 + 11520*e**4*(-d/4 - s
qrt(3)*I*(d + 2*e)/18) + 48384*e**3*(-d/4 - sqrt(3)*I*(d + 2*e)/18)**2 + 31
1040*e**2*(-d/4 - sqrt(3)*I*(d + 2*e)/18)**3)/(3348*d**5 - 11408*d**3*e**2
- 7936*d*e**4)) + (-d/4 + sqrt(3)*I*(d + 2*e)/18)*log(x + (-10309*d**4*e +
1026*d**4*(-d/4 + sqrt(3)*I*(d + 2*e)/18) - 7200*d**2*e**3 - 31536*d**2*e**
2*(-d/4 + sqrt(3)*I*(d + 2*e)/18) + 108432*d**2*e*(-d/4 + sqrt(3)*I*(d + 2*
e)/18)**2 + 163296*d**2*(-d/4 + sqrt(3)*I*(d + 2*e)/18)**3 + 1792*e**5 + 11
520*e**4*(-d/4 + sqrt(3)*I*(d + 2*e)/18) + 48384*e**3*(-d/4 + sqrt(3)*I*(d
+ 2*e)/18)**2 + 311040*e**2*(-d/4 + sqrt(3)*I*(d + 2*e)/18)**3)/(3348*d**5
- 11408*d**3*e**2 - 7936*d*e**4)) + (d/4 - sqrt(3)*I*(d - 2*e)/18)*log(x +
(-10309*d**4*e + 1026*d**4*(d/4 - sqrt(3)*I*(d - 2*e)/18) - 7200*d**2*e**3
- 31536*d**2*e**2*(d/4 - sqrt(3)*I*(d - 2*e)/18) + 108432*d**2*e*(d/4 - sqr
t(3)*I*(d - 2*e)/18)**2 + 163296*d**2*(d/4 - sqrt(3)*I*(d - 2*e)/18)**3 + 1
792*e**5 + 11520*e**4*(d/4 - sqrt(3)*I*(d - 2*e)/18) + 48384*e**3*(d/4 - sq
rt(3)*I*(d - 2*e)/18)**2 + 311040*e**2*(d/4 - sqrt(3)*I*(d - 2*e)/18)**3)/(
3348*d**5 - 11408*d**3*e**2 - 7936*d*e**4)) + (d/4 + sqrt(3)*I*(d - 2*e)/18
)*log(x + (-10309*d**4*e + 1026*d**4*(d/4 + sqrt(3)*I*(d - 2*e)/18) - 7200*
d**2*e**3 - 31536*d**2*e**2*(d/4 + sqrt(3)*I*(d - 2*e)/18) + 108432*d**2*e*
(d/4 + sqrt(3)*I*(d - 2*e)/18)**2 + 163296*d**2*(d/4 + sqrt(3)*I*(d - 2*e)/
18)**3 + 1792*e**5 + 11520*e**4*(d/4 + sqrt(3)*I*(d - 2*e)/18) + 48384*e**3
*(d/4 + sqrt(3)*I*(d - 2*e)/18)**2 + 311040*e**2*(d/4 + sqrt(3)*I*(d - 2*e)
/18)**3)/(3348*d**5 - 11408*d**3*e**2 - 7936*d*e**4)) + (-d*x**3 + d*x + 2*
e*x**2 + e)/(6*x**4 + 6*x**2 + 6)
```

3.32 $\int \frac{d+ex+fx^2}{\left(1+x^2+x^4\right)^2} dx$

Optimal. Leaf size=165

$$-\frac{1}{8}(2d-f)\log\left(x^2-x+1\right)+\frac{1}{8}(2d-f)\log\left(x^2+x+1\right)+\frac{x\left(-\left(x^2(d-2f)\right)+d+f\right)}{6\left(x^4+x^2+1\right)}-\frac{(4d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}+\frac{(4d}{}$$

```
[Out] 1/6*e*(2*x^2+1)/(x^4+x^2+1)+1/6*x*(d+f-(d-2*f)*x^2)/(x^4+x^2+1)-1/8*(2*d-f)
*ln(x^2-x+1)+1/8*(2*d-f)*ln(x^2+x+1)-1/36*(4*d+f)*arctan(1/3*(1-2*x)*3^(1/2
))*3^(1/2)+1/36*(4*d+f)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+2/9*e*arctan(1/
3*(2*x^2+1)*3^(1/2))*3^(1/2)
```

Rubi [A] time = 0.13, antiderivative size = 165, normalized size of antiderivative = 1.00, number of steps used = 16, number of rules used = 10, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.476$, Rules used = {1673, 1178, 1169, 634, 618, 204, 628, 12, 1107, 614}

$$\frac{x\left(x^2(-(d-2f))+d+f\right)}{6\left(x^4+x^2+1\right)}-\frac{1}{8}(2d-f)\log\left(x^2-x+1\right)+\frac{1}{8}(2d-f)\log\left(x^2+x+1\right)-\frac{(4d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}+\frac{(4d+}{}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)/(1 + x^2 + x^4)^2,x]
```

```
[Out] (e*(1 + 2*x^2))/(6*(1 + x^2 + x^4)) + (x*(d + f - (d - 2*f)*x^2))/(6*(1 + x
^2 + x^4)) - ((4*d + f)*ArcTan[(1 - 2*x)/Sqrt[3]])/(12*Sqrt[3]) + ((4*d + f
)*ArcTan[(1 + 2*x)/Sqrt[3]])/(12*Sqrt[3]) + (2*e*ArcTan[(1 + 2*x^2)/Sqrt[3]
])/(3*Sqrt[3]) - ((2*d - f)*Log[1 - x + x^2])/8 + ((2*d - f)*Log[1 + x + x^
2])/8
```

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 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
```

```
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2}{\left(1+x^2+x^4\right)^2}\,dx = \int \frac{ex}{\left(1+x^2+x^4\right)^2}\,dx + \int \frac{d+fx^2}{\left(1+x^2+x^4\right)^2}\,dx$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{6}\int \frac{5d-f+(-d+2f)x^2}{1+x^2+x^4}\,dx + e\int \frac{x}{\left(1+x^2+x^4\right)^2}\,dx$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{12}\int \frac{5d-f-(6d-3f)x}{1-x+x^2}\,dx + \frac{1}{12}\int \frac{5d-f+(6d-3f)x}{1+x+x^2}\,d$$

$$= \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{x\left(d+f-(d-2f)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{3}e\,\mathrm{Subst}\left(\int \frac{1}{1+x+x^2}\,dx, x, x^2\right) + \frac{1}{8}(2d$$

$$= \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{x\left(d+f-(d-2f)x^2\right)}{6\left(1+x^2+x^4\right)} - \frac{1}{8}(2d-f)\log\left(1-x+x^2\right) + \frac{1}{8}(2d-f)\log$$

$$= \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{x\left(d+f-(d-2f)x^2\right)}{6\left(1+x^2+x^4\right)} - \frac{(4d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}} + \frac{(4d+f)\tan^{-1}\left(\frac{1+}{\sqrt{}}\right.}{12\sqrt{3}}$$

Mathematica [C] time = 0.42, size = 186, normalized size = 1.13

$$\frac{1}{36}\left(\frac{6\left(x\left(-dx^2+d+2fx^2+f\right)+2ex^2+e\right)}{x^4+x^2+1} - \frac{\left(\left(\sqrt{3}-11i\right)d-2\left(\sqrt{3}-2i\right)f\right)\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}-i\right)x\right)}{\sqrt{\frac{1}{6}\left(1+i\sqrt{3}\right)}} - \frac{\left(\left(\sqrt{3}+\right.\right.}{}\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x + f*x^2)/(1 + x^2 + x^4)^2,x]
```

```
[Out] ((6*(e + 2*e*x^2 + x*(d + f - d*x^2 + 2*f*x^2)))/(1 + x^2 + x^4) - (((-11*I
 + Sqrt[3])*d - 2*(-2*I + Sqrt[3])*f)*ArcTan[((-I + Sqrt[3])*x)/2])/Sqrt[(1
 + I*Sqrt[3])/6] - (((11*I + Sqrt[3])*d - 2*(2*I + Sqrt[3])*f)*ArcTan[((I +
 Sqrt[3])*x)/2])/Sqrt[(1 - I*Sqrt[3])/6] - 8*Sqrt[3]*e*ArcTan[Sqrt[3]/(1 +
2*x^2)])/36
```

fricas [A] time = 0.93, size = 212, normalized size = 1.28

$$-\frac{12\left(d-2f\right)x^3-24ex^2-2\sqrt{3}\left(\left(4d-8e+f\right)x^4+\left(4d-8e+f\right)x^2+4d-8e+f\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="fricas")
```

```
[Out] -1/72*(12*(d - 2*f)*x^3 - 24*e*x^2 - 2*sqrt(3)*((4*d - 8*e + f)*x^4 + (4*d
- 8*e + f)*x^2 + 4*d - 8*e + f)*arctan(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(3)*(
(4*d + 8*e + f)*x^4 + (4*d + 8*e + f)*x^2 + 4*d + 8*e + f)*arctan(1/3*sqrt(
3)*(2*x - 1)) - 12*(d + f)*x - 9*((2*d - f)*x^4 + (2*d - f)*x^2 + 2*d - f)*
log(x^2 + x + 1) + 9*((2*d - f)*x^4 + (2*d - f)*x^2 + 2*d - f)*log(x^2 - x
+ 1) - 12*e)/(x^4 + x^2 + 1)
```

giac [A] time = 0.23, size = 128, normalized size = 0.78

$$\frac{1}{36}\sqrt{3}\left(4d+f-8e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{36}\sqrt{3}\left(4d+f+8e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x-1\right)\right)+\frac{1}{8}\left(2d-f\right)\log\left(\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="giac")
```

```
[Out] 1/36*sqrt(3)*(4*d + f - 8*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/36*sqrt(3)*(
4*d + f + 8*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/8*(2*d - f)*log(x^2 + x +
1) - 1/8*(2*d - f)*log(x^2 - x + 1) - 1/6*(d*x^3 - 2*f*x^3 - 2*x^2*e - d*x
- f*x - e)/(x^4 + x^2 + 1)
```

maple [A] time = 0.01, size = 214, normalized size = 1.30

$$\frac{\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9}+\frac{\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9}-\frac{d\ln\left(x^2-x+1\right)}{4}+\frac{d\ln\left(x^2+x+1\right)}{4}-\frac{2\sqrt{3}\,e\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)/(x^4+x^2+1)^2,x)
```

```
[Out] 1/4*((-1/3*d-1/3*e+2/3*f)*x-2/3*d+1/3*e+1/3*f)/(x^2+x+1)+1/4*d*ln(x^2+x+1)-
1/8*f*ln(x^2+x+1)+1/9*3^(1/2)*d*arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*a
rctan(1/3*(2*x+1)*3^(1/2))+1/36*3^(1/2)*f*arctan(1/3*(2*x+1)*3^(1/2))-1/4*(
(1/3*d-1/3*e-2/3*f)*x-2/3*d-1/3*e+1/3*f)/(x^2-x+1)-1/4*d*ln(x^2-x+1)+1/8*f*
ln(x^2-x+1)+1/9*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(1/2)*e*arctan(
1/3*(2*x-1)*3^(1/2))+1/36*3^(1/2)*f*arctan(1/3*(2*x-1)*3^(1/2))
```

maxima [A] time = 2.39, size = 120, normalized size = 0.73

$$\frac{1}{36}\sqrt{3}\left(4\,d-8\,e+f\right)\arctan\left(\frac{1}{3}\sqrt{3}\,(2\,x+1)\right)+\frac{1}{36}\sqrt{3}\left(4\,d+8\,e+f\right)\arctan\left(\frac{1}{3}\sqrt{3}\,(2\,x-1)\right)+\frac{1}{8}\left(2\,d-f\right)\log\left(x^2\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="maxima")
```

```
[Out] 1/36*sqrt(3)*(4*d - 8*e + f)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/36*sqrt(3)*(
4*d + 8*e + f)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/8*(2*d - f)*log(x^2 + x +
1) - 1/8*(2*d - f)*log(x^2 - x + 1) - 1/6*((d - 2*f)*x^3 - 2*e*x^2 - (d + f
)*x - e)/(x^4 + x^2 + 1)
```

mupad [B] time = 0.32, size = 201, normalized size = 1.22

$$\frac{\left(\frac{f}{3}-\frac{d}{6}\right)x^3+\frac{e\,x^2}{3}+\left(\frac{d}{6}+\frac{f}{6}\right)x+\frac{e}{6}}{x^4+x^2+1}-\ln\left(x-\frac{1}{2}-\frac{\sqrt{3}\,1\mathrm{i}}{2}\right)\left(\frac{d}{4}-\frac{f}{8}+\frac{\sqrt{3}\,d\,1\mathrm{i}}{18}+\frac{\sqrt{3}\,e\,1\mathrm{i}}{9}+\frac{\sqrt{3}\,f\,1\mathrm{i}}{72}\right)-\ln\left(x+\frac{1}{2}-\frac{\sqrt{3}}{2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2)/(x^2 + x^4 + 1)^2,x)
```

```
[Out] (e/6 - x^3*(d/6 - f/3) + (e*x^2)/3 + x*(d/6 + f/6))/(x^2 + x^4 + 1) - log(x
 - (3^(1/2)*1i)/2 - 1/2)*(d/4 - f/8 + (3^(1/2)*d*1i)/18 + (3^(1/2)*e*1i)/9
+ (3^(1/2)*f*1i)/72) - log(x - (3^(1/2)*1i)/2 + 1/2)*(f/8 - d/4 + (3^(1/2)*
d*1i)/18 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72) + log(x + (3^(1/2)*1i)/2 -
 1/2)*(f/8 - d/4 + (3^(1/2)*d*1i)/18 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72
) + log(x + (3^(1/2)*1i)/2 + 1/2)*(d/4 - f/8 + (3^(1/2)*d*1i)/18 - (3^(1/2)
*e*1i)/9 + (3^(1/2)*f*1i)/72)
```

sympy [C] time = 108.82, size = 4106, normalized size = 24.88

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(x**4+x**2+1)**2,x)
```

```
[Out] (-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)*log(x + (-164944*d**5*e + 16416
*d**5*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) + 336520*d**4*e*f + 20066
4*d**4*f*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) - 115200*d**3*e**3 - 5
04576*d**3*e**2*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) - 272380*d**3*e
*f**2 + 1734912*d**3*e*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**2 - 229
500*d**3*f**2*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) + 2612736*d**3*(-
d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**3 + 51840*d**2*e**3*f + 881280*d
**2*e**2*f*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) + 119420*d**2*e*f**3
 - 2477952*d**2*e*f*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**2 + 50436*
d**2*f**3*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) - 2519424*d**2*f*(-d/
4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**3 + 28672*d*e**5 + 184320*d*e**4*(
-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) + 8640*d*e**3*f**2 + 774144*d*e*
*3*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**2 - 409536*d*e**2*f**2*(-d/
4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) + 4976640*d*e**2*(-d/4 + f/8 - sqrt
(3)*I*(4*d + 8*e + f)/72)**3 - 31040*d*e*f**4 + 1270080*d*e*f**2*(-d/4 + f/
8 - sqrt(3)*I*(4*d + 8*e + f)/72)**2 + 14040*d*f**4*(-d/4 + f/8 - sqrt(3)*I
*(4*d + 8*e + f)/72) + 139968*d*f**2*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f
)/72)**3 - 20480*e**5*f - 36864*e**4*f*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e +
 f)/72) - 2880*e**3*f**3 - 552960*e**3*f*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e
 + f)/72)**2 + 70848*e**2*f**3*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)
- 995328*e**2*f*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**3 + 3956*e*f**
5 - 209088*e*f**3*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**2 - 3996*f**
5*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) + 233280*f**3*(-d/4 + f/8 - s
qrt(3)*I*(4*d + 8*e + f)/72)**3)/(53568*d**6 - 69984*d**5*f - 182528*d**4*e
**2 + 23652*d**4*f**2 + 377344*d**3*e**2*f + 5400*d**3*f**3 - 126976*d**2*e
**4 - 278400*d**2*e**2*f**2 - 4131*d**2*f**4 + 102400*d*e**4*f + 93568*d*e*
*2*f**3 + 81*d*f**5 - 28672*e**4*f**2 - 11648*e**2*f**4 + 189*f**6)) + (-d/
4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)*log(x + (-164944*d**5*e + 16416*d**
5*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) + 336520*d**4*e*f + 200664*d*
*4*f*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) - 115200*d**3*e**3 - 50457
6*d**3*e**2*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) - 272380*d**3*e*f**
2 + 1734912*d**3*e*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)**2 - 229500*
d**3*f**2*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) + 2612736*d**3*(-d/4
+ f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)**3 + 51840*d**2*e**3*f + 881280*d**2*
e**2*f*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) + 119420*d**2*e*f**3 - 2
477952*d**2*e*f*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)**2 + 50436*d**2
*f**3*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) - 2519424*d**2*f*(-d/4 +
f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)**3 + 28672*d*e**5 + 184320*d*e**4*(-d/4
 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) + 8640*d*e**3*f**2 + 774144*d*e**3*(
-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)**2 - 409536*d*e**2*f**2*(-d/4 +
f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) + 4976640*d*e**2*(-d/4 + f/8 + sqrt(3)*
I*(4*d + 8*e + f)/72)**3 - 31040*d*e*f**4 + 1270080*d*e*f**2*(-d/4 + f/8 +
sqrt(3)*I*(4*d + 8*e + f)/72)**2 + 14040*d*f**4*(-d/4 + f/8 + sqrt(3)*I*(4*
d + 8*e + f)/72) + 139968*d*f**2*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72
)**3 - 20480*e**5*f - 36864*e**4*f*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/
72) - 2880*e**3*f**3 - 552960*e**3*f*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f
)/72)**2 + 70848*e**2*f**3*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) - 99
5328*e**2*f*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)**3 + 3956*e*f**5 -
209088*e*f**3*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)**2 - 3996*f**5*(-
d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) + 233280*f**3*(-d/4 + f/8 + sqrt(
3)*I*(4*d + 8*e + f)/72)**3)/(53568*d**6 - 69984*d**5*f - 182528*d**4*e**2
+ 23652*d**4*f**2 + 377344*d**3*e**2*f + 5400*d**3*f**3 - 126976*d**2*e**4
- 278400*d**2*e**2*f**2 - 4131*d**2*f**4 + 102400*d*e**4*f + 93568*d*e**2*f
**3 + 81*d*f**5 - 28672*e**4*f**2 - 11648*e**2*f**4 + 189*f**6)) + (d/4 - f
/8 - sqrt(3)*I*(4*d - 8*e + f)/72)*log(x + (-164944*d**5*e + 16416*d**5*(d/
4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72) + 336520*d**4*e*f + 200664*d**4*f*(
d/4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72) - 115200*d**3*e**3 - 504576*d**3*
e**2*(d/4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72) - 272380*d**3*e*f**2 + 1734
```

```
912*d**3*e*(d/4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72)**2 - 229500*d**3*f**2
*(d/4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72) + 2612736*d**3*(d/4 - f/8 - sqr
t(3)*I*(4*d - 8*e + f)/72)**3 + 51840*d**2*e**3*f + 881280*d**2*e**2*f*(d/4
 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72) + 119420*d**2*e*f**3 - 2477952*d**2*
e*f*(d/4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72)**2 + 50436*d**2*f**3*(d/4 -
f/8 - sqrt(3)*I*(4*d - 8*e + f)/72) - 2519424*d**2*f*(d/4 - f/8 - sqrt(3)*I
*(4*d - 8*e + f)/72)**3 + 28672*d*e**5 + 184320*d*e**4*(d/4 - f/8 - sqrt(3)
*I*(4*d - 8*e + f)/72) + 8640*d*e**3*f**2 + 774144*d*e**3*(d/4 - f/8 - sqrt
(3)*I*(4*d - 8*e + f)/72)**2 - 409536*d*e**2*f**2*(d/4 - f/8 - sqrt(3)*I*(4
*d - 8*e + f)/72) + 4976640*d*e**2*(d/4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/7
2)**3 - 31040*d*e*f**4 + 1270080*d*e*f**2*(d/4 - f/8 - sqrt(3)*I*(4*d - 8*e
 + f)/72)**2 + 14040*d*f**4*(d/4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72) + 13
9968*d*f**2*(d/4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72)**3 - 20480*e**5*f -
36864*e**4*f*(d/4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72) - 2880*e**3*f**3 -
552960*e**3*f*(d/4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72)**2 + 70848*e**2*f*
*3*(d/4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72) - 995328*e**2*f*(d/4 - f/8 -
sqrt(3)*I*(4*d - 8*e + f)/72)**3 + 3956*e*f**5 - 209088*e*f**3*(d/4 - f/8 -
 sqrt(3)*I*(4*d - 8*e + f)/72)**2 - 3996*f**5*(d/4 - f/8 - sqrt(3)*I*(4*d -
 8*e + f)/72) + 233280*f**3*(d/4 - f/8 - sqrt(3)*I*(4*d - 8*e + f)/72)**3)/
(53568*d**6 - 69984*d**5*f - 182528*d**4*e**2 + 23652*d**4*f**2 + 377344*d*
*3*e**2*f + 5400*d**3*f**3 - 126976*d**2*e**4 - 278400*d**2*e**2*f**2 - 413
1*d**2*f**4 + 102400*d*e**4*f + 93568*d*e**2*f**3 + 81*d*f**5 - 28672*e**4*
f**2 - 11648*e**2*f**4 + 189*f**6)) + (d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f
)/72)*log(x + (-164944*d**5*e + 16416*d**5*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*
e + f)/72) + 336520*d**4*e*f + 200664*d**4*f*(d/4 - f/8 + sqrt(3)*I*(4*d -
8*e + f)/72) - 115200*d**3*e**3 - 504576*d**3*e**2*(d/4 - f/8 + sqrt(3)*I*(
4*d - 8*e + f)/72) - 272380*d**3*e*f**2 + 1734912*d**3*e*(d/4 - f/8 + sqrt(
3)*I*(4*d - 8*e + f)/72)**2 - 229500*d**3*f**2*(d/4 - f/8 + sqrt(3)*I*(4*d
- 8*e + f)/72) + 2612736*d**3*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f)/72)**3
 + 51840*d**2*e**3*f + 881280*d**2*e**2*f*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*e
 + f)/72) + 119420*d**2*e*f**3 - 2477952*d**2*e*f*(d/4 - f/8 + sqrt(3)*I*(4
*d - 8*e + f)/72)**2 + 50436*d**2*f**3*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*e +
f)/72) - 2519424*d**2*f*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f)/72)**3 + 286
72*d*e**5 + 184320*d*e**4*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f)/72) + 8640
*d*e**3*f**2 + 774144*d*e**3*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f)/72)**2
- 409536*d*e**2*f**2*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f)/72) + 4976640*d
*e**2*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f)/72)**3 - 31040*d*e*f**4 + 1270
080*d*e*f**2*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f)/72)**2 + 14040*d*f**4*(
d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f)/72) + 139968*d*f**2*(d/4 - f/8 + sqrt
(3)*I*(4*d - 8*e + f)/72)**3 - 20480*e**5*f - 36864*e**4*f*(d/4 - f/8 + sqr
t(3)*I*(4*d - 8*e + f)/72) - 2880*e**3*f**3 - 552960*e**3*f*(d/4 - f/8 + sq
rt(3)*I*(4*d - 8*e + f)/72)**2 + 70848*e**2*f**3*(d/4 - f/8 + sqrt(3)*I*(4*
d - 8*e + f)/72) - 995328*e**2*f*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f)/72)
**3 + 3956*e*f**5 - 209088*e*f**3*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f)/72
)**2 - 3996*f**5*(d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f)/72) + 233280*f**3*(
d/4 - f/8 + sqrt(3)*I*(4*d - 8*e + f)/72)**3)/(53568*d**6 - 69984*d**5*f -
182528*d**4*e**2 + 23652*d**4*f**2 + 377344*d**3*e**2*f + 5400*d**3*f**3 -
126976*d**2*e**4 - 278400*d**2*e**2*f**2 - 4131*d**2*f**4 + 102400*d*e**4*f
 + 93568*d*e**2*f**3 + 81*d*f**5 - 28672*e**4*f**2 - 11648*e**2*f**4 + 189*
f**6)) + (2*e*x**2 + e + x**3*(-d + 2*f) + x*(d + f))/(6*x**4 + 6*x**2 + 6)
```

3.33 $\int \frac{d+ex+fx^2+gx^3}{\left(1+x^2+x^4\right)^2}\,dx$

Optimal. Leaf size=179

$$-\frac{1}{8}(2d-f)\log\left(x^2-x+1\right)+\frac{1}{8}(2d-f)\log\left(x^2+x+1\right)+\frac{x\left(-\left(x^2(d-2f)\right)+d+f\right)}{6\left(x^4+x^2+1\right)}-\frac{(4d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}+\frac{(4d$$

```
[Out] 1/6*x*(d+f-(d-2*f)*x^2)/(x^4+x^2+1)+1/6*(e-2*g+(2*e-g)*x^2)/(x^4+x^2+1)-1/8
*(2*d-f)*ln(x^2-x+1)+1/8*(2*d-f)*ln(x^2+x+1)-1/36*(4*d+f)*arctan(1/3*(1-2*x
)*3^(1/2))*3^(1/2)+1/36*(4*d+f)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/9*(2*
e-g)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)
```

Rubi [A] time = 0.14, antiderivative size = 179, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 9, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.346, Rules used = {1673, 1178, 1169, 634, 618, 204, 628, 1247, 638}

$$\frac{x\left(x^2(-(d-2f))+d+f\right)}{6\left(x^4+x^2+1\right)}-\frac{1}{8}(2d-f)\log\left(x^2-x+1\right)+\frac{1}{8}(2d-f)\log\left(x^2+x+1\right)-\frac{(4d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}+\frac{(4d+$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^2,x]
```

```
[Out] (x*(d + f - (d - 2*f)*x^2))/(6*(1 + x^2 + x^4)) + (e - 2*g + (2*e - g)*x^2)
/(6*(1 + x^2 + x^4)) - ((4*d + f)*ArcTan[(1 - 2*x)/Sqrt[3]])/(12*Sqrt[3]) +
 ((4*d + f)*ArcTan[(1 + 2*x)/Sqrt[3]])/(12*Sqrt[3]) + ((2*e - g)*ArcTan[(1
+ 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((2*d - f)*Log[1 - x + x^2])/8 + ((2*d - f
)*Log[1 + x + x^2])/8
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
```

```
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3}{\left(1+x^2+x^4\right)^2}\,dx = \int \frac{d+fx^2}{\left(1+x^2+x^4\right)^2}\,dx + \int \frac{x\left(e+gx^2\right)}{\left(1+x^2+x^4\right)^2}\,dx$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{6}\int \frac{5d-f+(-d+2f)x^2}{1+x^2+x^4}\,dx + \frac{1}{2}\text{Subst}\left(\int \frac{e+gx}{\left(1+x+x^2\right)^2}\right.$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{e-2g+(2e-g)x^2}{6\left(1+x^2+x^4\right)} + \frac{1}{12}\int \frac{5d-f-(6d-3f)x}{1-x+x^2}\,dx + \frac{1}{12}\int$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{e-2g+(2e-g)x^2}{6\left(1+x^2+x^4\right)} + \frac{1}{8}(2d-f)\int \frac{1+2x}{1+x+x^2}\,dx + \frac{1}{8}(-2d$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{e-2g+(2e-g)x^2}{6\left(1+x^2+x^4\right)} + \frac{(2e-g)\tan^{-1}\left(\frac{1+2x^2}{\sqrt{3}}\right)}{3\sqrt{3}} - \frac{1}{8}(2d-f)\,\text{lo}$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{e-2g+(2e-g)x^2}{6\left(1+x^2+x^4\right)} - \frac{(4d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}} + \frac{(4d+f)\tan}{12\sqrt{}}$$

Mathematica [C] time = 0.43, size = 200, normalized size = 1.12

$$\frac{1}{36}\left(\frac{6\left(x\left(-dx^2+d+2fx^2+f\right)+2ex^2+e-g\left(x^2+2\right)\right)}{x^4+x^2+1}-\frac{\left(\left(\sqrt{3}-11i\right)d-2\left(\sqrt{3}-2i\right)f\right)\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}-i\right)x\right.}{\sqrt{\frac{1}{6}\left(1+i\sqrt{3}\right)}}\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^2,x]
```

```
[Out] ((6*(e + 2*e*x^2 - g*(2 + x^2) + x*(d + f - d*x^2 + 2*f*x^2)))/(1 + x^2 + x
^4) - (((-11*I + Sqrt[3])*d - 2*(-2*I + Sqrt[3])*f)*ArcTan[((-I + Sqrt[3])*
x)/2])/Sqrt[(1 + I*Sqrt[3])/6] - (((11*I + Sqrt[3])*d - 2*(2*I + Sqrt[3])*f
)*ArcTan[((I + Sqrt[3])*x)/2])/Sqrt[(1 - I*Sqrt[3])/6] - 4*Sqrt[3]*(2*e - g
)*ArcTan[Sqrt[3]/(1 + 2*x^2)])/36
```

fricas [A] time = 1.48, size = 239, normalized size = 1.34

$$-\frac{12\left(d-2f\right)x^3-12\left(2e-g\right)x^2-2\sqrt{3}\left(\left(4d-8e+f+4g\right)x^4+\left(4d-8e+f+4g\right)x^2+4d-8e+f+4g\right)}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="fricas")
```

```
[Out] -1/72*(12*(d - 2*f)*x^3 - 12*(2*e - g)*x^2 - 2*sqrt(3)*((4*d - 8*e + f + 4*
g)*x^4 + (4*d - 8*e + f + 4*g)*x^2 + 4*d - 8*e + f + 4*g)*arctan(1/3*sqrt(3
)*(2*x + 1)) - 2*sqrt(3)*((4*d + 8*e + f - 4*g)*x^4 + (4*d + 8*e + f - 4*g)
*x^2 + 4*d + 8*e + f - 4*g)*arctan(1/3*sqrt(3)*(2*x - 1)) - 12*(d + f)*x -
9*((2*d - f)*x^4 + (2*d - f)*x^2 + 2*d - f)*log(x^2 + x + 1) + 9*((2*d - f)
*x^4 + (2*d - f)*x^2 + 2*d - f)*log(x^2 - x + 1) - 12*e + 24*g)/(x^4 + x^2
+ 1)
```

giac [A] time = 0.31, size = 142, normalized size = 0.79

$$\frac{1}{36}\sqrt{3}\left(4d+f+4g-8e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{36}\sqrt{3}\left(4d+f-4g+8e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x-1\right)\right)+\frac{1}{8}\left(2\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="giac")
```

```
[Out] 1/36*sqrt(3)*(4*d + f + 4*g - 8*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/36*sqr
t(3)*(4*d + f - 4*g + 8*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/8*(2*d - f)*lo
g(x^2 + x + 1) - 1/8*(2*d - f)*log(x^2 - x + 1) - 1/6*(d*x^3 - 2*f*x^3 + g*
x^2 - 2*x^2*e - d*x - f*x + 2*g - e)/(x^4 + x^2 + 1)
```

maple [A] time = 0.02, size = 260, normalized size = 1.45

$$\frac{\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9}+\frac{\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9}-\frac{d\ln\left(x^2-x+1\right)}{4}+\frac{d\ln\left(x^2+x+1\right)}{4}-\frac{2\sqrt{3}\,e\arctan\left(\frac{(2x+1)\sqrt{}}{3}\right.}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x)
```

```
[Out] 1/4*((-1/3*d-1/3*e-1/3*g+2/3*f)*x-2/3*d+1/3*e-2/3*g+1/3*f)/(x^2+x+1)+1/4*d*
ln(x^2+x+1)-1/8*f*ln(x^2+x+1)+1/9*3^(1/2)*d*arctan(1/3*(2*x+1)*3^(1/2))-2/9
*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))+1/36*3^(1/2)*f*arctan(1/3*(2*x+1)*3^
```

```
(1/2))+1/9*3^(1/2)*g*arctan(1/3*(2*x+1)*3^(1/2))-1/4*((1/3*d-1/3*e-1/3*g-2/
3*f)*x-2/3*d-1/3*e+2/3*g+1/3*f)/(x^2-x+1)-1/4*d*ln(x^2-x+1)+1/8*f*ln(x^2-x+
1)+1/9*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(1/2)*e*arctan(1/3*(2*x-
1)*3^(1/2))+1/36*3^(1/2)*f*arctan(1/3*(2*x-1)*3^(1/2))-1/9*3^(1/2)*g*arctan
(1/3*(2*x-1)*3^(1/2))
```

maxima [A] time = 2.58, size = 135, normalized size = 0.75

$$\frac{1}{36}\sqrt{3}\left(4d-8e+f+4g\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{36}\sqrt{3}\left(4d+8e+f-4g\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x-1\right)\right)+\frac{1}{8}\left(2d-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="maxima")
```

```
[Out] 1/36*sqrt(3)*(4*d - 8*e + f + 4*g)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/36*sqr
t(3)*(4*d + 8*e + f - 4*g)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/8*(2*d - f)*lo
g(x^2 + x + 1) - 1/8*(2*d - f)*log(x^2 - x + 1) - 1/6*((d - 2*f)*x^3 - (2*e
 - g)*x^2 - (d + f)*x - e + 2*g)/(x^4 + x^2 + 1)
```

mupad [B] time = 1.15, size = 237, normalized size = 1.32

$$\frac{\left(\frac{f}{3}-\frac{d}{6}\right)x^3+\left(\frac{e}{3}-\frac{g}{6}\right)x^2+\left(\frac{d}{6}+\frac{f}{6}\right)x+\frac{e}{6}-\frac{g}{3}}{x^4+x^2+1}-\ln\left(x-\frac{1}{2}-\frac{\sqrt{3}\,1\mathrm{i}}{2}\right)\left(\frac{d}{4}-\frac{f}{8}+\frac{\sqrt{3}\,d\,1\mathrm{i}}{18}+\frac{\sqrt{3}\,e\,1\mathrm{i}}{9}+\frac{\sqrt{3}\,f\,1\mathrm{i}}{72}-\frac{\sqrt{3}}{1}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3)/(x^2 + x^4 + 1)^2,x)
```

```
[Out] (e/6 - g/3 - x^3*(d/6 - f/3) + x^2*(e/3 - g/6) + x*(d/6 + f/6))/(x^2 + x^4
+ 1) - log(x - (3^(1/2)*1i)/2 - 1/2)*(d/4 - f/8 + (3^(1/2)*d*1i)/18 + (3^(1
/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 - (3^(1/2)*g*1i)/18) - log(x - (3^(1/2)*1i)
/2 + 1/2)*(f/8 - d/4 + (3^(1/2)*d*1i)/18 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i
)/72 + (3^(1/2)*g*1i)/18) + log(x + (3^(1/2)*1i)/2 - 1/2)*(f/8 - d/4 + (3^(
1/2)*d*1i)/18 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 - (3^(1/2)*g*1i)/18) +
 log(x + (3^(1/2)*1i)/2 + 1/2)*(d/4 - f/8 + (3^(1/2)*d*1i)/18 - (3^(1/2)*e*
1i)/9 + (3^(1/2)*f*1i)/72 + (3^(1/2)*g*1i)/18)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(x**4+x**2+1)**2,x)
```

```
[Out] Timed out
```

3.34 $\int \frac{d+ex+fx^2+gx^3+hx^4}{(1+x^2+x^4)^2}\,dx$

Optimal. Leaf size=187

$$-\frac{1}{8}\log\left(x^2-x+1\right)(2d-f+h)+\frac{1}{8}\log\left(x^2+x+1\right)(2d-f+h)+\frac{x\left(-\left(x^2(d-2f+h)\right)+d+f-2h\right)}{6\left(x^4+x^2+1\right)}-\frac{\tan^{-1}\left(\frac{1-2}{\sqrt{3}}\right)}{1}$$

```
[Out] 1/6*(e-2*g+(2*e-g)*x^2)/(x^4+x^2+1)+1/6*x*(d+f-2*h-(d-2*f+h)*x^2)/(x^4+x^2+
1)-1/8*(2*d-f+h)*ln(x^2-x+1)+1/8*(2*d-f+h)*ln(x^2+x+1)-1/36*(4*d+f+h)*arcta
n(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/36*(4*d+f+h)*arctan(1/3*(1+2*x)*3^(1/2))*3
^(1/2)+1/9*(2*e-g)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)
```

Rubi [A] time = 0.17, antiderivative size = 187, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 9, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.290, Rules used = {1673, 1678, 1169, 634, 618, 204, 628, 1247, 638}

$$\frac{x\left(x^2(-(d-2f+h))+d+f-2h\right)}{6\left(x^4+x^2+1\right)}-\frac{1}{8}\log\left(x^2-x+1\right)(2d-f+h)+\frac{1}{8}\log\left(x^2+x+1\right)(2d-f+h)-\frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^2,x]
```

```
[Out] (e - 2*g + (2*e - g)*x^2)/(6*(1 + x^2 + x^4)) + (x*(d + f - 2*h - (d - 2*f
+ h)*x^2))/(6*(1 + x^2 + x^4)) - ((4*d + f + h)*ArcTan[(1 - 2*x)/Sqrt[3]])/
(12*Sqrt[3]) + ((4*d + f + h)*ArcTan[(1 + 2*x)/Sqrt[3]])/(12*Sqrt[3]) + ((2
*e - g)*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((2*d - f + h)*Log[1 - x
 + x^2])/8 + ((2*d - f + h)*Log[1 + x + x^2])/8
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
```

```
1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4}{\left(1+x^2+x^4\right)^2}\,dx = \int \frac{x\left(e+gx^2\right)}{\left(1+x^2+x^4\right)^2}\,dx + \int \frac{d+fx^2+hx^4}{\left(1+x^2+x^4\right)^2}\,dx$$

$$= \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{6}\int \frac{5d-f+2h+(-d+2f-h)x^2}{1+x^2+x^4}\,dx +$$

$$= \frac{e-2g+(2e-g)x^2}{6\left(1+x^2+x^4\right)} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{12}\int \frac{5d-f+2h}{1}$$

$$= \frac{e-2g+(2e-g)x^2}{6\left(1+x^2+x^4\right)} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{3}(-2e+g)\,\mathrm{Subst}$$

$$= \frac{e-2g+(2e-g)x^2}{6\left(1+x^2+x^4\right)} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{(2e-g)\tan^{-1}\left(\frac{1+2}{\sqrt{}}\right.}{3\sqrt{3}}$$

$$= \frac{e-2g+(2e-g)x^2}{6\left(1+x^2+x^4\right)} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{6\left(1+x^2+x^4\right)} - \frac{(4d+f+h)\tan^{-1}}{12\sqrt{3}}$$

Mathematica [C] time = 0.61, size = 234, normalized size = 1.25

$$\frac{1}{36}\left(-\frac{6\left(x\left(d\left(x^2-1\right)-f\left(2x^2+1\right)+h\left(x^2+2\right)\right)-e\left(2x^2+1\right)+g\left(x^2+2\right)\right)}{x^4+x^2+1} - \frac{\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}-i\right)x\right)\left(\left(\sqrt{3}-11\right.\right.}{\sqrt{\frac{1}{6}(}}\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^2,x]
```

```
[Out] ((-6*(g*(2 + x^2) - e*(1 + 2*x^2) + x*(d*(-1 + x^2) + h*(2 + x^2) - f*(1 +
2*x^2))))/(1 + x^2 + x^4) - (((-11*I + Sqrt[3])*d - 2*(-2*I + Sqrt[3])*f +
(-5*I + Sqrt[3])*h)*ArcTan[((-I + Sqrt[3])*x)/2])/Sqrt[(1 + I*Sqrt[3])/6] -
 (((11*I + Sqrt[3])*d - 2*(2*I + Sqrt[3])*f + (5*I + Sqrt[3])*h)*ArcTan[((I
 + Sqrt[3])*x)/2])/Sqrt[(1 - I*Sqrt[3])/6] - 4*Sqrt[3]*(2*e - g)*ArcTan[Sqr
t[3]/(1 + 2*x^2)])/36
```

fricas [A] time = 4.34, size = 255, normalized size = 1.36

$$-\frac{12\left(d-2f+h\right)x^3-12\left(2e-g\right)x^2-2\sqrt{3}\left(\left(4d-8e+f+4g+h\right)x^4+\left(4d-8e+f+4g+h\right)x^2+4d-8\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="fricas")
```

```
[Out] -1/72*(12*(d - 2*f + h)*x^3 - 12*(2*e - g)*x^2 - 2*sqrt(3)*((4*d - 8*e + f
+ 4*g + h)*x^4 + (4*d - 8*e + f + 4*g + h)*x^2 + 4*d - 8*e + f + 4*g + h)*a
rctan(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(3)*((4*d + 8*e + f - 4*g + h)*x^4 + (
4*d + 8*e + f - 4*g + h)*x^2 + 4*d + 8*e + f - 4*g + h)*arctan(1/3*sqrt(3)*
(2*x - 1)) - 12*(d + f - 2*h)*x - 9*((2*d - f + h)*x^4 + (2*d - f + h)*x^2
+ 2*d - f + h)*log(x^2 + x + 1) + 9*((2*d - f + h)*x^4 + (2*d - f + h)*x^2
+ 2*d - f + h)*log(x^2 - x + 1) - 12*e + 24*g)/(x^4 + x^2 + 1)
```

giac [A] time = 0.32, size = 155, normalized size = 0.83

$$\frac{1}{36}\sqrt{3}\left(4d+f+4g+h-8e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{36}\sqrt{3}\left(4d+f-4g+h+8e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x-1\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="giac")
```

```
[Out] 1/36*sqrt(3)*(4*d + f + 4*g + h - 8*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/36
*sqrt(3)*(4*d + f - 4*g + h + 8*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/8*(2*d
 - f + h)*log(x^2 + x + 1) - 1/8*(2*d - f + h)*log(x^2 - x + 1) - 1/6*(d*x^
3 - 2*f*x^3 + h*x^3 + g*x^2 - 2*x^2*e - d*x - f*x + 2*h*x + 2*g - e)/(x^4 +
 x^2 + 1)
```

maple [A] time = 0.02, size = 328, normalized size = 1.75

$$\frac{\sqrt{3}\, d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9}+\frac{\sqrt{3}\, d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9}-\frac{d \ln\left(x^2-x+1\right)}{4}+\frac{d \ln\left(x^2+x+1\right)}{4}-\frac{2\sqrt{3}\, e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x)
```

```
[Out] 1/4*((-1/3*d+2/3*f-1/3*g-1/3*e-1/3*h)*x-2/3*d+1/3*f-2/3*g+1/3*e+1/3*h)/(x^2
+x+1)+1/4*d*ln(x^2+x+1)-1/8*f*ln(x^2+x+1)+1/8*ln(x^2+x+1)*h+1/9*3^(1/2)*d*a
rctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))+1/36*3
^(1/2)*f*arctan(1/3*(2*x+1)*3^(1/2))+1/9*3^(1/2)*g*arctan(1/3*(2*x+1)*3^(1/
2))+1/36*3^(1/2)*h*arctan(1/3*(2*x+1)*3^(1/2))-1/4*((1/3*d-2/3*f-1/3*g-1/3*
e+1/3*h)*x-2/3*d+1/3*f+2/3*g-1/3*e+1/3*h)/(x^2-x+1)-1/4*d*ln(x^2-x+1)+1/8*f
*ln(x^2-x+1)-1/8*ln(x^2-x+1)*h+1/9*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+2/
9*3^(1/2)*e*arctan(1/3*(2*x-1)*3^(1/2))+1/36*3^(1/2)*f*arctan(1/3*(2*x-1)*3
^(1/2))-1/9*3^(1/2)*g*arctan(1/3*(2*x-1)*3^(1/2))+1/36*3^(1/2)*h*arctan(1/3
*(2*x-1)*3^(1/2))
```

maxima [A] time = 2.95, size = 143, normalized size = 0.76

$$\frac{1}{36}\sqrt{3}\left(4d-8e+f+4g+h\right)\arctan\left(\frac{1}{3}\sqrt{3}\,(2x+1)\right)+\frac{1}{36}\sqrt{3}\left(4d+8e+f-4g+h\right)\arctan\left(\frac{1}{3}\sqrt{3}\,(2x-1)\right)+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="maxima")
```

```
[Out] 1/36*sqrt(3)*(4*d - 8*e + f + 4*g + h)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/36
*sqrt(3)*(4*d + 8*e + f - 4*g + h)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/8*(2*d
 - f + h)*log(x^2 + x + 1) - 1/8*(2*d - f + h)*log(x^2 - x + 1) - 1/6*((d -
 2*f + h)*x^3 - (2*e - g)*x^2 - (d + f - 2*h)*x - e + 2*g)/(x^4 + x^2 + 1)
```

mupad [B] time = 5.35, size = 1547, normalized size = 8.27

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^2 + x^4 + 1)^2,x)
```

```
[Out] (e/6 - g/3 + x^2*(e/3 - g/6) + x*(d/6 + f/6 - h/3) - x^3*(d/6 - f/3 + h/6))
/(x^2 + x^4 + 1) - log(60*d*g - 153*d*f - 120*d*e + 24*e*f + 135*d*h - 48*e
*h - 12*f*g - 81*f*h + 24*g*h + 3^(1/2)*d^2*90i + 3^(1/2)*f^2*9i + 3^(1/2)*
h^2*18i - 198*d^2*x - 36*f^2*x - 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 + 3^(
1/2)*d*e*56i - 3^(1/2)*d*f*63i - 3^(1/2)*d*g*28i - 3^(1/2)*e*f*40i + 3^(1/2
)*d*h*81i + 3^(1/2)*e*h*32i + 3^(1/2)*f*g*20i - 3^(1/2)*f*h*27i - 3^(1/2)*g
*h*16i - 24*d*e*x + 171*d*f*x + 12*d*g*x + 48*e*f*x - 189*d*h*x - 24*e*h*x
- 24*f*g*x + 81*f*h*x + 12*g*h*x + 3^(1/2)*d^2*x*18i + 3^(1/2)*f^2*x*18i +
3^(1/2)*h^2*x*9i - 3^(1/2)*d*f*x*45i + 3^(1/2)*d*g*x*44i + 3^(1/2)*e*f*x*32
```

```
i + 3^(1/2)*d*h*x*27i - 3^(1/2)*e*h*x*40i - 3^(1/2)*f*g*x*16i - 3^(1/2)*f*h
*x*27i + 3^(1/2)*g*h*x*20i - 3^(1/2)*d*e*x*88i)*(d/4 - f/8 + h/8 + (3^(1/2)
*d*1i)/18 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 - (3^(1/2)*g*1i)/18 + (3^(
1/2)*h*1i)/72) - log(120*d*e - 153*d*f - 60*d*g - 24*e*f + 135*d*h + 48*e*h
 + 12*f*g - 81*f*h - 24*g*h - 3^(1/2)*d^2*90i - 3^(1/2)*f^2*9i - 3^(1/2)*h^
2*18i + 198*d^2*x + 36*f^2*x + 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 + 3^(1/
2)*d*e*56i + 3^(1/2)*d*f*63i - 3^(1/2)*d*g*28i - 3^(1/2)*e*f*40i - 3^(1/2)*
d*h*81i + 3^(1/2)*e*h*32i + 3^(1/2)*f*g*20i + 3^(1/2)*f*h*27i - 3^(1/2)*g*h
*16i - 24*d*e*x - 171*d*f*x + 12*d*g*x + 48*e*f*x + 189*d*h*x - 24*e*h*x -
24*f*g*x - 81*f*h*x + 12*g*h*x + 3^(1/2)*d^2*x*18i + 3^(1/2)*f^2*x*18i + 3^
(1/2)*h^2*x*9i - 3^(1/2)*d*f*x*45i - 3^(1/2)*d*g*x*44i - 3^(1/2)*e*f*x*32i
+ 3^(1/2)*d*h*x*27i + 3^(1/2)*e*h*x*40i + 3^(1/2)*f*g*x*16i - 3^(1/2)*f*h*x
*27i - 3^(1/2)*g*h*x*20i + 3^(1/2)*d*e*x*88i)*(f/8 - d/4 - h/8 + (3^(1/2)*d
*1i)/18 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 + (3^(1/2)*g*1i)/18 + (3^(1/
2)*h*1i)/72) + log(120*d*e - 153*d*f - 60*d*g - 24*e*f + 135*d*h + 48*e*h +
 12*f*g - 81*f*h - 24*g*h + 3^(1/2)*d^2*90i + 3^(1/2)*f^2*9i + 3^(1/2)*h^2*
18i + 198*d^2*x + 36*f^2*x + 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 - 3^(1/2)
*d*e*56i - 3^(1/2)*d*f*63i + 3^(1/2)*d*g*28i + 3^(1/2)*e*f*40i + 3^(1/2)*d*
h*81i - 3^(1/2)*e*h*32i - 3^(1/2)*f*g*20i - 3^(1/2)*f*h*27i + 3^(1/2)*g*h*1
6i - 24*d*e*x - 171*d*f*x + 12*d*g*x + 48*e*f*x + 189*d*h*x - 24*e*h*x - 24
*f*g*x - 81*f*h*x + 12*g*h*x - 3^(1/2)*d^2*x*18i - 3^(1/2)*f^2*x*18i - 3^(1
/2)*h^2*x*9i + 3^(1/2)*d*f*x*45i + 3^(1/2)*d*g*x*44i + 3^(1/2)*e*f*x*32i -
3^(1/2)*d*h*x*27i - 3^(1/2)*e*h*x*40i - 3^(1/2)*f*g*x*16i + 3^(1/2)*f*h*x*2
7i + 3^(1/2)*g*h*x*20i - 3^(1/2)*d*e*x*88i)*(d/4 - f/8 + h/8 + (3^(1/2)*d*1
i)/18 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 + (3^(1/2)*g*1i)/18 + (3^(1/2)
*h*1i)/72) + log(120*d*e + 153*d*f - 60*d*g - 24*e*f - 135*d*h + 48*e*h + 1
2*f*g + 81*f*h - 24*g*h + 3^(1/2)*d^2*90i + 3^(1/2)*f^2*9i + 3^(1/2)*h^2*18
i + 198*d^2*x + 36*f^2*x + 45*h^2*x - 126*d^2 - 45*f^2 - 36*h^2 + 3^(1/2)*d
*e*56i - 3^(1/2)*d*f*63i - 3^(1/2)*d*g*28i - 3^(1/2)*e*f*40i + 3^(1/2)*d*h*
81i + 3^(1/2)*e*h*32i + 3^(1/2)*f*g*20i - 3^(1/2)*f*h*27i - 3^(1/2)*g*h*16i
 + 24*d*e*x - 171*d*f*x - 12*d*g*x - 48*e*f*x + 189*d*h*x + 24*e*h*x + 24*f
*g*x - 81*f*h*x - 12*g*h*x + 3^(1/2)*d^2*x*18i + 3^(1/2)*f^2*x*18i + 3^(1/2
)*h^2*x*9i - 3^(1/2)*d*f*x*45i + 3^(1/2)*d*g*x*44i + 3^(1/2)*e*f*x*32i + 3^
(1/2)*d*h*x*27i - 3^(1/2)*e*h*x*40i - 3^(1/2)*f*g*x*16i - 3^(1/2)*f*h*x*27i
 + 3^(1/2)*g*h*x*20i - 3^(1/2)*d*e*x*88i)*(f/8 - d/4 - h/8 + (3^(1/2)*d*1i)
/18 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 - (3^(1/2)*g*1i)/18 + (3^(1/2)*h
*1i)/72)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(x**4+x**2+1)**2,x)
[Out] Timed out
```

3.35 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{\left(1+x^2+x^4\right)^2} dx$

Optimal. Leaf size=194

$$-\frac{1}{8}\log\left(x^2-x+1\right)(2d-f+h)+\frac{1}{8}\log\left(x^2+x+1\right)(2d-f+h)+\frac{x\left(-\left(x^2(d-2f+h)\right)+d+f-2h\right)}{6\left(x^4+x^2+1\right)}-\frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(}{12\sqrt{}}$$

```
[Out] 1/6*x*(d+f-2*h-(d-2*f+h)*x^2)/(x^4+x^2+1)+1/6*(e-2*g+i+(2*e-g-i)*x^2)/(x^4+
x^2+1)-1/8*(2*d-f+h)*ln(x^2-x+1)+1/8*(2*d-f+h)*ln(x^2+x+1)-1/36*(4*d+f+h)*a
rctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/36*(4*d+f+h)*arctan(1/3*(1+2*x)*3^(1/2
))*3^(1/2)+1/9*(2*e-g+2*i)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)
```

Rubi [A] time = 0.20, antiderivative size = 194, normalized size of antiderivative = 1.00, number of steps used = 16, number of rules used = 10, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.278, Rules used = {1673, 1678, 1169, 634, 618, 204, 628, 1663, 1660, 12}

$$\frac{x\left(x^2(-(d-2f+h))+d+f-2h\right)}{6\left(x^4+x^2+1\right)}-\frac{1}{8}\log\left(x^2-x+1\right)(2d-f+h)+\frac{1}{8}\log\left(x^2+x+1\right)(2d-f+h)-\frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(4d}{12\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4)^2,x]
```

```
[Out] (x*(d + f - 2*h - (d - 2*f + h)*x^2))/(6*(1 + x^2 + x^4)) + (e - 2*g + i +
(2*e - g - i)*x^2)/(6*(1 + x^2 + x^4)) - ((4*d + f + h)*ArcTan[(1 - 2*x)/Sq
rt[3]])/(12*Sqrt[3]) + ((4*d + f + h)*ArcTan[(1 + 2*x)/Sqrt[3]])/(12*Sqrt[3
]) + ((2*e - g + 2*i)*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((2*d - f
+ h)*Log[1 - x + x^2])/8 + ((2*d - f + h)*Log[1 + x + x^2])/8
```

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 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
```

```
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^
(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
 - 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+35x^5}{\left(1+x^2+x^4\right)^2}\,dx = \int \frac{x\left(e+gx^2+35x^4\right)}{\left(1+x^2+x^4\right)^2}\,dx + \int \frac{d+fx^2+hx^4}{\left(1+x^2+x^4\right)^2}\,dx$$

$$= \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{6}\int \frac{5d-f+2h+(-d+2f-h)x^2}{1+x^2+x^4}$$

$$= \frac{35+e-2g-(35-2e+g)x^2}{6\left(1+x^2+x^4\right)} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{12}$$

$$= \frac{35+e-2g-(35-2e+g)x^2}{6\left(1+x^2+x^4\right)} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{6}(7$$

$$= \frac{35+e-2g-(35-2e+g)x^2}{6\left(1+x^2+x^4\right)} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{6\left(1+x^2+x^4\right)} - \frac{1}{8}(2$$

$$= \frac{35+e-2g-(35-2e+g)x^2}{6\left(1+x^2+x^4\right)} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{6\left(1+x^2+x^4\right)} - \frac{(4d}{}$$

Mathematica [C] time = 0.66, size = 243, normalized size = 1.25

$$\frac{1}{36}\left(\frac{6\left(-dx^3+dx+2ex^2+e+2fx^3+fx-g\left(x^2+2\right)-hx^3-2hx-ix^2+i\right)}{x^4+x^2+1} - \frac{\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}-i\right)x\right)\left(\left(\sqrt{3}-11i\right)\right.}{\sqrt{\frac{1}{6}\left(1\right.}}\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4)^2,x]
```

```
[Out] ((6*(e + i + d*x + f*x - 2*h*x + 2*e*x^2 - i*x^2 - d*x^3 + 2*f*x^3 - h*x^3
- g*(2 + x^2)))/(1 + x^2 + x^4) - (((-11*I + Sqrt[3])*d - 2*(-2*I + Sqrt[3]
)*f + (-5*I + Sqrt[3])*h)*ArcTan[((-I + Sqrt[3])*x)/2])/Sqrt[(1 + I*Sqrt[3]
)/6] - (((11*I + Sqrt[3])*d - 2*(2*I + Sqrt[3])*f + (5*I + Sqrt[3])*h)*ArcT
an[((I + Sqrt[3])*x)/2])/Sqrt[(1 - I*Sqrt[3])/6] - 4*Sqrt[3]*(2*e - g + 2*i
)*ArcTan[Sqrt[3]/(1 + 2*x^2)])/36
```

fricas [A] time = 19.79, size = 279, normalized size = 1.44

$$-\frac{12\left(d-2f+h\right)x^3-12\left(2e-g-i\right)x^2-2\sqrt{3}\left(\left(4d-8e+f+4g+h-8i\right)x^4+\left(4d-8e+f+4g+h-8i\right)x^2\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="frica
s")
```

```
[Out] -1/72*(12*(d - 2*f + h)*x^3 - 12*(2*e - g - i)*x^2 - 2*sqrt(3)*((4*d - 8*e
+ f + 4*g + h - 8*i)*x^4 + (4*d - 8*e + f + 4*g + h - 8*i)*x^2 + 4*d - 8*e
+ f + 4*g + h - 8*i)*arctan(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(3)*((4*d + 8*e
+ f - 4*g + h + 8*i)*x^4 + (4*d + 8*e + f - 4*g + h + 8*i)*x^2 + 4*d + 8*e
+ f - 4*g + h + 8*i)*arctan(1/3*sqrt(3)*(2*x - 1)) - 12*(d + f - 2*h)*x - 9
*((2*d - f + h)*x^4 + (2*d - f + h)*x^2 + 2*d - f + h)*log(x^2 + x + 1) + 9
*((2*d - f + h)*x^4 + (2*d - f + h)*x^2 + 2*d - f + h)*log(x^2 - x + 1) - 1
2*e + 24*g - 12*i)/(x^4 + x^2 + 1)
```

giac [A] time = 0.31, size = 169, normalized size = 0.87

$$\frac{1}{36}\sqrt{3}\left(4d+f+4g+h-8i-8e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{36}\sqrt{3}\left(4d+f-4g+h+8i+8e\right)\arctan\left(\frac{1}{3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="giac"
)
```

```
[Out] 1/36*sqrt(3)*(4*d + f + 4*g + h - 8*i - 8*e)*arctan(1/3*sqrt(3)*(2*x + 1))
+ 1/36*sqrt(3)*(4*d + f - 4*g + h + 8*i + 8*e)*arctan(1/3*sqrt(3)*(2*x - 1)
) + 1/8*(2*d - f + h)*log(x^2 + x + 1) - 1/8*(2*d - f + h)*log(x^2 - x + 1)
 - 1/6*(d*x^3 - 2*f*x^3 + h*x^3 + g*x^2 + i*x^2 - 2*x^2*e - d*x - f*x + 2*h
*x + 2*g - i - e)/(x^4 + x^2 + 1)
```

maple [B] time = 0.02, size = 374, normalized size = 1.93

$$\frac{\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9}+\frac{\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9}-\frac{d\ln\left(x^2-x+1\right)}{4}+\frac{d\ln\left(x^2+x+1\right)}{4}-\frac{2\sqrt{3}\,e\arctan\left(\frac{(2x+1)\sqrt{}}{3}\right.}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x)
```

```
[Out] 1/4*((-1/3*d-1/3*e-1/3*g-1/3*h+2/3*f+2/3*i)*x-2/3*d+1/3*e-2/3*g+1/3*h+1/3*f
+1/3*i)/(x^2+x+1)+1/4*d*ln(x^2+x+1)-1/8*f*ln(x^2+x+1)+1/8*h*ln(x^2+x+1)+1/9
*3^(1/2)*d*arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(
1/2))+1/36*3^(1/2)*f*arctan(1/3*(2*x+1)*3^(1/2))+1/9*3^(1/2)*g*arctan(1/3*(
2*x+1)*3^(1/2))+1/36*3^(1/2)*h*arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*i*ar
ctan(1/3*(2*x+1)*3^(1/2))-1/4*((1/3*d-1/3*e-1/3*g+1/3*h-2/3*f+2/3*i)*x-2/3*
d-1/3*e+2/3*g+1/3*h+1/3*f-1/3*i)/(x^2-x+1)-1/4*d*ln(x^2-x+1)+1/8*f*ln(x^2-x
+1)-1/8*h*ln(x^2-x+1)+1/9*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(1/2)
*e*arctan(1/3*(2*x-1)*3^(1/2))+1/36*3^(1/2)*f*arctan(1/3*(2*x-1)*3^(1/2))-1
/9*3^(1/2)*g*arctan(1/3*(2*x-1)*3^(1/2))+1/36*3^(1/2)*h*arctan(1/3*(2*x-1)*
3^(1/2))+2/9*3^(1/2)*i*arctan(1/3*(2*x-1)*3^(1/2))
```

maxima [A] time = 2.63, size = 155, normalized size = 0.80

$$\frac{1}{36}\sqrt{3}\left(4d-8e+f+4g+h-8i\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{36}\sqrt{3}\left(4d+8e+f-4g+h+8i\right)\arctan\left(\frac{1}{3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="maxim
a")
```

```
[Out] 1/36*sqrt(3)*(4*d - 8*e + f + 4*g + h - 8*i)*arctan(1/3*sqrt(3)*(2*x + 1))
+ 1/36*sqrt(3)*(4*d + 8*e + f - 4*g + h + 8*i)*arctan(1/3*sqrt(3)*(2*x - 1)
) + 1/8*(2*d - f + h)*log(x^2 + x + 1) - 1/8*(2*d - f + h)*log(x^2 - x + 1)
 - 1/6*((d - 2*f + h)*x^3 - (2*e - g - i)*x^2 - (d + f - 2*h)*x - e + 2*g -
 i)/(x^4 + x^2 + 1)
```

mupad [B] time = 8.18, size = 1894, normalized size = 9.76

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^2 + x^4 + 1)^2,x)
```

```
[Out] (e/6 - g/3 + i/6 + x*(d/6 + f/6 - h/3) - x^3*(d/6 - f/3 + h/6) - x^2*(g/6 -
 e/3 + i/6))/(x^2 + x^4 + 1) - log(60*d*g - 153*d*f - 120*d*e + 24*e*f + 13
5*d*h - 120*d*i - 48*e*h - 12*f*g - 81*f*h + 24*f*i + 24*g*h - 48*h*i + 3^(
1/2)*d^2*90i + 3^(1/2)*f^2*9i + 3^(1/2)*h^2*18i - 198*d^2*x - 36*f^2*x - 45
*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 + 3^(1/2)*d*e*56i - 3^(1/2)*d*f*63i - 3^
(1/2)*d*g*28i - 3^(1/2)*e*f*40i + 3^(1/2)*d*h*81i + 3^(1/2)*d*i*56i + 3^(1/
2)*e*h*32i + 3^(1/2)*f*g*20i - 3^(1/2)*f*h*27i - 3^(1/2)*f*i*40i - 3^(1/2)*
g*h*16i + 3^(1/2)*h*i*32i - 24*d*e*x + 171*d*f*x + 12*d*g*x + 48*e*f*x - 18
9*d*h*x - 24*d*i*x - 24*e*h*x - 24*f*g*x + 81*f*h*x + 48*f*i*x + 12*g*h*x -
 24*h*i*x + 3^(1/2)*d^2*x*18i + 3^(1/2)*f^2*x*18i + 3^(1/2)*h^2*x*9i - 3^(1
/2)*d*f*x*45i + 3^(1/2)*d*g*x*44i + 3^(1/2)*e*f*x*32i + 3^(1/2)*d*h*x*27i -
 3^(1/2)*d*i*x*88i - 3^(1/2)*e*h*x*40i - 3^(1/2)*f*g*x*16i - 3^(1/2)*f*h*x*
27i + 3^(1/2)*f*i*x*32i + 3^(1/2)*g*h*x*20i - 3^(1/2)*h*i*x*40i - 3^(1/2)*d
*e*x*88i)*(d/4 - f/8 + h/8 + (3^(1/2)*d*1i)/18 + (3^(1/2)*e*1i)/9 + (3^(1/2
)*f*1i)/72 - (3^(1/2)*g*1i)/18 + (3^(1/2)*h*1i)/72 + (3^(1/2)*i*1i)/9) - lo
g(120*d*e - 153*d*f - 60*d*g - 24*e*f + 135*d*h + 120*d*i + 48*e*h + 12*f*g
 - 81*f*h - 24*f*i - 24*g*h + 48*h*i - 3^(1/2)*d^2*90i - 3^(1/2)*f^2*9i - 3
^(1/2)*h^2*18i + 198*d^2*x + 36*f^2*x + 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^
2 + 3^(1/2)*d*e*56i + 3^(1/2)*d*f*63i - 3^(1/2)*d*g*28i - 3^(1/2)*e*f*40i -
 3^(1/2)*d*h*81i + 3^(1/2)*d*i*56i + 3^(1/2)*e*h*32i + 3^(1/2)*f*g*20i + 3^
(1/2)*f*h*27i - 3^(1/2)*f*i*40i - 3^(1/2)*g*h*16i + 3^(1/2)*h*i*32i - 24*d*
e*x - 171*d*f*x + 12*d*g*x + 48*e*f*x + 189*d*h*x - 24*d*i*x - 24*e*h*x - 2
4*f*g*x - 81*f*h*x + 48*f*i*x + 12*g*h*x - 24*h*i*x + 3^(1/2)*d^2*x*18i + 3
^(1/2)*f^2*x*18i + 3^(1/2)*h^2*x*9i - 3^(1/2)*d*f*x*45i - 3^(1/2)*d*g*x*44i
 - 3^(1/2)*e*f*x*32i + 3^(1/2)*d*h*x*27i + 3^(1/2)*d*i*x*88i + 3^(1/2)*e*h*
x*40i + 3^(1/2)*f*g*x*16i - 3^(1/2)*f*h*x*27i - 3^(1/2)*f*i*x*32i - 3^(1/2)
*g*h*x*20i + 3^(1/2)*h*i*x*40i + 3^(1/2)*d*e*x*88i)*(f/8 - d/4 - h/8 + (3^(
1/2)*d*1i)/18 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 + (3^(1/2)*g*1i)/18 +
(3^(1/2)*h*1i)/72 - (3^(1/2)*i*1i)/9) + log(120*d*e - 153*d*f - 60*d*g - 24
*e*f + 135*d*h + 120*d*i + 48*e*h + 12*f*g - 81*f*h - 24*f*i - 24*g*h + 48*
h*i + 3^(1/2)*d^2*90i + 3^(1/2)*f^2*9i + 3^(1/2)*h^2*18i + 198*d^2*x + 36*f
^2*x + 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 - 3^(1/2)*d*e*56i - 3^(1/2)*d*f
*63i + 3^(1/2)*d*g*28i + 3^(1/2)*e*f*40i + 3^(1/2)*d*h*81i - 3^(1/2)*d*i*56
i - 3^(1/2)*e*h*32i - 3^(1/2)*f*g*20i - 3^(1/2)*f*h*27i + 3^(1/2)*f*i*40i +
 3^(1/2)*g*h*16i - 3^(1/2)*h*i*32i - 24*d*e*x - 171*d*f*x + 12*d*g*x + 48*e
*f*x + 189*d*h*x - 24*d*i*x - 24*e*h*x - 24*f*g*x - 81*f*h*x + 48*f*i*x + 1
2*g*h*x - 24*h*i*x - 3^(1/2)*d^2*x*18i - 3^(1/2)*f^2*x*18i - 3^(1/2)*h^2*x*
9i + 3^(1/2)*d*f*x*45i + 3^(1/2)*d*g*x*44i + 3^(1/2)*e*f*x*32i - 3^(1/2)*d*
h*x*27i - 3^(1/2)*d*i*x*88i - 3^(1/2)*e*h*x*40i - 3^(1/2)*f*g*x*16i + 3^(1/
2)*f*h*x*27i + 3^(1/2)*f*i*x*32i + 3^(1/2)*g*h*x*20i - 3^(1/2)*h*i*x*40i -
3^(1/2)*d*e*x*88i)*(d/4 - f/8 + h/8 + (3^(1/2)*d*1i)/18 - (3^(1/2)*e*1i)/9
+ (3^(1/2)*f*1i)/72 + (3^(1/2)*g*1i)/18 + (3^(1/2)*h*1i)/72 - (3^(1/2)*i*1i
)/9) + log(120*d*e + 153*d*f - 60*d*g - 24*e*f - 135*d*h + 120*d*i + 48*e*h
 + 12*f*g + 81*f*h - 24*f*i - 24*g*h + 48*h*i + 3^(1/2)*d^2*90i + 3^(1/2)*f
^2*9i + 3^(1/2)*h^2*18i + 198*d^2*x + 36*f^2*x + 45*h^2*x - 126*d^2 - 45*f^
2 - 36*h^2 + 3^(1/2)*d*e*56i - 3^(1/2)*d*f*63i - 3^(1/2)*d*g*28i - 3^(1/2)*
e*f*40i + 3^(1/2)*d*h*81i + 3^(1/2)*d*i*56i + 3^(1/2)*e*h*32i + 3^(1/2)*f*g
*20i - 3^(1/2)*f*h*27i - 3^(1/2)*f*i*40i - 3^(1/2)*g*h*16i + 3^(1/2)*h*i*32
i + 24*d*e*x - 171*d*f*x - 12*d*g*x - 48*e*f*x + 189*d*h*x + 24*d*i*x + 24*
e*h*x + 24*f*g*x - 81*f*h*x - 48*f*i*x - 12*g*h*x + 24*h*i*x + 3^(1/2)*d^2*
x*18i + 3^(1/2)*f^2*x*18i + 3^(1/2)*h^2*x*9i - 3^(1/2)*d*f*x*45i + 3^(1/2)*
d*g*x*44i + 3^(1/2)*e*f*x*32i + 3^(1/2)*d*h*x*27i - 3^(1/2)*d*i*x*88i - 3^(
1/2)*e*h*x*40i - 3^(1/2)*f*g*x*16i - 3^(1/2)*f*h*x*27i + 3^(1/2)*f*i*x*32i
+ 3^(1/2)*g*h*x*20i - 3^(1/2)*h*i*x*40i - 3^(1/2)*d*e*x*88i)*(f/8 - d/4 - h
/8 + (3^(1/2)*d*1i)/18 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 - (3^(1/2)*g*
1i)/18 + (3^(1/2)*h*1i)/72 + (3^(1/2)*i*1i)/9)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4+x**2+1)**2,x)
```

```
[Out] Timed out
```

3.36 $\int \frac{d+ex}{\left(a+bx^2+cx^4\right)^2}\,dx$

Optimal. Leaf size=330

$$\frac{dx\left(-2ac+b^2+bcx^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\,d\left(b\sqrt{b^2-4ac}\;-12ac+b^2\right)\tan^{-1}\left(\frac{\sqrt{2}\,\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}\,a\left(b^2-4ac\right)^{3/2}\sqrt{b-\sqrt{b^2-4ac}}}-\frac{\sqrt{c}\,d\left(-b\sqrt{b^2-4ac}\;-12ac+\right.}{2\sqrt{2}\,a\left(b^2-4ac\right)^{3/2}}$$

```
[Out] -1/2*e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*d*x*(b*c*x^2-2*a*c+b^2)
/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+2*c*e*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2
))/(-4*a*c+b^2)^(3/2)+1/4*d*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))
^(1/2))*c^(1/2)*(b^2-12*a*c+b*(-4*a*c+b^2)^(1/2))/a/(-4*a*c+b^2)^(3/2)*2^(1
/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)-1/4*d*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+
b^2)^(1/2))^(1/2))*c^(1/2)*(b^2-12*a*c-b*(-4*a*c+b^2)^(1/2))/a/(-4*a*c+b^2)
^(3/2)*2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 0.74, antiderivative size = 330, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.450, Rules used = {1673, 12, 1092, 1166, 205, 1107, 614, 618, 206}

$$\frac{dx\left(-2ac+b^2+bcx^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\,d\left(b\sqrt{b^2-4ac}\;-12ac+b^2\right)\tan^{-1}\left(\frac{\sqrt{2}\,\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}\,a\left(b^2-4ac\right)^{3/2}\sqrt{b-\sqrt{b^2-4ac}}}-\frac{\sqrt{c}\,d\left(-b\sqrt{b^2-4ac}\;-12ac+\right.}{2\sqrt{2}\,a\left(b^2-4ac\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] -(e*(b + 2*c*x^2))/(2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (d*x*(b^2 - 2*a*
c + b*c*x^2))/(2*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (Sqrt[c]*(b^2 - 12*
a*c + b*Sqrt[b^2 - 4*a*c])*d*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 -
 4*a*c]]])/(2*Sqrt[2]*a*(b^2 - 4*a*c)^(3/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) -
(Sqrt[c]*(b^2 - 12*a*c - b*Sqrt[b^2 - 4*a*c])*d*ArcTan[(Sqrt[2]*Sqrt[c]*x)/
Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(2*Sqrt[2]*a*(b^2 - 4*a*c)^(3/2)*Sqrt[b + Sqr
t[b^2 - 4*a*c]]) + (2*c*e*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(b^2 -
4*a*c)^(3/2)
```

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 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
```

```
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1092

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> -Simp[(x*(b^2 -
 2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)),
 x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(b^2 - 2*a*c + 2*(p + 1)*(b^2
 - 4*a*c) + b*c*(4*p + 7)*x^2)*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ
[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex}{\left(a+bx^2+cx^4\right)^2}\,dx = \int \frac{d}{\left(a+bx^2+cx^4\right)^2}\,dx + \int \frac{ex}{\left(a+bx^2+cx^4\right)^2}\,dx$$

$$= d\int \frac{1}{\left(a+bx^2+cx^4\right)^2}\,dx + e\int \frac{x}{\left(a+bx^2+cx^4\right)^2}\,dx$$

$$= \frac{dx\left(b^2-2ac+bcx^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} - \frac{d\int \frac{b^2-2ac-2\left(b^2-4ac\right)-bcx^2}{a+bx^2+cx^4}\,dx}{2a\left(b^2-4ac\right)} + \frac{1}{2}e\,\text{Subst}\left(\int \frac{1}{\left(a+bx+cx\right.}\right.$$

$$= -\frac{e\left(b+2cx^2\right)}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{dx\left(b^2-2ac+bcx^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} - \frac{\left(c\left(b^2-12ac-b\sqrt{b^2-\right.\right.}{4a\left(\right.}$$

$$= -\frac{e\left(b+2cx^2\right)}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{dx\left(b^2-2ac+bcx^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{\sqrt{c}\left(b^2-12ac+b\sqrt{b^2}\right.}{2\sqrt{2}\,a\left(b^2-4a\right.}$$

$$= -\frac{e\left(b+2cx^2\right)}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{dx\left(b^2-2ac+bcx^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{\sqrt{c}\left(b^2-12ac+b\sqrt{b^2}\right.}{2\sqrt{2}\,a\left(b^2-4a\right.}$$

Mathematica [A] time = 0.76, size = 341, normalized size = 1.03

$$\frac{1}{4}\left(\frac{2abe+4acx(d+ex)-2bdx\left(b+cx^2\right)}{a\left(4ac-b^2\right)\left(a+bx^2+cx^4\right)} + \frac{\sqrt{2}\sqrt{c}\,d\left(b\sqrt{b^2-4ac}-12ac+b^2\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{a\left(b^2-4ac\right)^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{2}\sqrt{c}\,d\left(b\right.}{}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] ((2*a*b*e + 4*a*c*x*(d + e*x) - 2*b*d*x*(b + c*x^2))/(a*(-b^2 + 4*a*c)*(a +
 b*x^2 + c*x^4)) + (Sqrt[2]*Sqrt[c]*(b^2 - 12*a*c + b*Sqrt[b^2 - 4*a*c])*d*
ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^(
3/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*Sqrt[c]*(-b^2 + 12*a*c + b*Sqr
t[b^2 - 4*a*c])*d*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/
(a*(b^2 - 4*a*c)^(3/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - (4*c*e*Log[-b + Sqrt[
b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(3/2) + (4*c*e*Log[b + Sqrt[b^2 - 4*
a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(3/2))/4
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 5.02, size = 3434, normalized size = 10.41

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="giac")
```

```
[Out] 1/2*(b*c*d*x^3 - 2*a*c*x^2*e + b^2*d*x - 2*a*c*d*x - a*b*e)/((c*x^4 + b*x^2
 + a)*(a*b^2 - 4*a^2*c)) + 1/16*((2*b^3*c^2 - 8*a*b*c^3 - sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*b^2*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(
b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b^2 - 4*a^2*c)^2*d + 2*(s
qrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6 - 14*sqrt(2)*sqrt(b*c + sqrt(b
^2 - 4*a*c)*c)*a^2*b^4*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*
c - 2*a*b^6*c + 64*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^2 + 20
*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + sqrt(2)*sqrt(b*c + s
qrt(b^2 - 4*a*c)*c)*a*b^4*c^2 + 28*a^2*b^4*c^2 - 96*sqrt(2)*sqrt(b*c + sqrt
(b^2 - 4*a*c)*c)*a^4*c^3 - 48*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b
*c^3 - 10*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 128*a^3*b^2
*c^3 + 24*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^4 + 192*a^4*c^4 + 2
*(b^2 - 4*a*c)*a*b^4*c - 20*(b^2 - 4*a*c)*a^2*b^2*c^2 + 48*(b^2 - 4*a*c)*a^
3*c^3)*d*abs(a*b^2 - 4*a^2*c) + (2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b
^3*c^4 - 384*a^5*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*
a*c)*c)*a^2*b^7 + 20*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*a^3*b^5*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)
*a^2*b^6*c - 112*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*
a^4*b^3*c^2 - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*
a^3*b^4*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2
*b^5*c^2 + 192*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^
5*b*c^3 + 96*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*
b^2*c^3 + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*
b^3*c^3 - 48*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*
b*c^4 - 2*(b^2 - 4*a*c)*a^2*b^5*c^2 + 32*(b^2 - 4*a*c)*a^3*b^3*c^3 - 96*(b^
2 - 4*a*c)*a^4*b*c^4)*d)*arctan(2*sqrt(1/2)*x/sqrt((a*b^3 - 4*a^2*b*c + sqr
t((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*
b^2*c - 4*a^2*c^2)))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^5*c + 48*a^5*b^2*c^
2 + 16*a^4*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b*c^3 - 8*a^4*b^2*c^
3 + 16*a^5*c^4)*abs(a*b^2 - 4*a^2*c)*abs(c)) - 1/16*((2*b^3*c^2 - 8*a*b*c^3
 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3 + 4*sqrt(2
)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c + 2*sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c - sqrt(2)*sqrt(b^2 - 4*a
*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b^2 -
 4*a^2*c)^2*d - 2*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^6 - 14*sqrt(
2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^
2 - 4*a*c)*c)*a*b^5*c + 2*a*b^6*c + 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)
*c)*a^3*b^2*c^2 + 20*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 +
sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 - 28*a^2*b^4*c^2 - 96*sqr
t(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*c^3 - 48*sqrt(2)*sqrt(b*c - sqrt(b
^2 - 4*a*c)*c)*a^3*b*c^3 - 10*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b
^2*c^3 + 128*a^3*b^2*c^3 + 24*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c
^4 - 192*a^4*c^4 - 2*(b^2 - 4*a*c)*a*b^4*c + 20*(b^2 - 4*a*c)*a^2*b^2*c^2 -
 48*(b^2 - 4*a*c)*a^3*c^3)*d*abs(a*b^2 - 4*a^2*c) + (2*a^2*b^7*c^2 - 40*a^3
*b^5*c^3 + 224*a^4*b^3*c^4 - 384*a^5*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^7 + 20*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
 - sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*a^2*b^6*c - 112*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - s
qrt(b^2 - 4*a*c)*c)*a^4*b^3*c^2 - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - s
qrt(b^2 - 4*a*c)*c)*a^3*b^4*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt
(b^2 - 4*a*c)*c)*a^2*b^5*c^2 + 192*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqr
t(b^2 - 4*a*c)*c)*a^5*b*c^3 + 96*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(
b^2 - 4*a*c)*c)*a^4*b^2*c^3 + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(
b^2 - 4*a*c)*c)*a^3*b^3*c^3 - 48*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(
```

```
b^2 - 4*a*c)*c)*a^4*b*c^4 - 2*(b^2 - 4*a*c)*a^2*b^5*c^2 + 32*(b^2 - 4*a*c)*
a^3*b^3*c^3 - 96*(b^2 - 4*a*c)*a^4*b*c^4)*d)*arctan(2*sqrt(1/2)*x/sqrt((a*b
^3 - 4*a^2*b*c - sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*
c - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c^2)))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b
^5*c + 48*a^5*b^2*c^2 + 16*a^4*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*
b*c^3 - 8*a^4*b^2*c^3 + 16*a^5*c^4)*abs(a*b^2 - 4*a^2*c)*abs(c)) - 1/4*((b^
3*c^2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c^4 + (b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)
*sqrt(b^2 - 4*a*c))*abs(a*b^2 - 4*a^2*c)*e - (a*b^5*c^2 - 8*a^2*b^3*c^3 - 2
*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 + (a*b^
4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(
x^2 + 1/2*(a*b^3 - 4*a^2*b*c + sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*
a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c
 - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(a*
b^2 - 4*a^2*c)) - 1/4*((b^3*c^2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c^4 - (b^2*c^2
- 4*a*c^3 - 2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c))*abs(a*b^2 - 4*a^2*c)*e - (a*b
^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3
*c^4 - 4*a^2*b*c^5 - (a*b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*
sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(a*b^3 - 4*a^2*b*c - sqrt((a*b^3 - 4*a^
2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c
^2))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c
^2 - 4*a^2*c^3)*c^2*abs(a*b^2 - 4*a^2*c))
```

maple [B] time = 0.14, size = 1237, normalized size = 3.75

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)/(c*x^4+b*x^2+a)^2,x)
```

```
[Out] c/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*d*x*(-4*a*c+b^2)^(1/
2)-1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)/a*d*x*b^2*(-4*a
*c+b^2)^(1/2)-c/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*d*x*b+
1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)/a*d*x*b^3+2*c/(4*a
*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*e*a-1/2/(4*a*c-b^2)^2/(x^2
+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*e*b^2+c/(4*a*c-b^2)^2*e*(-4*a*c+b^2)^(1/
2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+3*c^2/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*
(-4*a*c+b^2)^(1/2)*d-1/4*c/(4*a*c-b^2)^2/a*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*
c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^
(1/2)*b^2*d-c^2/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arct
an(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*d+1/4*c/(4*a*c-b^2)^2/a*
2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*c*x)*b^3*d-c/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2
)/c)*d*x*(-4*a*c+b^2)^(1/2)+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)
^(1/2)/c)/a*d*x*b^2*(-4*a*c+b^2)^(1/2)-c/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4
*a*c+b^2)^(1/2)/c)*d*x*b+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1
/2)/c)/a*d*x*b^3+2*c/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*e
*a-1/2/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*e*b^2-c/(4*a*c-
b^2)^2*e*(-4*a*c+b^2)^(1/2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))+3*c^2/(4*a*c-
b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a
*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d-1/4*c/(4*a*c-b^2)^2/a*2^(
1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*d+c^2/(4*a*c-b^2)^2*2^(1/2)/((-b+
(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1
/2)*c*x)*b*d-1/4*c/(4*a*c-b^2)^2/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2
)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*d
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="maxima")
```

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

mupad [B] time = 1.50, size = 2382, normalized size = 7.22

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x)/(a + b*x^2 + c*x^4)^2,x)
```

```
[Out] ((b*e)/(2*(4*a*c - b^2)) + (c*e*x^2)/(4*a*c - b^2) + (d*x*(2*a*c - b^2))/(2
*a*(4*a*c - b^2)) - (b*c*d*x^3)/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4) +
symsum(log((5*b^3*c^4*d^3 - 96*a^2*c^5*d*e^2 - 36*a*b*c^5*d^3 + 16*a*b^2*c^
4*d*e^2)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - root(
1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 -
 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^
3*b^12*z^4 + 61440*a^5*b*c^5*d^2*z^2 + 432*a*b^9*c*d^2*z^2 + 24576*a^5*b^2*
c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^
4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 -
32768*a^6*c^5*e^2*z^2 - 16*b^11*d^2*z^2 - 672*a*b^6*c^2*d^2*e*z - 15872*a^3
*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z + 18432*a^4*c^5*d^2*e*z + 32*b^
8*c*d^2*e*z - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 - 16*b^5*c^2*d^
2*e^2 + 360*a*b^2*c^4*d^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5
*d^4, z, k)*(root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680
*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^
9*c^6*z^4 - 256*a^3*b^12*z^4 + 61440*a^5*b*c^5*d^2*z^2 + 432*a*b^9*c*d^2*z^
2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*
e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*
b^7*c^2*d^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*b^11*d^2*z^2 - 672*a*b^6*c^2*d
^2*e*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z + 18432*a^4*c
^5*d^2*e*z + 32*b^8*c*d^2*e*z - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e
^2 - 16*b^5*c^2*d^2*e^2 + 360*a*b^2*c^4*d^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*
d^4 - 1296*a^2*c^5*d^4, z, k)*((x*(1024*a^5*c^6*e - 16*a^2*b^6*c^3*e + 192*
a^3*b^4*c^4*e - 768*a^4*b^2*c^5*e))/(2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c
 + 48*a^4*b^2*c^2)) - (6144*a^5*c^6*d - 288*a^2*b^6*c^3*d + 1920*a^3*b^4*c^
4*d - 5632*a^4*b^2*c^5*d + 16*a*b^8*c^2*d)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^
3*b^4*c + 48*a^4*b^2*c^2)) + (root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4
*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c
*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 61440*a^5*b*c^5*d^2*z^2 + 4
32*a*b^9*c*d^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 +
 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^
2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*b^11*d^2*z^2
- 672*a*b^6*c^2*d^2*e*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*
e*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 960*a^2*b*c^4*d^2*e^2 + 24
0*a*b^3*c^3*d^2*e^2 - 16*b^5*c^2*d^2*e^2 + 360*a*b^2*c^4*d^4 - 256*a^3*c^4*
e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*x*(4096*a^6*b*c^6 + 16*a^2*b
^9*c^2 - 256*a^3*b^7*c^3 + 1536*a^4*b^5*c^4 - 4096*a^5*b^3*c^5))/(2*(a^2*b^
6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) + (32*a*b^5*c^3*d*e + 102
4*a^3*b*c^5*d*e - 384*a^2*b^3*c^4*d*e)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^
4*c + 48*a^4*b^2*c^2)) - (x*(288*a^3*c^6*d^2 - b^6*c^3*d^2 + 18*a*b^4*c^4*d
^2 - 64*a^3*b*c^5*e^2 - 128*a^2*b^2*c^5*d^2 + 16*a^2*b^3*c^4*e^2))/(2*(a^2*
b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) - (x*(16*a^2*c^5*e^3 -
b^3*c^4*d^2*e + 12*a*b*c^5*d^2*e))/(2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c
+ 48*a^4*b^2*c^2)))*root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 +
```

```
 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 104
8576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 61440*a^5*b*c^5*d^2*z^2 + 432*a*b^9*c
*d^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b
^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 46
08*a^2*b^7*c^2*d^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*b^11*d^2*z^2 - 672*a*b^
6*c^2*d^2*e*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z + 1843
2*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^
3*d^2*e^2 - 16*b^5*c^2*d^2*e^2 + 360*a*b^2*c^4*d^4 - 256*a^3*c^4*e^4 - 25*b
^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k), k, 1, 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x**4+b*x**2+a)**2,x)
```

```
[Out] Timed out
```

3.37 $\int \frac{d+ex+fx^2}{\left(a+bx^2+cx^4\right)^2}\,dx$

Optimal. Leaf size=368

$$\frac{x\left(cx^2(bd-2af)-abf-2acd+b^2d\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}a\left(b^2-4ac\right)\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\sqrt{c}\left(-\frac{4abf-12acd+}{\sqrt{b^2-4ac}}\right.}{2\sqrt{2}a\left(\right.}$$

```
[Out] -1/2*e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*x*(b^2*d-2*a*c*d-a*b*f+
c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+2*c*e*arctanh((2*c*x^2+b
)/(-4*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(3/2)+1/4*arctan(x*2^(1/2)*c^(1/2)/(b-(-
4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(b*d-2*a*f+(4*a*b*f-12*a*c*d+b^2*d)/(-4*a*
c+b^2)^(1/2))/a/(-4*a*c+b^2)*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/4*arcta
n(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(b*d-2*a*f+(-4*a*
b*f+12*a*c*d-b^2*d)/(-4*a*c+b^2)^(1/2))/a/(-4*a*c+b^2)*2^(1/2)/(b+(-4*a*c+b
^2)^(1/2))^(1/2)
```

Rubi [A] time = 0.87, antiderivative size = 368, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.360, Rules used = {1673, 1178, 1166, 205, 12, 1107, 614, 618, 206}

$$\frac{x\left(cx^2(bd-2af)-abf-2acd+b^2d\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}a\left(b^2-4ac\right)\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\sqrt{c}\left(-\frac{4abf-12acd+}{\sqrt{b^2-4ac}}\right.}{2\sqrt{2}a\left(\right.}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] -(e*(b + 2*c*x^2))/(2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (x*(b^2*d - 2*a*
c*d - a*b*f + c*(b*d - 2*a*f)*x^2))/(2*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4))
 + (Sqrt[c]*(b*d - 2*a*f + (b^2*d - 12*a*c*d + 4*a*b*f)/Sqrt[b^2 - 4*a*c])*
ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(2*Sqrt[2]*a*(b^2
- 4*a*c)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[c]*(b*d - 2*a*f - (b^2*d - 12
*a*c*d + 4*a*b*f)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sq
rt[b^2 - 4*a*c]]])/(2*Sqrt[2]*a*(b^2 - 4*a*c)*Sqrt[b + Sqrt[b^2 - 4*a*c]])
 + (2*c*e*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(3/2)
```

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 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2}{\left(a+bx^2+cx^4\right)^2}dx = \int \frac{ex}{\left(a+bx^2+cx^4\right)^2}dx + \int \frac{d+fx^2}{\left(a+bx^2+cx^4\right)^2}dx$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} - \frac{\int \frac{-b^2d+6acd-abf-c(bd-2af)x^2}{a+bx^2+cx^4}dx}{2a\left(b^2-4ac\right)} + e\int \frac{}{(a+bx}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{1}{2}e\,\text{Subst}\left(\int \frac{1}{\left(a+bx+cx^2\right)^2}dx, x, x^2\right) + -$$

$$= -\frac{e\left(b+2cx^2\right)}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{\sqrt{c}\left(bd-2\right.}{2}$$

$$= -\frac{e\left(b+2cx^2\right)}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{\sqrt{c}\left(bd-2\right.}{2}$$

$$= -\frac{e\left(b+2cx^2\right)}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{\sqrt{c}\left(bd-2\right.}{2}$$

Mathematica [A] time = 1.17, size = 398, normalized size = 1.08

$$\frac{1}{4}\left(\frac{2ab(e+fx)+4acx(d+x(e+fx))-2bdx\left(b+cx^2\right)}{a\left(4ac-b^2\right)\left(a+bx^2+cx^4\right)} + \frac{\sqrt{2}\sqrt{c}\left(b\left(d\sqrt{b^2-4ac}+4af\right)-2a\left(f\sqrt{b^2-4ac}+\right.\right.}{a\left(b^2-4ac\right)^{3/2}\sqrt{b-\sqrt{b^2-}}}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] ((2*a*b*(e + f*x) - 2*b*d*x*(b + c*x^2) + 4*a*c*x*(d + x*(e + f*x)))/(a*(-b
^2 + 4*a*c)*(a + b*x^2 + c*x^4)) + (Sqrt[2]*Sqrt[c]*(b^2*d + b*(Sqrt[b^2 -
4*a*c]*d + 4*a*f) - 2*a*(6*c*d + Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt
[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^(3/2)*Sqrt[b - Sqrt[b
^2 - 4*a*c]]) + (Sqrt[2]*Sqrt[c]*(-(b^2*d) + 12*a*c*d + b*Sqrt[b^2 - 4*a*c]
*d - 4*a*b*f - 2*a*Sqrt[b^2 - 4*a*c]*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b +
 Sqrt[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^(3/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) -
 (4*c*e*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(3/2) + (4*c*e
*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(3/2))/4
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 6.67, size = 5164, normalized size = 14.03

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="giac")
```

```
[Out] 1/2*(b*c*d*x^3 - 2*a*c*f*x^3 - 2*a*c*x^2*e + b^2*d*x - 2*a*c*d*x - a*b*f*x
- a*b*e)/((c*x^4 + b*x^2 + a)*(a*b^2 - 4*a^2*c)) + 1/16*((2*b^3*c^2 - 8*a*b
*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3 + 4*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c + 2*sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c - sqrt(2)*sqrt(b^2 -
 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b
^2 - 4*a^2*c)^2*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4
*a*c)*c)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*(a*b^2 - 4*a^2*c)^2*f + 2*(sqrt(2)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6 - 14*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*
a*c)*c)*a^2*b^4*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c - 2*a
*b^6*c + 64*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^2 + 20*sqrt(2
)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2
 - 4*a*c)*c)*a*b^4*c^2 + 28*a^2*b^4*c^2 - 96*sqrt(2)*sqrt(b*c + sqrt(b^2 -
4*a*c)*c)*a^4*c^3 - 48*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 -
10*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 128*a^3*b^2*c^3 +
24*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^4 + 192*a^4*c^4 + 2*(b^2 -
 4*a*c)*a*b^4*c - 20*(b^2 - 4*a*c)*a^2*b^2*c^2 + 48*(b^2 - 4*a*c)*a^3*c^3)*
d*abs(a*b^2 - 4*a^2*c) + 2*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5
 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c - 2*sqrt(2)*sqrt(b*c
 + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c - 2*a^2*b^5*c + 16*sqrt(2)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*a^4*b*c^2 + 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3
*b^2*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + 16*a^3*b^3
*c^2 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 - 32*a^4*b*c^3 +
 2*(b^2 - 4*a*c)*a^2*b^3*c - 8*(b^2 - 4*a*c)*a^3*b*c^2)*f*abs(a*b^2 - 4*a^2
*c) + (2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b^3*c^4 - 384*a^5*b*c^5 - s
qrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^7 + 20*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c + 2*sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^6*c - 112*sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^3*c^2 - 32*sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c^2 - sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c^2 + 192*sqrt(2)*sqr
t(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^5*b*c^3 + 96*sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^3 + 16*sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^3 - 48*sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b*c^4 - 2*(b^2 - 4*a*c)*a^
2*b^5*c^2 + 32*(b^2 - 4*a*c)*a^3*b^3*c^3 - 96*(b^2 - 4*a*c)*a^4*b*c^4)*d +
4*(2*a^3*b^6*c^2 - 16*a^4*b^4*c^3 + 32*a^5*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a
*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^6 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*s
qrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^4*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b
*c + sqrt(b^2 - 4*a*c)*c)*a^5*b^2*c^2 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^4*b^3*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c +
 sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c +
sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^3 - 2*(b^2 - 4*a*c)*a^3*b^4*c^2 + 8*(b^2 - 4
*a*c)*a^4*b^2*c^3)*f)*arctan(2*sqrt(1/2)*x/sqrt((a*b^3 - 4*a^2*b*c + sqrt((
a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2
*c - 4*a^2*c^2)))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^5*c + 48*a^5*b^2*c^2 +
 16*a^4*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b*c^3 - 8*a^4*b^2*c^3 +
 16*a^5*c^4)*abs(a*b^2 - 4*a^2*c)*abs(c)) - 1/16*((2*b^3*c^2 - 8*a*b*c^3 -
```

```
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3 + 4*sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c + 2*sqrt(2)*sqrt(b^2
 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c - sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b^2 - 4*
a^2*c)^2*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c - sqrt(b^2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqr
t(b^2 - 4*a*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 -
 4*a*c)*c)*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*(a*b^2 - 4*a^2*c)^2*f - 2*(sqrt(2)*sqrt(b*
c - sqrt(b^2 - 4*a*c)*c)*a*b^6 - 14*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)
*a^2*b^4*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c + 2*a*b^6*c
+ 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^2 + 20*sqrt(2)*sqrt(
b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*
c)*c)*a*b^4*c^2 - 28*a^2*b^4*c^2 - 96*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*
c)*a^4*c^3 - 48*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 - 10*sqrt
(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 128*a^3*b^2*c^3 + 24*sqrt
(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^4 - 192*a^4*c^4 - 2*(b^2 - 4*a*c)
*a*b^4*c + 20*(b^2 - 4*a*c)*a^2*b^2*c^2 - 48*(b^2 - 4*a*c)*a^3*c^3)*d*abs(a
*b^2 - 4*a^2*c) - 2*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^5 - 8*sq
rt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c - 2*sqrt(2)*sqrt(b*c - sqrt
(b^2 - 4*a*c)*c)*a^2*b^4*c + 2*a^2*b^5*c + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 -
 4*a*c)*c)*a^4*b*c^2 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^
2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 - 16*a^3*b^3*c^2 -
4*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 + 32*a^4*b*c^3 - 2*(b^2
 - 4*a*c)*a^2*b^3*c + 8*(b^2 - 4*a*c)*a^3*b*c^2)*f*abs(a*b^2 - 4*a^2*c) + (
2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b^3*c^4 - 384*a^5*b*c^5 - sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^7 + 20*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c + 2*sqrt(2)*sqrt(b^
2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^6*c - 112*sqrt(2)*sqrt(b^2
 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^3*c^2 - 32*sqrt(2)*sqrt(b^2
 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c^2 - sqrt(2)*sqrt(b^2 -
4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c^2 + 192*sqrt(2)*sqrt(b^2 -
 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^5*b*c^3 + 96*sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^3 + 16*sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^3 - 48*sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b*c^4 - 2*(b^2 - 4*a*c)*a^2*b^5*c
^2 + 32*(b^2 - 4*a*c)*a^3*b^3*c^3 - 96*(b^2 - 4*a*c)*a^4*b*c^4)*d + 4*(2*a^
3*b^6*c^2 - 16*a^4*b^4*c^3 + 32*a^5*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqr
t(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^6 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
 - sqrt(b^2 - 4*a*c)*c)*a^4*b^4*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sq
rt(b^2 - 4*a*c)*c)*a^5*b^2*c^2 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqr
t(b^2 - 4*a*c)*c)*a^4*b^3*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b
^2 - 4*a*c)*c)*a^3*b^4*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^
2 - 4*a*c)*c)*a^4*b^2*c^3 - 2*(b^2 - 4*a*c)*a^3*b^4*c^2 + 8*(b^2 - 4*a*c)*a
^4*b^2*c^3)*f)*arctan(2*sqrt(1/2)*x/sqrt((a*b^3 - 4*a^2*b*c - sqrt((a*b^3 -
 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*
a^2*c^2)))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^5*c + 48*a^5*b^2*c^2 + 16*a^4
*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b*c^3 - 8*a^4*b^2*c^3 + 16*a^5
*c^4)*abs(a*b^2 - 4*a^2*c)*abs(c)) - 1/4*((b^3*c^2 - 4*a*b*c^3 - 2*b^2*c^3
+ b*c^4 + (b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c))*abs(a*b^2
- 4*a^2*c)*e - (a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*
a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 + (a*b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^
3*c^3 + a*b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(a*b^3 - 4*a^2*b*c +
 sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))
/(a*b^2*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*
a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(a*b^2 - 4*a^2*c)) - 1/4*((b^3*c^
2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c^4 - (b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sqr
t(b^2 - 4*a*c))*abs(a*b^2 - 4*a^2*c)*e - (a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b
```

```
^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 - (a*b^4*c^
2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2
+ 1/2*(a*b^3 - 4*a^2*b*c - sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*
c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c - 2
*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(a*b^2
- 4*a^2*c))
```

maple [B] time = 0.18, size = 1813, normalized size = 4.93

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x)
```

```
[Out] -1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1
/2)/a*b^2*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/4*c/(4
*a*c-b^2)^2/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-
b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*d-1/2/(4*a*c-b^2
)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*b^2*e-1/2/(4*a*c-b^2)^2/(x^2+1/2
*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*b^2*e-c/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b
^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*
(-4*a*c+b^2)^(1/2)*b*f-c/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(
1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2
)*b*f-2*c^2/(4*a*c-b^2)^2*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arcta
nh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f+1/2*c/(4*a*c-b^2)^2*2^(
1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*c*x)*b^2*f+2*c^2/(4*a*c-b^2)^2*a*2^(1/2)/((b+(-4*a*c+b^2)^(1/
2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f-1/2*c/(
4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-
4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^2*f+2*c/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-
4*a*c+b^2)^(1/2)/c)*x*a*f+2*c/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(
1/2)/c)*x*a*f-1/4*c/(4*a*c-b^2)^2/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/
2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*d-1/2/(4*a*c-
b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*x*b^2*f+1/(4*a*c-b^2)^2*(-4*a
*c+b^2)^(1/2)*c*e*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+2/(4*a*c-b^2)^2/(x^2+1/2
*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*a*c*e-1/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*c*e
*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))-1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a
*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2)/a*b^2*d*x+3/(4*a*c-b^2)^2*2^(1/2)/((b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)*c^2*d*arctan(2^(1/2)/((b+(-4
*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/
2))*c)^(1/2)*b*c^2*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+1
/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2)/
a*b^2*d*x+3*c^2/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arc
tanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d+c^
2/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/(
(-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*d+1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4
*a*c+b^2)^(1/2))*c)^(1/2)/a*b^3*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*
c)^(1/2)*c*x)+2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*a*c*e-
1/2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*x*b^2*f+1/(4*a*c-b
^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2)*c*d*x-1/(4*
a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*b*c*d*x+1/4/(4*a*c-b^2)^2
/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)/a*b^3*d*x-1/(4*a*c-b^2)^2/(x^2+1/2*
b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2)*c*d*x-1/(4*a*c-b^2)^2/(x^2
+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*b*c*d*x+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1
/2*(-4*a*c+b^2)^(1/2)/c)/a*b^3*d*x
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="maxima")
```

```
[Out] -1/2*(2*a*c*e*x^2 - (b*c*d - 2*a*c*f)*x^3 + a*b*e + (a*b*f - (b^2 - 2*a*c)*
d)*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)*
x^2) - 1/2*integrate((4*a*c*e*x - a*b*f - (b*c*d - 2*a*c*f)*x^2 - (b^2 - 6*
a*c)*d)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c)
```

mupad [B] time = 1.71, size = 4707, normalized size = 12.79

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2)/(a + b*x^2 + c*x^4)^2,x)
```

```
[Out] symsum(log((5*b^3*c^4*d^3 + 8*a^3*c^4*f^3 - 96*a^2*c^5*d*e^2 + 72*a^2*c^5*d
^2*f - 3*b^4*c^3*d^2*f + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + 16*a*b^2*c^4*
d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 16*a^
2*b*c^4*e^2*f)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) -
 root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3
*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 -
256*a^3*b^12*z^4 + 576*a^2*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072
*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2 +
 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 81
92*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z
^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4
*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10
*d*f*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 - 4
096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*d*e*f*z - 768
*a^2*b^5*c^2*d*e*f*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 1536*
a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z +
 4992*a^2*b^4*c^3*d^2*e*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z +
32*b^8*c*d^2*e*z - 32*a*b^4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^2*f - 192*a^3
*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*
c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 2016*a^2*b*c^4*
d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3*c^2*e^2*f^2
- 960*a^2*b^2*c^3*d^2*f^2 - 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^5
*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9*
a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c^4*e^4 - 25*b
^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*((32*a*b^5*c^3*d*e - 512*a^4*c^5*e*f +
 1024*a^3*b*c^5*d*e - 384*a^2*b^3*c^4*d*e + 32*a^2*b^4*c^3*e*f)/(8*(a^2*b^6
 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) + root(1572864*a^8*b^2*c^5*
z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z
^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 576*a^2
*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 204
8*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2 + 61440*a^5*b*c^5*d^2*z^2 -
 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + 1
536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*
z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c
^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10*d*f*z^2 - 32768*a^6*c^5*e
^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 - 4096*a^4*b*c^4*d*e*f*z + 64
*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*d*e*f*z - 768*a^2*b^5*c^2*d*e*f*z + 32*
a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 1536*a^4*b^2*c^3*e*f^2*z - 384*
a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z
- 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 32*a*b^
4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^2*f - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4
*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^
3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 2016*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*
f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3*c^2*e^2*f^2 - 960*a^2*b^2*c^3*d^2*f^2
- 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*
c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9*a^2*b^4*c*f^4 + 360*a*b^2*
```

```
c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*
d^4, z, k)*((x*(1024*a^5*c^6*e - 16*a^2*b^6*c^3*e + 192*a^3*b^4*c^4*e - 768
*a^4*b^2*c^5*e))/(2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))
 - (6144*a^5*c^6*d - 288*a^2*b^6*c^3*d + 1920*a^3*b^4*c^4*d - 5632*a^4*b^2*
c^5*d + 16*a^2*b^7*c^2*f - 192*a^3*b^5*c^3*f + 768*a^4*b^3*c^4*f + 16*a*b^8
*c^2*d - 1024*a^5*b*c^5*f)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4
*b^2*c^2)) + (root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 32768
0*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a
^9*c^6*z^4 - 256*a^3*b^12*z^4 + 576*a^2*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d
*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*
c^4*f^2*z^2 + 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c
*d^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*
b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 6144
0*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^
2 - 32*a*b^10*d*f*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^1
1*d^2*z^2 - 4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*
d*e*f*z - 768*a^2*b^5*c^2*d*e*f*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^
2*e*z + 1536*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*
c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c
^5*d^2*e*z + 32*b^8*c*d^2*e*z - 32*a*b^4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^
2*f - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3
 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 20
16*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3
*c^2*e^2*f^2 - 960*a^2*b^2*c^3*d^2*f^2 - 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2
*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c
*d^2*f^2 - 9*a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c
^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*x*(4096*a^6*b*c^6 + 16*a^
2*b^9*c^2 - 256*a^3*b^7*c^3 + 1536*a^4*b^5*c^4 - 4096*a^5*b^3*c^5))/(2*(a^2
*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) + (x*(b^6*c^3*d^2 - 28
8*a^3*c^6*d^2 + 32*a^4*c^5*f^2 - 18*a*b^4*c^4*d^2 + 64*a^3*b*c^5*e^2 + 128*
a^2*b^2*c^5*d^2 - 16*a^2*b^3*c^4*e^2 + 10*a^2*b^4*c^3*f^2 - 48*a^3*b^2*c^4*
f^2 + 2*a*b^5*c^3*d*f + 160*a^3*b*c^5*d*f - 48*a^2*b^3*c^4*d*f))/(2*(a^2*b^
6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) - (x*(16*a^2*c^5*e^3 - b^
3*c^4*d^2*e + 12*a*b*c^5*d^2*e - 24*a^2*c^5*d*e*f + 8*a^2*b*c^4*e*f^2 - 2*a
*b^2*c^4*d*e*f))/(2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))
)*root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^
3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 -
 256*a^3*b^12*z^4 + 576*a^2*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 307
2*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2
+ 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8
192*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*
z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^
4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^1
0*d*f*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 -
4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*d*e*f*z - 76
8*a^2*b^5*c^2*d*e*f*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 1536
*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z
+ 4992*a^2*b^4*c^3*d^2*e*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z +
 32*b^8*c*d^2*e*z - 32*a*b^4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^2*f - 192*a^
3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b
*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 2016*a^2*b*c^4
*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3*c^2*e^2*f^2
 - 960*a^2*b^2*c^3*d^2*f^2 - 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^
5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9
*a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c^4*e^4 - 25*
b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k), k, 1, 4) + ((b*e)/(2*(4*a*c - b^2))
+ (c*e*x^2)/(4*a*c - b^2) + (x*(2*a*c*d - b^2*d + a*b*f))/(2*a*(4*a*c - b^2
)) - (c*x^3*(b*d - 2*a*f))/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(c*x**4+b*x**2+a)**2,x)
```

```
[Out] Timed out
```

3.38 $\int \frac{d+ex+fx^2+gx^3}{\left(a+bx^2+cx^4\right)^2} \, dx$

Optimal. Leaf size=386

$$\frac{x\left(cx^2(bd-2af)-abf-2acd+b^2d\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}a\left(b^2-4ac\right)\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\sqrt{c}\left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}\right.}{2\sqrt{2}a\left(b^2\right.}$$

```
[Out] 1/2*x*(b^2*d-2*a*c*d-a*b*f+c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+
a)+1/2*(-b*e+2*a*g-(-b*g+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+(-b*g+2*c
*e)*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(3/2)+1/4*arctan(x
*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(b*d-2*a*f+(4*a*b*f-
12*a*c*d+b^2*d)/(-4*a*c+b^2)^(1/2))/a/(-4*a*c+b^2)*2^(1/2)/(b-(-4*a*c+b^2)^
(1/2))^(1/2)+1/4*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*c^(
1/2)*(b*d-2*a*f+(-4*a*b*f+12*a*c*d-b^2*d)/(-4*a*c+b^2)^(1/2))/a/(-4*a*c+b^2
)*2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 0.49, antiderivative size = 386, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.267, Rules used = {1673, 1178, 1166, 205, 1247, 638, 618, 206}

$$\frac{x\left(cx^2(bd-2af)-abf-2acd+b^2d\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}a\left(b^2-4ac\right)\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\sqrt{c}\left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}\right.}{2\sqrt{2}a\left(b^2\right.}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] (x*(b^2*d - 2*a*c*d - a*b*f + c*(b*d - 2*a*f)*x^2))/(2*a*(b^2 - 4*a*c)*(a +
 b*x^2 + c*x^4)) - (b*e - 2*a*g + (2*c*e - b*g)*x^2)/(2*(b^2 - 4*a*c)*(a +
b*x^2 + c*x^4)) + (Sqrt[c]*(b*d - 2*a*f + (b^2*d - 12*a*c*d + 4*a*b*f)/Sqrt
[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(2*
Sqrt[2]*a*(b^2 - 4*a*c)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[c]*(b*d - 2*a*
f - (b^2*d - 12*a*c*d + 4*a*b*f)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]
*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(2*Sqrt[2]*a*(b^2 - 4*a*c)*Sqrt[b + Sqrt[
b^2 - 4*a*c]]) + ((2*c*e - b*g)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(
b^2 - 4*a*c)^(3/2)
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3}{\left(a+bx^2+cx^4\right)^2}\,dx = \int \frac{d+fx^2}{\left(a+bx^2+cx^4\right)^2}\,dx + \int \frac{x\left(e+gx^2\right)}{\left(a+bx^2+cx^4\right)^2}\,dx$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{1}{2}\text{Subst}\left(\int \frac{e+gx}{\left(a+bx+cx^2\right)^2}\,dx, x, x^2\right) - \int \frac{}{}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} - \frac{be-2ag+(2ce-bg)x^2}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{\left(c\left(bd-2af\right.\right.}{}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} - \frac{be-2ag+(2ce-bg)x^2}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{\sqrt{c}\left(bd-2a\right.}{2\sqrt{2}}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} - \frac{be-2ag+(2ce-bg)x^2}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{\sqrt{c}\left(bd-2a\right.}{2\sqrt{2}}$$

Mathematica [A] time = 1.30, size = 421, normalized size = 1.09

$$\frac{1}{4}\left(\frac{-4a^2g+2ab(e+x(f-gx))+4acx(d+x(e+fx))-2bdx\left(b+cx^2\right)}{a\left(4ac-b^2\right)\left(a+bx^2+cx^4\right)} + \frac{\sqrt{2}\sqrt{c}\left(b\left(d\sqrt{b^2-4ac}+4af\right)-2a\left(f\right.\right.}{a\left(b^2-4ac\right)^{3/}}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] ((-4*a^2*g - 2*b*d*x*(b + c*x^2) + 4*a*c*x*(d + x*(e + f*x)) + 2*a*b*(e + x
*(f - g*x)))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)) + (Sqrt[2]*Sqrt[c]*(b^2
*d + b*(Sqrt[b^2 - 4*a*c]*d + 4*a*f) - 2*a*(6*c*d + Sqrt[b^2 - 4*a*c]*f))*A
rcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^(3
/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*Sqrt[c]*(-(b^2*d) + 12*a*c*d +
b*Sqrt[b^2 - 4*a*c]*d - 4*a*b*f - 2*a*Sqrt[b^2 - 4*a*c]*f)*ArcTan[(Sqrt[2]*
Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^(3/2)*Sqrt[b + Sq
rt[b^2 - 4*a*c]]) + (2*(-2*c*e + b*g)*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2]
)/(b^2 - 4*a*c)^(3/2) - (2*(-2*c*e + b*g)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x
^2])/(b^2 - 4*a*c)^(3/2))/4
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 6.11, size = 5579, normalized size = 14.45

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="giac")
```

```
[Out] 1/2*(b*c*d*x^3 - 2*a*c*f*x^3 + a*b*g*x^2 - 2*a*c*x^2*e + b^2*d*x - 2*a*c*d*
x - a*b*f*x + 2*a^2*g - a*b*e)/((c*x^4 + b*x^2 + a)*(a*b^2 - 4*a^2*c)) + 1/
16*((2*b^3*c^2 - 8*a*b*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*b^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*a*b*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*
c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^
2 - 4*a*c)*b*c^2)*(a*b^2 - 4*a^2*c)^2*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqr
t(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 -
 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*s
qrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*(a*b^2 - 4*a^
2*c)^2*f + 2*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6 - 14*sqrt(2)*sq
rt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4
*a*c)*c)*a*b^5*c - 2*a*b^6*c + 64*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
^3*b^2*c^2 + 20*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + sqrt(
2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 + 28*a^2*b^4*c^2 - 96*sqrt(2)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*c^3 - 48*sqrt(2)*sqrt(b*c + sqrt(b^2 -
4*a*c)*c)*a^3*b*c^3 - 10*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^
3 - 128*a^3*b^2*c^3 + 24*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^4 +
192*a^4*c^4 + 2*(b^2 - 4*a*c)*a*b^4*c - 20*(b^2 - 4*a*c)*a^2*b^2*c^2 + 48*(
b^2 - 4*a*c)*a^3*c^3)*d*abs(a*b^2 - 4*a^2*c) + 2*(sqrt(2)*sqrt(b*c + sqrt(b
^2 - 4*a*c)*c)*a^2*b^5 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^3*
c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c - 2*a^2*b^5*c + 16*
sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b*c^2 + 8*sqrt(2)*sqrt(b*c + sq
rt(b^2 - 4*a*c)*c)*a^3*b^2*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^
2*b^3*c^2 + 16*a^3*b^3*c^2 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*
b*c^3 - 32*a^4*b*c^3 + 2*(b^2 - 4*a*c)*a^2*b^3*c - 8*(b^2 - 4*a*c)*a^3*b*c^
2)*f*abs(a*b^2 - 4*a^2*c) + (2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b^3*c
^4 - 384*a^5*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*a^2*b^7 + 20*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*
a^3*b^5*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2
*b^6*c - 112*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*
b^3*c^2 - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*
b^4*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5
*c^2 + 192*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^5*b*
c^3 + 96*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^2*
c^3 + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^3*
c^3 - 48*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b*c^
4 - 2*(b^2 - 4*a*c)*a^2*b^5*c^2 + 32*(b^2 - 4*a*c)*a^3*b^3*c^3 - 96*(b^2 -
4*a*c)*a^4*b*c^4)*d + 4*(2*a^3*b^6*c^2 - 16*a^4*b^4*c^3 + 32*a^5*b^2*c^4 -
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^6 + 8*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^4*c + 2*sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c - 16*sqrt(2)*sq
rt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^5*b^2*c^2 - 8*sqrt(2)*sqr
t(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^3*c^2 - sqrt(2)*sqrt(b
^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c^2 + 4*sqrt(2)*sqrt(b^
2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^3 - 2*(b^2 - 4*a*c)*a^
3*b^4*c^2 + 8*(b^2 - 4*a*c)*a^4*b^2*c^3)*f)*arctan(2*sqrt(1/2)*x/sqrt((a*b^
3 - 4*a^2*b*c + sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c
 - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c^2)))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^
5*c + 48*a^5*b^2*c^2 + 16*a^4*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b
*c^3 - 8*a^4*b^2*c^3 + 16*a^5*c^4)*abs(a*b^2 - 4*a^2*c)*abs(c)) - 1/16*((2*
b^3*c^2 - 8*a*b*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c
)*c)*b^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*
c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c - sqr
t(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a
*c)*b*c^2)*(a*b^2 - 4*a^2*c)^2*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*sqr
t(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqrt(b^2 -
```

```
4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
 - sqrt(b^2 - 4*a*c)*c)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*(a*b^2 - 4*a^2*c)^2*
f - 2*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^6 - 14*sqrt(2)*sqrt(b*c
- sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a*b^5*c + 2*a*b^6*c + 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*
c^2 + 20*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + sqrt(2)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 - 28*a^2*b^4*c^2 - 96*sqrt(2)*sqrt(b*
c - sqrt(b^2 - 4*a*c)*c)*a^4*c^3 - 48*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*
c)*a^3*b*c^3 - 10*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 128
*a^3*b^2*c^3 + 24*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^4 - 192*a^4
*c^4 - 2*(b^2 - 4*a*c)*a*b^4*c + 20*(b^2 - 4*a*c)*a^2*b^2*c^2 - 48*(b^2 - 4
*a*c)*a^3*c^3)*d*abs(a*b^2 - 4*a^2*c) - 2*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*
a*c)*c)*a^2*b^5 - 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c - 2*s
qrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c + 2*a^2*b^5*c + 16*sqrt(2)
*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b*c^2 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2
- 4*a*c)*c)*a^3*b^2*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c
^2 - 16*a^3*b^3*c^2 - 4*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 +
 32*a^4*b*c^3 - 2*(b^2 - 4*a*c)*a^2*b^3*c + 8*(b^2 - 4*a*c)*a^3*b*c^2)*f*ab
s(a*b^2 - 4*a^2*c) + (2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b^3*c^4 - 38
4*a^5*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2
*b^7 + 20*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^5
*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^6*c
- 112*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^3*c^2
 - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c^2
 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c^2 +
192*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^5*b*c^3 + 9
6*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^3 + 1
6*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^3 - 4
8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b*c^4 - 2*(
b^2 - 4*a*c)*a^2*b^5*c^2 + 32*(b^2 - 4*a*c)*a^3*b^3*c^3 - 96*(b^2 - 4*a*c)*
a^4*b*c^4)*d + 4*(2*a^3*b^6*c^2 - 16*a^4*b^4*c^3 + 32*a^5*b^2*c^4 - sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^6 + 8*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^4*c + 2*sqrt(2)*sqrt(b^
2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c - 16*sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^5*b^2*c^2 - 8*sqrt(2)*sqrt(b^2 -
 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^3*c^2 - sqrt(2)*sqrt(b^2 - 4*
a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a
*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^3 - 2*(b^2 - 4*a*c)*a^3*b^4*c
^2 + 8*(b^2 - 4*a*c)*a^4*b^2*c^3)*f)*arctan(2*sqrt(1/2)*x/sqrt((a*b^3 - 4*a
^2*b*c - sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^
2*c^2)))/(a*b^2*c - 4*a^2*c^2)))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^5*c + 4
8*a^5*b^2*c^2 + 16*a^4*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b*c^3 -
8*a^4*b^2*c^3 + 16*a^5*c^4)*abs(a*b^2 - 4*a^2*c)*abs(c)) + 1/8*((b^4*c - 4*
a*b^2*c^2 - 2*b^3*c^2 + b^2*c^3 + (b^3*c - 4*a*b*c^2 - 2*b^2*c^2 + b*c^3)*s
qrt(b^2 - 4*a*c))*g*abs(a*b^2 - 4*a^2*c) - 2*(b^3*c^2 - 4*a*b*c^3 - 2*b^2*c
^3 + b*c^4 + (b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c))*abs(a*b
^2 - 4*a^2*c)*e - (a*b^6*c - 8*a^2*b^4*c^2 - 2*a*b^5*c^2 + 16*a^3*b^2*c^3 +
 8*a^2*b^3*c^3 + a*b^4*c^3 - 4*a^2*b^2*c^4 + (a*b^5*c - 4*a^2*b^3*c^2 - 2*a
*b^4*c^2 + a*b^3*c^3)*sqrt(b^2 - 4*a*c))*g + 2*(a*b^5*c^2 - 8*a^2*b^3*c^3 -
 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 + (a*
b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*lo
g(x^2 + 1/2*(a*b^3 - 4*a^2*b*c + sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 -
4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2
*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(
a*b^2 - 4*a^2*c)) + 1/8*((b^4*c - 4*a*b^2*c^2 - 2*b^3*c^2 + b^2*c^3 - (b^3*
c - 4*a*b*c^2 - 2*b^2*c^2 + b*c^3)*sqrt(b^2 - 4*a*c))*g*abs(a*b^2 - 4*a^2*c
) - 2*(b^3*c^2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c^4 - (b^2*c^2 - 4*a*c^3 - 2*b*c
^3 + c^4)*sqrt(b^2 - 4*a*c))*abs(a*b^2 - 4*a^2*c)*e - (a*b^6*c - 8*a^2*b^4*
```

```
c^2 - 2*a*b^5*c^2 + 16*a^3*b^2*c^3 + 8*a^2*b^3*c^3 + a*b^4*c^3 - 4*a^2*b^2*
c^4 - (a*b^5*c - 4*a^2*b^3*c^2 - 2*a*b^4*c^2 + a*b^3*c^3)*sqrt(b^2 - 4*a*c)
)*g + 2*(a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2
*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 - (a*b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 +
 a*b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(a*b^3 - 4*a^2*b*c - sqrt((
a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2
*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c
^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(a*b^2 - 4*a^2*c))
```

maple [B] time = 0.18, size = 2310, normalized size = 5.98

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x)
```

```
[Out] -1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1
/2)/a*b^2*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/4*c/(4
*a*c-b^2)^2/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-
b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*d-1/2/(4*a*c-b^2
)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*b^2*e-1/2/(4*a*c-b^2)^2/(x^2+1/2
*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*b^2*e-c/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b
^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*
(-4*a*c+b^2)^(1/2)*b*f-1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(
1/2)*(-4*a*c+b^2)^(1/2)*b*c*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/
2)*c*x)-2*c^2/(4*a*c-b^2)^2*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arc
tanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f+1/2*c/(4*a*c-b^2)^2*2
^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^
(1/2))*c)^(1/2)*c*x)*b^2*f+2/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*
c)^(1/2)*a*c^2*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/2/(
4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b^2*c*f*arctan(2^(1/2
)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-
4*a*c+b^2)^(1/2)/c)*a*c*f*x+2/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(
1/2)/c)*a*c*f*x-1/4*c/(4*a*c-b^2)^2/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(
1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*d-1/2/(4*a*
c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*b^2*f*x+1/2/(4*a*c-b^2)^2*l
n(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b*g+1/(4*a*c-b^2)^2*(-4
*a*c+b^2)^(1/2)*c*e*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+2/(4*a*c-b^2)^2/(x^2+1
/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*a*c*e-1/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*c
*e*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))-1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4
*a*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2)/a*b^2*d*x+3/(4*a*c-b^2)^2*2^(1/2)/((b
+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)*c^2*d*arctan(2^(1/2)/((b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*b*c^2*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)
+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2
)/a*b^2*d*x+3*c^2/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*a
rctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d+
c^2/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)
/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*d+1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)/a*b^3*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2)
)*c)^(1/2)*c*x)+2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*a*c*
e-1/2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*b^2*f*x+1/4/c/(4
*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*b^3*g+1/4/c/(4*a*c-b^2)^
2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*b^3*g-1/(4*a*c-b^2)^2/(x^2+1/2*b/c
+1/2*(-4*a*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2)*a*g-1/(4*a*c-b^2)^2/(x^2+1/2*
b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*a*b*g-1/2/(4*a*c-b^2)^2*ln(2*c*x^2+b+(-4*a*c+
b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b*g+1/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c
+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2)*a*g-1/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*
a*c+b^2)^(1/2)/c)*a*b*g+1/4/c/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(
1/2)/c)*(-4*a*c+b^2)^(1/2)*b^2*g-1/4/c/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a
```

```
*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2)*b^2*g+1/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*
(-4*a*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2)*c*d*x-1/(4*a*c-b^2)^2/(x^2+1/2*b/c
+1/2*(-4*a*c+b^2)^(1/2)/c)*b*c*d*x+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a
*c+b^2)^(1/2)/c)/a*b^3*d*x-1/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1
/2)/c)*(-4*a*c+b^2)^(1/2)*c*d*x-1/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^
2)^(1/2)/c)*b*c*d*x+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c
)/a*b^3*d*x
```

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

$$\frac{\left(bcd-2\,acf\right)x^{3}-abe+2\,a^{2}g-\left(2\,ace-abg\right)x^{2}-\left(abf-\left(b^{2}-2\,ac\right)d\right)x}{2\left(\left(ab^{2}c-4\,a^{2}c^{2}\right)x^{4}+a^{2}b^{2}-4\,a^{3}c+\left(ab^{3}-4\,a^{2}bc\right)x^{2}\right)}-\frac{-\int\frac{abf+\left(bcd-2\,acf\right)x^{2}+\left(b^{2}-6\,ac\right)d-2\left(2\,ace-abg\right)}{cx^{4}+bx^{2}+a}}{2\left(ab^{2}-4\,a^{2}c\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="maxima")
```

```
[Out] 1/2*((b*c*d - 2*a*c*f)*x^3 - a*b*e + 2*a^2*g - (2*a*c*e - a*b*g)*x^2 - (a*b
*f - (b^2 - 2*a*c)*d)*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (
a*b^3 - 4*a^2*b*c)*x^2) - 1/2*integrate(-(a*b*f + (b*c*d - 2*a*c*f)*x^2 + (
b^2 - 6*a*c)*d - 2*(2*a*c*e - a*b*g)*x)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*
a^2*c)
```

mupad [B] time = 1.77, size = 7373, normalized size = 19.10

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^2,x)
```

```
[Out] symsum(log((5*b^3*c^4*d^3 + 8*a^3*c^4*f^3 - 96*a^2*c^5*d*e^2 + 72*a^2*c^5*d
^2*f - 3*b^4*c^3*d^2*f + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + 16*a*b^2*c^4*
d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 4*a*b
^4*c^2*d*g^2 + 16*a^2*b*c^4*e^2*f - 24*a^2*b^2*c^3*d*g^2 + 4*a^2*b^3*c^2*f*
g^2 - 16*a*b^3*c^3*d*e*g + 96*a^2*b*c^4*d*e*g - 16*a^2*b^2*c^3*e*f*g)/(8*(a
^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - root(1572864*a^8*b^
2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8
*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 3
2768*a^6*b*c^4*e*g*z^2 - 512*a^3*b^7*c*e*g*z^2 + 576*a^2*b^8*c*d*f*z^2 - 24
576*a^5*b^3*c^3*e*g*z^2 + 6144*a^4*b^5*c^2*e*g*z^2 + 24576*a^5*b^2*c^4*d*f*
z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 - 1536*a^4*b^6*c*
g^2*z^2 + 12288*a^6*b*c^4*f^2*z^2 + 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5
*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8192*a^6*b^2*c^3*g^2*z^2 + 6144*a^5*b^4*c^
2*g^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5
*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 614
40*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z
^2 - 32*a*b^10*d*f*z^2 + 128*a^3*b^8*g^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a
^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 + 384*a^2*b^6*c*d*f*g*z - 4096*a^4*b*c^4*d
*e*f*z + 64*a*b^7*c*d*e*f*z + 2048*a^4*b^2*c^3*d*f*g*z - 1536*a^3*b^4*c^2*d
*f*g*z + 3072*a^3*b^3*c^3*d*e*f*z - 768*a^2*b^5*c^2*d*e*f*z + 1024*a^5*b*c^
3*f^2*g*z + 192*a^3*b^5*c*f^2*g*z - 9216*a^4*b*c^4*d^2*g*z + 32*a^2*b^6*c*e
*f^2*z - 672*a*b^6*c^2*d^2*e*z + 336*a*b^7*c*d^2*g*z - 768*a^4*b^3*c^2*f^2*
g*z + 7936*a^3*b^3*c^3*d^2*g*z - 2496*a^2*b^5*c^2*d^2*g*z + 1536*a^4*b^2*c^
3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*
b^4*c^3*d^2*e*z - 32*a*b^8*d*f*g*z - 16*a^2*b^7*f^2*g*z - 2048*a^5*c^4*e*f^
2*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 16*b^9*d^2*g*z - 768*a^3*b
*c^3*d*e*f*g + 32*a*b^5*c*d*e*f*g - 192*a^2*b^3*c^2*d*e*f*g + 16*a^2*b^4*c*
e*f^2*g + 48*a^2*b^4*c*d*f*g^2 - 240*a*b^4*c^2*d^2*e*g - 32*a*b^4*c^2*d*e^2
*f + 192*a^3*b^2*c^2*e*f^2*g + 192*a^3*b^2*c^2*d*f*g^2 + 960*a^2*b^2*c^3*d^
```

2*e*g + 192*a^2*b^2*c^3*d*e^2*f - 48*a^3*b^3*c*f^2*g^2 - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 512*a^3*b*c^3*e^3*g + 128*a^3*b^3*c*e*g^3 + 60*a*b^5*c*d^2*g^2 + 2016*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 384*a^3*b^2*c^2*e^2*g^2 - 240*a^2*b^3*c^2*d^2*g^2 - 16*a^2*b^3*c^2*e^2*f^2 - 960*a^2*b^2*c^3*d^2*f^2 + 16*b^6*c*d^2*e*g - 8*a*b^6*d*f*g^2 - 18*a*b^5*c*d*f^3 - 4*a^2*b^5*f^2*g^2 - 288*a^3*c^4*d^2*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9*a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 4*b^7*d^2*g^2 - 16*a^4*c^3*f^4 - 16*a^3*b^4*g^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*(root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 32768*a^6*b*c^4*e*g*z^2 - 512*a^3*b^7*c*e*g*z^2 + 576*a^2*b^8*c*d*f*z^2 - 24576*a^5*b^3*c^3*e*g*z^2 + 6144*a^4*b^5*c^2*e*g*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 - 1536*a^4*b^6*c*g^2*z^2 + 12288*a^6*b*c^4*f^2*z^2 + 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8192*a^6*b^2*c^3*g^2*z^2 + 6144*a^5*b^4*c^2*g^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10*d*f*z^2 + 128*a^3*b^8*g^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 + 384*a^2*b^6*c*d*f*g*z - 4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 2048*a^4*b^2*c^3*d*f*g*z - 1536*a^3*b^4*c^2*d*f*g*z + 3072*a^3*b^3*c^3*d*e*f*z - 768*a^2*b^5*c^2*d*e*f*z + 1024*a^5*b*c^3*f^2*g*z + 192*a^3*b^5*c*f^2*g*z - 9216*a^4*b*c^4*d^2*g*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 336*a*b^7*c*d^2*g*z - 768*a^4*b^3*c^2*f^2*g*z + 7936*a^3*b^3*c^3*d^2*g*z - 2496*a^2*b^5*c^2*d^2*g*z + 1536*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z - 32*a*b^8*d*f*g*z - 16*a^2*b^7*f^2*g*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 16*b^9*d^2*g*z - 768*a^3*b*c^3*d*e*f*g + 32*a*b^5*c*d*e*f*g - 192*a^2*b^3*c^2*d*e*f*g + 16*a^2*b^4*c*e*f^2*g + 48*a^2*b^4*c*d*f*g^2 - 240*a*b^4*c^2*d^2*e*g - 32*a*b^4*c^2*d*e^2*f + 192*a^3*b^2*c^2*e*f^2*g + 192*a^3*b^2*c^2*d*f*g^2 + 960*a^2*b^2*c^3*d^2*e*g + 192*a^2*b^2*c^3*d*e^2*f - 48*a^3*b^3*c*f^2*g^2 - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 512*a^3*b*c^3*e^3*g + 128*a^3*b^3*c*e*g^3 + 60*a*b^5*c*d^2*g^2 + 2016*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 384*a^3*b^2*c^2*e^2*g^2 - 240*a^2*b^3*c^2*d^2*g^2 - 16*a^2*b^3*c^2*e^2*f^2 - 960*a^2*b^2*c^3*d^2*f^2 + 16*b^6*c*d^2*e*g - 8*a*b^6*d*f*g^2 - 18*a*b^5*c*d*f^3 - 4*a^2*b^5*f^2*g^2 - 288*a^3*c^4*d^2*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9*a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 4*b^7*d^2*g^2 - 16*a^4*c^3*f^4 - 16*a^3*b^4*g^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*((x*(2048*a^5*c^6*e - 32*a^2*b^6*c^3*e + 384*a^3*b^4*c^4*e - 1536*a^4*b^2*c^5*e + 16*a^2*b^7*c^2*g - 192*a^3*b^5*c^3*g + 768*a^4*b^3*c^4*g - 1024*a^5*b*c^5*g))/(4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - (6144*a^5*c^6*d - 288*a^2*b^6*c^3*d + 1920*a^3*b^4*c^4*d - 5632*a^4*b^2*c^5*d + 16*a^2*b^7*c^2*f - 192*a^3*b^5*c^3*f + 768*a^4*b^3*c^4*f + 16*a*b^8*c^2*d - 1024*a^5*b*c^5*f)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) + (root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 32768*a^6*b*c^4*e*g*z^2 - 512*a^3*b^7*c*e*g*z^2 + 576*a^2*b^8*c*d*f*z^2 - 24576*a^5*b^3*c^3*e*g*z^2 + 6144*a^4*b^5*c^2*e*g*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 - 1536*a^4*b^6*c*g^2*z^2 + 12288*a^6*b*c^4*f^2*z^2 + 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8192*a^6*b^2*c^3*g^2*z^2 + 6144*a^5*b^4*c^2*g^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^

4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^1
0*d*f*z^2 + 128*a^3*b^8*g^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^
2 - 16*b^11*d^2*z^2 + 384*a^2*b^6*c*d*f*g*z - 4096*a^4*b*c^4*d*e*f*z + 64*a
*b^7*c*d*e*f*z + 2048*a^4*b^2*c^3*d*f*g*z - 1536*a^3*b^4*c^2*d*f*g*z + 3072
*a^3*b^3*c^3*d*e*f*z - 768*a^2*b^5*c^2*d*e*f*z + 1024*a^5*b*c^3*f^2*g*z + 1
92*a^3*b^5*c*f^2*g*z - 9216*a^4*b*c^4*d^2*g*z + 32*a^2*b^6*c*e*f^2*z - 672*
a*b^6*c^2*d^2*e*z + 336*a*b^7*c*d^2*g*z - 768*a^4*b^3*c^2*f^2*g*z + 7936*a^
3*b^3*c^3*d^2*g*z - 2496*a^2*b^5*c^2*d^2*g*z + 1536*a^4*b^2*c^3*e*f^2*z - 3
84*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e
*z - 32*a*b^8*d*f*g*z - 16*a^2*b^7*f^2*g*z - 2048*a^5*c^4*e*f^2*z + 18432*a
^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 16*b^9*d^2*g*z - 768*a^3*b*c^3*d*e*f*g
+ 32*a*b^5*c*d*e*f*g - 192*a^2*b^3*c^2*d*e*f*g + 16*a^2*b^4*c*e*f^2*g + 48*
a^2*b^4*c*d*f*g^2 - 240*a*b^4*c^2*d^2*e*g - 32*a*b^4*c^2*d*e^2*f + 192*a^3*
b^2*c^2*e*f^2*g + 192*a^3*b^2*c^2*d*f*g^2 + 960*a^2*b^2*c^3*d^2*e*g + 192*a
^2*b^2*c^3*d*e^2*f - 48*a^3*b^3*c*f^2*g^2 - 192*a^3*b*c^3*e^2*f^2 + 198*a*b
^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*
c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 512*a^3*b*c^3*e^3*g + 128*a^3*b^3*c*e*g
^3 + 60*a*b^5*c*d^2*g^2 + 2016*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*f + 224*
a^3*b*c^3*d*f^3 - 384*a^3*b^2*c^2*e^2*g^2 - 240*a^2*b^3*c^2*d^2*g^2 - 16*a^
2*b^3*c^2*e^2*f^2 - 960*a^2*b^2*c^3*d^2*f^2 + 16*b^6*c*d^2*e*g - 8*a*b^6*d*
f*g^2 - 18*a*b^5*c*d*f^3 - 4*a^2*b^5*f^2*g^2 - 288*a^3*c^4*d^2*f^2 - 16*b^5
*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9*
a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 4*b^7*d^2*g^2 - 16*a^4*c^3*f^4 - 16*a^3
*b^4*g^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*x*(81
92*a^6*b*c^6 + 32*a^2*b^9*c^2 - 512*a^3*b^7*c^3 + 3072*a^4*b^5*c^4 - 8192*a
^5*b^3*c^5))/(4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) -
(512*a^4*c^5*e*f - 32*a*b^5*c^3*d*e - 1024*a^3*b*c^5*d*e + 16*a*b^6*c^2*d*g
 - 256*a^4*b*c^4*f*g + 384*a^2*b^3*c^4*d*e - 192*a^2*b^4*c^3*d*g - 32*a^2*b
^4*c^3*e*f + 512*a^3*b^2*c^4*d*g + 16*a^2*b^5*c^2*f*g)/(8*(a^2*b^6 - 64*a^5
*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) + (x*(2*b^6*c^3*d^2 - 576*a^3*c^6*d^
2 + 64*a^4*c^5*f^2 - 36*a*b^4*c^4*d^2 + 128*a^3*b*c^5*e^2 + 256*a^2*b^2*c^5
*d^2 - 32*a^2*b^3*c^4*e^2 + 20*a^2*b^4*c^3*f^2 - 96*a^3*b^2*c^4*f^2 - 8*a^2
*b^5*c^2*g^2 + 32*a^3*b^3*c^3*g^2 + 4*a*b^5*c^3*d*f + 320*a^3*b*c^5*d*f - 9
6*a^2*b^3*c^4*d*f + 32*a^2*b^4*c^3*e*g - 128*a^3*b^2*c^4*e*g))/(4*(a^2*b^6
- 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) - (x*(32*a^2*c^5*e^3 - 2*b^
3*c^4*d^2*e + b^4*c^3*d^2*g - 4*a^2*b^3*c^2*g^3 + 24*a*b*c^5*d^2*e - 48*a^2
*c^5*d*e*f - 12*a*b^2*c^4*d^2*g + 16*a^2*b*c^4*e*f^2 - 48*a^2*b*c^4*e^2*g +
 24*a^2*b^2*c^3*e*g^2 - 8*a^2*b^2*c^3*f^2*g - 4*a*b^2*c^4*d*e*f + 2*a*b^3*c
^3*d*f*g + 24*a^2*b*c^4*d*f*g))/(4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 4
8*a^4*b^2*c^2)))*root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 32
7680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 104857
6*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 32768*a^6*b*c^4*e*g*z^2 - 512*a^3*b^7*c*
e*g*z^2 + 576*a^2*b^8*c*d*f*z^2 - 24576*a^5*b^3*c^3*e*g*z^2 + 6144*a^4*b^5*
c^2*e*g*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 2048*a
^4*b^4*c^3*d*f*z^2 - 1536*a^4*b^6*c*g^2*z^2 + 12288*a^6*b*c^4*f^2*z^2 + 614
40*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8192*a
^6*b^2*c^3*g^2*z^2 + 6144*a^5*b^4*c^2*g^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 +
1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2
*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*
c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10*d*f*z^2 + 128*a^3*b^8*g^
2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 + 384*
a^2*b^6*c*d*f*g*z - 4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 2048*a^4*
b^2*c^3*d*f*g*z - 1536*a^3*b^4*c^2*d*f*g*z + 3072*a^3*b^3*c^3*d*e*f*z - 768
*a^2*b^5*c^2*d*e*f*z + 1024*a^5*b*c^3*f^2*g*z + 192*a^3*b^5*c*f^2*g*z - 921
6*a^4*b*c^4*d^2*g*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 336*a*
b^7*c*d^2*g*z - 768*a^4*b^3*c^2*f^2*g*z + 7936*a^3*b^3*c^3*d^2*g*z - 2496*a
^2*b^5*c^2*d^2*g*z + 1536*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 1
5872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z - 32*a*b^8*d*f*g*z - 16
*a^2*b^7*f^2*g*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*

```
d^2*e*z - 16*b^9*d^2*g*z - 768*a^3*b*c^3*d*e*f*g + 32*a*b^5*c*d*e*f*g - 192
*a^2*b^3*c^2*d*e*f*g + 16*a^2*b^4*c*e*f^2*g + 48*a^2*b^4*c*d*f*g^2 - 240*a*
b^4*c^2*d^2*e*g - 32*a*b^4*c^2*d*e^2*f + 192*a^3*b^2*c^2*e*f^2*g + 192*a^3*
b^2*c^2*d*f*g^2 + 960*a^2*b^2*c^3*d^2*e*g + 192*a^2*b^2*c^3*d*e^2*f - 48*a^
3*b^3*c*f^2*g^2 - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b
^3*c^2*d*f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*
d*e^2*f + 512*a^3*b*c^3*e^3*g + 128*a^3*b^3*c*e*g^3 + 60*a*b^5*c*d^2*g^2 +
2016*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 384*a^3*
b^2*c^2*e^2*g^2 - 240*a^2*b^3*c^2*d^2*g^2 - 16*a^2*b^3*c^2*e^2*f^2 - 960*a^
2*b^2*c^3*d^2*f^2 + 16*b^6*c*d^2*e*g - 8*a*b^6*d*f*g^2 - 18*a*b^5*c*d*f^3 -
 4*a^2*b^5*f^2*g^2 - 288*a^3*c^4*d^2*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*
c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9*a^2*b^4*c*f^4 + 360*a*b^2*
c^4*d^4 - 4*b^7*d^2*g^2 - 16*a^4*c^3*f^4 - 16*a^3*b^4*g^4 - 256*a^3*c^4*e^4
 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k), k, 1, 4) + ((b*e - 2*a*g)/(2*(
4*a*c - b^2)) + (x^2*(2*c*e - b*g))/(2*(4*a*c - b^2)) + (x*(2*a*c*d - b^2*d
 + a*b*f))/(2*a*(4*a*c - b^2)) - (c*x^3*(b*d - 2*a*f))/(2*a*(4*a*c - b^2)))
/(a + b*x^2 + c*x^4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**2,x)
```

```
[Out] Timed out
```

3.39 $\int \frac{d+ex+fx^2+gx^3+hx^4}{\left(a+bx^2+cx^4\right)^2}\,dx$

Optimal. Leaf size=439

$$\frac{x\left(x^2(abh-2acf+bcd)-abf-2a(cd-ah)+b^2d\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{b^2(cd-ah)+4abcf-4ac(ah+3cd)}{\sqrt{b^2-4ac}}+abh-2acf\cdots\right.}{2\sqrt{2}\,a\sqrt{c}\left(b^2-4ac\right)\sqrt{b-\sqrt{b^2-4ac}}}$$

```
[Out] 1/2*(-b*e+2*a*g-(-b*g+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*x*(b^2*d
-a*b*f-2*a*(-a*h+c*d)+(a*b*h-2*a*c*f+b*c*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^
2+a)+(-b*g+2*c*e)*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(3/2
)+1/4*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))*(b*c*d-2*a*c*f
+a*b*h+(4*a*b*c*f+b^2*(-a*h+c*d)-4*a*c*(a*h+3*c*d))/(-4*a*c+b^2)^(1/2))/a/(
-4*a*c+b^2)*2^(1/2)/c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/4*arctan(x*2^(1/
2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*(b*c*d-2*a*c*f+a*b*h+(-4*a*b*c*f-b
^2*(-a*h+c*d)+4*a*c*(a*h+3*c*d))/(-4*a*c+b^2)^(1/2))/a/(-4*a*c+b^2)*2^(1/2)
/c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 1.89, antiderivative size = 439, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.229, Rules used = {1673, 1678, 1166, 205, 1247, 638, 618, 206}

$$\frac{x\left(x^2(abh-2acf+bcd)-abf-2a(cd-ah)+b^2d\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{b^2(cd-ah)+4abcf-4ac(ah+3cd)}{\sqrt{b^2-4ac}}+abh-2acf\cdots\right.}{2\sqrt{2}\,a\sqrt{c}\left(b^2-4ac\right)\sqrt{b-\sqrt{b^2-4ac}}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] -(b*e - 2*a*g + (2*c*e - b*g)*x^2)/(2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) +
(x*(b^2*d - a*b*f - 2*a*(c*d - a*h) + (b*c*d - 2*a*c*f + a*b*h)*x^2))/(2*a*
(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + ((b*c*d - 2*a*c*f + a*b*h + (4*a*b*c*f
 + b^2*(c*d - a*h) - 4*a*c*(3*c*d + a*h))/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2
]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(2*Sqrt[2]*a*Sqrt[c]*(b^2 - 4*a*
c)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((b*c*d - 2*a*c*f + a*b*h - (4*a*b*c*f +
b^2*(c*d - a*h) - 4*a*c*(3*c*d + a*h))/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*S
qrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(2*Sqrt[2]*a*Sqrt[c]*(b^2 - 4*a*c)*
Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((2*c*e - b*g)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^
2 - 4*a*c]])/(b^2 - 4*a*c)^(3/2)
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
```

```
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rule steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4}{\left(a+bx^2+cx^4\right)^2}\,dx = \int \frac{x\left(e+gx^2\right)}{\left(a+bx^2+cx^4\right)^2}\,dx + \int \frac{d+fx^2+hx^4}{\left(a+bx^2+cx^4\right)^2}\,dx$$

$$= \frac{x\left(b^2d-abf-2a(cd-ah)+(bcd-2acf+abh)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{1}{2}\text{Subst}\left(\int \frac{e+gx}{\left(a+bx+c\right.}\right.$$

$$= -\frac{be-2ag+(2ce-bg)x^2}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-abf-2a(cd-ah)+(bcd-2acf+ab\right.}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}$$

$$= -\frac{be-2ag+(2ce-bg)x^2}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-abf-2a(cd-ah)+(bcd-2acf+ab\right.}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}$$

$$= -\frac{be-2ag+(2ce-bg)x^2}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-abf-2a(cd-ah)+(bcd-2acf+ab\right.}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}$$

Mathematica [A] time = 1.88, size = 489, normalized size = 1.11

$$\frac{1}{4}\left(\frac{-4a^2(g+hx)+2ab(e+x(f-x(g+hx)))+4acx(d+x(e+fx))-2bdx\left(b+cx^2\right)}{a\left(4ac-b^2\right)\left(a+bx^2+cx^4\right)} + \frac{\sqrt{2}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\right.}{}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] ((-4*a^2*(g + h*x) - 2*b*d*x*(b + c*x^2) + 4*a*c*x*(d + x*(e + f*x)) + 2*a*
b*(e + x*(f - x*(g + h*x))))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)) + (Sqrt
[2]*(b^2*(c*d - a*h) - 2*a*c*(6*c*d + Sqrt[b^2 - 4*a*c]*f + 2*a*h) + b*(c*S
qrt[b^2 - 4*a*c]*d + 4*a*c*f + a*Sqrt[b^2 - 4*a*c]*h))*ArcTan[(Sqrt[2]*Sqrt
[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(a*Sqrt[c]*(b^2 - 4*a*c)^(3/2)*Sqrt[b
- Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*(b^2*(-(c*d) + a*h) + 2*a*c*(6*c*d - Sqrt[
b^2 - 4*a*c]*f + 2*a*h) + b*(c*Sqrt[b^2 - 4*a*c]*d - 4*a*c*f + a*Sqrt[b^2 -
 4*a*c]*h))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(a*Sqr
t[c]*(b^2 - 4*a*c)^(3/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + (2*(-2*c*e + b*g)*L
og[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(3/2) - (2*(-2*c*e + b*
g)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(3/2))/4
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="fricas"
)
```

```
[Out] Timed out
```

giac [B] time = 8.03, size = 7502, normalized size = 17.09

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="giac")
```

```
[Out] 1/2*(b*c*d*x^3 - 2*a*c*f*x^3 + a*b*h*x^3 + a*b*g*x^2 - 2*a*c*x^2*e + b^2*d*
x - 2*a*c*d*x - a*b*f*x + 2*a^2*h*x + 2*a^2*g - a*b*e)/((c*x^4 + b*x^2 + a)
*(a*b^2 - 4*a^2*c)) + 1/16*((2*b^3*c^3 - 8*a*b*c^4 - sqrt(2)*sqrt(b^2 - 4*a
*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqr
t(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
 + sqrt(b^2 - 4*a*c)*c)*b^2*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt
(b^2 - 4*a*c)*c)*b*c^3 - 2*(b^2 - 4*a*c)*b*c^3)*(a*b^2 - 4*a^2*c)^2*d - 2*(
2*a*b^2*c^3 - 8*a^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4
*a*c)*c)*a*b^2*c + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*a^2*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
*b*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*c^3 -
2*(b^2 - 4*a*c)*a*c^3)*(a*b^2 - 4*a^2*c)^2*f + (2*a*b^3*c^2 - 8*a^2*b*c^3 -
 sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3 + 4*sqrt(2
)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c + 2*sqrt(2)*sqr
t(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c - sqrt(2)*sqrt(b^2 -
 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^2 - 2*(b^2 - 4*a*c)*a*b*c^2)*
(a*b^2 - 4*a^2*c)^2*h + 2*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6*c
- 14*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 - 2*sqrt(2)*sqrt(b
*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 - 2*a*b^6*c^2 + 64*sqrt(2)*sqrt(b*c + s
qrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 + 20*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c
)*a^2*b^3*c^3 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^3 + 28*a^2*
b^4*c^3 - 96*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*c^4 - 48*sqrt(2)*s
qrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 - 10*sqrt(2)*sqrt(b*c + sqrt(b^2 -
 4*a*c)*c)*a^2*b^2*c^4 - 128*a^3*b^2*c^4 + 24*sqrt(2)*sqrt(b*c + sqrt(b^2 -
 4*a*c)*c)*a^3*c^5 + 192*a^4*c^5 + 2*(b^2 - 4*a*c)*a*b^4*c^2 - 20*(b^2 - 4*
a*c)*a^2*b^2*c^3 + 48*(b^2 - 4*a*c)*a^3*c^4)*d*abs(a*b^2 - 4*a^2*c) + 2*(sq
rt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c - 8*sqrt(2)*sqrt(b*c + sqrt
(b^2 - 4*a*c)*c)*a^3*b^3*c^2 - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^
2*b^4*c^2 - 2*a^2*b^5*c^2 + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*
b*c^3 + 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 + sqrt(2)*sqr
t(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 + 16*a^3*b^3*c^3 - 4*sqrt(2)*sqrt(
b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 - 32*a^4*b*c^4 + 2*(b^2 - 4*a*c)*a^2*b
^3*c^2 - 8*(b^2 - 4*a*c)*a^3*b*c^3)*f*abs(a*b^2 - 4*a^2*c) - 4*(sqrt(2)*sqr
t(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*
a*c)*c)*a^4*b^2*c^2 - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^2
 - 2*a^3*b^4*c^2 + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^5*c^3 + 8*s
qrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b*c^3 + sqrt(2)*sqrt(b*c + sqrt(
b^2 - 4*a*c)*c)*a^3*b^2*c^3 + 16*a^4*b^2*c^3 - 4*sqrt(2)*sqrt(b*c + sqrt(b^
2 - 4*a*c)*c)*a^4*c^4 - 32*a^5*c^4 + 2*(b^2 - 4*a*c)*a^3*b^2*c^2 - 8*(b^2 -
 4*a*c)*a^4*c^3)*h*abs(a*b^2 - 4*a^2*c) + (2*a^2*b^7*c^3 - 40*a^3*b^5*c^4 +
 224*a^4*b^3*c^5 - 384*a^5*b*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*a^2*b^7*c + 20*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(
b^2 - 4*a*c)*c)*a^3*b^5*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b
^2 - 4*a*c)*c)*a^2*b^6*c^2 - 112*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(
b^2 - 4*a*c)*c)*a^4*b^3*c^3 - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(
b^2 - 4*a*c)*c)*a^3*b^4*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2
 - 4*a*c)*c)*a^2*b^5*c^3 + 192*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^
2 - 4*a*c)*c)*a^5*b*c^4 + 96*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*a^4*b^2*c^4 + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*a^3*b^3*c^4 - 48*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*a^4*b*c^5 - 2*(b^2 - 4*a*c)*a^2*b^5*c^3 + 32*(b^2 - 4*a*c)*a^3*
b^3*c^4 - 96*(b^2 - 4*a*c)*a^4*b*c^5)*d + 4*(2*a^3*b^6*c^3 - 16*a^4*b^4*c^4
 + 32*a^5*b^2*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*a^3*b^6*c + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*
a^4*b^4*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
^3*b^5*c^2 - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
```

```
^5*b^2*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^
4*b^3*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b
^4*c^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^
2*c^4 - 2*(b^2 - 4*a*c)*a^3*b^4*c^3 + 8*(b^2 - 4*a*c)*a^4*b^2*c^4)*f - (2*a
^3*b^7*c^2 - 8*a^4*b^5*c^3 - 32*a^5*b^3*c^4 + 128*a^6*b*c^5 - sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^7 + 4*sqrt(2)*sqrt(b^2 -
 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^5*c + 2*sqrt(2)*sqrt(b^2 - 4*
a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^6*c + 16*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^5*b^3*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c^2 - 64*sqrt(2)*sqrt(b^2 - 4*a*c)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^6*b*c^3 - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sq
rt(b*c + sqrt(b^2 - 4*a*c)*c)*a^5*b^2*c^3 + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sq
rt(b*c + sqrt(b^2 - 4*a*c)*c)*a^5*b*c^4 - 2*(b^2 - 4*a*c)*a^3*b^5*c^2 + 32*
(b^2 - 4*a*c)*a^5*b*c^4)*h)*arctan(2*sqrt(1/2)*x/sqrt((a*b^3 - 4*a^2*b*c +
sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/
(a*b^2*c - 4*a^2*c^2)))/((a^3*b^6*c - 12*a^4*b^4*c^2 - 2*a^3*b^5*c^2 + 48*a
^5*b^2*c^3 + 16*a^4*b^3*c^3 + a^3*b^4*c^3 - 64*a^6*c^4 - 32*a^5*b*c^4 - 8*a
^4*b^2*c^4 + 16*a^5*c^5)*abs(a*b^2 - 4*a^2*c)*abs(c)) - 1/16*((2*b^3*c^3 -
8*a*b*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c
 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^2 + 2*
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^2 - sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b*c^3 - 2*(b^2 - 4*a*c)*
b*c^3)*(a*b^2 - 4*a^2*c)^2*d - 2*(2*a*b^2*c^3 - 8*a^2*c^4 - sqrt(2)*sqrt(b^
2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c + 4*sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b
*c - sqrt(b^2 - 4*a*c)*c)*a*c^3 - 2*(b^2 - 4*a*c)*a*c^3)*(a*b^2 - 4*a^2*c)^
2*f + (2*a*b^3*c^2 - 8*a^2*b*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqr
t(b^2 - 4*a*c)*c)*a*b^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 -
 4*a*c)*c)*a^2*b*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*
c)*c)*a*b^2*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a
*b*c^2 - 2*(b^2 - 4*a*c)*a*b*c^2)*(a*b^2 - 4*a^2*c)^2*h - 2*(sqrt(2)*sqrt(b
*c - sqrt(b^2 - 4*a*c)*c)*a*b^6*c - 14*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)
*c)*a^2*b^4*c^2 - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + 2*a
*b^6*c^2 + 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 + 20*sqrt
(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 + sqrt(2)*sqrt(b*c - sqrt(b
^2 - 4*a*c)*c)*a*b^4*c^3 - 28*a^2*b^4*c^3 - 96*sqrt(2)*sqrt(b*c - sqrt(b^2
- 4*a*c)*c)*a^4*c^4 - 48*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4
- 10*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^4 + 128*a^3*b^2*c^4
+ 24*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^5 - 192*a^4*c^5 - 2*(b^2
 - 4*a*c)*a*b^4*c^2 + 20*(b^2 - 4*a*c)*a^2*b^2*c^3 - 48*(b^2 - 4*a*c)*a^3*c
^4)*d*abs(a*b^2 - 4*a^2*c) - 2*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2
*b^5*c - 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^2 - 2*sqrt(2)*
sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + 2*a^2*b^5*c^2 + 16*sqrt(2)*sq
rt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b*c^3 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4
*a*c)*c)*a^3*b^2*c^3 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3
- 16*a^3*b^3*c^3 - 4*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 32
*a^4*b*c^4 - 2*(b^2 - 4*a*c)*a^2*b^3*c^2 + 8*(b^2 - 4*a*c)*a^3*b*c^3)*f*abs
(a*b^2 - 4*a^2*c) + 4*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c -
8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^2 - 2*sqrt(2)*sqrt(b*c
- sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^2 + 2*a^3*b^4*c^2 + 16*sqrt(2)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*a^5*c^3 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^
4*b*c^3 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 16*a^4*b^2*
c^3 - 4*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*c^4 + 32*a^5*c^4 - 2*(b
^2 - 4*a*c)*a^3*b^2*c^2 + 8*(b^2 - 4*a*c)*a^4*c^3)*h*abs(a*b^2 - 4*a^2*c) +
 (2*a^2*b^7*c^3 - 40*a^3*b^5*c^4 + 224*a^4*b^3*c^5 - 384*a^5*b*c^6 - sqrt(2
)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^7*c + 20*sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c^2 + 2*sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^6*c^2 - 112*sqrt(2)*
```

```
sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^3*c^3 - 32*sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c^3 - sqrt(2)*sqr
t(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c^3 + 192*sqrt(2)*sq
rt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^5*b*c^4 + 96*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^4 + 16*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^4 - 48*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b*c^5 - 2*(b^2 - 4*a*c)*a
^2*b^5*c^3 + 32*(b^2 - 4*a*c)*a^3*b^3*c^4 - 96*(b^2 - 4*a*c)*a^4*b*c^5)*d +
 4*(2*a^3*b^6*c^3 - 16*a^4*b^4*c^4 + 32*a^5*b^2*c^5 - sqrt(2)*sqrt(b^2 - 4*
a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^6*c + 8*sqrt(2)*sqrt(b^2 - 4*a*c
)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^4*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c^2 - 16*sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^5*b^2*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*
sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^3*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqr
t(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^4 - 2*(b^2 - 4*a*c)*a^3*b^4*c^3 + 8*(
b^2 - 4*a*c)*a^4*b^2*c^4)*f - (2*a^3*b^7*c^2 - 8*a^4*b^5*c^3 - 32*a^5*b^3*c
^4 + 128*a^6*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)
*c)*a^3*b^7 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a
^4*b^5*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*
b^6*c + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^5*b^
3*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c
^2 - 64*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^6*b*c^3
 - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^5*b^2*c^3
 + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^5*b*c^4 -
 2*(b^2 - 4*a*c)*a^3*b^5*c^2 + 32*(b^2 - 4*a*c)*a^5*b*c^4)*h)*arctan(2*sqrt
(1/2)*x/sqrt((a*b^3 - 4*a^2*b*c - sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 -
 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c^2)))/((a^3*b^6*c - 12*
a^4*b^4*c^2 - 2*a^3*b^5*c^2 + 48*a^5*b^2*c^3 + 16*a^4*b^3*c^3 + a^3*b^4*c^3
 - 64*a^6*c^4 - 32*a^5*b*c^4 - 8*a^4*b^2*c^4 + 16*a^5*c^5)*abs(a*b^2 - 4*a^
2*c)*abs(c)) + 1/8*((b^4*c - 4*a*b^2*c^2 - 2*b^3*c^2 + b^2*c^3 + (b^3*c - 4
*a*b*c^2 - 2*b^2*c^2 + b*c^3)*sqrt(b^2 - 4*a*c))*g*abs(a*b^2 - 4*a^2*c) - 2
*(b^3*c^2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c^4 + (b^2*c^2 - 4*a*c^3 - 2*b*c^3 +
c^4)*sqrt(b^2 - 4*a*c))*abs(a*b^2 - 4*a^2*c)*e - (a*b^6*c - 8*a^2*b^4*c^2 -
 2*a*b^5*c^2 + 16*a^3*b^2*c^3 + 8*a^2*b^3*c^3 + a*b^4*c^3 - 4*a^2*b^2*c^4 +
 (a*b^5*c - 4*a^2*b^3*c^2 - 2*a*b^4*c^2 + a*b^3*c^3)*sqrt(b^2 - 4*a*c))*g +
 2*(a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4
+ a*b^3*c^4 - 4*a^2*b*c^5 + (a*b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^
2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(a*b^3 - 4*a^2*b*c + sqrt((a*b^3
 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c -
4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 +
a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(a*b^2 - 4*a^2*c)) + 1/8*((b^4*c - 4*a*b^2*c^
2 - 2*b^3*c^2 + b^2*c^3 - (b^3*c - 4*a*b*c^2 - 2*b^2*c^2 + b*c^3)*sqrt(b^2
- 4*a*c))*g*abs(a*b^2 - 4*a^2*c) - 2*(b^3*c^2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c
^4 - (b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c))*abs(a*b^2 - 4*a
^2*c)*e - (a*b^6*c - 8*a^2*b^4*c^2 - 2*a*b^5*c^2 + 16*a^3*b^2*c^3 + 8*a^2*b
^3*c^3 + a*b^4*c^3 - 4*a^2*b^2*c^4 - (a*b^5*c - 4*a^2*b^3*c^2 - 2*a*b^4*c^2
 + a*b^3*c^3)*sqrt(b^2 - 4*a*c))*g + 2*(a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4
*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 - (a*b^4*c^2
- 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2 +
1/2*(a*b^3 - 4*a^2*b*c - sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)
*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c - 2*a
*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(a*b^2 -
4*a^2*c))
```

maple [B] time = 0.07, size = 1801, normalized size = 4.10

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x)
```

```
[Out] 1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/(
(b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*h+1/4/(4*a*c-b^
2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*h+(-1/2/a*(a*b*h-2*a*c*f+
b*c*d)/(4*a*c-b^2)*x^3-1/2*(b*g-2*c*e)/(4*a*c-b^2)*x^2-1/2*(2*a^2*h-a*b*f-2
*a*c*d+b^2*d)/a/(4*a*c-b^2)*x-1/2*(2*a*g-b*e)/(4*a*c-b^2))/(c*x^4+b*x^2+a)-
1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/
2)/a*b^2*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/4*c/(4*
a*c-b^2)^2/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b
+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*d-c/(4*a*c-b^2)^2
*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2
)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b*f-1/(4*a*c-b^2)^2*2^(1/2)/((b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)*b*c*f*arctan(2^(1/2)/((b+(-4
*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-2*c^2/(4*a*c-b^2)^2*a*2^(1/2)/((-b+(-4*a*c+b
^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*
f+1/2*c/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(
1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^2*f+2/(4*a*c-b^2)^2*2^(1/2)/(
(b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*a*c^2*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/
2))*c)^(1/2)*c*x)-1/2/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2
)*b^2*c*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/4*c/(4*a*c
-b^2)^2/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-
4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*d+a/(4*a*c-b^2)^2*c*2^(1/2)/((-b+(-4*a*
c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*
x)*b*h+1/2/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*b*g*ln(-2*c*x^2-b+(-4*a*c+b^2)^
(1/2))+1/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*c*e*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/
2))-1/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*c*e*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2)
)+3/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/
2)*c^2*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/(4*a*c-b^2)
^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b*c^2*d*arctan(2^(1/2)/((b+(-4*
a*c+b^2)^(1/2))*c)^(1/2)*c*x)+3*c^2/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4
*a*c+b^2)^(1/2)*d+c^2/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/
2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*d+1/4/(4*a*c-b^
2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)/a*b^3*c*d*arctan(2^(1/2)/((b+
(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/4/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^
2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b
^3*h-1/2/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*b*g*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/
2))+a/(4*a*c-b^2)^2*c*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/
2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*h-a/(4*a*c-b^2)
^2*c*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^
2)^(1/2))*c)^(1/2)*c*x)*b*h+a/(4*a*c-b^2)^2*c*2^(1/2)/((-b+(-4*a*c+b^2)^(1/
2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c
+b^2)^(1/2)*h+1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*ar
ctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*h
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="maxima"
)
```

```
[Out] 1/2*((b*c*d - 2*a*c*f + a*b*h)*x^3 - a*b*e + 2*a^2*g - (2*a*c*e - a*b*g)*x^
2 - (a*b*f - 2*a^2*h - (b^2 - 2*a*c)*d)*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2
*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)*x^2) + 1/2*integrate((a*b*f - 2*a^2*h
+ (b*c*d - 2*a*c*f + a*b*h)*x^2 + (b^2 - 6*a*c)*d - 2*(2*a*c*e - a*b*g)*x)/
(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c)
```

mupad [B] time = 2.31, size = 13024, normalized size = 29.67

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^2,x)
```

```
[Out] ((b*e - 2*a*g)/(2*(4*a*c - b^2)) + (x^2*(2*c*e - b*g))/(2*(4*a*c - b^2)) -
(x*(b^2*d + 2*a^2*h - 2*a*c*d - a*b*f))/(2*a*(4*a*c - b^2)) - (x^3*(b*c*d -
 2*a*c*f + a*b*h))/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4) + symsum(log((5
*b^3*c^4*d^3 + 8*a^3*c^4*f^3 - 96*a^2*c^5*d*e^2 + 72*a^2*c^5*d^2*f - 3*a^3*
b^3*c*h^3 - 4*a^4*b*c^2*h^3 - 3*b^4*c^3*d^2*f - 32*a^3*c^4*e^2*h + b^5*c^2*
d^2*h + 8*a^4*c^3*f*h^2 + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + a*b^5*c*d*h^
2 + 48*a^3*c^4*d*f*h + 16*a*b^2*c^4*d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^
3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 4*a*b^4*c^2*d*g^2 + 16*a^2*b*c^4*e^2*f - a*b
^3*c^3*d^2*h - 60*a^2*b*c^4*d^2*h - 28*a^3*b*c^3*d*h^2 + a^2*b^4*c*f*h^2 -
28*a^3*b*c^3*f^2*h - 24*a^2*b^2*c^3*d*g^2 - 9*a^2*b^3*c^2*d*h^2 + 4*a^2*b^3
*c^2*f*g^2 - 5*a^2*b^3*c^2*f^2*h + 18*a^3*b^2*c^2*f*h^2 - 8*a^3*b^2*c^2*g^2
*h - 16*a*b^3*c^3*d*e*g + 96*a^2*b*c^4*d*e*g - 4*a*b^4*c^2*d*f*h + 32*a^3*b
*c^3*e*g*h + 52*a^2*b^2*c^3*d*f*h - 16*a^2*b^2*c^3*e*f*g)/(8*(a^2*b^6 - 64*
a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - root(1572864*a^8*b^2*c^6*z^4 -
983040*a^7*b^4*c^5*z^4 + 327680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6
144*a^4*b^10*c^2*z^4 - 256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 192*a^3*b
^8*c*f*h*z^2 + 57344*a^6*b*c^5*d*h*z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a^2*b
^9*c*d*h*z^2 - 32*a*b^10*c*d*f*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*b^
6*c^2*f*h*z^2 - 49152*a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g*z^2 + 153
60*a^4*b^5*c^3*d*h*z^2 + 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*c^2*d*h*z^
2 - 512*a^3*b^7*c^2*e*g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6*c^3*
d*f*z^2 + 2048*a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 12288*a^7*b*
c^4*h^2*z^2 + 128*a^3*b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^2 - 16*a^2*b^9*
c*f^2*z^2 + 61440*a^5*b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 - 16384*a^7*c^5
*f*h*z^2 - 49152*a^6*c^6*d*f*z^2 - 8192*a^6*b^3*c^3*h^2*z^2 + 1536*a^5*b^5*
c^2*h^2*z^2 - 8192*a^6*b^2*c^4*g^2*z^2 + 6144*a^5*b^4*c^3*g^2*z^2 - 1536*a^
4*b^6*c^2*g^2*z^2 - 8192*a^5*b^3*c^4*f^2*z^2 + 1536*a^4*b^5*c^3*f^2*z^2 + 2
4576*a^5*b^2*c^5*e^2*z^2 - 6144*a^4*b^4*c^4*e^2*z^2 + 512*a^3*b^6*c^3*e^2*z
^2 - 61440*a^4*b^3*c^5*d^2*z^2 + 24064*a^3*b^5*c^4*d^2*z^2 - 4608*a^2*b^7*c
^3*d^2*z^2 - 16*a^3*b^9*h^2*z^2 - 32768*a^6*c^6*e^2*z^2 - 16*b^11*c*d^2*z^2
 - 6144*a^5*b*c^4*d*g*h*z + 96*a^2*b^7*c*d*g*h*z - 4096*a^4*b*c^5*d*e*f*z +
 64*a*b^7*c^2*d*e*f*z - 32*a*b^8*c*d*f*g*z + 4608*a^4*b^3*c^3*d*g*h*z - 115
2*a^3*b^5*c^2*d*g*h*z - 9216*a^4*b^2*c^4*d*e*h*z + 2304*a^3*b^4*c^3*d*e*h*z
 + 2048*a^4*b^2*c^4*d*f*g*z - 1536*a^3*b^4*c^3*d*f*g*z + 384*a^2*b^6*c^2*d*
f*g*z - 192*a^2*b^6*c^2*d*e*h*z + 3072*a^3*b^3*c^4*d*e*f*z - 768*a^2*b^5*c^
3*d*e*f*z - 1024*a^6*b*c^3*g*h^2*z - 192*a^4*b^5*c*g*h^2*z + 1024*a^5*b*c^4
*f^2*g*z - 32*a^3*b^6*c*e*h^2*z - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*c^5*d^2
*g*z + 336*a*b^7*c^2*d^2*g*z - 672*a*b^6*c^3*d^2*e*z + 12288*a^5*c^5*d*e*h*
z + 768*a^5*b^3*c^2*g*h^2*z - 1536*a^5*b^2*c^3*e*h^2*z - 768*a^4*b^3*c^3*f^
2*g*z + 384*a^4*b^4*c^2*e*h^2*z + 192*a^3*b^5*c^2*f^2*g*z + 7936*a^3*b^3*c^
4*d^2*g*z - 2496*a^2*b^5*c^3*d^2*g*z + 1536*a^4*b^2*c^4*e*f^2*z - 384*a^3*b
^4*c^3*e*f^2*z + 32*a^2*b^6*c^2*e*f^2*z - 15872*a^3*b^2*c^5*d^2*e*z + 4992*
a^2*b^4*c^4*d^2*e*z + 16*a^3*b^7*g*h^2*z + 2048*a^6*c^4*e*h^2*z - 2048*a^5*
c^5*e*f^2*z + 32*b^8*c^2*d^2*e*z + 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2*g*z
 - 256*a^4*b*c^3*e*f*g*h - 768*a^3*b*c^4*d*e*f*g + 32*a*b^5*c^2*d*e*f*g - 1
92*a^3*b^3*c^2*e*f*g*h + 896*a^3*b^2*c^3*d*e*g*h - 96*a^2*b^4*c^2*d*e*g*h -
 192*a^2*b^3*c^3*d*e*f*g + 48*a^3*b^4*c*f*g^2*h + 16*a^3*b^4*c*e*g*h^2 + 24
*a^2*b^5*c*d*g^2*h + 2208*a^3*b*c^4*d^2*f*h + 800*a^4*b*c^3*d*f*h^2 - 102*a
*b^5*c^2*d^2*f*h - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h - 240*a*b^4
*c^3*d^2*e*g - 32*a*b^4*c^3*d*e^2*f + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*f*g^
2 + 64*a^4*b^2*c^2*f*g^2*h + 192*a^4*b^2*c^2*e*g*h^2 - 224*a^3*b^3*c^2*d*g^
2*h + 192*a^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 336*a^3*b^3*c^2*d
```

*f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2*b^3*c^3*d^2*f*h + 16*a^2*b^4*c^2
*e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^3*b^2*c^3*d*f*g^2 + 96*a^2*b^3*c^
3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a^2*b^2*c^4*d^2*e*g + 192*a^2*b^2*
c^4*d*e^2*f - 48*a^4*b^3*c*g^2*h^2 + 80*a^3*b^3*c^2*f^3*h - 42*a^3*b^4*c*f^
2*h^2 - 192*a^4*b*c^3*e^2*h^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h^3
- 192*a^2*b^2*c^4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2 +
60*a*b^5*c^2*d^2*g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 960*
a^2*b*c^5*d^2*e^2 + 240*a*b^3*c^4*d^2*e^2 + 256*a^4*c^4*e^2*f*h - 192*a^4*c
^4*d*f^2*h + 16*b^6*c^2*d^2*e*g + 96*a^5*b*c^2*f*h^3 + 96*a^4*b*c^3*f^3*h +
80*a^4*b^3*c*f*h^3 + 6*a^2*b^5*c*f^3*h + 768*a^3*c^5*d*e^2*f + 512*a^3*b*c
^4*e^3*g + 132*a*b^4*c^3*d^3*h - 28*a^3*b^4*c*d*h^3 + 12*a*b^6*c*d^2*h^2 +
2016*a^2*b*c^5*d^3*f - 496*a*b^3*c^4*d^3*f + 224*a^3*b*c^4*d*f^3 - 18*a*b^5
*c^2*d*f^3 - 192*a^4*b^2*c^2*f^2*h^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*b^3*
c^2*e^2*h^2 - 464*a^3*b^2*c^3*d^2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^2*b^
4*c^2*d^2*h^2 - 240*a^2*b^3*c^3*d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*a^2*
b^2*c^4*d^2*f^2 + 6*b^7*c*d^2*f*h - 2*a*b^7*d*f*h^2 - 32*a^5*c^3*f^2*h^2 -
4*a^3*b^5*g^2*h^2 - 864*a^4*c^4*d^2*h^2 - 9*b^6*c^2*d^2*f^2 - 288*a^3*c^5*d
^2*f^2 - 16*b^5*c^3*d^2*e^2 - 24*a^3*b^2*c^3*f^4 - 9*a^2*b^4*c^2*f^4 - 10*b
^6*c^2*d^3*h + 6*a^3*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192*a^5*c^3*d*h^3 - 4
*b^7*c*d^2*g^2 + 30*b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a^5*b^2*c*h^4 - 16
*a^3*b^4*c*g^4 + 360*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^4*b^4*h^4 - 16*a^
4*c^4*f^4 - 256*a^3*c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^6*d^4 - a^2*b^6*f
^2*h^2 - b^8*d^2*h^2, z, k)*(root(1572864*a^8*b^2*c^6*z^4 - 983040*a^7*b^4*
c^5*z^4 + 327680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^10*c^
2*z^4 - 256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 192*a^3*b^8*c*f*h*z^2 +
57344*a^6*b*c^5*d*h*z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a^2*b^9*c*d*h*z^2 -
32*a*b^10*c*d*f*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*b^6*c^2*f*h*z^2 -
49152*a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g*z^2 + 15360*a^4*b^5*c^3*
d*h*z^2 + 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*c^2*d*h*z^2 - 512*a^3*b^7
*c^2*e*g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6*c^3*d*f*z^2 + 2048*
a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 12288*a^7*b*c^4*h^2*z^2 + 1
28*a^3*b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^2 - 16*a^2*b^9*c*f^2*z^2 + 614
40*a^5*b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 - 16384*a^7*c^5*f*h*z^2 - 4915
2*a^6*c^6*d*f*z^2 - 8192*a^6*b^3*c^3*h^2*z^2 + 1536*a^5*b^5*c^2*h^2*z^2 - 8
192*a^6*b^2*c^4*g^2*z^2 + 6144*a^5*b^4*c^3*g^2*z^2 - 1536*a^4*b^6*c^2*g^2*z
^2 - 8192*a^5*b^3*c^4*f^2*z^2 + 1536*a^4*b^5*c^3*f^2*z^2 + 24576*a^5*b^2*c^
5*e^2*z^2 - 6144*a^4*b^4*c^4*e^2*z^2 + 512*a^3*b^6*c^3*e^2*z^2 - 61440*a^4*
b^3*c^5*d^2*z^2 + 24064*a^3*b^5*c^4*d^2*z^2 - 4608*a^2*b^7*c^3*d^2*z^2 - 16
*a^3*b^9*h^2*z^2 - 32768*a^6*c^6*e^2*z^2 - 16*b^11*c*d^2*z^2 - 6144*a^5*b*c
^4*d*g*h*z + 96*a^2*b^7*c*d*g*h*z - 4096*a^4*b*c^5*d*e*f*z + 64*a*b^7*c^2*d
*e*f*z - 32*a*b^8*c*d*f*g*z + 4608*a^4*b^3*c^3*d*g*h*z - 1152*a^3*b^5*c^2*d
*g*h*z - 9216*a^4*b^2*c^4*d*e*h*z + 2304*a^3*b^4*c^3*d*e*h*z + 2048*a^4*b^2
*c^4*d*f*g*z - 1536*a^3*b^4*c^3*d*f*g*z + 384*a^2*b^6*c^2*d*f*g*z - 192*a^2
*b^6*c^2*d*e*h*z + 3072*a^3*b^3*c^4*d*e*f*z - 768*a^2*b^5*c^3*d*e*f*z - 102
4*a^6*b*c^3*g*h^2*z - 192*a^4*b^5*c*g*h^2*z + 1024*a^5*b*c^4*f^2*g*z - 32*a
^3*b^6*c*e*h^2*z - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*c^5*d^2*g*z + 336*a*b^
7*c^2*d^2*g*z - 672*a*b^6*c^3*d^2*e*z + 12288*a^5*c^5*d*e*h*z + 768*a^5*b^3
*c^2*g*h^2*z - 1536*a^5*b^2*c^3*e*h^2*z - 768*a^4*b^3*c^3*f^2*g*z + 384*a^4
*b^4*c^2*e*h^2*z + 192*a^3*b^5*c^2*f^2*g*z + 7936*a^3*b^3*c^4*d^2*g*z - 249
6*a^2*b^5*c^3*d^2*g*z + 1536*a^4*b^2*c^4*e*f^2*z - 384*a^3*b^4*c^3*e*f^2*z
+ 32*a^2*b^6*c^2*e*f^2*z - 15872*a^3*b^2*c^5*d^2*e*z + 4992*a^2*b^4*c^4*d^2
*e*z + 16*a^3*b^7*g*h^2*z + 2048*a^6*c^4*e*h^2*z - 2048*a^5*c^5*e*f^2*z + 3
2*b^8*c^2*d^2*e*z + 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2*g*z - 256*a^4*b*c^
3*e*f*g*h - 768*a^3*b*c^4*d*e*f*g + 32*a*b^5*c^2*d*e*f*g - 192*a^3*b^3*c^2*
e*f*g*h + 896*a^3*b^2*c^3*d*e*g*h - 96*a^2*b^4*c^2*d*e*g*h - 192*a^2*b^3*c^
3*d*e*f*g + 48*a^3*b^4*c*f*g^2*h + 16*a^3*b^4*c*e*g*h^2 + 24*a^2*b^5*c*d*g^
2*h + 2208*a^3*b*c^4*d^2*f*h + 800*a^4*b*c^3*d*f*h^2 - 102*a*b^5*c^2*d^2*f*
h - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h - 240*a*b^4*c^3*d^2*e*g -
32*a*b^4*c^3*d*e^2*f + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*f*g^2 + 64*a^4*b^2*

c^2*f*g^2*h + 192*a^4*b^2*c^2*e*g*h^2 - 224*a^3*b^3*c^2*d*g^2*h + 192*a^3*b
^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 336*a^3*b^3*c^2*d*f*h^2 + 192*a^
3*b^2*c^3*e*f^2*g + 144*a^2*b^3*c^3*d^2*f*h + 16*a^2*b^4*c^2*e*f^2*g - 12*a
^2*b^4*c^2*d*f^2*h + 192*a^3*b^2*c^3*d*f*g^2 + 96*a^2*b^3*c^3*d*e^2*h + 48*
a^2*b^4*c^2*d*f*g^2 + 960*a^2*b^2*c^4*d^2*e*g + 192*a^2*b^2*c^4*d*e^2*f - 4
8*a^4*b^3*c*g^2*h^2 + 80*a^3*b^3*c^2*f^3*h - 42*a^3*b^4*c*f^2*h^2 - 192*a^4
*b*c^3*e^2*h^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h^3 - 192*a^2*b^2*
c^4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2 + 60*a*b^5*c^2*d^
2*g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 960*a^2*b*c^5*d^2*e
^2 + 240*a*b^3*c^4*d^2*e^2 + 256*a^4*c^4*e^2*f*h - 192*a^4*c^4*d*f^2*h + 16
*b^6*c^2*d^2*e*g + 96*a^5*b*c^2*f*h^3 + 96*a^4*b*c^3*f^3*h + 80*a^4*b^3*c*f
*h^3 + 6*a^2*b^5*c*f^3*h + 768*a^3*c^5*d*e^2*f + 512*a^3*b*c^4*e^3*g + 132*
a*b^4*c^3*d^3*h - 28*a^3*b^4*c*d*h^3 + 12*a*b^6*c*d^2*h^2 + 2016*a^2*b*c^5*
d^3*f - 496*a*b^3*c^4*d^3*f + 224*a^3*b*c^4*d*f^3 - 18*a*b^5*c^2*d*f^3 - 19
2*a^4*b^2*c^2*f^2*h^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*b^3*c^2*e^2*h^2 - 4
64*a^3*b^2*c^3*d^2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^2*b^4*c^2*d^2*h^2 -
240*a^2*b^3*c^3*d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*a^2*b^2*c^4*d^2*f^2
+ 6*b^7*c*d^2*f*h - 2*a*b^7*d*f*h^2 - 32*a^5*c^3*f^2*h^2 - 4*a^3*b^5*g^2*h
^2 - 864*a^4*c^4*d^2*h^2 - 9*b^6*c^2*d^2*f^2 - 288*a^3*c^5*d^2*f^2 - 16*b^5
*c^3*d^2*e^2 - 24*a^3*b^2*c^3*f^4 - 9*a^2*b^4*c^2*f^4 - 10*b^6*c^2*d^3*h +
6*a^3*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192*a^5*c^3*d*h^3 - 4*b^7*c*d^2*g^2
+ 30*b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a^5*b^2*c*h^4 - 16*a^3*b^4*c*g^4
+ 360*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^4*b^4*h^4 - 16*a^4*c^4*f^4 - 256
*a^3*c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^6*d^4 - a^2*b^6*f^2*h^2 - b^8*d^
2*h^2, z, k)*((x*(2048*a^5*c^6*e - 32*a^2*b^6*c^3*e + 384*a^3*b^4*c^4*e - 1
536*a^4*b^2*c^5*e + 16*a^2*b^7*c^2*g - 192*a^3*b^5*c^3*g + 768*a^4*b^3*c^4*
g - 1024*a^5*b*c^5*g))/(4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2
*c^2)) - (6144*a^5*c^6*d + 2048*a^6*c^5*h - 288*a^2*b^6*c^3*d + 1920*a^3*b^
4*c^4*d - 5632*a^4*b^2*c^5*d + 16*a^2*b^7*c^2*f - 192*a^3*b^5*c^3*f + 768*a
^4*b^3*c^4*f - 32*a^3*b^6*c^2*h + 384*a^4*b^4*c^3*h - 1536*a^5*b^2*c^4*h +
16*a*b^8*c^2*d - 1024*a^5*b*c^5*f)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c
+ 48*a^4*b^2*c^2)) + (root(1572864*a^8*b^2*c^6*z^4 - 983040*a^7*b^4*c^5*z^4
+ 327680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^10*c^2*z^4 -
256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 192*a^3*b^8*c*f*h*z^2 + 57344*a
^6*b*c^5*d*h*z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a^2*b^9*c*d*h*z^2 - 32*a*b^
10*c*d*f*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*b^6*c^2*f*h*z^2 - 49152*
a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g*z^2 + 15360*a^4*b^5*c^3*d*h*z^2
+ 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*c^2*d*h*z^2 - 512*a^3*b^7*c^2*e*
g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6*c^3*d*f*z^2 + 2048*a^4*b^4
*c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 12288*a^7*b*c^4*h^2*z^2 + 128*a^3*
b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^2 - 16*a^2*b^9*c*f^2*z^2 + 61440*a^5*
b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 - 16384*a^7*c^5*f*h*z^2 - 49152*a^6*c
^6*d*f*z^2 - 8192*a^6*b^3*c^3*h^2*z^2 + 1536*a^5*b^5*c^2*h^2*z^2 - 8192*a^6
*b^2*c^4*g^2*z^2 + 6144*a^5*b^4*c^3*g^2*z^2 - 1536*a^4*b^6*c^2*g^2*z^2 - 81
92*a^5*b^3*c^4*f^2*z^2 + 1536*a^4*b^5*c^3*f^2*z^2 + 24576*a^5*b^2*c^5*e^2*z
^2 - 6144*a^4*b^4*c^4*e^2*z^2 + 512*a^3*b^6*c^3*e^2*z^2 - 61440*a^4*b^3*c^5
*d^2*z^2 + 24064*a^3*b^5*c^4*d^2*z^2 - 4608*a^2*b^7*c^3*d^2*z^2 - 16*a^3*b^
9*h^2*z^2 - 32768*a^6*c^6*e^2*z^2 - 16*b^11*c*d^2*z^2 - 6144*a^5*b*c^4*d*g*
h*z + 96*a^2*b^7*c*d*g*h*z - 4096*a^4*b*c^5*d*e*f*z + 64*a*b^7*c^2*d*e*f*z
- 32*a*b^8*c*d*f*g*z + 4608*a^4*b^3*c^3*d*g*h*z - 1152*a^3*b^5*c^2*d*g*h*z
- 9216*a^4*b^2*c^4*d*e*h*z + 2304*a^3*b^4*c^3*d*e*h*z + 2048*a^4*b^2*c^4*d*
f*g*z - 1536*a^3*b^4*c^3*d*f*g*z + 384*a^2*b^6*c^2*d*f*g*z - 192*a^2*b^6*c^
2*d*e*h*z + 3072*a^3*b^3*c^4*d*e*f*z - 768*a^2*b^5*c^3*d*e*f*z - 1024*a^6*b
*c^3*g*h^2*z - 192*a^4*b^5*c*g*h^2*z + 1024*a^5*b*c^4*f^2*g*z - 32*a^3*b^6*
c*e*h^2*z - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*c^5*d^2*g*z + 336*a*b^7*c^2*d
^2*g*z - 672*a*b^6*c^3*d^2*e*z + 12288*a^5*c^5*d*e*h*z + 768*a^5*b^3*c^2*g*
h^2*z - 1536*a^5*b^2*c^3*e*h^2*z - 768*a^4*b^3*c^3*f^2*g*z + 384*a^4*b^4*c^
2*e*h^2*z + 192*a^3*b^5*c^2*f^2*g*z + 7936*a^3*b^3*c^4*d^2*g*z - 2496*a^2*b
^5*c^3*d^2*g*z + 1536*a^4*b^2*c^4*e*f^2*z - 384*a^3*b^4*c^3*e*f^2*z + 32*a^

2*b^6*c^2*e*f^2*z - 15872*a^3*b^2*c^5*d^2*e*z + 4992*a^2*b^4*c^4*d^2*e*z +
16*a^3*b^7*g*h^2*z + 2048*a^6*c^4*e*h^2*z - 2048*a^5*c^5*e*f^2*z + 32*b^8*c
^2*d^2*e*z + 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2*g*z - 256*a^4*b*c^3*e*f*g
*h - 768*a^3*b*c^4*d*e*f*g + 32*a*b^5*c^2*d*e*f*g - 192*a^3*b^3*c^2*e*f*g*h
 + 896*a^3*b^2*c^3*d*e*g*h - 96*a^2*b^4*c^2*d*e*g*h - 192*a^2*b^3*c^3*d*e*f
*g + 48*a^3*b^4*c*f*g^2*h + 16*a^3*b^4*c*e*g*h^2 + 24*a^2*b^5*c*d*g^2*h + 2
208*a^3*b*c^4*d^2*f*h + 800*a^4*b*c^3*d*f*h^2 - 102*a*b^5*c^2*d^2*f*h - 30*
a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h - 240*a*b^4*c^3*d^2*e*g - 32*a*b^
4*c^3*d*e^2*f + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*f*g^2 + 64*a^4*b^2*c^2*f*g
^2*h + 192*a^4*b^2*c^2*e*g*h^2 - 224*a^3*b^3*c^2*d*g^2*h + 192*a^3*b^2*c^3*
e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 336*a^3*b^3*c^2*d*f*h^2 + 192*a^3*b^2*c
^3*e*f^2*g + 144*a^2*b^3*c^3*d^2*f*h + 16*a^2*b^4*c^2*e*f^2*g - 12*a^2*b^4*
c^2*d*f^2*h + 192*a^3*b^2*c^3*d*f*g^2 + 96*a^2*b^3*c^3*d*e^2*h + 48*a^2*b^4
*c^2*d*f*g^2 + 960*a^2*b^2*c^4*d^2*e*g + 192*a^2*b^2*c^4*d*e^2*f - 48*a^4*b
^3*c*g^2*h^2 + 80*a^3*b^3*c^2*f^3*h - 42*a^3*b^4*c*f^2*h^2 - 192*a^4*b*c^3*
e^2*h^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h^3 - 192*a^2*b^2*c^4*d^3
*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2 + 60*a*b^5*c^2*d^2*g^2 +
 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 960*a^2*b*c^5*d^2*e^2 + 24
0*a*b^3*c^4*d^2*e^2 + 256*a^4*c^4*e^2*f*h - 192*a^4*c^4*d*f^2*h + 16*b^6*c^
2*d^2*e*g + 96*a^5*b*c^2*f*h^3 + 96*a^4*b*c^3*f^3*h + 80*a^4*b^3*c*f*h^3 +
6*a^2*b^5*c*f^3*h + 768*a^3*c^5*d*e^2*f + 512*a^3*b*c^4*e^3*g + 132*a*b^4*c
^3*d^3*h - 28*a^3*b^4*c*d*h^3 + 12*a*b^6*c*d^2*h^2 + 2016*a^2*b*c^5*d^3*f -
 496*a*b^3*c^4*d^3*f + 224*a^3*b*c^4*d*f^3 - 18*a*b^5*c^2*d*f^3 - 192*a^4*b
^2*c^2*f^2*h^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*b^3*c^2*e^2*h^2 - 464*a^3*
b^2*c^3*d^2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^2*b^4*c^2*d^2*h^2 - 240*a^
2*b^3*c^3*d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*a^2*b^2*c^4*d^2*f^2 + 6*b^
7*c*d^2*f*h - 2*a*b^7*d*f*h^2 - 32*a^5*c^3*f^2*h^2 - 4*a^3*b^5*g^2*h^2 - 86
4*a^4*c^4*d^2*h^2 - 9*b^6*c^2*d^2*f^2 - 288*a^3*c^5*d^2*f^2 - 16*b^5*c^3*d^
2*e^2 - 24*a^3*b^2*c^3*f^4 - 9*a^2*b^4*c^2*f^4 - 10*b^6*c^2*d^3*h + 6*a^3*b
^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192*a^5*c^3*d*h^3 - 4*b^7*c*d^2*g^2 + 30*b^
5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a^5*b^2*c*h^4 - 16*a^3*b^4*c*g^4 + 360*a
*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^4*b^4*h^4 - 16*a^4*c^4*f^4 - 256*a^3*c^
5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^6*d^4 - a^2*b^6*f^2*h^2 - b^8*d^2*h^2,
z, k)*x*(8192*a^6*b*c^6 + 32*a^2*b^9*c^2 - 512*a^3*b^7*c^3 + 3072*a^4*b^5*c
^4 - 8192*a^5*b^3*c^5))/(4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^
2*c^2))) - (512*a^4*c^5*e*f - 32*a*b^5*c^3*d*e - 1024*a^3*b*c^5*d*e + 16*a*
b^6*c^2*d*g - 512*a^4*b*c^4*e*h - 256*a^4*b*c^4*f*g + 384*a^2*b^3*c^4*d*e -
 192*a^2*b^4*c^3*d*g - 32*a^2*b^4*c^3*e*f + 512*a^3*b^2*c^4*d*g + 16*a^2*b^
5*c^2*f*g + 128*a^3*b^3*c^3*e*h - 64*a^3*b^4*c^2*g*h + 256*a^4*b^2*c^3*g*h)
/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) + (x*(2*b^6*c^3
*d^2 - 576*a^3*c^6*d^2 + 64*a^4*c^5*f^2 - 64*a^5*c^4*h^2 - 36*a*b^4*c^4*d^2
 + 128*a^3*b*c^5*e^2 + 2*a^2*b^6*c*h^2 + 256*a^2*b^2*c^5*d^2 - 32*a^2*b^3*c
^4*e^2 + 20*a^2*b^4*c^3*f^2 - 96*a^3*b^2*c^4*f^2 - 8*a^2*b^5*c^2*g^2 + 32*a
^3*b^3*c^3*g^2 - 4*a^3*b^4*c^2*h^2 - 384*a^4*c^5*d*h + 4*a*b^5*c^3*d*f + 32
0*a^3*b*c^5*d*f + 64*a^4*b*c^4*f*h - 96*a^2*b^3*c^4*d*f + 8*a^2*b^4*c^3*d*h
 + 32*a^2*b^4*c^3*e*g + 64*a^3*b^2*c^4*d*h - 128*a^3*b^2*c^4*e*g - 12*a^2*b
^5*c^2*f*h + 32*a^3*b^3*c^3*f*h))/(4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c +
 48*a^4*b^2*c^2))) - (x*(32*a^2*c^5*e^3 - 2*b^3*c^4*d^2*e + b^4*c^3*d^2*g -
 4*a^2*b^3*c^2*g^3 + 24*a*b*c^5*d^2*e - 48*a^2*c^5*d*e*f - 16*a^3*c^4*e*f*h
 - 12*a*b^2*c^4*d^2*g + 16*a^2*b*c^4*e*f^2 - 48*a^2*b*c^4*e^2*g + 8*a^3*b*c
^3*e*h^2 - a^2*b^4*c*g*h^2 + 24*a^2*b^2*c^3*e*g^2 - 8*a^2*b^2*c^3*f^2*g + 2
*a^2*b^3*c^2*e*h^2 - 4*a^3*b^2*c^2*g*h^2 - 4*a*b^2*c^4*d*e*f + 2*a*b^3*c^3*
d*f*g + 32*a^2*b*c^4*d*e*h + 24*a^2*b*c^4*d*f*g + 8*a^3*b*c^3*f*g*h - 16*a^
2*b^2*c^3*d*g*h - 12*a^2*b^2*c^3*e*f*h + 6*a^2*b^3*c^2*f*g*h))/(4*(a^2*b^6
 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)))*root(1572864*a^8*b^2*c^6*z^
4 - 983040*a^7*b^4*c^5*z^4 + 327680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4
 + 6144*a^4*b^10*c^2*z^4 - 256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 192*a
^3*b^8*c*f*h*z^2 + 57344*a^6*b*c^5*d*h*z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a
^2*b^9*c*d*h*z^2 - 32*a*b^10*c*d*f*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^

```
4*b^6*c^2*f*h*z^2 - 49152*a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g*z^2 +
 15360*a^4*b^5*c^3*d*h*z^2 + 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*c^2*d*
h*z^2 - 512*a^3*b^7*c^2*e*g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6*
c^3*d*f*z^2 + 2048*a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 12288*a^
7*b*c^4*h^2*z^2 + 128*a^3*b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^2 - 16*a^2*
b^9*c*f^2*z^2 + 61440*a^5*b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 - 16384*a^7
*c^5*f*h*z^2 - 49152*a^6*c^6*d*f*z^2 - 8192*a^6*b^3*c^3*h^2*z^2 + 1536*a^5*
b^5*c^2*h^2*z^2 - 8192*a^6*b^2*c^4*g^2*z^2 + 6144*a^5*b^4*c^3*g^2*z^2 - 153
6*a^4*b^6*c^2*g^2*z^2 - 8192*a^5*b^3*c^4*f^2*z^2 + 1536*a^4*b^5*c^3*f^2*z^2
 + 24576*a^5*b^2*c^5*e^2*z^2 - 6144*a^4*b^4*c^4*e^2*z^2 + 512*a^3*b^6*c^3*e
^2*z^2 - 61440*a^4*b^3*c^5*d^2*z^2 + 24064*a^3*b^5*c^4*d^2*z^2 - 4608*a^2*b
^7*c^3*d^2*z^2 - 16*a^3*b^9*h^2*z^2 - 32768*a^6*c^6*e^2*z^2 - 16*b^11*c*d^2
*z^2 - 6144*a^5*b*c^4*d*g*h*z + 96*a^2*b^7*c*d*g*h*z - 4096*a^4*b*c^5*d*e*f
*z + 64*a*b^7*c^2*d*e*f*z - 32*a*b^8*c*d*f*g*z + 4608*a^4*b^3*c^3*d*g*h*z -
 1152*a^3*b^5*c^2*d*g*h*z - 9216*a^4*b^2*c^4*d*e*h*z + 2304*a^3*b^4*c^3*d*e
*h*z + 2048*a^4*b^2*c^4*d*f*g*z - 1536*a^3*b^4*c^3*d*f*g*z + 384*a^2*b^6*c^
2*d*f*g*z - 192*a^2*b^6*c^2*d*e*h*z + 3072*a^3*b^3*c^4*d*e*f*z - 768*a^2*b^
5*c^3*d*e*f*z - 1024*a^6*b*c^3*g*h^2*z - 192*a^4*b^5*c*g*h^2*z + 1024*a^5*b
*c^4*f^2*g*z - 32*a^3*b^6*c*e*h^2*z - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*c^5
*d^2*g*z + 336*a*b^7*c^2*d^2*g*z - 672*a*b^6*c^3*d^2*e*z + 12288*a^5*c^5*d*
e*h*z + 768*a^5*b^3*c^2*g*h^2*z - 1536*a^5*b^2*c^3*e*h^2*z - 768*a^4*b^3*c^
3*f^2*g*z + 384*a^4*b^4*c^2*e*h^2*z + 192*a^3*b^5*c^2*f^2*g*z + 7936*a^3*b^
3*c^4*d^2*g*z - 2496*a^2*b^5*c^3*d^2*g*z + 1536*a^4*b^2*c^4*e*f^2*z - 384*a
^3*b^4*c^3*e*f^2*z + 32*a^2*b^6*c^2*e*f^2*z - 15872*a^3*b^2*c^5*d^2*e*z + 4
992*a^2*b^4*c^4*d^2*e*z + 16*a^3*b^7*g*h^2*z + 2048*a^6*c^4*e*h^2*z - 2048*
a^5*c^5*e*f^2*z + 32*b^8*c^2*d^2*e*z + 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2
*g*z - 256*a^4*b*c^3*e*f*g*h - 768*a^3*b*c^4*d*e*f*g + 32*a*b^5*c^2*d*e*f*g
 - 192*a^3*b^3*c^2*e*f*g*h + 896*a^3*b^2*c^3*d*e*g*h - 96*a^2*b^4*c^2*d*e*g
*h - 192*a^2*b^3*c^3*d*e*f*g + 48*a^3*b^4*c*f*g^2*h + 16*a^3*b^4*c*e*g*h^2
+ 24*a^2*b^5*c*d*g^2*h + 2208*a^3*b*c^4*d^2*f*h + 800*a^4*b*c^3*d*f*h^2 - 1
02*a*b^5*c^2*d^2*f*h - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h - 240*a
*b^4*c^3*d^2*e*g - 32*a*b^4*c^3*d*e^2*f + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*
f*g^2 + 64*a^4*b^2*c^2*f*g^2*h + 192*a^4*b^2*c^2*e*g*h^2 - 224*a^3*b^3*c^2*
d*g^2*h + 192*a^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 336*a^3*b^3*c
^2*d*f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2*b^3*c^3*d^2*f*h + 16*a^2*b^4
*c^2*e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^3*b^2*c^3*d*f*g^2 + 96*a^2*b^
3*c^3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a^2*b^2*c^4*d^2*e*g + 192*a^2*
b^2*c^4*d*e^2*f - 48*a^4*b^3*c*g^2*h^2 + 80*a^3*b^3*c^2*f^3*h - 42*a^3*b^4*
c*f^2*h^2 - 192*a^4*b*c^3*e^2*h^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d
*h^3 - 192*a^2*b^2*c^4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^
2 + 60*a*b^5*c^2*d^2*g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 -
960*a^2*b*c^5*d^2*e^2 + 240*a*b^3*c^4*d^2*e^2 + 256*a^4*c^4*e^2*f*h - 192*a
^4*c^4*d*f^2*h + 16*b^6*c^2*d^2*e*g + 96*a^5*b*c^2*f*h^3 + 96*a^4*b*c^3*f^3
*h + 80*a^4*b^3*c*f*h^3 + 6*a^2*b^5*c*f^3*h + 768*a^3*c^5*d*e^2*f + 512*a^3
*b*c^4*e^3*g + 132*a*b^4*c^3*d^3*h - 28*a^3*b^4*c*d*h^3 + 12*a*b^6*c*d^2*h^
2 + 2016*a^2*b*c^5*d^3*f - 496*a*b^3*c^4*d^3*f + 224*a^3*b*c^4*d*f^3 - 18*a
*b^5*c^2*d*f^3 - 192*a^4*b^2*c^2*f^2*h^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*
b^3*c^2*e^2*h^2 - 464*a^3*b^2*c^3*d^2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^
2*b^4*c^2*d^2*h^2 - 240*a^2*b^3*c^3*d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*
a^2*b^2*c^4*d^2*f^2 + 6*b^7*c*d^2*f*h - 2*a*b^7*d*f*h^2 - 32*a^5*c^3*f^2*h^
2 - 4*a^3*b^5*g^2*h^2 - 864*a^4*c^4*d^2*h^2 - 9*b^6*c^2*d^2*f^2 - 288*a^3*c
^5*d^2*f^2 - 16*b^5*c^3*d^2*e^2 - 24*a^3*b^2*c^3*f^4 - 9*a^2*b^4*c^2*f^4 -
10*b^6*c^2*d^3*h + 6*a^3*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192*a^5*c^3*d*h^3
 - 4*b^7*c*d^2*g^2 + 30*b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a^5*b^2*c*h^4
- 16*a^3*b^4*c*g^4 + 360*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^4*b^4*h^4 - 1
6*a^4*c^4*f^4 - 256*a^3*c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^6*d^4 - a^2*b
^6*f^2*h^2 - b^8*d^2*h^2, z, k), k, 1, 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**2,x)
```

```
[Out] Timed out
```

3.40 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{\left(a+bx^2+cx^4\right)^2}\,dx$

Optimal. Leaf size=468

$$\frac{-\left(x^2\left(-2aci+b^2i-bcg+2c^2e\right)\right)-b(ai+ce)+2acg}{2c\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{x\left(x^2(abh-2acf+bcd)-abf-2a(cd-ah)+b^2d\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+-$$

```
[Out] 1/2*x*(b^2*d-a*b*f-2*a*(-a*h+c*d)+(a*b*h-2*a*c*f+b*c*d)*x^2)/a/(-4*a*c+b^2)
/(c*x^4+b*x^2+a)+1/2*(2*a*c*g-b*(a*i+c*e)-(-2*a*c*i+b^2*i-b*c*g+2*c^2*e)*x^
2)/c/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+(2*a*i-b*g+2*c*e)*arctanh((2*c*x^2+b)/(-4
*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(3/2)+1/4*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c
+b^2)^(1/2))^(1/2))*(b*c*d-2*a*c*f+a*b*h+(4*a*b*c*f+b^2*(-a*h+c*d)-4*a*c*(a
*h+3*c*d))/(-4*a*c+b^2)^(1/2))/a/(-4*a*c+b^2)*2^(1/2)/c^(1/2)/(b-(-4*a*c+b^
2)^(1/2))^(1/2)+1/4*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*
(b*c*d-2*a*c*f+a*b*h+(-4*a*b*c*f-b^2*(-a*h+c*d)+4*a*c*(a*h+3*c*d))/(-4*a*c+
b^2)^(1/2))/a/(-4*a*c+b^2)*2^(1/2)/c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 1.12, antiderivative size = 468, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 9, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.225, Rules used = {1673, 1678, 1166, 205, 1663, 1660, 12, 618, 206}

$$\frac{x^2\left(-\left(-2aci+b^2i-bcg+2c^2e\right)\right)-b(ai+ce)+2acg}{2c\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{x\left(x^2(abh-2acf+bcd)-abf-2a(cd-ah)+b^2d\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+-$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] (x*(b^2*d - a*b*f - 2*a*(c*d - a*h) + (b*c*d - 2*a*c*f + a*b*h)*x^2))/(2*a*
(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (2*a*c*g - b*(c*e + a*i) - (2*c^2*e -
b*c*g + b^2*i - 2*a*c*i)*x^2)/(2*c*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + ((b
*c*d - 2*a*c*f + a*b*h + (4*a*b*c*f + b^2*(c*d - a*h) - 4*a*c*(3*c*d + a*h)
)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]
])/(2*Sqrt[2]*a*Sqrt[c]*(b^2 - 4*a*c)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((b*c*
d - 2*a*c*f + a*b*h - (4*a*b*c*f + b^2*(c*d - a*h) - 4*a*c*(3*c*d + a*h))/S
qrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/
(2*Sqrt[2]*a*Sqrt[c]*(b^2 - 4*a*c)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((2*c*e -
 b*g + 2*a*i)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(3/2)
```

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 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^
(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
 - 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+40x^5}{\left(a+bx^2+cx^4\right)^2}\,dx = \int \frac{x\left(e+gx^2+40x^4\right)}{\left(a+bx^2+cx^4\right)^2}\,dx + \int \frac{d+fx^2+hx^4}{\left(a+bx^2+cx^4\right)^2}\,dx$$

$$= \frac{x\left(b^2d-abf-2a(cd-ah)+(bcd-2acf+abh)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{1}{2}\text{Subst}\Bigg(\int$$

$$= -\frac{40ab+bce-2acg+\left(40b^2-2c(40a-ce)-bcg\right)x^2}{2c\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-ab\right.}{}$$

$$= -\frac{40ab+bce-2acg+\left(40b^2-2c(40a-ce)-bcg\right)x^2}{2c\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-ab\right.}{}$$

$$= -\frac{40ab+bce-2acg+\left(40b^2-2c(40a-ce)-bcg\right)x^2}{2c\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-ab\right.}{}$$

$$= -\frac{40ab+bce-2acg+\left(40b^2-2c(40a-ce)-bcg\right)x^2}{2c\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-ab\right.}{}$$

Mathematica [A] time = 2.11, size = 524, normalized size = 1.12

$$\frac{1}{4}\left(\frac{2\left(a^2(bi-2c(g+x(h+ix)))+a\left(b^2ix^2+bc(e+x(f-x(g+hx)))+2c^2x(d+x(e+fx))\right)-bcdx\left(b+cx^2\right)\right)}{ac\left(4ac-b^2\right)\left(a+bx^2+cx^4\right)}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4)^2,x
]
```

```
[Out] ((2*(-(b*c*d*x*(b + c*x^2)) + a^2*(b*i - 2*c*(g + x*(h + i*x))) + a*(b^2*i*
x^2 + 2*c^2*x*(d + x*(e + f*x)) + b*c*(e + x*(f - x*(g + h*x))))))/(a*c*(-b
^2 + 4*a*c)*(a + b*x^2 + c*x^4)) + (Sqrt[2]*(b^2*(c*d - a*h) - 2*a*c*(6*c*d
 + Sqrt[b^2 - 4*a*c]*f + 2*a*h) + b*(c*Sqrt[b^2 - 4*a*c]*d + 4*a*c*f + a*Sq
rt[b^2 - 4*a*c]*h))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]]
)/(a*Sqrt[c]*(b^2 - 4*a*c)^(3/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*(b
^2*(-(c*d) + a*h) + 2*a*c*(6*c*d - Sqrt[b^2 - 4*a*c]*f + 2*a*h) + b*(c*Sqrt
[b^2 - 4*a*c]*d - 4*a*c*f + a*Sqrt[b^2 - 4*a*c]*h))*ArcTan[(Sqrt[2]*Sqrt[c]
*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(a*Sqrt[c]*(b^2 - 4*a*c)^(3/2)*Sqrt[b + S
qrt[b^2 - 4*a*c]]) + (2*(-2*c*e + b*g - 2*a*i)*Log[-b + Sqrt[b^2 - 4*a*c] -
 2*c*x^2])/(b^2 - 4*a*c)^(3/2) + (2*(2*c*e - b*g + 2*a*i)*Log[b + Sqrt[b^2
- 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(3/2))/4
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="f
ricas")
```

```
[Out] Timed out
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="g
iac")
```

```
[Out] Timed out
```

maple [B] time = 0.05, size = 1917, normalized size = 4.10

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x)
```

```
[Out] 1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/
2)*b^2*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+1/4/(4*a*c-b^
2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*h+(-1/2*(a*b*h-2*a*c*f+b*
c*d)/(4*a*c-b^2)/a*x^3-1/2*(2*a*c*i-b^2*i+b*c*g-2*c^2*e)/(4*a*c-b^2)/c*x^2-
1/2*(2*a^2*h-a*b*f-2*a*c*d+b^2*d)/(4*a*c-b^2)/a*x+1/2/c*(a*b*i-2*a*c*g+b*c*
e)/(4*a*c-b^2))/(c*x^4+b*x^2+a)-1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^
(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)/a*b^2*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2
)^(1/2))*c)^(1/2)*c*x)-1/4*c/(4*a*c-b^2)^2/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2
))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+
b^2)^(1/2)*b^2*d-c/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*
arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b
*f-1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1
/2)*b*c*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-2*c^2/(4*a*c
-b^2)^2*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-
4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f+1/2*c/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+
b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)
*b^2*f+2/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*a*c^2*f*arc
tan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/2/(4*a*c-b^2)^2*2^(1/2)
/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b^2*c*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*c*x)-1/4*c/(4*a*c-b^2)^2/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*
c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*d+a/(4*
a*c-b^2)^2*c*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b
+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*h+1/2/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)
*b*g*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))+1/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*c
*e*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))-1/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*c*e*
ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))+3/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^
(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)*c^2*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*c*x)-1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)
*b*c^2*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+3*c^2/(4*a*c-
b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a
*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d+c^2/(4*a*c-b^2)^2*2^(1/2)
/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))
*c)^(1/2)*c*x)*b*d+1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/
2)/a*b^3*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/4/(4*a*
c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4
*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*h-1/2/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*b
*g*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2
```

```
)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)*a*c*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)^
(1/2))*c)^(1/2)*c*x)-1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/
2)*a*b*c*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+a/(4*a*c-b^
2)^2*c*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a
*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*h+1/4/(4*a*c-b^2)^2*2^(1/2)
/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b^3*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/
2))*c)^(1/2)*c*x)-a/(4*a*c-b^2)^2*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-4*a*c
+b^2)^(1/2)*i+a/(4*a*c-b^2)^2*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)
^(1/2)*i
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="m
axima")
```

```
[Out] -1/2*(a*b*c*e - 2*a^2*c*g + a^2*b*i - (b*c^2*d - 2*a*c^2*f + a*b*c*h)*x^3 +
 (2*a*c^2*e - a*b*c*g + (a*b^2 - 2*a^2*c)*i)*x^2 + (a*b*c*f - 2*a^2*c*h - (
b^2*c - 2*a*c^2)*d)*x)/(a^2*b^2*c - 4*a^3*c^2 + (a*b^2*c^2 - 4*a^2*c^3)*x^4
 + (a*b^3*c - 4*a^2*b*c^2)*x^2) + 1/2*integrate((a*b*f - 2*a^2*h + (b*c*d -
 2*a*c*f + a*b*h)*x^2 + (b^2 - 6*a*c)*d - 2*(2*a*c*e - a*b*g + 2*a^2*i)*x)/
(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c)
```

mupad [B] time = 3.12, size = 18449, normalized size = 39.42

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4)^2,x)
```

```
[Out] ((b*c*e - 2*a*c*g + a*b*i)/(2*c*(4*a*c - b^2)) - (x*(b^2*d + 2*a^2*h - 2*a*
c*d - a*b*f))/(2*a*(4*a*c - b^2)) + (x^2*(2*c^2*e + b^2*i - b*c*g - 2*a*c*i
))/(2*c*(4*a*c - b^2)) - (x^3*(b*c*d - 2*a*c*f + a*b*h))/(2*a*(4*a*c - b^2)
))/(a + b*x^2 + c*x^4) + symsum(log((5*b^3*c^4*d^3 + 8*a^3*c^4*f^3 - 96*a^2
*c^5*d*e^2 + 72*a^2*c^5*d^2*f - 3*a^3*b^3*c*h^3 - 4*a^4*b*c^2*h^3 - 3*b^4*c
^3*d^2*f - 32*a^3*c^4*e^2*h - 96*a^4*c^3*d*i^2 + b^5*c^2*d^2*h + 8*a^4*c^3*
f*h^2 - 32*a^5*c^2*h*i^2 + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + a*b^5*c*d*h
^2 - 192*a^3*c^4*d*e*i + 48*a^3*c^4*d*f*h - 64*a^4*c^3*e*h*i + 16*a*b^2*c^4
*d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 4*a*
b^4*c^2*d*g^2 + 16*a^2*b*c^4*e^2*f - a*b^3*c^3*d^2*h - 60*a^2*b*c^4*d^2*h -
 28*a^3*b*c^3*d*h^2 + a^2*b^4*c*f*h^2 - 28*a^3*b*c^3*f^2*h + 16*a^4*b*c^2*f
*i^2 - 24*a^2*b^2*c^3*d*g^2 - 9*a^2*b^3*c^2*d*h^2 + 4*a^2*b^3*c^2*f*g^2 + 1
6*a^3*b^2*c^2*d*i^2 - 5*a^2*b^3*c^2*f^2*h + 18*a^3*b^2*c^2*f*h^2 - 8*a^3*b^
2*c^2*g^2*h - 16*a*b^3*c^3*d*e*g + 96*a^2*b*c^4*d*e*g - 4*a*b^4*c^2*d*f*h +
 96*a^3*b*c^3*d*g*i + 32*a^3*b*c^3*e*f*i + 32*a^3*b*c^3*e*g*h + 32*a^4*b*c^
2*g*h*i + 32*a^2*b^2*c^3*d*e*i + 52*a^2*b^2*c^3*d*f*h - 16*a^2*b^2*c^3*e*f*
g - 16*a^2*b^3*c^2*d*g*i - 16*a^3*b^2*c^2*f*g*i)/(8*(a^2*b^6 - 64*a^5*c^3 -
 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - root(1572864*a^8*b^2*c^6*z^4 - 983040*a^
7*b^4*c^5*z^4 + 327680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b
^10*c^2*z^4 - 256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 32768*a^7*b*c^4*g*
i*z^2 - 512*a^4*b^7*c*g*i*z^2 + 192*a^3*b^8*c*f*h*z^2 + 57344*a^6*b*c^5*d*h
*z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a^2*b^9*c*d*h*z^2 - 32*a*b^10*c*d*f*z^2
 - 24576*a^6*b^3*c^3*g*i*z^2 + 6144*a^5*b^5*c^2*g*i*z^2 + 49152*a^6*b^2*c^4
*e*i*z^2 - 12288*a^5*b^4*c^3*e*i*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*
b^6*c^2*f*h*z^2 + 1024*a^4*b^6*c^2*e*i*z^2 - 49152*a^5*b^3*c^4*d*h*z^2 - 24
576*a^5*b^3*c^4*e*g*z^2 + 15360*a^4*b^5*c^3*d*h*z^2 + 6144*a^4*b^5*c^3*e*g*
z^2 - 2048*a^3*b^7*c^2*d*h*z^2 - 512*a^3*b^7*c^2*e*g*z^2 + 24576*a^5*b^2*c^
5*d*f*z^2 - 3072*a^3*b^6*c^3*d*f*z^2 + 2048*a^4*b^4*c^4*d*f*z^2 + 576*a^2*b
```

^8*c^2*d*f*z^2 + 512*a^5*b^6*c*i^2*z^2 + 12288*a^7*b*c^4*h^2*z^2 + 128*a^3*
b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^2 - 16*a^2*b^9*c*f^2*z^2 + 61440*a^5*
b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 - 65536*a^7*c^5*e*i*z^2 - 16384*a^7*c
^5*f*h*z^2 - 49152*a^6*c^6*d*f*z^2 + 24576*a^7*b^2*c^3*i^2*z^2 - 6144*a^6*b
^4*c^2*i^2*z^2 - 8192*a^6*b^3*c^3*h^2*z^2 + 1536*a^5*b^5*c^2*h^2*z^2 - 8192
*a^6*b^2*c^4*g^2*z^2 + 6144*a^5*b^4*c^3*g^2*z^2 - 1536*a^4*b^6*c^2*g^2*z^2
- 8192*a^5*b^3*c^4*f^2*z^2 + 1536*a^4*b^5*c^3*f^2*z^2 + 24576*a^5*b^2*c^5*e
^2*z^2 - 6144*a^4*b^4*c^4*e^2*z^2 + 512*a^3*b^6*c^3*e^2*z^2 - 61440*a^4*b^3
*c^5*d^2*z^2 + 24064*a^3*b^5*c^4*d^2*z^2 - 4608*a^2*b^7*c^3*d^2*z^2 - 32768
*a^8*c^4*i^2*z^2 - 16*a^3*b^9*h^2*z^2 - 32768*a^6*c^6*e^2*z^2 - 16*b^11*c*d
^2*z^2 - 192*a^3*b^6*c*d*h*i*z - 6144*a^5*b*c^4*d*g*h*z - 4096*a^5*b*c^4*d*
f*i*z + 96*a^2*b^7*c*d*g*h*z + 64*a^2*b^7*c*d*f*i*z - 4096*a^4*b*c^5*d*e*f*
z + 64*a*b^7*c^2*d*e*f*z - 32*a*b^8*c*d*f*g*z - 9216*a^5*b^2*c^3*d*h*i*z +
2304*a^4*b^4*c^2*d*h*i*z + 4608*a^4*b^3*c^3*d*g*h*z + 3072*a^4*b^3*c^3*d*f*
i*z - 1152*a^3*b^5*c^2*d*g*h*z - 768*a^3*b^5*c^2*d*f*i*z - 9216*a^4*b^2*c^4
*d*e*h*z + 2304*a^3*b^4*c^3*d*e*h*z + 2048*a^4*b^2*c^4*d*f*g*z - 1536*a^3*b
^4*c^3*d*f*g*z + 384*a^2*b^6*c^2*d*f*g*z - 192*a^2*b^6*c^2*d*e*h*z + 3072*a
^3*b^3*c^4*d*e*f*z - 768*a^2*b^5*c^3*d*e*f*z + 384*a^5*b^4*c*h^2*i*z - 1024
*a^6*b*c^3*g*h^2*z - 192*a^4*b^5*c*g*h^2*z + 32*a^3*b^6*c*f^2*i*z + 1024*a^
5*b*c^4*f^2*g*z - 32*a^3*b^6*c*e*h^2*z - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*
c^5*d^2*g*z + 336*a*b^7*c^2*d^2*g*z - 672*a*b^6*c^3*d^2*e*z + 12288*a^6*c^4
*d*h*i*z + 12288*a^5*c^5*d*e*h*z + 32*a*b^8*c*d^2*i*z - 1536*a^6*b^2*c^2*h^
2*i*z + 1536*a^5*b^2*c^3*f^2*i*z + 768*a^5*b^3*c^2*g*h^2*z - 384*a^4*b^4*c^
2*f^2*i*z - 15872*a^4*b^2*c^4*d^2*i*z + 4992*a^3*b^4*c^3*d^2*i*z - 1536*a^5
*b^2*c^3*e*h^2*z - 768*a^4*b^3*c^3*f^2*g*z - 672*a^2*b^6*c^2*d^2*i*z + 384*
a^4*b^4*c^2*e*h^2*z + 192*a^3*b^5*c^2*f^2*g*z + 7936*a^3*b^3*c^4*d^2*g*z -
2496*a^2*b^5*c^3*d^2*g*z + 1536*a^4*b^2*c^4*e*f^2*z - 384*a^3*b^4*c^3*e*f^2
*z + 32*a^2*b^6*c^2*e*f^2*z - 15872*a^3*b^2*c^5*d^2*e*z + 4992*a^2*b^4*c^4*
d^2*e*z + 2048*a^7*c^3*h^2*i*z - 32*a^4*b^6*h^2*i*z - 2048*a^6*c^4*f^2*i*z
+ 16*a^3*b^7*g*h^2*z + 18432*a^5*c^5*d^2*i*z + 2048*a^6*c^4*e*h^2*z - 2048*
a^5*c^5*e*f^2*z + 32*b^8*c^2*d^2*e*z + 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2
*g*z - 256*a^5*b*c^2*f*g*h*i - 192*a^4*b^3*c*f*g*h*i - 96*a^3*b^4*c*d*g*h*i
- 1792*a^4*b*c^3*d*e*h*i - 768*a^4*b*c^3*d*f*g*i - 256*a^4*b*c^3*e*f*g*h +
32*a^2*b^5*c*d*f*g*i - 768*a^3*b*c^4*d*e*f*g + 32*a*b^5*c^2*d*e*f*g + 896*
a^4*b^2*c^2*d*g*h*i + 384*a^4*b^2*c^2*e*f*h*i - 192*a^3*b^3*c^2*e*f*g*h - 1
92*a^3*b^3*c^2*d*f*g*i + 192*a^3*b^3*c^2*d*e*h*i + 896*a^3*b^2*c^3*d*e*g*h
+ 384*a^3*b^2*c^3*d*e*f*i - 96*a^2*b^4*c^2*d*e*g*h - 64*a^2*b^4*c^2*d*e*f*i
- 192*a^2*b^3*c^3*d*e*f*g + 192*a^5*b^2*c*g*h^2*i + 192*a^5*b^2*c*f*h*i^2
- 384*a^5*b*c^2*e*h^2*i - 32*a^4*b^3*c*e*h^2*i + 16*a^3*b^4*c*f^2*g*i + 153
6*a^5*b*c^2*e*g*i^2 + 1536*a^4*b*c^3*e^2*g*i - 896*a^5*b*c^2*d*h*i^2 + 96*a
^4*b^3*c*d*h*i^2 + 48*a^3*b^4*c*f*g^2*h - 384*a^4*b*c^3*e*f^2*i + 16*a^3*b^
4*c*e*g*h^2 - 32*a^3*b^4*c*d*f*i^2 + 24*a^2*b^5*c*d*g^2*h + 2208*a^3*b*c^4*
d^2*f*h - 1920*a^3*b*c^4*d^2*e*i + 800*a^4*b*c^3*d*f*h^2 - 102*a*b^5*c^2*d^
2*f*h - 32*a*b^5*c^2*d^2*e*i - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h
- 240*a*b^4*c^3*d^2*e*g - 32*a*b^4*c^3*d*e^2*f + 512*a^5*c^3*e*f*h*i + 153
6*a^4*c^4*d*e*f*i + 16*a*b^6*c*d^2*g*i + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*f
*g^2 + 192*a^4*b^2*c^2*f^2*g*i - 768*a^4*b^2*c^2*e*g^2*i + 64*a^4*b^2*c^2*f
*g^2*h + 960*a^3*b^2*c^3*d^2*g*i - 240*a^2*b^4*c^2*d^2*g*i + 192*a^4*b^2*c^
2*e*g*h^2 - 32*a^3*b^3*c^2*e*f^2*i - 224*a^3*b^3*c^2*d*g^2*h + 192*a^4*b^2*
c^2*d*f*i^2 + 192*a^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 480*a^2*b
^3*c^3*d^2*e*i + 336*a^3*b^3*c^2*d*f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^
2*b^3*c^3*d^2*f*h + 16*a^2*b^4*c^2*e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a
^3*b^2*c^3*d*f*g^2 + 96*a^2*b^3*c^3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*
a^2*b^2*c^4*d^2*e*g + 192*a^2*b^2*c^4*d*e^2*f - 384*a^5*b^2*c*g^2*i^2 - 192
*a^5*b*c^2*f^2*i^2 - 48*a^4*b^3*c*g^2*h^2 - 16*a^4*b^3*c*f^2*i^2 + 80*a^3*b
^3*c^2*f^3*h - 42*a^3*b^4*c*f^2*h^2 - 960*a^4*b*c^3*d^2*i^2 - 192*a^4*b*c^3
*e^2*h^2 - 16*a^2*b^5*c*d^2*i^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h
^3 - 192*a^2*b^2*c^4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2
+ 60*a*b^5*c^2*d^2*g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 96

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0*a^2*b*c^5*d^2*e^2 + 240*a*b^3*c^4*d^2*e^2 + 256*a^6*c^2*f*h*i^2 + 16*a^4*
b^4*g*h^2*i + 768*a^5*c^3*d*f*i^2 + 256*a^4*c^4*e^2*f*h - 192*a^6*b*c*h^2*i
^2 - 192*a^4*c^4*d*f^2*h + 128*a^4*b^3*c*g^3*i + 16*b^6*c^2*d^2*e*g + 96*a^
5*b*c^2*f*h^3 + 96*a^4*b*c^3*f^3*h + 80*a^4*b^3*c*f*h^3 + 6*a^2*b^5*c*f^3*h
 + 768*a^3*c^5*d*e^2*f + 512*a^3*b*c^4*e^3*g + 132*a*b^4*c^3*d^3*h - 28*a^3
*b^4*c*d*h^3 + 12*a*b^6*c*d^2*h^2 + 2016*a^2*b*c^5*d^3*f - 496*a*b^3*c^4*d^
3*f + 224*a^3*b*c^4*d*f^3 - 18*a*b^5*c^2*d*f^3 - 192*a^4*b^2*c^2*f^2*h^2 +
240*a^3*b^3*c^2*d^2*i^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*b^3*c^2*e^2*h^2 -
 464*a^3*b^2*c^3*d^2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^2*b^4*c^2*d^2*h^2
 - 240*a^2*b^3*c^3*d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*a^2*b^2*c^4*d^2*f
^2 + 6*b^7*c*d^2*f*h + 512*a^6*b*c*g*i^3 - 2*a*b^7*d*f*h^2 - 16*a^5*b^3*h^2
*i^2 - 1536*a^5*c^3*e^2*i^2 - 32*a^5*c^3*f^2*h^2 - 4*a^3*b^5*g^2*h^2 - 864*
a^4*c^4*d^2*h^2 - 9*b^6*c^2*d^2*f^2 - 288*a^3*c^5*d^2*f^2 - 16*b^5*c^3*d^2*
e^2 - 24*a^3*b^2*c^3*f^4 - 9*a^2*b^4*c^2*f^4 - 1024*a^6*c^2*e*i^3 - 1024*a^
4*c^4*e^3*i - 10*b^6*c^2*d^3*h + 6*a^3*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192
*a^5*c^3*d*h^3 - 4*b^7*c*d^2*g^2 + 30*b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*
a^5*b^2*c*h^4 - 16*a^3*b^4*c*g^4 + 360*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a
^4*b^4*h^4 - 16*a^4*c^4*f^4 - 256*a^3*c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c
^6*d^4 - a^2*b^6*f^2*h^2 - 256*a^7*c*i^4 - b^8*d^2*h^2, z, l)*((32*a*b^5*c^
3*d*e - 512*a^5*c^4*f*i - 512*a^4*c^5*e*f + 1024*a^3*b*c^5*d*e - 16*a*b^6*c
^2*d*g + 1024*a^4*b*c^4*d*i + 512*a^4*b*c^4*e*h + 256*a^4*b*c^4*f*g + 512*a
^5*b*c^3*h*i - 384*a^2*b^3*c^4*d*e + 192*a^2*b^4*c^3*d*g + 32*a^2*b^4*c^3*e
*f - 512*a^3*b^2*c^4*d*g + 32*a^2*b^5*c^2*d*i - 16*a^2*b^5*c^2*f*g - 384*a^
3*b^3*c^3*d*i - 128*a^3*b^3*c^3*e*h + 32*a^3*b^4*c^2*f*i + 64*a^3*b^4*c^2*g
*h - 256*a^4*b^2*c^3*g*h - 128*a^4*b^3*c^2*h*i)/(8*(a^2*b^6 - 64*a^5*c^3 -
12*a^3*b^4*c + 48*a^4*b^2*c^2)) + root(1572864*a^8*b^2*c^6*z^4 - 983040*a^7
*b^4*c^5*z^4 + 327680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^
10*c^2*z^4 - 256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 32768*a^7*b*c^4*g*i
*z^2 - 512*a^4*b^7*c*g*i*z^2 + 192*a^3*b^8*c*f*h*z^2 + 57344*a^6*b*c^5*d*h*
z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a^2*b^9*c*d*h*z^2 - 32*a*b^10*c*d*f*z^2
 - 24576*a^6*b^3*c^3*g*i*z^2 + 6144*a^5*b^5*c^2*g*i*z^2 + 49152*a^6*b^2*c^4*
e*i*z^2 - 12288*a^5*b^4*c^3*e*i*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*b
^6*c^2*f*h*z^2 + 1024*a^4*b^6*c^2*e*i*z^2 - 49152*a^5*b^3*c^4*d*h*z^2 - 245
76*a^5*b^3*c^4*e*g*z^2 + 15360*a^4*b^5*c^3*d*h*z^2 + 6144*a^4*b^5*c^3*e*g*z
^2 - 2048*a^3*b^7*c^2*d*h*z^2 - 512*a^3*b^7*c^2*e*g*z^2 + 24576*a^5*b^2*c^5
*d*f*z^2 - 3072*a^3*b^6*c^3*d*f*z^2 + 2048*a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^
8*c^2*d*f*z^2 + 512*a^5*b^6*c*i^2*z^2 + 12288*a^7*b*c^4*h^2*z^2 + 128*a^3*b
^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^2 - 16*a^2*b^9*c*f^2*z^2 + 61440*a^5*b
*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 - 65536*a^7*c^5*e*i*z^2 - 16384*a^7*c^
5*f*h*z^2 - 49152*a^6*c^6*d*f*z^2 + 24576*a^7*b^2*c^3*i^2*z^2 - 6144*a^6*b^
4*c^2*i^2*z^2 - 8192*a^6*b^3*c^3*h^2*z^2 + 1536*a^5*b^5*c^2*h^2*z^2 - 8192*
a^6*b^2*c^4*g^2*z^2 + 6144*a^5*b^4*c^3*g^2*z^2 - 1536*a^4*b^6*c^2*g^2*z^2 -
 8192*a^5*b^3*c^4*f^2*z^2 + 1536*a^4*b^5*c^3*f^2*z^2 + 24576*a^5*b^2*c^5*e^
2*z^2 - 6144*a^4*b^4*c^4*e^2*z^2 + 512*a^3*b^6*c^3*e^2*z^2 - 61440*a^4*b^3*
c^5*d^2*z^2 + 24064*a^3*b^5*c^4*d^2*z^2 - 4608*a^2*b^7*c^3*d^2*z^2 - 32768*
a^8*c^4*i^2*z^2 - 16*a^3*b^9*h^2*z^2 - 32768*a^6*c^6*e^2*z^2 - 16*b^11*c*d^
2*z^2 - 192*a^3*b^6*c*d*h*i*z - 6144*a^5*b*c^4*d*g*h*z - 4096*a^5*b*c^4*d*f
*i*z + 96*a^2*b^7*c*d*g*h*z + 64*a^2*b^7*c*d*f*i*z - 4096*a^4*b*c^5*d*e*f*z
 + 64*a*b^7*c^2*d*e*f*z - 32*a*b^8*c*d*f*g*z - 9216*a^5*b^2*c^3*d*h*i*z + 2
304*a^4*b^4*c^2*d*h*i*z + 4608*a^4*b^3*c^3*d*g*h*z + 3072*a^4*b^3*c^3*d*f*i
*z - 1152*a^3*b^5*c^2*d*g*h*z - 768*a^3*b^5*c^2*d*f*i*z - 9216*a^4*b^2*c^4*
d*e*h*z + 2304*a^3*b^4*c^3*d*e*h*z + 2048*a^4*b^2*c^4*d*f*g*z - 1536*a^3*b^
4*c^3*d*f*g*z + 384*a^2*b^6*c^2*d*f*g*z - 192*a^2*b^6*c^2*d*e*h*z + 3072*a^
3*b^3*c^4*d*e*f*z - 768*a^2*b^5*c^3*d*e*f*z + 384*a^5*b^4*c*h^2*i*z - 1024*
a^6*b*c^3*g*h^2*z - 192*a^4*b^5*c*g*h^2*z + 32*a^3*b^6*c*f^2*i*z + 1024*a^5
*b*c^4*f^2*g*z - 32*a^3*b^6*c*e*h^2*z - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*c
^5*d^2*g*z + 336*a*b^7*c^2*d^2*g*z - 672*a*b^6*c^3*d^2*e*z + 12288*a^6*c^4*
d*h*i*z + 12288*a^5*c^5*d*e*h*z + 32*a*b^8*c*d^2*i*z - 1536*a^6*b^2*c^2*h^2
*i*z + 1536*a^5*b^2*c^3*f^2*i*z + 768*a^5*b^3*c^2*g*h^2*z - 384*a^4*b^4*c^2
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*f^2*i*z - 15872*a^4*b^2*c^4*d^2*i*z + 4992*a^3*b^4*c^3*d^2*i*z - 1536*a^5*
b^2*c^3*e*h^2*z - 768*a^4*b^3*c^3*f^2*g*z - 672*a^2*b^6*c^2*d^2*i*z + 384*a
^4*b^4*c^2*e*h^2*z + 192*a^3*b^5*c^2*f^2*g*z + 7936*a^3*b^3*c^4*d^2*g*z - 2
496*a^2*b^5*c^3*d^2*g*z + 1536*a^4*b^2*c^4*e*f^2*z - 384*a^3*b^4*c^3*e*f^2*
z + 32*a^2*b^6*c^2*e*f^2*z - 15872*a^3*b^2*c^5*d^2*e*z + 4992*a^2*b^4*c^4*d
^2*e*z + 2048*a^7*c^3*h^2*i*z - 32*a^4*b^6*h^2*i*z - 2048*a^6*c^4*f^2*i*z +
 16*a^3*b^7*g*h^2*z + 18432*a^5*c^5*d^2*i*z + 2048*a^6*c^4*e*h^2*z - 2048*a
^5*c^5*e*f^2*z + 32*b^8*c^2*d^2*e*z + 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2*
g*z - 256*a^5*b*c^2*f*g*h*i - 192*a^4*b^3*c*f*g*h*i - 96*a^3*b^4*c*d*g*h*i
- 1792*a^4*b*c^3*d*e*h*i - 768*a^4*b*c^3*d*f*g*i - 256*a^4*b*c^3*e*f*g*h +
32*a^2*b^5*c*d*f*g*i - 768*a^3*b*c^4*d*e*f*g + 32*a*b^5*c^2*d*e*f*g + 896*a
^4*b^2*c^2*d*g*h*i + 384*a^4*b^2*c^2*e*f*h*i - 192*a^3*b^3*c^2*e*f*g*h - 19
2*a^3*b^3*c^2*d*f*g*i + 192*a^3*b^3*c^2*d*e*h*i + 896*a^3*b^2*c^3*d*e*g*h +
 384*a^3*b^2*c^3*d*e*f*i - 96*a^2*b^4*c^2*d*e*g*h - 64*a^2*b^4*c^2*d*e*f*i
- 192*a^2*b^3*c^3*d*e*f*g + 192*a^5*b^2*c*g*h^2*i + 192*a^5*b^2*c*f*h*i^2 -
 384*a^5*b*c^2*e*h^2*i - 32*a^4*b^3*c*e*h^2*i + 16*a^3*b^4*c*f^2*g*i + 1536
*a^5*b*c^2*e*g*i^2 + 1536*a^4*b*c^3*e^2*g*i - 896*a^5*b*c^2*d*h*i^2 + 96*a^
4*b^3*c*d*h*i^2 + 48*a^3*b^4*c*f*g^2*h - 384*a^4*b*c^3*e*f^2*i + 16*a^3*b^4
*c*e*g*h^2 - 32*a^3*b^4*c*d*f*i^2 + 24*a^2*b^5*c*d*g^2*h + 2208*a^3*b*c^4*d
^2*f*h - 1920*a^3*b*c^4*d^2*e*i + 800*a^4*b*c^3*d*f*h^2 - 102*a*b^5*c^2*d^2
*f*h - 32*a*b^5*c^2*d^2*e*i - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h
- 240*a*b^4*c^3*d^2*e*g - 32*a*b^4*c^3*d*e^2*f + 512*a^5*c^3*e*f*h*i + 1536
*a^4*c^4*d*e*f*i + 16*a*b^6*c*d^2*g*i + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*f*
g^2 + 192*a^4*b^2*c^2*f^2*g*i - 768*a^4*b^2*c^2*e*g^2*i + 64*a^4*b^2*c^2*f*
g^2*h + 960*a^3*b^2*c^3*d^2*g*i - 240*a^2*b^4*c^2*d^2*g*i + 192*a^4*b^2*c^2
*e*g*h^2 - 32*a^3*b^3*c^2*e*f^2*i - 224*a^3*b^3*c^2*d*g^2*h + 192*a^4*b^2*c
^2*d*f*i^2 + 192*a^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 480*a^2*b^
3*c^3*d^2*e*i + 336*a^3*b^3*c^2*d*f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2
*b^3*c^3*d^2*f*h + 16*a^2*b^4*c^2*e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^
3*b^2*c^3*d*f*g^2 + 96*a^2*b^3*c^3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a
^2*b^2*c^4*d^2*e*g + 192*a^2*b^2*c^4*d*e^2*f - 384*a^5*b^2*c*g^2*i^2 - 192*
a^5*b*c^2*f^2*i^2 - 48*a^4*b^3*c*g^2*h^2 - 16*a^4*b^3*c*f^2*i^2 + 80*a^3*b^
3*c^2*f^3*h - 42*a^3*b^4*c*f^2*h^2 - 960*a^4*b*c^3*d^2*i^2 - 192*a^4*b*c^3*
e^2*h^2 - 16*a^2*b^5*c*d^2*i^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h^
3 - 192*a^2*b^2*c^4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2 +
 60*a*b^5*c^2*d^2*g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 960
*a^2*b*c^5*d^2*e^2 + 240*a*b^3*c^4*d^2*e^2 + 256*a^6*c^2*f*h*i^2 + 16*a^4*b
^4*g*h^2*i + 768*a^5*c^3*d*f*i^2 + 256*a^4*c^4*e^2*f*h - 192*a^6*b*c*h^2*i^
2 - 192*a^4*c^4*d*f^2*h + 128*a^4*b^3*c*g^3*i + 16*b^6*c^2*d^2*e*g + 96*a^5
*b*c^2*f*h^3 + 96*a^4*b*c^3*f^3*h + 80*a^4*b^3*c*f*h^3 + 6*a^2*b^5*c*f^3*h
+ 768*a^3*c^5*d*e^2*f + 512*a^3*b*c^4*e^3*g + 132*a*b^4*c^3*d^3*h - 28*a^3*
b^4*c*d*h^3 + 12*a*b^6*c*d^2*h^2 + 2016*a^2*b*c^5*d^3*f - 496*a*b^3*c^4*d^3
*f + 224*a^3*b*c^4*d*f^3 - 18*a*b^5*c^2*d*f^3 - 192*a^4*b^2*c^2*f^2*h^2 + 2
40*a^3*b^3*c^2*d^2*i^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*b^3*c^2*e^2*h^2 -
464*a^3*b^2*c^3*d^2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^2*b^4*c^2*d^2*h^2
- 240*a^2*b^3*c^3*d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*a^2*b^2*c^4*d^2*f^
2 + 6*b^7*c*d^2*f*h + 512*a^6*b*c*g*i^3 - 2*a*b^7*d*f*h^2 - 16*a^5*b^3*h^2*
i^2 - 1536*a^5*c^3*e^2*i^2 - 32*a^5*c^3*f^2*h^2 - 4*a^3*b^5*g^2*h^2 - 864*a
^4*c^4*d^2*h^2 - 9*b^6*c^2*d^2*f^2 - 288*a^3*c^5*d^2*f^2 - 16*b^5*c^3*d^2*e
^2 - 24*a^3*b^2*c^3*f^4 - 9*a^2*b^4*c^2*f^4 - 1024*a^6*c^2*e*i^3 - 1024*a^4
*c^4*e^3*i - 10*b^6*c^2*d^3*h + 6*a^3*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192*
a^5*c^3*d*h^3 - 4*b^7*c*d^2*g^2 + 30*b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a
^5*b^2*c*h^4 - 16*a^3*b^4*c*g^4 + 360*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^
4*b^4*h^4 - 16*a^4*c^4*f^4 - 256*a^3*c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^
6*d^4 - a^2*b^6*f^2*h^2 - 256*a^7*c*i^4 - b^8*d^2*h^2, z, l)*((x*(2048*a^5*
c^6*e + 2048*a^6*c^5*i - 32*a^2*b^6*c^3*e + 384*a^3*b^4*c^4*e - 1536*a^4*b^
2*c^5*e + 16*a^2*b^7*c^2*g - 192*a^3*b^5*c^3*g + 768*a^4*b^3*c^4*g - 32*a^3
*b^6*c^2*i + 384*a^4*b^4*c^3*i - 1536*a^5*b^2*c^4*i - 1024*a^5*b*c^5*g))/(4
*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - (6144*a^5*c^6*d
```

+ 2048*a^6*c^5*h - 288*a^2*b^6*c^3*d + 1920*a^3*b^4*c^4*d - 5632*a^4*b^2*c^
5*d + 16*a^2*b^7*c^2*f - 192*a^3*b^5*c^3*f + 768*a^4*b^3*c^4*f - 32*a^3*b^6
*c^2*h + 384*a^4*b^4*c^3*h - 1536*a^5*b^2*c^4*h + 16*a*b^8*c^2*d - 1024*a^5
*b*c^5*f)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) + (roo
t(1572864*a^8*b^2*c^6*z^4 - 983040*a^7*b^4*c^5*z^4 + 327680*a^6*b^6*c^4*z^4
 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^10*c^2*z^4 - 256*a^3*b^12*c*z^4 - 104
8576*a^9*c^7*z^4 + 32768*a^7*b*c^4*g*i*z^2 - 512*a^4*b^7*c*g*i*z^2 + 192*a^
3*b^8*c*f*h*z^2 + 57344*a^6*b*c^5*d*h*z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a^
2*b^9*c*d*h*z^2 - 32*a*b^10*c*d*f*z^2 - 24576*a^6*b^3*c^3*g*i*z^2 + 6144*a^
5*b^5*c^2*g*i*z^2 + 49152*a^6*b^2*c^4*e*i*z^2 - 12288*a^5*b^4*c^3*e*i*z^2 +
 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*b^6*c^2*f*h*z^2 + 1024*a^4*b^6*c^2*e*i
*z^2 - 49152*a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g*z^2 + 15360*a^4*b^
5*c^3*d*h*z^2 + 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*c^2*d*h*z^2 - 512*a
^3*b^7*c^2*e*g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6*c^3*d*f*z^2 +
 2048*a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 512*a^5*b^6*c*i^2*z^2
 + 12288*a^7*b*c^4*h^2*z^2 + 128*a^3*b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^
2 - 16*a^2*b^9*c*f^2*z^2 + 61440*a^5*b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2
- 65536*a^7*c^5*e*i*z^2 - 16384*a^7*c^5*f*h*z^2 - 49152*a^6*c^6*d*f*z^2 + 2
4576*a^7*b^2*c^3*i^2*z^2 - 6144*a^6*b^4*c^2*i^2*z^2 - 8192*a^6*b^3*c^3*h^2*
z^2 + 1536*a^5*b^5*c^2*h^2*z^2 - 8192*a^6*b^2*c^4*g^2*z^2 + 6144*a^5*b^4*c^
3*g^2*z^2 - 1536*a^4*b^6*c^2*g^2*z^2 - 8192*a^5*b^3*c^4*f^2*z^2 + 1536*a^4*
b^5*c^3*f^2*z^2 + 24576*a^5*b^2*c^5*e^2*z^2 - 6144*a^4*b^4*c^4*e^2*z^2 + 51
2*a^3*b^6*c^3*e^2*z^2 - 61440*a^4*b^3*c^5*d^2*z^2 + 24064*a^3*b^5*c^4*d^2*z
^2 - 4608*a^2*b^7*c^3*d^2*z^2 - 32768*a^8*c^4*i^2*z^2 - 16*a^3*b^9*h^2*z^2
- 32768*a^6*c^6*e^2*z^2 - 16*b^11*c*d^2*z^2 - 192*a^3*b^6*c*d*h*i*z - 6144*
a^5*b*c^4*d*g*h*z - 4096*a^5*b*c^4*d*f*i*z + 96*a^2*b^7*c*d*g*h*z + 64*a^2*
b^7*c*d*f*i*z - 4096*a^4*b*c^5*d*e*f*z + 64*a*b^7*c^2*d*e*f*z - 32*a*b^8*c*
d*f*g*z - 9216*a^5*b^2*c^3*d*h*i*z + 2304*a^4*b^4*c^2*d*h*i*z + 4608*a^4*b^
3*c^3*d*g*h*z + 3072*a^4*b^3*c^3*d*f*i*z - 1152*a^3*b^5*c^2*d*g*h*z - 768*a
^3*b^5*c^2*d*f*i*z - 9216*a^4*b^2*c^4*d*e*h*z + 2304*a^3*b^4*c^3*d*e*h*z +
2048*a^4*b^2*c^4*d*f*g*z - 1536*a^3*b^4*c^3*d*f*g*z + 384*a^2*b^6*c^2*d*f*g
*z - 192*a^2*b^6*c^2*d*e*h*z + 3072*a^3*b^3*c^4*d*e*f*z - 768*a^2*b^5*c^3*d
*e*f*z + 384*a^5*b^4*c*h^2*i*z - 1024*a^6*b*c^3*g*h^2*z - 192*a^4*b^5*c*g*h
^2*z + 32*a^3*b^6*c*f^2*i*z + 1024*a^5*b*c^4*f^2*g*z - 32*a^3*b^6*c*e*h^2*z
 - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*c^5*d^2*g*z + 336*a*b^7*c^2*d^2*g*z -
672*a*b^6*c^3*d^2*e*z + 12288*a^6*c^4*d*h*i*z + 12288*a^5*c^5*d*e*h*z + 32*
a*b^8*c*d^2*i*z - 1536*a^6*b^2*c^2*h^2*i*z + 1536*a^5*b^2*c^3*f^2*i*z + 768
*a^5*b^3*c^2*g*h^2*z - 384*a^4*b^4*c^2*f^2*i*z - 15872*a^4*b^2*c^4*d^2*i*z
+ 4992*a^3*b^4*c^3*d^2*i*z - 1536*a^5*b^2*c^3*e*h^2*z - 768*a^4*b^3*c^3*f^2
*g*z - 672*a^2*b^6*c^2*d^2*i*z + 384*a^4*b^4*c^2*e*h^2*z + 192*a^3*b^5*c^2*
f^2*g*z + 7936*a^3*b^3*c^4*d^2*g*z - 2496*a^2*b^5*c^3*d^2*g*z + 1536*a^4*b^
2*c^4*e*f^2*z - 384*a^3*b^4*c^3*e*f^2*z + 32*a^2*b^6*c^2*e*f^2*z - 15872*a^
3*b^2*c^5*d^2*e*z + 4992*a^2*b^4*c^4*d^2*e*z + 2048*a^7*c^3*h^2*i*z - 32*a^
4*b^6*h^2*i*z - 2048*a^6*c^4*f^2*i*z + 16*a^3*b^7*g*h^2*z + 18432*a^5*c^5*d
^2*i*z + 2048*a^6*c^4*e*h^2*z - 2048*a^5*c^5*e*f^2*z + 32*b^8*c^2*d^2*e*z +
 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2*g*z - 256*a^5*b*c^2*f*g*h*i - 192*a^4
*b^3*c*f*g*h*i - 96*a^3*b^4*c*d*g*h*i - 1792*a^4*b*c^3*d*e*h*i - 768*a^4*b*
c^3*d*f*g*i - 256*a^4*b*c^3*e*f*g*h + 32*a^2*b^5*c*d*f*g*i - 768*a^3*b*c^4*
d*e*f*g + 32*a*b^5*c^2*d*e*f*g + 896*a^4*b^2*c^2*d*g*h*i + 384*a^4*b^2*c^2*
e*f*h*i - 192*a^3*b^3*c^2*e*f*g*h - 192*a^3*b^3*c^2*d*f*g*i + 192*a^3*b^3*c
^2*d*e*h*i + 896*a^3*b^2*c^3*d*e*g*h + 384*a^3*b^2*c^3*d*e*f*i - 96*a^2*b^4
*c^2*d*e*g*h - 64*a^2*b^4*c^2*d*e*f*i - 192*a^2*b^3*c^3*d*e*f*g + 192*a^5*b
^2*c*g*h^2*i + 192*a^5*b^2*c*f*h*i^2 - 384*a^5*b*c^2*e*h^2*i - 32*a^4*b^3*c
*e*h^2*i + 16*a^3*b^4*c*f^2*g*i + 1536*a^5*b*c^2*e*g*i^2 + 1536*a^4*b*c^3*e
^2*g*i - 896*a^5*b*c^2*d*h*i^2 + 96*a^4*b^3*c*d*h*i^2 + 48*a^3*b^4*c*f*g^2*
h - 384*a^4*b*c^3*e*f^2*i + 16*a^3*b^4*c*e*g*h^2 - 32*a^3*b^4*c*d*f*i^2 + 2
4*a^2*b^5*c*d*g^2*h + 2208*a^3*b*c^4*d^2*f*h - 1920*a^3*b*c^4*d^2*e*i + 800
*a^4*b*c^3*d*f*h^2 - 102*a*b^5*c^2*d^2*f*h - 32*a*b^5*c^2*d^2*e*i - 30*a^2*
b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h - 240*a*b^4*c^3*d^2*e*g - 32*a*b^4*c^

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3*d*e^2*f + 512*a^5*c^3*e*f*h*i + 1536*a^4*c^4*d*e*f*i + 16*a*b^6*c*d^2*g*i
 + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*f*g^2 + 192*a^4*b^2*c^2*f^2*g*i - 768*a
^4*b^2*c^2*e*g^2*i + 64*a^4*b^2*c^2*f*g^2*h + 960*a^3*b^2*c^3*d^2*g*i - 240
*a^2*b^4*c^2*d^2*g*i + 192*a^4*b^2*c^2*e*g*h^2 - 32*a^3*b^3*c^2*e*f^2*i - 2
24*a^3*b^3*c^2*d*g^2*h + 192*a^4*b^2*c^2*d*f*i^2 + 192*a^3*b^2*c^3*e^2*f*h
- 864*a^3*b^2*c^3*d*f^2*h + 480*a^2*b^3*c^3*d^2*e*i + 336*a^3*b^3*c^2*d*f*h
^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2*b^3*c^3*d^2*f*h + 16*a^2*b^4*c^2*e*f
^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^3*b^2*c^3*d*f*g^2 + 96*a^2*b^3*c^3*d*
e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a^2*b^2*c^4*d^2*e*g + 192*a^2*b^2*c^4*
d*e^2*f - 384*a^5*b^2*c*g^2*i^2 - 192*a^5*b*c^2*f^2*i^2 - 48*a^4*b^3*c*g^2*
h^2 - 16*a^4*b^3*c*f^2*i^2 + 80*a^3*b^3*c^2*f^3*h - 42*a^3*b^4*c*f^2*h^2 -
960*a^4*b*c^3*d^2*i^2 - 192*a^4*b*c^3*e^2*h^2 - 16*a^2*b^5*c*d^2*i^2 - 4*a^
2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h^3 - 192*a^2*b^2*c^4*d^3*h + 128*a^3*b
^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2 + 60*a*b^5*c^2*d^2*g^2 + 198*a*b^4*c^3
*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 960*a^2*b*c^5*d^2*e^2 + 240*a*b^3*c^4*d^
2*e^2 + 256*a^6*c^2*f*h*i^2 + 16*a^4*b^4*g*h^2*i + 768*a^5*c^3*d*f*i^2 + 25
6*a^4*c^4*e^2*f*h - 192*a^6*b*c*h^2*i^2 - 192*a^4*c^4*d*f^2*h + 128*a^4*b^3
*c*g^3*i + 16*b^6*c^2*d^2*e*g + 96*a^5*b*c^2*f*h^3 + 96*a^4*b*c^3*f^3*h + 8
0*a^4*b^3*c*f*h^3 + 6*a^2*b^5*c*f^3*h + 768*a^3*c^5*d*e^2*f + 512*a^3*b*c^4
*e^3*g + 132*a*b^4*c^3*d^3*h - 28*a^3*b^4*c*d*h^3 + 12*a*b^6*c*d^2*h^2 + 20
16*a^2*b*c^5*d^3*f - 496*a*b^3*c^4*d^3*f + 224*a^3*b*c^4*d*f^3 - 18*a*b^5*c
^2*d*f^3 - 192*a^4*b^2*c^2*f^2*h^2 + 240*a^3*b^3*c^2*d^2*i^2 - 48*a^3*b^3*c
^2*f^2*g^2 - 16*a^3*b^3*c^2*e^2*h^2 - 464*a^3*b^2*c^3*d^2*h^2 - 384*a^3*b^2
*c^3*e^2*g^2 + 42*a^2*b^4*c^2*d^2*h^2 - 240*a^2*b^3*c^3*d^2*g^2 - 16*a^2*b^
3*c^3*e^2*f^2 - 960*a^2*b^2*c^4*d^2*f^2 + 6*b^7*c*d^2*f*h + 512*a^6*b*c*g*i
^3 - 2*a*b^7*d*f*h^2 - 16*a^5*b^3*h^2*i^2 - 1536*a^5*c^3*e^2*i^2 - 32*a^5*c
^3*f^2*h^2 - 4*a^3*b^5*g^2*h^2 - 864*a^4*c^4*d^2*h^2 - 9*b^6*c^2*d^2*f^2 -
288*a^3*c^5*d^2*f^2 - 16*b^5*c^3*d^2*e^2 - 24*a^3*b^2*c^3*f^4 - 9*a^2*b^4*c
^2*f^4 - 1024*a^6*c^2*e*i^3 - 1024*a^4*c^4*e^3*i - 10*b^6*c^2*d^3*h + 6*a^3
*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192*a^5*c^3*d*h^3 - 4*b^7*c*d^2*g^2 + 30*
b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a^5*b^2*c*h^4 - 16*a^3*b^4*c*g^4 + 360
*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^4*b^4*h^4 - 16*a^4*c^4*f^4 - 256*a^3*
c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^6*d^4 - a^2*b^6*f^2*h^2 - 256*a^7*c*i
^4 - b^8*d^2*h^2, z, l)*x*(8192*a^6*b*c^6 + 32*a^2*b^9*c^2 - 512*a^3*b^7*c^
3 + 3072*a^4*b^5*c^4 - 8192*a^5*b^3*c^5))/(4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3
*b^4*c + 48*a^4*b^2*c^2))) + (x*(2*b^6*c^3*d^2 - 576*a^3*c^6*d^2 + 64*a^4*c
^5*f^2 - 64*a^5*c^4*h^2 - 36*a*b^4*c^4*d^2 + 128*a^3*b*c^5*e^2 + 2*a^2*b^6*
c*h^2 + 128*a^5*b*c^3*i^2 + 256*a^2*b^2*c^5*d^2 - 32*a^2*b^3*c^4*e^2 + 20*a
^2*b^4*c^3*f^2 - 96*a^3*b^2*c^4*f^2 - 8*a^2*b^5*c^2*g^2 + 32*a^3*b^3*c^3*g^
2 - 4*a^3*b^4*c^2*h^2 - 32*a^4*b^3*c^2*i^2 - 384*a^4*c^5*d*h + 4*a*b^5*c^3*
d*f + 320*a^3*b*c^5*d*f + 256*a^4*b*c^4*e*i + 64*a^4*b*c^4*f*h - 96*a^2*b^3
*c^4*d*f + 8*a^2*b^4*c^3*d*h + 32*a^2*b^4*c^3*e*g + 64*a^3*b^2*c^4*d*h - 12
8*a^3*b^2*c^4*e*g - 12*a^2*b^5*c^2*f*h - 64*a^3*b^3*c^3*e*i + 32*a^3*b^3*c^
3*f*h + 32*a^3*b^4*c^2*g*i - 128*a^4*b^2*c^3*g*i))/(4*(a^2*b^6 - 64*a^5*c^3
 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) - (x*(32*a^2*c^5*e^3 + 32*a^5*c^2*i^3 -
 2*b^3*c^4*d^2*e + b^4*c^3*d^2*g + 96*a^3*c^4*e^2*i + 96*a^4*c^3*e*i^2 - 4*
a^2*b^3*c^2*g^3 + 24*a*b*c^5*d^2*e - 48*a^2*c^5*d*e*f - 48*a^3*c^4*d*f*i -
16*a^3*c^4*e*f*h - 16*a^4*c^3*f*h*i - 12*a*b^2*c^4*d^2*g + 16*a^2*b*c^4*e*f
^2 - 48*a^2*b*c^4*e^2*g - 2*a*b^3*c^3*d^2*i + 24*a^2*b*c^4*d^2*i + 8*a^3*b*
c^3*e*h^2 - a^2*b^4*c*g*h^2 + 16*a^3*b*c^3*f^2*i - 48*a^4*b*c^2*g*i^2 + 2*a
^3*b^3*c*h^2*i + 8*a^4*b*c^2*h^2*i + 24*a^2*b^2*c^3*e*g^2 - 8*a^2*b^2*c^3*f
^2*g + 2*a^2*b^3*c^2*e*h^2 - 4*a^3*b^2*c^2*g*h^2 + 24*a^3*b^2*c^2*g^2*i - 4
*a*b^2*c^4*d*e*f + 2*a*b^3*c^3*d*f*g + 32*a^2*b*c^4*d*e*h + 24*a^2*b*c^4*d*
f*g + 32*a^3*b*c^3*d*h*i - 96*a^3*b*c^3*e*g*i + 8*a^3*b*c^3*f*g*h - 4*a^2*b
^2*c^3*d*f*i - 16*a^2*b^2*c^3*d*g*h - 12*a^2*b^2*c^3*e*f*h + 6*a^2*b^3*c^2*
f*g*h - 12*a^3*b^2*c^2*f*h*i))/(4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48
*a^4*b^2*c^2)))*root(1572864*a^8*b^2*c^6*z^4 - 983040*a^7*b^4*c^5*z^4 + 327
680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^10*c^2*z^4 - 256*a
^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 32768*a^7*b*c^4*g*i*z^2 - 512*a^4*b^7
```

*c*g*i*z^2 + 192*a^3*b^8*c*f*h*z^2 + 57344*a^6*b*c^5*d*h*z^2 + 32768*a^6*b*
c^5*e*g*z^2 + 96*a^2*b^9*c*d*h*z^2 - 32*a*b^10*c*d*f*z^2 - 24576*a^6*b^3*c^
3*g*i*z^2 + 6144*a^5*b^5*c^2*g*i*z^2 + 49152*a^6*b^2*c^4*e*i*z^2 - 12288*a^
5*b^4*c^3*e*i*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*b^6*c^2*f*h*z^2 + 1
024*a^4*b^6*c^2*e*i*z^2 - 49152*a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g
*z^2 + 15360*a^4*b^5*c^3*d*h*z^2 + 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*
c^2*d*h*z^2 - 512*a^3*b^7*c^2*e*g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^
3*b^6*c^3*d*f*z^2 + 2048*a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 51
2*a^5*b^6*c*i^2*z^2 + 12288*a^7*b*c^4*h^2*z^2 + 128*a^3*b^8*c*g^2*z^2 + 122
88*a^6*b*c^5*f^2*z^2 - 16*a^2*b^9*c*f^2*z^2 + 61440*a^5*b*c^6*d^2*z^2 + 432
*a*b^9*c^2*d^2*z^2 - 65536*a^7*c^5*e*i*z^2 - 16384*a^7*c^5*f*h*z^2 - 49152*
a^6*c^6*d*f*z^2 + 24576*a^7*b^2*c^3*i^2*z^2 - 6144*a^6*b^4*c^2*i^2*z^2 - 81
92*a^6*b^3*c^3*h^2*z^2 + 1536*a^5*b^5*c^2*h^2*z^2 - 8192*a^6*b^2*c^4*g^2*z^
2 + 6144*a^5*b^4*c^3*g^2*z^2 - 1536*a^4*b^6*c^2*g^2*z^2 - 8192*a^5*b^3*c^4*
f^2*z^2 + 1536*a^4*b^5*c^3*f^2*z^2 + 24576*a^5*b^2*c^5*e^2*z^2 - 6144*a^4*b
^4*c^4*e^2*z^2 + 512*a^3*b^6*c^3*e^2*z^2 - 61440*a^4*b^3*c^5*d^2*z^2 + 2406
4*a^3*b^5*c^4*d^2*z^2 - 4608*a^2*b^7*c^3*d^2*z^2 - 32768*a^8*c^4*i^2*z^2 -
16*a^3*b^9*h^2*z^2 - 32768*a^6*c^6*e^2*z^2 - 16*b^11*c*d^2*z^2 - 192*a^3*b^
6*c*d*h*i*z - 6144*a^5*b*c^4*d*g*h*z - 4096*a^5*b*c^4*d*f*i*z + 96*a^2*b^7*
c*d*g*h*z + 64*a^2*b^7*c*d*f*i*z - 4096*a^4*b*c^5*d*e*f*z + 64*a*b^7*c^2*d*
e*f*z - 32*a*b^8*c*d*f*g*z - 9216*a^5*b^2*c^3*d*h*i*z + 2304*a^4*b^4*c^2*d*
h*i*z + 4608*a^4*b^3*c^3*d*g*h*z + 3072*a^4*b^3*c^3*d*f*i*z - 1152*a^3*b^5*
c^2*d*g*h*z - 768*a^3*b^5*c^2*d*f*i*z - 9216*a^4*b^2*c^4*d*e*h*z + 2304*a^3
*b^4*c^3*d*e*h*z + 2048*a^4*b^2*c^4*d*f*g*z - 1536*a^3*b^4*c^3*d*f*g*z + 38
4*a^2*b^6*c^2*d*f*g*z - 192*a^2*b^6*c^2*d*e*h*z + 3072*a^3*b^3*c^4*d*e*f*z
- 768*a^2*b^5*c^3*d*e*f*z + 384*a^5*b^4*c*h^2*i*z - 1024*a^6*b*c^3*g*h^2*z
- 192*a^4*b^5*c*g*h^2*z + 32*a^3*b^6*c*f^2*i*z + 1024*a^5*b*c^4*f^2*g*z - 3
2*a^3*b^6*c*e*h^2*z - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*c^5*d^2*g*z + 336*a
*b^7*c^2*d^2*g*z - 672*a*b^6*c^3*d^2*e*z + 12288*a^6*c^4*d*h*i*z + 12288*a^
5*c^5*d*e*h*z + 32*a*b^8*c*d^2*i*z - 1536*a^6*b^2*c^2*h^2*i*z + 1536*a^5*b^
2*c^3*f^2*i*z + 768*a^5*b^3*c^2*g*h^2*z - 384*a^4*b^4*c^2*f^2*i*z - 15872*a
^4*b^2*c^4*d^2*i*z + 4992*a^3*b^4*c^3*d^2*i*z - 1536*a^5*b^2*c^3*e*h^2*z -
768*a^4*b^3*c^3*f^2*g*z - 672*a^2*b^6*c^2*d^2*i*z + 384*a^4*b^4*c^2*e*h^2*z
 + 192*a^3*b^5*c^2*f^2*g*z + 7936*a^3*b^3*c^4*d^2*g*z - 2496*a^2*b^5*c^3*d^
2*g*z + 1536*a^4*b^2*c^4*e*f^2*z - 384*a^3*b^4*c^3*e*f^2*z + 32*a^2*b^6*c^2
*e*f^2*z - 15872*a^3*b^2*c^5*d^2*e*z + 4992*a^2*b^4*c^4*d^2*e*z + 2048*a^7*
c^3*h^2*i*z - 32*a^4*b^6*h^2*i*z - 2048*a^6*c^4*f^2*i*z + 16*a^3*b^7*g*h^2*
z + 18432*a^5*c^5*d^2*i*z + 2048*a^6*c^4*e*h^2*z - 2048*a^5*c^5*e*f^2*z + 3
2*b^8*c^2*d^2*e*z + 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2*g*z - 256*a^5*b*c^
2*f*g*h*i - 192*a^4*b^3*c*f*g*h*i - 96*a^3*b^4*c*d*g*h*i - 1792*a^4*b*c^3*d
*e*h*i - 768*a^4*b*c^3*d*f*g*i - 256*a^4*b*c^3*e*f*g*h + 32*a^2*b^5*c*d*f*g
*i - 768*a^3*b*c^4*d*e*f*g + 32*a*b^5*c^2*d*e*f*g + 896*a^4*b^2*c^2*d*g*h*i
 + 384*a^4*b^2*c^2*e*f*h*i - 192*a^3*b^3*c^2*e*f*g*h - 192*a^3*b^3*c^2*d*f*
g*i + 192*a^3*b^3*c^2*d*e*h*i + 896*a^3*b^2*c^3*d*e*g*h + 384*a^3*b^2*c^3*d
*e*f*i - 96*a^2*b^4*c^2*d*e*g*h - 64*a^2*b^4*c^2*d*e*f*i - 192*a^2*b^3*c^3*
d*e*f*g + 192*a^5*b^2*c*g*h^2*i + 192*a^5*b^2*c*f*h*i^2 - 384*a^5*b*c^2*e*h
^2*i - 32*a^4*b^3*c*e*h^2*i + 16*a^3*b^4*c*f^2*g*i + 1536*a^5*b*c^2*e*g*i^2
 + 1536*a^4*b*c^3*e^2*g*i - 896*a^5*b*c^2*d*h*i^2 + 96*a^4*b^3*c*d*h*i^2 +
48*a^3*b^4*c*f*g^2*h - 384*a^4*b*c^3*e*f^2*i + 16*a^3*b^4*c*e*g*h^2 - 32*a^
3*b^4*c*d*f*i^2 + 24*a^2*b^5*c*d*g^2*h + 2208*a^3*b*c^4*d^2*f*h - 1920*a^3*
b*c^4*d^2*e*i + 800*a^4*b*c^3*d*f*h^2 - 102*a*b^5*c^2*d^2*f*h - 32*a*b^5*c^
2*d^2*e*i - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h - 240*a*b^4*c^3*d^
2*e*g - 32*a*b^4*c^3*d*e^2*f + 512*a^5*c^3*e*f*h*i + 1536*a^4*c^4*d*e*f*i +
 16*a*b^6*c*d^2*g*i + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*f*g^2 + 192*a^4*b^2*
c^2*f^2*g*i - 768*a^4*b^2*c^2*e*g^2*i + 64*a^4*b^2*c^2*f*g^2*h + 960*a^3*b^
2*c^3*d^2*g*i - 240*a^2*b^4*c^2*d^2*g*i + 192*a^4*b^2*c^2*e*g*h^2 - 32*a^3*
b^3*c^2*e*f^2*i - 224*a^3*b^3*c^2*d*g^2*h + 192*a^4*b^2*c^2*d*f*i^2 + 192*a
^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 480*a^2*b^3*c^3*d^2*e*i + 33
6*a^3*b^3*c^2*d*f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2*b^3*c^3*d^2*f*h +

```
 16*a^2*b^4*c^2*e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^3*b^2*c^3*d*f*g^2
+ 96*a^2*b^3*c^3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a^2*b^2*c^4*d^2*e*g
 + 192*a^2*b^2*c^4*d*e^2*f - 384*a^5*b^2*c*g^2*i^2 - 192*a^5*b*c^2*f^2*i^2
- 48*a^4*b^3*c*g^2*h^2 - 16*a^4*b^3*c*f^2*i^2 + 80*a^3*b^3*c^2*f^3*h - 42*a
^3*b^4*c*f^2*h^2 - 960*a^4*b*c^3*d^2*i^2 - 192*a^4*b*c^3*e^2*h^2 - 16*a^2*b
^5*c*d^2*i^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h^3 - 192*a^2*b^2*c^
4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2 + 60*a*b^5*c^2*d^2*
g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 960*a^2*b*c^5*d^2*e^2
 + 240*a*b^3*c^4*d^2*e^2 + 256*a^6*c^2*f*h*i^2 + 16*a^4*b^4*g*h^2*i + 768*a
^5*c^3*d*f*i^2 + 256*a^4*c^4*e^2*f*h - 192*a^6*b*c*h^2*i^2 - 192*a^4*c^4*d*
f^2*h + 128*a^4*b^3*c*g^3*i + 16*b^6*c^2*d^2*e*g + 96*a^5*b*c^2*f*h^3 + 96*
a^4*b*c^3*f^3*h + 80*a^4*b^3*c*f*h^3 + 6*a^2*b^5*c*f^3*h + 768*a^3*c^5*d*e^
2*f + 512*a^3*b*c^4*e^3*g + 132*a*b^4*c^3*d^3*h - 28*a^3*b^4*c*d*h^3 + 12*a
*b^6*c*d^2*h^2 + 2016*a^2*b*c^5*d^3*f - 496*a*b^3*c^4*d^3*f + 224*a^3*b*c^4
*d*f^3 - 18*a*b^5*c^2*d*f^3 - 192*a^4*b^2*c^2*f^2*h^2 + 240*a^3*b^3*c^2*d^2
*i^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*b^3*c^2*e^2*h^2 - 464*a^3*b^2*c^3*d^
2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^2*b^4*c^2*d^2*h^2 - 240*a^2*b^3*c^3*
d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*a^2*b^2*c^4*d^2*f^2 + 6*b^7*c*d^2*f*
h + 512*a^6*b*c*g*i^3 - 2*a*b^7*d*f*h^2 - 16*a^5*b^3*h^2*i^2 - 1536*a^5*c^3
*e^2*i^2 - 32*a^5*c^3*f^2*h^2 - 4*a^3*b^5*g^2*h^2 - 864*a^4*c^4*d^2*h^2 - 9
*b^6*c^2*d^2*f^2 - 288*a^3*c^5*d^2*f^2 - 16*b^5*c^3*d^2*e^2 - 24*a^3*b^2*c^
3*f^4 - 9*a^2*b^4*c^2*f^4 - 1024*a^6*c^2*e*i^3 - 1024*a^4*c^4*e^3*i - 10*b^
6*c^2*d^3*h + 6*a^3*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192*a^5*c^3*d*h^3 - 4*
b^7*c*d^2*g^2 + 30*b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a^5*b^2*c*h^4 - 16*
a^3*b^4*c*g^4 + 360*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^4*b^4*h^4 - 16*a^4
*c^4*f^4 - 256*a^3*c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^6*d^4 - a^2*b^6*f^
2*h^2 - 256*a^7*c*i^4 - b^8*d^2*h^2, z, l), l, 1, 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**2,x)
[Out] Timed out
```

3.41 $\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{\left(a+bx^2+cx^4\right)^2} dx$

Optimal. Leaf size=770

$$-\frac{x\left(-\left(b^2\left(a^2m+c^2d\right)\right)+x^2\left(-bc\left(-3a^2m+ach+c^2d\right)-ab^3m+ab^2ck+2ac^2(cf-ak)\right)+2ac\left(a^2m-ach+c\right.}{2ac^2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}$$

```
[Out] m*x/c^2+1/2*(-b*c*(a*j+c*e)+a*b^2*l+2*a*c*(-a*l+c*g)-(2*c^3*e-c^2*(2*a*j+b*
g)-b^3*l+b*c*(3*a*l+b*j))*x^2)/c^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)-1/2*x*(a*b*
c*(a*k+c*f)-b^2*(a^2*m+c^2*d)+2*a*c*(a^2*m-a*c*h+c^2*d)+(a*b^2*c*k+2*a*c^2*
(-a*k+c*f)-a*b^3*m-b*c*(-3*a^2*m+a*c*h+c^2*d))*x^2)/a/c^2/(-4*a*c+b^2)/(c*x
^4+b*x^2+a)+1/2*(4*c^3*e-c^2*(-4*a*j+2*b*g)+b^3*l-6*a*b*c*l)*arctanh((2*c*x
^2+b)/(-4*a*c+b^2)^(1/2))/c^2/(-4*a*c+b^2)^(3/2)+1/4*l*ln(c*x^4+b*x^2+a)/c^
2+1/4*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))*(a*b^2*c*k-2*a
*c^2*(3*a*k+c*f)-3*a*b^3*m+b*c*(13*a^2*m+a*c*h+c^2*d)+(-a*b^3*c*k+4*a*b*c^2
*(2*a*k+c*f)+3*a*b^4*m+b^2*c*(-19*a^2*m-a*c*h+c^2*d)-4*a*c^2*(-5*a^2*m+a*c*
h+3*c^2*d))/(-4*a*c+b^2)^(1/2))/a/c^(5/2)/(-4*a*c+b^2)*2^(1/2)/(b-(-4*a*c+b
^2)^(1/2))^(1/2)+1/4*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))
*(a*b^2*c*k-2*a*c^2*(3*a*k+c*f)-3*a*b^3*m+b*c*(13*a^2*m+a*c*h+c^2*d)+(a*b^3
*c*k-4*a*b*c^2*(2*a*k+c*f)-3*a*b^4*m-b^2*c*(-19*a^2*m-a*c*h+c^2*d)+4*a*c^2*
(-5*a^2*m+a*c*h+3*c^2*d))/(-4*a*c+b^2)^(1/2))/a/c^(5/2)/(-4*a*c+b^2)*2^(1/2
)/(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 7.83, antiderivative size = 770, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 11, integrand size = 55, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {1673, 1678, 1676, 1166, 205, 1663, 1660, 634, 618, 206, 628}

$$-\frac{x\left(x^2\left(-bc\left(-3a^2m+ach+c^2d\right)+ab^2ck-ab^3m+2ac^2(cf-ak)\right)+b^2\left(-\left(a^2m+c^2d\right)\right)+2ac\left(a^2m-ach+c\right.}{2ac^2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a +
b*x^2 + c*x^4)^2,x]
```

```
[Out] (m*x)/c^2 - (b*c*(c*e + a*j) - a*b^2*l - 2*a*c*(c*g - a*l) + (2*c^3*e - c^2
*(b*g + 2*a*j) - b^3*l + b*c*(b*j + 3*a*l))*x^2)/(2*c^2*(b^2 - 4*a*c)*(a +
b*x^2 + c*x^4)) - (x*(a*b*c*(c*f + a*k) - b^2*(c^2*d + a^2*m) + 2*a*c*(c^2*
d - a*c*h + a^2*m) + (a*b^2*c*k + 2*a*c^2*(c*f - a*k) - a*b^3*m - b*c*(c^2*
d + a*c*h - 3*a^2*m))*x^2))/(2*a*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (
(a*b^2*c*k - 2*a*c^2*(c*f + 3*a*k) - 3*a*b^3*m + b*c*(c^2*d + a*c*h + 13*a^
2*m) - (a*b^3*c*k - 4*a*b*c^2*(c*f + 2*a*k) - 3*a*b^4*m - b^2*c*(c^2*d - a*
c*h - 19*a^2*m) + 4*a*c^2*(3*c^2*d + a*c*h - 5*a^2*m))/Sqrt[b^2 - 4*a*c])*A
rcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(2*Sqrt[2]*a*c^(5/2
)*(b^2 - 4*a*c)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((a*b^2*c*k - 2*a*c^2*(c*f +
 3*a*k) - 3*a*b^3*m + b*c*(c^2*d + a*c*h + 13*a^2*m) + (a*b^3*c*k - 4*a*b*c
^2*(c*f + 2*a*k) - 3*a*b^4*m - b^2*c*(c^2*d - a*c*h - 19*a^2*m) + 4*a*c^2*(
3*c^2*d + a*c*h - 5*a^2*m))/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/S
qrt[b + Sqrt[b^2 - 4*a*c]]])/(2*Sqrt[2]*a*c^(5/2)*(b^2 - 4*a*c)*Sqrt[b + Sq
rt[b^2 - 4*a*c]]) + ((4*c^3*e - c^2*(2*b*g - 4*a*j) + b^3*l - 6*a*b*c*l)*Ar
cTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(2*c^2*(b^2 - 4*a*c)^(3/2)) + (l*Lo
g[a + b*x^2 + c*x^4])/(4*c^2)
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^
(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
 - 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
```

```
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1676

```
Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> Int[ExpandInte
grand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{\left(a+bx^2+cx^4\right)^2}\,dx = \int \frac{x\left(e+gx^2+jx^4+lx^6\right)}{\left(a+bx^2+cx^4\right)^2}\,dx + \int \frac{d+fx^2+hx^4+\ldots}{\left(a+bx^2+\ldots\right.}$$

$$= -\frac{x\left(abc(cf+ak)-b^2\left(c^2d+a^2m\right)+2ac\left(c^2d-ac\ldots\right.\right.}{2ac^2\ldots}$$

$$= -\frac{bc(ce+aj)-ab^2l-2ac(cg-al)+\left(2c^3e-c^2(bg\ldots\right.}{2c^2\left(b^2-4ac\right)\left(a+bx^2+\ldots\right.}$$

$$= \frac{mx}{c^2} - \frac{bc(ce+aj)-ab^2l-2ac(cg-al)+\left(2c^3e-c^2\ldots\right.}{2c^2\left(b^2-4ac\right)\left(a+b\ldots\right.}$$

$$= \frac{mx}{c^2} - \frac{bc(ce+aj)-ab^2l-2ac(cg-al)+\left(2c^3e-c^2\ldots\right.}{2c^2\left(b^2-4ac\right)\left(a+b\ldots\right.}$$

$$= \frac{mx}{c^2} - \frac{bc(ce+aj)-ab^2l-2ac(cg-al)+\left(2c^3e-c^2\ldots\right.}{2c^2\left(b^2-4ac\right)\left(a+b\ldots\right.}$$

Mathematica [A] time = 5.70, size = 935, normalized size = 1.21

$$4\sqrt{c}\,mx + \frac{2\sqrt{c}\left(2c(l+mx)a^3-\left((l+mx)b^2-c(j+x(k+3x(l+mx)))b+2c^2(g+x(h+x(j+kx)))\right)a^2+\left(-x^2(l+mx)b^3+cx^2(j+kx)b^2+c^2(e+x(f-x(g+hx)))b+2\ldots\right.\right.}{a\left(4ac-b^2\right)\left(cx^4+bx^2+a\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)
/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] (4*Sqrt[c]*m*x + (2*Sqrt[c]*(2*a^3*c*(l + m*x) - b*c^2*d*x*(b + c*x^2) + a*
(b^2*c*x^2*(j + k*x) - b^3*x^2*(l + m*x) + 2*c^3*x*(d + x*(e + f*x)) + b*c^
2*(e + x*(f - x*(g + h*x)))) - a^2*(b^2*(l + m*x) + 2*c^2*(g + x*(h + x*(j
+ k*x))) - b*c*(j + x*(k + 3*x*(l + m*x))))))/(a*(-b^2 + 4*a*c)*(a + b*x^2
+ c*x^4)) - (Sqrt[2]*(-3*a*b^4*m + 2*a*c^2*(6*c^2*d + c*Sqrt[b^2 - 4*a*c]*f
 + 2*a*c*h + 3*a*Sqrt[b^2 - 4*a*c]*k - 10*a^2*m) + a*b^3*(c*k + 3*Sqrt[b^2
- 4*a*c]*m) - b*c*(c^2*(Sqrt[b^2 - 4*a*c]*d + 4*a*f) + a*c*(Sqrt[b^2 - 4*a*
c]*h + 8*a*k) + 13*a^2*Sqrt[b^2 - 4*a*c]*m) + b^2*c*(-(c^2*d) + a*c*h + a*(
-(Sqrt[b^2 - 4*a*c]*k) + 19*a*m)))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt
[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^(3/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) - (Sqr
t[2]*(3*a*b^4*m + 2*a*c^2*(-6*c^2*d + c*Sqrt[b^2 - 4*a*c]*f - 2*a*c*h + 3*a
*Sqrt[b^2 - 4*a*c]*k + 10*a^2*m) + a*b^3*(-(c*k) + 3*Sqrt[b^2 - 4*a*c]*m) -
 b*c*(c^2*(Sqrt[b^2 - 4*a*c]*d - 4*a*f) + a*c*(Sqrt[b^2 - 4*a*c]*h - 8*a*k)
 + 13*a^2*Sqrt[b^2 - 4*a*c]*m) + b^2*c*(c^2*d - a*c*h - a*(Sqrt[b^2 - 4*a*c
]*k + 19*a*m)))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(a
*(b^2 - 4*a*c)^(3/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + (Sqrt[c]*(-4*c^3*e + 2*
c^2*(b*g - 2*a*j) + b^2*(-b + Sqrt[b^2 - 4*a*c])*l + a*c*(6*b*l - 4*Sqrt[b^
2 - 4*a*c]*l))*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(3/2) +
 (Sqrt[c]*(4*c^3*e + c^2*(-2*b*g + 4*a*j) + b^2*(b + Sqrt[b^2 - 4*a*c])*l -
 2*a*c*(3*b + 2*Sqrt[b^2 - 4*a*c])*l)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])
/(b^2 - 4*a*c)^(3/2))/(4*c^(5/2))
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)
^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)
^2,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [B] time = 0.10, size = 4570, normalized size = 5.94

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x)
```

```
[Out] -3/4/c^2/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1
/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^5*m+1/4/(4*a*c-b^2)^2*2^(1/2)/(
(b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)*b^2*h*arctan(2^(1/2)/((b
+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+1/4/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b
^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*
(-4*a*c+b^2)^(1/2)*b^2*h+4*a^2/(4*a*c-b^2)^2*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2
```

```
))*l-1/(c*x^4+b*x^2+a)/(4*a*c-b^2)*a*g+1/2/(c*x^4+b*x^2+a)/(4*a*c-b^2)*b*e+
4*a^2/(4*a*c-b^2)^2*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*l-1/4/(4*a*c-b^2)^2*2
^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)/a*b^2*c*d*arctan
(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/4*c/(4*a*c-b^2)^2/a*2^(1/2
)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2)
)*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*d+m*x/c^2-c/(4*a*c-b^2)^2*2^(1/2)/((
-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)
^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b*f-1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)*b*c*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*c*x)-2*c^2/(4*a*c-b^2)^2*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*
c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f+1/2*c/(4*
a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^2*f+2/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+
b^2)^(1/2))*c)^(1/2)*a*c^2*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2
)*c*x)-1/2/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b^2*c*f*a
rctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/4*c/(4*a*c-b^2)^2/a*2
^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^
(1/2))*c)^(1/2)*c*x)*b^3*d+a/(4*a*c-b^2)^2*c*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2
))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*h+1/2/
(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*b*g*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))+1/(4
*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*c*e*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))-1/(4*a*
c-b^2)^2*(-4*a*c+b^2)^(1/2)*c*e*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))+c/(c*x^4+
b*x^2+a)/(4*a*c-b^2)*x*d+1/c/(c*x^4+b*x^2+a)/(4*a*c-b^2)*a^2*l-1/(c*x^4+b*x
^2+a)*a/(4*a*c-b^2)*x^3*k-1/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^2*a*j-1/2/(c*x^4+
b*x^2+a)/(4*a*c-b^2)*x^2*b*g-1/(c*x^4+b*x^2+a)*a/(4*a*c-b^2)*x*h-1/2/(c*x^4
+b*x^2+a)/(4*a*c-b^2)*x^3*b*h+1/2/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x*b*f+1/4/c^2
/(4*a*c-b^2)^2*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*b^4*l-a/(4*a*c-b^2)^2*ln(-
2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*j+a/(4*a*c-b^2)^2*ln(2*c*x
^2+b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*j+1/4/c^2/(4*a*c-b^2)^2*ln(2*c*
x^2+b+(-4*a*c+b^2)^(1/2))*b^4*l+3/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)*c^2*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2
))*c)^(1/2)*c*x)-1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b
*c^2*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+3*c^2/(4*a*c-b^
2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d+c^2/(4*a*c-b^2)^2*2^(1/2)/(
(-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c
)^(1/2)*c*x)*b*d+1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)
/a*b^3*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+3/2/c/(c*x^
4+b*x^2+a)*a/(4*a*c-b^2)*x^3*b*m-1/2*c/(c*x^4+b*x^2+a)/a/(4*a*c-b^2)*x^3*b*
d+3/2/c/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^2*a*b*l+1/2/c/(c*x^4+b*x^2+a)*a/(4*a*
c-b^2)*x*b*k-1/2/c^2/(c*x^4+b*x^2+a)*a/(4*a*c-b^2)*x*b^2*m-5*a^2/(4*a*c-b^2
)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+
b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*m+13*a^2/(4*a*c-b^2)^2*2^(1/2)
/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))
*c)^(1/2)*c*x)*b*m+5/2*a/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^
(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^2*k-13*a^2/(
4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-
4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*m-5/2*a/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*
b^2*k-5*a^2/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2
^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*m+3/2/c*a/(
4*a*c-b^2)^2*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b*l-6*c*a
^2/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/
((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*k-3/2/c*a/(4*a*c-b^2)^2*ln(2*c*x^2+b
+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b*l+6*c*a^2/(4*a*c-b^2)^2*2^(1/2)/(
(b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(
1/2)*c*x)*k+3/4/c^2/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)
*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^5*m-1/4/c/(4*a*c-
b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a
```

```
*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^4*k+1/4/c/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+
b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b
^4*k-1/4/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^
(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*h-1/2/(4*a*c-b^2)^2*(-4*a*
c+b^2)^(1/2)*b*g*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+19/4/c*a/(4*a*c-b^2)^2*2^
(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*m+19/4/c*a/(4*a*c-b^2)^2*2^(1/2)
/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)
^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*m+1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^
2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)*a*c*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*c*x)-1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1
/2)*a*b*c*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+a/(4*a*c-b
^2)^2*c*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*
a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*h+c/(c*x^4+b*x^2+a)/(4*a*c
-b^2)*x^2*e+c/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^3*f+1/4/(4*a*c-b^2)^2*2^(1/2)/(
(b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b^3*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2)
)*c)^(1/2)*c*x)-25/4/c*a/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^
(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*m+25/4/c*a
/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+
(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*m-3/4/c^2/(4*a*c-b^2)^2*2^(1/2)/((-b+
(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1
/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^4*m-3/4/c^2/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*
(-4*a*c+b^2)^(1/2)*b^4*m+1/4/c/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2
))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+
b^2)^(1/2)*b^3*k-2*a/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2
)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)
*b*k-2*a/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1
/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b*k+1/4/c/(4*a
*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a
*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^3*k-1/2/(c*x^4+b*x^2+a)/a
/(4*a*c-b^2)*x*b^2*d-1/2/c^2/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^2*b^3*l-1/2/c^2/
(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^3*b^3*m-1/2/c^2/(c*x^4+b*x^2+a)/(4*a*c-b^2)*a
*b^2*l+1/2/c/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^2*b^2*j+1/c/(c*x^4+b*x^2+a)*a^2/
(4*a*c-b^2)*x*m+1/2/c/(c*x^4+b*x^2+a)/(4*a*c-b^2)*a*b*j+1/2/c/(c*x^4+b*x^2+
a)/(4*a*c-b^2)*x^3*b^2*k-1/4/c^2/(4*a*c-b^2)^2*ln(-2*c*x^2-b+(-4*a*c+b^2)^(
1/2))*(-4*a*c+b^2)^(1/2)*b^3*l+1/4/c^2/(4*a*c-b^2)^2*ln(2*c*x^2+b+(-4*a*c+b
^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b^3*l-2/c*a/(4*a*c-b^2)^2*ln(-2*c*x^2-b+(-4*a
*c+b^2)^(1/2))*b^2*l-2/c*a/(4*a*c-b^2)^2*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*b
^2*l
```

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

$$-\frac{abc^2e - 2\,a^2c^2g + a^2bcj - \left(bc^3d - 2\,ac^3f + abc^2h - \left(ab^2c - 2\,a^2c^2\right)k + \left(ab^3 - 3\,a^2bc\right)m\right)x^3 + \left(2\,ac^3e - abc^2g + \left(\right.\right.}{2\left(a^2b^2c^2 - 4\,a^3c^3 + \left(ab^2c^3\right.\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)
^2,x, algorithm="maxima")
```

```
[Out] -1/2*(a*b*c^2*e - 2*a^2*c^2*g + a^2*b*c*j - (b*c^3*d - 2*a*c^3*f + a*b*c^2*
h - (a*b^2*c - 2*a^2*c^2)*k + (a*b^3 - 3*a^2*b*c)*m)*x^3 + (2*a*c^3*e - a*b
*c^2*g + (a*b^2*c - 2*a^2*c^2)*j - (a*b^3 - 3*a^2*b*c)*l)*x^2 - (a^2*b^2 -
2*a^3*c)*l + (a*b*c^2*f - 2*a^2*c^2*h + a^2*b*c*k - (b^2*c^2 - 2*a*c^3)*d -
 (a^2*b^2 - 2*a^3*c)*m)*x)/(a^2*b^2*c^2 - 4*a^3*c^3 + (a*b^2*c^3 - 4*a^2*c^
4)*x^4 + (a*b^3*c^2 - 4*a^2*b*c^3)*x^2) + m*x/c^2 - 1/2*integrate(-(a*b*c^2
*f - 2*a^2*c^2*h + a^2*b*c*k + 2*(a*b^2*c - 4*a^2*c^2)*l*x^3 + (b*c^3*d - 2
*a*c^3*f + a*b*c^2*h + (a*b^2*c - 6*a^2*c^2)*k - (3*a*b^3 - 13*a^2*b*c)*m)*
x^2 + (b^2*c^2 - 6*a*c^3)*d - (3*a^2*b^2 - 10*a^3*c)*m - 2*(2*a*c^3*e - a*b
```

```
*c^2*g + 2*a^2*c^2*j - a^2*b*c*l)*x)/(c*x^4 + b*x^2 + a), x)/(a*b^2*c^2 - 4
*a^2*c^3)
```

mupad [B] time = 13.91, size = 82785, normalized size = 107.51

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a +
b*x^2 + c*x^4)^2,x)
```

```
[Out] symsum(log(root(1572864*a^8*b^2*c^10*z^4 - 983040*a^7*b^4*c^9*z^4 + 327680*
a^6*b^6*c^8*z^4 - 61440*a^5*b^8*c^7*z^4 + 6144*a^4*b^10*c^6*z^4 - 256*a^3*b
^12*c^5*z^4 - 1048576*a^9*c^11*z^4 - 1572864*a^8*b^2*c^8*l*z^3 + 983040*a^7
*b^4*c^7*l*z^3 - 327680*a^6*b^6*c^6*l*z^3 + 61440*a^5*b^8*c^5*l*z^3 - 6144*
a^4*b^10*c^4*l*z^3 + 256*a^3*b^12*c^3*l*z^3 + 1048576*a^9*c^9*l*z^3 + 96*a^
3*b^12*c*k*m*z^2 + 98304*a^8*b*c^7*j*l*z^2 + 24576*a^8*b*c^7*h*m*z^2 + 1556
48*a^7*b*c^8*d*m*z^2 + 98304*a^7*b*c^8*e*l*z^2 + 57344*a^7*b*c^8*f*k*z^2 +
32768*a^7*b*c^8*g*j*z^2 + 57344*a^6*b*c^9*d*h*z^2 + 32768*a^6*b*c^9*e*g*z^2
 - 32*a*b^10*c^5*d*f*z^2 - 491520*a^8*b^2*c^6*k*m*z^2 + 358400*a^7*b^4*c^5*
k*m*z^2 - 129024*a^6*b^6*c^4*k*m*z^2 + 24768*a^5*b^8*c^3*k*m*z^2 - 2432*a^4
*b^10*c^2*k*m*z^2 - 90112*a^7*b^3*c^6*j*l*z^2 + 30720*a^6*b^5*c^5*j*l*z^2 -
 4608*a^5*b^7*c^4*j*l*z^2 + 256*a^4*b^9*c^3*j*l*z^2 - 21504*a^6*b^5*c^5*h*m
*z^2 + 9216*a^5*b^7*c^4*h*m*z^2 + 8192*a^7*b^3*c^6*h*m*z^2 - 1568*a^4*b^9*c
^3*h*m*z^2 + 96*a^3*b^11*c^2*h*m*z^2 - 172032*a^7*b^2*c^7*f*m*z^2 + 116736*
a^6*b^4*c^6*f*m*z^2 - 49152*a^7*b^2*c^7*g*l*z^2 + 45056*a^6*b^4*c^6*g*l*z^2
 - 35840*a^5*b^6*c^5*f*m*z^2 + 24576*a^7*b^2*c^7*h*k*z^2 - 15360*a^5*b^6*c^
5*g*l*z^2 + 5184*a^4*b^8*c^4*f*m*z^2 - 3072*a^5*b^6*c^5*h*k*z^2 + 2304*a^4*
b^8*c^4*g*l*z^2 + 2048*a^6*b^4*c^6*h*k*z^2 + 576*a^4*b^8*c^4*h*k*z^2 - 288*
a^3*b^10*c^3*f*m*z^2 - 128*a^3*b^10*c^3*g*l*z^2 - 32*a^3*b^10*c^3*h*k*z^2 -
 147456*a^6*b^3*c^7*d*m*z^2 - 90112*a^6*b^3*c^7*e*l*z^2 + 52224*a^5*b^5*c^6
*d*m*z^2 - 49152*a^6*b^3*c^7*f*k*z^2 + 30720*a^5*b^5*c^6*e*l*z^2 - 24576*a^
6*b^3*c^7*g*j*z^2 + 15360*a^5*b^5*c^6*f*k*z^2 - 8192*a^4*b^7*c^5*d*m*z^2 +
6144*a^5*b^5*c^6*g*j*z^2 - 4608*a^4*b^7*c^5*e*l*z^2 - 2048*a^4*b^7*c^5*f*k*
z^2 - 512*a^4*b^7*c^5*g*j*z^2 + 480*a^3*b^9*c^4*d*m*z^2 + 256*a^3*b^9*c^4*e
*l*z^2 + 96*a^3*b^9*c^4*f*k*z^2 + 131072*a^6*b^2*c^8*d*k*z^2 + 49152*a^6*b^
2*c^8*e*j*z^2 - 43008*a^5*b^4*c^7*d*k*z^2 - 12288*a^5*b^4*c^7*e*j*z^2 + 614
4*a^4*b^6*c^6*d*k*z^2 + 1024*a^4*b^6*c^6*e*j*z^2 - 320*a^3*b^8*c^5*d*k*z^2
+ 6144*a^5*b^4*c^7*f*h*z^2 - 2048*a^4*b^6*c^6*f*h*z^2 + 192*a^3*b^8*c^5*f*h
*z^2 - 49152*a^5*b^3*c^8*d*h*z^2 - 24576*a^5*b^3*c^8*e*g*z^2 + 15360*a^4*b^
5*c^7*d*h*z^2 + 6144*a^4*b^5*c^7*e*g*z^2 - 2048*a^3*b^7*c^6*d*h*z^2 - 512*a
^3*b^7*c^6*e*g*z^2 + 96*a^2*b^9*c^5*d*h*z^2 + 24576*a^5*b^2*c^9*d*f*z^2 - 3
072*a^3*b^6*c^7*d*f*z^2 + 2048*a^4*b^4*c^8*d*f*z^2 + 576*a^2*b^8*c^6*d*f*z^
2 - 430080*a^9*b*c^6*m^2*z^2 + 3408*a^4*b^11*c*m^2*z^2 - 64*a^3*b^12*c*l^2*
z^2 + 61440*a^8*b*c^7*k^2*z^2 + 12288*a^7*b*c^8*h^2*z^2 + 12288*a^6*b*c^9*f
^2*z^2 + 61440*a^5*b*c^10*d^2*z^2 + 432*a*b^9*c^6*d^2*z^2 + 245760*a^9*c^7*
k*m*z^2 + 81920*a^8*c^8*f*m*z^2 - 49152*a^8*c^8*h*k*z^2 - 147456*a^7*c^9*d*
k*z^2 - 65536*a^7*c^9*e*j*z^2 - 16384*a^7*c^9*f*h*z^2 - 49152*a^6*c^10*d*f*
z^2 + 716800*a^8*b^3*c^5*m^2*z^2 - 483840*a^7*b^5*c^4*m^2*z^2 + 170496*a^6*
b^7*c^3*m^2*z^2 - 33232*a^5*b^9*c^2*m^2*z^2 + 516096*a^8*b^2*c^6*l^2*z^2 -
288768*a^7*b^4*c^5*l^2*z^2 + 88576*a^6*b^6*c^4*l^2*z^2 - 15744*a^5*b^8*c^3*
l^2*z^2 + 1536*a^4*b^10*c^2*l^2*z^2 - 61440*a^7*b^3*c^6*k^2*z^2 + 24064*a^6
*b^5*c^5*k^2*z^2 - 4608*a^5*b^7*c^4*k^2*z^2 + 432*a^4*b^9*c^3*k^2*z^2 - 16*
a^3*b^11*c^2*k^2*z^2 + 24576*a^7*b^2*c^7*j^2*z^2 - 6144*a^6*b^4*c^6*j^2*z^2
 + 512*a^5*b^6*c^5*j^2*z^2 - 8192*a^6*b^3*c^7*h^2*z^2 + 1536*a^5*b^5*c^6*h^
2*z^2 - 16*a^3*b^9*c^4*h^2*z^2 - 8192*a^6*b^2*c^8*g^2*z^2 + 6144*a^5*b^4*c^
7*g^2*z^2 - 1536*a^4*b^6*c^6*g^2*z^2 + 128*a^3*b^8*c^5*g^2*z^2 - 8192*a^5*b
^3*c^8*f^2*z^2 + 1536*a^4*b^5*c^7*f^2*z^2 - 16*a^2*b^9*c^5*f^2*z^2 + 24576*
a^5*b^2*c^9*e^2*z^2 - 6144*a^4*b^4*c^8*e^2*z^2 + 512*a^3*b^6*c^7*e^2*z^2 -
61440*a^4*b^3*c^9*d^2*z^2 + 24064*a^3*b^5*c^8*d^2*z^2 - 4608*a^2*b^7*c^7*d^
```

2*z^2 - 393216*a^9*c^7*l^2*z^2 - 144*a^3*b^13*m^2*z^2 - 32768*a^8*c^8*j^2*z
^2 - 32768*a^6*c^10*e^2*z^2 - 16*b^11*c^5*d^2*z^2 + 18432*a^8*b*c^5*h*l*m*z
 - 96*a^3*b^10*c*g*k*m*z + 90112*a^7*b*c^6*e*k*m*z + 36864*a^7*b*c^6*f*j*m*
z - 16384*a^7*b*c^6*g*j*l*z + 14336*a^7*b*c^6*d*l*m*z - 10240*a^7*b*c^6*f*k
*l*z + 4096*a^7*b*c^6*h*j*k*z + 10240*a^7*b*c^6*g*h*m*z - 47104*a^6*b*c^7*d
*h*l*z + 36864*a^6*b*c^7*e*f*m*z + 30720*a^6*b*c^7*d*g*m*z - 16384*a^6*b*c^
7*e*g*l*z + 6144*a^6*b*c^7*f*g*k*z + 4096*a^6*b*c^7*e*h*k*z + 32*a*b^10*c^3
*d*f*l*z - 4096*a^5*b*c^8*d*f*j*z - 6144*a^5*b*c^8*d*g*h*z - 32*a*b^8*c^5*d
*f*g*z - 4096*a^4*b*c^9*d*e*f*z + 64*a*b^7*c^6*d*e*f*z + 110592*a^8*b^2*c^4
*k*l*m*z - 36864*a^7*b^4*c^3*k*l*m*z + 5376*a^6*b^6*c^2*k*l*m*z - 79872*a^7
*b^3*c^4*j*k*m*z + 26112*a^6*b^5*c^3*j*k*m*z - 3712*a^5*b^7*c^2*j*k*m*z - 1
3824*a^7*b^3*c^4*h*l*m*z + 3456*a^6*b^5*c^3*h*l*m*z - 288*a^5*b^7*c^2*h*l*m
*z - 45056*a^7*b^2*c^5*g*k*m*z + 39936*a^6*b^4*c^4*g*k*m*z + 30720*a^7*b^2*
c^5*f*l*m*z - 18432*a^7*b^2*c^5*h*k*l*z - 13056*a^5*b^6*c^3*g*k*m*z - 7680*
a^6*b^4*c^4*f*l*m*z + 5376*a^6*b^4*c^4*h*j*m*z + 4608*a^6*b^4*c^4*h*k*l*z +
 3072*a^7*b^2*c^5*h*j*m*z - 1984*a^5*b^6*c^3*h*j*m*z + 1856*a^4*b^8*c^2*g*k
*m*z + 640*a^5*b^6*c^3*f*l*m*z - 384*a^5*b^6*c^3*h*k*l*z + 192*a^4*b^8*c^2*
h*j*m*z - 79872*a^6*b^3*c^5*e*k*m*z - 27648*a^6*b^3*c^5*f*j*m*z + 26112*a^5
*b^5*c^4*e*k*m*z + 12288*a^6*b^3*c^5*g*j*l*z - 10752*a^6*b^3*c^5*d*l*m*z +
7680*a^6*b^3*c^5*f*k*l*z + 6912*a^5*b^5*c^4*f*j*m*z - 3712*a^4*b^7*c^3*e*k*
m*z - 3072*a^6*b^3*c^5*h*j*k*z - 3072*a^5*b^5*c^4*g*j*l*z + 2688*a^5*b^5*c^
4*d*l*m*z - 1920*a^5*b^5*c^4*f*k*l*z + 768*a^5*b^5*c^4*h*j*k*z - 576*a^4*b^
7*c^3*f*j*m*z + 256*a^4*b^7*c^3*g*j*l*z - 224*a^4*b^7*c^3*d*l*m*z + 192*a^3
*b^9*c^2*e*k*m*z + 160*a^4*b^7*c^3*f*k*l*z - 64*a^4*b^7*c^3*h*j*k*z - 2688*
a^5*b^5*c^4*g*h*m*z - 1536*a^6*b^3*c^5*g*h*m*z + 992*a^4*b^7*c^3*g*h*m*z -
96*a^3*b^9*c^2*g*h*m*z - 65536*a^6*b^2*c^6*d*k*l*z + 46080*a^6*b^2*c^6*d*j*
m*z - 24576*a^6*b^2*c^6*e*j*l*z + 21504*a^5*b^4*c^5*d*k*l*z - 11520*a^5*b^4
*c^5*d*j*m*z + 9216*a^6*b^2*c^6*f*j*k*z + 6144*a^5*b^4*c^5*e*j*l*z - 3072*a
^4*b^6*c^4*d*k*l*z - 2304*a^5*b^4*c^5*f*j*k*z + 960*a^4*b^6*c^4*d*j*m*z - 5
12*a^4*b^6*c^4*e*j*l*z + 192*a^4*b^6*c^4*f*j*k*z + 160*a^3*b^8*c^3*d*k*l*z
 - 18432*a^6*b^2*c^6*f*g*m*z + 13824*a^5*b^4*c^5*f*g*m*z + 5376*a^5*b^4*c^5*
e*h*m*z - 3456*a^4*b^6*c^4*f*g*m*z + 3072*a^6*b^2*c^6*e*h*m*z - 3072*a^5*b^
4*c^5*f*h*l*z - 2048*a^6*b^2*c^6*g*h*k*z - 1984*a^4*b^6*c^4*e*h*m*z + 1536*
a^5*b^4*c^5*g*h*k*z + 1024*a^4*b^6*c^4*f*h*l*z - 384*a^4*b^6*c^4*g*h*k*z +
288*a^3*b^8*c^3*f*g*m*z + 192*a^3*b^8*c^3*e*h*m*z - 96*a^3*b^8*c^3*f*h*l*z
 + 32*a^3*b^8*c^3*g*h*k*z + 41472*a^5*b^3*c^6*d*h*l*z - 27648*a^5*b^3*c^6*e*
f*m*z - 23040*a^5*b^3*c^6*d*g*m*z - 13440*a^4*b^5*c^5*d*h*l*z + 12288*a^5*b
^3*c^6*e*g*l*z + 6912*a^4*b^5*c^5*e*f*m*z + 5760*a^4*b^5*c^5*d*g*m*z - 4608
*a^5*b^3*c^6*f*g*k*z - 3072*a^5*b^3*c^6*e*h*k*z - 3072*a^4*b^5*c^5*e*g*l*z
 + 1888*a^3*b^7*c^4*d*h*l*z + 1152*a^4*b^5*c^5*f*g*k*z + 768*a^4*b^5*c^5*e*h
*k*z - 576*a^3*b^7*c^4*e*f*m*z - 480*a^3*b^7*c^4*d*g*m*z + 256*a^3*b^7*c^4*
e*g*l*z - 96*a^3*b^7*c^4*f*g*k*z - 96*a^2*b^9*c^3*d*h*l*z - 64*a^3*b^7*c^4*
e*h*k*z + 46080*a^5*b^2*c^7*d*e*m*z - 11520*a^4*b^4*c^6*d*e*m*z + 9216*a^5*
b^2*c^7*e*f*k*z - 9216*a^5*b^2*c^7*d*h*j*z - 6656*a^4*b^4*c^6*d*f*l*z - 614
4*a^5*b^2*c^7*d*f*l*z + 3456*a^3*b^6*c^5*d*f*l*z - 2304*a^4*b^4*c^6*e*f*k*z
 + 2304*a^4*b^4*c^6*d*h*j*z + 960*a^3*b^6*c^5*d*e*m*z - 576*a^2*b^8*c^4*d*f
*l*z + 192*a^3*b^6*c^5*e*f*k*z - 192*a^3*b^6*c^5*d*h*j*z + 3072*a^4*b^3*c^7
*d*f*j*z - 768*a^3*b^5*c^6*d*f*j*z + 64*a^2*b^7*c^5*d*f*j*z + 4608*a^4*b^3*
c^7*d*g*h*z - 1152*a^3*b^5*c^6*d*g*h*z + 96*a^2*b^7*c^5*d*g*h*z - 9216*a^4*
b^2*c^8*d*e*h*z + 2304*a^3*b^4*c^7*d*e*h*z + 2048*a^4*b^2*c^8*d*f*g*z - 153
6*a^3*b^4*c^7*d*f*g*z + 384*a^2*b^6*c^6*d*f*g*z - 192*a^2*b^6*c^6*d*e*h*z +
 3072*a^3*b^3*c^8*d*e*f*z - 768*a^2*b^5*c^7*d*e*f*z - 288*a^5*b^8*c*k*l*m*z
 + 90112*a^8*b*c^5*j*k*m*z + 192*a^4*b^9*c*j*k*m*z + 138240*a^9*b*c^4*l*m^2
*z - 7344*a^6*b^7*c*l*m^2*z + 5088*a^5*b^8*c*j*m^2*z - 3072*a^8*b*c^5*k^2*l
*z - 49152*a^8*b*c^5*j*l^2*z - 128*a^4*b^9*c*j*l^2*z - 25600*a^8*b*c^5*g*m^
2*z - 9216*a^7*b*c^6*h^2*l*z - 2544*a^4*b^9*c*g*m^2*z + 64*a^3*b^10*c*g*l^2
*z + 9216*a^7*b*c^6*g*k^2*z - 3072*a^6*b*c^7*f^2*l*z - 288*a^3*b^10*c*e*m^2
*z - 49152*a^7*b*c^6*e*l^2*z - 58368*a^5*b*c^8*d^2*l*z - 432*a*b^9*c^4*d^2*
l*z - 1024*a^6*b*c^7*g*h^2*z + 32*a*b^8*c^5*d^2*j*z + 1024*a^5*b*c^8*f^2*g*

z - 9216*a^4*b*c^9*d^2*g*z + 336*a*b^7*c^6*d^2*g*z - 672*a*b^6*c^7*d^2*e*z
- 122880*a^9*c^5*k*l*m*z - 40960*a^8*c^6*f*l*m*z + 24576*a^8*c^6*h*k*l*z -
20480*a^8*c^6*h*j*m*z + 73728*a^7*c^7*d*k*l*z - 61440*a^7*c^7*d*j*m*z + 327
68*a^7*c^7*e*j*l*z - 12288*a^7*c^7*f*j*k*z - 20480*a^7*c^7*e*h*m*z + 8192*a
^7*c^7*f*h*l*z - 61440*a^6*c^8*d*e*m*z + 24576*a^6*c^8*d*f*l*z - 12288*a^6*
c^8*e*f*k*z + 12288*a^6*c^8*d*h*j*z + 12288*a^5*c^9*d*e*h*z - 131328*a^8*b^
3*c^3*l*m^2*z + 46656*a^7*b^5*c^2*l*m^2*z - 142848*a^8*b^2*c^4*j*m^2*z + 10
6368*a^7*b^4*c^3*j*m^2*z - 34208*a^6*b^6*c^2*j*m^2*z + 2304*a^7*b^3*c^4*k^2
*l*z - 576*a^6*b^5*c^3*k^2*l*z + 48*a^5*b^7*c^2*k^2*l*z + 45056*a^7*b^3*c^4
*j*l^2*z - 15360*a^6*b^5*c^3*j*l^2*z - 12288*a^7*b^2*c^5*j^2*l*z + 3072*a^6
*b^4*c^4*j^2*l*z + 2304*a^5*b^7*c^2*j*l^2*z - 256*a^5*b^6*c^3*j^2*l*z + 158
72*a^7*b^2*c^5*j*k^2*z - 4992*a^6*b^4*c^4*j*k^2*z + 672*a^5*b^6*c^3*j*k^2*z
 - 32*a^4*b^8*c^2*j*k^2*z + 71424*a^7*b^3*c^4*g*m^2*z - 53184*a^6*b^5*c^3*g
*m^2*z + 17104*a^5*b^7*c^2*g*m^2*z + 6912*a^6*b^3*c^5*h^2*l*z - 1728*a^5*b^
5*c^4*h^2*l*z + 144*a^4*b^7*c^3*h^2*l*z + 24576*a^7*b^2*c^5*g*l^2*z - 22528
*a^6*b^4*c^4*g*l^2*z + 7680*a^5*b^6*c^3*g*l^2*z + 4096*a^6*b^2*c^6*g^2*l*z
- 3072*a^5*b^4*c^5*g^2*l*z - 1152*a^4*b^8*c^2*g*l^2*z + 768*a^4*b^6*c^4*g^2
*l*z - 64*a^3*b^8*c^3*g^2*l*z - 142848*a^7*b^2*c^5*e*m^2*z + 106368*a^6*b^4
*c^4*e*m^2*z - 34208*a^5*b^6*c^3*e*m^2*z - 7936*a^6*b^3*c^5*g*k^2*z + 5088*
a^4*b^8*c^2*e*m^2*z + 2496*a^5*b^5*c^4*g*k^2*z - 1536*a^6*b^2*c^6*h^2*j*z +
 1280*a^5*b^3*c^6*f^2*l*z + 384*a^5*b^4*c^5*h^2*j*z - 336*a^4*b^7*c^3*g*k^2
*z + 192*a^4*b^5*c^5*f^2*l*z - 144*a^3*b^7*c^4*f^2*l*z - 32*a^4*b^6*c^4*h^2
*j*z + 16*a^3*b^9*c^2*g*k^2*z + 16*a^2*b^9*c^3*f^2*l*z + 45056*a^6*b^3*c^5*
e*l^2*z - 15360*a^5*b^5*c^4*e*l^2*z - 12288*a^5*b^2*c^7*e^2*l*z + 3072*a^4*
b^4*c^6*e^2*l*z + 2304*a^4*b^7*c^3*e*l^2*z - 256*a^3*b^6*c^5*e^2*l*z - 128*
a^3*b^9*c^2*e*l^2*z + 59136*a^4*b^3*c^7*d^2*l*z - 23488*a^3*b^5*c^6*d^2*l*z
 + 15872*a^6*b^2*c^6*e*k^2*z - 4992*a^5*b^4*c^5*e*k^2*z + 4560*a^2*b^7*c^5*
d^2*l*z + 1536*a^5*b^2*c^7*f^2*j*z + 672*a^4*b^6*c^4*e*k^2*z - 384*a^4*b^4*
c^6*f^2*j*z - 32*a^3*b^8*c^3*e*k^2*z + 32*a^3*b^6*c^5*f^2*j*z + 768*a^5*b^3
*c^6*g*h^2*z - 192*a^4*b^5*c^5*g*h^2*z + 16*a^3*b^7*c^4*g*h^2*z - 15872*a^4
*b^2*c^8*d^2*j*z + 4992*a^3*b^4*c^7*d^2*j*z - 672*a^2*b^6*c^6*d^2*j*z - 153
6*a^5*b^2*c^7*e*h^2*z - 768*a^4*b^3*c^7*f^2*g*z + 384*a^4*b^4*c^6*e*h^2*z +
 192*a^3*b^5*c^6*f^2*g*z - 32*a^3*b^6*c^5*e*h^2*z - 16*a^2*b^7*c^5*f^2*g*z
+ 7936*a^3*b^3*c^8*d^2*g*z - 2496*a^2*b^5*c^7*d^2*g*z + 1536*a^4*b^2*c^8*e*
f^2*z - 384*a^3*b^4*c^7*e*f^2*z + 32*a^2*b^6*c^6*e*f^2*z - 15872*a^3*b^2*c^
9*d^2*e*z + 4992*a^2*b^4*c^8*d^2*e*z - 61440*a^8*b^2*c^4*l^3*z + 21504*a^7*
b^4*c^3*l^3*z - 3328*a^6*b^6*c^2*l^3*z + 432*a^5*b^9*l*m^2*z + 51200*a^9*c^
5*j*m^2*z + 16384*a^8*c^6*j^2*l*z - 288*a^4*b^10*j*m^2*z - 18432*a^8*c^6*j*
k^2*z + 144*a^3*b^11*g*m^2*z + 51200*a^8*c^6*e*m^2*z + 2048*a^7*c^7*h^2*j*z
 + 16384*a^6*c^8*e^2*l*z + 16*b^11*c^3*d^2*l*z - 18432*a^7*c^7*e*k^2*z - 20
48*a^6*c^8*f^2*j*z + 18432*a^5*c^9*d^2*j*z + 192*a^5*b^8*c*l^3*z + 2048*a^6
*c^8*e*h^2*z - 16*b^9*c^5*d^2*g*z - 2048*a^5*c^9*e*f^2*z + 32*b^8*c^6*d^2*e
*z + 18432*a^4*c^10*d^2*e*z + 65536*a^9*c^5*l^3*z - 11008*a^8*b*c^3*j*k*l*m
 - 288*a^6*b^5*c*j*k*l*m + 144*a^5*b^6*c*g*k*l*m - 11008*a^7*b*c^4*e*k*l*m
- 5376*a^7*b*c^4*f*j*l*m + 3840*a^7*b*c^4*g*j*k*m - 3328*a^7*b*c^4*h*j*k*l
- 96*a^4*b^7*c*g*j*k*m - 2560*a^7*b*c^4*g*h*l*m - 36*a^3*b^8*c*f*h*k*m - 69
12*a^6*b*c^5*d*j*k*l - 7872*a^6*b*c^5*d*h*k*m - 7680*a^6*b*c^5*d*g*l*m - 53
76*a^6*b*c^5*e*f*l*m + 3840*a^6*b*c^5*e*g*k*m - 3328*a^6*b*c^5*e*h*k*l - 15
36*a^6*b*c^5*f*g*k*l + 1280*a^6*b*c^5*f*g*j*m - 768*a^6*b*c^5*g*h*j*k - 768
*a^6*b*c^5*f*h*j*l - 768*a^6*b*c^5*e*h*j*m - 36*a^2*b^9*c*d*h*k*m - 6912*a^
5*b*c^6*d*e*k*l - 4864*a^5*b*c^6*d*e*j*m - 2304*a^5*b*c^6*d*g*j*k - 1792*a^
5*b*c^6*e*f*j*k - 1280*a^5*b*c^6*d*f*j*l - 4544*a^5*b*c^6*d*f*h*m + 1536*a^
5*b*c^6*d*g*h*l + 1280*a^5*b*c^6*e*f*g*m - 768*a^5*b*c^6*e*g*h*k - 768*a^5*
b*c^6*e*f*h*l - 256*a^5*b*c^6*f*g*h*j + 12*a*b^9*c^2*d*f*h*m + 16*a*b^8*c^3
*d*f*g*l - 4*a*b^8*c^3*d*f*h*k - 2304*a^4*b*c^7*d*e*g*k - 1792*a^4*b*c^7*d*
e*h*j - 1280*a^4*b*c^7*d*e*f*l - 768*a^4*b*c^7*d*f*g*j - 32*a*b^7*c^4*d*e*f
*l - 256*a^4*b*c^7*e*f*g*h - 768*a^3*b*c^8*d*e*f*g + 32*a*b^5*c^6*d*e*f*g +
 12*a*b^10*c*d*f*k*m + 3648*a^7*b^3*c^2*j*k*l*m + 5504*a^7*b^2*c^3*g*k*l*m
- 1824*a^6*b^4*c^2*g*k*l*m + 384*a^7*b^2*c^3*h*j*l*m - 288*a^6*b^4*c^2*h*j*

l*m - 4800*a^6*b^3*c^3*g*j*k*m + 3648*a^6*b^3*c^3*e*k*l*m + 1280*a^5*b^5*c^
2*g*j*k*m + 1088*a^6*b^3*c^3*f*j*l*m + 576*a^6*b^3*c^3*h*j*k*l - 288*a^5*b^
5*c^2*e*k*l*m - 192*a^6*b^3*c^3*g*h*l*m + 144*a^5*b^5*c^2*g*h*l*m + 9600*a^
6*b^2*c^4*e*j*k*m - 4224*a^6*b^2*c^4*d*j*l*m - 2560*a^5*b^4*c^3*e*j*k*m + 3
84*a^6*b^2*c^4*f*j*k*l + 224*a^5*b^4*c^3*d*j*l*m + 192*a^4*b^6*c^2*e*j*k*m
- 160*a^5*b^4*c^3*f*j*k*l - 4608*a^6*b^2*c^4*f*h*k*m + 2688*a^6*b^2*c^4*f*g
*l*m + 1664*a^6*b^2*c^4*g*h*k*l - 744*a^5*b^4*c^3*f*h*k*m - 544*a^5*b^4*c^3
*f*g*l*m + 492*a^4*b^6*c^2*f*h*k*m + 416*a^5*b^4*c^3*g*h*j*m + 384*a^6*b^2*
c^4*g*h*j*m + 384*a^6*b^2*c^4*e*h*l*m - 288*a^5*b^4*c^3*g*h*k*l - 288*a^5*b
^4*c^3*e*h*l*m - 96*a^4*b^6*c^2*g*h*j*m + 2112*a^5*b^3*c^4*d*j*k*l - 160*a^
4*b^5*c^3*d*j*k*l + 16992*a^5*b^3*c^4*d*h*k*m - 6252*a^4*b^5*c^3*d*h*k*m -
4800*a^5*b^3*c^4*e*g*k*m + 2112*a^5*b^3*c^4*d*g*l*m - 1728*a^5*b^3*c^4*f*g*
j*m + 1280*a^4*b^5*c^3*e*g*k*m + 1088*a^5*b^3*c^4*e*f*l*m - 832*a^5*b^3*c^4
*e*h*j*m + 816*a^3*b^7*c^2*d*h*k*m + 576*a^5*b^3*c^4*e*h*k*l - 448*a^5*b^3*
c^4*f*h*j*l + 288*a^4*b^5*c^3*f*g*j*m - 192*a^5*b^3*c^4*g*h*j*k - 192*a^5*b
^3*c^4*f*g*k*l + 192*a^4*b^5*c^3*e*h*j*m - 112*a^4*b^5*c^3*d*g*l*m + 96*a^4
*b^5*c^3*f*h*j*l - 96*a^3*b^7*c^2*e*g*k*m + 80*a^4*b^5*c^3*f*g*k*l + 32*a^4
*b^5*c^3*g*h*j*k - 11456*a^5*b^2*c^5*d*f*k*m + 4992*a^5*b^2*c^5*d*h*j*l - 4
608*a^5*b^2*c^5*e*g*j*l - 4224*a^5*b^2*c^5*d*e*l*m + 3456*a^5*b^2*c^5*e*f*j
*m + 3456*a^5*b^2*c^5*d*g*k*l + 2432*a^5*b^2*c^5*d*g*j*m - 1312*a^4*b^4*c^4
*d*h*j*l + 1272*a^3*b^6*c^3*d*f*k*m - 1056*a^4*b^4*c^4*d*g*k*l + 896*a^5*b^
2*c^5*f*g*j*k + 768*a^4*b^4*c^4*e*g*j*l - 576*a^4*b^4*c^4*e*f*j*m - 480*a^4
*b^4*c^4*d*g*j*m + 384*a^5*b^2*c^5*e*h*j*k + 384*a^5*b^2*c^5*e*f*k*l - 232*
a^2*b^8*c^2*d*f*k*m + 224*a^4*b^4*c^4*d*e*l*m - 160*a^4*b^4*c^4*e*f*k*l - 9
6*a^4*b^4*c^4*f*g*j*k + 96*a^3*b^6*c^3*d*h*j*l + 80*a^3*b^6*c^3*d*g*k*l - 6
4*a^4*b^4*c^4*e*h*j*k - 24*a^4*b^4*c^4*d*f*k*m + 416*a^4*b^4*c^4*e*g*h*m +
384*a^5*b^2*c^5*f*g*h*l + 384*a^5*b^2*c^5*e*g*h*m + 224*a^4*b^4*c^4*f*g*h*l
 - 96*a^3*b^6*c^3*e*g*h*m - 48*a^3*b^6*c^3*f*g*h*l + 2112*a^4*b^3*c^5*d*e*k
*l - 960*a^4*b^3*c^5*d*f*j*l + 960*a^4*b^3*c^5*d*e*j*m + 384*a^3*b^5*c^4*d*
f*j*l + 320*a^4*b^3*c^5*d*g*j*k + 192*a^4*b^3*c^5*e*f*j*k - 160*a^3*b^5*c^4
*d*e*k*l - 32*a^2*b^7*c^3*d*f*j*l + 7392*a^4*b^3*c^5*d*f*h*m - 2496*a^4*b^3
*c^5*d*g*h*l - 1728*a^4*b^3*c^5*e*f*g*m - 1500*a^3*b^5*c^4*d*f*h*m + 656*a^
3*b^5*c^4*d*g*h*l - 448*a^4*b^3*c^5*e*f*h*l + 288*a^3*b^5*c^4*e*f*g*m - 192
*a^4*b^3*c^5*f*g*h*j - 192*a^4*b^3*c^5*e*g*h*k + 96*a^3*b^5*c^4*e*f*h*l - 4
8*a^2*b^7*c^3*d*g*h*l + 32*a^3*b^5*c^4*e*g*h*k - 16*a^2*b^7*c^3*d*f*h*m - 6
40*a^4*b^2*c^6*d*e*j*k + 4992*a^4*b^2*c^6*d*e*h*l - 3584*a^4*b^2*c^6*d*f*h*
k + 2432*a^4*b^2*c^6*d*e*g*m - 1312*a^3*b^4*c^5*d*e*h*l + 896*a^4*b^2*c^6*e
*f*g*k + 896*a^4*b^2*c^6*d*g*h*j + 640*a^4*b^2*c^6*d*f*g*l + 600*a^3*b^4*c^
5*d*f*h*k + 480*a^3*b^4*c^5*d*f*g*l - 480*a^3*b^4*c^5*d*e*g*m + 384*a^4*b^2
*c^6*e*f*h*j - 192*a^2*b^6*c^4*d*f*g*l - 96*a^3*b^4*c^5*e*f*g*k - 96*a^3*b^
4*c^5*d*g*h*j + 96*a^2*b^6*c^4*d*e*h*l + 12*a^2*b^6*c^4*d*f*h*k - 960*a^3*b
^3*c^6*d*e*f*l + 384*a^2*b^5*c^5*d*e*f*l + 320*a^3*b^3*c^6*d*e*g*k - 192*a^
3*b^3*c^6*d*f*g*j + 192*a^3*b^3*c^6*d*e*h*j + 32*a^2*b^5*c^5*d*f*g*j - 192*
a^3*b^3*c^6*e*f*g*h + 384*a^3*b^2*c^7*d*e*f*j - 64*a^2*b^4*c^6*d*e*f*j + 89
6*a^3*b^2*c^7*d*e*g*h - 96*a^2*b^4*c^6*d*e*g*h - 192*a^2*b^3*c^7*d*e*f*g +
496*a^7*b^4*c*k*l^2*m - 4752*a^7*b^4*c*j*l*m^2 + 96*a^5*b^6*c*j^2*k*m - 614
4*a^8*b*c^3*h*l^2*m - 168*a^6*b^5*c*h*l^2*m + 6400*a^8*b*c^3*g*l*m^2 - 2862
*a^6*b^5*c*h*k*m^2 + 2376*a^6*b^5*c*g*l*m^2 - 1632*a^7*b*c^4*h^2*k*m - 480*
a^8*b*c^3*h*k*m^2 - 180*a^5*b^6*c*h*k^2*m + 54*a^4*b^7*c*h^2*k*m - 384*a^7*
b*c^4*h*j^2*m + 120*a^5*b^6*c*h*k*l^2 + 56*a^5*b^6*c*f*l^2*m + 24*a^3*b^8*c
*g^2*k*m + 4512*a^7*b*c^4*f*k^2*m - 2304*a^7*b*c^4*g*k^2*l - 1680*a^5*b^6*c
*g*j*m^2 + 1184*a^6*b*c^5*f^2*k*m + 804*a^5*b^6*c*f*k*m^2 + 432*a^5*b^6*c*e
*l*m^2 + 60*a^4*b^7*c*f*k^2*m + 6*a^2*b^9*c*f^2*k*m - 13312*a^7*b*c^4*d*l^2
*m + 2048*a^7*b*c^4*g*j*l^2 - 1024*a^7*b*c^4*f*k*l^2 + 64*a^4*b^7*c*g*j*l^2
 + 56*a^4*b^7*c*d*l^2*m - 40*a^4*b^7*c*f*k*l^2 + 13440*a^7*b*c^4*e*j*m^2 -
8928*a^5*b*c^6*d^2*k*m - 6240*a^7*b*c^4*d*k*m^2 + 1614*a^4*b^7*c*d*k*m^2 -
288*a^4*b^7*c*e*j*m^2 - 170*a*b^9*c^2*d^2*k*m + 60*a^3*b^8*c*d*k^2*m + 4608
*a^6*b*c^5*e*j^2*l + 4608*a^5*b*c^6*e^2*j*l - 2432*a^6*b*c^5*d*j^2*m + 1440
*a^7*b*c^4*f*h*m^2 - 896*a^6*b*c^5*f*j^2*k - 864*a^6*b*c^5*f*h^2*m - 558*a^

4*b^7*c*f*h*m^2 + 256*a^6*b*c^5*g*h^2*l - 40*a^3*b^8*c*d*k*l^2 - 1920*a^6*b
*c^5*e*j*k^2 - 384*a^5*b*c^6*e^2*h*m + 24*a^3*b^8*c*f*h*l^2 - 16*a*b^8*c^3*
d^2*j*l + 2208*a^6*b*c^5*f*h*k^2 - 1044*a^3*b^8*c*d*h*m^2 + 800*a^5*b*c^6*f
^2*h*k - 256*a^5*b*c^6*f^2*g*l + 144*a^3*b^8*c*e*g*m^2 - 116*a*b^8*c^3*d^2*
h*m + 8192*a^6*b*c^5*d*h*l^2 + 2048*a^6*b*c^5*e*g*l^2 + 24*a^2*b^9*c*d*h*l^
2 - 5856*a^4*b*c^7*d^2*f*m + 4896*a^4*b*c^7*d^2*h*k + 2720*a^6*b*c^5*d*f*m^
2 + 2304*a^4*b*c^7*d^2*g*l + 1824*a^5*b*c^6*d*h^2*k + 438*a*b^7*c^4*d^2*f*m
 - 384*a^5*b*c^6*e*h^2*j + 318*a^2*b^9*c*d*f*m^2 - 168*a*b^7*c^4*d^2*g*l +
42*a*b^7*c^4*d^2*h*k - 36*a*b^8*c^3*d*f^2*m - 2432*a^4*b*c^7*d*e^2*m + 1536
*a^5*b*c^6*e*g*j^2 + 1536*a^4*b*c^7*e^2*g*j - 896*a^5*b*c^6*d*h*j^2 - 896*a
^4*b*c^7*e^2*f*k + 4896*a^5*b*c^6*d*f*k^2 + 1824*a^4*b*c^7*d*f^2*k - 384*a^
4*b*c^7*e*f^2*j + 336*a*b^6*c^5*d^2*e*l - 156*a*b^6*c^5*d^2*f*k + 16*a*b^6*
c^5*d^2*g*j + 12*a*b^7*c^4*d*f^2*k - 2*a*b^9*c^2*d*f*k^2 - 1920*a^3*b*c^8*d
^2*e*j - 32*a*b^5*c^6*d^2*e*j + 2208*a^3*b*c^8*d^2*f*h + 800*a^4*b*c^7*d*f*
h^2 - 102*a*b^5*c^6*d^2*f*h + 12*a*b^6*c^5*d*f^2*h - 2*a*b^7*c^4*d*f*h^2 -
896*a^3*b*c^8*d*e^2*h - 8*a*b^6*c^5*d*f*g^2 - 240*a*b^4*c^7*d^2*e*g - 32*a*
b^4*c^7*d*e^2*f + 5120*a^8*c^4*h*j*l*m + 15360*a^7*c^5*d*j*l*m - 7680*a^7*c
^5*e*j*k*m + 3072*a^7*c^5*f*j*k*l + 5120*a^7*c^5*e*h*l*m + 1920*a^7*c^5*f*h
*k*m + 15360*a^6*c^6*d*e*l*m + 5760*a^6*c^6*d*f*k*m + 3072*a^6*c^6*e*f*k*l
- 3072*a^6*c^6*d*h*j*l - 2560*a^6*c^6*e*f*j*m + 1536*a^6*c^6*e*h*j*k + 4608
*a^5*c^7*d*e*j*k - 3072*a^5*c^7*d*e*h*l - 1152*a^5*c^7*d*f*h*k + 512*a^5*c^
7*e*f*h*j + 1536*a^4*c^8*d*e*f*j - 8*a*b^10*c*d*f*l^2 - 5568*a^8*b^2*c^2*k*
l^2*m + 15552*a^8*b^2*c^2*j*l*m^2 + 4800*a^7*b^2*c^3*j^2*k*m - 1280*a^6*b^4
*c^2*j^2*k*m + 2080*a^7*b^3*c^2*h*l^2*m - 1088*a^7*b^2*c^3*j*k^2*l + 48*a^6
*b^4*c^2*j*k^2*l - 8544*a^7*b^2*c^3*h*k^2*m - 7776*a^7*b^3*c^2*g*l*m^2 + 76
32*a^7*b^3*c^2*h*k*m^2 + 3600*a^6*b^3*c^3*h^2*k*m + 2484*a^6*b^4*c^2*h*k^2*
m - 918*a^5*b^5*c^2*h^2*k*m + 4800*a^7*b^2*c^3*h*k*l^2 - 1424*a^6*b^4*c^2*h
*k*l^2 + 1200*a^5*b^4*c^3*g^2*k*m - 960*a^6*b^2*c^4*g^2*k*m - 528*a^6*b^4*c
^2*f*l^2*m - 416*a^6*b^3*c^3*h*j^2*m - 320*a^4*b^6*c^2*g^2*k*m + 192*a^7*b^
2*c^3*f*l^2*m + 96*a^5*b^5*c^2*h*j^2*m + 15552*a^7*b^2*c^3*e*l*m^2 - 6720*a
^7*b^2*c^3*g*j*m^2 + 6160*a^6*b^4*c^2*g*j*m^2 - 4752*a^6*b^4*c^2*e*l*m^2 -
2016*a^7*b^2*c^3*f*k*m^2 - 1164*a^6*b^4*c^2*f*k*m^2 + 1104*a^5*b^3*c^4*f^2*
k*m + 1008*a^6*b^3*c^3*f*k^2*m + 960*a^6*b^2*c^4*h^2*j*l - 678*a^5*b^5*c^2*
f*k^2*m + 544*a^6*b^3*c^3*g*k^2*l - 144*a^5*b^4*c^3*h^2*j*l - 102*a^4*b^5*c
^3*f^2*k*m - 62*a^3*b^7*c^2*f^2*k*m - 24*a^5*b^5*c^2*g*k^2*l + 6432*a^6*b^3
*c^3*d*l^2*m + 4800*a^5*b^2*c^5*e^2*k*m - 2304*a^6*b^2*c^4*g*j^2*l + 1920*a
^6*b^3*c^3*g*j*l^2 + 1728*a^6*b^2*c^4*f*j^2*m - 1280*a^4*b^4*c^4*e^2*k*m +
1152*a^5*b^3*c^4*g^2*j*l - 1032*a^5*b^5*c^2*d*l^2*m - 864*a^6*b^3*c^3*f*k*l
^2 - 768*a^5*b^5*c^2*g*j*l^2 + 408*a^5*b^5*c^2*f*k*l^2 + 384*a^5*b^4*c^3*g*
j^2*l - 288*a^5*b^4*c^3*f*j^2*m + 192*a^6*b^2*c^4*h*j^2*k - 192*a^4*b^5*c^3
*g^2*j*l + 96*a^3*b^6*c^3*e^2*k*m - 32*a^5*b^4*c^3*h*j^2*k - 21120*a^6*b^2*
c^4*d*k^2*m + 20880*a^6*b^3*c^3*d*k*m^2 + 19760*a^4*b^3*c^5*d^2*k*m - 12320
*a^6*b^3*c^3*e*j*m^2 - 9750*a^5*b^5*c^2*d*k*m^2 - 9390*a^3*b^5*c^4*d^2*k*m
+ 8460*a^5*b^4*c^3*d*k^2*m + 3360*a^5*b^5*c^2*e*j*m^2 + 1860*a^2*b^7*c^3*d^
2*k*m - 1218*a^4*b^6*c^2*d*k^2*m - 1088*a^6*b^2*c^4*e*k^2*l + 960*a^6*b^2*c
^4*g*j*k^2 - 240*a^5*b^4*c^3*g*j*k^2 + 192*a^5*b^2*c^5*f^2*j*l - 104*a^4*b^
5*c^3*g^2*h*m - 96*a^5*b^3*c^4*g^2*h*m + 48*a^5*b^4*c^3*e*k^2*l + 48*a^4*b^
4*c^4*f^2*j*l + 24*a^3*b^7*c^2*g^2*h*m + 16*a^4*b^6*c^2*g*j*k^2 - 16*a^3*b^
6*c^3*f^2*j*l + 13376*a^6*b^2*c^4*d*k*l^2 - 5136*a^5*b^4*c^3*d*k*l^2 - 3840
*a^6*b^2*c^4*e*j*l^2 + 1536*a^5*b^4*c^3*e*j*l^2 + 1392*a^5*b^3*c^4*f*h^2*m
+ 1386*a^5*b^5*c^2*f*h*m^2 - 768*a^5*b^3*c^4*e*j^2*l + 768*a^4*b^6*c^2*d*k*
l^2 - 768*a^4*b^3*c^5*e^2*j*l - 588*a^4*b^4*c^4*f^2*h*m - 480*a^5*b^3*c^4*g
*h^2*l + 480*a^5*b^3*c^4*d*j^2*m - 480*a^5*b^2*c^5*f^2*h*m - 128*a^4*b^6*c^
2*e*j*l^2 + 100*a^3*b^6*c^3*f^2*h*m + 96*a^5*b^3*c^4*f*j^2*k + 72*a^4*b^5*c
^3*g*h^2*l - 54*a^4*b^5*c^3*f*h^2*m - 48*a^6*b^3*c^3*f*h*m^2 - 36*a^3*b^7*c
^2*f*h^2*m + 6*a^2*b^8*c^2*f^2*h*m + 6848*a^4*b^2*c^6*d^2*j*l - 2448*a^3*b^
4*c^5*d^2*j*l + 624*a^5*b^4*c^3*f*h*l^2 + 576*a^6*b^2*c^4*f*h*l^2 + 480*a^5
*b^3*c^4*e*j*k^2 + 432*a^4*b^4*c^4*f*g^2*m - 416*a^4*b^3*c^5*e^2*h*m + 336*
a^2*b^6*c^4*d^2*j*l - 320*a^5*b^2*c^5*f*g^2*m - 256*a^4*b^6*c^2*f*h*l^2 + 1

92*a^5*b^2*c^5*g^2*h*k + 96*a^3*b^5*c^4*e^2*h*m - 72*a^3*b^6*c^3*f*g^2*m +
48*a^4*b^4*c^4*g^2*h*k - 32*a^4*b^5*c^3*e*j*k^2 - 8*a^3*b^6*c^3*g^2*h*k + 2
4768*a^6*b^2*c^4*d*h*m^2 - 21108*a^5*b^4*c^3*d*h*m^2 - 10048*a^4*b^2*c^6*d^
2*h*m + 7218*a^4*b^6*c^2*d*h*m^2 - 6720*a^6*b^2*c^4*e*g*m^2 + 6160*a^5*b^4*
c^3*e*g*m^2 - 2592*a^5*b^2*c^5*d*h^2*m - 1680*a^4*b^6*c^2*e*g*m^2 + 1068*a^
3*b^4*c^5*d^2*h*m + 960*a^5*b^2*c^5*e*h^2*l - 876*a^4*b^4*c^4*d*h^2*m - 864
*a^5*b^2*c^5*f*h^2*k + 546*a^2*b^6*c^4*d^2*h*m + 432*a^3*b^6*c^3*d*h^2*m +
336*a^4*b^3*c^5*f^2*h*k - 320*a^5*b^2*c^5*d*j^2*k + 192*a^5*b^2*c^5*g*h^2*j
 + 144*a^5*b^3*c^4*f*h*k^2 - 144*a^4*b^4*c^4*e*h^2*l - 102*a^4*b^5*c^3*f*h*
k^2 - 96*a^4*b^3*c^5*f^2*g*l - 36*a^2*b^8*c^2*d*h^2*m - 30*a^3*b^5*c^4*f^2*
h*k - 24*a^3*b^5*c^4*f^2*g*l + 16*a^4*b^4*c^4*g*h^2*j - 12*a^4*b^4*c^4*f*h^
2*k + 12*a^3*b^6*c^3*f*h^2*k + 8*a^2*b^7*c^3*f^2*g*l + 6*a^3*b^7*c^2*f*h*k^
2 - 2*a^2*b^7*c^3*f^2*h*k - 9312*a^5*b^3*c^4*d*h*l^2 + 3288*a^4*b^5*c^3*d*h
*l^2 - 2304*a^4*b^2*c^6*e^2*g*l + 1920*a^5*b^3*c^4*e*g*l^2 + 1728*a^4*b^2*c
^6*e^2*f*m + 1152*a^4*b^3*c^5*e*g^2*l - 768*a^4*b^5*c^3*e*g*l^2 - 608*a^4*b
^3*c^5*d*g^2*m - 472*a^3*b^7*c^2*d*h*l^2 + 384*a^3*b^4*c^5*e^2*g*l - 288*a^
3*b^4*c^5*e^2*f*m - 224*a^4*b^3*c^5*f*g^2*k + 192*a^5*b^2*c^5*f*h*j^2 + 192
*a^4*b^2*c^6*e^2*h*k - 192*a^3*b^5*c^4*e*g^2*l + 120*a^3*b^5*c^4*d*g^2*m +
64*a^3*b^7*c^2*e*g*l^2 - 32*a^3*b^4*c^5*e^2*h*k + 24*a^3*b^5*c^4*f*g^2*k +
9936*a^3*b^3*c^6*d^2*f*m + 3786*a^4*b^5*c^3*d*f*m^2 - 3552*a^5*b^2*c^5*d*h*
k^2 - 3486*a^2*b^5*c^5*d^2*f*m - 3424*a^3*b^3*c^6*d^2*g*l - 1868*a^3*b^7*c^
2*d*f*m^2 + 1332*a^4*b^4*c^4*d*h*k^2 - 1296*a^5*b^3*c^4*d*f*m^2 - 1236*a^3*
b^4*c^5*d*f^2*m + 1224*a^2*b^5*c^5*d^2*g*l - 1152*a^4*b^2*c^6*d*f^2*m + 960
*a^5*b^2*c^5*e*g*k^2 - 496*a^3*b^3*c^6*d^2*h*k + 462*a^2*b^6*c^4*d*f^2*m +
432*a^4*b^3*c^5*d*h^2*k - 240*a^4*b^4*c^4*e*g*k^2 - 222*a^2*b^5*c^5*d^2*h*k
 + 192*a^4*b^2*c^6*f^2*g*j + 192*a^4*b^2*c^6*e*f^2*l - 174*a^3*b^5*c^4*d*h^
2*k - 156*a^3*b^6*c^3*d*h*k^2 + 48*a^3*b^4*c^5*e*f^2*l - 32*a^4*b^3*c^5*e*h
^2*j + 16*a^3*b^6*c^3*e*g*k^2 + 16*a^3*b^4*c^5*f^2*g*j - 16*a^2*b^6*c^4*e*f
^2*l + 12*a^2*b^7*c^3*d*h^2*k + 6*a^2*b^8*c^2*d*h*k^2 + 1728*a^5*b^2*c^5*d*
f*l^2 + 1392*a^4*b^4*c^4*d*f*l^2 - 840*a^3*b^6*c^3*d*f*l^2 - 768*a^4*b^2*c^
6*e*g^2*j + 576*a^4*b^2*c^6*d*g^2*k + 480*a^3*b^3*c^6*d*e^2*m + 144*a^2*b^8
*c^2*d*f*l^2 + 96*a^4*b^3*c^5*d*h*j^2 + 96*a^3*b^3*c^6*e^2*f*k - 80*a^3*b^4
*c^5*d*g^2*k + 6848*a^3*b^2*c^7*d^2*e*l - 3552*a^3*b^2*c^7*d^2*f*k - 2448*a
^2*b^4*c^6*d^2*e*l + 1332*a^2*b^4*c^6*d^2*f*k + 960*a^3*b^2*c^7*d^2*g*j - 4
96*a^4*b^3*c^5*d*f*k^2 + 432*a^3*b^3*c^6*d*f^2*k - 240*a^2*b^4*c^6*d^2*g*j
- 222*a^3*b^5*c^4*d*f*k^2 - 174*a^2*b^5*c^5*d*f^2*k + 64*a^4*b^2*c^6*f*g^2*
h + 48*a^3*b^4*c^5*f*g^2*h + 42*a^2*b^7*c^3*d*f*k^2 - 32*a^3*b^3*c^6*e*f^2*
j - 320*a^3*b^2*c^7*d*e^2*k + 192*a^4*b^2*c^6*e*g*h^2 + 192*a^4*b^2*c^6*d*f
*j^2 - 32*a^3*b^4*c^5*d*f*j^2 + 16*a^3*b^4*c^5*e*g*h^2 + 480*a^2*b^3*c^7*d^
2*e*j - 224*a^3*b^3*c^6*d*g^2*h + 192*a^3*b^2*c^7*e^2*f*h + 24*a^2*b^5*c^5*
d*g^2*h - 864*a^3*b^2*c^7*d*f^2*h + 336*a^3*b^3*c^6*d*f*h^2 + 192*a^3*b^2*c
^7*e*f^2*g + 144*a^2*b^3*c^7*d^2*f*h - 30*a^2*b^5*c^5*d*f*h^2 + 16*a^2*b^4*
c^6*e*f^2*g - 12*a^2*b^4*c^6*d*f^2*h + 192*a^3*b^2*c^7*d*f*g^2 + 96*a^2*b^3
*c^7*d*e^2*h + 48*a^2*b^4*c^6*d*f*g^2 + 960*a^2*b^2*c^8*d^2*e*g + 192*a^2*b
^2*c^8*d*e^2*f - 7680*a^9*b*c^2*l^2*m^2 + 3152*a^8*b^3*c*l^2*m^2 + 2070*a^7
*b^4*c*k^2*m^2 - 1840*a^7*b^3*c^2*k^3*m + 6720*a^8*b*c^3*j^2*m^2 - 3072*a^8
*b*c^3*k^2*l^2 + 1680*a^6*b^5*c*j^2*m^2 - 100*a^6*b^5*c*k^2*l^2 - 2176*a^7*
b^3*c^2*j*l^3 - 256*a^6*b^3*c^3*j^3*l - 64*a^5*b^6*c*j^2*l^2 - 12480*a^8*b^
2*c^2*h*m^3 + 972*a^5*b^6*c*h^2*m^2 - 960*a^7*b*c^4*j^2*k^2 - 252*a^5*b^4*c
^3*h^3*m - 192*a^6*b^2*c^4*h^3*m + 54*a^4*b^6*c^2*h^3*m + 1536*a^7*b*c^4*h^
2*l^2 + 420*a^4*b^7*c*g^2*m^2 - 36*a^4*b^7*c*h^2*l^2 - 3072*a^7*b^2*c^3*g*l
^3 + 2096*a^7*b^3*c^2*f*m^3 + 1088*a^6*b^4*c^2*g*l^3 - 496*a^6*b^3*c^3*h*k^
3 - 192*a^4*b^4*c^4*g^3*l + 176*a^4*b^3*c^5*f^3*m + 144*a^5*b^3*c^4*h^3*k +
 78*a^3*b^8*c*f^2*m^2 + 54*a^3*b^5*c^4*f^3*m + 32*a^3*b^6*c^3*g^3*l + 30*a^
5*b^5*c^2*h*k^3 - 18*a^4*b^5*c^3*h^3*k - 18*a^2*b^7*c^3*f^3*m - 16*a^3*b^8*
c*g^2*l^2 + 6720*a^6*b*c^5*e^2*m^2 - 192*a^6*b*c^5*h^2*j^2 - 4*a^2*b^9*c*f^
2*l^2 - 35040*a^7*b^2*c^3*d*m^3 + 14300*a^6*b^4*c^2*d*m^3 - 12000*a^3*b^2*c
^7*d^3*m + 4380*a^2*b^4*c^6*d^3*m - 2176*a^6*b^3*c^3*e*l^3 - 256*a^3*b^3*c^
6*e^3*l - 192*a^6*b^2*c^4*f*k^3 + 192*a^5*b^5*c^2*e*l^3 - 192*a^4*b^2*c^6*f

^3*k + 132*a^5*b^4*c^3*f*k^3 + 128*a^4*b^3*c^5*g^3*j - 28*a^3*b^4*c^5*f^3*k - 10*a^4*b^6*c^2*f*k^3 + 6*a^2*b^6*c^4*f^3*k + 10752*a^5*b*c^6*d^2*l^2 - 960*a^5*b*c^6*e^2*k^2 - 192*a^5*b*c^6*f^2*j^2 + 108*a*b^9*c^2*d^2*l^2 - 1680*a^5*b^3*c^4*d*k^3 - 1680*a^2*b^3*c^7*d^3*k + 222*a^4*b^5*c^3*d*k^3 + 30*a*b^8*c^3*d^2*k^2 - 10*a^3*b^7*c^2*d*k^3 - 960*a^4*b*c^7*d^2*j^2 + 80*a^4*b^3*c^5*f*h^3 + 80*a^3*b^3*c^6*f^3*h + 6*a^3*b^5*c^4*f*h^3 + 6*a^2*b^5*c^5*f^3*h - 192*a^4*b*c^7*e^2*h^2 - 192*a^4*b^2*c^6*d*h^3 - 192*a^2*b^2*c^8*d^3*h + 128*a^3*b^3*c^6*e*g^3 - 28*a^3*b^4*c^5*d*h^3 + 12*a*b^6*c^5*d^2*h^2 + 6*a^2*b^6*c^4*d*h^3 - 192*a^3*b*c^8*e^2*f^2 + 60*a*b^5*c^6*d^2*g^2 + 198*a*b^4*c^7*d^2*f^2 + 144*a^2*b^3*c^7*d*f^3 - 960*a^2*b*c^9*d^2*e^2 + 240*a*b^3*c^8*d^2*e^2 + 15360*a^9*c^3*k*l^2*m - 12800*a^9*c^3*j*l*m^2 - 3840*a^8*c^4*j^2*k*m + 432*a^6*b^6*j*l*m^2 + 4608*a^8*c^4*j*k^2*l + 2880*a^8*c^4*h*k^2*m + 5120*a^8*c^4*f*l^2*m - 3072*a^8*c^4*h*k*l^2 + 270*a^5*b^7*h*k*m^2 - 216*a^5*b^7*g*l*m^2 - 12800*a^8*c^4*e*l*m^2 - 4800*a^8*c^4*f*k*m^2 - 512*a^7*c^5*h^2*j*l - 3840*a^6*c^6*e^2*k*m - 1280*a^7*c^5*f*j^2*m + 768*a^7*c^5*h*j^2*k + 144*a^4*b^8*g*j*m^2 - 90*a^4*b^8*f*k*m^2 + 8640*a^7*c^5*d*k^2*m + 4608*a^7*c^5*e*k^2*l + 512*a^6*c^6*f^2*j*l - 9216*a^7*c^5*d*k*l^2 - 4096*a^7*c^5*e*j*l^2 + 320*a^6*c^6*f^2*h*m - 90*a^3*b^9*d*k*m^2 + 15200*a^9*b*c^2*k*m^3 - 6192*a^8*b^3*c*k*m^3 + 5472*a^8*b*c^3*k^3*m - 4608*a^5*c^7*d^2*j*l - 1024*a^7*c^5*f*h*l^2 + 150*a^6*b^5*c*k^3*m + 54*a^3*b^9*f*h*m^2 + 6*b^10*c^2*d^2*h*m - 14400*a^7*c^5*d*h*m^2 + 8640*a^5*c^7*d^2*h*m + 2880*a^6*c^6*d*h^2*m + 2304*a^6*c^6*d*j^2*k - 512*a^6*c^6*e*h^2*l - 192*a^6*c^6*f*h^2*k + 6144*a^8*b*c^3*j*l^3 + 1536*a^7*b*c^4*j^3*l - 1280*a^5*c^7*e^2*f*m + 768*a^5*c^7*e^2*h*k + 256*a^6*c^6*f*h*j^2 + 192*a^6*b^5*c*j*l^3 + 54*a^2*b^10*d*h*m^2 - 18*b^9*c^3*d^2*f*m + 8*b^9*c^3*d^2*g*l - 2*b^9*c^3*d^2*h*k + 4068*a^7*b^4*c*h*m^3 - 1728*a^6*c^6*d*h*k^2 + 960*a^5*c^7*d*f^2*m + 512*a^5*c^7*e*f^2*l - 3072*a^6*c^6*d*f*l^2 - 16*b^8*c^4*d^2*e*l + 6*b^8*c^4*d^2*f*k - 4608*a^4*c^8*d^2*e*l + 2400*a^8*b*c^3*f*m^3 + 2016*a^7*b*c^4*h*k^3 - 1728*a^4*c^8*d^2*f*k - 1146*a^6*b^5*c*f*m^3 + 224*a^6*b*c^5*h^3*k - 96*a^5*b^6*c*g*l^3 + 96*a^5*b*c^6*f^3*m + 2304*a^4*c^8*d*e^2*k + 768*a^5*c^7*d*f*j^2 + 6144*a^7*b*c^4*e*l^3 - 2280*a^5*b^6*c*d*m^3 + 1536*a^4*b*c^7*e^3*l - 616*a*b^6*c^5*d^3*m + 512*a^6*b*c^5*g*j^3 + 256*a^4*c^8*e^2*f*h + 240*a*b^10*c*d^2*m^2 + 6*b^7*c^5*d^2*f*h - 192*a^4*c^8*d*f^2*h + 4320*a^6*b*c^5*d*k^3 + 4320*a^3*b*c^8*d^3*k + 222*a*b^5*c^6*d^3*k + 16*b^6*c^6*d^2*e*g + 96*a^5*b*c^6*f*h^3 + 96*a^4*b*c^7*f^3*h + 768*a^3*c^9*d*e^2*f + 512*a^3*b*c^8*e^3*g + 132*a*b^4*c^7*d^3*h + 2016*a^2*b*c^9*d^3*f - 496*a*b^3*c^8*d^3*f + 224*a^3*b*c^8*d*f^3 - 18*a*b^5*c^6*d*f^3 - 3264*a^8*b^2*c^2*k^2*m^2 - 6160*a^7*b^3*c^2*j^2*m^2 + 1104*a^7*b^3*c^2*k^2*l^2 - 1920*a^7*b^2*c^3*j^2*l^2 + 768*a^6*b^4*c^2*j^2*l^2 + 3888*a^7*b^2*c^3*h^2*m^2 - 3510*a^6*b^4*c^2*h^2*m^2 + 240*a^6*b^3*c^3*j^2*k^2 - 16*a^5*b^5*c^2*j^2*k^2 + 1680*a^6*b^3*c^3*g^2*m^2 - 1648*a^6*b^3*c^3*h^2*l^2 - 1540*a^5*b^5*c^2*g^2*m^2 + 444*a^5*b^5*c^2*h^2*l^2 - 960*a^6*b^2*c^4*h^2*k^2 - 576*a^6*b^2*c^4*f^2*m^2 - 512*a^6*b^2*c^4*g^2*l^2 - 480*a^5*b^4*c^3*g^2*l^2 + 198*a^5*b^4*c^3*h^2*k^2 + 192*a^4*b^6*c^2*g^2*l^2 - 186*a^5*b^4*c^3*f^2*m^2 - 97*a^4*b^6*c^2*f^2*m^2 - 9*a^4*b^6*c^2*h^2*k^2 - 6160*a^5*b^3*c^4*e^2*m^2 + 1680*a^4*b^5*c^3*e^2*m^2 - 240*a^5*b^3*c^4*g^2*k^2 - 240*a^5*b^3*c^4*f^2*l^2 - 144*a^3*b^7*c^2*e^2*m^2 + 60*a^4*b^5*c^3*g^2*k^2 - 36*a^4*b^5*c^3*f^2*l^2 + 36*a^3*b^7*c^2*f^2*l^2 - 16*a^5*b^3*c^4*h^2*j^2 - 4*a^3*b^7*c^2*g^2*k^2 + 38512*a^5*b^2*c^5*d^2*m^2 - 32310*a^4*b^4*c^4*d^2*m^2 + 12720*a^3*b^6*c^3*d^2*m^2 - 2500*a^2*b^8*c^2*d^2*m^2 - 1920*a^5*b^2*c^5*e^2*l^2 + 768*a^4*b^4*c^4*e^2*l^2 - 464*a^5*b^2*c^5*f^2*k^2 - 384*a^5*b^2*c^5*g^2*j^2 - 64*a^3*b^6*c^3*e^2*l^2 + 42*a^4*b^4*c^4*f^2*k^2 + 12*a^3*b^6*c^3*f^2*k^2 - 13104*a^4*b^3*c^5*d^2*l^2 + 5628*a^3*b^5*c^4*d^2*l^2 - 1128*a^2*b^7*c^3*d^2*l^2 + 240*a^4*b^3*c^5*e^2*k^2 - 16*a^4*b^3*c^5*f^2*j^2 - 16*a^3*b^5*c^4*e^2*k^2 - 2880*a^4*b^2*c^6*d^2*k^2 + 1750*a^3*b^4*c^5*d^2*k^2 - 345*a^2*b^6*c^4*d^2*k^2 - 48*a^4*b^3*c^5*g^2*h^2 - 4*a^3*b^5*c^4*g^2*h^2 + 240*a^3*b^3*c^6*d^2*j^2 - 192*a^4*b^2*c^6*f^2*h^2 - 42*a^3*b^4*c^5*f^2*h^2 - 16*a^2*b^5*c^5*d^2*j^2 - 48*a^3*b^3*c^6*f^2*g^2 - 16*a^3*b^3*c^6*e^2*h^2 - 4*a^2*b^5*c^5*f^2*g^2 - 464*a^3*b^2*c^7*d^2*h^2 - 384*a^3*b^2*c^7*e^2*g^2 + 42*a^2*b^4*c^6*d^2*h^2 - 240*a^2*b^3*c^7*d^2*g^2 - 16*a^2*b^

3*c^7*e^2*f^2 - 960*a^2*b^2*c^8*d^2*f^2 + 6*b^11*c*d^2*k*m - 18*a*b^11*d*f*
m^2 - 7200*a^9*c^3*k^2*m^2 - 324*a^7*b^5*l^2*m^2 - 225*a^6*b^6*k^2*m^2 - 20
48*a^8*c^4*j^2*l^2 - 144*a^5*b^7*j^2*m^2 - 2400*a^8*c^4*h^2*m^2 - 81*a^4*b^
8*h^2*m^2 - 800*a^7*c^5*f^2*m^2 - 288*a^7*c^5*h^2*k^2 - 36*a^3*b^9*g^2*m^2
- 9*a^2*b^10*f^2*m^2 - 21600*a^6*c^6*d^2*m^2 - 2048*a^6*c^6*e^2*l^2 - 864*a
^6*c^6*f^2*k^2 - 2592*a^5*c^7*d^2*k^2 - 1536*a^5*c^7*e^2*j^2 + 1536*a^8*b^2
*c^2*l^4 - 32*a^5*c^7*f^2*h^2 + 360*a^7*b^2*c^3*k^4 - 25*a^6*b^4*c^2*k^4 -
864*a^4*c^8*d^2*h^2 - 4*b^7*c^5*d^2*g^2 - 9*b^6*c^6*d^2*f^2 - 288*a^3*c^9*d
^2*f^2 - 24*a^5*b^2*c^5*h^4 - 16*b^5*c^7*d^2*e^2 - 9*a^4*b^4*c^4*h^4 - 16*a
^3*b^4*c^5*g^4 - 24*a^3*b^2*c^7*f^4 - 9*a^2*b^4*c^6*f^4 - a^2*b^8*c^2*f^2*k
^2 - a^2*b^6*c^4*f^2*h^2 + 630*a^7*b^5*k*m^3 + 8000*a^9*c^3*h*m^3 + 320*a^7
*c^5*h^3*m - 378*a^6*b^6*h*m^3 + 126*a^5*b^7*f*m^3 + 30*b^8*c^4*d^3*m + 240
00*a^8*c^4*d*m^3 + 8640*a^4*c^8*d^3*m - 1728*a^7*c^5*f*k^3 - 192*a^5*c^7*f^
3*k - 4*b^11*c*d^2*l^2 + 126*a^4*b^8*d*m^3 - 10*b^7*c^5*d^3*k + 4200*a^9*b^
2*c*m^4 - 1024*a^6*c^6*e*j^3 - 1024*a^4*c^8*e^3*j - 144*a^7*b^4*c*l^4 - 10*
b^6*c^6*d^3*h - 1728*a^3*c^9*d^3*h - 192*a^5*c^7*d*h^3 + 30*b^5*c^7*d^3*f +
360*a*b^2*c^9*d^4 - 9*b^12*d^2*m^2 - 10000*a^10*c^2*m^4 - 4096*a^9*c^3*l^4
- 441*a^8*b^4*m^4 - 1296*a^8*c^4*k^4 - 256*a^7*c^5*j^4 - 16*a^6*c^6*h^4 -
16*a^4*c^8*f^4 - 256*a^3*c^9*e^4 - 25*b^4*c^8*d^4 - 1296*a^2*c^10*d^4 - b^1
0*c^2*d^2*k^2 - b^8*c^4*d^2*h^2, z, k1)*((3072*a^5*c^7*d*l - 512*a^4*c^8*e*
f - 1536*a^5*c^7*e*k - 512*a^5*c^7*f*j + 1024*a^6*c^6*h*l - 1536*a^6*c^6*j*
k - 5120*a^7*c^5*l*m + 32*a*b^5*c^6*d*e + 1024*a^3*b*c^8*d*e - 16*a*b^6*c^5
*d*g + 512*a^4*b*c^7*e*h + 256*a^4*b*c^7*f*g + 1024*a^4*b*c^7*d*j + 16*a*b^
8*c^3*d*l + 2048*a^5*b*c^6*e*m + 256*a^5*b*c^6*f*l + 768*a^5*b*c^6*g*k + 51
2*a^5*b*c^6*h*j + 2048*a^6*b*c^5*j*m + 1792*a^6*b*c^5*k*l - 384*a^2*b^3*c^7
*d*e + 192*a^2*b^4*c^6*d*g + 32*a^2*b^4*c^6*e*f - 512*a^3*b^2*c^7*d*g - 16*
a^2*b^5*c^5*f*g - 128*a^3*b^3*c^6*e*h + 32*a^2*b^5*c^5*d*j - 384*a^3*b^3*c^
6*d*j + 64*a^3*b^4*c^5*g*h - 256*a^4*b^2*c^6*g*h - 288*a^2*b^6*c^4*d*l + 17
92*a^3*b^4*c^5*d*l - 32*a^3*b^4*c^5*e*k + 32*a^3*b^4*c^5*f*j - 4352*a^4*b^2
*c^6*d*l + 512*a^4*b^2*c^6*e*k + 16*a^2*b^7*c^3*f*l + 96*a^3*b^5*c^4*e*m -
144*a^3*b^5*c^4*f*l + 16*a^3*b^5*c^4*g*k - 896*a^4*b^3*c^5*e*m + 256*a^4*b^
3*c^5*f*l - 256*a^4*b^3*c^5*g*k - 128*a^4*b^3*c^5*h*j - 48*a^3*b^6*c^3*g*m
- 48*a^3*b^6*c^3*h*l + 448*a^4*b^4*c^4*g*m + 512*a^4*b^4*c^4*h*l - 1024*a^5
*b^2*c^5*g*m - 1536*a^5*b^2*c^5*h*l - 32*a^4*b^4*c^4*j*k + 512*a^5*b^2*c^5*
j*k + 96*a^4*b^5*c^3*j*m + 80*a^4*b^5*c^3*k*l - 896*a^5*b^3*c^4*j*m - 768*a
^5*b^3*c^4*k*l - 256*a^5*b^4*c^3*l*m + 2304*a^6*b^2*c^4*l*m)/(8*(64*a^5*c^6
- a^2*b^6*c^3 + 12*a^3*b^4*c^4 - 48*a^4*b^2*c^5)) - root(1572864*a^8*b^2*c
^10*z^4 - 983040*a^7*b^4*c^9*z^4 + 327680*a^6*b^6*c^8*z^4 - 61440*a^5*b^8*c
^7*z^4 + 6144*a^4*b^10*c^6*z^4 - 256*a^3*b^12*c^5*z^4 - 1048576*a^9*c^11*z^
4 - 1572864*a^8*b^2*c^8*l*z^3 + 983040*a^7*b^4*c^7*l*z^3 - 327680*a^6*b^6*c
^6*l*z^3 + 61440*a^5*b^8*c^5*l*z^3 - 6144*a^4*b^10*c^4*l*z^3 + 256*a^3*b^12
*c^3*l*z^3 + 1048576*a^9*c^9*l*z^3 + 96*a^3*b^12*c*k*m*z^2 + 98304*a^8*b*c^
7*j*l*z^2 + 24576*a^8*b*c^7*h*m*z^2 + 155648*a^7*b*c^8*d*m*z^2 + 98304*a^7*
b*c^8*e*l*z^2 + 57344*a^7*b*c^8*f*k*z^2 + 32768*a^7*b*c^8*g*j*z^2 + 57344*a
^6*b*c^9*d*h*z^2 + 32768*a^6*b*c^9*e*g*z^2 - 32*a*b^10*c^5*d*f*z^2 - 491520
*a^8*b^2*c^6*k*m*z^2 + 358400*a^7*b^4*c^5*k*m*z^2 - 129024*a^6*b^6*c^4*k*m*
z^2 + 24768*a^5*b^8*c^3*k*m*z^2 - 2432*a^4*b^10*c^2*k*m*z^2 - 90112*a^7*b^3
*c^6*j*l*z^2 + 30720*a^6*b^5*c^5*j*l*z^2 - 4608*a^5*b^7*c^4*j*l*z^2 + 256*a
^4*b^9*c^3*j*l*z^2 - 21504*a^6*b^5*c^5*h*m*z^2 + 9216*a^5*b^7*c^4*h*m*z^2 +
8192*a^7*b^3*c^6*h*m*z^2 - 1568*a^4*b^9*c^3*h*m*z^2 + 96*a^3*b^11*c^2*h*m*
z^2 - 172032*a^7*b^2*c^7*f*m*z^2 + 116736*a^6*b^4*c^6*f*m*z^2 - 49152*a^7*b
^2*c^7*g*l*z^2 + 45056*a^6*b^4*c^6*g*l*z^2 - 35840*a^5*b^6*c^5*f*m*z^2 + 24
576*a^7*b^2*c^7*h*k*z^2 - 15360*a^5*b^6*c^5*g*l*z^2 + 5184*a^4*b^8*c^4*f*m*
z^2 - 3072*a^5*b^6*c^5*h*k*z^2 + 2304*a^4*b^8*c^4*g*l*z^2 + 2048*a^6*b^4*c^
6*h*k*z^2 + 576*a^4*b^8*c^4*h*k*z^2 - 288*a^3*b^10*c^3*f*m*z^2 - 128*a^3*b^
10*c^3*g*l*z^2 - 32*a^3*b^10*c^3*h*k*z^2 - 147456*a^6*b^3*c^7*d*m*z^2 - 901
12*a^6*b^3*c^7*e*l*z^2 + 52224*a^5*b^5*c^6*d*m*z^2 - 49152*a^6*b^3*c^7*f*k*
z^2 + 30720*a^5*b^5*c^6*e*l*z^2 - 24576*a^6*b^3*c^7*g*j*z^2 + 15360*a^5*b^5
*c^6*f*k*z^2 - 8192*a^4*b^7*c^5*d*m*z^2 + 6144*a^5*b^5*c^6*g*j*z^2 - 4608*a

```
^4*b^7*c^5*e*l*z^2 - 2048*a^4*b^7*c^5*f*k*z^2 - 512*a^4*b^7*c^5*g*j*z^2 + 4
80*a^3*b^9*c^4*d*m*z^2 + 256*a^3*b^9*c^4*e*l*z^2 + 96*a^3*b^9*c^4*f*k*z^2 +
 131072*a^6*b^2*c^8*d*k*z^2 + 49152*a^6*b^2*c^8*e*j*z^2 - 43008*a^5*b^4*c^7
*d*k*z^2 - 12288*a^5*b^4*c^7*e*j*z^2 + 6144*a^4*b^6*c^6*d*k*z^2 + 1024*a^4*
b^6*c^6*e*j*z^2 - 320*a^3*b^8*c^5*d*k*z^2 + 6144*a^5*b^4*c^7*f*h*z^2 - 2048
*a^4*b^6*c^6*f*h*z^2 + 192*a^3*b^8*c^5*f*h*z^2 - 49152*a^5*b^3*c^8*d*h*z^2
- 24576*a^5*b^3*c^8*e*g*z^2 + 15360*a^4*b^5*c^7*d*h*z^2 + 6144*a^4*b^5*c^7*
e*g*z^2 - 2048*a^3*b^7*c^6*d*h*z^2 - 512*a^3*b^7*c^6*e*g*z^2 + 96*a^2*b^9*c
^5*d*h*z^2 + 24576*a^5*b^2*c^9*d*f*z^2 - 3072*a^3*b^6*c^7*d*f*z^2 + 2048*a^
4*b^4*c^8*d*f*z^2 + 576*a^2*b^8*c^6*d*f*z^2 - 430080*a^9*b*c^6*m^2*z^2 + 34
08*a^4*b^11*c*m^2*z^2 - 64*a^3*b^12*c*l^2*z^2 + 61440*a^8*b*c^7*k^2*z^2 + 1
2288*a^7*b*c^8*h^2*z^2 + 12288*a^6*b*c^9*f^2*z^2 + 61440*a^5*b*c^10*d^2*z^2
 + 432*a*b^9*c^6*d^2*z^2 + 245760*a^9*c^7*k*m*z^2 + 81920*a^8*c^8*f*m*z^2 -
 49152*a^8*c^8*h*k*z^2 - 147456*a^7*c^9*d*k*z^2 - 65536*a^7*c^9*e*j*z^2 - 1
6384*a^7*c^9*f*h*z^2 - 49152*a^6*c^10*d*f*z^2 + 716800*a^8*b^3*c^5*m^2*z^2
- 483840*a^7*b^5*c^4*m^2*z^2 + 170496*a^6*b^7*c^3*m^2*z^2 - 33232*a^5*b^9*c
^2*m^2*z^2 + 516096*a^8*b^2*c^6*l^2*z^2 - 288768*a^7*b^4*c^5*l^2*z^2 + 8857
6*a^6*b^6*c^4*l^2*z^2 - 15744*a^5*b^8*c^3*l^2*z^2 + 1536*a^4*b^10*c^2*l^2*z
^2 - 61440*a^7*b^3*c^6*k^2*z^2 + 24064*a^6*b^5*c^5*k^2*z^2 - 4608*a^5*b^7*c
^4*k^2*z^2 + 432*a^4*b^9*c^3*k^2*z^2 - 16*a^3*b^11*c^2*k^2*z^2 + 24576*a^7*
b^2*c^7*j^2*z^2 - 6144*a^6*b^4*c^6*j^2*z^2 + 512*a^5*b^6*c^5*j^2*z^2 - 8192
*a^6*b^3*c^7*h^2*z^2 + 1536*a^5*b^5*c^6*h^2*z^2 - 16*a^3*b^9*c^4*h^2*z^2 -
8192*a^6*b^2*c^8*g^2*z^2 + 6144*a^5*b^4*c^7*g^2*z^2 - 1536*a^4*b^6*c^6*g^2*
z^2 + 128*a^3*b^8*c^5*g^2*z^2 - 8192*a^5*b^3*c^8*f^2*z^2 + 1536*a^4*b^5*c^7
*f^2*z^2 - 16*a^2*b^9*c^5*f^2*z^2 + 24576*a^5*b^2*c^9*e^2*z^2 - 6144*a^4*b^
4*c^8*e^2*z^2 + 512*a^3*b^6*c^7*e^2*z^2 - 61440*a^4*b^3*c^9*d^2*z^2 + 24064
*a^3*b^5*c^8*d^2*z^2 - 4608*a^2*b^7*c^7*d^2*z^2 - 393216*a^9*c^7*l^2*z^2 -
144*a^3*b^13*m^2*z^2 - 32768*a^8*c^8*j^2*z^2 - 32768*a^6*c^10*e^2*z^2 - 16*
b^11*c^5*d^2*z^2 + 18432*a^8*b*c^5*h*l*m*z - 96*a^3*b^10*c*g*k*m*z + 90112*
a^7*b*c^6*e*k*m*z + 36864*a^7*b*c^6*f*j*m*z - 16384*a^7*b*c^6*g*j*l*z + 143
36*a^7*b*c^6*d*l*m*z - 10240*a^7*b*c^6*f*k*l*z + 4096*a^7*b*c^6*h*j*k*z + 1
0240*a^7*b*c^6*g*h*m*z - 47104*a^6*b*c^7*d*h*l*z + 36864*a^6*b*c^7*e*f*m*z
+ 30720*a^6*b*c^7*d*g*m*z - 16384*a^6*b*c^7*e*g*l*z + 6144*a^6*b*c^7*f*g*k*
z + 4096*a^6*b*c^7*e*h*k*z + 32*a*b^10*c^3*d*f*l*z - 4096*a^5*b*c^8*d*f*j*z
 - 6144*a^5*b*c^8*d*g*h*z - 32*a*b^8*c^5*d*f*g*z - 4096*a^4*b*c^9*d*e*f*z +
 64*a*b^7*c^6*d*e*f*z + 110592*a^8*b^2*c^4*k*l*m*z - 36864*a^7*b^4*c^3*k*l*
m*z + 5376*a^6*b^6*c^2*k*l*m*z - 79872*a^7*b^3*c^4*j*k*m*z + 26112*a^6*b^5*
c^3*j*k*m*z - 3712*a^5*b^7*c^2*j*k*m*z - 13824*a^7*b^3*c^4*h*l*m*z + 3456*a
^6*b^5*c^3*h*l*m*z - 288*a^5*b^7*c^2*h*l*m*z - 45056*a^7*b^2*c^5*g*k*m*z +
39936*a^6*b^4*c^4*g*k*m*z + 30720*a^7*b^2*c^5*f*l*m*z - 18432*a^7*b^2*c^5*h
*k*l*z - 13056*a^5*b^6*c^3*g*k*m*z - 7680*a^6*b^4*c^4*f*l*m*z + 5376*a^6*b^
4*c^4*h*j*m*z + 4608*a^6*b^4*c^4*h*k*l*z + 3072*a^7*b^2*c^5*h*j*m*z - 1984*
a^5*b^6*c^3*h*j*m*z + 1856*a^4*b^8*c^2*g*k*m*z + 640*a^5*b^6*c^3*f*l*m*z -
384*a^5*b^6*c^3*h*k*l*z + 192*a^4*b^8*c^2*h*j*m*z - 79872*a^6*b^3*c^5*e*k*m
*z - 27648*a^6*b^3*c^5*f*j*m*z + 26112*a^5*b^5*c^4*e*k*m*z + 12288*a^6*b^3*
c^5*g*j*l*z - 10752*a^6*b^3*c^5*d*l*m*z + 7680*a^6*b^3*c^5*f*k*l*z + 6912*a
^5*b^5*c^4*f*j*m*z - 3712*a^4*b^7*c^3*e*k*m*z - 3072*a^6*b^3*c^5*h*j*k*z -
3072*a^5*b^5*c^4*g*j*l*z + 2688*a^5*b^5*c^4*d*l*m*z - 1920*a^5*b^5*c^4*f*k*
l*z + 768*a^5*b^5*c^4*h*j*k*z - 576*a^4*b^7*c^3*f*j*m*z + 256*a^4*b^7*c^3*g
*j*l*z - 224*a^4*b^7*c^3*d*l*m*z + 192*a^3*b^9*c^2*e*k*m*z + 160*a^4*b^7*c^
3*f*k*l*z - 64*a^4*b^7*c^3*h*j*k*z - 2688*a^5*b^5*c^4*g*h*m*z - 1536*a^6*b^
3*c^5*g*h*m*z + 992*a^4*b^7*c^3*g*h*m*z - 96*a^3*b^9*c^2*g*h*m*z - 65536*a^
6*b^2*c^6*d*k*l*z + 46080*a^6*b^2*c^6*d*j*m*z - 24576*a^6*b^2*c^6*e*j*l*z +
 21504*a^5*b^4*c^5*d*k*l*z - 11520*a^5*b^4*c^5*d*j*m*z + 9216*a^6*b^2*c^6*f
*j*k*z + 6144*a^5*b^4*c^5*e*j*l*z - 3072*a^4*b^6*c^4*d*k*l*z - 2304*a^5*b^4
*c^5*f*j*k*z + 960*a^4*b^6*c^4*d*j*m*z - 512*a^4*b^6*c^4*e*j*l*z + 192*a^4*
b^6*c^4*f*j*k*z + 160*a^3*b^8*c^3*d*k*l*z - 18432*a^6*b^2*c^6*f*g*m*z + 138
24*a^5*b^4*c^5*f*g*m*z + 5376*a^5*b^4*c^5*e*h*m*z - 3456*a^4*b^6*c^4*f*g*m*
z + 3072*a^6*b^2*c^6*e*h*m*z - 3072*a^5*b^4*c^5*f*h*l*z - 2048*a^6*b^2*c^6*
```

g*h*k*z - 1984*a^4*b^6*c^4*e*h*m*z + 1536*a^5*b^4*c^5*g*h*k*z + 1024*a^4*b^
6*c^4*f*h*l*z - 384*a^4*b^6*c^4*g*h*k*z + 288*a^3*b^8*c^3*f*g*m*z + 192*a^3
*b^8*c^3*e*h*m*z - 96*a^3*b^8*c^3*f*h*l*z + 32*a^3*b^8*c^3*g*h*k*z + 41472*
a^5*b^3*c^6*d*h*l*z - 27648*a^5*b^3*c^6*e*f*m*z - 23040*a^5*b^3*c^6*d*g*m*z
 - 13440*a^4*b^5*c^5*d*h*l*z + 12288*a^5*b^3*c^6*e*g*l*z + 6912*a^4*b^5*c^5
*e*f*m*z + 5760*a^4*b^5*c^5*d*g*m*z - 4608*a^5*b^3*c^6*f*g*k*z - 3072*a^5*b
^3*c^6*e*h*k*z - 3072*a^4*b^5*c^5*e*g*l*z + 1888*a^3*b^7*c^4*d*h*l*z + 1152
*a^4*b^5*c^5*f*g*k*z + 768*a^4*b^5*c^5*e*h*k*z - 576*a^3*b^7*c^4*e*f*m*z -
480*a^3*b^7*c^4*d*g*m*z + 256*a^3*b^7*c^4*e*g*l*z - 96*a^3*b^7*c^4*f*g*k*z
 - 96*a^2*b^9*c^3*d*h*l*z - 64*a^3*b^7*c^4*e*h*k*z + 46080*a^5*b^2*c^7*d*e*m
*z - 11520*a^4*b^4*c^6*d*e*m*z + 9216*a^5*b^2*c^7*e*f*k*z - 9216*a^5*b^2*c^
7*d*h*j*z - 6656*a^4*b^4*c^6*d*f*l*z - 6144*a^5*b^2*c^7*d*f*l*z + 3456*a^3*
b^6*c^5*d*f*l*z - 2304*a^4*b^4*c^6*e*f*k*z + 2304*a^4*b^4*c^6*d*h*j*z + 960
*a^3*b^6*c^5*d*e*m*z - 576*a^2*b^8*c^4*d*f*l*z + 192*a^3*b^6*c^5*e*f*k*z -
192*a^3*b^6*c^5*d*h*j*z + 3072*a^4*b^3*c^7*d*f*j*z - 768*a^3*b^5*c^6*d*f*j*
z + 64*a^2*b^7*c^5*d*f*j*z + 4608*a^4*b^3*c^7*d*g*h*z - 1152*a^3*b^5*c^6*d*
g*h*z + 96*a^2*b^7*c^5*d*g*h*z - 9216*a^4*b^2*c^8*d*e*h*z + 2304*a^3*b^4*c^
7*d*e*h*z + 2048*a^4*b^2*c^8*d*f*g*z - 1536*a^3*b^4*c^7*d*f*g*z + 384*a^2*b
^6*c^6*d*f*g*z - 192*a^2*b^6*c^6*d*e*h*z + 3072*a^3*b^3*c^8*d*e*f*z - 768*a
^2*b^5*c^7*d*e*f*z - 288*a^5*b^8*c*k*l*m*z + 90112*a^8*b*c^5*j*k*m*z + 192*
a^4*b^9*c*j*k*m*z + 138240*a^9*b*c^4*l*m^2*z - 7344*a^6*b^7*c*l*m^2*z + 508
8*a^5*b^8*c*j*m^2*z - 3072*a^8*b*c^5*k^2*l*z - 49152*a^8*b*c^5*j*l^2*z - 12
8*a^4*b^9*c*j*l^2*z - 25600*a^8*b*c^5*g*m^2*z - 9216*a^7*b*c^6*h^2*l*z - 25
44*a^4*b^9*c*g*m^2*z + 64*a^3*b^10*c*g*l^2*z + 9216*a^7*b*c^6*g*k^2*z - 307
2*a^6*b*c^7*f^2*l*z - 288*a^3*b^10*c*e*m^2*z - 49152*a^7*b*c^6*e*l^2*z - 58
368*a^5*b*c^8*d^2*l*z - 432*a*b^9*c^4*d^2*l*z - 1024*a^6*b*c^7*g*h^2*z + 32
*a*b^8*c^5*d^2*j*z + 1024*a^5*b*c^8*f^2*g*z - 9216*a^4*b*c^9*d^2*g*z + 336*
a*b^7*c^6*d^2*g*z - 672*a*b^6*c^7*d^2*e*z - 122880*a^9*c^5*k*l*m*z - 40960*
a^8*c^6*f*l*m*z + 24576*a^8*c^6*h*k*l*z - 20480*a^8*c^6*h*j*m*z + 73728*a^7
*c^7*d*k*l*z - 61440*a^7*c^7*d*j*m*z + 32768*a^7*c^7*e*j*l*z - 12288*a^7*c^
7*f*j*k*z - 20480*a^7*c^7*e*h*m*z + 8192*a^7*c^7*f*h*l*z - 61440*a^6*c^8*d*
e*m*z + 24576*a^6*c^8*d*f*l*z - 12288*a^6*c^8*e*f*k*z + 12288*a^6*c^8*d*h*j
*z + 12288*a^5*c^9*d*e*h*z - 131328*a^8*b^3*c^3*l*m^2*z + 46656*a^7*b^5*c^2
*l*m^2*z - 142848*a^8*b^2*c^4*j*m^2*z + 106368*a^7*b^4*c^3*j*m^2*z - 34208*
a^6*b^6*c^2*j*m^2*z + 2304*a^7*b^3*c^4*k^2*l*z - 576*a^6*b^5*c^3*k^2*l*z +
48*a^5*b^7*c^2*k^2*l*z + 45056*a^7*b^3*c^4*j*l^2*z - 15360*a^6*b^5*c^3*j*l^
2*z - 12288*a^7*b^2*c^5*j^2*l*z + 3072*a^6*b^4*c^4*j^2*l*z + 2304*a^5*b^7*c
^2*j*l^2*z - 256*a^5*b^6*c^3*j^2*l*z + 15872*a^7*b^2*c^5*j*k^2*z - 4992*a^6
*b^4*c^4*j*k^2*z + 672*a^5*b^6*c^3*j*k^2*z - 32*a^4*b^8*c^2*j*k^2*z + 71424
*a^7*b^3*c^4*g*m^2*z - 53184*a^6*b^5*c^3*g*m^2*z + 17104*a^5*b^7*c^2*g*m^2*
z + 6912*a^6*b^3*c^5*h^2*l*z - 1728*a^5*b^5*c^4*h^2*l*z + 144*a^4*b^7*c^3*h
^2*l*z + 24576*a^7*b^2*c^5*g*l^2*z - 22528*a^6*b^4*c^4*g*l^2*z + 7680*a^5*b
^6*c^3*g*l^2*z + 4096*a^6*b^2*c^6*g^2*l*z - 3072*a^5*b^4*c^5*g^2*l*z - 1152
*a^4*b^8*c^2*g*l^2*z + 768*a^4*b^6*c^4*g^2*l*z - 64*a^3*b^8*c^3*g^2*l*z - 1
42848*a^7*b^2*c^5*e*m^2*z + 106368*a^6*b^4*c^4*e*m^2*z - 34208*a^5*b^6*c^3*
e*m^2*z - 7936*a^6*b^3*c^5*g*k^2*z + 5088*a^4*b^8*c^2*e*m^2*z + 2496*a^5*b^
5*c^4*g*k^2*z - 1536*a^6*b^2*c^6*h^2*j*z + 1280*a^5*b^3*c^6*f^2*l*z + 384*a
^5*b^4*c^5*h^2*j*z - 336*a^4*b^7*c^3*g*k^2*z + 192*a^4*b^5*c^5*f^2*l*z - 14
4*a^3*b^7*c^4*f^2*l*z - 32*a^4*b^6*c^4*h^2*j*z + 16*a^3*b^9*c^2*g*k^2*z + 1
6*a^2*b^9*c^3*f^2*l*z + 45056*a^6*b^3*c^5*e*l^2*z - 15360*a^5*b^5*c^4*e*l^2
*z - 12288*a^5*b^2*c^7*e^2*l*z + 3072*a^4*b^4*c^6*e^2*l*z + 2304*a^4*b^7*c^
3*e*l^2*z - 256*a^3*b^6*c^5*e^2*l*z - 128*a^3*b^9*c^2*e*l^2*z + 59136*a^4*b
^3*c^7*d^2*l*z - 23488*a^3*b^5*c^6*d^2*l*z + 15872*a^6*b^2*c^6*e*k^2*z - 49
92*a^5*b^4*c^5*e*k^2*z + 4560*a^2*b^7*c^5*d^2*l*z + 1536*a^5*b^2*c^7*f^2*j*
z + 672*a^4*b^6*c^4*e*k^2*z - 384*a^4*b^4*c^6*f^2*j*z - 32*a^3*b^8*c^3*e*k^
2*z + 32*a^3*b^6*c^5*f^2*j*z + 768*a^5*b^3*c^6*g*h^2*z - 192*a^4*b^5*c^5*g*
h^2*z + 16*a^3*b^7*c^4*g*h^2*z - 15872*a^4*b^2*c^8*d^2*j*z + 4992*a^3*b^4*c
^7*d^2*j*z - 672*a^2*b^6*c^6*d^2*j*z - 1536*a^5*b^2*c^7*e*h^2*z - 768*a^4*b
^3*c^7*f^2*g*z + 384*a^4*b^4*c^6*e*h^2*z + 192*a^3*b^5*c^6*f^2*g*z - 32*a^3

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*b^6*c^5*e*h^2*z - 16*a^2*b^7*c^5*f^2*g*z + 7936*a^3*b^3*c^8*d^2*g*z - 2496
*a^2*b^5*c^7*d^2*g*z + 1536*a^4*b^2*c^8*e*f^2*z - 384*a^3*b^4*c^7*e*f^2*z +
 32*a^2*b^6*c^6*e*f^2*z - 15872*a^3*b^2*c^9*d^2*e*z + 4992*a^2*b^4*c^8*d^2*
e*z - 61440*a^8*b^2*c^4*l^3*z + 21504*a^7*b^4*c^3*l^3*z - 3328*a^6*b^6*c^2*
l^3*z + 432*a^5*b^9*l*m^2*z + 51200*a^9*c^5*j*m^2*z + 16384*a^8*c^6*j^2*l*z
 - 288*a^4*b^10*j*m^2*z - 18432*a^8*c^6*j*k^2*z + 144*a^3*b^11*g*m^2*z + 51
200*a^8*c^6*e*m^2*z + 2048*a^7*c^7*h^2*j*z + 16384*a^6*c^8*e^2*l*z + 16*b^1
1*c^3*d^2*l*z - 18432*a^7*c^7*e*k^2*z - 2048*a^6*c^8*f^2*j*z + 18432*a^5*c^
9*d^2*j*z + 192*a^5*b^8*c*l^3*z + 2048*a^6*c^8*e*h^2*z - 16*b^9*c^5*d^2*g*z
 - 2048*a^5*c^9*e*f^2*z + 32*b^8*c^6*d^2*e*z + 18432*a^4*c^10*d^2*e*z + 655
36*a^9*c^5*l^3*z - 11008*a^8*b*c^3*j*k*l*m - 288*a^6*b^5*c*j*k*l*m + 144*a^
5*b^6*c*g*k*l*m - 11008*a^7*b*c^4*e*k*l*m - 5376*a^7*b*c^4*f*j*l*m + 3840*a
^7*b*c^4*g*j*k*m - 3328*a^7*b*c^4*h*j*k*l - 96*a^4*b^7*c*g*j*k*m - 2560*a^7
*b*c^4*g*h*l*m - 36*a^3*b^8*c*f*h*k*m - 6912*a^6*b*c^5*d*j*k*l - 7872*a^6*b
*c^5*d*h*k*m - 7680*a^6*b*c^5*d*g*l*m - 5376*a^6*b*c^5*e*f*l*m + 3840*a^6*b
*c^5*e*g*k*m - 3328*a^6*b*c^5*e*h*k*l - 1536*a^6*b*c^5*f*g*k*l + 1280*a^6*b
*c^5*f*g*j*m - 768*a^6*b*c^5*g*h*j*k - 768*a^6*b*c^5*f*h*j*l - 768*a^6*b*c^
5*e*h*j*m - 36*a^2*b^9*c*d*h*k*m - 6912*a^5*b*c^6*d*e*k*l - 4864*a^5*b*c^6*
d*e*j*m - 2304*a^5*b*c^6*d*g*j*k - 1792*a^5*b*c^6*e*f*j*k - 1280*a^5*b*c^6*
d*f*j*l - 4544*a^5*b*c^6*d*f*h*m + 1536*a^5*b*c^6*d*g*h*l + 1280*a^5*b*c^6*
e*f*g*m - 768*a^5*b*c^6*e*g*h*k - 768*a^5*b*c^6*e*f*h*l - 256*a^5*b*c^6*f*g
*h*j + 12*a*b^9*c^2*d*f*h*m + 16*a*b^8*c^3*d*f*g*l - 4*a*b^8*c^3*d*f*h*k -
2304*a^4*b*c^7*d*e*g*k - 1792*a^4*b*c^7*d*e*h*j - 1280*a^4*b*c^7*d*e*f*l -
768*a^4*b*c^7*d*f*g*j - 32*a*b^7*c^4*d*e*f*l - 256*a^4*b*c^7*e*f*g*h - 768*
a^3*b*c^8*d*e*f*g + 32*a*b^5*c^6*d*e*f*g + 12*a*b^10*c*d*f*k*m + 3648*a^7*b
^3*c^2*j*k*l*m + 5504*a^7*b^2*c^3*g*k*l*m - 1824*a^6*b^4*c^2*g*k*l*m + 384*
a^7*b^2*c^3*h*j*l*m - 288*a^6*b^4*c^2*h*j*l*m - 4800*a^6*b^3*c^3*g*j*k*m +
3648*a^6*b^3*c^3*e*k*l*m + 1280*a^5*b^5*c^2*g*j*k*m + 1088*a^6*b^3*c^3*f*j*
l*m + 576*a^6*b^3*c^3*h*j*k*l - 288*a^5*b^5*c^2*e*k*l*m - 192*a^6*b^3*c^3*g
*h*l*m + 144*a^5*b^5*c^2*g*h*l*m + 9600*a^6*b^2*c^4*e*j*k*m - 4224*a^6*b^2*
c^4*d*j*l*m - 2560*a^5*b^4*c^3*e*j*k*m + 384*a^6*b^2*c^4*f*j*k*l + 224*a^5*
b^4*c^3*d*j*l*m + 192*a^4*b^6*c^2*e*j*k*m - 160*a^5*b^4*c^3*f*j*k*l - 4608*
a^6*b^2*c^4*f*h*k*m + 2688*a^6*b^2*c^4*f*g*l*m + 1664*a^6*b^2*c^4*g*h*k*l -
 744*a^5*b^4*c^3*f*h*k*m - 544*a^5*b^4*c^3*f*g*l*m + 492*a^4*b^6*c^2*f*h*k*
m + 416*a^5*b^4*c^3*g*h*j*m + 384*a^6*b^2*c^4*g*h*j*m + 384*a^6*b^2*c^4*e*h
*l*m - 288*a^5*b^4*c^3*g*h*k*l - 288*a^5*b^4*c^3*e*h*l*m - 96*a^4*b^6*c^2*g
*h*j*m + 2112*a^5*b^3*c^4*d*j*k*l - 160*a^4*b^5*c^3*d*j*k*l + 16992*a^5*b^3
*c^4*d*h*k*m - 6252*a^4*b^5*c^3*d*h*k*m - 4800*a^5*b^3*c^4*e*g*k*m + 2112*a
^5*b^3*c^4*d*g*l*m - 1728*a^5*b^3*c^4*f*g*j*m + 1280*a^4*b^5*c^3*e*g*k*m +
1088*a^5*b^3*c^4*e*f*l*m - 832*a^5*b^3*c^4*e*h*j*m + 816*a^3*b^7*c^2*d*h*k*
m + 576*a^5*b^3*c^4*e*h*k*l - 448*a^5*b^3*c^4*f*h*j*l + 288*a^4*b^5*c^3*f*g
*j*m - 192*a^5*b^3*c^4*g*h*j*k - 192*a^5*b^3*c^4*f*g*k*l + 192*a^4*b^5*c^3*
e*h*j*m - 112*a^4*b^5*c^3*d*g*l*m + 96*a^4*b^5*c^3*f*h*j*l - 96*a^3*b^7*c^2
*e*g*k*m + 80*a^4*b^5*c^3*f*g*k*l + 32*a^4*b^5*c^3*g*h*j*k - 11456*a^5*b^2*
c^5*d*f*k*m + 4992*a^5*b^2*c^5*d*h*j*l - 4608*a^5*b^2*c^5*e*g*j*l - 4224*a^
5*b^2*c^5*d*e*l*m + 3456*a^5*b^2*c^5*e*f*j*m + 3456*a^5*b^2*c^5*d*g*k*l + 2
432*a^5*b^2*c^5*d*g*j*m - 1312*a^4*b^4*c^4*d*h*j*l + 1272*a^3*b^6*c^3*d*f*k
*m - 1056*a^4*b^4*c^4*d*g*k*l + 896*a^5*b^2*c^5*f*g*j*k + 768*a^4*b^4*c^4*e
*g*j*l - 576*a^4*b^4*c^4*e*f*j*m - 480*a^4*b^4*c^4*d*g*j*m + 384*a^5*b^2*c^
5*e*h*j*k + 384*a^5*b^2*c^5*e*f*k*l - 232*a^2*b^8*c^2*d*f*k*m + 224*a^4*b^4
*c^4*d*e*l*m - 160*a^4*b^4*c^4*e*f*k*l - 96*a^4*b^4*c^4*f*g*j*k + 96*a^3*b^
6*c^3*d*h*j*l + 80*a^3*b^6*c^3*d*g*k*l - 64*a^4*b^4*c^4*e*h*j*k - 24*a^4*b^
4*c^4*d*f*k*m + 416*a^4*b^4*c^4*e*g*h*m + 384*a^5*b^2*c^5*f*g*h*l + 384*a^5
*b^2*c^5*e*g*h*m + 224*a^4*b^4*c^4*f*g*h*l - 96*a^3*b^6*c^3*e*g*h*m - 48*a^
3*b^6*c^3*f*g*h*l + 2112*a^4*b^3*c^5*d*e*k*l - 960*a^4*b^3*c^5*d*f*j*l + 96
0*a^4*b^3*c^5*d*e*j*m + 384*a^3*b^5*c^4*d*f*j*l + 320*a^4*b^3*c^5*d*g*j*k +
 192*a^4*b^3*c^5*e*f*j*k - 160*a^3*b^5*c^4*d*e*k*l - 32*a^2*b^7*c^3*d*f*j*l
 + 7392*a^4*b^3*c^5*d*f*h*m - 2496*a^4*b^3*c^5*d*g*h*l - 1728*a^4*b^3*c^5*e
*f*g*m - 1500*a^3*b^5*c^4*d*f*h*m + 656*a^3*b^5*c^4*d*g*h*l - 448*a^4*b^3*c
```

^5*e*f*h*l + 288*a^3*b^5*c^4*e*f*g*m - 192*a^4*b^3*c^5*f*g*h*j - 192*a^4*b^
3*c^5*e*g*h*k + 96*a^3*b^5*c^4*e*f*h*l - 48*a^2*b^7*c^3*d*g*h*l + 32*a^3*b^
5*c^4*e*g*h*k - 16*a^2*b^7*c^3*d*f*h*m - 640*a^4*b^2*c^6*d*e*j*k + 4992*a^4
*b^2*c^6*d*e*h*l - 3584*a^4*b^2*c^6*d*f*h*k + 2432*a^4*b^2*c^6*d*e*g*m - 13
12*a^3*b^4*c^5*d*e*h*l + 896*a^4*b^2*c^6*e*f*g*k + 896*a^4*b^2*c^6*d*g*h*j
+ 640*a^4*b^2*c^6*d*f*g*l + 600*a^3*b^4*c^5*d*f*h*k + 480*a^3*b^4*c^5*d*f*g
*l - 480*a^3*b^4*c^5*d*e*g*m + 384*a^4*b^2*c^6*e*f*h*j - 192*a^2*b^6*c^4*d*
f*g*l - 96*a^3*b^4*c^5*e*f*g*k - 96*a^3*b^4*c^5*d*g*h*j + 96*a^2*b^6*c^4*d*
e*h*l + 12*a^2*b^6*c^4*d*f*h*k - 960*a^3*b^3*c^6*d*e*f*l + 384*a^2*b^5*c^5*
d*e*f*l + 320*a^3*b^3*c^6*d*e*g*k - 192*a^3*b^3*c^6*d*f*g*j + 192*a^3*b^3*c
^6*d*e*h*j + 32*a^2*b^5*c^5*d*f*g*j - 192*a^3*b^3*c^6*e*f*g*h + 384*a^3*b^2
*c^7*d*e*f*j - 64*a^2*b^4*c^6*d*e*f*j + 896*a^3*b^2*c^7*d*e*g*h - 96*a^2*b^
4*c^6*d*e*g*h - 192*a^2*b^3*c^7*d*e*f*g + 496*a^7*b^4*c*k*l^2*m - 4752*a^7*
b^4*c*j*l*m^2 + 96*a^5*b^6*c*j^2*k*m - 6144*a^8*b*c^3*h*l^2*m - 168*a^6*b^5
*c*h*l^2*m + 6400*a^8*b*c^3*g*l*m^2 - 2862*a^6*b^5*c*h*k*m^2 + 2376*a^6*b^5
*c*g*l*m^2 - 1632*a^7*b*c^4*h^2*k*m - 480*a^8*b*c^3*h*k*m^2 - 180*a^5*b^6*c
*h*k^2*m + 54*a^4*b^7*c*h^2*k*m - 384*a^7*b*c^4*h*j^2*m + 120*a^5*b^6*c*h*k
*l^2 + 56*a^5*b^6*c*f*l^2*m + 24*a^3*b^8*c*g^2*k*m + 4512*a^7*b*c^4*f*k^2*m
 - 2304*a^7*b*c^4*g*k^2*l - 1680*a^5*b^6*c*g*j*m^2 + 1184*a^6*b*c^5*f^2*k*m
 + 804*a^5*b^6*c*f*k*m^2 + 432*a^5*b^6*c*e*l*m^2 + 60*a^4*b^7*c*f*k^2*m + 6
*a^2*b^9*c*f^2*k*m - 13312*a^7*b*c^4*d*l^2*m + 2048*a^7*b*c^4*g*j*l^2 - 102
4*a^7*b*c^4*f*k*l^2 + 64*a^4*b^7*c*g*j*l^2 + 56*a^4*b^7*c*d*l^2*m - 40*a^4*
b^7*c*f*k*l^2 + 13440*a^7*b*c^4*e*j*m^2 - 8928*a^5*b*c^6*d^2*k*m - 6240*a^7
*b*c^4*d*k*m^2 + 1614*a^4*b^7*c*d*k*m^2 - 288*a^4*b^7*c*e*j*m^2 - 170*a*b^9
*c^2*d^2*k*m + 60*a^3*b^8*c*d*k^2*m + 4608*a^6*b*c^5*e*j^2*l + 4608*a^5*b*c
^6*e^2*j*l - 2432*a^6*b*c^5*d*j^2*m + 1440*a^7*b*c^4*f*h*m^2 - 896*a^6*b*c^
5*f*j^2*k - 864*a^6*b*c^5*f*h^2*m - 558*a^4*b^7*c*f*h*m^2 + 256*a^6*b*c^5*g
*h^2*l - 40*a^3*b^8*c*d*k*l^2 - 1920*a^6*b*c^5*e*j*k^2 - 384*a^5*b*c^6*e^2*
h*m + 24*a^3*b^8*c*f*h*l^2 - 16*a*b^8*c^3*d^2*j*l + 2208*a^6*b*c^5*f*h*k^2
 - 1044*a^3*b^8*c*d*h*m^2 + 800*a^5*b*c^6*f^2*h*k - 256*a^5*b*c^6*f^2*g*l +
144*a^3*b^8*c*e*g*m^2 - 116*a*b^8*c^3*d^2*h*m + 8192*a^6*b*c^5*d*h*l^2 + 20
48*a^6*b*c^5*e*g*l^2 + 24*a^2*b^9*c*d*h*l^2 - 5856*a^4*b*c^7*d^2*f*m + 4896
*a^4*b*c^7*d^2*h*k + 2720*a^6*b*c^5*d*f*m^2 + 2304*a^4*b*c^7*d^2*g*l + 1824
*a^5*b*c^6*d*h^2*k + 438*a*b^7*c^4*d^2*f*m - 384*a^5*b*c^6*e*h^2*j + 318*a^
2*b^9*c*d*f*m^2 - 168*a*b^7*c^4*d^2*g*l + 42*a*b^7*c^4*d^2*h*k - 36*a*b^8*c
^3*d*f^2*m - 2432*a^4*b*c^7*d*e^2*m + 1536*a^5*b*c^6*e*g*j^2 + 1536*a^4*b*c
^7*e^2*g*j - 896*a^5*b*c^6*d*h*j^2 - 896*a^4*b*c^7*e^2*f*k + 4896*a^5*b*c^6
*d*f*k^2 + 1824*a^4*b*c^7*d*f^2*k - 384*a^4*b*c^7*e*f^2*j + 336*a*b^6*c^5*d
^2*e*l - 156*a*b^6*c^5*d^2*f*k + 16*a*b^6*c^5*d^2*g*j + 12*a*b^7*c^4*d*f^2*
k - 2*a*b^9*c^2*d*f*k^2 - 1920*a^3*b*c^8*d^2*e*j - 32*a*b^5*c^6*d^2*e*j + 2
208*a^3*b*c^8*d^2*f*h + 800*a^4*b*c^7*d*f*h^2 - 102*a*b^5*c^6*d^2*f*h + 12*
a*b^6*c^5*d*f^2*h - 2*a*b^7*c^4*d*f*h^2 - 896*a^3*b*c^8*d*e^2*h - 8*a*b^6*c
^5*d*f*g^2 - 240*a*b^4*c^7*d^2*e*g - 32*a*b^4*c^7*d*e^2*f + 5120*a^8*c^4*h*
j*l*m + 15360*a^7*c^5*d*j*l*m - 7680*a^7*c^5*e*j*k*m + 3072*a^7*c^5*f*j*k*l
 + 5120*a^7*c^5*e*h*l*m + 1920*a^7*c^5*f*h*k*m + 15360*a^6*c^6*d*e*l*m + 57
60*a^6*c^6*d*f*k*m + 3072*a^6*c^6*e*f*k*l - 3072*a^6*c^6*d*h*j*l - 2560*a^6
*c^6*e*f*j*m + 1536*a^6*c^6*e*h*j*k + 4608*a^5*c^7*d*e*j*k - 3072*a^5*c^7*d
*e*h*l - 1152*a^5*c^7*d*f*h*k + 512*a^5*c^7*e*f*h*j + 1536*a^4*c^8*d*e*f*j
- 8*a*b^10*c*d*f*l^2 - 5568*a^8*b^2*c^2*k*l^2*m + 15552*a^8*b^2*c^2*j*l*m^2
 + 4800*a^7*b^2*c^3*j^2*k*m - 1280*a^6*b^4*c^2*j^2*k*m + 2080*a^7*b^3*c^2*h
*l^2*m - 1088*a^7*b^2*c^3*j*k^2*l + 48*a^6*b^4*c^2*j*k^2*l - 8544*a^7*b^2*c
^3*h*k^2*m - 7776*a^7*b^3*c^2*g*l*m^2 + 7632*a^7*b^3*c^2*h*k*m^2 + 3600*a^6
*b^3*c^3*h^2*k*m + 2484*a^6*b^4*c^2*h*k^2*m - 918*a^5*b^5*c^2*h^2*k*m + 480
0*a^7*b^2*c^3*h*k*l^2 - 1424*a^6*b^4*c^2*h*k*l^2 + 1200*a^5*b^4*c^3*g^2*k*m
 - 960*a^6*b^2*c^4*g^2*k*m - 528*a^6*b^4*c^2*f*l^2*m - 416*a^6*b^3*c^3*h*j^
2*m - 320*a^4*b^6*c^2*g^2*k*m + 192*a^7*b^2*c^3*f*l^2*m + 96*a^5*b^5*c^2*h*
j^2*m + 15552*a^7*b^2*c^3*e*l*m^2 - 6720*a^7*b^2*c^3*g*j*m^2 + 6160*a^6*b^4
*c^2*g*j*m^2 - 4752*a^6*b^4*c^2*e*l*m^2 - 2016*a^7*b^2*c^3*f*k*m^2 - 1164*a
^6*b^4*c^2*f*k*m^2 + 1104*a^5*b^3*c^4*f^2*k*m + 1008*a^6*b^3*c^3*f*k^2*m +

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960*a^6*b^2*c^4*h^2*j*l - 678*a^5*b^5*c^2*f*k^2*m + 544*a^6*b^3*c^3*g*k^2*l
 - 144*a^5*b^4*c^3*h^2*j*l - 102*a^4*b^5*c^3*f^2*k*m - 62*a^3*b^7*c^2*f^2*k
*m - 24*a^5*b^5*c^2*g*k^2*l + 6432*a^6*b^3*c^3*d*l^2*m + 4800*a^5*b^2*c^5*e
^2*k*m - 2304*a^6*b^2*c^4*g*j^2*l + 1920*a^6*b^3*c^3*g*j*l^2 + 1728*a^6*b^2
*c^4*f*j^2*m - 1280*a^4*b^4*c^4*e^2*k*m + 1152*a^5*b^3*c^4*g^2*j*l - 1032*a
^5*b^5*c^2*d*l^2*m - 864*a^6*b^3*c^3*f*k*l^2 - 768*a^5*b^5*c^2*g*j*l^2 + 40
8*a^5*b^5*c^2*f*k*l^2 + 384*a^5*b^4*c^3*g*j^2*l - 288*a^5*b^4*c^3*f*j^2*m +
 192*a^6*b^2*c^4*h*j^2*k - 192*a^4*b^5*c^3*g^2*j*l + 96*a^3*b^6*c^3*e^2*k*m
 - 32*a^5*b^4*c^3*h*j^2*k - 21120*a^6*b^2*c^4*d*k^2*m + 20880*a^6*b^3*c^3*d
*k*m^2 + 19760*a^4*b^3*c^5*d^2*k*m - 12320*a^6*b^3*c^3*e*j*m^2 - 9750*a^5*b
^5*c^2*d*k*m^2 - 9390*a^3*b^5*c^4*d^2*k*m + 8460*a^5*b^4*c^3*d*k^2*m + 3360
*a^5*b^5*c^2*e*j*m^2 + 1860*a^2*b^7*c^3*d^2*k*m - 1218*a^4*b^6*c^2*d*k^2*m
- 1088*a^6*b^2*c^4*e*k^2*l + 960*a^6*b^2*c^4*g*j*k^2 - 240*a^5*b^4*c^3*g*j*
k^2 + 192*a^5*b^2*c^5*f^2*j*l - 104*a^4*b^5*c^3*g^2*h*m - 96*a^5*b^3*c^4*g^
2*h*m + 48*a^5*b^4*c^3*e*k^2*l + 48*a^4*b^4*c^4*f^2*j*l + 24*a^3*b^7*c^2*g^
2*h*m + 16*a^4*b^6*c^2*g*j*k^2 - 16*a^3*b^6*c^3*f^2*j*l + 13376*a^6*b^2*c^4
*d*k*l^2 - 5136*a^5*b^4*c^3*d*k*l^2 - 3840*a^6*b^2*c^4*e*j*l^2 + 1536*a^5*b
^4*c^3*e*j*l^2 + 1392*a^5*b^3*c^4*f*h^2*m + 1386*a^5*b^5*c^2*f*h*m^2 - 768*
a^5*b^3*c^4*e*j^2*l + 768*a^4*b^6*c^2*d*k*l^2 - 768*a^4*b^3*c^5*e^2*j*l - 5
88*a^4*b^4*c^4*f^2*h*m - 480*a^5*b^3*c^4*g*h^2*l + 480*a^5*b^3*c^4*d*j^2*m
- 480*a^5*b^2*c^5*f^2*h*m - 128*a^4*b^6*c^2*e*j*l^2 + 100*a^3*b^6*c^3*f^2*h
*m + 96*a^5*b^3*c^4*f*j^2*k + 72*a^4*b^5*c^3*g*h^2*l - 54*a^4*b^5*c^3*f*h^2
*m - 48*a^6*b^3*c^3*f*h*m^2 - 36*a^3*b^7*c^2*f*h^2*m + 6*a^2*b^8*c^2*f^2*h*
m + 6848*a^4*b^2*c^6*d^2*j*l - 2448*a^3*b^4*c^5*d^2*j*l + 624*a^5*b^4*c^3*f
*h*l^2 + 576*a^6*b^2*c^4*f*h*l^2 + 480*a^5*b^3*c^4*e*j*k^2 + 432*a^4*b^4*c^
4*f*g^2*m - 416*a^4*b^3*c^5*e^2*h*m + 336*a^2*b^6*c^4*d^2*j*l - 320*a^5*b^2
*c^5*f*g^2*m - 256*a^4*b^6*c^2*f*h*l^2 + 192*a^5*b^2*c^5*g^2*h*k + 96*a^3*b
^5*c^4*e^2*h*m - 72*a^3*b^6*c^3*f*g^2*m + 48*a^4*b^4*c^4*g^2*h*k - 32*a^4*b
^5*c^3*e*j*k^2 - 8*a^3*b^6*c^3*g^2*h*k + 24768*a^6*b^2*c^4*d*h*m^2 - 21108*
a^5*b^4*c^3*d*h*m^2 - 10048*a^4*b^2*c^6*d^2*h*m + 7218*a^4*b^6*c^2*d*h*m^2
- 6720*a^6*b^2*c^4*e*g*m^2 + 6160*a^5*b^4*c^3*e*g*m^2 - 2592*a^5*b^2*c^5*d*
h^2*m - 1680*a^4*b^6*c^2*e*g*m^2 + 1068*a^3*b^4*c^5*d^2*h*m + 960*a^5*b^2*c
^5*e*h^2*l - 876*a^4*b^4*c^4*d*h^2*m - 864*a^5*b^2*c^5*f*h^2*k + 546*a^2*b^
6*c^4*d^2*h*m + 432*a^3*b^6*c^3*d*h^2*m + 336*a^4*b^3*c^5*f^2*h*k - 320*a^5
*b^2*c^5*d*j^2*k + 192*a^5*b^2*c^5*g*h^2*j + 144*a^5*b^3*c^4*f*h*k^2 - 144*
a^4*b^4*c^4*e*h^2*l - 102*a^4*b^5*c^3*f*h*k^2 - 96*a^4*b^3*c^5*f^2*g*l - 36
*a^2*b^8*c^2*d*h^2*m - 30*a^3*b^5*c^4*f^2*h*k - 24*a^3*b^5*c^4*f^2*g*l + 16
*a^4*b^4*c^4*g*h^2*j - 12*a^4*b^4*c^4*f*h^2*k + 12*a^3*b^6*c^3*f*h^2*k + 8*
a^2*b^7*c^3*f^2*g*l + 6*a^3*b^7*c^2*f*h*k^2 - 2*a^2*b^7*c^3*f^2*h*k - 9312*
a^5*b^3*c^4*d*h*l^2 + 3288*a^4*b^5*c^3*d*h*l^2 - 2304*a^4*b^2*c^6*e^2*g*l +
 1920*a^5*b^3*c^4*e*g*l^2 + 1728*a^4*b^2*c^6*e^2*f*m + 1152*a^4*b^3*c^5*e*g
^2*l - 768*a^4*b^5*c^3*e*g*l^2 - 608*a^4*b^3*c^5*d*g^2*m - 472*a^3*b^7*c^2*
d*h*l^2 + 384*a^3*b^4*c^5*e^2*g*l - 288*a^3*b^4*c^5*e^2*f*m - 224*a^4*b^3*c
^5*f*g^2*k + 192*a^5*b^2*c^5*f*h*j^2 + 192*a^4*b^2*c^6*e^2*h*k - 192*a^3*b^
5*c^4*e*g^2*l + 120*a^3*b^5*c^4*d*g^2*m + 64*a^3*b^7*c^2*e*g*l^2 - 32*a^3*b
^4*c^5*e^2*h*k + 24*a^3*b^5*c^4*f*g^2*k + 9936*a^3*b^3*c^6*d^2*f*m + 3786*a
^4*b^5*c^3*d*f*m^2 - 3552*a^5*b^2*c^5*d*h*k^2 - 3486*a^2*b^5*c^5*d^2*f*m -
3424*a^3*b^3*c^6*d^2*g*l - 1868*a^3*b^7*c^2*d*f*m^2 + 1332*a^4*b^4*c^4*d*h*
k^2 - 1296*a^5*b^3*c^4*d*f*m^2 - 1236*a^3*b^4*c^5*d*f^2*m + 1224*a^2*b^5*c^
5*d^2*g*l - 1152*a^4*b^2*c^6*d*f^2*m + 960*a^5*b^2*c^5*e*g*k^2 - 496*a^3*b^
3*c^6*d^2*h*k + 462*a^2*b^6*c^4*d*f^2*m + 432*a^4*b^3*c^5*d*h^2*k - 240*a^4
*b^4*c^4*e*g*k^2 - 222*a^2*b^5*c^5*d^2*h*k + 192*a^4*b^2*c^6*f^2*g*j + 192*
a^4*b^2*c^6*e*f^2*l - 174*a^3*b^5*c^4*d*h^2*k - 156*a^3*b^6*c^3*d*h*k^2 + 4
8*a^3*b^4*c^5*e*f^2*l - 32*a^4*b^3*c^5*e*h^2*j + 16*a^3*b^6*c^3*e*g*k^2 + 1
6*a^3*b^4*c^5*f^2*g*j - 16*a^2*b^6*c^4*e*f^2*l + 12*a^2*b^7*c^3*d*h^2*k + 6
*a^2*b^8*c^2*d*h*k^2 + 1728*a^5*b^2*c^5*d*f*l^2 + 1392*a^4*b^4*c^4*d*f*l^2
- 840*a^3*b^6*c^3*d*f*l^2 - 768*a^4*b^2*c^6*e*g^2*j + 576*a^4*b^2*c^6*d*g^2
*k + 480*a^3*b^3*c^6*d*e^2*m + 144*a^2*b^8*c^2*d*f*l^2 + 96*a^4*b^3*c^5*d*h
*j^2 + 96*a^3*b^3*c^6*e^2*f*k - 80*a^3*b^4*c^5*d*g^2*k + 6848*a^3*b^2*c^7*d
```

^2*e*l - 3552*a^3*b^2*c^7*d^2*f*k - 2448*a^2*b^4*c^6*d^2*e*l + 1332*a^2*b^4
*c^6*d^2*f*k + 960*a^3*b^2*c^7*d^2*g*j - 496*a^4*b^3*c^5*d*f*k^2 + 432*a^3*
b^3*c^6*d*f^2*k - 240*a^2*b^4*c^6*d^2*g*j - 222*a^3*b^5*c^4*d*f*k^2 - 174*a
^2*b^5*c^5*d*f^2*k + 64*a^4*b^2*c^6*f*g^2*h + 48*a^3*b^4*c^5*f*g^2*h + 42*a
^2*b^7*c^3*d*f*k^2 - 32*a^3*b^3*c^6*e*f^2*j - 320*a^3*b^2*c^7*d*e^2*k + 192
*a^4*b^2*c^6*e*g*h^2 + 192*a^4*b^2*c^6*d*f*j^2 - 32*a^3*b^4*c^5*d*f*j^2 + 1
6*a^3*b^4*c^5*e*g*h^2 + 480*a^2*b^3*c^7*d^2*e*j - 224*a^3*b^3*c^6*d*g^2*h +
192*a^3*b^2*c^7*e^2*f*h + 24*a^2*b^5*c^5*d*g^2*h - 864*a^3*b^2*c^7*d*f^2*h
+ 336*a^3*b^3*c^6*d*f*h^2 + 192*a^3*b^2*c^7*e*f^2*g + 144*a^2*b^3*c^7*d^2*
f*h - 30*a^2*b^5*c^5*d*f*h^2 + 16*a^2*b^4*c^6*e*f^2*g - 12*a^2*b^4*c^6*d*f^
2*h + 192*a^3*b^2*c^7*d*f*g^2 + 96*a^2*b^3*c^7*d*e^2*h + 48*a^2*b^4*c^6*d*f
*g^2 + 960*a^2*b^2*c^8*d^2*e*g + 192*a^2*b^2*c^8*d*e^2*f - 7680*a^9*b*c^2*l
^2*m^2 + 3152*a^8*b^3*c*l^2*m^2 + 2070*a^7*b^4*c*k^2*m^2 - 1840*a^7*b^3*c^2
*k^3*m + 6720*a^8*b*c^3*j^2*m^2 - 3072*a^8*b*c^3*k^2*l^2 + 1680*a^6*b^5*c*j
^2*m^2 - 100*a^6*b^5*c*k^2*l^2 - 2176*a^7*b^3*c^2*j*l^3 - 256*a^6*b^3*c^3*j
^3*l - 64*a^5*b^6*c*j^2*l^2 - 12480*a^8*b^2*c^2*h*m^3 + 972*a^5*b^6*c*h^2*m
^2 - 960*a^7*b*c^4*j^2*k^2 - 252*a^5*b^4*c^3*h^3*m - 192*a^6*b^2*c^4*h^3*m
+ 54*a^4*b^6*c^2*h^3*m + 1536*a^7*b*c^4*h^2*l^2 + 420*a^4*b^7*c*g^2*m^2 - 3
6*a^4*b^7*c*h^2*l^2 - 3072*a^7*b^2*c^3*g*l^3 + 2096*a^7*b^3*c^2*f*m^3 + 108
8*a^6*b^4*c^2*g*l^3 - 496*a^6*b^3*c^3*h*k^3 - 192*a^4*b^4*c^4*g^3*l + 176*a
^4*b^3*c^5*f^3*m + 144*a^5*b^3*c^4*h^3*k + 78*a^3*b^8*c*f^2*m^2 + 54*a^3*b^
5*c^4*f^3*m + 32*a^3*b^6*c^3*g^3*l + 30*a^5*b^5*c^2*h*k^3 - 18*a^4*b^5*c^3*
h^3*k - 18*a^2*b^7*c^3*f^3*m - 16*a^3*b^8*c*g^2*l^2 + 6720*a^6*b*c^5*e^2*m^
2 - 192*a^6*b*c^5*h^2*j^2 - 4*a^2*b^9*c*f^2*l^2 - 35040*a^7*b^2*c^3*d*m^3 +
14300*a^6*b^4*c^2*d*m^3 - 12000*a^3*b^2*c^7*d^3*m + 4380*a^2*b^4*c^6*d^3*m
- 2176*a^6*b^3*c^3*e*l^3 - 256*a^3*b^3*c^6*e^3*l - 192*a^6*b^2*c^4*f*k^3 +
192*a^5*b^5*c^2*e*l^3 - 192*a^4*b^2*c^6*f^3*k + 132*a^5*b^4*c^3*f*k^3 + 12
8*a^4*b^3*c^5*g^3*j - 28*a^3*b^4*c^5*f^3*k - 10*a^4*b^6*c^2*f*k^3 + 6*a^2*b
^6*c^4*f^3*k + 10752*a^5*b*c^6*d^2*l^2 - 960*a^5*b*c^6*e^2*k^2 - 192*a^5*b*
c^6*f^2*j^2 + 108*a*b^9*c^2*d^2*l^2 - 1680*a^5*b^3*c^4*d*k^3 - 1680*a^2*b^3
*c^7*d^3*k + 222*a^4*b^5*c^3*d*k^3 + 30*a*b^8*c^3*d^2*k^2 - 10*a^3*b^7*c^2*
d*k^3 - 960*a^4*b*c^7*d^2*j^2 + 80*a^4*b^3*c^5*f*h^3 + 80*a^3*b^3*c^6*f^3*h
+ 6*a^3*b^5*c^4*f*h^3 + 6*a^2*b^5*c^5*f^3*h - 192*a^4*b*c^7*e^2*h^2 - 192*
a^4*b^2*c^6*d*h^3 - 192*a^2*b^2*c^8*d^3*h + 128*a^3*b^3*c^6*e*g^3 - 28*a^3*
b^4*c^5*d*h^3 + 12*a*b^6*c^5*d^2*h^2 + 6*a^2*b^6*c^4*d*h^3 - 192*a^3*b*c^8*
e^2*f^2 + 60*a*b^5*c^6*d^2*g^2 + 198*a*b^4*c^7*d^2*f^2 + 144*a^2*b^3*c^7*d*
f^3 - 960*a^2*b*c^9*d^2*e^2 + 240*a*b^3*c^8*d^2*e^2 + 15360*a^9*c^3*k*l^2*m
- 12800*a^9*c^3*j*l*m^2 - 3840*a^8*c^4*j^2*k*m + 432*a^6*b^6*j*l*m^2 + 460
8*a^8*c^4*j*k^2*l + 2880*a^8*c^4*h*k^2*m + 5120*a^8*c^4*f*l^2*m - 3072*a^8*
c^4*h*k*l^2 + 270*a^5*b^7*h*k*m^2 - 216*a^5*b^7*g*l*m^2 - 12800*a^8*c^4*e*l
*m^2 - 4800*a^8*c^4*f*k*m^2 - 512*a^7*c^5*h^2*j*l - 3840*a^6*c^6*e^2*k*m -
1280*a^7*c^5*f*j^2*m + 768*a^7*c^5*h*j^2*k + 144*a^4*b^8*g*j*m^2 - 90*a^4*b
^8*f*k*m^2 + 8640*a^7*c^5*d*k^2*m + 4608*a^7*c^5*e*k^2*l + 512*a^6*c^6*f^2*
j*l - 9216*a^7*c^5*d*k*l^2 - 4096*a^7*c^5*e*j*l^2 + 320*a^6*c^6*f^2*h*m - 9
0*a^3*b^9*d*k*m^2 + 15200*a^9*b*c^2*k*m^3 - 6192*a^8*b^3*c*k*m^3 + 5472*a^8
*b*c^3*k^3*m - 4608*a^5*c^7*d^2*j*l - 1024*a^7*c^5*f*h*l^2 + 150*a^6*b^5*c*
k^3*m + 54*a^3*b^9*f*h*m^2 + 6*b^10*c^2*d^2*h*m - 14400*a^7*c^5*d*h*m^2 + 8
640*a^5*c^7*d^2*h*m + 2880*a^6*c^6*d*h^2*m + 2304*a^6*c^6*d*j^2*k - 512*a^6
*c^6*e*h^2*l - 192*a^6*c^6*f*h^2*k + 6144*a^8*b*c^3*j*l^3 + 1536*a^7*b*c^4*
j^3*l - 1280*a^5*c^7*e^2*f*m + 768*a^5*c^7*e^2*h*k + 256*a^6*c^6*f*h*j^2 +
192*a^6*b^5*c*j*l^3 + 54*a^2*b^10*d*h*m^2 - 18*b^9*c^3*d^2*f*m + 8*b^9*c^3*
d^2*g*l - 2*b^9*c^3*d^2*h*k + 4068*a^7*b^4*c*h*m^3 - 1728*a^6*c^6*d*h*k^2 +
960*a^5*c^7*d*f^2*m + 512*a^5*c^7*e*f^2*l - 3072*a^6*c^6*d*f*l^2 - 16*b^8*
c^4*d^2*e*l + 6*b^8*c^4*d^2*f*k - 4608*a^4*c^8*d^2*e*l + 2400*a^8*b*c^3*f*m
^3 + 2016*a^7*b*c^4*h*k^3 - 1728*a^4*c^8*d^2*f*k - 1146*a^6*b^5*c*f*m^3 + 2
24*a^6*b*c^5*h^3*k - 96*a^5*b^6*c*g*l^3 + 96*a^5*b*c^6*f^3*m + 2304*a^4*c^8
*d*e^2*k + 768*a^5*c^7*d*f*j^2 + 6144*a^7*b*c^4*e*l^3 - 2280*a^5*b^6*c*d*m^
3 + 1536*a^4*b*c^7*e^3*l - 616*a*b^6*c^5*d^3*m + 512*a^6*b*c^5*g*j^3 + 256*
a^4*c^8*e^2*f*h + 240*a*b^10*c*d^2*m^2 + 6*b^7*c^5*d^2*f*h - 192*a^4*c^8*d*

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f^2*h + 4320*a^6*b*c^5*d*k^3 + 4320*a^3*b*c^8*d^3*k + 222*a*b^5*c^6*d^3*k +
 16*b^6*c^6*d^2*e*g + 96*a^5*b*c^6*f*h^3 + 96*a^4*b*c^7*f^3*h + 768*a^3*c^9
*d*e^2*f + 512*a^3*b*c^8*e^3*g + 132*a*b^4*c^7*d^3*h + 2016*a^2*b*c^9*d^3*f
 - 496*a*b^3*c^8*d^3*f + 224*a^3*b*c^8*d*f^3 - 18*a*b^5*c^6*d*f^3 - 3264*a^
8*b^2*c^2*k^2*m^2 - 6160*a^7*b^3*c^2*j^2*m^2 + 1104*a^7*b^3*c^2*k^2*l^2 - 1
920*a^7*b^2*c^3*j^2*l^2 + 768*a^6*b^4*c^2*j^2*l^2 + 3888*a^7*b^2*c^3*h^2*m^
2 - 3510*a^6*b^4*c^2*h^2*m^2 + 240*a^6*b^3*c^3*j^2*k^2 - 16*a^5*b^5*c^2*j^2
*k^2 + 1680*a^6*b^3*c^3*g^2*m^2 - 1648*a^6*b^3*c^3*h^2*l^2 - 1540*a^5*b^5*c
^2*g^2*m^2 + 444*a^5*b^5*c^2*h^2*l^2 - 960*a^6*b^2*c^4*h^2*k^2 - 576*a^6*b^
2*c^4*f^2*m^2 - 512*a^6*b^2*c^4*g^2*l^2 - 480*a^5*b^4*c^3*g^2*l^2 + 198*a^5
*b^4*c^3*h^2*k^2 + 192*a^4*b^6*c^2*g^2*l^2 - 186*a^5*b^4*c^3*f^2*m^2 - 97*a
^4*b^6*c^2*f^2*m^2 - 9*a^4*b^6*c^2*h^2*k^2 - 6160*a^5*b^3*c^4*e^2*m^2 + 168
0*a^4*b^5*c^3*e^2*m^2 - 240*a^5*b^3*c^4*g^2*k^2 - 240*a^5*b^3*c^4*f^2*l^2 -
 144*a^3*b^7*c^2*e^2*m^2 + 60*a^4*b^5*c^3*g^2*k^2 - 36*a^4*b^5*c^3*f^2*l^2
+ 36*a^3*b^7*c^2*f^2*l^2 - 16*a^5*b^3*c^4*h^2*j^2 - 4*a^3*b^7*c^2*g^2*k^2 +
 38512*a^5*b^2*c^5*d^2*m^2 - 32310*a^4*b^4*c^4*d^2*m^2 + 12720*a^3*b^6*c^3*
d^2*m^2 - 2500*a^2*b^8*c^2*d^2*m^2 - 1920*a^5*b^2*c^5*e^2*l^2 + 768*a^4*b^4
*c^4*e^2*l^2 - 464*a^5*b^2*c^5*f^2*k^2 - 384*a^5*b^2*c^5*g^2*j^2 - 64*a^3*b
^6*c^3*e^2*l^2 + 42*a^4*b^4*c^4*f^2*k^2 + 12*a^3*b^6*c^3*f^2*k^2 - 13104*a^
4*b^3*c^5*d^2*l^2 + 5628*a^3*b^5*c^4*d^2*l^2 - 1128*a^2*b^7*c^3*d^2*l^2 + 2
40*a^4*b^3*c^5*e^2*k^2 - 16*a^4*b^3*c^5*f^2*j^2 - 16*a^3*b^5*c^4*e^2*k^2 -
2880*a^4*b^2*c^6*d^2*k^2 + 1750*a^3*b^4*c^5*d^2*k^2 - 345*a^2*b^6*c^4*d^2*k
^2 - 48*a^4*b^3*c^5*g^2*h^2 - 4*a^3*b^5*c^4*g^2*h^2 + 240*a^3*b^3*c^6*d^2*j
^2 - 192*a^4*b^2*c^6*f^2*h^2 - 42*a^3*b^4*c^5*f^2*h^2 - 16*a^2*b^5*c^5*d^2*
j^2 - 48*a^3*b^3*c^6*f^2*g^2 - 16*a^3*b^3*c^6*e^2*h^2 - 4*a^2*b^5*c^5*f^2*g
^2 - 464*a^3*b^2*c^7*d^2*h^2 - 384*a^3*b^2*c^7*e^2*g^2 + 42*a^2*b^4*c^6*d^2
*h^2 - 240*a^2*b^3*c^7*d^2*g^2 - 16*a^2*b^3*c^7*e^2*f^2 - 960*a^2*b^2*c^8*d
^2*f^2 + 6*b^11*c*d^2*k*m - 18*a*b^11*d*f*m^2 - 7200*a^9*c^3*k^2*m^2 - 324*
a^7*b^5*l^2*m^2 - 225*a^6*b^6*k^2*m^2 - 2048*a^8*c^4*j^2*l^2 - 144*a^5*b^7*
j^2*m^2 - 2400*a^8*c^4*h^2*m^2 - 81*a^4*b^8*h^2*m^2 - 800*a^7*c^5*f^2*m^2 -
 288*a^7*c^5*h^2*k^2 - 36*a^3*b^9*g^2*m^2 - 9*a^2*b^10*f^2*m^2 - 21600*a^6*
c^6*d^2*m^2 - 2048*a^6*c^6*e^2*l^2 - 864*a^6*c^6*f^2*k^2 - 2592*a^5*c^7*d^2
*k^2 - 1536*a^5*c^7*e^2*j^2 + 1536*a^8*b^2*c^2*l^4 - 32*a^5*c^7*f^2*h^2 + 3
60*a^7*b^2*c^3*k^4 - 25*a^6*b^4*c^2*k^4 - 864*a^4*c^8*d^2*h^2 - 4*b^7*c^5*d
^2*g^2 - 9*b^6*c^6*d^2*f^2 - 288*a^3*c^9*d^2*f^2 - 24*a^5*b^2*c^5*h^4 - 16*
b^5*c^7*d^2*e^2 - 9*a^4*b^4*c^4*h^4 - 16*a^3*b^4*c^5*g^4 - 24*a^3*b^2*c^7*f
^4 - 9*a^2*b^4*c^6*f^4 - a^2*b^8*c^2*f^2*k^2 - a^2*b^6*c^4*f^2*h^2 + 630*a^
7*b^5*k*m^3 + 8000*a^9*c^3*h*m^3 + 320*a^7*c^5*h^3*m - 378*a^6*b^6*h*m^3 +
126*a^5*b^7*f*m^3 + 30*b^8*c^4*d^3*m + 24000*a^8*c^4*d*m^3 + 8640*a^4*c^8*d
^3*m - 1728*a^7*c^5*f*k^3 - 192*a^5*c^7*f^3*k - 4*b^11*c*d^2*l^2 + 126*a^4*
b^8*d*m^3 - 10*b^7*c^5*d^3*k + 4200*a^9*b^2*c*m^4 - 1024*a^6*c^6*e*j^3 - 10
24*a^4*c^8*e^3*j - 144*a^7*b^4*c*l^4 - 10*b^6*c^6*d^3*h - 1728*a^3*c^9*d^3*
h - 192*a^5*c^7*d*h^3 + 30*b^5*c^7*d^3*f + 360*a*b^2*c^9*d^4 - 9*b^12*d^2*m
^2 - 10000*a^10*c^2*m^4 - 4096*a^9*c^3*l^4 - 441*a^8*b^4*m^4 - 1296*a^8*c^4
*k^4 - 256*a^7*c^5*j^4 - 16*a^6*c^6*h^4 - 16*a^4*c^8*f^4 - 256*a^3*c^9*e^4
- 25*b^4*c^8*d^4 - 1296*a^2*c^10*d^4 - b^10*c^2*d^2*k^2 - b^8*c^4*d^2*h^2,
z, k1)*((6144*a^5*c^9*d + 2048*a^6*c^8*h - 10240*a^7*c^7*m - 288*a^2*b^6*c^
6*d + 1920*a^3*b^4*c^7*d - 5632*a^4*b^2*c^8*d + 16*a^2*b^7*c^5*f - 192*a^3*
b^5*c^6*f + 768*a^4*b^3*c^7*f - 32*a^3*b^6*c^5*h + 384*a^4*b^4*c^6*h - 1536
*a^5*b^2*c^7*h + 16*a^3*b^7*c^4*k - 192*a^4*b^5*c^5*k + 768*a^5*b^3*c^6*k -
 48*a^3*b^8*c^3*m + 736*a^4*b^6*c^4*m - 4224*a^5*b^4*c^5*m + 10752*a^6*b^2*
c^6*m + 16*a*b^8*c^5*d - 1024*a^5*b*c^8*f - 1024*a^6*b*c^7*k)/(8*(64*a^5*c^
6 - a^2*b^6*c^3 + 12*a^3*b^4*c^4 - 48*a^4*b^2*c^5)) + (x*(32*a^2*b^6*c^6*e
- 2048*a^6*c^8*j - 2048*a^5*c^9*e - 384*a^3*b^4*c^7*e + 1536*a^4*b^2*c^8*e
- 16*a^2*b^7*c^5*g + 192*a^3*b^5*c^6*g - 768*a^4*b^3*c^7*g + 32*a^3*b^6*c^5
*j - 384*a^4*b^4*c^6*j + 1536*a^5*b^2*c^7*j + 32*a^2*b^9*c^3*l - 528*a^3*b^
7*c^4*l + 3264*a^4*b^5*c^5*l - 8960*a^5*b^3*c^6*l + 1024*a^5*b*c^8*g + 9216
*a^6*b*c^7*l))/(4*(64*a^5*c^6 - a^2*b^6*c^3 + 12*a^3*b^4*c^4 - 48*a^4*b^2*c
^5)) - (root(1572864*a^8*b^2*c^10*z^4 - 983040*a^7*b^4*c^9*z^4 + 327680*a^6
```

*b^6*c^8*z^4 - 61440*a^5*b^8*c^7*z^4 + 6144*a^4*b^10*c^6*z^4 - 256*a^3*b^12
*c^5*z^4 - 1048576*a^9*c^11*z^4 - 1572864*a^8*b^2*c^8*l*z^3 + 983040*a^7*b^
4*c^7*l*z^3 - 327680*a^6*b^6*c^6*l*z^3 + 61440*a^5*b^8*c^5*l*z^3 - 6144*a^4
*b^10*c^4*l*z^3 + 256*a^3*b^12*c^3*l*z^3 + 1048576*a^9*c^9*l*z^3 + 96*a^3*b
^12*c*k*m*z^2 + 98304*a^8*b*c^7*j*l*z^2 + 24576*a^8*b*c^7*h*m*z^2 + 155648*
a^7*b*c^8*d*m*z^2 + 98304*a^7*b*c^8*e*l*z^2 + 57344*a^7*b*c^8*f*k*z^2 + 327
68*a^7*b*c^8*g*j*z^2 + 57344*a^6*b*c^9*d*h*z^2 + 32768*a^6*b*c^9*e*g*z^2 -
32*a*b^10*c^5*d*f*z^2 - 491520*a^8*b^2*c^6*k*m*z^2 + 358400*a^7*b^4*c^5*k*m
*z^2 - 129024*a^6*b^6*c^4*k*m*z^2 + 24768*a^5*b^8*c^3*k*m*z^2 - 2432*a^4*b^
10*c^2*k*m*z^2 - 90112*a^7*b^3*c^6*j*l*z^2 + 30720*a^6*b^5*c^5*j*l*z^2 - 46
08*a^5*b^7*c^4*j*l*z^2 + 256*a^4*b^9*c^3*j*l*z^2 - 21504*a^6*b^5*c^5*h*m*z^
2 + 9216*a^5*b^7*c^4*h*m*z^2 + 8192*a^7*b^3*c^6*h*m*z^2 - 1568*a^4*b^9*c^3*
h*m*z^2 + 96*a^3*b^11*c^2*h*m*z^2 - 172032*a^7*b^2*c^7*f*m*z^2 + 116736*a^6
*b^4*c^6*f*m*z^2 - 49152*a^7*b^2*c^7*g*l*z^2 + 45056*a^6*b^4*c^6*g*l*z^2 -
35840*a^5*b^6*c^5*f*m*z^2 + 24576*a^7*b^2*c^7*h*k*z^2 - 15360*a^5*b^6*c^5*g
*l*z^2 + 5184*a^4*b^8*c^4*f*m*z^2 - 3072*a^5*b^6*c^5*h*k*z^2 + 2304*a^4*b^8
*c^4*g*l*z^2 + 2048*a^6*b^4*c^6*h*k*z^2 + 576*a^4*b^8*c^4*h*k*z^2 - 288*a^3
*b^10*c^3*f*m*z^2 - 128*a^3*b^10*c^3*g*l*z^2 - 32*a^3*b^10*c^3*h*k*z^2 - 14
7456*a^6*b^3*c^7*d*m*z^2 - 90112*a^6*b^3*c^7*e*l*z^2 + 52224*a^5*b^5*c^6*d*
m*z^2 - 49152*a^6*b^3*c^7*f*k*z^2 + 30720*a^5*b^5*c^6*e*l*z^2 - 24576*a^6*b
^3*c^7*g*j*z^2 + 15360*a^5*b^5*c^6*f*k*z^2 - 8192*a^4*b^7*c^5*d*m*z^2 + 614
4*a^5*b^5*c^6*g*j*z^2 - 4608*a^4*b^7*c^5*e*l*z^2 - 2048*a^4*b^7*c^5*f*k*z^2
 - 512*a^4*b^7*c^5*g*j*z^2 + 480*a^3*b^9*c^4*d*m*z^2 + 256*a^3*b^9*c^4*e*l*
z^2 + 96*a^3*b^9*c^4*f*k*z^2 + 131072*a^6*b^2*c^8*d*k*z^2 + 49152*a^6*b^2*c
^8*e*j*z^2 - 43008*a^5*b^4*c^7*d*k*z^2 - 12288*a^5*b^4*c^7*e*j*z^2 + 6144*a
^4*b^6*c^6*d*k*z^2 + 1024*a^4*b^6*c^6*e*j*z^2 - 320*a^3*b^8*c^5*d*k*z^2 + 6
144*a^5*b^4*c^7*f*h*z^2 - 2048*a^4*b^6*c^6*f*h*z^2 + 192*a^3*b^8*c^5*f*h*z^
2 - 49152*a^5*b^3*c^8*d*h*z^2 - 24576*a^5*b^3*c^8*e*g*z^2 + 15360*a^4*b^5*c
^7*d*h*z^2 + 6144*a^4*b^5*c^7*e*g*z^2 - 2048*a^3*b^7*c^6*d*h*z^2 - 512*a^3*
b^7*c^6*e*g*z^2 + 96*a^2*b^9*c^5*d*h*z^2 + 24576*a^5*b^2*c^9*d*f*z^2 - 3072
*a^3*b^6*c^7*d*f*z^2 + 2048*a^4*b^4*c^8*d*f*z^2 + 576*a^2*b^8*c^6*d*f*z^2 -
 430080*a^9*b*c^6*m^2*z^2 + 3408*a^4*b^11*c*m^2*z^2 - 64*a^3*b^12*c*l^2*z^2
 + 61440*a^8*b*c^7*k^2*z^2 + 12288*a^7*b*c^8*h^2*z^2 + 12288*a^6*b*c^9*f^2*
z^2 + 61440*a^5*b*c^10*d^2*z^2 + 432*a*b^9*c^6*d^2*z^2 + 245760*a^9*c^7*k*m
*z^2 + 81920*a^8*c^8*f*m*z^2 - 49152*a^8*c^8*h*k*z^2 - 147456*a^7*c^9*d*k*z
^2 - 65536*a^7*c^9*e*j*z^2 - 16384*a^7*c^9*f*h*z^2 - 49152*a^6*c^10*d*f*z^2
 + 716800*a^8*b^3*c^5*m^2*z^2 - 483840*a^7*b^5*c^4*m^2*z^2 + 170496*a^6*b^7
*c^3*m^2*z^2 - 33232*a^5*b^9*c^2*m^2*z^2 + 516096*a^8*b^2*c^6*l^2*z^2 - 288
768*a^7*b^4*c^5*l^2*z^2 + 88576*a^6*b^6*c^4*l^2*z^2 - 15744*a^5*b^8*c^3*l^2
*z^2 + 1536*a^4*b^10*c^2*l^2*z^2 - 61440*a^7*b^3*c^6*k^2*z^2 + 24064*a^6*b^
5*c^5*k^2*z^2 - 4608*a^5*b^7*c^4*k^2*z^2 + 432*a^4*b^9*c^3*k^2*z^2 - 16*a^3
*b^11*c^2*k^2*z^2 + 24576*a^7*b^2*c^7*j^2*z^2 - 6144*a^6*b^4*c^6*j^2*z^2 +
512*a^5*b^6*c^5*j^2*z^2 - 8192*a^6*b^3*c^7*h^2*z^2 + 1536*a^5*b^5*c^6*h^2*z
^2 - 16*a^3*b^9*c^4*h^2*z^2 - 8192*a^6*b^2*c^8*g^2*z^2 + 6144*a^5*b^4*c^7*g
^2*z^2 - 1536*a^4*b^6*c^6*g^2*z^2 + 128*a^3*b^8*c^5*g^2*z^2 - 8192*a^5*b^3*
c^8*f^2*z^2 + 1536*a^4*b^5*c^7*f^2*z^2 - 16*a^2*b^9*c^5*f^2*z^2 + 24576*a^5
*b^2*c^9*e^2*z^2 - 6144*a^4*b^4*c^8*e^2*z^2 + 512*a^3*b^6*c^7*e^2*z^2 - 614
40*a^4*b^3*c^9*d^2*z^2 + 24064*a^3*b^5*c^8*d^2*z^2 - 4608*a^2*b^7*c^7*d^2*z
^2 - 393216*a^9*c^7*l^2*z^2 - 144*a^3*b^13*m^2*z^2 - 32768*a^8*c^8*j^2*z^2
- 32768*a^6*c^10*e^2*z^2 - 16*b^11*c^5*d^2*z^2 + 18432*a^8*b*c^5*h*l*m*z -
96*a^3*b^10*c*g*k*m*z + 90112*a^7*b*c^6*e*k*m*z + 36864*a^7*b*c^6*f*j*m*z -
 16384*a^7*b*c^6*g*j*l*z + 14336*a^7*b*c^6*d*l*m*z - 10240*a^7*b*c^6*f*k*l*
z + 4096*a^7*b*c^6*h*j*k*z + 10240*a^7*b*c^6*g*h*m*z - 47104*a^6*b*c^7*d*h*
l*z + 36864*a^6*b*c^7*e*f*m*z + 30720*a^6*b*c^7*d*g*m*z - 16384*a^6*b*c^7*e
*g*l*z + 6144*a^6*b*c^7*f*g*k*z + 4096*a^6*b*c^7*e*h*k*z + 32*a*b^10*c^3*d*
f*l*z - 4096*a^5*b*c^8*d*f*j*z - 6144*a^5*b*c^8*d*g*h*z - 32*a*b^8*c^5*d*f*
g*z - 4096*a^4*b*c^9*d*e*f*z + 64*a*b^7*c^6*d*e*f*z + 110592*a^8*b^2*c^4*k*
l*m*z - 36864*a^7*b^4*c^3*k*l*m*z + 5376*a^6*b^6*c^2*k*l*m*z - 79872*a^7*b^
3*c^4*j*k*m*z + 26112*a^6*b^5*c^3*j*k*m*z - 3712*a^5*b^7*c^2*j*k*m*z - 1382

4*a^7*b^3*c^4*h*l*m*z + 3456*a^6*b^5*c^3*h*l*m*z - 288*a^5*b^7*c^2*h*l*m*z
- 45056*a^7*b^2*c^5*g*k*m*z + 39936*a^6*b^4*c^4*g*k*m*z + 30720*a^7*b^2*c^5
*f*l*m*z - 18432*a^7*b^2*c^5*h*k*l*z - 13056*a^5*b^6*c^3*g*k*m*z - 7680*a^6
*b^4*c^4*f*l*m*z + 5376*a^6*b^4*c^4*h*j*m*z + 4608*a^6*b^4*c^4*h*k*l*z + 30
72*a^7*b^2*c^5*h*j*m*z - 1984*a^5*b^6*c^3*h*j*m*z + 1856*a^4*b^8*c^2*g*k*m*
z + 640*a^5*b^6*c^3*f*l*m*z - 384*a^5*b^6*c^3*h*k*l*z + 192*a^4*b^8*c^2*h*j
*m*z - 79872*a^6*b^3*c^5*e*k*m*z - 27648*a^6*b^3*c^5*f*j*m*z + 26112*a^5*b^
5*c^4*e*k*m*z + 12288*a^6*b^3*c^5*g*j*l*z - 10752*a^6*b^3*c^5*d*l*m*z + 768
0*a^6*b^3*c^5*f*k*l*z + 6912*a^5*b^5*c^4*f*j*m*z - 3712*a^4*b^7*c^3*e*k*m*z
 - 3072*a^6*b^3*c^5*h*j*k*z - 3072*a^5*b^5*c^4*g*j*l*z + 2688*a^5*b^5*c^4*d
*l*m*z - 1920*a^5*b^5*c^4*f*k*l*z + 768*a^5*b^5*c^4*h*j*k*z - 576*a^4*b^7*c
^3*f*j*m*z + 256*a^4*b^7*c^3*g*j*l*z - 224*a^4*b^7*c^3*d*l*m*z + 192*a^3*b^
9*c^2*e*k*m*z + 160*a^4*b^7*c^3*f*k*l*z - 64*a^4*b^7*c^3*h*j*k*z - 2688*a^5
*b^5*c^4*g*h*m*z - 1536*a^6*b^3*c^5*g*h*m*z + 992*a^4*b^7*c^3*g*h*m*z - 96*
a^3*b^9*c^2*g*h*m*z - 65536*a^6*b^2*c^6*d*k*l*z + 46080*a^6*b^2*c^6*d*j*m*z
 - 24576*a^6*b^2*c^6*e*j*l*z + 21504*a^5*b^4*c^5*d*k*l*z - 11520*a^5*b^4*c^
5*d*j*m*z + 9216*a^6*b^2*c^6*f*j*k*z + 6144*a^5*b^4*c^5*e*j*l*z - 3072*a^4*
b^6*c^4*d*k*l*z - 2304*a^5*b^4*c^5*f*j*k*z + 960*a^4*b^6*c^4*d*j*m*z - 512*
a^4*b^6*c^4*e*j*l*z + 192*a^4*b^6*c^4*f*j*k*z + 160*a^3*b^8*c^3*d*k*l*z - 1
8432*a^6*b^2*c^6*f*g*m*z + 13824*a^5*b^4*c^5*f*g*m*z + 5376*a^5*b^4*c^5*e*h
*m*z - 3456*a^4*b^6*c^4*f*g*m*z + 3072*a^6*b^2*c^6*e*h*m*z - 3072*a^5*b^4*c
^5*f*h*l*z - 2048*a^6*b^2*c^6*g*h*k*z - 1984*a^4*b^6*c^4*e*h*m*z + 1536*a^5
*b^4*c^5*g*h*k*z + 1024*a^4*b^6*c^4*f*h*l*z - 384*a^4*b^6*c^4*g*h*k*z + 288
*a^3*b^8*c^3*f*g*m*z + 192*a^3*b^8*c^3*e*h*m*z - 96*a^3*b^8*c^3*f*h*l*z + 3
2*a^3*b^8*c^3*g*h*k*z + 41472*a^5*b^3*c^6*d*h*l*z - 27648*a^5*b^3*c^6*e*f*m
*z - 23040*a^5*b^3*c^6*d*g*m*z - 13440*a^4*b^5*c^5*d*h*l*z + 12288*a^5*b^3*
c^6*e*g*l*z + 6912*a^4*b^5*c^5*e*f*m*z + 5760*a^4*b^5*c^5*d*g*m*z - 4608*a^
5*b^3*c^6*f*g*k*z - 3072*a^5*b^3*c^6*e*h*k*z - 3072*a^4*b^5*c^5*e*g*l*z + 1
888*a^3*b^7*c^4*d*h*l*z + 1152*a^4*b^5*c^5*f*g*k*z + 768*a^4*b^5*c^5*e*h*k*
z - 576*a^3*b^7*c^4*e*f*m*z - 480*a^3*b^7*c^4*d*g*m*z + 256*a^3*b^7*c^4*e*g
*l*z - 96*a^3*b^7*c^4*f*g*k*z - 96*a^2*b^9*c^3*d*h*l*z - 64*a^3*b^7*c^4*e*h
*k*z + 46080*a^5*b^2*c^7*d*e*m*z - 11520*a^4*b^4*c^6*d*e*m*z + 9216*a^5*b^2
*c^7*e*f*k*z - 9216*a^5*b^2*c^7*d*h*j*z - 6656*a^4*b^4*c^6*d*f*l*z - 6144*a
^5*b^2*c^7*d*f*l*z + 3456*a^3*b^6*c^5*d*f*l*z - 2304*a^4*b^4*c^6*e*f*k*z +
2304*a^4*b^4*c^6*d*h*j*z + 960*a^3*b^6*c^5*d*e*m*z - 576*a^2*b^8*c^4*d*f*l*
z + 192*a^3*b^6*c^5*e*f*k*z - 192*a^3*b^6*c^5*d*h*j*z + 3072*a^4*b^3*c^7*d*
f*j*z - 768*a^3*b^5*c^6*d*f*j*z + 64*a^2*b^7*c^5*d*f*j*z + 4608*a^4*b^3*c^7
*d*g*h*z - 1152*a^3*b^5*c^6*d*g*h*z + 96*a^2*b^7*c^5*d*g*h*z - 9216*a^4*b^2
*c^8*d*e*h*z + 2304*a^3*b^4*c^7*d*e*h*z + 2048*a^4*b^2*c^8*d*f*g*z - 1536*a
^3*b^4*c^7*d*f*g*z + 384*a^2*b^6*c^6*d*f*g*z - 192*a^2*b^6*c^6*d*e*h*z + 30
72*a^3*b^3*c^8*d*e*f*z - 768*a^2*b^5*c^7*d*e*f*z - 288*a^5*b^8*c*k*l*m*z +
90112*a^8*b*c^5*j*k*m*z + 192*a^4*b^9*c*j*k*m*z + 138240*a^9*b*c^4*l*m^2*z
- 7344*a^6*b^7*c*l*m^2*z + 5088*a^5*b^8*c*j*m^2*z - 3072*a^8*b*c^5*k^2*l*z
- 49152*a^8*b*c^5*j*l^2*z - 128*a^4*b^9*c*j*l^2*z - 25600*a^8*b*c^5*g*m^2*z
 - 9216*a^7*b*c^6*h^2*l*z - 2544*a^4*b^9*c*g*m^2*z + 64*a^3*b^10*c*g*l^2*z
+ 9216*a^7*b*c^6*g*k^2*z - 3072*a^6*b*c^7*f^2*l*z - 288*a^3*b^10*c*e*m^2*z
- 49152*a^7*b*c^6*e*l^2*z - 58368*a^5*b*c^8*d^2*l*z - 432*a*b^9*c^4*d^2*l*z
 - 1024*a^6*b*c^7*g*h^2*z + 32*a*b^8*c^5*d^2*j*z + 1024*a^5*b*c^8*f^2*g*z -
 9216*a^4*b*c^9*d^2*g*z + 336*a*b^7*c^6*d^2*g*z - 672*a*b^6*c^7*d^2*e*z - 1
22880*a^9*c^5*k*l*m*z - 40960*a^8*c^6*f*l*m*z + 24576*a^8*c^6*h*k*l*z - 204
80*a^8*c^6*h*j*m*z + 73728*a^7*c^7*d*k*l*z - 61440*a^7*c^7*d*j*m*z + 32768*
a^7*c^7*e*j*l*z - 12288*a^7*c^7*f*j*k*z - 20480*a^7*c^7*e*h*m*z + 8192*a^7*
c^7*f*h*l*z - 61440*a^6*c^8*d*e*m*z + 24576*a^6*c^8*d*f*l*z - 12288*a^6*c^8
*e*f*k*z + 12288*a^6*c^8*d*h*j*z + 12288*a^5*c^9*d*e*h*z - 131328*a^8*b^3*c
^3*l*m^2*z + 46656*a^7*b^5*c^2*l*m^2*z - 142848*a^8*b^2*c^4*j*m^2*z + 10636
8*a^7*b^4*c^3*j*m^2*z - 34208*a^6*b^6*c^2*j*m^2*z + 2304*a^7*b^3*c^4*k^2*l*
z - 576*a^6*b^5*c^3*k^2*l*z + 48*a^5*b^7*c^2*k^2*l*z + 45056*a^7*b^3*c^4*j*
l^2*z - 15360*a^6*b^5*c^3*j*l^2*z - 12288*a^7*b^2*c^5*j^2*l*z + 3072*a^6*b^
4*c^4*j^2*l*z + 2304*a^5*b^7*c^2*j*l^2*z - 256*a^5*b^6*c^3*j^2*l*z + 15872*

a^7*b^2*c^5*j*k^2*z - 4992*a^6*b^4*c^4*j*k^2*z + 672*a^5*b^6*c^3*j*k^2*z -
32*a^4*b^8*c^2*j*k^2*z + 71424*a^7*b^3*c^4*g*m^2*z - 53184*a^6*b^5*c^3*g*m^
2*z + 17104*a^5*b^7*c^2*g*m^2*z + 6912*a^6*b^3*c^5*h^2*l*z - 1728*a^5*b^5*c
^4*h^2*l*z + 144*a^4*b^7*c^3*h^2*l*z + 24576*a^7*b^2*c^5*g*l^2*z - 22528*a^
6*b^4*c^4*g*l^2*z + 7680*a^5*b^6*c^3*g*l^2*z + 4096*a^6*b^2*c^6*g^2*l*z - 3
072*a^5*b^4*c^5*g^2*l*z - 1152*a^4*b^8*c^2*g*l^2*z + 768*a^4*b^6*c^4*g^2*l*
z - 64*a^3*b^8*c^3*g^2*l*z - 142848*a^7*b^2*c^5*e*m^2*z + 106368*a^6*b^4*c^
4*e*m^2*z - 34208*a^5*b^6*c^3*e*m^2*z - 7936*a^6*b^3*c^5*g*k^2*z + 5088*a^4
*b^8*c^2*e*m^2*z + 2496*a^5*b^5*c^4*g*k^2*z - 1536*a^6*b^2*c^6*h^2*j*z + 12
80*a^5*b^3*c^6*f^2*l*z + 384*a^5*b^4*c^5*h^2*j*z - 336*a^4*b^7*c^3*g*k^2*z
+ 192*a^4*b^5*c^5*f^2*l*z - 144*a^3*b^7*c^4*f^2*l*z - 32*a^4*b^6*c^4*h^2*j*
z + 16*a^3*b^9*c^2*g*k^2*z + 16*a^2*b^9*c^3*f^2*l*z + 45056*a^6*b^3*c^5*e*l
^2*z - 15360*a^5*b^5*c^4*e*l^2*z - 12288*a^5*b^2*c^7*e^2*l*z + 3072*a^4*b^4
*c^6*e^2*l*z + 2304*a^4*b^7*c^3*e*l^2*z - 256*a^3*b^6*c^5*e^2*l*z - 128*a^3
*b^9*c^2*e*l^2*z + 59136*a^4*b^3*c^7*d^2*l*z - 23488*a^3*b^5*c^6*d^2*l*z +
15872*a^6*b^2*c^6*e*k^2*z - 4992*a^5*b^4*c^5*e*k^2*z + 4560*a^2*b^7*c^5*d^2
*l*z + 1536*a^5*b^2*c^7*f^2*j*z + 672*a^4*b^6*c^4*e*k^2*z - 384*a^4*b^4*c^6
*f^2*j*z - 32*a^3*b^8*c^3*e*k^2*z + 32*a^3*b^6*c^5*f^2*j*z + 768*a^5*b^3*c^
6*g*h^2*z - 192*a^4*b^5*c^5*g*h^2*z + 16*a^3*b^7*c^4*g*h^2*z - 15872*a^4*b^
2*c^8*d^2*j*z + 4992*a^3*b^4*c^7*d^2*j*z - 672*a^2*b^6*c^6*d^2*j*z - 1536*a
^5*b^2*c^7*e*h^2*z - 768*a^4*b^3*c^7*f^2*g*z + 384*a^4*b^4*c^6*e*h^2*z + 19
2*a^3*b^5*c^6*f^2*g*z - 32*a^3*b^6*c^5*e*h^2*z - 16*a^2*b^7*c^5*f^2*g*z + 7
936*a^3*b^3*c^8*d^2*g*z - 2496*a^2*b^5*c^7*d^2*g*z + 1536*a^4*b^2*c^8*e*f^2
*z - 384*a^3*b^4*c^7*e*f^2*z + 32*a^2*b^6*c^6*e*f^2*z - 15872*a^3*b^2*c^9*d
^2*e*z + 4992*a^2*b^4*c^8*d^2*e*z - 61440*a^8*b^2*c^4*l^3*z + 21504*a^7*b^4
*c^3*l^3*z - 3328*a^6*b^6*c^2*l^3*z + 432*a^5*b^9*l*m^2*z + 51200*a^9*c^5*j
*m^2*z + 16384*a^8*c^6*j^2*l*z - 288*a^4*b^10*j*m^2*z - 18432*a^8*c^6*j*k^2
*z + 144*a^3*b^11*g*m^2*z + 51200*a^8*c^6*e*m^2*z + 2048*a^7*c^7*h^2*j*z +
16384*a^6*c^8*e^2*l*z + 16*b^11*c^3*d^2*l*z - 18432*a^7*c^7*e*k^2*z - 2048*
a^6*c^8*f^2*j*z + 18432*a^5*c^9*d^2*j*z + 192*a^5*b^8*c*l^3*z + 2048*a^6*c^
8*e*h^2*z - 16*b^9*c^5*d^2*g*z - 2048*a^5*c^9*e*f^2*z + 32*b^8*c^6*d^2*e*z
+ 18432*a^4*c^10*d^2*e*z + 65536*a^9*c^5*l^3*z - 11008*a^8*b*c^3*j*k*l*m -
288*a^6*b^5*c*j*k*l*m + 144*a^5*b^6*c*g*k*l*m - 11008*a^7*b*c^4*e*k*l*m - 5
376*a^7*b*c^4*f*j*l*m + 3840*a^7*b*c^4*g*j*k*m - 3328*a^7*b*c^4*h*j*k*l - 9
6*a^4*b^7*c*g*j*k*m - 2560*a^7*b*c^4*g*h*l*m - 36*a^3*b^8*c*f*h*k*m - 6912*
a^6*b*c^5*d*j*k*l - 7872*a^6*b*c^5*d*h*k*m - 7680*a^6*b*c^5*d*g*l*m - 5376*
a^6*b*c^5*e*f*l*m + 3840*a^6*b*c^5*e*g*k*m - 3328*a^6*b*c^5*e*h*k*l - 1536*
a^6*b*c^5*f*g*k*l + 1280*a^6*b*c^5*f*g*j*m - 768*a^6*b*c^5*g*h*j*k - 768*a^
6*b*c^5*f*h*j*l - 768*a^6*b*c^5*e*h*j*m - 36*a^2*b^9*c*d*h*k*m - 6912*a^5*b
*c^6*d*e*k*l - 4864*a^5*b*c^6*d*e*j*m - 2304*a^5*b*c^6*d*g*j*k - 1792*a^5*b
*c^6*e*f*j*k - 1280*a^5*b*c^6*d*f*j*l - 4544*a^5*b*c^6*d*f*h*m + 1536*a^5*b
*c^6*d*g*h*l + 1280*a^5*b*c^6*e*f*g*m - 768*a^5*b*c^6*e*g*h*k - 768*a^5*b*c
^6*e*f*h*l - 256*a^5*b*c^6*f*g*h*j + 12*a*b^9*c^2*d*f*h*m + 16*a*b^8*c^3*d*
f*g*l - 4*a*b^8*c^3*d*f*h*k - 2304*a^4*b*c^7*d*e*g*k - 1792*a^4*b*c^7*d*e*h
*j - 1280*a^4*b*c^7*d*e*f*l - 768*a^4*b*c^7*d*f*g*j - 32*a*b^7*c^4*d*e*f*l
- 256*a^4*b*c^7*e*f*g*h - 768*a^3*b*c^8*d*e*f*g + 32*a*b^5*c^6*d*e*f*g + 12
*a*b^10*c*d*f*k*m + 3648*a^7*b^3*c^2*j*k*l*m + 5504*a^7*b^2*c^3*g*k*l*m - 1
824*a^6*b^4*c^2*g*k*l*m + 384*a^7*b^2*c^3*h*j*l*m - 288*a^6*b^4*c^2*h*j*l*m
- 4800*a^6*b^3*c^3*g*j*k*m + 3648*a^6*b^3*c^3*e*k*l*m + 1280*a^5*b^5*c^2*g
*j*k*m + 1088*a^6*b^3*c^3*f*j*l*m + 576*a^6*b^3*c^3*h*j*k*l - 288*a^5*b^5*c
^2*e*k*l*m - 192*a^6*b^3*c^3*g*h*l*m + 144*a^5*b^5*c^2*g*h*l*m + 9600*a^6*b
^2*c^4*e*j*k*m - 4224*a^6*b^2*c^4*d*j*l*m - 2560*a^5*b^4*c^3*e*j*k*m + 384*
a^6*b^2*c^4*f*j*k*l + 224*a^5*b^4*c^3*d*j*l*m + 192*a^4*b^6*c^2*e*j*k*m - 1
60*a^5*b^4*c^3*f*j*k*l - 4608*a^6*b^2*c^4*f*h*k*m + 2688*a^6*b^2*c^4*f*g*l*
m + 1664*a^6*b^2*c^4*g*h*k*l - 744*a^5*b^4*c^3*f*h*k*m - 544*a^5*b^4*c^3*f*
g*l*m + 492*a^4*b^6*c^2*f*h*k*m + 416*a^5*b^4*c^3*g*h*j*m + 384*a^6*b^2*c^4
*g*h*j*m + 384*a^6*b^2*c^4*e*h*l*m - 288*a^5*b^4*c^3*g*h*k*l - 288*a^5*b^4*
c^3*e*h*l*m - 96*a^4*b^6*c^2*g*h*j*m + 2112*a^5*b^3*c^4*d*j*k*l - 160*a^4*b
^5*c^3*d*j*k*l + 16992*a^5*b^3*c^4*d*h*k*m - 6252*a^4*b^5*c^3*d*h*k*m - 480

```
0*a^5*b^3*c^4*e*g*k*m + 2112*a^5*b^3*c^4*d*g*l*m - 1728*a^5*b^3*c^4*f*g*j*m
 + 1280*a^4*b^5*c^3*e*g*k*m + 1088*a^5*b^3*c^4*e*f*l*m - 832*a^5*b^3*c^4*e*
h*j*m + 816*a^3*b^7*c^2*d*h*k*m + 576*a^5*b^3*c^4*e*h*k*l - 448*a^5*b^3*c^4
*f*h*j*l + 288*a^4*b^5*c^3*f*g*j*m - 192*a^5*b^3*c^4*g*h*j*k - 192*a^5*b^3*
c^4*f*g*k*l + 192*a^4*b^5*c^3*e*h*j*m - 112*a^4*b^5*c^3*d*g*l*m + 96*a^4*b^
5*c^3*f*h*j*l - 96*a^3*b^7*c^2*e*g*k*m + 80*a^4*b^5*c^3*f*g*k*l + 32*a^4*b^
5*c^3*g*h*j*k - 11456*a^5*b^2*c^5*d*f*k*m + 4992*a^5*b^2*c^5*d*h*j*l - 4608
*a^5*b^2*c^5*e*g*j*l - 4224*a^5*b^2*c^5*d*e*l*m + 3456*a^5*b^2*c^5*e*f*j*m
+ 3456*a^5*b^2*c^5*d*g*k*l + 2432*a^5*b^2*c^5*d*g*j*m - 1312*a^4*b^4*c^4*d*
h*j*l + 1272*a^3*b^6*c^3*d*f*k*m - 1056*a^4*b^4*c^4*d*g*k*l + 896*a^5*b^2*c
^5*f*g*j*k + 768*a^4*b^4*c^4*e*g*j*l - 576*a^4*b^4*c^4*e*f*j*m - 480*a^4*b^
4*c^4*d*g*j*m + 384*a^5*b^2*c^5*e*h*j*k + 384*a^5*b^2*c^5*e*f*k*l - 232*a^2
*b^8*c^2*d*f*k*m + 224*a^4*b^4*c^4*d*e*l*m - 160*a^4*b^4*c^4*e*f*k*l - 96*a
^4*b^4*c^4*f*g*j*k + 96*a^3*b^6*c^3*d*h*j*l + 80*a^3*b^6*c^3*d*g*k*l - 64*a
^4*b^4*c^4*e*h*j*k - 24*a^4*b^4*c^4*d*f*k*m + 416*a^4*b^4*c^4*e*g*h*m + 384
*a^5*b^2*c^5*f*g*h*l + 384*a^5*b^2*c^5*e*g*h*m + 224*a^4*b^4*c^4*f*g*h*l -
96*a^3*b^6*c^3*e*g*h*m - 48*a^3*b^6*c^3*f*g*h*l + 2112*a^4*b^3*c^5*d*e*k*l
- 960*a^4*b^3*c^5*d*f*j*l + 960*a^4*b^3*c^5*d*e*j*m + 384*a^3*b^5*c^4*d*f*j
*l + 320*a^4*b^3*c^5*d*g*j*k + 192*a^4*b^3*c^5*e*f*j*k - 160*a^3*b^5*c^4*d*
e*k*l - 32*a^2*b^7*c^3*d*f*j*l + 7392*a^4*b^3*c^5*d*f*h*m - 2496*a^4*b^3*c^
5*d*g*h*l - 1728*a^4*b^3*c^5*e*f*g*m - 1500*a^3*b^5*c^4*d*f*h*m + 656*a^3*b
^5*c^4*d*g*h*l - 448*a^4*b^3*c^5*e*f*h*l + 288*a^3*b^5*c^4*e*f*g*m - 192*a^
4*b^3*c^5*f*g*h*j - 192*a^4*b^3*c^5*e*g*h*k + 96*a^3*b^5*c^4*e*f*h*l - 48*a
^2*b^7*c^3*d*g*h*l + 32*a^3*b^5*c^4*e*g*h*k - 16*a^2*b^7*c^3*d*f*h*m - 640*
a^4*b^2*c^6*d*e*j*k + 4992*a^4*b^2*c^6*d*e*h*l - 3584*a^4*b^2*c^6*d*f*h*k +
 2432*a^4*b^2*c^6*d*e*g*m - 1312*a^3*b^4*c^5*d*e*h*l + 896*a^4*b^2*c^6*e*f*
g*k + 896*a^4*b^2*c^6*d*g*h*j + 640*a^4*b^2*c^6*d*f*g*l + 600*a^3*b^4*c^5*d
*f*h*k + 480*a^3*b^4*c^5*d*f*g*l - 480*a^3*b^4*c^5*d*e*g*m + 384*a^4*b^2*c^
6*e*f*h*j - 192*a^2*b^6*c^4*d*f*g*l - 96*a^3*b^4*c^5*e*f*g*k - 96*a^3*b^4*c
^5*d*g*h*j + 96*a^2*b^6*c^4*d*e*h*l + 12*a^2*b^6*c^4*d*f*h*k - 960*a^3*b^3*
c^6*d*e*f*l + 384*a^2*b^5*c^5*d*e*f*l + 320*a^3*b^3*c^6*d*e*g*k - 192*a^3*b
^3*c^6*d*f*g*j + 192*a^3*b^3*c^6*d*e*h*j + 32*a^2*b^5*c^5*d*f*g*j - 192*a^3
*b^3*c^6*e*f*g*h + 384*a^3*b^2*c^7*d*e*f*j - 64*a^2*b^4*c^6*d*e*f*j + 896*a
^3*b^2*c^7*d*e*g*h - 96*a^2*b^4*c^6*d*e*g*h - 192*a^2*b^3*c^7*d*e*f*g + 496
*a^7*b^4*c*k*l^2*m - 4752*a^7*b^4*c*j*l*m^2 + 96*a^5*b^6*c*j^2*k*m - 6144*a
^8*b*c^3*h*l^2*m - 168*a^6*b^5*c*h*l^2*m + 6400*a^8*b*c^3*g*l*m^2 - 2862*a^
6*b^5*c*h*k*m^2 + 2376*a^6*b^5*c*g*l*m^2 - 1632*a^7*b*c^4*h^2*k*m - 480*a^8
*b*c^3*h*k*m^2 - 180*a^5*b^6*c*h*k^2*m + 54*a^4*b^7*c*h^2*k*m - 384*a^7*b*c
^4*h*j^2*m + 120*a^5*b^6*c*h*k*l^2 + 56*a^5*b^6*c*f*l^2*m + 24*a^3*b^8*c*g^
2*k*m + 4512*a^7*b*c^4*f*k^2*m - 2304*a^7*b*c^4*g*k^2*l - 1680*a^5*b^6*c*g*
j*m^2 + 1184*a^6*b*c^5*f^2*k*m + 804*a^5*b^6*c*f*k*m^2 + 432*a^5*b^6*c*e*l*
m^2 + 60*a^4*b^7*c*f*k^2*m + 6*a^2*b^9*c*f^2*k*m - 13312*a^7*b*c^4*d*l^2*m
+ 2048*a^7*b*c^4*g*j*l^2 - 1024*a^7*b*c^4*f*k*l^2 + 64*a^4*b^7*c*g*j*l^2 +
56*a^4*b^7*c*d*l^2*m - 40*a^4*b^7*c*f*k*l^2 + 13440*a^7*b*c^4*e*j*m^2 - 892
8*a^5*b*c^6*d^2*k*m - 6240*a^7*b*c^4*d*k*m^2 + 1614*a^4*b^7*c*d*k*m^2 - 288
*a^4*b^7*c*e*j*m^2 - 170*a*b^9*c^2*d^2*k*m + 60*a^3*b^8*c*d*k^2*m + 4608*a^
6*b*c^5*e*j^2*l + 4608*a^5*b*c^6*e^2*j*l - 2432*a^6*b*c^5*d*j^2*m + 1440*a^
7*b*c^4*f*h*m^2 - 896*a^6*b*c^5*f*j^2*k - 864*a^6*b*c^5*f*h^2*m - 558*a^4*b
^7*c*f*h*m^2 + 256*a^6*b*c^5*g*h^2*l - 40*a^3*b^8*c*d*k*l^2 - 1920*a^6*b*c^
5*e*j*k^2 - 384*a^5*b*c^6*e^2*h*m + 24*a^3*b^8*c*f*h*l^2 - 16*a*b^8*c^3*d^2
*j*l + 2208*a^6*b*c^5*f*h*k^2 - 1044*a^3*b^8*c*d*h*m^2 + 800*a^5*b*c^6*f^2*
h*k - 256*a^5*b*c^6*f^2*g*l + 144*a^3*b^8*c*e*g*m^2 - 116*a*b^8*c^3*d^2*h*m
 + 8192*a^6*b*c^5*d*h*l^2 + 2048*a^6*b*c^5*e*g*l^2 + 24*a^2*b^9*c*d*h*l^2 -
 5856*a^4*b*c^7*d^2*f*m + 4896*a^4*b*c^7*d^2*h*k + 2720*a^6*b*c^5*d*f*m^2 +
 2304*a^4*b*c^7*d^2*g*l + 1824*a^5*b*c^6*d*h^2*k + 438*a*b^7*c^4*d^2*f*m -
384*a^5*b*c^6*e*h^2*j + 318*a^2*b^9*c*d*f*m^2 - 168*a*b^7*c^4*d^2*g*l + 42*
a*b^7*c^4*d^2*h*k - 36*a*b^8*c^3*d*f^2*m - 2432*a^4*b*c^7*d*e^2*m + 1536*a^
5*b*c^6*e*g*j^2 + 1536*a^4*b*c^7*e^2*g*j - 896*a^5*b*c^6*d*h*j^2 - 896*a^4*
b*c^7*e^2*f*k + 4896*a^5*b*c^6*d*f*k^2 + 1824*a^4*b*c^7*d*f^2*k - 384*a^4*b
```

*c^7*e*f^2*j + 336*a*b^6*c^5*d^2*e*l - 156*a*b^6*c^5*d^2*f*k + 16*a*b^6*c^5
*d^2*g*j + 12*a*b^7*c^4*d*f^2*k - 2*a*b^9*c^2*d*f*k^2 - 1920*a^3*b*c^8*d^2*
e*j - 32*a*b^5*c^6*d^2*e*j + 2208*a^3*b*c^8*d^2*f*h + 800*a^4*b*c^7*d*f*h^2
 - 102*a*b^5*c^6*d^2*f*h + 12*a*b^6*c^5*d*f^2*h - 2*a*b^7*c^4*d*f*h^2 - 896
*a^3*b*c^8*d*e^2*h - 8*a*b^6*c^5*d*f*g^2 - 240*a*b^4*c^7*d^2*e*g - 32*a*b^4
*c^7*d*e^2*f + 5120*a^8*c^4*h*j*l*m + 15360*a^7*c^5*d*j*l*m - 7680*a^7*c^5*
e*j*k*m + 3072*a^7*c^5*f*j*k*l + 5120*a^7*c^5*e*h*l*m + 1920*a^7*c^5*f*h*k*
m + 15360*a^6*c^6*d*e*l*m + 5760*a^6*c^6*d*f*k*m + 3072*a^6*c^6*e*f*k*l - 3
072*a^6*c^6*d*h*j*l - 2560*a^6*c^6*e*f*j*m + 1536*a^6*c^6*e*h*j*k + 4608*a^
5*c^7*d*e*j*k - 3072*a^5*c^7*d*e*h*l - 1152*a^5*c^7*d*f*h*k + 512*a^5*c^7*e
*f*h*j + 1536*a^4*c^8*d*e*f*j - 8*a*b^10*c*d*f*l^2 - 5568*a^8*b^2*c^2*k*l^2
*m + 15552*a^8*b^2*c^2*j*l*m^2 + 4800*a^7*b^2*c^3*j^2*k*m - 1280*a^6*b^4*c^
2*j^2*k*m + 2080*a^7*b^3*c^2*h*l^2*m - 1088*a^7*b^2*c^3*j*k^2*l + 48*a^6*b^
4*c^2*j*k^2*l - 8544*a^7*b^2*c^3*h*k^2*m - 7776*a^7*b^3*c^2*g*l*m^2 + 7632*
a^7*b^3*c^2*h*k*m^2 + 3600*a^6*b^3*c^3*h^2*k*m + 2484*a^6*b^4*c^2*h*k^2*m -
 918*a^5*b^5*c^2*h^2*k*m + 4800*a^7*b^2*c^3*h*k*l^2 - 1424*a^6*b^4*c^2*h*k*
l^2 + 1200*a^5*b^4*c^3*g^2*k*m - 960*a^6*b^2*c^4*g^2*k*m - 528*a^6*b^4*c^2*
f*l^2*m - 416*a^6*b^3*c^3*h*j^2*m - 320*a^4*b^6*c^2*g^2*k*m + 192*a^7*b^2*c
^3*f*l^2*m + 96*a^5*b^5*c^2*h*j^2*m + 15552*a^7*b^2*c^3*e*l*m^2 - 6720*a^7*
b^2*c^3*g*j*m^2 + 6160*a^6*b^4*c^2*g*j*m^2 - 4752*a^6*b^4*c^2*e*l*m^2 - 201
6*a^7*b^2*c^3*f*k*m^2 - 1164*a^6*b^4*c^2*f*k*m^2 + 1104*a^5*b^3*c^4*f^2*k*m
 + 1008*a^6*b^3*c^3*f*k^2*m + 960*a^6*b^2*c^4*h^2*j*l - 678*a^5*b^5*c^2*f*k
^2*m + 544*a^6*b^3*c^3*g*k^2*l - 144*a^5*b^4*c^3*h^2*j*l - 102*a^4*b^5*c^3*
f^2*k*m - 62*a^3*b^7*c^2*f^2*k*m - 24*a^5*b^5*c^2*g*k^2*l + 6432*a^6*b^3*c^
3*d*l^2*m + 4800*a^5*b^2*c^5*e^2*k*m - 2304*a^6*b^2*c^4*g*j^2*l + 1920*a^6*
b^3*c^3*g*j*l^2 + 1728*a^6*b^2*c^4*f*j^2*m - 1280*a^4*b^4*c^4*e^2*k*m + 115
2*a^5*b^3*c^4*g^2*j*l - 1032*a^5*b^5*c^2*d*l^2*m - 864*a^6*b^3*c^3*f*k*l^2
 - 768*a^5*b^5*c^2*g*j*l^2 + 408*a^5*b^5*c^2*f*k*l^2 + 384*a^5*b^4*c^3*g*j^2
*l - 288*a^5*b^4*c^3*f*j^2*m + 192*a^6*b^2*c^4*h*j^2*k - 192*a^4*b^5*c^3*g^
2*j*l + 96*a^3*b^6*c^3*e^2*k*m - 32*a^5*b^4*c^3*h*j^2*k - 21120*a^6*b^2*c^4
*d*k^2*m + 20880*a^6*b^3*c^3*d*k*m^2 + 19760*a^4*b^3*c^5*d^2*k*m - 12320*a^
6*b^3*c^3*e*j*m^2 - 9750*a^5*b^5*c^2*d*k*m^2 - 9390*a^3*b^5*c^4*d^2*k*m + 8
460*a^5*b^4*c^3*d*k^2*m + 3360*a^5*b^5*c^2*e*j*m^2 + 1860*a^2*b^7*c^3*d^2*k
*m - 1218*a^4*b^6*c^2*d*k^2*m - 1088*a^6*b^2*c^4*e*k^2*l + 960*a^6*b^2*c^4*
g*j*k^2 - 240*a^5*b^4*c^3*g*j*k^2 + 192*a^5*b^2*c^5*f^2*j*l - 104*a^4*b^5*c
^3*g^2*h*m - 96*a^5*b^3*c^4*g^2*h*m + 48*a^5*b^4*c^3*e*k^2*l + 48*a^4*b^4*c
^4*f^2*j*l + 24*a^3*b^7*c^2*g^2*h*m + 16*a^4*b^6*c^2*g*j*k^2 - 16*a^3*b^6*c
^3*f^2*j*l + 13376*a^6*b^2*c^4*d*k*l^2 - 5136*a^5*b^4*c^3*d*k*l^2 - 3840*a^
6*b^2*c^4*e*j*l^2 + 1536*a^5*b^4*c^3*e*j*l^2 + 1392*a^5*b^3*c^4*f*h^2*m + 1
386*a^5*b^5*c^2*f*h*m^2 - 768*a^5*b^3*c^4*e*j^2*l + 768*a^4*b^6*c^2*d*k*l^2
 - 768*a^4*b^3*c^5*e^2*j*l - 588*a^4*b^4*c^4*f^2*h*m - 480*a^5*b^3*c^4*g*h^
2*l + 480*a^5*b^3*c^4*d*j^2*m - 480*a^5*b^2*c^5*f^2*h*m - 128*a^4*b^6*c^2*e
*j*l^2 + 100*a^3*b^6*c^3*f^2*h*m + 96*a^5*b^3*c^4*f*j^2*k + 72*a^4*b^5*c^3*
g*h^2*l - 54*a^4*b^5*c^3*f*h^2*m - 48*a^6*b^3*c^3*f*h*m^2 - 36*a^3*b^7*c^2*
f*h^2*m + 6*a^2*b^8*c^2*f^2*h*m + 6848*a^4*b^2*c^6*d^2*j*l - 2448*a^3*b^4*c
^5*d^2*j*l + 624*a^5*b^4*c^3*f*h*l^2 + 576*a^6*b^2*c^4*f*h*l^2 + 480*a^5*b^
3*c^4*e*j*k^2 + 432*a^4*b^4*c^4*f*g^2*m - 416*a^4*b^3*c^5*e^2*h*m + 336*a^2
*b^6*c^4*d^2*j*l - 320*a^5*b^2*c^5*f*g^2*m - 256*a^4*b^6*c^2*f*h*l^2 + 192*
a^5*b^2*c^5*g^2*h*k + 96*a^3*b^5*c^4*e^2*h*m - 72*a^3*b^6*c^3*f*g^2*m + 48*
a^4*b^4*c^4*g^2*h*k - 32*a^4*b^5*c^3*e*j*k^2 - 8*a^3*b^6*c^3*g^2*h*k + 2476
8*a^6*b^2*c^4*d*h*m^2 - 21108*a^5*b^4*c^3*d*h*m^2 - 10048*a^4*b^2*c^6*d^2*h
*m + 7218*a^4*b^6*c^2*d*h*m^2 - 6720*a^6*b^2*c^4*e*g*m^2 + 6160*a^5*b^4*c^3
*e*g*m^2 - 2592*a^5*b^2*c^5*d*h^2*m - 1680*a^4*b^6*c^2*e*g*m^2 + 1068*a^3*b
^4*c^5*d^2*h*m + 960*a^5*b^2*c^5*e*h^2*l - 876*a^4*b^4*c^4*d*h^2*m - 864*a^
5*b^2*c^5*f*h^2*k + 546*a^2*b^6*c^4*d^2*h*m + 432*a^3*b^6*c^3*d*h^2*m + 336
*a^4*b^3*c^5*f^2*h*k - 320*a^5*b^2*c^5*d*j^2*k + 192*a^5*b^2*c^5*g*h^2*j +
144*a^5*b^3*c^4*f*h*k^2 - 144*a^4*b^4*c^4*e*h^2*l - 102*a^4*b^5*c^3*f*h*k^2
 - 96*a^4*b^3*c^5*f^2*g*l - 36*a^2*b^8*c^2*d*h^2*m - 30*a^3*b^5*c^4*f^2*h*k
 - 24*a^3*b^5*c^4*f^2*g*l + 16*a^4*b^4*c^4*g*h^2*j - 12*a^4*b^4*c^4*f*h^2*k

+ 12*a^3*b^6*c^3*f*h^2*k + 8*a^2*b^7*c^3*f^2*g*l + 6*a^3*b^7*c^2*f*h*k^2 - 2*a^2*b^7*c^3*f^2*h*k - 9312*a^5*b^3*c^4*d*h*l^2 + 3288*a^4*b^5*c^3*d*h*l^2 - 2304*a^4*b^2*c^6*e^2*g*l + 1920*a^5*b^3*c^4*e*g*l^2 + 1728*a^4*b^2*c^6*e^2*f*m + 1152*a^4*b^3*c^5*e*g^2*l - 768*a^4*b^5*c^3*e*g*l^2 - 608*a^4*b^3*c^5*d*g^2*m - 472*a^3*b^7*c^2*d*h*l^2 + 384*a^3*b^4*c^5*e^2*g*l - 288*a^3*b^4*c^5*e^2*f*m - 224*a^4*b^3*c^5*f*g^2*k + 192*a^5*b^2*c^5*f*h*j^2 + 192*a^4*b^2*c^6*e^2*h*k - 192*a^3*b^5*c^4*e*g^2*l + 120*a^3*b^5*c^4*d*g^2*m + 64*a^3*b^7*c^2*e*g*l^2 - 32*a^3*b^4*c^5*e^2*h*k + 24*a^3*b^5*c^4*f*g^2*k + 9936*a^3*b^3*c^6*d^2*f*m + 3786*a^4*b^5*c^3*d*f*m^2 - 3552*a^5*b^2*c^5*d*h*k^2 - 3486*a^2*b^5*c^5*d^2*f*m - 3424*a^3*b^3*c^6*d^2*g*l - 1868*a^3*b^7*c^2*d*f*m^2 + 1332*a^4*b^4*c^4*d*h*k^2 - 1296*a^5*b^3*c^4*d*f*m^2 - 1236*a^3*b^4*c^5*d*f^2*m + 1224*a^2*b^5*c^5*d^2*g*l - 1152*a^4*b^2*c^6*d*f^2*m + 960*a^5*b^2*c^5*e*g*k^2 - 496*a^3*b^3*c^6*d^2*h*k + 462*a^2*b^6*c^4*d*f^2*m + 432*a^4*b^3*c^5*d*h^2*k - 240*a^4*b^4*c^4*e*g*k^2 - 222*a^2*b^5*c^5*d^2*h*k + 192*a^4*b^2*c^6*f^2*g*j + 192*a^4*b^2*c^6*e*f^2*l - 174*a^3*b^5*c^4*d*h^2*k - 156*a^3*b^6*c^3*d*h*k^2 + 48*a^3*b^4*c^5*e*f^2*l - 32*a^4*b^3*c^5*e*h^2*j + 16*a^3*b^6*c^3*e*g*k^2 + 16*a^3*b^4*c^5*f^2*g*j - 16*a^2*b^6*c^4*e*f^2*l + 12*a^2*b^7*c^3*d*h^2*k + 6*a^2*b^8*c^2*d*h*k^2 + 1728*a^5*b^2*c^5*d*f*l^2 + 1392*a^4*b^4*c^4*d*f*l^2 - 840*a^3*b^6*c^3*d*f*l^2 - 768*a^4*b^2*c^6*e*g^2*j + 576*a^4*b^2*c^6*d*g^2*k + 480*a^3*b^3*c^6*d*e^2*m + 144*a^2*b^8*c^2*d*f*l^2 + 96*a^4*b^3*c^5*d*h*j^2 + 96*a^3*b^3*c^6*e^2*f*k - 80*a^3*b^4*c^5*d*g^2*k + 6848*a^3*b^2*c^7*d^2*e*l - 3552*a^3*b^2*c^7*d^2*f*k - 2448*a^2*b^4*c^6*d^2*e*l + 1332*a^2*b^4*c^6*d^2*f*k + 960*a^3*b^2*c^7*d^2*g*j - 496*a^4*b^3*c^5*d*f*k^2 + 432*a^3*b^3*c^6*d*f^2*k - 240*a^2*b^4*c^6*d^2*g*j - 222*a^3*b^5*c^4*d*f*k^2 - 174*a^2*b^5*c^5*d*f^2*k + 64*a^4*b^2*c^6*f*g^2*h + 48*a^3*b^4*c^5*f*g^2*h + 42*a^2*b^7*c^3*d*f*k^2 - 32*a^3*b^3*c^6*e*f^2*j - 320*a^3*b^2*c^7*d*e^2*k + 192*a^4*b^2*c^6*e*g*h^2 + 192*a^4*b^2*c^6*d*f*j^2 - 32*a^3*b^4*c^5*d*f*j^2 + 16*a^3*b^4*c^5*e*g*h^2 + 480*a^2*b^3*c^7*d^2*e*j - 224*a^3*b^3*c^6*d*g^2*h + 192*a^3*b^2*c^7*e^2*f*h + 24*a^2*b^5*c^5*d*g^2*h - 864*a^3*b^2*c^7*d*f^2*h + 336*a^3*b^3*c^6*d*f*h^2 + 192*a^3*b^2*c^7*e*f^2*g + 144*a^2*b^3*c^7*d^2*f*h - 30*a^2*b^5*c^5*d*f*h^2 + 16*a^2*b^4*c^6*e*f^2*g - 12*a^2*b^4*c^6*d*f^2*h + 192*a^3*b^2*c^7*d*f*g^2 + 96*a^2*b^3*c^7*d*e^2*h + 48*a^2*b^4*c^6*d*f*g^2 + 960*a^2*b^2*c^8*d^2*e*g + 192*a^2*b^2*c^8*d*e^2*f - 7680*a^9*b*c^2*l^2*m^2 + 3152*a^8*b^3*c*l^2*m^2 + 2070*a^7*b^4*c*k^2*m^2 - 1840*a^7*b^3*c^2*k^3*m + 6720*a^8*b*c^3*j^2*m^2 - 3072*a^8*b*c^3*k^2*l^2 + 1680*a^6*b^5*c*j^2*m^2 - 100*a^6*b^5*c*k^2*l^2 - 2176*a^7*b^3*c^2*j*l^3 - 256*a^6*b^3*c^3*j^3*l - 64*a^5*b^6*c*j^2*l^2 - 12480*a^8*b^2*c^2*h*m^3 + 972*a^5*b^6*c*h^2*m^2 - 960*a^7*b*c^4*j^2*k^2 - 252*a^5*b^4*c^3*h^3*m - 192*a^6*b^2*c^4*h^3*m + 54*a^4*b^6*c^2*h^3*m + 1536*a^7*b*c^4*h^2*l^2 + 420*a^4*b^7*c*g^2*m^2 - 36*a^4*b^7*c*h^2*l^2 - 3072*a^7*b^2*c^3*g*l^3 + 2096*a^7*b^3*c^2*f*m^3 + 1088*a^6*b^4*c^2*g*l^3 - 496*a^6*b^3*c^3*h*k^3 - 192*a^4*b^4*c^4*g^3*l + 176*a^4*b^3*c^5*f^3*m + 144*a^5*b^3*c^4*h^3*k + 78*a^3*b^8*c*f^2*m^2 + 54*a^3*b^5*c^4*f^3*m + 32*a^3*b^6*c^3*g^3*l + 30*a^5*b^5*c^2*h*k^3 - 18*a^4*b^5*c^3*h^3*k - 18*a^2*b^7*c^3*f^3*m - 16*a^3*b^8*c*g^2*l^2 + 6720*a^6*b*c^5*e^2*m^2 - 192*a^6*b*c^5*h^2*j^2 - 4*a^2*b^9*c*f^2*l^2 - 35040*a^7*b^2*c^3*d*m^3 + 14300*a^6*b^4*c^2*d*m^3 - 12000*a^3*b^2*c^7*d^3*m + 4380*a^2*b^4*c^6*d^3*m - 2176*a^6*b^3*c^3*e*l^3 - 256*a^3*b^3*c^6*e^3*l - 192*a^6*b^2*c^4*f*k^3 + 192*a^5*b^5*c^2*e*l^3 - 192*a^4*b^2*c^6*f^3*k + 132*a^5*b^4*c^3*f*k^3 + 128*a^4*b^3*c^5*g^3*j - 28*a^3*b^4*c^5*f^3*k - 10*a^4*b^6*c^2*f*k^3 + 6*a^2*b^6*c^4*f^3*k + 10752*a^5*b*c^6*d^2*l^2 - 960*a^5*b*c^6*e^2*k^2 - 192*a^5*b*c^6*f^2*j^2 + 108*a*b^9*c^2*d^2*l^2 - 1680*a^5*b^3*c^4*d*k^3 - 1680*a^2*b^3*c^7*d^3*k + 222*a^4*b^5*c^3*d*k^3 + 30*a*b^8*c^3*d^2*k^2 - 10*a^3*b^7*c^2*d*k^3 - 960*a^4*b*c^7*d^2*j^2 + 80*a^4*b^3*c^5*f*h^3 + 80*a^3*b^3*c^6*f^3*h + 6*a^3*b^5*c^4*f*h^3 + 6*a^2*b^5*c^5*f^3*h - 192*a^4*b*c^7*e^2*h^2 - 192*a^4*b^2*c^6*d*h^3 - 192*a^2*b^2*c^8*d^3*h + 128*a^3*b^3*c^6*e*g^3 - 28*a^3*b^4*c^5*d*h^3 + 12*a*b^6*c^5*d^2*h^2 + 6*a^2*b^6*c^4*d*h^3 - 192*a^3*b*c^8*e^2*f^2 + 60*a*b^5*c^6*d^2*g^2 + 198*a*b^4*c^7*d^2*f^2 + 144*a^2*b^3*c^7*d*f^3 - 960*a^2*b*c^9*d^2*e^2 + 240*a*b^3*c^8*d^2*e^2 + 15360*a^9*c^3*k*l^2*m - 12800*a^9*c^3*j*l*m^2 - 3840*a^8*c^4*j^2*k

*m + 432*a^6*b^6*j*l*m^2 + 4608*a^8*c^4*j*k^2*l + 2880*a^8*c^4*h*k^2*m + 51
20*a^8*c^4*f*l^2*m - 3072*a^8*c^4*h*k*l^2 + 270*a^5*b^7*h*k*m^2 - 216*a^5*b
^7*g*l*m^2 - 12800*a^8*c^4*e*l*m^2 - 4800*a^8*c^4*f*k*m^2 - 512*a^7*c^5*h^2
*j*l - 3840*a^6*c^6*e^2*k*m - 1280*a^7*c^5*f*j^2*m + 768*a^7*c^5*h*j^2*k +
144*a^4*b^8*g*j*m^2 - 90*a^4*b^8*f*k*m^2 + 8640*a^7*c^5*d*k^2*m + 4608*a^7*
c^5*e*k^2*l + 512*a^6*c^6*f^2*j*l - 9216*a^7*c^5*d*k*l^2 - 4096*a^7*c^5*e*j
*l^2 + 320*a^6*c^6*f^2*h*m - 90*a^3*b^9*d*k*m^2 + 15200*a^9*b*c^2*k*m^3 - 6
192*a^8*b^3*c*k*m^3 + 5472*a^8*b*c^3*k^3*m - 4608*a^5*c^7*d^2*j*l - 1024*a^
7*c^5*f*h*l^2 + 150*a^6*b^5*c*k^3*m + 54*a^3*b^9*f*h*m^2 + 6*b^10*c^2*d^2*h
*m - 14400*a^7*c^5*d*h*m^2 + 8640*a^5*c^7*d^2*h*m + 2880*a^6*c^6*d*h^2*m +
2304*a^6*c^6*d*j^2*k - 512*a^6*c^6*e*h^2*l - 192*a^6*c^6*f*h^2*k + 6144*a^8
*b*c^3*j*l^3 + 1536*a^7*b*c^4*j^3*l - 1280*a^5*c^7*e^2*f*m + 768*a^5*c^7*e^
2*h*k + 256*a^6*c^6*f*h*j^2 + 192*a^6*b^5*c*j*l^3 + 54*a^2*b^10*d*h*m^2 - 1
8*b^9*c^3*d^2*f*m + 8*b^9*c^3*d^2*g*l - 2*b^9*c^3*d^2*h*k + 4068*a^7*b^4*c*
h*m^3 - 1728*a^6*c^6*d*h*k^2 + 960*a^5*c^7*d*f^2*m + 512*a^5*c^7*e*f^2*l -
3072*a^6*c^6*d*f*l^2 - 16*b^8*c^4*d^2*e*l + 6*b^8*c^4*d^2*f*k - 4608*a^4*c^
8*d^2*e*l + 2400*a^8*b*c^3*f*m^3 + 2016*a^7*b*c^4*h*k^3 - 1728*a^4*c^8*d^2*
f*k - 1146*a^6*b^5*c*f*m^3 + 224*a^6*b*c^5*h^3*k - 96*a^5*b^6*c*g*l^3 + 96*
a^5*b*c^6*f^3*m + 2304*a^4*c^8*d*e^2*k + 768*a^5*c^7*d*f*j^2 + 6144*a^7*b*c
^4*e*l^3 - 2280*a^5*b^6*c*d*m^3 + 1536*a^4*b*c^7*e^3*l - 616*a*b^6*c^5*d^3*
m + 512*a^6*b*c^5*g*j^3 + 256*a^4*c^8*e^2*f*h + 240*a*b^10*c*d^2*m^2 + 6*b^
7*c^5*d^2*f*h - 192*a^4*c^8*d*f^2*h + 4320*a^6*b*c^5*d*k^3 + 4320*a^3*b*c^8
*d^3*k + 222*a*b^5*c^6*d^3*k + 16*b^6*c^6*d^2*e*g + 96*a^5*b*c^6*f*h^3 + 96
*a^4*b*c^7*f^3*h + 768*a^3*c^9*d*e^2*f + 512*a^3*b*c^8*e^3*g + 132*a*b^4*c^
7*d^3*h + 2016*a^2*b*c^9*d^3*f - 496*a*b^3*c^8*d^3*f + 224*a^3*b*c^8*d*f^3
- 18*a*b^5*c^6*d*f^3 - 3264*a^8*b^2*c^2*k^2*m^2 - 6160*a^7*b^3*c^2*j^2*m^2
+ 1104*a^7*b^3*c^2*k^2*l^2 - 1920*a^7*b^2*c^3*j^2*l^2 + 768*a^6*b^4*c^2*j^2
*l^2 + 3888*a^7*b^2*c^3*h^2*m^2 - 3510*a^6*b^4*c^2*h^2*m^2 + 240*a^6*b^3*c^
3*j^2*k^2 - 16*a^5*b^5*c^2*j^2*k^2 + 1680*a^6*b^3*c^3*g^2*m^2 - 1648*a^6*b^
3*c^3*h^2*l^2 - 1540*a^5*b^5*c^2*g^2*m^2 + 444*a^5*b^5*c^2*h^2*l^2 - 960*a^
6*b^2*c^4*h^2*k^2 - 576*a^6*b^2*c^4*f^2*m^2 - 512*a^6*b^2*c^4*g^2*l^2 - 480
*a^5*b^4*c^3*g^2*l^2 + 198*a^5*b^4*c^3*h^2*k^2 + 192*a^4*b^6*c^2*g^2*l^2 -
186*a^5*b^4*c^3*f^2*m^2 - 97*a^4*b^6*c^2*f^2*m^2 - 9*a^4*b^6*c^2*h^2*k^2 -
6160*a^5*b^3*c^4*e^2*m^2 + 1680*a^4*b^5*c^3*e^2*m^2 - 240*a^5*b^3*c^4*g^2*k
^2 - 240*a^5*b^3*c^4*f^2*l^2 - 144*a^3*b^7*c^2*e^2*m^2 + 60*a^4*b^5*c^3*g^2
*k^2 - 36*a^4*b^5*c^3*f^2*l^2 + 36*a^3*b^7*c^2*f^2*l^2 - 16*a^5*b^3*c^4*h^2
*j^2 - 4*a^3*b^7*c^2*g^2*k^2 + 38512*a^5*b^2*c^5*d^2*m^2 - 32310*a^4*b^4*c^
4*d^2*m^2 + 12720*a^3*b^6*c^3*d^2*m^2 - 2500*a^2*b^8*c^2*d^2*m^2 - 1920*a^5
*b^2*c^5*e^2*l^2 + 768*a^4*b^4*c^4*e^2*l^2 - 464*a^5*b^2*c^5*f^2*k^2 - 384*
a^5*b^2*c^5*g^2*j^2 - 64*a^3*b^6*c^3*e^2*l^2 + 42*a^4*b^4*c^4*f^2*k^2 + 12*
a^3*b^6*c^3*f^2*k^2 - 13104*a^4*b^3*c^5*d^2*l^2 + 5628*a^3*b^5*c^4*d^2*l^2
- 1128*a^2*b^7*c^3*d^2*l^2 + 240*a^4*b^3*c^5*e^2*k^2 - 16*a^4*b^3*c^5*f^2*j
^2 - 16*a^3*b^5*c^4*e^2*k^2 - 2880*a^4*b^2*c^6*d^2*k^2 + 1750*a^3*b^4*c^5*d
^2*k^2 - 345*a^2*b^6*c^4*d^2*k^2 - 48*a^4*b^3*c^5*g^2*h^2 - 4*a^3*b^5*c^4*g
^2*h^2 + 240*a^3*b^3*c^6*d^2*j^2 - 192*a^4*b^2*c^6*f^2*h^2 - 42*a^3*b^4*c^5
*f^2*h^2 - 16*a^2*b^5*c^5*d^2*j^2 - 48*a^3*b^3*c^6*f^2*g^2 - 16*a^3*b^3*c^6
*e^2*h^2 - 4*a^2*b^5*c^5*f^2*g^2 - 464*a^3*b^2*c^7*d^2*h^2 - 384*a^3*b^2*c^
7*e^2*g^2 + 42*a^2*b^4*c^6*d^2*h^2 - 240*a^2*b^3*c^7*d^2*g^2 - 16*a^2*b^3*c
^7*e^2*f^2 - 960*a^2*b^2*c^8*d^2*f^2 + 6*b^11*c*d^2*k*m - 18*a*b^11*d*f*m^2
- 7200*a^9*c^3*k^2*m^2 - 324*a^7*b^5*l^2*m^2 - 225*a^6*b^6*k^2*m^2 - 2048*
a^8*c^4*j^2*l^2 - 144*a^5*b^7*j^2*m^2 - 2400*a^8*c^4*h^2*m^2 - 81*a^4*b^8*h
^2*m^2 - 800*a^7*c^5*f^2*m^2 - 288*a^7*c^5*h^2*k^2 - 36*a^3*b^9*g^2*m^2 - 9
*a^2*b^10*f^2*m^2 - 21600*a^6*c^6*d^2*m^2 - 2048*a^6*c^6*e^2*l^2 - 864*a^6*
c^6*f^2*k^2 - 2592*a^5*c^7*d^2*k^2 - 1536*a^5*c^7*e^2*j^2 + 1536*a^8*b^2*c^
2*l^4 - 32*a^5*c^7*f^2*h^2 + 360*a^7*b^2*c^3*k^4 - 25*a^6*b^4*c^2*k^4 - 864
*a^4*c^8*d^2*h^2 - 4*b^7*c^5*d^2*g^2 - 9*b^6*c^6*d^2*f^2 - 288*a^3*c^9*d^2*
f^2 - 24*a^5*b^2*c^5*h^4 - 16*b^5*c^7*d^2*e^2 - 9*a^4*b^4*c^4*h^4 - 16*a^3*
b^4*c^5*g^4 - 24*a^3*b^2*c^7*f^4 - 9*a^2*b^4*c^6*f^4 - a^2*b^8*c^2*f^2*k^2
- a^2*b^6*c^4*f^2*h^2 + 630*a^7*b^5*k*m^3 + 8000*a^9*c^3*h*m^3 + 320*a^7*c^

```
5*h^3*m - 378*a^6*b^6*h*m^3 + 126*a^5*b^7*f*m^3 + 30*b^8*c^4*d^3*m + 24000*
a^8*c^4*d*m^3 + 8640*a^4*c^8*d^3*m - 1728*a^7*c^5*f*k^3 - 192*a^5*c^7*f^3*k
 - 4*b^11*c*d^2*l^2 + 126*a^4*b^8*d*m^3 - 10*b^7*c^5*d^3*k + 4200*a^9*b^2*c
*m^4 - 1024*a^6*c^6*e*j^3 - 1024*a^4*c^8*e^3*j - 144*a^7*b^4*c*l^4 - 10*b^6
*c^6*d^3*h - 1728*a^3*c^9*d^3*h - 192*a^5*c^7*d*h^3 + 30*b^5*c^7*d^3*f + 36
0*a*b^2*c^9*d^4 - 9*b^12*d^2*m^2 - 10000*a^10*c^2*m^4 - 4096*a^9*c^3*l^4 -
441*a^8*b^4*m^4 - 1296*a^8*c^4*k^4 - 256*a^7*c^5*j^4 - 16*a^6*c^6*h^4 - 16*
a^4*c^8*f^4 - 256*a^3*c^9*e^4 - 25*b^4*c^8*d^4 - 1296*a^2*c^10*d^4 - b^10*c
^2*d^2*k^2 - b^8*c^4*d^2*h^2, z, k1)*x*(8192*a^6*b*c^9 + 32*a^2*b^9*c^5 - 5
12*a^3*b^7*c^6 + 3072*a^4*b^5*c^7 - 8192*a^5*b^3*c^8))/(4*(64*a^5*c^6 - a^2
*b^6*c^3 + 12*a^3*b^4*c^4 - 48*a^4*b^2*c^5))) + (x*(2*b^6*c^6*d^2 - 576*a^3
*c^9*d^2 + 64*a^4*c^8*f^2 - 64*a^5*c^7*h^2 + 576*a^6*c^6*k^2 + 18*a^2*b^10*
m^2 - 1600*a^7*c^5*m^2 - 36*a*b^4*c^7*d^2 + 128*a^3*b*c^8*e^2 + 128*a^5*b*c
^6*j^2 + 8*a^2*b^9*c*l^2 + 3072*a^6*b*c^5*l^2 - 300*a^3*b^8*c*m^2 + 256*a^2
*b^2*c^8*d^2 - 32*a^2*b^3*c^7*e^2 + 20*a^2*b^4*c^6*f^2 - 96*a^3*b^2*c^7*f^2
 - 8*a^2*b^5*c^5*g^2 + 32*a^3*b^3*c^6*g^2 + 2*a^2*b^6*c^4*h^2 - 4*a^3*b^4*c
^5*h^2 - 32*a^4*b^3*c^5*j^2 + 2*a^2*b^8*c^2*k^2 - 40*a^3*b^6*c^3*k^2 + 276*
a^4*b^4*c^4*k^2 - 736*a^5*b^2*c^5*k^2 - 136*a^3*b^7*c^2*l^2 + 888*a^4*b^5*c
^3*l^2 - 2656*a^5*b^3*c^4*l^2 + 1874*a^4*b^6*c^2*m^2 - 5284*a^5*b^4*c^3*m^2
 + 6144*a^6*b^2*c^4*m^2 - 384*a^4*c^8*d*h + 1920*a^5*c^7*d*m - 1024*a^5*c^7
*e*l + 384*a^5*c^7*f*k + 640*a^6*c^6*h*m - 1024*a^6*c^6*j*l + 4*a*b^5*c^6*d
*f + 320*a^3*b*c^8*d*f + 64*a^4*b*c^7*f*h + 576*a^4*b*c^7*d*k + 256*a^4*b*c
^7*e*j - 1472*a^5*b*c^6*f*m + 512*a^5*b*c^6*g*l + 64*a^5*b*c^6*h*k - 12*a^2
*b^9*c*k*m - 3776*a^6*b*c^5*k*m - 96*a^2*b^3*c^7*d*f + 8*a^2*b^4*c^6*d*h +
32*a^2*b^4*c^6*e*g + 64*a^3*b^2*c^7*d*h - 128*a^3*b^2*c^7*e*g - 12*a^2*b^5*
c^5*f*h + 32*a^3*b^3*c^6*f*h + 20*a^2*b^5*c^5*d*k - 224*a^3*b^3*c^6*d*k - 6
4*a^3*b^3*c^6*e*j - 60*a^2*b^6*c^4*d*m - 12*a^2*b^6*c^4*f*k + 632*a^3*b^4*c
^5*d*m - 32*a^3*b^4*c^5*e*l + 152*a^3*b^4*c^5*f*k + 32*a^3*b^4*c^5*g*j - 20
48*a^4*b^2*c^6*d*m + 384*a^4*b^2*c^6*e*l - 512*a^4*b^2*c^6*f*k - 128*a^4*b^
2*c^6*g*j + 36*a^2*b^7*c^3*f*m + 4*a^2*b^7*c^3*h*k - 396*a^3*b^5*c^4*f*m +
16*a^3*b^5*c^4*g*l - 44*a^3*b^5*c^4*h*k + 1376*a^4*b^3*c^5*f*m - 192*a^4*b^
3*c^5*g*l + 96*a^4*b^3*c^5*h*k - 12*a^2*b^8*c^2*h*m + 112*a^3*b^6*c^3*h*m -
 248*a^4*b^4*c^4*h*m - 192*a^5*b^2*c^5*h*m - 32*a^4*b^4*c^4*j*l + 384*a^5*b
^2*c^5*j*l + 220*a^3*b^7*c^2*k*m - 1436*a^4*b^5*c^3*k*m + 3936*a^5*b^3*c^4*
k*m))/(4*(64*a^5*c^6 - a^2*b^6*c^3 + 12*a^3*b^4*c^4 - 48*a^4*b^2*c^5))) - (
5*b^3*c^7*d^3 + 8*a^3*c^7*f^3 + 216*a^6*c^4*k^3 - 63*a^5*b^5*m^3 - 96*a^2*c
^8*d*e^2 + 72*a^2*c^8*d^2*f - 4*a^4*b*c^5*h^3 - 3*b^4*c^6*d^2*f - 32*a^3*c^
7*e^2*h + b^5*c^5*d^2*h - 96*a^4*c^6*d*j^2 + 8*a^4*c^6*f*h^2 + 216*a^3*c^7*
d^2*k + 573*a^6*b^3*c*m^3 - 1300*a^7*b*c^2*m^3 + 384*a^5*c^5*d*l^2 + b^6*c^
4*d^2*k + 72*a^4*c^6*f^2*k + 216*a^5*c^5*f*k^2 + 9*a^2*b^8*f*m^2 + 160*a^4*
c^6*e^2*m - 32*a^5*c^5*h*j^2 - 3*b^7*c^3*d^2*m + 24*a^5*c^5*h^2*k + 200*a^6
*c^4*f*m^2 - 27*a^3*b^7*h*m^2 + 128*a^6*c^4*h*l^2 + 45*a^4*b^6*k*m^2 + 160*
a^6*c^4*j^2*m + 600*a^7*c^3*k*m^2 - 640*a^7*c^3*l^2*m + 6*a^2*b^2*c^6*f^3 -
 3*a^3*b^3*c^4*h^3 + 5*a^4*b^4*c^2*k^3 - 66*a^5*b^2*c^3*k^3 - 36*a*b*c^8*d^
3 + 9*a*b^9*d*m^2 + 4*a*b^8*c*d*l^2 + 48*a^3*c^7*d*f*h - 192*a^3*c^7*d*e*j
 - 240*a^4*c^6*d*f*m + 144*a^4*c^6*d*h*k - 128*a^4*c^6*e*f*l - 64*a^4*c^6*e*
h*j - 80*a^5*c^5*f*h*m - 720*a^5*c^5*d*k*m + 320*a^5*c^5*e*j*m - 384*a^5*c^
5*e*k*l - 128*a^5*c^5*f*j*l - 240*a^6*c^4*h*k*m - 384*a^6*c^4*j*k*l + 16*a*
b^2*c^7*d*e^2 + 18*a*b^2*c^7*d^2*f + 3*a*b^3*c^6*d*f^2 - 60*a^2*b*c^7*d*f^2
 + 4*a*b^4*c^5*d*g^2 + 16*a^2*b*c^7*e^2*f - a*b^3*c^6*d^2*h + a*b^5*c^4*d*h
^2 - 60*a^2*b*c^7*d^2*h - 28*a^3*b*c^6*d*h^2 - 28*a^3*b*c^6*f^2*h - 10*a*b^
4*c^5*d^2*k + a*b^7*c^2*d*k^2 - 396*a^4*b*c^5*d*k^2 + 16*a^3*b*c^6*e^2*k +
16*a^4*b*c^5*f*j^2 + 25*a*b^5*c^4*d^2*m - 159*a^2*b^7*c*d*m^2 - 348*a^3*b*c
^6*d^2*m + 1460*a^5*b*c^4*d*m^2 + 4*a^2*b^7*c*f*l^2 + 128*a^5*b*c^4*f*l^2 -
 78*a^3*b^6*c*f*m^2 - 76*a^4*b*c^5*f^2*m - 204*a^5*b*c^4*h*k^2 - 12*a^3*b^6
*c*h*l^2 + 279*a^4*b^5*c*h*m^2 - 12*a^5*b*c^4*h^2*m + 16*a^5*b*c^4*j^2*k +
420*a^6*b*c^3*h*m^2 + 20*a^4*b^5*c*k*l^2 + 512*a^6*b*c^3*k*l^2 - 30*a^4*b^5
*c*k^2*m - 402*a^5*b^4*c*k*m^2 - 924*a^6*b*c^3*k^2*m - 28*a^5*b^4*c*l^2*m -
 24*a^2*b^2*c^6*d*g^2 - 9*a^2*b^3*c^5*d*h^2 + 4*a^2*b^3*c^5*f*g^2 - 5*a^2*b
```

^3*c^5*f^2*h + a^2*b^4*c^4*f*h^2 + 16*a^3*b^2*c^5*d*j^2 + 18*a^3*b^2*c^5*f*
h^2 - 6*a^2*b^2*c^6*d^2*k - 21*a^2*b^5*c^3*d*k^2 - 8*a^3*b^2*c^5*g^2*h + 15
5*a^3*b^3*c^4*d*k^2 - 72*a^2*b^6*c^2*d*l^2 + 436*a^3*b^4*c^3*d*l^2 - 952*a^
4*b^2*c^4*d*l^2 + 23*a^2*b^3*c^5*d^2*m - 5*a^2*b^4*c^4*f^2*k + a^2*b^6*c^2*
f*k^2 + 26*a^3*b^2*c^5*f^2*k - 12*a^3*b^4*c^3*f*k^2 + 970*a^3*b^5*c^2*d*m^2
 + 2*a^4*b^2*c^4*f*k^2 - 2289*a^4*b^3*c^3*d*m^2 - 48*a^3*b^2*c^5*e^2*m + 4*
a^3*b^3*c^4*g^2*k - 36*a^3*b^5*c^2*f*l^2 + 52*a^4*b^3*c^3*f*l^2 + 15*a^2*b^
5*c^3*f^2*m - 53*a^3*b^3*c^4*f^2*m - 6*a^3*b^4*c^3*h^2*k - 3*a^3*b^5*c^2*h*
k^2 + 42*a^4*b^2*c^4*h^2*k + 51*a^4*b^3*c^3*h*k^2 + 133*a^4*b^4*c^2*f*m^2 +
 114*a^5*b^2*c^3*f*m^2 - 12*a^3*b^4*c^3*g^2*m + 40*a^4*b^2*c^4*g^2*m + 128*
a^4*b^4*c^2*h*l^2 - 360*a^5*b^2*c^3*h*l^2 + 18*a^3*b^5*c^2*h^2*m - 81*a^4*b
^3*c^3*h^2*m - 801*a^5*b^3*c^2*h*m^2 - 48*a^5*b^2*c^3*j^2*m - 204*a^5*b^3*c
^2*k*l^2 + 339*a^5*b^3*c^2*k^2*m + 762*a^6*b^2*c^2*k*m^2 + 264*a^6*b^2*c^2*
l^2*m - 6*a*b^8*c*d*k*m - 16*a*b^3*c^6*d*e*g + 96*a^2*b*c^7*d*e*g - 4*a*b^4
*c^5*d*f*h + 32*a^3*b*c^6*e*g*h + 16*a*b^5*c^4*d*e*l - 4*a*b^5*c^4*d*f*k +
544*a^3*b*c^6*d*e*l - 312*a^3*b*c^6*d*f*k + 96*a^3*b*c^6*d*g*j + 32*a^3*b*c
^6*e*f*j + 12*a*b^6*c^3*d*f*m - 8*a*b^6*c^3*d*g*l + 2*a*b^6*c^3*d*h*k - 6*a
*b^7*c^2*d*h*m - 152*a^4*b*c^5*d*h*m - 160*a^4*b*c^5*e*g*m + 224*a^4*b*c^5*
e*h*l + 64*a^4*b*c^5*f*g*l - 152*a^4*b*c^5*f*h*k + 32*a^4*b*c^5*g*h*j + 544
*a^4*b*c^5*d*j*l + 32*a^4*b*c^5*e*j*k - 6*a^2*b^7*c*f*k*m + 32*a^5*b*c^4*e*
l*m - 536*a^5*b*c^4*f*k*m - 160*a^5*b*c^4*g*j*m + 192*a^5*b*c^4*g*k*l + 224
*a^5*b*c^4*h*j*l + 18*a^3*b^6*c*h*k*m + 32*a^6*b*c^3*j*l*m + 52*a^2*b^2*c^6
*d*f*h - 16*a^2*b^2*c^6*e*f*g + 32*a^2*b^2*c^6*d*e*j - 192*a^2*b^3*c^5*d*e*
l + 70*a^2*b^3*c^5*d*f*k - 16*a^2*b^3*c^5*d*g*j - 190*a^2*b^4*c^4*d*f*m + 9
6*a^2*b^4*c^4*d*g*l - 30*a^2*b^4*c^4*d*h*k + 16*a^2*b^4*c^4*e*f*l + 676*a^3
*b^2*c^5*d*f*m - 272*a^3*b^2*c^5*d*g*l + 100*a^3*b^2*c^5*d*h*k - 48*a^3*b^2
*c^5*e*f*l - 16*a^3*b^2*c^5*e*g*k - 16*a^3*b^2*c^5*f*g*j + 80*a^2*b^5*c^3*d
*h*m - 8*a^2*b^5*c^3*f*g*l + 2*a^2*b^5*c^3*f*h*k - 210*a^3*b^3*c^4*d*h*m +
48*a^3*b^3*c^4*e*g*m - 48*a^3*b^3*c^4*e*h*l + 24*a^3*b^3*c^4*f*g*l + 6*a^3*
b^3*c^4*f*h*k + 16*a^2*b^5*c^3*d*j*l - 192*a^3*b^3*c^4*d*j*l - 6*a^2*b^6*c^
2*f*h*m - 28*a^3*b^4*c^3*f*h*m + 24*a^3*b^4*c^3*g*h*l + 276*a^4*b^2*c^4*f*h
*m - 112*a^4*b^2*c^4*g*h*l + 116*a^2*b^6*c^2*d*k*m - 780*a^3*b^4*c^3*d*k*m
+ 16*a^3*b^4*c^3*f*j*l + 1876*a^4*b^2*c^4*d*k*m - 96*a^4*b^2*c^4*e*j*m + 80
*a^4*b^2*c^4*e*k*l - 48*a^4*b^2*c^4*f*j*l - 16*a^4*b^2*c^4*g*j*k + 62*a^3*b
^5*c^2*f*k*m - 42*a^4*b^3*c^3*f*k*m + 48*a^4*b^3*c^3*g*j*m - 40*a^4*b^3*c^3
*g*k*l - 48*a^4*b^3*c^3*h*j*l - 246*a^4*b^4*c^2*h*k*m - 16*a^5*b^2*c^3*g*l*
m + 804*a^5*b^2*c^3*h*k*m + 80*a^5*b^2*c^3*j*k*l)/(8*(64*a^5*c^6 - a^2*b^6*
c^3 + 12*a^3*b^4*c^4 - 48*a^4*b^2*c^5)) + (x*(32*a^2*c^8*e^3 + 32*a^5*c^5*j
^3 - 2*b^3*c^7*d^2*e + b^4*c^6*d^2*g - 12*a^4*b^5*c*l^3 - 320*a^6*b*c^3*l^3
 + 96*a^3*c^7*e^2*j + 96*a^4*c^6*e*j^2 + 144*a^3*c^7*d^2*l + 128*a^5*c^5*e*
l^2 - b^6*c^4*d^2*l - 16*a^4*c^6*f^2*l - 9*a^2*b^8*g*m^2 + 16*a^5*c^5*h^2*l
 + 18*a^3*b^7*j*m^2 + 128*a^6*c^4*j*l^2 - 144*a^6*c^4*k^2*l - 27*a^4*b^6*l*
m^2 + 400*a^7*c^3*l*m^2 - 4*a^2*b^3*c^5*g^3 + 124*a^5*b^3*c^2*l^3 + 24*a*b*
c^8*d^2*e - 48*a^2*c^8*d*e*f - 16*a^3*c^7*e*f*h - 144*a^3*c^7*d*e*k - 48*a^
3*c^7*d*f*j + 96*a^4*c^6*d*h*l + 80*a^4*c^6*e*f*m - 48*a^4*c^6*e*h*k - 16*a
^4*c^6*f*h*j - 144*a^4*c^6*d*j*k - 480*a^5*c^5*d*l*m + 240*a^5*c^5*e*k*m +
80*a^5*c^5*f*j*m - 96*a^5*c^5*f*k*l - 48*a^5*c^5*h*j*k - 160*a^6*c^4*h*l*m
+ 240*a^6*c^4*j*k*m - 12*a*b^2*c^7*d^2*g + 16*a^2*b*c^7*e*f^2 - 48*a^2*b*c^
7*e^2*g + 8*a^3*b*c^6*e*h^2 - 2*a*b^3*c^6*d^2*j + 24*a^2*b*c^7*d^2*j + 18*a
*b^4*c^5*d^2*l + 16*a^3*b*c^6*f^2*j + 96*a^4*b*c^5*e*k^2 - 176*a^3*b*c^6*e^
2*l - 48*a^4*b*c^5*g*j^2 + 18*a^2*b^7*c*e*m^2 + 8*a^4*b*c^5*h^2*j - 520*a^5
*b*c^4*e*m^2 - 4*a^2*b^7*c*g*l^2 - 64*a^5*b*c^4*g*l^2 + 96*a^3*b^6*c*g*m^2
+ 96*a^5*b*c^4*j*k^2 + 8*a^3*b^6*c*j*l^2 - 176*a^5*b*c^4*j^2*l - 192*a^4*b^
5*c*j*m^2 - 520*a^6*b*c^3*j*m^2 + 270*a^5*b^4*c*l*m^2 + 24*a^2*b^2*c^6*e*g^
2 - 8*a^2*b^2*c^6*f^2*g + 2*a^2*b^3*c^5*e*h^2 - a^2*b^4*c^4*g*h^2 - 4*a^3*b
^2*c^5*g*h^2 - 100*a^2*b^2*c^6*d^2*l + 2*a^2*b^5*c^3*e*k^2 - 28*a^3*b^3*c^4
*e*k^2 + 32*a^2*b^3*c^5*e^2*l + 8*a^2*b^6*c^2*e*l^2 + 24*a^3*b^2*c^5*g^2*j
- 88*a^3*b^4*c^3*e*l^2 + 216*a^4*b^2*c^4*e*l^2 - a^2*b^4*c^4*f^2*l - a^2*b^
6*c^2*g*k^2 + 2*a^3*b^3*c^4*h^2*j + 14*a^3*b^4*c^3*g*k^2 - 192*a^3*b^5*c^2*

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e*m^2 - 48*a^4*b^2*c^4*g*k^2 + 614*a^4*b^3*c^3*e*m^2 + 8*a^2*b^5*c^3*g^2*l
- 44*a^3*b^3*c^4*g^2*l + 44*a^3*b^5*c^2*g*l^2 - 108*a^4*b^3*c^3*g*l^2 - 12*
a^4*b^2*c^4*h^2*l - 307*a^4*b^4*c^2*g*m^2 + 260*a^5*b^2*c^3*g*m^2 + 2*a^3*b
^5*c^2*j*k^2 - 28*a^4*b^3*c^3*j*k^2 + 32*a^4*b^3*c^3*j^2*l - 88*a^4*b^4*c^2
*j*l^2 + 216*a^5*b^2*c^3*j*l^2 - 3*a^4*b^4*c^2*k^2*l + 40*a^5*b^2*c^3*k^2*l
 + 614*a^5*b^3*c^2*j*m^2 - 756*a^6*b^2*c^2*l*m^2 - 4*a*b^2*c^7*d*e*f + 2*a*
b^3*c^6*d*f*g + 32*a^2*b*c^7*d*e*h + 24*a^2*b*c^7*d*f*g + 8*a^3*b*c^6*f*g*h
 - 2*a*b^5*c^4*d*f*l + 272*a^3*b*c^6*d*e*m - 8*a^3*b*c^6*d*f*l + 72*a^3*b*c
^6*d*g*k + 32*a^3*b*c^6*d*h*j + 80*a^3*b*c^6*e*f*k - 96*a^3*b*c^6*e*g*j + 6
4*a^4*b*c^5*e*h*m - 40*a^4*b*c^5*f*g*m + 8*a^4*b*c^5*f*h*l + 24*a^4*b*c^5*g
*h*k + 272*a^4*b*c^5*d*j*m + 72*a^4*b*c^5*d*k*l - 352*a^4*b*c^5*e*j*l + 80*
a^4*b*c^5*f*j*k + 6*a^2*b^7*c*g*k*m + 248*a^5*b*c^4*f*l*m - 120*a^5*b*c^4*g
*k*m + 64*a^5*b*c^4*h*j*m + 56*a^5*b*c^4*h*k*l - 12*a^3*b^6*c*j*k*m + 18*a^
4*b^5*c*k*l*m + 584*a^6*b*c^3*k*l*m - 16*a^2*b^2*c^6*d*g*h - 12*a^2*b^2*c^6
*e*f*h + 20*a^2*b^2*c^6*d*e*k - 4*a^2*b^2*c^6*d*f*j + 6*a^2*b^3*c^5*f*g*h -
 60*a^2*b^3*c^5*d*e*m + 18*a^2*b^3*c^5*d*f*l - 10*a^2*b^3*c^5*d*g*k - 12*a^
2*b^3*c^5*e*f*k + 30*a^2*b^4*c^4*d*g*m + 6*a^2*b^4*c^4*d*h*l + 36*a^2*b^4*c
^4*e*f*m - 32*a^2*b^4*c^4*e*g*l + 4*a^2*b^4*c^4*e*h*k + 6*a^2*b^4*c^4*f*g*k
 - 136*a^3*b^2*c^5*d*g*m - 64*a^3*b^2*c^5*d*h*l - 180*a^3*b^2*c^5*e*f*m + 1
76*a^3*b^2*c^5*e*g*l - 20*a^3*b^2*c^5*e*h*k - 40*a^3*b^2*c^5*f*g*k - 12*a^3
*b^2*c^5*f*h*j + 20*a^3*b^2*c^5*d*j*k - 12*a^2*b^5*c^3*e*h*m - 18*a^2*b^5*c
^3*f*g*m - 2*a^2*b^5*c^3*g*h*k + 40*a^3*b^3*c^4*e*h*m + 90*a^3*b^3*c^4*f*g*
m + 6*a^3*b^3*c^4*f*h*l + 10*a^3*b^3*c^4*g*h*k - 60*a^3*b^3*c^4*d*j*m - 10*
a^3*b^3*c^4*d*k*l + 64*a^3*b^3*c^4*e*j*l - 12*a^3*b^3*c^4*f*j*k + 6*a^2*b^6
*c^2*g*h*m - 20*a^3*b^4*c^3*g*h*m - 32*a^4*b^2*c^4*g*h*m - 12*a^2*b^6*c^2*e
*k*m + 148*a^3*b^4*c^3*e*k*m + 36*a^3*b^4*c^3*f*j*m - 32*a^3*b^4*c^3*g*j*l
+ 4*a^3*b^4*c^3*h*j*k + 104*a^4*b^2*c^4*d*l*m - 476*a^4*b^2*c^4*e*k*m - 180
*a^4*b^2*c^4*f*j*m + 8*a^4*b^2*c^4*f*k*l + 176*a^4*b^2*c^4*g*j*l - 20*a^4*b
^2*c^4*h*j*k - 74*a^3*b^5*c^2*g*k*m - 12*a^3*b^5*c^2*h*j*m - 54*a^4*b^3*c^3
*f*l*m + 238*a^4*b^3*c^3*g*k*m + 40*a^4*b^3*c^3*h*j*m - 6*a^4*b^3*c^3*h*k*l
 + 18*a^4*b^4*c^2*h*l*m - 48*a^5*b^2*c^3*h*l*m + 148*a^4*b^4*c^2*j*k*m - 47
6*a^5*b^2*c^3*j*k*m - 210*a^5*b^3*c^2*k*l*m))/(4*(64*a^5*c^6 - a^2*b^6*c^3
+ 12*a^3*b^4*c^4 - 48*a^4*b^2*c^5)))*root(1572864*a^8*b^2*c^10*z^4 - 983040
*a^7*b^4*c^9*z^4 + 327680*a^6*b^6*c^8*z^4 - 61440*a^5*b^8*c^7*z^4 + 6144*a^
4*b^10*c^6*z^4 - 256*a^3*b^12*c^5*z^4 - 1048576*a^9*c^11*z^4 - 1572864*a^8*
b^2*c^8*l*z^3 + 983040*a^7*b^4*c^7*l*z^3 - 327680*a^6*b^6*c^6*l*z^3 + 61440
*a^5*b^8*c^5*l*z^3 - 6144*a^4*b^10*c^4*l*z^3 + 256*a^3*b^12*c^3*l*z^3 + 104
8576*a^9*c^9*l*z^3 + 96*a^3*b^12*c*k*m*z^2 + 98304*a^8*b*c^7*j*l*z^2 + 2457
6*a^8*b*c^7*h*m*z^2 + 155648*a^7*b*c^8*d*m*z^2 + 98304*a^7*b*c^8*e*l*z^2 +
57344*a^7*b*c^8*f*k*z^2 + 32768*a^7*b*c^8*g*j*z^2 + 57344*a^6*b*c^9*d*h*z^2
 + 32768*a^6*b*c^9*e*g*z^2 - 32*a*b^10*c^5*d*f*z^2 - 491520*a^8*b^2*c^6*k*m
*z^2 + 358400*a^7*b^4*c^5*k*m*z^2 - 129024*a^6*b^6*c^4*k*m*z^2 + 24768*a^5*
b^8*c^3*k*m*z^2 - 2432*a^4*b^10*c^2*k*m*z^2 - 90112*a^7*b^3*c^6*j*l*z^2 + 3
0720*a^6*b^5*c^5*j*l*z^2 - 4608*a^5*b^7*c^4*j*l*z^2 + 256*a^4*b^9*c^3*j*l*z
^2 - 21504*a^6*b^5*c^5*h*m*z^2 + 9216*a^5*b^7*c^4*h*m*z^2 + 8192*a^7*b^3*c^
6*h*m*z^2 - 1568*a^4*b^9*c^3*h*m*z^2 + 96*a^3*b^11*c^2*h*m*z^2 - 172032*a^7
*b^2*c^7*f*m*z^2 + 116736*a^6*b^4*c^6*f*m*z^2 - 49152*a^7*b^2*c^7*g*l*z^2 +
 45056*a^6*b^4*c^6*g*l*z^2 - 35840*a^5*b^6*c^5*f*m*z^2 + 24576*a^7*b^2*c^7*
h*k*z^2 - 15360*a^5*b^6*c^5*g*l*z^2 + 5184*a^4*b^8*c^4*f*m*z^2 - 3072*a^5*b
^6*c^5*h*k*z^2 + 2304*a^4*b^8*c^4*g*l*z^2 + 2048*a^6*b^4*c^6*h*k*z^2 + 576*
a^4*b^8*c^4*h*k*z^2 - 288*a^3*b^10*c^3*f*m*z^2 - 128*a^3*b^10*c^3*g*l*z^2 -
 32*a^3*b^10*c^3*h*k*z^2 - 147456*a^6*b^3*c^7*d*m*z^2 - 90112*a^6*b^3*c^7*e
*l*z^2 + 52224*a^5*b^5*c^6*d*m*z^2 - 49152*a^6*b^3*c^7*f*k*z^2 + 30720*a^5*
b^5*c^6*e*l*z^2 - 24576*a^6*b^3*c^7*g*j*z^2 + 15360*a^5*b^5*c^6*f*k*z^2 - 8
192*a^4*b^7*c^5*d*m*z^2 + 6144*a^5*b^5*c^6*g*j*z^2 - 4608*a^4*b^7*c^5*e*l*z
^2 - 2048*a^4*b^7*c^5*f*k*z^2 - 512*a^4*b^7*c^5*g*j*z^2 + 480*a^3*b^9*c^4*d
*m*z^2 + 256*a^3*b^9*c^4*e*l*z^2 + 96*a^3*b^9*c^4*f*k*z^2 + 131072*a^6*b^2*
c^8*d*k*z^2 + 49152*a^6*b^2*c^8*e*j*z^2 - 43008*a^5*b^4*c^7*d*k*z^2 - 12288
*a^5*b^4*c^7*e*j*z^2 + 6144*a^4*b^6*c^6*d*k*z^2 + 1024*a^4*b^6*c^6*e*j*z^2
```

- 320*a^3*b^8*c^5*d*k*z^2 + 6144*a^5*b^4*c^7*f*h*z^2 - 2048*a^4*b^6*c^6*f*h
*z^2 + 192*a^3*b^8*c^5*f*h*z^2 - 49152*a^5*b^3*c^8*d*h*z^2 - 24576*a^5*b^3*
c^8*e*g*z^2 + 15360*a^4*b^5*c^7*d*h*z^2 + 6144*a^4*b^5*c^7*e*g*z^2 - 2048*a
^3*b^7*c^6*d*h*z^2 - 512*a^3*b^7*c^6*e*g*z^2 + 96*a^2*b^9*c^5*d*h*z^2 + 245
76*a^5*b^2*c^9*d*f*z^2 - 3072*a^3*b^6*c^7*d*f*z^2 + 2048*a^4*b^4*c^8*d*f*z^
2 + 576*a^2*b^8*c^6*d*f*z^2 - 430080*a^9*b*c^6*m^2*z^2 + 3408*a^4*b^11*c*m^
2*z^2 - 64*a^3*b^12*c*l^2*z^2 + 61440*a^8*b*c^7*k^2*z^2 + 12288*a^7*b*c^8*h
^2*z^2 + 12288*a^6*b*c^9*f^2*z^2 + 61440*a^5*b*c^10*d^2*z^2 + 432*a*b^9*c^6
*d^2*z^2 + 245760*a^9*c^7*k*m*z^2 + 81920*a^8*c^8*f*m*z^2 - 49152*a^8*c^8*h
*k*z^2 - 147456*a^7*c^9*d*k*z^2 - 65536*a^7*c^9*e*j*z^2 - 16384*a^7*c^9*f*h
*z^2 - 49152*a^6*c^10*d*f*z^2 + 716800*a^8*b^3*c^5*m^2*z^2 - 483840*a^7*b^5
*c^4*m^2*z^2 + 170496*a^6*b^7*c^3*m^2*z^2 - 33232*a^5*b^9*c^2*m^2*z^2 + 516
096*a^8*b^2*c^6*l^2*z^2 - 288768*a^7*b^4*c^5*l^2*z^2 + 88576*a^6*b^6*c^4*l^
2*z^2 - 15744*a^5*b^8*c^3*l^2*z^2 + 1536*a^4*b^10*c^2*l^2*z^2 - 61440*a^7*b
^3*c^6*k^2*z^2 + 24064*a^6*b^5*c^5*k^2*z^2 - 4608*a^5*b^7*c^4*k^2*z^2 + 432
*a^4*b^9*c^3*k^2*z^2 - 16*a^3*b^11*c^2*k^2*z^2 + 24576*a^7*b^2*c^7*j^2*z^2
- 6144*a^6*b^4*c^6*j^2*z^2 + 512*a^5*b^6*c^5*j^2*z^2 - 8192*a^6*b^3*c^7*h^2
*z^2 + 1536*a^5*b^5*c^6*h^2*z^2 - 16*a^3*b^9*c^4*h^2*z^2 - 8192*a^6*b^2*c^8
*g^2*z^2 + 6144*a^5*b^4*c^7*g^2*z^2 - 1536*a^4*b^6*c^6*g^2*z^2 + 128*a^3*b^
8*c^5*g^2*z^2 - 8192*a^5*b^3*c^8*f^2*z^2 + 1536*a^4*b^5*c^7*f^2*z^2 - 16*a^
2*b^9*c^5*f^2*z^2 + 24576*a^5*b^2*c^9*e^2*z^2 - 6144*a^4*b^4*c^8*e^2*z^2 +
512*a^3*b^6*c^7*e^2*z^2 - 61440*a^4*b^3*c^9*d^2*z^2 + 24064*a^3*b^5*c^8*d^2
*z^2 - 4608*a^2*b^7*c^7*d^2*z^2 - 393216*a^9*c^7*l^2*z^2 - 144*a^3*b^13*m^2
*z^2 - 32768*a^8*c^8*j^2*z^2 - 32768*a^6*c^10*e^2*z^2 - 16*b^11*c^5*d^2*z^2
+ 18432*a^8*b*c^5*h*l*m*z - 96*a^3*b^10*c*g*k*m*z + 90112*a^7*b*c^6*e*k*m*
z + 36864*a^7*b*c^6*f*j*m*z - 16384*a^7*b*c^6*g*j*l*z + 14336*a^7*b*c^6*d*l
*m*z - 10240*a^7*b*c^6*f*k*l*z + 4096*a^7*b*c^6*h*j*k*z + 10240*a^7*b*c^6*g
*h*m*z - 47104*a^6*b*c^7*d*h*l*z + 36864*a^6*b*c^7*e*f*m*z + 30720*a^6*b*c^
7*d*g*m*z - 16384*a^6*b*c^7*e*g*l*z + 6144*a^6*b*c^7*f*g*k*z + 4096*a^6*b*c
^7*e*h*k*z + 32*a*b^10*c^3*d*f*l*z - 4096*a^5*b*c^8*d*f*j*z - 6144*a^5*b*c^
8*d*g*h*z - 32*a*b^8*c^5*d*f*g*z - 4096*a^4*b*c^9*d*e*f*z + 64*a*b^7*c^6*d*
e*f*z + 110592*a^8*b^2*c^4*k*l*m*z - 36864*a^7*b^4*c^3*k*l*m*z + 5376*a^6*b
^6*c^2*k*l*m*z - 79872*a^7*b^3*c^4*j*k*m*z + 26112*a^6*b^5*c^3*j*k*m*z - 37
12*a^5*b^7*c^2*j*k*m*z - 13824*a^7*b^3*c^4*h*l*m*z + 3456*a^6*b^5*c^3*h*l*m
*z - 288*a^5*b^7*c^2*h*l*m*z - 45056*a^7*b^2*c^5*g*k*m*z + 39936*a^6*b^4*c^
4*g*k*m*z + 30720*a^7*b^2*c^5*f*l*m*z - 18432*a^7*b^2*c^5*h*k*l*z - 13056*a
^5*b^6*c^3*g*k*m*z - 7680*a^6*b^4*c^4*f*l*m*z + 5376*a^6*b^4*c^4*h*j*m*z +
4608*a^6*b^4*c^4*h*k*l*z + 3072*a^7*b^2*c^5*h*j*m*z - 1984*a^5*b^6*c^3*h*j*
m*z + 1856*a^4*b^8*c^2*g*k*m*z + 640*a^5*b^6*c^3*f*l*m*z - 384*a^5*b^6*c^3*
h*k*l*z + 192*a^4*b^8*c^2*h*j*m*z - 79872*a^6*b^3*c^5*e*k*m*z - 27648*a^6*b
^3*c^5*f*j*m*z + 26112*a^5*b^5*c^4*e*k*m*z + 12288*a^6*b^3*c^5*g*j*l*z - 10
752*a^6*b^3*c^5*d*l*m*z + 7680*a^6*b^3*c^5*f*k*l*z + 6912*a^5*b^5*c^4*f*j*m
*z - 3712*a^4*b^7*c^3*e*k*m*z - 3072*a^6*b^3*c^5*h*j*k*z - 3072*a^5*b^5*c^4
*g*j*l*z + 2688*a^5*b^5*c^4*d*l*m*z - 1920*a^5*b^5*c^4*f*k*l*z + 768*a^5*b^
5*c^4*h*j*k*z - 576*a^4*b^7*c^3*f*j*m*z + 256*a^4*b^7*c^3*g*j*l*z - 224*a^4
*b^7*c^3*d*l*m*z + 192*a^3*b^9*c^2*e*k*m*z + 160*a^4*b^7*c^3*f*k*l*z - 64*a
^4*b^7*c^3*h*j*k*z - 2688*a^5*b^5*c^4*g*h*m*z - 1536*a^6*b^3*c^5*g*h*m*z +
992*a^4*b^7*c^3*g*h*m*z - 96*a^3*b^9*c^2*g*h*m*z - 65536*a^6*b^2*c^6*d*k*l*
z + 46080*a^6*b^2*c^6*d*j*m*z - 24576*a^6*b^2*c^6*e*j*l*z + 21504*a^5*b^4*c
^5*d*k*l*z - 11520*a^5*b^4*c^5*d*j*m*z + 9216*a^6*b^2*c^6*f*j*k*z + 6144*a^
5*b^4*c^5*e*j*l*z - 3072*a^4*b^6*c^4*d*k*l*z - 2304*a^5*b^4*c^5*f*j*k*z + 9
60*a^4*b^6*c^4*d*j*m*z - 512*a^4*b^6*c^4*e*j*l*z + 192*a^4*b^6*c^4*f*j*k*z
+ 160*a^3*b^8*c^3*d*k*l*z - 18432*a^6*b^2*c^6*f*g*m*z + 13824*a^5*b^4*c^5*f
*g*m*z + 5376*a^5*b^4*c^5*e*h*m*z - 3456*a^4*b^6*c^4*f*g*m*z + 3072*a^6*b^2
*c^6*e*h*m*z - 3072*a^5*b^4*c^5*f*h*l*z - 2048*a^6*b^2*c^6*g*h*k*z - 1984*a
^4*b^6*c^4*e*h*m*z + 1536*a^5*b^4*c^5*g*h*k*z + 1024*a^4*b^6*c^4*f*h*l*z -
384*a^4*b^6*c^4*g*h*k*z + 288*a^3*b^8*c^3*f*g*m*z + 192*a^3*b^8*c^3*e*h*m*z
- 96*a^3*b^8*c^3*f*h*l*z + 32*a^3*b^8*c^3*g*h*k*z + 41472*a^5*b^3*c^6*d*h*
l*z - 27648*a^5*b^3*c^6*e*f*m*z - 23040*a^5*b^3*c^6*d*g*m*z - 13440*a^4*b^5

*c^5*d*h*l*z + 12288*a^5*b^3*c^6*e*g*l*z + 6912*a^4*b^5*c^5*e*f*m*z + 5760*
a^4*b^5*c^5*d*g*m*z - 4608*a^5*b^3*c^6*f*g*k*z - 3072*a^5*b^3*c^6*e*h*k*z -
 3072*a^4*b^5*c^5*e*g*l*z + 1888*a^3*b^7*c^4*d*h*l*z + 1152*a^4*b^5*c^5*f*g
*k*z + 768*a^4*b^5*c^5*e*h*k*z - 576*a^3*b^7*c^4*e*f*m*z - 480*a^3*b^7*c^4*
d*g*m*z + 256*a^3*b^7*c^4*e*g*l*z - 96*a^3*b^7*c^4*f*g*k*z - 96*a^2*b^9*c^3
*d*h*l*z - 64*a^3*b^7*c^4*e*h*k*z + 46080*a^5*b^2*c^7*d*e*m*z - 11520*a^4*b
^4*c^6*d*e*m*z + 9216*a^5*b^2*c^7*e*f*k*z - 9216*a^5*b^2*c^7*d*h*j*z - 6656
*a^4*b^4*c^6*d*f*l*z - 6144*a^5*b^2*c^7*d*f*l*z + 3456*a^3*b^6*c^5*d*f*l*z
- 2304*a^4*b^4*c^6*e*f*k*z + 2304*a^4*b^4*c^6*d*h*j*z + 960*a^3*b^6*c^5*d*e
*m*z - 576*a^2*b^8*c^4*d*f*l*z + 192*a^3*b^6*c^5*e*f*k*z - 192*a^3*b^6*c^5*
d*h*j*z + 3072*a^4*b^3*c^7*d*f*j*z - 768*a^3*b^5*c^6*d*f*j*z + 64*a^2*b^7*c
^5*d*f*j*z + 4608*a^4*b^3*c^7*d*g*h*z - 1152*a^3*b^5*c^6*d*g*h*z + 96*a^2*b
^7*c^5*d*g*h*z - 9216*a^4*b^2*c^8*d*e*h*z + 2304*a^3*b^4*c^7*d*e*h*z + 2048
*a^4*b^2*c^8*d*f*g*z - 1536*a^3*b^4*c^7*d*f*g*z + 384*a^2*b^6*c^6*d*f*g*z -
 192*a^2*b^6*c^6*d*e*h*z + 3072*a^3*b^3*c^8*d*e*f*z - 768*a^2*b^5*c^7*d*e*f
*z - 288*a^5*b^8*c*k*l*m*z + 90112*a^8*b*c^5*j*k*m*z + 192*a^4*b^9*c*j*k*m*
z + 138240*a^9*b*c^4*l*m^2*z - 7344*a^6*b^7*c*l*m^2*z + 5088*a^5*b^8*c*j*m^
2*z - 3072*a^8*b*c^5*k^2*l*z - 49152*a^8*b*c^5*j*l^2*z - 128*a^4*b^9*c*j*l^
2*z - 25600*a^8*b*c^5*g*m^2*z - 9216*a^7*b*c^6*h^2*l*z - 2544*a^4*b^9*c*g*m
^2*z + 64*a^3*b^10*c*g*l^2*z + 9216*a^7*b*c^6*g*k^2*z - 3072*a^6*b*c^7*f^2*
l*z - 288*a^3*b^10*c*e*m^2*z - 49152*a^7*b*c^6*e*l^2*z - 58368*a^5*b*c^8*d^
2*l*z - 432*a*b^9*c^4*d^2*l*z - 1024*a^6*b*c^7*g*h^2*z + 32*a*b^8*c^5*d^2*j
*z + 1024*a^5*b*c^8*f^2*g*z - 9216*a^4*b*c^9*d^2*g*z + 336*a*b^7*c^6*d^2*g*
z - 672*a*b^6*c^7*d^2*e*z - 122880*a^9*c^5*k*l*m*z - 40960*a^8*c^6*f*l*m*z
+ 24576*a^8*c^6*h*k*l*z - 20480*a^8*c^6*h*j*m*z + 73728*a^7*c^7*d*k*l*z - 6
1440*a^7*c^7*d*j*m*z + 32768*a^7*c^7*e*j*l*z - 12288*a^7*c^7*f*j*k*z - 2048
0*a^7*c^7*e*h*m*z + 8192*a^7*c^7*f*h*l*z - 61440*a^6*c^8*d*e*m*z + 24576*a^
6*c^8*d*f*l*z - 12288*a^6*c^8*e*f*k*z + 12288*a^6*c^8*d*h*j*z + 12288*a^5*c
^9*d*e*h*z - 131328*a^8*b^3*c^3*l*m^2*z + 46656*a^7*b^5*c^2*l*m^2*z - 14284
8*a^8*b^2*c^4*j*m^2*z + 106368*a^7*b^4*c^3*j*m^2*z - 34208*a^6*b^6*c^2*j*m^
2*z + 2304*a^7*b^3*c^4*k^2*l*z - 576*a^6*b^5*c^3*k^2*l*z + 48*a^5*b^7*c^2*k
^2*l*z + 45056*a^7*b^3*c^4*j*l^2*z - 15360*a^6*b^5*c^3*j*l^2*z - 12288*a^7*
b^2*c^5*j^2*l*z + 3072*a^6*b^4*c^4*j^2*l*z + 2304*a^5*b^7*c^2*j*l^2*z - 256
*a^5*b^6*c^3*j^2*l*z + 15872*a^7*b^2*c^5*j*k^2*z - 4992*a^6*b^4*c^4*j*k^2*z
 + 672*a^5*b^6*c^3*j*k^2*z - 32*a^4*b^8*c^2*j*k^2*z + 71424*a^7*b^3*c^4*g*m
^2*z - 53184*a^6*b^5*c^3*g*m^2*z + 17104*a^5*b^7*c^2*g*m^2*z + 6912*a^6*b^3
*c^5*h^2*l*z - 1728*a^5*b^5*c^4*h^2*l*z + 144*a^4*b^7*c^3*h^2*l*z + 24576*a
^7*b^2*c^5*g*l^2*z - 22528*a^6*b^4*c^4*g*l^2*z + 7680*a^5*b^6*c^3*g*l^2*z +
 4096*a^6*b^2*c^6*g^2*l*z - 3072*a^5*b^4*c^5*g^2*l*z - 1152*a^4*b^8*c^2*g*l
^2*z + 768*a^4*b^6*c^4*g^2*l*z - 64*a^3*b^8*c^3*g^2*l*z - 142848*a^7*b^2*c^
5*e*m^2*z + 106368*a^6*b^4*c^4*e*m^2*z - 34208*a^5*b^6*c^3*e*m^2*z - 7936*a
^6*b^3*c^5*g*k^2*z + 5088*a^4*b^8*c^2*e*m^2*z + 2496*a^5*b^5*c^4*g*k^2*z -
1536*a^6*b^2*c^6*h^2*j*z + 1280*a^5*b^3*c^6*f^2*l*z + 384*a^5*b^4*c^5*h^2*j
*z - 336*a^4*b^7*c^3*g*k^2*z + 192*a^4*b^5*c^5*f^2*l*z - 144*a^3*b^7*c^4*f^
2*l*z - 32*a^4*b^6*c^4*h^2*j*z + 16*a^3*b^9*c^2*g*k^2*z + 16*a^2*b^9*c^3*f^
2*l*z + 45056*a^6*b^3*c^5*e*l^2*z - 15360*a^5*b^5*c^4*e*l^2*z - 12288*a^5*b
^2*c^7*e^2*l*z + 3072*a^4*b^4*c^6*e^2*l*z + 2304*a^4*b^7*c^3*e*l^2*z - 256*
a^3*b^6*c^5*e^2*l*z - 128*a^3*b^9*c^2*e*l^2*z + 59136*a^4*b^3*c^7*d^2*l*z -
 23488*a^3*b^5*c^6*d^2*l*z + 15872*a^6*b^2*c^6*e*k^2*z - 4992*a^5*b^4*c^5*e
*k^2*z + 4560*a^2*b^7*c^5*d^2*l*z + 1536*a^5*b^2*c^7*f^2*j*z + 672*a^4*b^6*
c^4*e*k^2*z - 384*a^4*b^4*c^6*f^2*j*z - 32*a^3*b^8*c^3*e*k^2*z + 32*a^3*b^6
*c^5*f^2*j*z + 768*a^5*b^3*c^6*g*h^2*z - 192*a^4*b^5*c^5*g*h^2*z + 16*a^3*b
^7*c^4*g*h^2*z - 15872*a^4*b^2*c^8*d^2*j*z + 4992*a^3*b^4*c^7*d^2*j*z - 672
*a^2*b^6*c^6*d^2*j*z - 1536*a^5*b^2*c^7*e*h^2*z - 768*a^4*b^3*c^7*f^2*g*z +
 384*a^4*b^4*c^6*e*h^2*z + 192*a^3*b^5*c^6*f^2*g*z - 32*a^3*b^6*c^5*e*h^2*z
 - 16*a^2*b^7*c^5*f^2*g*z + 7936*a^3*b^3*c^8*d^2*g*z - 2496*a^2*b^5*c^7*d^2
*g*z + 1536*a^4*b^2*c^8*e*f^2*z - 384*a^3*b^4*c^7*e*f^2*z + 32*a^2*b^6*c^6*
e*f^2*z - 15872*a^3*b^2*c^9*d^2*e*z + 4992*a^2*b^4*c^8*d^2*e*z - 61440*a^8*
b^2*c^4*l^3*z + 21504*a^7*b^4*c^3*l^3*z - 3328*a^6*b^6*c^2*l^3*z + 432*a^5*

b^9*l*m^2*z + 51200*a^9*c^5*j*m^2*z + 16384*a^8*c^6*j^2*l*z - 288*a^4*b^10*
j*m^2*z - 18432*a^8*c^6*j*k^2*z + 144*a^3*b^11*g*m^2*z + 51200*a^8*c^6*e*m^
2*z + 2048*a^7*c^7*h^2*j*z + 16384*a^6*c^8*e^2*l*z + 16*b^11*c^3*d^2*l*z -
18432*a^7*c^7*e*k^2*z - 2048*a^6*c^8*f^2*j*z + 18432*a^5*c^9*d^2*j*z + 192*
a^5*b^8*c*l^3*z + 2048*a^6*c^8*e*h^2*z - 16*b^9*c^5*d^2*g*z - 2048*a^5*c^9*
e*f^2*z + 32*b^8*c^6*d^2*e*z + 18432*a^4*c^10*d^2*e*z + 65536*a^9*c^5*l^3*z
 - 11008*a^8*b*c^3*j*k*l*m - 288*a^6*b^5*c*j*k*l*m + 144*a^5*b^6*c*g*k*l*m
- 11008*a^7*b*c^4*e*k*l*m - 5376*a^7*b*c^4*f*j*l*m + 3840*a^7*b*c^4*g*j*k*m
 - 3328*a^7*b*c^4*h*j*k*l - 96*a^4*b^7*c*g*j*k*m - 2560*a^7*b*c^4*g*h*l*m -
 36*a^3*b^8*c*f*h*k*m - 6912*a^6*b*c^5*d*j*k*l - 7872*a^6*b*c^5*d*h*k*m - 7
680*a^6*b*c^5*d*g*l*m - 5376*a^6*b*c^5*e*f*l*m + 3840*a^6*b*c^5*e*g*k*m - 3
328*a^6*b*c^5*e*h*k*l - 1536*a^6*b*c^5*f*g*k*l + 1280*a^6*b*c^5*f*g*j*m - 7
68*a^6*b*c^5*g*h*j*k - 768*a^6*b*c^5*f*h*j*l - 768*a^6*b*c^5*e*h*j*m - 36*a
^2*b^9*c*d*h*k*m - 6912*a^5*b*c^6*d*e*k*l - 4864*a^5*b*c^6*d*e*j*m - 2304*a
^5*b*c^6*d*g*j*k - 1792*a^5*b*c^6*e*f*j*k - 1280*a^5*b*c^6*d*f*j*l - 4544*a
^5*b*c^6*d*f*h*m + 1536*a^5*b*c^6*d*g*h*l + 1280*a^5*b*c^6*e*f*g*m - 768*a^
5*b*c^6*e*g*h*k - 768*a^5*b*c^6*e*f*h*l - 256*a^5*b*c^6*f*g*h*j + 12*a*b^9*
c^2*d*f*h*m + 16*a*b^8*c^3*d*f*g*l - 4*a*b^8*c^3*d*f*h*k - 2304*a^4*b*c^7*d
*e*g*k - 1792*a^4*b*c^7*d*e*h*j - 1280*a^4*b*c^7*d*e*f*l - 768*a^4*b*c^7*d*
f*g*j - 32*a*b^7*c^4*d*e*f*l - 256*a^4*b*c^7*e*f*g*h - 768*a^3*b*c^8*d*e*f*
g + 32*a*b^5*c^6*d*e*f*g + 12*a*b^10*c*d*f*k*m + 3648*a^7*b^3*c^2*j*k*l*m +
 5504*a^7*b^2*c^3*g*k*l*m - 1824*a^6*b^4*c^2*g*k*l*m + 384*a^7*b^2*c^3*h*j*
l*m - 288*a^6*b^4*c^2*h*j*l*m - 4800*a^6*b^3*c^3*g*j*k*m + 3648*a^6*b^3*c^3
*e*k*l*m + 1280*a^5*b^5*c^2*g*j*k*m + 1088*a^6*b^3*c^3*f*j*l*m + 576*a^6*b^
3*c^3*h*j*k*l - 288*a^5*b^5*c^2*e*k*l*m - 192*a^6*b^3*c^3*g*h*l*m + 144*a^5
*b^5*c^2*g*h*l*m + 9600*a^6*b^2*c^4*e*j*k*m - 4224*a^6*b^2*c^4*d*j*l*m - 25
60*a^5*b^4*c^3*e*j*k*m + 384*a^6*b^2*c^4*f*j*k*l + 224*a^5*b^4*c^3*d*j*l*m
+ 192*a^4*b^6*c^2*e*j*k*m - 160*a^5*b^4*c^3*f*j*k*l - 4608*a^6*b^2*c^4*f*h*
k*m + 2688*a^6*b^2*c^4*f*g*l*m + 1664*a^6*b^2*c^4*g*h*k*l - 744*a^5*b^4*c^3
*f*h*k*m - 544*a^5*b^4*c^3*f*g*l*m + 492*a^4*b^6*c^2*f*h*k*m + 416*a^5*b^4*
c^3*g*h*j*m + 384*a^6*b^2*c^4*g*h*j*m + 384*a^6*b^2*c^4*e*h*l*m - 288*a^5*b
^4*c^3*g*h*k*l - 288*a^5*b^4*c^3*e*h*l*m - 96*a^4*b^6*c^2*g*h*j*m + 2112*a^
5*b^3*c^4*d*j*k*l - 160*a^4*b^5*c^3*d*j*k*l + 16992*a^5*b^3*c^4*d*h*k*m - 6
252*a^4*b^5*c^3*d*h*k*m - 4800*a^5*b^3*c^4*e*g*k*m + 2112*a^5*b^3*c^4*d*g*l
*m - 1728*a^5*b^3*c^4*f*g*j*m + 1280*a^4*b^5*c^3*e*g*k*m + 1088*a^5*b^3*c^4
*e*f*l*m - 832*a^5*b^3*c^4*e*h*j*m + 816*a^3*b^7*c^2*d*h*k*m + 576*a^5*b^3*
c^4*e*h*k*l - 448*a^5*b^3*c^4*f*h*j*l + 288*a^4*b^5*c^3*f*g*j*m - 192*a^5*b
^3*c^4*g*h*j*k - 192*a^5*b^3*c^4*f*g*k*l + 192*a^4*b^5*c^3*e*h*j*m - 112*a^
4*b^5*c^3*d*g*l*m + 96*a^4*b^5*c^3*f*h*j*l - 96*a^3*b^7*c^2*e*g*k*m + 80*a^
4*b^5*c^3*f*g*k*l + 32*a^4*b^5*c^3*g*h*j*k - 11456*a^5*b^2*c^5*d*f*k*m + 49
92*a^5*b^2*c^5*d*h*j*l - 4608*a^5*b^2*c^5*e*g*j*l - 4224*a^5*b^2*c^5*d*e*l*
m + 3456*a^5*b^2*c^5*e*f*j*m + 3456*a^5*b^2*c^5*d*g*k*l + 2432*a^5*b^2*c^5*
d*g*j*m - 1312*a^4*b^4*c^4*d*h*j*l + 1272*a^3*b^6*c^3*d*f*k*m - 1056*a^4*b^
4*c^4*d*g*k*l + 896*a^5*b^2*c^5*f*g*j*k + 768*a^4*b^4*c^4*e*g*j*l - 576*a^4
*b^4*c^4*e*f*j*m - 480*a^4*b^4*c^4*d*g*j*m + 384*a^5*b^2*c^5*e*h*j*k + 384*
a^5*b^2*c^5*e*f*k*l - 232*a^2*b^8*c^2*d*f*k*m + 224*a^4*b^4*c^4*d*e*l*m - 1
60*a^4*b^4*c^4*e*f*k*l - 96*a^4*b^4*c^4*f*g*j*k + 96*a^3*b^6*c^3*d*h*j*l +
80*a^3*b^6*c^3*d*g*k*l - 64*a^4*b^4*c^4*e*h*j*k - 24*a^4*b^4*c^4*d*f*k*m +
416*a^4*b^4*c^4*e*g*h*m + 384*a^5*b^2*c^5*f*g*h*l + 384*a^5*b^2*c^5*e*g*h*m
 + 224*a^4*b^4*c^4*f*g*h*l - 96*a^3*b^6*c^3*e*g*h*m - 48*a^3*b^6*c^3*f*g*h*
l + 2112*a^4*b^3*c^5*d*e*k*l - 960*a^4*b^3*c^5*d*f*j*l + 960*a^4*b^3*c^5*d*
e*j*m + 384*a^3*b^5*c^4*d*f*j*l + 320*a^4*b^3*c^5*d*g*j*k + 192*a^4*b^3*c^5
*e*f*j*k - 160*a^3*b^5*c^4*d*e*k*l - 32*a^2*b^7*c^3*d*f*j*l + 7392*a^4*b^3*
c^5*d*f*h*m - 2496*a^4*b^3*c^5*d*g*h*l - 1728*a^4*b^3*c^5*e*f*g*m - 1500*a^
3*b^5*c^4*d*f*h*m + 656*a^3*b^5*c^4*d*g*h*l - 448*a^4*b^3*c^5*e*f*h*l + 288
*a^3*b^5*c^4*e*f*g*m - 192*a^4*b^3*c^5*f*g*h*j - 192*a^4*b^3*c^5*e*g*h*k +
96*a^3*b^5*c^4*e*f*h*l - 48*a^2*b^7*c^3*d*g*h*l + 32*a^3*b^5*c^4*e*g*h*k -
16*a^2*b^7*c^3*d*f*h*m - 640*a^4*b^2*c^6*d*e*j*k + 4992*a^4*b^2*c^6*d*e*h*l
 - 3584*a^4*b^2*c^6*d*f*h*k + 2432*a^4*b^2*c^6*d*e*g*m - 1312*a^3*b^4*c^5*d

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*e*h*l + 896*a^4*b^2*c^6*e*f*g*k + 896*a^4*b^2*c^6*d*g*h*j + 640*a^4*b^2*c^
6*d*f*g*l + 600*a^3*b^4*c^5*d*f*h*k + 480*a^3*b^4*c^5*d*f*g*l - 480*a^3*b^4
*c^5*d*e*g*m + 384*a^4*b^2*c^6*e*f*h*j - 192*a^2*b^6*c^4*d*f*g*l - 96*a^3*b
^4*c^5*e*f*g*k - 96*a^3*b^4*c^5*d*g*h*j + 96*a^2*b^6*c^4*d*e*h*l + 12*a^2*b
^6*c^4*d*f*h*k - 960*a^3*b^3*c^6*d*e*f*l + 384*a^2*b^5*c^5*d*e*f*l + 320*a^
3*b^3*c^6*d*e*g*k - 192*a^3*b^3*c^6*d*f*g*j + 192*a^3*b^3*c^6*d*e*h*j + 32*
a^2*b^5*c^5*d*f*g*j - 192*a^3*b^3*c^6*e*f*g*h + 384*a^3*b^2*c^7*d*e*f*j - 6
4*a^2*b^4*c^6*d*e*f*j + 896*a^3*b^2*c^7*d*e*g*h - 96*a^2*b^4*c^6*d*e*g*h -
192*a^2*b^3*c^7*d*e*f*g + 496*a^7*b^4*c*k*l^2*m - 4752*a^7*b^4*c*j*l*m^2 +
96*a^5*b^6*c*j^2*k*m - 6144*a^8*b*c^3*h*l^2*m - 168*a^6*b^5*c*h*l^2*m + 640
0*a^8*b*c^3*g*l*m^2 - 2862*a^6*b^5*c*h*k*m^2 + 2376*a^6*b^5*c*g*l*m^2 - 163
2*a^7*b*c^4*h^2*k*m - 480*a^8*b*c^3*h*k*m^2 - 180*a^5*b^6*c*h*k^2*m + 54*a^
4*b^7*c*h^2*k*m - 384*a^7*b*c^4*h*j^2*m + 120*a^5*b^6*c*h*k*l^2 + 56*a^5*b^
6*c*f*l^2*m + 24*a^3*b^8*c*g^2*k*m + 4512*a^7*b*c^4*f*k^2*m - 2304*a^7*b*c^
4*g*k^2*l - 1680*a^5*b^6*c*g*j*m^2 + 1184*a^6*b*c^5*f^2*k*m + 804*a^5*b^6*c
*f*k*m^2 + 432*a^5*b^6*c*e*l*m^2 + 60*a^4*b^7*c*f*k^2*m + 6*a^2*b^9*c*f^2*k
*m - 13312*a^7*b*c^4*d*l^2*m + 2048*a^7*b*c^4*g*j*l^2 - 1024*a^7*b*c^4*f*k*
l^2 + 64*a^4*b^7*c*g*j*l^2 + 56*a^4*b^7*c*d*l^2*m - 40*a^4*b^7*c*f*k*l^2 +
13440*a^7*b*c^4*e*j*m^2 - 8928*a^5*b*c^6*d^2*k*m - 6240*a^7*b*c^4*d*k*m^2 +
 1614*a^4*b^7*c*d*k*m^2 - 288*a^4*b^7*c*e*j*m^2 - 170*a*b^9*c^2*d^2*k*m + 6
0*a^3*b^8*c*d*k^2*m + 4608*a^6*b*c^5*e*j^2*l + 4608*a^5*b*c^6*e^2*j*l - 243
2*a^6*b*c^5*d*j^2*m + 1440*a^7*b*c^4*f*h*m^2 - 896*a^6*b*c^5*f*j^2*k - 864*
a^6*b*c^5*f*h^2*m - 558*a^4*b^7*c*f*h*m^2 + 256*a^6*b*c^5*g*h^2*l - 40*a^3*
b^8*c*d*k*l^2 - 1920*a^6*b*c^5*e*j*k^2 - 384*a^5*b*c^6*e^2*h*m + 24*a^3*b^8
*c*f*h*l^2 - 16*a*b^8*c^3*d^2*j*l + 2208*a^6*b*c^5*f*h*k^2 - 1044*a^3*b^8*c
*d*h*m^2 + 800*a^5*b*c^6*f^2*h*k - 256*a^5*b*c^6*f^2*g*l + 144*a^3*b^8*c*e*
g*m^2 - 116*a*b^8*c^3*d^2*h*m + 8192*a^6*b*c^5*d*h*l^2 + 2048*a^6*b*c^5*e*g
*l^2 + 24*a^2*b^9*c*d*h*l^2 - 5856*a^4*b*c^7*d^2*f*m + 4896*a^4*b*c^7*d^2*h
*k + 2720*a^6*b*c^5*d*f*m^2 + 2304*a^4*b*c^7*d^2*g*l + 1824*a^5*b*c^6*d*h^2
*k + 438*a*b^7*c^4*d^2*f*m - 384*a^5*b*c^6*e*h^2*j + 318*a^2*b^9*c*d*f*m^2
- 168*a*b^7*c^4*d^2*g*l + 42*a*b^7*c^4*d^2*h*k - 36*a*b^8*c^3*d*f^2*m - 243
2*a^4*b*c^7*d*e^2*m + 1536*a^5*b*c^6*e*g*j^2 + 1536*a^4*b*c^7*e^2*g*j - 896
*a^5*b*c^6*d*h*j^2 - 896*a^4*b*c^7*e^2*f*k + 4896*a^5*b*c^6*d*f*k^2 + 1824*
a^4*b*c^7*d*f^2*k - 384*a^4*b*c^7*e*f^2*j + 336*a*b^6*c^5*d^2*e*l - 156*a*b
^6*c^5*d^2*f*k + 16*a*b^6*c^5*d^2*g*j + 12*a*b^7*c^4*d*f^2*k - 2*a*b^9*c^2*
d*f*k^2 - 1920*a^3*b*c^8*d^2*e*j - 32*a*b^5*c^6*d^2*e*j + 2208*a^3*b*c^8*d^
2*f*h + 800*a^4*b*c^7*d*f*h^2 - 102*a*b^5*c^6*d^2*f*h + 12*a*b^6*c^5*d*f^2*
h - 2*a*b^7*c^4*d*f*h^2 - 896*a^3*b*c^8*d*e^2*h - 8*a*b^6*c^5*d*f*g^2 - 240
*a*b^4*c^7*d^2*e*g - 32*a*b^4*c^7*d*e^2*f + 5120*a^8*c^4*h*j*l*m + 15360*a^
7*c^5*d*j*l*m - 7680*a^7*c^5*e*j*k*m + 3072*a^7*c^5*f*j*k*l + 5120*a^7*c^5*
e*h*l*m + 1920*a^7*c^5*f*h*k*m + 15360*a^6*c^6*d*e*l*m + 5760*a^6*c^6*d*f*k
*m + 3072*a^6*c^6*e*f*k*l - 3072*a^6*c^6*d*h*j*l - 2560*a^6*c^6*e*f*j*m + 1
536*a^6*c^6*e*h*j*k + 4608*a^5*c^7*d*e*j*k - 3072*a^5*c^7*d*e*h*l - 1152*a^
5*c^7*d*f*h*k + 512*a^5*c^7*e*f*h*j + 1536*a^4*c^8*d*e*f*j - 8*a*b^10*c*d*f
*l^2 - 5568*a^8*b^2*c^2*k*l^2*m + 15552*a^8*b^2*c^2*j*l*m^2 + 4800*a^7*b^2*
c^3*j^2*k*m - 1280*a^6*b^4*c^2*j^2*k*m + 2080*a^7*b^3*c^2*h*l^2*m - 1088*a^
7*b^2*c^3*j*k^2*l + 48*a^6*b^4*c^2*j*k^2*l - 8544*a^7*b^2*c^3*h*k^2*m - 777
6*a^7*b^3*c^2*g*l*m^2 + 7632*a^7*b^3*c^2*h*k*m^2 + 3600*a^6*b^3*c^3*h^2*k*m
 + 2484*a^6*b^4*c^2*h*k^2*m - 918*a^5*b^5*c^2*h^2*k*m + 4800*a^7*b^2*c^3*h*
k*l^2 - 1424*a^6*b^4*c^2*h*k*l^2 + 1200*a^5*b^4*c^3*g^2*k*m - 960*a^6*b^2*c
^4*g^2*k*m - 528*a^6*b^4*c^2*f*l^2*m - 416*a^6*b^3*c^3*h*j^2*m - 320*a^4*b^
6*c^2*g^2*k*m + 192*a^7*b^2*c^3*f*l^2*m + 96*a^5*b^5*c^2*h*j^2*m + 15552*a^
7*b^2*c^3*e*l*m^2 - 6720*a^7*b^2*c^3*g*j*m^2 + 6160*a^6*b^4*c^2*g*j*m^2 - 4
752*a^6*b^4*c^2*e*l*m^2 - 2016*a^7*b^2*c^3*f*k*m^2 - 1164*a^6*b^4*c^2*f*k*m
^2 + 1104*a^5*b^3*c^4*f^2*k*m + 1008*a^6*b^3*c^3*f*k^2*m + 960*a^6*b^2*c^4*
h^2*j*l - 678*a^5*b^5*c^2*f*k^2*m + 544*a^6*b^3*c^3*g*k^2*l - 144*a^5*b^4*c
^3*h^2*j*l - 102*a^4*b^5*c^3*f^2*k*m - 62*a^3*b^7*c^2*f^2*k*m - 24*a^5*b^5*
c^2*g*k^2*l + 6432*a^6*b^3*c^3*d*l^2*m + 4800*a^5*b^2*c^5*e^2*k*m - 2304*a^
6*b^2*c^4*g*j^2*l + 1920*a^6*b^3*c^3*g*j*l^2 + 1728*a^6*b^2*c^4*f*j^2*m - 1
```

280*a^4*b^4*c^4*e^2*k*m + 1152*a^5*b^3*c^4*g^2*j*l - 1032*a^5*b^5*c^2*d*l^2
*m - 864*a^6*b^3*c^3*f*k*l^2 - 768*a^5*b^5*c^2*g*j*l^2 + 408*a^5*b^5*c^2*f*
k*l^2 + 384*a^5*b^4*c^3*g*j^2*l - 288*a^5*b^4*c^3*f*j^2*m + 192*a^6*b^2*c^4
*h*j^2*k - 192*a^4*b^5*c^3*g^2*j*l + 96*a^3*b^6*c^3*e^2*k*m - 32*a^5*b^4*c^
3*h*j^2*k - 21120*a^6*b^2*c^4*d*k^2*m + 20880*a^6*b^3*c^3*d*k*m^2 + 19760*a
^4*b^3*c^5*d^2*k*m - 12320*a^6*b^3*c^3*e*j*m^2 - 9750*a^5*b^5*c^2*d*k*m^2 -
9390*a^3*b^5*c^4*d^2*k*m + 8460*a^5*b^4*c^3*d*k^2*m + 3360*a^5*b^5*c^2*e*j
*m^2 + 1860*a^2*b^7*c^3*d^2*k*m - 1218*a^4*b^6*c^2*d*k^2*m - 1088*a^6*b^2*c
^4*e*k^2*l + 960*a^6*b^2*c^4*g*j*k^2 - 240*a^5*b^4*c^3*g*j*k^2 + 192*a^5*b^
2*c^5*f^2*j*l - 104*a^4*b^5*c^3*g^2*h*m - 96*a^5*b^3*c^4*g^2*h*m + 48*a^5*b
^4*c^3*e*k^2*l + 48*a^4*b^4*c^4*f^2*j*l + 24*a^3*b^7*c^2*g^2*h*m + 16*a^4*b
^6*c^2*g*j*k^2 - 16*a^3*b^6*c^3*f^2*j*l + 13376*a^6*b^2*c^4*d*k*l^2 - 5136*
a^5*b^4*c^3*d*k*l^2 - 3840*a^6*b^2*c^4*e*j*l^2 + 1536*a^5*b^4*c^3*e*j*l^2 +
1392*a^5*b^3*c^4*f*h^2*m + 1386*a^5*b^5*c^2*f*h*m^2 - 768*a^5*b^3*c^4*e*j^
2*l + 768*a^4*b^6*c^2*d*k*l^2 - 768*a^4*b^3*c^5*e^2*j*l - 588*a^4*b^4*c^4*f
^2*h*m - 480*a^5*b^3*c^4*g*h^2*l + 480*a^5*b^3*c^4*d*j^2*m - 480*a^5*b^2*c^
5*f^2*h*m - 128*a^4*b^6*c^2*e*j*l^2 + 100*a^3*b^6*c^3*f^2*h*m + 96*a^5*b^3*
c^4*f*j^2*k + 72*a^4*b^5*c^3*g*h^2*l - 54*a^4*b^5*c^3*f*h^2*m - 48*a^6*b^3*
c^3*f*h*m^2 - 36*a^3*b^7*c^2*f*h^2*m + 6*a^2*b^8*c^2*f^2*h*m + 6848*a^4*b^2
*c^6*d^2*j*l - 2448*a^3*b^4*c^5*d^2*j*l + 624*a^5*b^4*c^3*f*h*l^2 + 576*a^6
*b^2*c^4*f*h*l^2 + 480*a^5*b^3*c^4*e*j*k^2 + 432*a^4*b^4*c^4*f*g^2*m - 416*
a^4*b^3*c^5*e^2*h*m + 336*a^2*b^6*c^4*d^2*j*l - 320*a^5*b^2*c^5*f*g^2*m - 2
56*a^4*b^6*c^2*f*h*l^2 + 192*a^5*b^2*c^5*g^2*h*k + 96*a^3*b^5*c^4*e^2*h*m -
72*a^3*b^6*c^3*f*g^2*m + 48*a^4*b^4*c^4*g^2*h*k - 32*a^4*b^5*c^3*e*j*k^2 -
8*a^3*b^6*c^3*g^2*h*k + 24768*a^6*b^2*c^4*d*h*m^2 - 21108*a^5*b^4*c^3*d*h*
m^2 - 10048*a^4*b^2*c^6*d^2*h*m + 7218*a^4*b^6*c^2*d*h*m^2 - 6720*a^6*b^2*c
^4*e*g*m^2 + 6160*a^5*b^4*c^3*e*g*m^2 - 2592*a^5*b^2*c^5*d*h^2*m - 1680*a^4
*b^6*c^2*e*g*m^2 + 1068*a^3*b^4*c^5*d^2*h*m + 960*a^5*b^2*c^5*e*h^2*l - 876
*a^4*b^4*c^4*d*h^2*m - 864*a^5*b^2*c^5*f*h^2*k + 546*a^2*b^6*c^4*d^2*h*m +
432*a^3*b^6*c^3*d*h^2*m + 336*a^4*b^3*c^5*f^2*h*k - 320*a^5*b^2*c^5*d*j^2*k
+ 192*a^5*b^2*c^5*g*h^2*j + 144*a^5*b^3*c^4*f*h*k^2 - 144*a^4*b^4*c^4*e*h^
2*l - 102*a^4*b^5*c^3*f*h*k^2 - 96*a^4*b^3*c^5*f^2*g*l - 36*a^2*b^8*c^2*d*h
^2*m - 30*a^3*b^5*c^4*f^2*h*k - 24*a^3*b^5*c^4*f^2*g*l + 16*a^4*b^4*c^4*g*h
^2*j - 12*a^4*b^4*c^4*f*h^2*k + 12*a^3*b^6*c^3*f*h^2*k + 8*a^2*b^7*c^3*f^2*
g*l + 6*a^3*b^7*c^2*f*h*k^2 - 2*a^2*b^7*c^3*f^2*h*k - 9312*a^5*b^3*c^4*d*h*
l^2 + 3288*a^4*b^5*c^3*d*h*l^2 - 2304*a^4*b^2*c^6*e^2*g*l + 1920*a^5*b^3*c^
4*e*g*l^2 + 1728*a^4*b^2*c^6*e^2*f*m + 1152*a^4*b^3*c^5*e*g^2*l - 768*a^4*b
^5*c^3*e*g*l^2 - 608*a^4*b^3*c^5*d*g^2*m - 472*a^3*b^7*c^2*d*h*l^2 + 384*a^
3*b^4*c^5*e^2*g*l - 288*a^3*b^4*c^5*e^2*f*m - 224*a^4*b^3*c^5*f*g^2*k + 192
*a^5*b^2*c^5*f*h*j^2 + 192*a^4*b^2*c^6*e^2*h*k - 192*a^3*b^5*c^4*e*g^2*l +
120*a^3*b^5*c^4*d*g^2*m + 64*a^3*b^7*c^2*e*g*l^2 - 32*a^3*b^4*c^5*e^2*h*k +
24*a^3*b^5*c^4*f*g^2*k + 9936*a^3*b^3*c^6*d^2*f*m + 3786*a^4*b^5*c^3*d*f*m
^2 - 3552*a^5*b^2*c^5*d*h*k^2 - 3486*a^2*b^5*c^5*d^2*f*m - 3424*a^3*b^3*c^6
*d^2*g*l - 1868*a^3*b^7*c^2*d*f*m^2 + 1332*a^4*b^4*c^4*d*h*k^2 - 1296*a^5*b
^3*c^4*d*f*m^2 - 1236*a^3*b^4*c^5*d*f^2*m + 1224*a^2*b^5*c^5*d^2*g*l - 1152
*a^4*b^2*c^6*d*f^2*m + 960*a^5*b^2*c^5*e*g*k^2 - 496*a^3*b^3*c^6*d^2*h*k +
462*a^2*b^6*c^4*d*f^2*m + 432*a^4*b^3*c^5*d*h^2*k - 240*a^4*b^4*c^4*e*g*k^2
- 222*a^2*b^5*c^5*d^2*h*k + 192*a^4*b^2*c^6*f^2*g*j + 192*a^4*b^2*c^6*e*f^
2*l - 174*a^3*b^5*c^4*d*h^2*k - 156*a^3*b^6*c^3*d*h*k^2 + 48*a^3*b^4*c^5*e*
f^2*l - 32*a^4*b^3*c^5*e*h^2*j + 16*a^3*b^6*c^3*e*g*k^2 + 16*a^3*b^4*c^5*f^
2*g*j - 16*a^2*b^6*c^4*e*f^2*l + 12*a^2*b^7*c^3*d*h^2*k + 6*a^2*b^8*c^2*d*h
*k^2 + 1728*a^5*b^2*c^5*d*f*l^2 + 1392*a^4*b^4*c^4*d*f*l^2 - 840*a^3*b^6*c^
3*d*f*l^2 - 768*a^4*b^2*c^6*e*g^2*j + 576*a^4*b^2*c^6*d*g^2*k + 480*a^3*b^3
*c^6*d*e^2*m + 144*a^2*b^8*c^2*d*f*l^2 + 96*a^4*b^3*c^5*d*h*j^2 + 96*a^3*b^
3*c^6*e^2*f*k - 80*a^3*b^4*c^5*d*g^2*k + 6848*a^3*b^2*c^7*d^2*e*l - 3552*a^
3*b^2*c^7*d^2*f*k - 2448*a^2*b^4*c^6*d^2*e*l + 1332*a^2*b^4*c^6*d^2*f*k + 9
60*a^3*b^2*c^7*d^2*g*j - 496*a^4*b^3*c^5*d*f*k^2 + 432*a^3*b^3*c^6*d*f^2*k
- 240*a^2*b^4*c^6*d^2*g*j - 222*a^3*b^5*c^4*d*f*k^2 - 174*a^2*b^5*c^5*d*f^2
*k + 64*a^4*b^2*c^6*f*g^2*h + 48*a^3*b^4*c^5*f*g^2*h + 42*a^2*b^7*c^3*d*f*k

^2 - 32*a^3*b^3*c^6*e*f^2*j - 320*a^3*b^2*c^7*d*e^2*k + 192*a^4*b^2*c^6*e*g
*h^2 + 192*a^4*b^2*c^6*d*f*j^2 - 32*a^3*b^4*c^5*d*f*j^2 + 16*a^3*b^4*c^5*e*
g*h^2 + 480*a^2*b^3*c^7*d^2*e*j - 224*a^3*b^3*c^6*d*g^2*h + 192*a^3*b^2*c^7
*e^2*f*h + 24*a^2*b^5*c^5*d*g^2*h - 864*a^3*b^2*c^7*d*f^2*h + 336*a^3*b^3*c
^6*d*f*h^2 + 192*a^3*b^2*c^7*e*f^2*g + 144*a^2*b^3*c^7*d^2*f*h - 30*a^2*b^5
*c^5*d*f*h^2 + 16*a^2*b^4*c^6*e*f^2*g - 12*a^2*b^4*c^6*d*f^2*h + 192*a^3*b^
2*c^7*d*f*g^2 + 96*a^2*b^3*c^7*d*e^2*h + 48*a^2*b^4*c^6*d*f*g^2 + 960*a^2*b
^2*c^8*d^2*e*g + 192*a^2*b^2*c^8*d*e^2*f - 7680*a^9*b*c^2*l^2*m^2 + 3152*a^
8*b^3*c*l^2*m^2 + 2070*a^7*b^4*c*k^2*m^2 - 1840*a^7*b^3*c^2*k^3*m + 6720*a^
8*b*c^3*j^2*m^2 - 3072*a^8*b*c^3*k^2*l^2 + 1680*a^6*b^5*c*j^2*m^2 - 100*a^6
*b^5*c*k^2*l^2 - 2176*a^7*b^3*c^2*j*l^3 - 256*a^6*b^3*c^3*j^3*l - 64*a^5*b^
6*c*j^2*l^2 - 12480*a^8*b^2*c^2*h*m^3 + 972*a^5*b^6*c*h^2*m^2 - 960*a^7*b*c
^4*j^2*k^2 - 252*a^5*b^4*c^3*h^3*m - 192*a^6*b^2*c^4*h^3*m + 54*a^4*b^6*c^2
*h^3*m + 1536*a^7*b*c^4*h^2*l^2 + 420*a^4*b^7*c*g^2*m^2 - 36*a^4*b^7*c*h^2*
l^2 - 3072*a^7*b^2*c^3*g*l^3 + 2096*a^7*b^3*c^2*f*m^3 + 1088*a^6*b^4*c^2*g*
l^3 - 496*a^6*b^3*c^3*h*k^3 - 192*a^4*b^4*c^4*g^3*l + 176*a^4*b^3*c^5*f^3*m
 + 144*a^5*b^3*c^4*h^3*k + 78*a^3*b^8*c*f^2*m^2 + 54*a^3*b^5*c^4*f^3*m + 32
*a^3*b^6*c^3*g^3*l + 30*a^5*b^5*c^2*h*k^3 - 18*a^4*b^5*c^3*h^3*k - 18*a^2*b
^7*c^3*f^3*m - 16*a^3*b^8*c*g^2*l^2 + 6720*a^6*b*c^5*e^2*m^2 - 192*a^6*b*c^
5*h^2*j^2 - 4*a^2*b^9*c*f^2*l^2 - 35040*a^7*b^2*c^3*d*m^3 + 14300*a^6*b^4*c
^2*d*m^3 - 12000*a^3*b^2*c^7*d^3*m + 4380*a^2*b^4*c^6*d^3*m - 2176*a^6*b^3*
c^3*e*l^3 - 256*a^3*b^3*c^6*e^3*l - 192*a^6*b^2*c^4*f*k^3 + 192*a^5*b^5*c^2
*e*l^3 - 192*a^4*b^2*c^6*f^3*k + 132*a^5*b^4*c^3*f*k^3 + 128*a^4*b^3*c^5*g^
3*j - 28*a^3*b^4*c^5*f^3*k - 10*a^4*b^6*c^2*f*k^3 + 6*a^2*b^6*c^4*f^3*k + 1
0752*a^5*b*c^6*d^2*l^2 - 960*a^5*b*c^6*e^2*k^2 - 192*a^5*b*c^6*f^2*j^2 + 10
8*a*b^9*c^2*d^2*l^2 - 1680*a^5*b^3*c^4*d*k^3 - 1680*a^2*b^3*c^7*d^3*k + 222
*a^4*b^5*c^3*d*k^3 + 30*a*b^8*c^3*d^2*k^2 - 10*a^3*b^7*c^2*d*k^3 - 960*a^4*
b*c^7*d^2*j^2 + 80*a^4*b^3*c^5*f*h^3 + 80*a^3*b^3*c^6*f^3*h + 6*a^3*b^5*c^4
*f*h^3 + 6*a^2*b^5*c^5*f^3*h - 192*a^4*b*c^7*e^2*h^2 - 192*a^4*b^2*c^6*d*h^
3 - 192*a^2*b^2*c^8*d^3*h + 128*a^3*b^3*c^6*e*g^3 - 28*a^3*b^4*c^5*d*h^3 +
12*a*b^6*c^5*d^2*h^2 + 6*a^2*b^6*c^4*d*h^3 - 192*a^3*b*c^8*e^2*f^2 + 60*a*b
^5*c^6*d^2*g^2 + 198*a*b^4*c^7*d^2*f^2 + 144*a^2*b^3*c^7*d*f^3 - 960*a^2*b*
c^9*d^2*e^2 + 240*a*b^3*c^8*d^2*e^2 + 15360*a^9*c^3*k*l^2*m - 12800*a^9*c^3
*j*l*m^2 - 3840*a^8*c^4*j^2*k*m + 432*a^6*b^6*j*l*m^2 + 4608*a^8*c^4*j*k^2*
l + 2880*a^8*c^4*h*k^2*m + 5120*a^8*c^4*f*l^2*m - 3072*a^8*c^4*h*k*l^2 + 27
0*a^5*b^7*h*k*m^2 - 216*a^5*b^7*g*l*m^2 - 12800*a^8*c^4*e*l*m^2 - 4800*a^8*
c^4*f*k*m^2 - 512*a^7*c^5*h^2*j*l - 3840*a^6*c^6*e^2*k*m - 1280*a^7*c^5*f*j
^2*m + 768*a^7*c^5*h*j^2*k + 144*a^4*b^8*g*j*m^2 - 90*a^4*b^8*f*k*m^2 + 864
0*a^7*c^5*d*k^2*m + 4608*a^7*c^5*e*k^2*l + 512*a^6*c^6*f^2*j*l - 9216*a^7*c
^5*d*k*l^2 - 4096*a^7*c^5*e*j*l^2 + 320*a^6*c^6*f^2*h*m - 90*a^3*b^9*d*k*m^
2 + 15200*a^9*b*c^2*k*m^3 - 6192*a^8*b^3*c*k*m^3 + 5472*a^8*b*c^3*k^3*m - 4
608*a^5*c^7*d^2*j*l - 1024*a^7*c^5*f*h*l^2 + 150*a^6*b^5*c*k^3*m + 54*a^3*b
^9*f*h*m^2 + 6*b^10*c^2*d^2*h*m - 14400*a^7*c^5*d*h*m^2 + 8640*a^5*c^7*d^2*
h*m + 2880*a^6*c^6*d*h^2*m + 2304*a^6*c^6*d*j^2*k - 512*a^6*c^6*e*h^2*l - 1
92*a^6*c^6*f*h^2*k + 6144*a^8*b*c^3*j*l^3 + 1536*a^7*b*c^4*j^3*l - 1280*a^5
*c^7*e^2*f*m + 768*a^5*c^7*e^2*h*k + 256*a^6*c^6*f*h*j^2 + 192*a^6*b^5*c*j*
l^3 + 54*a^2*b^10*d*h*m^2 - 18*b^9*c^3*d^2*f*m + 8*b^9*c^3*d^2*g*l - 2*b^9*
c^3*d^2*h*k + 4068*a^7*b^4*c*h*m^3 - 1728*a^6*c^6*d*h*k^2 + 960*a^5*c^7*d*f
^2*m + 512*a^5*c^7*e*f^2*l - 3072*a^6*c^6*d*f*l^2 - 16*b^8*c^4*d^2*e*l + 6*
b^8*c^4*d^2*f*k - 4608*a^4*c^8*d^2*e*l + 2400*a^8*b*c^3*f*m^3 + 2016*a^7*b*
c^4*h*k^3 - 1728*a^4*c^8*d^2*f*k - 1146*a^6*b^5*c*f*m^3 + 224*a^6*b*c^5*h^3
*k - 96*a^5*b^6*c*g*l^3 + 96*a^5*b*c^6*f^3*m + 2304*a^4*c^8*d*e^2*k + 768*a
^5*c^7*d*f*j^2 + 6144*a^7*b*c^4*e*l^3 - 2280*a^5*b^6*c*d*m^3 + 1536*a^4*b*c
^7*e^3*l - 616*a*b^6*c^5*d^3*m + 512*a^6*b*c^5*g*j^3 + 256*a^4*c^8*e^2*f*h
+ 240*a*b^10*c*d^2*m^2 + 6*b^7*c^5*d^2*f*h - 192*a^4*c^8*d*f^2*h + 4320*a^6
*b*c^5*d*k^3 + 4320*a^3*b*c^8*d^3*k + 222*a*b^5*c^6*d^3*k + 16*b^6*c^6*d^2*
e*g + 96*a^5*b*c^6*f*h^3 + 96*a^4*b*c^7*f^3*h + 768*a^3*c^9*d*e^2*f + 512*a
^3*b*c^8*e^3*g + 132*a*b^4*c^7*d^3*h + 2016*a^2*b*c^9*d^3*f - 496*a*b^3*c^8
*d^3*f + 224*a^3*b*c^8*d*f^3 - 18*a*b^5*c^6*d*f^3 - 3264*a^8*b^2*c^2*k^2*m^

```
2 - 6160*a^7*b^3*c^2*j^2*m^2 + 1104*a^7*b^3*c^2*k^2*l^2 - 1920*a^7*b^2*c^3*
j^2*l^2 + 768*a^6*b^4*c^2*j^2*l^2 + 3888*a^7*b^2*c^3*h^2*m^2 - 3510*a^6*b^4
*c^2*h^2*m^2 + 240*a^6*b^3*c^3*j^2*k^2 - 16*a^5*b^5*c^2*j^2*k^2 + 1680*a^6*
b^3*c^3*g^2*m^2 - 1648*a^6*b^3*c^3*h^2*l^2 - 1540*a^5*b^5*c^2*g^2*m^2 + 444
*a^5*b^5*c^2*h^2*l^2 - 960*a^6*b^2*c^4*h^2*k^2 - 576*a^6*b^2*c^4*f^2*m^2 -
512*a^6*b^2*c^4*g^2*l^2 - 480*a^5*b^4*c^3*g^2*l^2 + 198*a^5*b^4*c^3*h^2*k^2
 + 192*a^4*b^6*c^2*g^2*l^2 - 186*a^5*b^4*c^3*f^2*m^2 - 97*a^4*b^6*c^2*f^2*m
^2 - 9*a^4*b^6*c^2*h^2*k^2 - 6160*a^5*b^3*c^4*e^2*m^2 + 1680*a^4*b^5*c^3*e^
2*m^2 - 240*a^5*b^3*c^4*g^2*k^2 - 240*a^5*b^3*c^4*f^2*l^2 - 144*a^3*b^7*c^2
*e^2*m^2 + 60*a^4*b^5*c^3*g^2*k^2 - 36*a^4*b^5*c^3*f^2*l^2 + 36*a^3*b^7*c^2
*f^2*l^2 - 16*a^5*b^3*c^4*h^2*j^2 - 4*a^3*b^7*c^2*g^2*k^2 + 38512*a^5*b^2*c
^5*d^2*m^2 - 32310*a^4*b^4*c^4*d^2*m^2 + 12720*a^3*b^6*c^3*d^2*m^2 - 2500*a
^2*b^8*c^2*d^2*m^2 - 1920*a^5*b^2*c^5*e^2*l^2 + 768*a^4*b^4*c^4*e^2*l^2 - 4
64*a^5*b^2*c^5*f^2*k^2 - 384*a^5*b^2*c^5*g^2*j^2 - 64*a^3*b^6*c^3*e^2*l^2 +
 42*a^4*b^4*c^4*f^2*k^2 + 12*a^3*b^6*c^3*f^2*k^2 - 13104*a^4*b^3*c^5*d^2*l^
2 + 5628*a^3*b^5*c^4*d^2*l^2 - 1128*a^2*b^7*c^3*d^2*l^2 + 240*a^4*b^3*c^5*e
^2*k^2 - 16*a^4*b^3*c^5*f^2*j^2 - 16*a^3*b^5*c^4*e^2*k^2 - 2880*a^4*b^2*c^6
*d^2*k^2 + 1750*a^3*b^4*c^5*d^2*k^2 - 345*a^2*b^6*c^4*d^2*k^2 - 48*a^4*b^3*
c^5*g^2*h^2 - 4*a^3*b^5*c^4*g^2*h^2 + 240*a^3*b^3*c^6*d^2*j^2 - 192*a^4*b^2
*c^6*f^2*h^2 - 42*a^3*b^4*c^5*f^2*h^2 - 16*a^2*b^5*c^5*d^2*j^2 - 48*a^3*b^3
*c^6*f^2*g^2 - 16*a^3*b^3*c^6*e^2*h^2 - 4*a^2*b^5*c^5*f^2*g^2 - 464*a^3*b^2
*c^7*d^2*h^2 - 384*a^3*b^2*c^7*e^2*g^2 + 42*a^2*b^4*c^6*d^2*h^2 - 240*a^2*b
^3*c^7*d^2*g^2 - 16*a^2*b^3*c^7*e^2*f^2 - 960*a^2*b^2*c^8*d^2*f^2 + 6*b^11*
c*d^2*k*m - 18*a*b^11*d*f*m^2 - 7200*a^9*c^3*k^2*m^2 - 324*a^7*b^5*l^2*m^2
- 225*a^6*b^6*k^2*m^2 - 2048*a^8*c^4*j^2*l^2 - 144*a^5*b^7*j^2*m^2 - 2400*a
^8*c^4*h^2*m^2 - 81*a^4*b^8*h^2*m^2 - 800*a^7*c^5*f^2*m^2 - 288*a^7*c^5*h^2
*k^2 - 36*a^3*b^9*g^2*m^2 - 9*a^2*b^10*f^2*m^2 - 21600*a^6*c^6*d^2*m^2 - 20
48*a^6*c^6*e^2*l^2 - 864*a^6*c^6*f^2*k^2 - 2592*a^5*c^7*d^2*k^2 - 1536*a^5*
c^7*e^2*j^2 + 1536*a^8*b^2*c^2*l^4 - 32*a^5*c^7*f^2*h^2 + 360*a^7*b^2*c^3*k
^4 - 25*a^6*b^4*c^2*k^4 - 864*a^4*c^8*d^2*h^2 - 4*b^7*c^5*d^2*g^2 - 9*b^6*c
^6*d^2*f^2 - 288*a^3*c^9*d^2*f^2 - 24*a^5*b^2*c^5*h^4 - 16*b^5*c^7*d^2*e^2
- 9*a^4*b^4*c^4*h^4 - 16*a^3*b^4*c^5*g^4 - 24*a^3*b^2*c^7*f^4 - 9*a^2*b^4*c
^6*f^4 - a^2*b^8*c^2*f^2*k^2 - a^2*b^6*c^4*f^2*h^2 + 630*a^7*b^5*k*m^3 + 80
00*a^9*c^3*h*m^3 + 320*a^7*c^5*h^3*m - 378*a^6*b^6*h*m^3 + 126*a^5*b^7*f*m^
3 + 30*b^8*c^4*d^3*m + 24000*a^8*c^4*d*m^3 + 8640*a^4*c^8*d^3*m - 1728*a^7*
c^5*f*k^3 - 192*a^5*c^7*f^3*k - 4*b^11*c*d^2*l^2 + 126*a^4*b^8*d*m^3 - 10*b
^7*c^5*d^3*k + 4200*a^9*b^2*c*m^4 - 1024*a^6*c^6*e*j^3 - 1024*a^4*c^8*e^3*j
 - 144*a^7*b^4*c*l^4 - 10*b^6*c^6*d^3*h - 1728*a^3*c^9*d^3*h - 192*a^5*c^7*
d*h^3 + 30*b^5*c^7*d^3*f + 360*a*b^2*c^9*d^4 - 9*b^12*d^2*m^2 - 10000*a^10*
c^2*m^4 - 4096*a^9*c^3*l^4 - 441*a^8*b^4*m^4 - 1296*a^8*c^4*k^4 - 256*a^7*c
^5*j^4 - 16*a^6*c^6*h^4 - 16*a^4*c^8*f^4 - 256*a^3*c^9*e^4 - 25*b^4*c^8*d^4
 - 1296*a^2*c^10*d^4 - b^10*c^2*d^2*k^2 - b^8*c^4*d^2*h^2, z, k1), k1, 1, 4
) + ((b*c^2*e - 2*a*c^2*g - a*b^2*l + 2*a^2*c*l + a*b*c*j)/(2*(4*a*c - b^2)
) + (x^2*(2*c^3*e - b^3*l - b*c^2*g - 2*a*c^2*j + b^2*c*j + 3*a*b*c*l))/(2*
(4*a*c - b^2)) + (x*(2*a*c^3*d - 2*a^2*c^2*h - a^2*b^2*m - b^2*c^2*d + 2*a^
3*c*m + a*b*c^2*f + a^2*b*c*k))/(2*a*(4*a*c - b^2)) - (x^3*(2*a^2*c^2*k + b
*c^3*d - 2*a*c^3*f + a*b^3*m + a*b*c^2*h - a*b^2*c*k - 3*a^2*b*c*m))/(2*a*(
4*a*c - b^2)))/(a*c^2 + c^3*x^4 + b*c^2*x^2) + (m*x)/c^2
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x**8+l*x**7+k*x**6+j*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+
b*x**2+a)**2,x)

[Out] Timed out
```

3.42 $\int \frac{d+ex}{\left(4-5x^2+x^4\right)^3} dx$

Optimal. Leaf size=143

$$-\frac{dx\left(59-35x^2\right)}{3456\left(x^4-5x^2+4\right)}+\frac{dx\left(17-5x^2\right)}{144\left(x^4-5x^2+4\right)^2}-\frac{313d\tanh^{-1}\left(\frac{x}{2}\right)}{20736}+\frac{13}{648}d\tanh^{-1}(x)-\frac{1}{81}e\log\left(1-x^2\right)+\frac{1}{81}e\log\left(4\cdot\right.$$

```
[Out] 1/144*d*x*(-5*x^2+17)/(x^4-5*x^2+4)^2+1/36*e*(-2*x^2+5)/(x^4-5*x^2+4)^2-1/3
456*d*x*(-35*x^2+59)/(x^4-5*x^2+4)-1/54*e*(-2*x^2+5)/(x^4-5*x^2+4)-313/2073
6*d*arctanh(1/2*x)+13/648*d*arctanh(x)-1/81*e*ln(-x^2+1)+1/81*e*ln(-x^2+4)
```

Rubi [A] time = 0.08, antiderivative size = 143, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 10, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.556, Rules used = {1673, 12, 1092, 1178, 1166, 207, 1107, 614, 616, 31}

$$-\frac{dx\left(59-35x^2\right)}{3456\left(x^4-5x^2+4\right)}+\frac{dx\left(17-5x^2\right)}{144\left(x^4-5x^2+4\right)^2}-\frac{313d\tanh^{-1}\left(\frac{x}{2}\right)}{20736}+\frac{13}{648}d\tanh^{-1}(x)-\frac{e\left(5-2x^2\right)}{54\left(x^4-5x^2+4\right)}+\frac{e\left(5-\right.}{36\left(x^4-5\right.}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)/(4 - 5*x^2 + x^4)^3,x]
```

```
[Out] (d*x*(17 - 5*x^2))/(144*(4 - 5*x^2 + x^4)^2) + (e*(5 - 2*x^2))/(36*(4 - 5*x
^2 + x^4)^2) - (d*x*(59 - 35*x^2))/(3456*(4 - 5*x^2 + x^4)) - (e*(5 - 2*x^2
))/(54*(4 - 5*x^2 + x^4)) - (313*d*ArcTanh[x/2])/20736 + (13*d*ArcTanh[x])/
648 - (e*Log[1 - x^2])/81 + (e*Log[4 - x^2])/81
```

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 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1092

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> -Simp[(x*(b^2 -
 2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)),
 x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(b^2 - 2*a*c + 2*(p + 1)*(b^2
 - 4*a*c) + b*c*(4*p + 7)*x^2)*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ
[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex}{\left(4-5x^2+x^4\right)^3}\,dx = \int \frac{d}{\left(4-5x^2+x^4\right)^3}\,dx + \int \frac{ex}{\left(4-5x^2+x^4\right)^3}\,dx$$

$$= d\int \frac{1}{\left(4-5x^2+x^4\right)^3}\,dx + e\int \frac{x}{\left(4-5x^2+x^4\right)^3}\,dx$$

$$= \frac{dx\left(17-5x^2\right)}{144\left(4-5x^2+x^4\right)^2} - \frac{1}{144}d\int \frac{-19+25x^2}{\left(4-5x^2+x^4\right)^2}\,dx + \frac{1}{2}e\,\text{Subst}\left(\int \frac{1}{\left(4-5x+x^2\right)^3}\,dx,\right.$$

$$= \frac{dx\left(17-5x^2\right)}{144\left(4-5x^2+x^4\right)^2} + \frac{e\left(5-2x^2\right)}{36\left(4-5x^2+x^4\right)^2} - \frac{dx\left(59-35x^2\right)}{3456\left(4-5x^2+x^4\right)} + \frac{d\int \frac{519+105x^2}{4-5x^2+x^4}\,dx}{10368} -$$

$$= \frac{dx\left(17-5x^2\right)}{144\left(4-5x^2+x^4\right)^2} + \frac{e\left(5-2x^2\right)}{36\left(4-5x^2+x^4\right)^2} - \frac{dx\left(59-35x^2\right)}{3456\left(4-5x^2+x^4\right)} - \frac{e\left(5-2x^2\right)}{54\left(4-5x^2+x^4\right)}$$

$$= \frac{dx\left(17-5x^2\right)}{144\left(4-5x^2+x^4\right)^2} + \frac{e\left(5-2x^2\right)}{36\left(4-5x^2+x^4\right)^2} - \frac{dx\left(59-35x^2\right)}{3456\left(4-5x^2+x^4\right)} - \frac{e\left(5-2x^2\right)}{54\left(4-5x^2+x^4\right)}$$

$$= \frac{dx\left(17-5x^2\right)}{144\left(4-5x^2+x^4\right)^2} + \frac{e\left(5-2x^2\right)}{36\left(4-5x^2+x^4\right)^2} - \frac{dx\left(59-35x^2\right)}{3456\left(4-5x^2+x^4\right)} - \frac{e\left(5-2x^2\right)}{54\left(4-5x^2+x^4\right)}$$

Mathematica [**A**] time = 0.10, size = 128, normalized size = 0.90

$$\frac{\frac{288\left(dx\left(17-5x^2\right)+e\left(20-8x^2\right)\right)}{\left(x^4-5x^2+4\right)^2} + \frac{12\left(dx\left(35x^2-59\right)+64e\left(2x^2-5\right)\right)}{x^4-5x^2+4} - 32(13d+16e)\log(1-x) + (313d+512e)\log(2-x) + 32(1}{41472}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)/(4 - 5*x^2 + x^4)^3,x]
```

```
[Out] ((288*(e*(20 - 8*x^2) + d*x*(17 - 5*x^2)))/(4 - 5*x^2 + x^4)^2 + (12*(64*e*
(-5 + 2*x^2) + d*x*(-59 + 35*x^2)))/(4 - 5*x^2 + x^4) - 32*(13*d + 16*e)*Lo
g[1 - x] + (313*d + 512*e)*Log[2 - x] + 32*(13*d - 16*e)*Log[1 + x] + (-313
*d + 512*e)*Log[2 + x])/41472
```

fricas [**B**] time = 1.49, size = 307, normalized size = 2.15

$$\frac{420\,dx^7 + 1536\,ex^6 - 2808\,dx^5 - 11520\,ex^4 + 3780\,dx^3 + 23040\,ex^2 + 2064\,dx - \left((313\,d - 512\,e)x^8 - 10\,(313\,d\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="fricas")
```

```
[Out] 1/41472*(420*d*x^7 + 1536*e*x^6 - 2808*d*x^5 - 11520*e*x^4 + 3780*d*x^3 + 2
3040*e*x^2 + 2064*d*x - ((313*d - 512*e)*x^8 - 10*(313*d - 512*e)*x^6 + 33*
(313*d - 512*e)*x^4 - 40*(313*d - 512*e)*x^2 + 5008*d - 8192*e)*log(x + 2)
+ 32*((13*d - 16*e)*x^8 - 10*(13*d - 16*e)*x^6 + 33*(13*d - 16*e)*x^4 - 40*
(13*d - 16*e)*x^2 + 208*d - 256*e)*log(x + 1) - 32*((13*d + 16*e)*x^8 - 10*
(13*d + 16*e)*x^6 + 33*(13*d + 16*e)*x^4 - 40*(13*d + 16*e)*x^2 + 208*d + 2
56*e)*log(x - 1) + ((313*d + 512*e)*x^8 - 10*(313*d + 512*e)*x^6 + 33*(313*
d + 512*e)*x^4 - 40*(313*d + 512*e)*x^2 + 5008*d + 8192*e)*log(x - 2) - 960
0*e)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)
```

giac [A] time = 0.33, size = 123, normalized size = 0.86

$$-\frac{1}{41472}(313d-512e)\log(|x+2|)+\frac{1}{1296}(13d-16e)\log(|x+1|)-\frac{1}{1296}(13d+16e)\log(|x-1|)+\frac{1}{41472}(313d$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="giac")
```

```
[Out] -1/41472*(313*d - 512*e)*log(abs(x + 2)) + 1/1296*(13*d - 16*e)*log(abs(x +
 1)) - 1/1296*(13*d + 16*e)*log(abs(x - 1)) + 1/41472*(313*d + 512*e)*log(a
bs(x - 2)) + 1/3456*(35*d*x^7 + 128*x^6*e - 234*d*x^5 - 960*x^4*e + 315*d*x
^3 + 1920*x^2*e + 172*d*x - 800*e)/(x^4 - 5*x^2 + 4)^2
```

maple [A] time = 0.02, size = 186, normalized size = 1.30

$$-\frac{313d\ln(x+2)}{41472}+\frac{313d\ln(x-2)}{41472}-\frac{13d\ln(x-1)}{1296}+\frac{13d\ln(x+1)}{1296}+\frac{e\ln(x+2)}{81}+\frac{e\ln(x-2)}{81}-\frac{e\ln(x-1)}{81}-\frac{e\ln(x+}{81}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)/(x^4-5*x^2+4)^3,x)
```

```
[Out] 19/6912/(x-2)*d+17/3456/(x-2)*e-1/3456/(x-2)^2*d-1/1728/(x-2)^2*e+313/41472
*d*ln(x-2)+1/81*e*ln(x-2)+1/432/(x+1)*d-1/144/(x+1)*e-1/432/(x+1)^2*d+1/432
/(x+1)^2*e+13/1296*d*ln(x+1)-1/81*e*ln(x+1)-13/1296*d*ln(x-1)-1/81*e*ln(x-1
)+1/432/(x-1)*d+1/144/(x-1)*e+1/432/(x-1)^2*d+1/432/(x-1)^2*e-313/41472*d*l
n(x+2)+1/81*e*ln(x+2)+19/6912/(x+2)*d-17/3456/(x+2)*e+1/3456/(x+2)^2*d-1/17
28/(x+2)^2*e
```

maxima [A] time = 1.06, size = 121, normalized size = 0.85

$$-\frac{1}{41472}(313d-512e)\log(x+2)+\frac{1}{1296}(13d-16e)\log(x+1)-\frac{1}{1296}(13d+16e)\log(x-1)+\frac{1}{41472}(313d+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="maxima")
```

```
[Out] -1/41472*(313*d - 512*e)*log(x + 2) + 1/1296*(13*d - 16*e)*log(x + 1) - 1/1
296*(13*d + 16*e)*log(x - 1) + 1/41472*(313*d + 512*e)*log(x - 2) + 1/3456*
(35*d*x^7 + 128*e*x^6 - 234*d*x^5 - 960*e*x^4 + 315*d*x^3 + 1920*e*x^2 + 17
2*d*x - 800*e)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)
```

mupad [B] time = 0.09, size = 118, normalized size = 0.83

$$\ln(x+1)\left(\frac{13d}{1296}-\frac{e}{81}\right)-\ln(x-1)\left(\frac{13d}{1296}+\frac{e}{81}\right)+\ln(x-2)\left(\frac{313d}{41472}+\frac{e}{81}\right)-\ln(x+2)\left(\frac{313d}{41472}-\frac{e}{81}\right)+\frac{\frac{35dx^7}{3456}+\frac{ex}{27}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x)/(x^4 - 5*x^2 + 4)^3,x)
```

```
[Out] log(x + 1)*((13*d)/1296 - e/81) - log(x - 1)*((13*d)/1296 + e/81) + log(x -
 2)*((313*d)/41472 + e/81) - log(x + 2)*((313*d)/41472 - e/81) + ((43*d*x)/
864 - (25*e)/108 + (35*d*x^3)/384 - (13*d*x^5)/192 + (35*d*x^7)/3456 + (5*e
*x^2)/9 - (5*e*x^4)/18 + (e*x^6)/27)/(33*x^4 - 40*x^2 - 10*x^6 + x^8 + 16)
```

sympy [B] time = 3.69, size = 668, normalized size = 4.67

$$(13d-16e)\log\left(x+\frac{-1106258459719280d^4e-13113710954343d^4(13d-16e)-817263343042560d^2e^3+153628968222720d^2e^2(13d-16e)+953019}{2294125624}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x**4-5*x**2+4)**3,x)
```

```
[Out] (13*d - 16*e)*log(x + (-1106258459719280*d**4*e - 13113710954343*d**4*(13*d
 - 16*e) - 817263343042560*d**2*e**3 + 153628968222720*d**2*e**2*(13*d - 16
*e) + 9530197557248*d**2*e*(13*d - 16*e)**2 + 88038005760*d**2*(13*d - 16*e
)**3 + 5035763255214080*e**5 + 142661633703936*e**4*(13*d - 16*e) - 1967095
0215680*e**3*(13*d - 16*e)**2 - 557272006656*e**2*(13*d - 16*e)**3)/(229412
56248261*d**5 - 2312740746035200*d**3*e**2 + 4473912813420544*d*e**4))/1296
 - (13*d + 16*e)*log(x + (-1106258459719280*d**4*e + 13113710954343*d**4*(1
3*d + 16*e) - 817263343042560*d**2*e**3 - 153628968222720*d**2*e**2*(13*d +
 16*e) + 9530197557248*d**2*e*(13*d + 16*e)**2 - 88038005760*d**2*(13*d + 1
6*e)**3 + 5035763255214080*e**5 - 142661633703936*e**4*(13*d + 16*e) - 1967
0950215680*e**3*(13*d + 16*e)**2 + 557272006656*e**2*(13*d + 16*e)**3)/(229
41256248261*d**5 - 2312740746035200*d**3*e**2 + 4473912813420544*d*e**4))/1
296 - (313*d - 512*e)*log(x + (-1106258459719280*d**4*e + 13113710954343*d*
*4*(313*d - 512*e)/32 - 817263343042560*d**2*e**3 - 4800905256960*d**2*e**2
*(313*d - 512*e) + 9306833552*d**2*e*(313*d - 512*e)**2 - 85974615*d**2*(31
3*d - 512*e)**3/32 + 5035763255214080*e**5 - 4458176053248*e**4*(313*d - 51
2*e) - 19209912320*e**3*(313*d - 512*e)**2 + 17006592*e**2*(313*d - 512*e)*
*3)/(22941256248261*d**5 - 2312740746035200*d**3*e**2 + 4473912813420544*d*
e**4))/41472 + (313*d + 512*e)*log(x + (-1106258459719280*d**4*e - 13113710
954343*d**4*(313*d + 512*e)/32 - 817263343042560*d**2*e**3 + 4800905256960*
d**2*e**2*(313*d + 512*e) + 9306833552*d**2*e*(313*d + 512*e)**2 + 85974615
*d**2*(313*d + 512*e)**3/32 + 5035763255214080*e**5 + 4458176053248*e**4*(3
13*d + 512*e) - 19209912320*e**3*(313*d + 512*e)**2 - 17006592*e**2*(313*d
+ 512*e)**3)/(22941256248261*d**5 - 2312740746035200*d**3*e**2 + 4473912813
420544*d*e**4))/41472 + (35*d*x**7 - 234*d*x**5 + 315*d*x**3 + 172*d*x + 12
8*e*x**6 - 960*e*x**4 + 1920*e*x**2 - 800*e)/(3456*x**8 - 34560*x**6 + 1140
48*x**4 - 138240*x**2 + 55296)
```

3.43 $\int \frac{d+ex+fx^2}{\left(4-5x^2+x^4\right)^3}\,dx$

Optimal. Leaf size=175

$$-\frac{x\left(-35x^2(d+4f)+59d+380f\right)}{3456\left(x^4-5x^2+4\right)}+\frac{x\left(-\left(x^2(5d+8f)\right)+17d+20f\right)}{144\left(x^4-5x^2+4\right)^2}-\frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736}+\frac{1}{648}(13d+25f$$

```
[Out] 1/36*e*(-2*x^2+5)/(x^4-5*x^2+4)^2+1/144*x*(17*d+20*f-(5*d+8*f)*x^2)/(x^4-5*
x^2+4)^2-1/54*e*(-2*x^2+5)/(x^4-5*x^2+4)-1/3456*x*(59*d+380*f-35*(d+4*f)*x^
2)/(x^4-5*x^2+4)-1/20736*(313*d+820*f)*arctanh(1/2*x)+1/648*(13*d+25*f)*arc
tanh(x)-1/81*e*ln(-x^2+1)+1/81*e*ln(-x^2+4)
```

Rubi [A] time = 0.22, antiderivative size = 175, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 9, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$, Rules used = {1673, 1178, 1166, 207, 12, 1107, 614, 616, 31}

$$-\frac{x\left(-35x^2(d+4f)+59d+380f\right)}{3456\left(x^4-5x^2+4\right)}+\frac{x\left(x^2(-(5d+8f))+17d+20f\right)}{144\left(x^4-5x^2+4\right)^2}-\frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736}+\frac{1}{648}(13d+25f)$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4)^3,x]
```

```
[Out] (e*(5 - 2*x^2))/(36*(4 - 5*x^2 + x^4)^2) + (x*(17*d + 20*f - (5*d + 8*f)*x^
2))/(144*(4 - 5*x^2 + x^4)^2) - (e*(5 - 2*x^2))/(54*(4 - 5*x^2 + x^4)) - (x
*(59*d + 380*f - 35*(d + 4*f)*x^2))/(3456*(4 - 5*x^2 + x^4)) - ((313*d + 82
0*f)*ArcTanh[x/2])/20736 + ((13*d + 25*f)*ArcTanh[x])/648 - (e*Log[1 - x^2]
)/81 + (e*Log[4 - x^2])/81
```

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 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
```

```
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2}{(4-5x^2+x^4)^3}dx = \int \frac{ex}{(4-5x^2+x^4)^3}dx + \int \frac{d+fx^2}{(4-5x^2+x^4)^3}dx$$

$$= \frac{x(17d+20f-(5d+8f)x^2)}{144(4-5x^2+x^4)^2} - \frac{1}{144}\int \frac{-19d+20f+5(5d+8f)x^2}{(4-5x^2+x^4)^2}dx + e\int \frac{x}{(4-5x^2+}$$

$$= \frac{x(17d+20f-(5d+8f)x^2)}{144(4-5x^2+x^4)^2} - \frac{x(59d+380f-35(d+4f)x^2)}{3456(4-5x^2+x^4)} + \frac{\int \frac{3(173d+260f)+105(d+4f}{4-5x^2+x^4}}{10368}$$

$$= \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} + \frac{x(17d+20f-(5d+8f)x^2)}{144(4-5x^2+x^4)^2} - \frac{x(59d+380f-35(d+4f)x^2)}{3456(4-5x^2+x^4)} -$$

$$= \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} + \frac{x(17d+20f-(5d+8f)x^2)}{144(4-5x^2+x^4)^2} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)} - \frac{x(59d+380f}{3456(4}$$

$$= \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} + \frac{x(17d+20f-(5d+8f)x^2)}{144(4-5x^2+x^4)^2} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)} - \frac{x(59d+380f}{3456(4}$$

$$= \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} + \frac{x(17d+20f-(5d+8f)x^2)}{144(4-5x^2+x^4)^2} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)} - \frac{x(59d+380f}{3456(4}$$

Mathematica [A] time = 0.13, size = 161, normalized size = 0.92

$$\frac{\frac{12(dx(35x^2-59)+64e(2x^2-5)+20fx(7x^2-19))}{x^4-5x^2+4} + \frac{288(-5dx^3+17dx+e(20-8x^2)-8fx^3+20fx)}{(x^4-5x^2+4)^2} - 32\log(1-x)(13d+16e+25f) + \log(2}{41472}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4)^3,x]
```

```
[Out] ((288*(17*d*x + 20*f*x - 5*d*x^3 - 8*f*x^3 + e*(20 - 8*x^2)))/(4 - 5*x^2 +
x^4)^2 + (12*(64*e*(-5 + 2*x^2) + 20*f*x*(-19 + 7*x^2) + d*x*(-59 + 35*x^2)
))/(4 - 5*x^2 + x^4) - 32*(13*d + 16*e + 25*f)*Log[1 - x] + (313*d + 512*e
+ 820*f)*Log[2 - x] + 32*(13*d - 16*e + 25*f)*Log[1 + x] + (-313*d + 512*e
- 820*f)*Log[2 + x])/41472
```

fricas [B] time = 1.92, size = 389, normalized size = 2.22

$$\frac{420(d+4f)x^7 + 1536ex^6 - 216(13d+60f)x^5 - 11520ex^4 + 756(5d+36f)x^3 + 23040ex^2 + 48(43d-260}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="fricas")
```

```
[Out] 1/41472*(420*(d + 4*f)*x^7 + 1536*e*x^6 - 216*(13*d + 60*f)*x^5 - 11520*e*x
^4 + 756*(5*d + 36*f)*x^3 + 23040*e*x^2 + 48*(43*d - 260*f)*x - ((313*d - 5
12*e + 820*f)*x^8 - 10*(313*d - 512*e + 820*f)*x^6 + 33*(313*d - 512*e + 82
0*f)*x^4 - 40*(313*d - 512*e + 820*f)*x^2 + 5008*d - 8192*e + 13120*f)*log(
x + 2) + 32*((13*d - 16*e + 25*f)*x^8 - 10*(13*d - 16*e + 25*f)*x^6 + 33*(1
3*d - 16*e + 25*f)*x^4 - 40*(13*d - 16*e + 25*f)*x^2 + 208*d - 256*e + 400*
f)*log(x + 1) - 32*((13*d + 16*e + 25*f)*x^8 - 10*(13*d + 16*e + 25*f)*x^6
+ 33*(13*d + 16*e + 25*f)*x^4 - 40*(13*d + 16*e + 25*f)*x^2 + 208*d + 256*e
 + 400*f)*log(x - 1) + ((313*d + 512*e + 820*f)*x^8 - 10*(313*d + 512*e + 8
```

```
20*f)*x^6 + 33*(313*d + 512*e + 820*f)*x^4 - 40*(313*d + 512*e + 820*f)*x^2
 + 5008*d + 8192*e + 13120*f)*log(x - 2) - 9600*e)/(x^8 - 10*x^6 + 33*x^4 -
 40*x^2 + 16)
```

giac [A] time = 0.35, size = 157, normalized size = 0.90

$$-\frac{1}{41472}\left(313\,d+820\,f-512\,e\right)\log\left(|x+2|\right)+\frac{1}{1296}\left(13\,d+25\,f-16\,e\right)\log\left(|x+1|\right)-\frac{1}{1296}\left(13\,d+25\,f+16\,e\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="giac")
```

```
[Out] -1/41472*(313*d + 820*f - 512*e)*log(abs(x + 2)) + 1/1296*(13*d + 25*f - 16
*e)*log(abs(x + 1)) - 1/1296*(13*d + 25*f + 16*e)*log(abs(x - 1)) + 1/41472
*(313*d + 820*f + 512*e)*log(abs(x - 2)) + 1/3456*(35*d*x^7 + 140*f*x^7 + 1
28*x^6*e - 234*d*x^5 - 1080*f*x^5 - 960*x^4*e + 315*d*x^3 + 2268*f*x^3 + 19
20*x^2*e + 172*d*x - 1040*f*x - 800*e)/(x^4 - 5*x^2 + 4)^2
```

maple [A] time = 0.02, size = 278, normalized size = 1.59

$$-\frac{313d\ln\left(x+2\right)}{41472}+\frac{e\ln\left(x+2\right)}{81}-\frac{e\ln\left(x-1\right)}{81}-\frac{13d\ln\left(x-1\right)}{1296}-\frac{e\ln\left(x+1\right)}{81}+\frac{13d\ln\left(x+1\right)}{1296}+\frac{313d\ln\left(x-2\right)}{41472}+\frac{e\ln(}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x)
```

```
[Out] -313/41472*d*ln(x+2)+1/81*e*ln(x+2)-1/81*e*ln(x-1)-13/1296*d*ln(x-1)-1/81*e
*ln(x+1)+13/1296*d*ln(x+1)+313/41472*d*ln(x-2)+1/81*e*ln(x-2)+205/10368*f*l
n(x-2)+25/1296*f*ln(x+1)-25/1296*f*ln(x-1)-205/10368*f*ln(x+2)-1/432/(x+1)^
2*d+1/432/(x+1)^2*e+1/432/(x-1)^2*d+1/432/(x-1)^2*e+1/3456/(x+2)^2*d-1/1728
/(x+2)^2*e+1/864/(x+2)^2*f+1/432/(x-1)^2*f-1/432/(x+1)^2*f-1/864/(x-2)^2*f-
1/3456/(x-2)^2*d-1/1728/(x-2)^2*e+19/6912/(x+2)*d-17/3456/(x+2)*e+19/6912/(
x-2)*d+17/3456/(x-2)*e+1/432/(x+1)*d-1/144/(x+1)*e+1/432/(x-1)*d+1/144/(x-1
)*e+5/432/(x-1)*f+5/576/(x+2)*f+5/576/(x-2)*f+5/432/(x+1)*f
```

maxima [A] time = 1.10, size = 155, normalized size = 0.89

$$-\frac{1}{41472}\left(313\,d-512\,e+820\,f\right)\log\left(x+2\right)+\frac{1}{1296}\left(13\,d-16\,e+25\,f\right)\log\left(x+1\right)-\frac{1}{1296}\left(13\,d+16\,e+25\,f\right)\mathrm{lo}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="maxima")
```

```
[Out] -1/41472*(313*d - 512*e + 820*f)*log(x + 2) + 1/1296*(13*d - 16*e + 25*f)*l
og(x + 1) - 1/1296*(13*d + 16*e + 25*f)*log(x - 1) + 1/41472*(313*d + 512*e
 + 820*f)*log(x - 2) + 1/3456*(35*(d + 4*f)*x^7 + 128*e*x^6 - 18*(13*d + 60
*f)*x^5 - 960*e*x^4 + 63*(5*d + 36*f)*x^3 + 1920*e*x^2 + 4*(43*d - 260*f)*x
 - 800*e)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)
```

mupad [B] time = 0.11, size = 151, normalized size = 0.86

$$\ln\left(x+1\right)\left(\frac{13\,d}{1296}-\frac{e}{81}+\frac{25\,f}{1296}\right)-\ln\left(x-1\right)\left(\frac{13\,d}{1296}+\frac{e}{81}+\frac{25\,f}{1296}\right)+\ln\left(x-2\right)\left(\frac{313\,d}{41472}+\frac{e}{81}+\frac{205\,f}{10368}\right)-\ln\left(x+2\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2)/(x^4 - 5*x^2 + 4)^3,x)
```

```
[Out] log(x + 1)*((13*d)/1296 - e/81 + (25*f)/1296) - log(x - 1)*((13*d)/1296 + e
/81 + (25*f)/1296) + log(x - 2)*((313*d)/41472 + e/81 + (205*f)/10368) - lo
g(x + 2)*((313*d)/41472 - e/81 + (205*f)/10368) + (x^3*((35*d)/384 + (21*f)
/32) - x^5*((13*d)/192 + (5*f)/16) - (25*e)/108 + x^7*((35*d)/3456 + (35*f)
/864) + (5*e*x^2)/9 - (5*e*x^4)/18 + (e*x^6)/27 + x*((43*d)/864 - (65*f)/21
6))/(33*x^4 - 40*x^2 - 10*x^6 + x^8 + 16)
```

sympy [B] time = 124.29, size = 2822, normalized size = 16.13

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(x**4-5*x**2+4)**3,x)
```

```
[Out] (13*d - 16*e + 25*f)*log(x + (-1106258459719280*d**5*e - 13113710954343*d**
5*(13*d - 16*e + 25*f) - 12929482401572800*d**4*e*f - 107063904267900*d**4*
f*(13*d - 16*e + 25*f) - 817263343042560*d**3*e**3 + 153628968222720*d**3*e
**2*(13*d - 16*e + 25*f) - 59478343838144000*d**3*e*f**2 + 9530197557248*d*
*3*e*(13*d - 16*e + 25*f)**2 - 324891412840800*d**3*f**2*(13*d - 16*e + 25*
f) + 88038005760*d**3*(13*d - 16*e + 25*f)**3 - 2885705898393600*d**2*e**3*
f + 1014848673546240*d**2*e**2*f*(13*d - 16*e + 25*f) - 134905286808320000*
d**2*e*f**3 + 63469758382080*d**2*e*f*(13*d - 16*e + 25*f)**2 - 42297272452
8000*d**2*f**3*(13*d - 16*e + 25*f) + 364616847360*d**2*f*(13*d - 16*e + 25
*f)**3 + 5035763255214080*d*e**5 + 142661633703936*d*e**4*(13*d - 16*e + 25
*f) - 2138314899456000*d*e**3*f**2 - 19670950215680*d*e**3*(13*d - 16*e + 2
5*f)**2 + 2257033730457600*d*e**2*f**2*(13*d - 16*e + 25*f) - 557272006656*
d*e**2*(13*d - 16*e + 25*f)**3 - 151082645593600000*d*e*f**4 + 141056507904
000*d*e*f**2*(13*d - 16*e + 25*f)**2 - 167683154400000*d*f**4*(13*d - 16*e
+ 25*f) + 339373670400*d*f**2*(13*d - 16*e + 25*f)**3 + 10643272556871680*e
**5*f + 214404767416320*e**4*f*(13*d - 16*e + 25*f) + 529992253440000*e**3*
f**3 - 41575283425280*e**3*f*(13*d - 16*e + 25*f)**2 + 1671759396864000*e**
2*f**3*(13*d - 16*e + 25*f) - 837518622720*e**2*f*(13*d - 16*e + 25*f)**3 -
 66895452108800000*e*f**5 + 104485486592000*e*f**3*(13*d - 16*e + 25*f)**2
+ 51041923200000*f**5*(13*d - 16*e + 25*f) - 80289792000*f**3*(13*d - 16*e
+ 25*f)**3)/(22941256248261*d**6 + 197271407316645*d**5*f - 231274074603520
0*d**4*e**2 + 612862910928900*d**4*f**2 - 20566607354920960*d**3*e**2*f + 7
67363353812000*d**3*f**3 + 4473912813420544*d**2*e**4 - 68552762169753600*d
**2*e**2*f**2 + 197499222000000*d**2*f**4 + 20324472439439360*d*e**4*f - 10
1559983669248000*d*e**2*f**3 - 182883938400000*d*f**5 + 22539988369408000*e
**4*f**2 - 56422196838400000*e**2*f**4 + 21520080000000*f**6))/1296 - (13*d
 + 16*e + 25*f)*log(x + (-1106258459719280*d**5*e + 13113710954343*d**5*(13
*d + 16*e + 25*f) - 12929482401572800*d**4*e*f + 107063904267900*d**4*f*(13
*d + 16*e + 25*f) - 817263343042560*d**3*e**3 - 153628968222720*d**3*e**2*(
13*d + 16*e + 25*f) - 59478343838144000*d**3*e*f**2 + 9530197557248*d**3*e*
(13*d + 16*e + 25*f)**2 + 324891412840800*d**3*f**2*(13*d + 16*e + 25*f) -
88038005760*d**3*(13*d + 16*e + 25*f)**3 - 2885705898393600*d**2*e**3*f - 1
014848673546240*d**2*e**2*f*(13*d + 16*e + 25*f) - 134905286808320000*d**2*
e*f**3 + 63469758382080*d**2*e*f*(13*d + 16*e + 25*f)**2 + 422972724528000*
d**2*f**3*(13*d + 16*e + 25*f) - 364616847360*d**2*f*(13*d + 16*e + 25*f)**
3 + 5035763255214080*d*e**5 - 142661633703936*d*e**4*(13*d + 16*e + 25*f) -
 2138314899456000*d*e**3*f**2 - 19670950215680*d*e**3*(13*d + 16*e + 25*f)*
*2 - 2257033730457600*d*e**2*f**2*(13*d + 16*e + 25*f) + 557272006656*d*e**
2*(13*d + 16*e + 25*f)**3 - 151082645593600000*d*e*f**4 + 141056507904000*d
*e*f**2*(13*d + 16*e + 25*f)**2 + 167683154400000*d*f**4*(13*d + 16*e + 25*
f) - 339373670400*d*f**2*(13*d + 16*e + 25*f)**3 + 10643272556871680*e**5*f
 - 214404767416320*e**4*f*(13*d + 16*e + 25*f) + 529992253440000*e**3*f**3
- 41575283425280*e**3*f*(13*d + 16*e + 25*f)**2 - 1671759396864000*e**2*f**
3*(13*d + 16*e + 25*f) + 837518622720*e**2*f*(13*d + 16*e + 25*f)**3 - 6689
5452108800000*e*f**5 + 104485486592000*e*f**3*(13*d + 16*e + 25*f)**2 - 510
41923200000*f**5*(13*d + 16*e + 25*f) + 80289792000*f**3*(13*d + 16*e + 25*
```

```
f)**3)/(22941256248261*d**6 + 197271407316645*d**5*f - 2312740746035200*d**
4*e**2 + 612862910928900*d**4*f**2 - 20566607354920960*d**3*e**2*f + 767363
353812000*d**3*f**3 + 4473912813420544*d**2*e**4 - 68552762169753600*d**2*e
**2*f**2 + 197499222000000*d**2*f**4 + 20324472439439360*d*e**4*f - 1015599
83669248000*d*e**2*f**3 - 182883938400000*d*f**5 + 22539988369408000*e**4*f
**2 - 56422196838400000*e**2*f**4 + 21520080000000*f**6))/1296 - (313*d - 5
12*e + 820*f)*log(x + (-1106258459719280*d**5*e + 13113710954343*d**5*(313*
d - 512*e + 820*f)/32 - 12929482401572800*d**4*e*f + 26765976066975*d**4*f*
(313*d - 512*e + 820*f)/8 - 817263343042560*d**3*e**3 - 4800905256960*d**3*
e**2*(313*d - 512*e + 820*f) - 59478343838144000*d**3*e*f**2 + 9306833552*d
**3*e*(313*d - 512*e + 820*f)**2 + 10152856651275*d**3*f**2*(313*d - 512*e
+ 820*f) - 85974615*d**3*(313*d - 512*e + 820*f)**3/32 - 2885705898393600*d
**2*e**3*f - 31714021048320*d**2*e**2*f*(313*d - 512*e + 820*f) - 134905286
808320000*d**2*e*f**3 + 61982185920*d**2*e*f*(313*d - 512*e + 820*f)**2 + 1
3217897641500*d**2*f**3*(313*d - 512*e + 820*f) - 89017785*d**2*f*(313*d -
512*e + 820*f)**3/8 + 5035763255214080*d*e**5 - 4458176053248*d*e**4*(313*d
 - 512*e + 820*f) - 2138314899456000*d*e**3*f**2 - 19209912320*d*e**3*(313*
d - 512*e + 820*f)**2 - 70532304076800*d*e**2*f**2*(313*d - 512*e + 820*f)
+ 17006592*d*e**2*(313*d - 512*e + 820*f)**3 - 151082645593600000*d*e*f**4
+ 137750496000*d*e*f**2*(313*d - 512*e + 820*f)**2 + 5240098575000*d*f**4*(
313*d - 512*e + 820*f) - 20713725*d*f**2*(313*d - 512*e + 820*f)**3/2 + 106
43272556871680*e**5*f - 6700148981760*e**4*f*(313*d - 512*e + 820*f) + 5299
92253440000*e**3*f**3 - 40600862720*e**3*f*(313*d - 512*e + 820*f)**2 - 522
42481152000*e**2*f**3*(313*d - 512*e + 820*f) + 25559040*e**2*f*(313*d - 51
2*e + 820*f)**3 - 66895452108800000*e*f**5 + 102036608000*e*f**3*(313*d - 5
12*e + 820*f)**2 - 1595060100000*f**5*(313*d - 512*e + 820*f) + 2450250*f**
3*(313*d - 512*e + 820*f)**3)/(22941256248261*d**6 + 197271407316645*d**5*f
 - 2312740746035200*d**4*e**2 + 612862910928900*d**4*f**2 - 205666073549209
60*d**3*e**2*f + 767363353812000*d**3*f**3 + 4473912813420544*d**2*e**4 - 6
8552762169753600*d**2*e**2*f**2 + 197499222000000*d**2*f**4 + 2032447243943
9360*d*e**4*f - 101559983669248000*d*e**2*f**3 - 182883938400000*d*f**5 + 2
2539988369408000*e**4*f**2 - 56422196838400000*e**2*f**4 + 21520080000000*f
**6))/41472 + (313*d + 512*e + 820*f)*log(x + (-1106258459719280*d**5*e - 1
3113710954343*d**5*(313*d + 512*e + 820*f)/32 - 12929482401572800*d**4*e*f
- 26765976066975*d**4*f*(313*d + 512*e + 820*f)/8 - 817263343042560*d**3*e*
*3 + 4800905256960*d**3*e**2*(313*d + 512*e + 820*f) - 59478343838144000*d*
*3*e*f**2 + 9306833552*d**3*e*(313*d + 512*e + 820*f)**2 - 10152856651275*d
**3*f**2*(313*d + 512*e + 820*f) + 85974615*d**3*(313*d + 512*e + 820*f)**3
/32 - 2885705898393600*d**2*e**3*f + 31714021048320*d**2*e**2*f*(313*d + 51
2*e + 820*f) - 134905286808320000*d**2*e*f**3 + 61982185920*d**2*e*f*(313*d
 + 512*e + 820*f)**2 - 13217897641500*d**2*f**3*(313*d + 512*e + 820*f) + 8
9017785*d**2*f*(313*d + 512*e + 820*f)**3/8 + 5035763255214080*d*e**5 + 445
8176053248*d*e**4*(313*d + 512*e + 820*f) - 2138314899456000*d*e**3*f**2 -
19209912320*d*e**3*(313*d + 512*e + 820*f)**2 + 70532304076800*d*e**2*f**2*
(313*d + 512*e + 820*f) - 17006592*d*e**2*(313*d + 512*e + 820*f)**3 - 1510
82645593600000*d*e*f**4 + 137750496000*d*e*f**2*(313*d + 512*e + 820*f)**2
- 5240098575000*d*f**4*(313*d + 512*e + 820*f) + 20713725*d*f**2*(313*d + 5
12*e + 820*f)**3/2 + 10643272556871680*e**5*f + 6700148981760*e**4*f*(313*d
 + 512*e + 820*f) + 529992253440000*e**3*f**3 - 40600862720*e**3*f*(313*d +
 512*e + 820*f)**2 + 52242481152000*e**2*f**3*(313*d + 512*e + 820*f) - 255
59040*e**2*f*(313*d + 512*e + 820*f)**3 - 66895452108800000*e*f**5 + 102036
608000*e*f**3*(313*d + 512*e + 820*f)**2 + 1595060100000*f**5*(313*d + 512*
e + 820*f) - 2450250*f**3*(313*d + 512*e + 820*f)**3)/(22941256248261*d**6
+ 197271407316645*d**5*f - 2312740746035200*d**4*e**2 + 612862910928900*d**
4*f**2 - 20566607354920960*d**3*e**2*f + 767363353812000*d**3*f**3 + 447391
2813420544*d**2*e**4 - 68552762169753600*d**2*e**2*f**2 + 197499222000000*d
**2*f**4 + 20324472439439360*d*e**4*f - 101559983669248000*d*e**2*f**3 - 18
2883938400000*d*f**5 + 22539988369408000*e**4*f**2 - 56422196838400000*e**2
*f**4 + 21520080000000*f**6))/41472 + (128*e*x**6 - 960*e*x**4 + 1920*e*x**
```

```
2 - 800*e + x**7*(35*d + 140*f) + x**5*(-234*d - 1080*f) + x**3*(315*d + 22
68*f) + x*(172*d - 1040*f))/(3456*x**8 - 34560*x**6 + 114048*x**4 - 138240*
x**2 + 55296)
```

3.44 $\int \frac{d+ex+fx^2+gx^3}{\left(4-5x^2+x^4\right)^3} \, dx$

Optimal. Leaf size=204

$$-\frac{x\left(-35x^2(d+4f)+59d+380f\right)}{3456\left(x^4-5x^2+4\right)}+\frac{x\left(-\left(x^2(5d+8f)\right)+17d+20f\right)}{144\left(x^4-5x^2+4\right)^2}-\frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736}+\frac{1}{648}(13d+2$$

```
[Out] 1/144*x*(17*d+20*f-(5*d+8*f)*x^2)/(x^4-5*x^2+4)^2+1/36*(5*e+8*g-(2*e+5*g)*x
^2)/(x^4-5*x^2+4)^2-1/108*(2*e+5*g)*(-2*x^2+5)/(x^4-5*x^2+4)-1/3456*x*(59*d
+380*f-35*(d+4*f)*x^2)/(x^4-5*x^2+4)-1/20736*(313*d+820*f)*arctanh(1/2*x)+1
/648*(13*d+25*f)*arctanh(x)-1/162*(2*e+5*g)*ln(-x^2+1)+1/162*(2*e+5*g)*ln(-
x^2+4)
```

Rubi [A] time = 0.25, antiderivative size = 204, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 9, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.321, Rules used = {1673, 1178, 1166, 207, 1247, 638, 614, 616, 31}

$$-\frac{x\left(-35x^2(d+4f)+59d+380f\right)}{3456\left(x^4-5x^2+4\right)}+\frac{x\left(x^2(-(5d+8f))+17d+20f\right)}{144\left(x^4-5x^2+4\right)^2}-\frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736}+\frac{1}{648}(13d+2$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4)^3,x]
```

```
[Out] (x*(17*d + 20*f - (5*d + 8*f)*x^2))/(144*(4 - 5*x^2 + x^4)^2) + (5*e + 8*g
- (2*e + 5*g)*x^2)/(36*(4 - 5*x^2 + x^4)^2) - ((2*e + 5*g)*(5 - 2*x^2))/(10
8*(4 - 5*x^2 + x^4)) - (x*(59*d + 380*f - 35*(d + 4*f)*x^2))/(3456*(4 - 5*x
^2 + x^4)) - ((313*d + 820*f)*ArcTanh[x/2])/20736 + ((13*d + 25*f)*ArcTanh[
x])/648 - ((2*e + 5*g)*Log[1 - x^2])/162 + ((2*e + 5*g)*Log[4 - x^2])/162
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3}{\left(4-5x^2+x^4\right)^3}\,dx = \int \frac{d+fx^2}{\left(4-5x^2+x^4\right)^3}\,dx + \int \frac{x\left(e+gx^2\right)}{\left(4-5x^2+x^4\right)^3}\,dx$$

$$= \frac{x\left(17d+20f-(5d+8f)x^2\right)}{144\left(4-5x^2+x^4\right)^2} - \frac{1}{144}\int \frac{-19d+20f+5(5d+8f)x^2}{\left(4-5x^2+x^4\right)^2}\,dx + \frac{1}{2}\,\text{Subst}$$

$$= \frac{x\left(17d+20f-(5d+8f)x^2\right)}{144\left(4-5x^2+x^4\right)^2} + \frac{5e+8g-(2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} - \frac{x\left(59d+380f-35(d+4\right.}{3456\left(4-5x^2+x^4\right.}$$

$$= \frac{x\left(17d+20f-(5d+8f)x^2\right)}{144\left(4-5x^2+x^4\right)^2} + \frac{5e+8g-(2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} - \frac{(2e+5g)\left(5-2x^2\right)}{108\left(4-5x^2+x^4\right)} - \frac{x\left(\right.}{}$$

$$= \frac{x\left(17d+20f-(5d+8f)x^2\right)}{144\left(4-5x^2+x^4\right)^2} + \frac{5e+8g-(2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} - \frac{(2e+5g)\left(5-2x^2\right)}{108\left(4-5x^2+x^4\right)} - \frac{x\left(\right.}{}$$

$$= \frac{x\left(17d+20f-(5d+8f)x^2\right)}{144\left(4-5x^2+x^4\right)^2} + \frac{5e+8g-(2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} - \frac{(2e+5g)\left(5-2x^2\right)}{108\left(4-5x^2+x^4\right)} - \frac{x\left(\right.}{}$$

Mathematica [A] time = 0.08, size = 193, normalized size = 0.95

$$\frac{\frac{12\left(dx\left(35x^2-59\right)+64e\left(2x^2-5\right)+20fx\left(7x^2-19\right)+160g\left(2x^2-5\right)\right)}{x^4-5x^2+4} + \frac{288\left(-5dx^3+17dx+e\left(20-8x^2\right)-8fx^3+20fx-4g\left(5x^2-8\right)\right)}{\left(x^4-5x^2+4\right)^2} - 32\log(1-x)(13}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4)^3,x]
```

```
[Out] ((288*(17*d*x + 20*f*x - 5*d*x^3 - 8*f*x^3 + e*(20 - 8*x^2) - 4*g*(-8 + 5*x
^2)))/(4 - 5*x^2 + x^4)^2 + (12*(64*e*(-5 + 2*x^2) + 160*g*(-5 + 2*x^2) + 2
0*f*x*(-19 + 7*x^2) + d*x*(-59 + 35*x^2)))/(4 - 5*x^2 + x^4) - 32*(13*d + 1
6*e + 25*f + 40*g)*Log[1 - x] + (313*d + 512*e + 820*f + 1280*g)*Log[2 - x]
 + 32*(13*d - 16*e + 25*f - 40*g)*Log[1 + x] + (-313*d + 512*e - 820*f + 12
80*g)*Log[2 + x])/41472
```

fricas [B] time = 2.86, size = 470, normalized size = 2.30

$$\frac{420\left(d+4f\right)x^7 + 768\left(2e+5g\right)x^6 - 216\left(13d+60f\right)x^5 - 5760\left(2e+5g\right)x^4 + 756\left(5d+36f\right)x^3 + 11520\left(2\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="fricas")
```

```
[Out] 1/41472*(420*(d + 4*f)*x^7 + 768*(2*e + 5*g)*x^6 - 216*(13*d + 60*f)*x^5 -
5760*(2*e + 5*g)*x^4 + 756*(5*d + 36*f)*x^3 + 11520*(2*e + 5*g)*x^2 + 48*(4
3*d - 260*f)*x - ((313*d - 512*e + 820*f - 1280*g)*x^8 - 10*(313*d - 512*e
+ 820*f - 1280*g)*x^6 + 33*(313*d - 512*e + 820*f - 1280*g)*x^4 - 40*(313*d
 - 512*e + 820*f - 1280*g)*x^2 + 5008*d - 8192*e + 13120*f - 20480*g)*log(x
 + 2) + 32*((13*d - 16*e + 25*f - 40*g)*x^8 - 10*(13*d - 16*e + 25*f - 40*g
)*x^6 + 33*(13*d - 16*e + 25*f - 40*g)*x^4 - 40*(13*d - 16*e + 25*f - 40*g)
*x^2 + 208*d - 256*e + 400*f - 640*g)*log(x + 1) - 32*((13*d + 16*e + 25*f
+ 40*g)*x^8 - 10*(13*d + 16*e + 25*f + 40*g)*x^6 + 33*(13*d + 16*e + 25*f +
 40*g)*x^4 - 40*(13*d + 16*e + 25*f + 40*g)*x^2 + 208*d + 256*e + 400*f + 6
40*g)*log(x - 1) + ((313*d + 512*e + 820*f + 1280*g)*x^8 - 10*(313*d + 512*
```

```
e + 820*f + 1280*g)*x^6 + 33*(313*d + 512*e + 820*f + 1280*g)*x^4 - 40*(313
*d + 512*e + 820*f + 1280*g)*x^2 + 5008*d + 8192*e + 13120*f + 20480*g)*log
(x - 2) - 9600*e - 29184*g)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)
```

giac [A] time = 0.39, size = 190, normalized size = 0.93

$$-\frac{1}{41472}\left(313\,d+820\,f-1280\,g-512\,e\right)\log\left(|x+2|\right)+\frac{1}{1296}\left(13\,d+25\,f-40\,g-16\,e\right)\log\left(|x+1|\right)-\frac{1}{1296}\left(13\,d+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="giac")
```

```
[Out] -1/41472*(313*d + 820*f - 1280*g - 512*e)*log(abs(x + 2)) + 1/1296*(13*d +
25*f - 40*g - 16*e)*log(abs(x + 1)) - 1/1296*(13*d + 25*f + 40*g + 16*e)*lo
g(abs(x - 1)) + 1/41472*(313*d + 820*f + 1280*g + 512*e)*log(abs(x - 2)) +
1/3456*(35*d*x^7 + 140*f*x^7 + 320*g*x^6 + 128*x^6*e - 234*d*x^5 - 1080*f*x
^5 - 2400*g*x^4 - 960*x^4*e + 315*d*x^3 + 2268*f*x^3 + 4800*g*x^2 + 1920*x^
2*e + 172*d*x - 1040*f*x - 2432*g - 800*e)/(x^4 - 5*x^2 + 4)^2
```

maple [A] time = 0.02, size = 370, normalized size = 1.81

$$-\frac{5g\ln\left(x-1\right)}{162}+\frac{5g\ln\left(x+2\right)}{162}+\frac{5g\ln\left(x-2\right)}{162}-\frac{5g\ln\left(x+1\right)}{162}-\frac{313d\ln\left(x+2\right)}{41472}+\frac{e\ln\left(x+2\right)}{81}-\frac{e\ln\left(x-1\right)}{81}-\frac{13d\ln\left(x-\right.}{1296}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x)
```

```
[Out] -5/162*g*ln(x-1)+5/162*g*ln(x+2)+5/162*g*ln(x-2)-5/162*g*ln(x+1)-313/41472*
d*ln(x+2)+1/81*e*ln(x+2)-1/81*e*ln(x-1)-13/1296*d*ln(x-1)-1/81*e*ln(x+1)+13
/1296*d*ln(x+1)+313/41472*d*ln(x-2)+1/81*e*ln(x-2)+205/10368*f*ln(x-2)+25/1
296*f*ln(x+1)-25/1296*f*ln(x-1)-205/10368*f*ln(x+2)-1/432/(x+2)^2*g+1/432/(
x-1)^2*g+1/432/(x+1)^2*g-1/432/(x-2)^2*g-1/432/(x+1)^2*d+1/432/(x+1)^2*e+1/
432/(x-1)^2*d+1/432/(x-1)^2*e+1/3456/(x+2)^2*d-1/1728/(x+2)^2*e+1/864/(x+2)
^2*f+1/432/(x-1)^2*f-1/432/(x+1)^2*f-1/864/(x-2)^2*f-1/3456/(x-2)^2*d-1/172
8/(x-2)^2*e-13/864/(x+2)*g-7/432/(x+1)*g+7/432/(x-1)*g+13/864/(x-2)*g+19/69
12/(x+2)*d-17/3456/(x+2)*e+19/6912/(x-2)*d+17/3456/(x-2)*e+1/432/(x+1)*d-1/
144/(x+1)*e+1/432/(x-1)*d+1/144/(x-1)*e+5/432/(x-1)*f+5/576/(x+2)*f+5/576/(
x-2)*f+5/432/(x+1)*f
```

maxima [A] time = 1.08, size = 188, normalized size = 0.92

$$-\frac{1}{41472}\left(313\,d-512\,e+820\,f-1280\,g\right)\log\left(x+2\right)+\frac{1}{1296}\left(13\,d-16\,e+25\,f-40\,g\right)\log\left(x+1\right)-\frac{1}{1296}\left(13\,d+1\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="maxima")
```

```
[Out] -1/41472*(313*d - 512*e + 820*f - 1280*g)*log(x + 2) + 1/1296*(13*d - 16*e
+ 25*f - 40*g)*log(x + 1) - 1/1296*(13*d + 16*e + 25*f + 40*g)*log(x - 1) +
 1/41472*(313*d + 512*e + 820*f + 1280*g)*log(x - 2) + 1/3456*(35*(d + 4*f)
*x^7 + 64*(2*e + 5*g)*x^6 - 18*(13*d + 60*f)*x^5 - 480*(2*e + 5*g)*x^4 + 63
*(5*d + 36*f)*x^3 + 960*(2*e + 5*g)*x^2 + 4*(43*d - 260*f)*x - 800*e - 2432
*g)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)
```

mupad [B] time = 0.85, size = 182, normalized size = 0.89

$$\frac{\left(\frac{35\,d}{3456}+\frac{35\,f}{864}\right)\,x^7+\left(\frac{e}{27}+\frac{5\,g}{54}\right)\,x^6+\left(-\frac{13\,d}{192}-\frac{5\,f}{16}\right)\,x^5+\left(-\frac{5\,e}{18}-\frac{25\,g}{36}\right)\,x^4+\left(\frac{35\,d}{384}+\frac{21\,f}{32}\right)\,x^3+\left(\frac{5\,e}{9}+\frac{25\,g}{18}\right)\,x^2+\left(\frac{43\,d}{864}-\right.}{x^8-10\,x^6+33\,x^4-40\,x^2+16}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3)/(x^4 - 5*x^2 + 4)^3,x)
```

```
[Out] (x^3*((35*d)/384 + (21*f)/32) - (19*g)/27 - x^5*((13*d)/192 + (5*f)/16) - (
25*e)/108 + x^7*((35*d)/3456 + (35*f)/864) + x^2*((5*e)/9 + (25*g)/18) - x^
4*((5*e)/18 + (25*g)/36) + x^6*(e/27 + (5*g)/54) + x*((43*d)/864 - (65*f)/2
16))/(33*x^4 - 40*x^2 - 10*x^6 + x^8 + 16) - log(x - 1)*((13*d)/1296 + e/81
 + (25*f)/1296 + (5*g)/162) + log(x + 1)*((13*d)/1296 - e/81 + (25*f)/1296
- (5*g)/162) + log(x - 2)*((313*d)/41472 + e/81 + (205*f)/10368 + (5*g)/162
) - log(x + 2)*((313*d)/41472 - e/81 + (205*f)/10368 - (5*g)/162)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**3,x)
```

```
[Out] Timed out
```

3.45 $\int \frac{d+ex+fx^2+gx^3+hx^4}{\left(4-5x^2+x^4\right)^3}\,dx$

Optimal. Leaf size=224

$$-\frac{x\left(-5x^2(7d+28f+64h)+59d+380f+848h\right)}{3456\left(x^4-5x^2+4\right)}+\frac{x\left(-\left(x^2(5d+8f+20h)\right)+17d+20f+32h\right)}{144\left(x^4-5x^2+4\right)^2}-\frac{\tanh^{-1}\left(\frac{x}{2}\right)(3}{}$$

```
[Out] 1/36*(5*e+8*g-(2*e+5*g)*x^2)/(x^4-5*x^2+4)^2+1/144*x*(17*d+20*f+32*h-(5*d+8
*f+20*h)*x^2)/(x^4-5*x^2+4)^2-1/108*(2*e+5*g)*(-2*x^2+5)/(x^4-5*x^2+4)-1/34
56*x*(59*d+380*f+848*h-5*(7*d+28*f+64*h)*x^2)/(x^4-5*x^2+4)-1/20736*(313*d+
820*f+1936*h)*arctanh(1/2*x)+1/648*(13*d+25*f+61*h)*arctanh(x)-1/162*(2*e+5
*g)*ln(-x^2+1)+1/162*(2*e+5*g)*ln(-x^2+4)
```

Rubi [A] time = 0.31, antiderivative size = 224, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 10, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.303, Rules used = {1673, 1678, 1178, 1166, 207, 1247, 638, 614, 616, 31}

$$-\frac{x\left(-5x^2(7d+28f+64h)+59d+380f+848h\right)}{3456\left(x^4-5x^2+4\right)}+\frac{x\left(x^2(-(5d+8f+20h))+17d+20f+32h\right)}{144\left(x^4-5x^2+4\right)^2}-\frac{\tanh^{-1}\left(\frac{x}{2}\right)(3}{}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(4 - 5*x^2 + x^4)^3,x]
```

```
[Out] (5*e + 8*g - (2*e + 5*g)*x^2)/(36*(4 - 5*x^2 + x^4)^2) + (x*(17*d + 20*f +
32*h - (5*d + 8*f + 20*h)*x^2))/(144*(4 - 5*x^2 + x^4)^2) - ((2*e + 5*g)*(5
 - 2*x^2))/(108*(4 - 5*x^2 + x^4)) - (x*(59*d + 380*f + 848*h - 5*(7*d + 28
*f + 64*h)*x^2))/(3456*(4 - 5*x^2 + x^4)) - ((313*d + 820*f + 1936*h)*ArcTa
nh[x/2])/20736 + ((13*d + 25*f + 61*h)*ArcTanh[x])/648 - ((2*e + 5*g)*Log[1
 - x^2])/162 + ((2*e + 5*g)*Log[4 - x^2])/162
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4}{\left(4-5x^2+x^4\right)^3}\,dx = \int \frac{x\left(e+gx^2\right)}{\left(4-5x^2+x^4\right)^3}\,dx + \int \frac{d+fx^2+hx^4}{\left(4-5x^2+x^4\right)^3}\,dx$$

$$= \frac{x\left(17d+20f+32h-(5d+8f+20h)x^2\right)}{144\left(4-5x^2+x^4\right)^2} - \frac{1}{144}\int \frac{-19d+20f+32h+5(5d}{\left(4-5x^2+x^4\right.}$$

$$= \frac{5e+8g-(2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} + \frac{x\left(17d+20f+32h-(5d+8f+20h)x^2\right)}{144\left(4-5x^2+x^4\right)^2} - \frac{x\left(59d+\right.}{}$$

$$= \frac{5e+8g-(2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} + \frac{x\left(17d+20f+32h-(5d+8f+20h)x^2\right)}{144\left(4-5x^2+x^4\right)^2} - \frac{(2e+5g}{108\left(4-\right.}$$

$$= \frac{5e+8g-(2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} + \frac{x\left(17d+20f+32h-(5d+8f+20h)x^2\right)}{144\left(4-5x^2+x^4\right)^2} - \frac{(2e+5g}{108\left(4-\right.}$$

$$= \frac{5e+8g-(2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} + \frac{x\left(17d+20f+32h-(5d+8f+20h)x^2\right)}{144\left(4-5x^2+x^4\right)^2} - \frac{(2e+5g}{108\left(4-\right.}$$

Mathematica [A] time = 0.12, size = 231, normalized size = 1.03

$$\frac{-5dx^3+17dx-8ex^2+20e-8fx^3+20fx-20gx^2+32g-20hx^3+32hx}{144\left(x^4-5x^2+4\right)^2}+\frac{35dx^3-59dx+128ex^2-320e+140}{345}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(4 - 5*x^2 + x^4)^3,x]
```

```
[Out] (20*e + 32*g + 17*d*x + 20*f*x + 32*h*x - 8*e*x^2 - 20*g*x^2 - 5*d*x^3 - 8*
f*x^3 - 20*h*x^3)/(144*(4 - 5*x^2 + x^4)^2) + (-320*e - 800*g - 59*d*x - 38
0*f*x - 848*h*x + 128*e*x^2 + 320*g*x^2 + 35*d*x^3 + 140*f*x^3 + 320*h*x^3)
/(3456*(4 - 5*x^2 + x^4)) + ((-13*d - 16*e - 25*f - 40*g - 61*h)*Log[1 - x]
)/1296 + ((313*d + 512*e + 820*f + 1280*g + 1936*h)*Log[2 - x])/41472 + ((1
3*d - 16*e + 25*f - 40*g + 61*h)*Log[1 + x])/1296 + ((-313*d + 512*e - 820*
f + 1280*g - 1936*h)*Log[2 + x])/41472
```

fricas [B] time = 6.13, size = 544, normalized size = 2.43

$$\frac{60\left(7d+28f+64h\right)x^7+768\left(2e+5g\right)x^6-216\left(13d+60f+136h\right)x^5-5760\left(2e+5g\right)x^4+756\left(5d+36f\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="fricas")
```

```
[Out] 1/41472*(60*(7*d + 28*f + 64*h)*x^7 + 768*(2*e + 5*g)*x^6 - 216*(13*d + 60*
f + 136*h)*x^5 - 5760*(2*e + 5*g)*x^4 + 756*(5*d + 36*f + 80*h)*x^3 + 11520
*(2*e + 5*g)*x^2 + 48*(43*d - 260*f - 656*h)*x - ((313*d - 512*e + 820*f -
1280*g + 1936*h)*x^8 - 10*(313*d - 512*e + 820*f - 1280*g + 1936*h)*x^6 + 3
3*(313*d - 512*e + 820*f - 1280*g + 1936*h)*x^4 - 40*(313*d - 512*e + 820*f
 - 1280*g + 1936*h)*x^2 + 5008*d - 8192*e + 13120*f - 20480*g + 30976*h)*lo
g(x + 2) + 32*((13*d - 16*e + 25*f - 40*g + 61*h)*x^8 - 10*(13*d - 16*e + 2
5*f - 40*g + 61*h)*x^6 + 33*(13*d - 16*e + 25*f - 40*g + 61*h)*x^4 - 40*(13
*d - 16*e + 25*f - 40*g + 61*h)*x^2 + 208*d - 256*e + 400*f - 640*g + 976*h
)*log(x + 1) - 32*((13*d + 16*e + 25*f + 40*g + 61*h)*x^8 - 10*(13*d + 16*e
```

```
 + 25*f + 40*g + 61*h)*x^6 + 33*(13*d + 16*e + 25*f + 40*g + 61*h)*x^4 - 40
*(13*d + 16*e + 25*f + 40*g + 61*h)*x^2 + 208*d + 256*e + 400*f + 640*g + 9
76*h)*log(x - 1) + ((313*d + 512*e + 820*f + 1280*g + 1936*h)*x^8 - 10*(313
*d + 512*e + 820*f + 1280*g + 1936*h)*x^6 + 33*(313*d + 512*e + 820*f + 128
0*g + 1936*h)*x^4 - 40*(313*d + 512*e + 820*f + 1280*g + 1936*h)*x^2 + 5008
*d + 8192*e + 13120*f + 20480*g + 30976*h)*log(x - 2) - 9600*e - 29184*g)/(
x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)
```

giac [A] time = 0.33, size = 224, normalized size = 1.00

$$-\frac{1}{41472}\left(313\,d + 820\,f - 1280\,g + 1936\,h - 512\,e\right)\log\left(|x+2|\right) + \frac{1}{1296}\left(13\,d + 25\,f - 40\,g + 61\,h - 16\,e\right)\log\left(|x\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="giac")
```

```
[Out] -1/41472*(313*d + 820*f - 1280*g + 1936*h - 512*e)*log(abs(x + 2)) + 1/1296
*(13*d + 25*f - 40*g + 61*h - 16*e)*log(abs(x + 1)) - 1/1296*(13*d + 25*f +
 40*g + 61*h + 16*e)*log(abs(x - 1)) + 1/41472*(313*d + 820*f + 1280*g + 19
36*h + 512*e)*log(abs(x - 2)) + 1/3456*(35*d*x^7 + 140*f*x^7 + 320*h*x^7 +
320*g*x^6 + 128*x^6*e - 234*d*x^5 - 1080*f*x^5 - 2448*h*x^5 - 2400*g*x^4 -
960*x^4*e + 315*d*x^3 + 2268*f*x^3 + 5040*h*x^3 + 4800*g*x^2 + 1920*x^2*e +
 172*d*x - 1040*f*x - 2624*h*x - 2432*g - 800*e)/(x^4 - 5*x^2 + 4)^2
```

maple [B] time = 0.02, size = 462, normalized size = 2.06

$$-\frac{121h\ln(x+2)}{2592} - \frac{61h\ln(x-1)}{1296} + \frac{61h\ln(x+1)}{1296} + \frac{121h\ln(x-2)}{2592} - \frac{5g\ln(x-1)}{162} + \frac{5g\ln(x+2)}{162} + \frac{5g\ln(x-2)}{162} - $$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x)
```

```
[Out] -121/2592*h*ln(x+2)-61/1296*h*ln(x-1)+61/1296*h*ln(x+1)+121/2592*h*ln(x-2)-
5/162*g*ln(x-1)+5/162*g*ln(x+2)+5/162*g*ln(x-2)-5/162*g*ln(x+1)-313/41472*d
*ln(x+2)+1/81*e*ln(x+2)-1/81*e*ln(x-1)-13/1296*d*ln(x-1)-1/81*e*ln(x+1)+13/
1296*d*ln(x+1)+313/41472*d*ln(x-2)+1/81*e*ln(x-2)+205/10368*f*ln(x-2)+25/12
96*f*ln(x+1)-25/1296*f*ln(x-1)-205/10368*f*ln(x+2)+1/216/(x+2)^2*h+1/432/(x
-1)^2*h-1/432/(x+1)^2*h-1/216/(x-2)^2*h-1/432/(x+2)^2*g+1/432/(x-1)^2*g+1/4
32/(x+1)^2*g-1/432/(x-2)^2*g-1/432/(x+1)^2*d+1/432/(x+1)^2*e+1/432/(x-1)^2*
d+1/432/(x-1)^2*e+1/3456/(x+2)^2*d-1/1728/(x+2)^2*e+1/864/(x+2)^2*f+1/432/(
x-1)^2*f-1/432/(x+1)^2*f-1/864/(x-2)^2*f-1/3456/(x-2)^2*d-1/1728/(x-2)^2*e+
11/432/(x+2)*h+1/48/(x+1)*h+1/48/(x-1)*h+11/432/(x-2)*h-13/864/(x+2)*g-7/43
2/(x+1)*g+7/432/(x-1)*g+13/864/(x-2)*g+19/6912/(x+2)*d-17/3456/(x+2)*e+19/6
912/(x-2)*d+17/3456/(x-2)*e+1/432/(x+1)*d-1/144/(x+1)*e+1/432/(x-1)*d+1/144
/(x-1)*e+5/432/(x-1)*f+5/576/(x+2)*f+5/576/(x-2)*f+5/432/(x+1)*f
```

maxima [A] time = 1.06, size = 214, normalized size = 0.96

$$-\frac{1}{41472}\left(313\,d - 512\,e + 820\,f - 1280\,g + 1936\,h\right)\log\left(x+2\right) + \frac{1}{1296}\left(13\,d - 16\,e + 25\,f - 40\,g + 61\,h\right)\log\left(x + \right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="maxima")
```

```
[Out] -1/41472*(313*d - 512*e + 820*f - 1280*g + 1936*h)*log(x + 2) + 1/1296*(13*
d - 16*e + 25*f - 40*g + 61*h)*log(x + 1) - 1/1296*(13*d + 16*e + 25*f + 40
*g + 61*h)*log(x - 1) + 1/41472*(313*d + 512*e + 820*f + 1280*g + 1936*h)*l
og(x - 2) + 1/3456*(5*(7*d + 28*f + 64*h)*x^7 + 64*(2*e + 5*g)*x^6 - 18*(13
```

```
*d + 60*f + 136*h)*x^5 - 480*(2*e + 5*g)*x^4 + 63*(5*d + 36*f + 80*h)*x^3 +
 960*(2*e + 5*g)*x^2 + 4*(43*d - 260*f - 656*h)*x - 800*e - 2432*g)/(x^8 -
10*x^6 + 33*x^4 - 40*x^2 + 16)
```

mupad [B] time = 0.25, size = 209, normalized size = 0.93

$$\ln(x+1)\left(\frac{13\,d}{1296}-\frac{e}{81}+\frac{25\,f}{1296}-\frac{5\,g}{162}+\frac{61\,h}{1296}\right)-\ln(x-1)\left(\frac{13\,d}{1296}+\frac{e}{81}+\frac{25\,f}{1296}+\frac{5\,g}{162}+\frac{61\,h}{1296}\right)-\frac{\left(-\frac{35\,d}{3456}-\frac{35\,f}{864}-\frac{5}{5}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^4 - 5*x^2 + 4)^3,x)
```

```
[Out] log(x + 1)*((13*d)/1296 - e/81 + (25*f)/1296 - (5*g)/162 + (61*h)/1296) - l
og(x - 1)*((13*d)/1296 + e/81 + (25*f)/1296 + (5*g)/162 + (61*h)/1296) - ((
25*e)/108 + (19*g)/27 - x^2*((5*e)/9 + (25*g)/18) + x^4*((5*e)/18 + (25*g)/
36) - x^6*(e/27 + (5*g)/54) + x*((65*f)/216 - (43*d)/864 + (41*h)/54) + x^5
*((13*d)/192 + (5*f)/16 + (17*h)/24) - x^3*((35*d)/384 + (21*f)/32 + (35*h)
/24) - x^7*((35*d)/3456 + (35*f)/864 + (5*h)/54))/(33*x^4 - 40*x^2 - 10*x^6
 + x^8 + 16) + log(x - 2)*((313*d)/41472 + e/81 + (205*f)/10368 + (5*g)/162
 + (121*h)/2592) - log(x + 2)*((313*d)/41472 - e/81 + (205*f)/10368 - (5*g)
/162 + (121*h)/2592)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**3,x)
```

```
[Out] Timed out
```

3.46 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{\left(4-5x^2+x^4\right)^3}\,dx$

Optimal. Leaf size=239

$$-\frac{x\left(-5x^2(7d+28f+64h)+59d+380f+848h\right)}{3456\left(x^4-5x^2+4\right)}+\frac{x\left(-\left(x^2(5d+8f+20h)\right)+17d+20f+32h\right)}{144\left(x^4-5x^2+4\right)^2}-\frac{\tanh^{-1}\left(\frac{x}{2}\right.}{}$$

```
[Out] 1/144*x*(17*d+20*f+32*h-(5*d+8*f+20*h)*x^2)/(x^4-5*x^2+4)^2+1/36*(5*e+8*g+2
0*i-(2*e+5*g+17*i)*x^2)/(x^4-5*x^2+4)^2-1/108*(2*e+5*g+11*i)*(-2*x^2+5)/(x^
4-5*x^2+4)-1/3456*x*(59*d+380*f+848*h-5*(7*d+28*f+64*h)*x^2)/(x^4-5*x^2+4)-
1/20736*(313*d+820*f+1936*h)*arctanh(1/2*x)+1/648*(13*d+25*f+61*h)*arctanh(
x)-1/162*(2*e+5*g+11*i)*ln(-x^2+1)+1/162*(2*e+5*g+11*i)*ln(-x^2+4)
```

Rubi [A] time = 0.34, antiderivative size = 239, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 11, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.290, Rules used = {1673, 1678, 1178, 1166, 207, 1663, 1660, 12, 614, 616, 31}

$$-\frac{x\left(-5x^2(7d+28f+64h)+59d+380f+848h\right)}{3456\left(x^4-5x^2+4\right)}+\frac{x\left(x^2(-(5d+8f+20h))+17d+20f+32h\right)}{144\left(x^4-5x^2+4\right)^2}-\frac{\tanh^{-1}\left(\frac{x}{2}\right)}{}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(4 - 5*x^2 + x^4)^3,x]
```

```
[Out] (x*(17*d + 20*f + 32*h - (5*d + 8*f + 20*h)*x^2))/(144*(4 - 5*x^2 + x^4)^2)
 + (5*e + 8*g + 20*i - (2*e + 5*g + 17*i)*x^2)/(36*(4 - 5*x^2 + x^4)^2) - (
(2*e + 5*g + 11*i)*(5 - 2*x^2))/(108*(4 - 5*x^2 + x^4)) - (x*(59*d + 380*f
+ 848*h - 5*(7*d + 28*f + 64*h)*x^2))/(3456*(4 - 5*x^2 + x^4)) - ((313*d +
820*f + 1936*h)*ArcTanh[x/2])/20736 + ((13*d + 25*f + 61*h)*ArcTanh[x])/648
 - ((2*e + 5*g + 11*i)*Log[1 - x^2])/162 + ((2*e + 5*g + 11*i)*Log[4 - x^2]
)/162
```

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 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 207

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a
, 0] || GtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^
(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
 - 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
```

```
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+46x^5}{\left(4-5x^2+x^4\right)^3}\,dx = \int \frac{x\left(e+gx^2+46x^4\right)}{\left(4-5x^2+x^4\right)^3}\,dx + \int \frac{d+fx^2+hx^4}{\left(4-5x^2+x^4\right)^3}\,dx$$

$$= \frac{x\left(17d+20f+32h-(5d+8f+20h)x^2\right)}{144\left(4-5x^2+x^4\right)^2} - \frac{1}{144}\int \frac{-19d+20f+3}{(4}$$

$$= \frac{920+5e+8g-(782+2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} + \frac{x\left(17d+20f+32h-(5d+8\right.}{144\left(4-5x^2+x^4\right)}$$

$$= \frac{920+5e+8g-(782+2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} + \frac{x\left(17d+20f+32h-(5d+8\right.}{144\left(4-5x^2+x^4\right)}$$

$$= \frac{920+5e+8g-(782+2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} + \frac{x\left(17d+20f+32h-(5d+8\right.}{144\left(4-5x^2+x^4\right)}$$

$$= \frac{920+5e+8g-(782+2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} + \frac{x\left(17d+20f+32h-(5d+8\right.}{144\left(4-5x^2+x^4\right)}$$

$$= \frac{920+5e+8g-(782+2e+5g)x^2}{36\left(4-5x^2+x^4\right)^2} + \frac{x\left(17d+20f+32h-(5d+8\right.}{144\left(4-5x^2+x^4\right)}$$

Mathematica [A] time = 0.13, size = 261, normalized size = 1.09

$$\frac{-5dx^3+17dx-8ex^2+20e-8fx^3+20fx-20gx^2+32g-20hx^3+32hx-68ix^2+80i}{144\left(x^4-5x^2+4\right)^2} + \frac{35dx^3-59dx+128}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(4 - 5*x^2 + x^4)^3,x]
```

```
[Out] (20*e + 32*g + 80*i + 17*d*x + 20*f*x + 32*h*x - 8*e*x^2 - 20*g*x^2 - 68*i*
x^2 - 5*d*x^3 - 8*f*x^3 - 20*h*x^3)/(144*(4 - 5*x^2 + x^4)^2) + (-320*e - 8
00*g - 1760*i - 59*d*x - 380*f*x - 848*h*x + 128*e*x^2 + 320*g*x^2 + 704*i*
x^2 + 35*d*x^3 + 140*f*x^3 + 320*h*x^3)/(3456*(4 - 5*x^2 + x^4)) + ((-13*d
- 16*e - 25*f - 40*g - 61*h - 88*i)*Log[1 - x])/1296 + ((313*d + 512*e + 82
0*f + 1280*g + 1936*h + 2816*i)*Log[2 - x])/41472 + ((13*d - 16*e + 25*f -
40*g + 61*h - 88*i)*Log[1 + x])/1296 + ((-313*d + 512*e - 820*f + 1280*g -
1936*h + 2816*i)*Log[2 + x])/41472
```

fricas [B] time = 27.72, size = 616, normalized size = 2.58

$$\frac{60\left(7d+28f+64h\right)x^7+768\left(2e+5g+11i\right)x^6-216\left(13d+60f+136h\right)x^5-5760\left(2e+5g+11i\right)x^4+}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="fri
cas")
```

```
[Out] 1/41472*(60*(7*d + 28*f + 64*h)*x^7 + 768*(2*e + 5*g + 11*i)*x^6 - 216*(13*
d + 60*f + 136*h)*x^5 - 5760*(2*e + 5*g + 11*i)*x^4 + 756*(5*d + 36*f + 80*
h)*x^3 + 2304*(10*e + 25*g + 52*i)*x^2 + 48*(43*d - 260*f - 656*h)*x - ((31
3*d - 512*e + 820*f - 1280*g + 1936*h - 2816*i)*x^8 - 10*(313*d - 512*e + 8
20*f - 1280*g + 1936*h - 2816*i)*x^6 + 33*(313*d - 512*e + 820*f - 1280*g +
 1936*h - 2816*i)*x^4 - 40*(313*d - 512*e + 820*f - 1280*g + 1936*h - 2816*
i)*x^2 + 5008*d - 8192*e + 13120*f - 20480*g + 30976*h - 45056*i)*log(x + 2
) + 32*((13*d - 16*e + 25*f - 40*g + 61*h - 88*i)*x^8 - 10*(13*d - 16*e + 2
5*f - 40*g + 61*h - 88*i)*x^6 + 33*(13*d - 16*e + 25*f - 40*g + 61*h - 88*i
)*x^4 - 40*(13*d - 16*e + 25*f - 40*g + 61*h - 88*i)*x^2 + 208*d - 256*e +
400*f - 640*g + 976*h - 1408*i)*log(x + 1) - 32*((13*d + 16*e + 25*f + 40*g
 + 61*h + 88*i)*x^8 - 10*(13*d + 16*e + 25*f + 40*g + 61*h + 88*i)*x^6 + 33
*(13*d + 16*e + 25*f + 40*g + 61*h + 88*i)*x^4 - 40*(13*d + 16*e + 25*f + 4
0*g + 61*h + 88*i)*x^2 + 208*d + 256*e + 400*f + 640*g + 976*h + 1408*i)*lo
g(x - 1) + ((313*d + 512*e + 820*f + 1280*g + 1936*h + 2816*i)*x^8 - 10*(31
3*d + 512*e + 820*f + 1280*g + 1936*h + 2816*i)*x^6 + 33*(313*d + 512*e + 8
20*f + 1280*g + 1936*h + 2816*i)*x^4 - 40*(313*d + 512*e + 820*f + 1280*g +
 1936*h + 2816*i)*x^2 + 5008*d + 8192*e + 13120*f + 20480*g + 30976*h + 450
56*i)*log(x - 2) - 9600*e - 29184*g - 61440*i)/(x^8 - 10*x^6 + 33*x^4 - 40*
x^2 + 16)
```

giac [A] time = 0.37, size = 257, normalized size = 1.08

$$-\frac{1}{41472}\left(313\,d+820\,f-1280\,g+1936\,h-2816\,i-512\,e\right)\log\left(|x+2|\right)+\frac{1}{1296}\left(13\,d+25\,f-40\,g+61\,h-88\,i-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="gia
c")
```

```
[Out] -1/41472*(313*d + 820*f - 1280*g + 1936*h - 2816*i - 512*e)*log(abs(x + 2))
 + 1/1296*(13*d + 25*f - 40*g + 61*h - 88*i - 16*e)*log(abs(x + 1)) - 1/129
6*(13*d + 25*f + 40*g + 61*h + 88*i + 16*e)*log(abs(x - 1)) + 1/41472*(313*
d + 820*f + 1280*g + 1936*h + 2816*i + 512*e)*log(abs(x - 2)) + 1/3456*(35*
d*x^7 + 140*f*x^7 + 320*h*x^7 + 320*g*x^6 + 704*i*x^6 + 128*x^6*e - 234*d*x
^5 - 1080*f*x^5 - 2448*h*x^5 - 2400*g*x^4 - 5280*i*x^4 - 960*x^4*e + 315*d*
x^3 + 2268*f*x^3 + 5040*h*x^3 + 4800*g*x^2 + 9984*i*x^2 + 1920*x^2*e + 172*
d*x - 1040*f*x - 2624*h*x - 2432*g - 5120*i - 800*e)/(x^4 - 5*x^2 + 4)^2
```

maple [B] time = 0.02, size = 554, normalized size = 2.32

$$\frac{11i\ln\left(x+2\right)}{162}-\frac{11i\ln\left(x-1\right)}{162}-\frac{11i\ln\left(x+1\right)}{162}+\frac{11i\ln\left(x-2\right)}{162}-\frac{121h\ln\left(x+2\right)}{2592}-\frac{61h\ln\left(x-1\right)}{1296}+\frac{61h\ln\left(x+1\right)}{1296}+\frac{121h\,\mathrm{l}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x)
```

```
[Out] 11/162*i*ln(x+2)-11/162*i*ln(x-1)-11/162*i*ln(x+1)+11/162*i*ln(x-2)-121/259
2*h*ln(x+2)-61/1296*h*ln(x-1)+61/1296*h*ln(x+1)+121/2592*h*ln(x-2)-5/162*g*
ln(x-1)+5/162*g*ln(x+2)+5/162*g*ln(x-2)-5/162*g*ln(x+1)-313/41472*d*ln(x+2)
+1/81*e*ln(x+2)-1/81*e*ln(x-1)-13/1296*d*ln(x-1)-1/81*e*ln(x+1)+13/1296*d*l
n(x+1)+313/41472*d*ln(x-2)+1/81*e*ln(x-2)+205/10368*f*ln(x-2)+25/1296*f*ln(
x+1)-25/1296*f*ln(x-1)-205/10368*f*ln(x+2)-1/108/(x+2)^2*i+1/432/(x-1)^2*i+
1/432/(x+1)^2*i-1/108/(x-2)^2*i+1/216/(x+2)^2*h+1/432/(x-1)^2*h-1/432/(x+1)
^2*h-1/216/(x-2)^2*h-1/432/(x+2)^2*g+1/432/(x-1)^2*g+1/432/(x+1)^2*g-1/432/
(x-2)^2*g-1/432/(x+1)^2*d+1/432/(x+1)^2*e+1/432/(x-1)^2*d+1/432/(x-1)^2*e+1
/3456/(x+2)^2*d-1/1728/(x+2)^2*e+1/864/(x+2)^2*f+1/432/(x-1)^2*f-1/432/(x+1
)^2*f-1/864/(x-2)^2*f-1/3456/(x-2)^2*d-1/1728/(x-2)^2*e-1/24/(x+2)*i-11/432
```

```
/(x+1)*i+11/432/(x-1)*i+1/24/(x-2)*i+11/432/(x+2)*h+1/48/(x+1)*h+1/48/(x-1)
*h+11/432/(x-2)*h-13/864/(x+2)*g-7/432/(x+1)*g+7/432/(x-1)*g+13/864/(x-2)*g
+19/6912/(x+2)*d-17/3456/(x+2)*e+19/6912/(x-2)*d+17/3456/(x-2)*e+1/432/(x+1
)*d-1/144/(x+1)*e+1/432/(x-1)*d+1/144/(x-1)*e+5/432/(x-1)*f+5/576/(x+2)*f+5
/576/(x-2)*f+5/432/(x+1)*f
```

maxima [A] time = 1.12, size = 238, normalized size = 1.00

$$-\frac{1}{41472}\left(313\,d-512\,e+820\,f-1280\,g+1936\,h-2816\,i\right)\log\left(x+2\right)+\frac{1}{1296}\left(13\,d-16\,e+25\,f-40\,g+61\,h$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="max
ima")
```

```
[Out] -1/41472*(313*d - 512*e + 820*f - 1280*g + 1936*h - 2816*i)*log(x + 2) + 1/
1296*(13*d - 16*e + 25*f - 40*g + 61*h - 88*i)*log(x + 1) - 1/1296*(13*d +
16*e + 25*f + 40*g + 61*h + 88*i)*log(x - 1) + 1/41472*(313*d + 512*e + 820
*f + 1280*g + 1936*h + 2816*i)*log(x - 2) + 1/3456*(5*(7*d + 28*f + 64*h)*x
^7 + 64*(2*e + 5*g + 11*i)*x^6 - 18*(13*d + 60*f + 136*h)*x^5 - 480*(2*e +
5*g + 11*i)*x^4 + 63*(5*d + 36*f + 80*h)*x^3 + 192*(10*e + 25*g + 52*i)*x^2
 + 4*(43*d - 260*f - 656*h)*x - 800*e - 2432*g - 5120*i)/(x^8 - 10*x^6 + 33
*x^4 - 40*x^2 + 16)
```

mupad [B] time = 0.62, size = 233, normalized size = 0.97

$$\ln\left(x+1\right)\left(\frac{13\,d}{1296}-\frac{e}{81}+\frac{25\,f}{1296}-\frac{5\,g}{162}+\frac{61\,h}{1296}-\frac{11\,i}{162}\right)-\ln\left(x-1\right)\left(\frac{13\,d}{1296}+\frac{e}{81}+\frac{25\,f}{1296}+\frac{5\,g}{162}+\frac{61\,h}{1296}+\frac{11\,i}{162}\right)-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^4 - 5*x^2 + 4)^3,x)
```

```
[Out] log(x + 1)*((13*d)/1296 - e/81 + (25*f)/1296 - (5*g)/162 + (61*h)/1296 - (1
1*i)/162) - log(x - 1)*((13*d)/1296 + e/81 + (25*f)/1296 + (5*g)/162 + (61*
h)/1296 + (11*i)/162) - ((25*e)/108 + (19*g)/27 + (40*i)/27 + x*((65*f)/216
 - (43*d)/864 + (41*h)/54) + x^5*((13*d)/192 + (5*f)/16 + (17*h)/24) - x^3*
((35*d)/384 + (21*f)/32 + (35*h)/24) - x^7*((35*d)/3456 + (35*f)/864 + (5*h
)/54) - x^2*((5*e)/9 + (25*g)/18 + (26*i)/9) - x^6*(e/27 + (5*g)/54 + (11*i
)/54) + x^4*((5*e)/18 + (25*g)/36 + (55*i)/36))/(33*x^4 - 40*x^2 - 10*x^6 +
 x^8 + 16) + log(x - 2)*((313*d)/41472 + e/81 + (205*f)/10368 + (5*g)/162 +
 (121*h)/2592 + (11*i)/162) - log(x + 2)*((313*d)/41472 - e/81 + (205*f)/10
368 - (5*g)/162 + (121*h)/2592 - (11*i)/162)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**3,x)
```

```
[Out] Timed out
```

3.47 $\int \frac{d+ex}{\left(1+x^2+x^4\right)^3} dx$

Optimal. Leaf size=185

$$-\frac{9}{32}d\log\left(x^2-x+1\right)+\frac{9}{32}d\log\left(x^2+x+1\right)+\frac{dx\left(2-7x^2\right)}{24\left(x^4+x^2+1\right)}+\frac{dx\left(1-x^2\right)}{12\left(x^4+x^2+1\right)^2}-\frac{13d\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{48\sqrt{3}}+\frac{13d\tan^{-1}\left(\right.}{48\sqrt{3}}$$

```
[Out] 1/12*d*x*(-x^2+1)/(x^4+x^2+1)^2+1/12*e*(2*x^2+1)/(x^4+x^2+1)^2+1/24*d*x*(-7
*x^2+2)/(x^4+x^2+1)+1/6*e*(2*x^2+1)/(x^4+x^2+1)-9/32*d*ln(x^2-x+1)+9/32*d*l
n(x^2+x+1)-13/144*d*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+13/144*d*arctan(1/3
*(1+2*x)*3^(1/2))*3^(1/2)+2/9*e*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)
```

Rubi [A] time = 0.12, antiderivative size = 185, normalized size of antiderivative = 1.00, number of steps used = 19, number of rules used = 11, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.688, Rules used = {1673, 12, 1092, 1178, 1169, 634, 618, 204, 628, 1107, 614}

$$\frac{dx\left(2-7x^2\right)}{24\left(x^4+x^2+1\right)}+\frac{dx\left(1-x^2\right)}{12\left(x^4+x^2+1\right)^2}-\frac{9}{32}d\log\left(x^2-x+1\right)+\frac{9}{32}d\log\left(x^2+x+1\right)-\frac{13d\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{48\sqrt{3}}+\frac{13d\tan^{-1}\left(\frac{2}{}\right.}{48\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)/(1 + x^2 + x^4)^3,x]
```

```
[Out] (d*x*(1 - x^2))/(12*(1 + x^2 + x^4)^2) + (e*(1 + 2*x^2))/(12*(1 + x^2 + x^4
)^2) + (d*x*(2 - 7*x^2))/(24*(1 + x^2 + x^4)) + (e*(1 + 2*x^2))/(6*(1 + x^2
 + x^4)) - (13*d*ArcTan[(1 - 2*x)/Sqrt[3]])/(48*Sqrt[3]) + (13*d*ArcTan[(1
+ 2*x)/Sqrt[3]])/(48*Sqrt[3]) + (2*e*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3
]) - (9*d*Log[1 - x + x^2])/32 + (9*d*Log[1 + x + x^2])/32
```

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 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1092

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> -Simp[(x*(b^2 -
 2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)),
 x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(b^2 - 2*a*c + 2*(p + 1)*(b^2
 - 4*a*c) + b*c*(4*p + 7)*x^2)*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ
[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex}{\left(1+x^2+x^4\right)^3}\,dx = \int \frac{d}{\left(1+x^2+x^4\right)^3}\,dx + \int \frac{ex}{\left(1+x^2+x^4\right)^3}\,dx$$
$$= d\int \frac{1}{\left(1+x^2+x^4\right)^3}\,dx + e\int \frac{x}{\left(1+x^2+x^4\right)^3}\,dx$$
$$= \frac{dx\left(1-x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{1}{12}d\int \frac{11-5x^2}{\left(1+x^2+x^4\right)^2}\,dx + \frac{1}{2}e\,\mathrm{Subst}\left(\int \frac{1}{\left(1+x+x^2\right)^3}\,dx, x, x^2\right)$$
$$= \frac{dx\left(1-x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{dx\left(2-7x^2\right)}{24\left(1+x^2+x^4\right)} + \frac{1}{72}d\int \frac{60-21x^2}{1+x^2+x^4}\,dx + \frac{1}{2}e\,\mathrm{S}$$
$$= \frac{dx\left(1-x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{dx\left(2-7x^2\right)}{24\left(1+x^2+x^4\right)} + \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{144}d\int \frac{6(}{1-}$$
$$= \frac{dx\left(1-x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{dx\left(2-7x^2\right)}{24\left(1+x^2+x^4\right)} + \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{1}{96}(13d)\int$$
$$= \frac{dx\left(1-x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{dx\left(2-7x^2\right)}{24\left(1+x^2+x^4\right)} + \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{2e\tan^{-1}\left(\frac{1}{}\right.}{3\sqrt{3}}$$
$$= \frac{dx\left(1-x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{dx\left(2-7x^2\right)}{24\left(1+x^2+x^4\right)} + \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} - \frac{13d\tan^{-1}\left(\right.}{48\sqrt{3}}$$

Mathematica [C] time = 0.75, size = 186, normalized size = 1.01

$$\frac{1}{144}\left(\frac{6\left(dx\left(2-7x^2\right)+e\left(8x^2+4\right)\right)}{x^4+x^2+1} + \frac{12\left(d\left(x-x^3\right)+2ex^2+e\right)}{\left(x^4+x^2+1\right)^2} - \frac{\left(7\sqrt{3}-47i\right)d\tan^{-1}\left(\frac{1}{2}\left(\sqrt{3}-i\right)x\right)}{\sqrt{\frac{1}{6}\left(1+i\sqrt{3}\right)}} - \frac{\left(7\sqrt{3}\right.}{}\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x)/(1 + x^2 + x^4)^3,x]
```

```
[Out] ((6*(d*x*(2 - 7*x^2) + e*(4 + 8*x^2)))/(1 + x^2 + x^4) + (12*(e + 2*e*x^2 +
 d*(x - x^3)))/(1 + x^2 + x^4)^2 - ((-47*I + 7*Sqrt[3])*d*ArcTan[((-I + Sqr
t[3])*x)/2])/Sqrt[(1 + I*Sqrt[3])/6] - ((47*I + 7*Sqrt[3])*d*ArcTan[((I + S
qrt[3])*x)/2])/Sqrt[(1 - I*Sqrt[3])/6] - 32*Sqrt[3]*e*ArcTan[Sqrt[3]/(1 + 2
*x^2)])/144
```

fricas [A] time = 0.73, size = 278, normalized size = 1.50

$$-\frac{84\,dx^7 - 96\,ex^6 + 60\,dx^5 - 144\,ex^4 + 84\,dx^3 - 192\,ex^2 - 2\sqrt{3}\left((13\,d-32\,e)x^8 + 2\,(13\,d-32\,e)x^6 + 3\,(13\,d-32\,e\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4+x^2+1)^3,x, algorithm="fricas")
```

```
[Out] -1/288*(84*d*x^7 - 96*e*x^6 + 60*d*x^5 - 144*e*x^4 + 84*d*x^3 - 192*e*x^2 -
 2*sqrt(3)*((13*d - 32*e)*x^8 + 2*(13*d - 32*e)*x^6 + 3*(13*d - 32*e)*x^4 +
 2*(13*d - 32*e)*x^2 + 13*d - 32*e)*arctan(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(
3)*((13*d + 32*e)*x^8 + 2*(13*d + 32*e)*x^6 + 3*(13*d + 32*e)*x^4 + 2*(13*d
 + 32*e)*x^2 + 13*d + 32*e)*arctan(1/3*sqrt(3)*(2*x - 1)) - 48*d*x - 81*(d*
```

```
x^8 + 2*d*x^6 + 3*d*x^4 + 2*d*x^2 + d)*log(x^2 + x + 1) + 81*(d*x^8 + 2*d*x
^6 + 3*d*x^4 + 2*d*x^2 + d)*log(x^2 - x + 1) - 72*e)/(x^8 + 2*x^6 + 3*x^4 +
 2*x^2 + 1)
```

giac [A] time = 0.36, size = 131, normalized size = 0.71

$$\frac{1}{144}\sqrt{3}\,(13\,d-32\,e)\arctan\left(\frac{1}{3}\sqrt{3}\,(2\,x+1)\right)+\frac{1}{144}\sqrt{3}\,(13\,d+32\,e)\arctan\left(\frac{1}{3}\sqrt{3}\,(2\,x-1)\right)+\frac{9}{32}\,d\log\left(x^2+x+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4+x^2+1)^3,x, algorithm="giac")
```

```
[Out] 1/144*sqrt(3)*(13*d - 32*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/144*sqrt(3)*(
13*d + 32*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 9/32*d*log(x^2 + x + 1) - 9/32
*d*log(x^2 - x + 1) - 1/24*(7*d*x^7 - 8*x^6*e + 5*d*x^5 - 12*x^4*e + 7*d*x^
3 - 16*x^2*e - 4*d*x - 6*e)/(x^4 + x^2 + 1)^2
```

maple [A] time = 0.02, size = 180, normalized size = 0.97

$$\frac{13\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144}+\frac{13\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144}-\frac{9d\ln\left(x^2-x+1\right)}{32}+\frac{9d\ln\left(x^2+x+1\right)}{32}-\frac{2\sqrt{3}\,e\arctan\left(\right.}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)/(x^4+x^2+1)^3,x)
```

```
[Out] 1/16*((-7/3*d-4/3*e)*x^3-6*d*x^2+(-20/3*d+1/3*e)*x-4*d+2*e)/(x^2+x+1)^2+9/3
2*d*ln(x^2+x+1)+13/144*3^(1/2)*d*arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*
arctan(1/3*(2*x+1)*3^(1/2))-1/16*((7/3*d-4/3*e)*x^3-6*d*x^2+(20/3*d+1/3*e)*
x-4*d-2*e)/(x^2-x+1)^2-9/32*d*ln(x^2-x+1)+13/144*3^(1/2)*d*arctan(1/3*(2*x-
1)*3^(1/2))+2/9*3^(1/2)*e*arctan(1/3*(2*x-1)*3^(1/2))
```

maxima [A] time = 2.55, size = 137, normalized size = 0.74

$$\frac{1}{144}\sqrt{3}\,(13\,d-32\,e)\arctan\left(\frac{1}{3}\sqrt{3}\,(2\,x+1)\right)+\frac{1}{144}\sqrt{3}\,(13\,d+32\,e)\arctan\left(\frac{1}{3}\sqrt{3}\,(2\,x-1)\right)+\frac{9}{32}\,d\log\left(x^2+x+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x^4+x^2+1)^3,x, algorithm="maxima")
```

```
[Out] 1/144*sqrt(3)*(13*d - 32*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/144*sqrt(3)*(
13*d + 32*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 9/32*d*log(x^2 + x + 1) - 9/32
*d*log(x^2 - x + 1) - 1/24*(7*d*x^7 - 8*e*x^6 + 5*d*x^5 - 12*e*x^4 + 7*d*x^
3 - 16*e*x^2 - 4*d*x - 6*e)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)
```

mupad [B] time = 0.26, size = 185, normalized size = 1.00

$$\frac{-\frac{7\,d\,x^7}{24}+\frac{e\,x^6}{3}-\frac{5\,d\,x^5}{24}+\frac{e\,x^4}{2}-\frac{7\,d\,x^3}{24}+\frac{2\,e\,x^2}{3}+\frac{d\,x}{6}+\frac{e}{4}}{x^8+2\,x^6+3\,x^4+2\,x^2+1}-\ln\left(x-\frac{1}{2}-\frac{\sqrt{3}\,1\mathrm{i}}{2}\right)\left(\frac{9\,d}{32}+\frac{\sqrt{3}\,d\,13\mathrm{i}}{288}+\frac{\sqrt{3}\,e\,1\mathrm{i}}{9}\right)+\ln\left(x+\frac{1}{2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x)/(x^2 + x^4 + 1)^3,x)
```

```
[Out] (e/4 + (d*x)/6 - (7*d*x^3)/24 - (5*d*x^5)/24 - (7*d*x^7)/24 + (2*e*x^2)/3 +
 (e*x^4)/2 + (e*x^6)/3)/(2*x^2 + 3*x^4 + 2*x^6 + x^8 + 1) - log(x - (3^(1/2
)*1i)/2 - 1/2)*((9*d)/32 + (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9) + log(x
- (3^(1/2)*1i)/2 + 1/2)*((9*d)/32 - (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9)
```

```
 + log(x + (3^(1/2)*1i)/2 - 1/2)*((3^(1/2)*d*13i)/288 - (9*d)/32 + (3^(1/2)
*e*1i)/9) + log(x + (3^(1/2)*1i)/2 + 1/2)*((9*d)/32 + (3^(1/2)*d*13i)/288 -
 (3^(1/2)*e*1i)/9)
```

sympy [C] time = 3.62, size = 1103, normalized size = 5.96

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(x**4+x**2+1)**3,x)
```

```
[Out] (-9*d/32 - sqrt(3)*I*(13*d + 32*e)/288)*log(x + (-1025428432*d**4*e - 33475
2912*d**4*(-9*d/32 - sqrt(3)*I*(13*d + 32*e)/288) - 431308800*d**2*e**3 - 3
143688192*d**2*e**2*(-9*d/32 - sqrt(3)*I*(13*d + 32*e)/288) + 9917005824*d*
*2*e*(-9*d/32 - sqrt(3)*I*(13*d + 32*e)/288)**2 + 11878244352*d**2*(-9*d/32
 - sqrt(3)*I*(13*d + 32*e)/288)**3 + 142606336*e**5 + 754974720*e**4*(-9*d/
32 - sqrt(3)*I*(13*d + 32*e)/288) + 3850371072*e**3*(-9*d/32 - sqrt(3)*I*(1
3*d + 32*e)/288)**2 + 20384317440*e**2*(-9*d/32 - sqrt(3)*I*(13*d + 32*e)/2
88)**3)/(217696167*d**5 - 1217128448*d**3*e**2 - 617611264*d*e**4)) + (-9*d
/32 + sqrt(3)*I*(13*d + 32*e)/288)*log(x + (-1025428432*d**4*e - 334752912*
d**4*(-9*d/32 + sqrt(3)*I*(13*d + 32*e)/288) - 431308800*d**2*e**3 - 314368
8192*d**2*e**2*(-9*d/32 + sqrt(3)*I*(13*d + 32*e)/288) + 9917005824*d**2*e*
(-9*d/32 + sqrt(3)*I*(13*d + 32*e)/288)**2 + 11878244352*d**2*(-9*d/32 + sq
rt(3)*I*(13*d + 32*e)/288)**3 + 142606336*e**5 + 754974720*e**4*(-9*d/32 +
sqrt(3)*I*(13*d + 32*e)/288) + 3850371072*e**3*(-9*d/32 + sqrt(3)*I*(13*d +
 32*e)/288)**2 + 20384317440*e**2*(-9*d/32 + sqrt(3)*I*(13*d + 32*e)/288)**
3)/(217696167*d**5 - 1217128448*d**3*e**2 - 617611264*d*e**4)) + (9*d/32 -
sqrt(3)*I*(13*d - 32*e)/288)*log(x + (-1025428432*d**4*e - 334752912*d**4*(
9*d/32 - sqrt(3)*I*(13*d - 32*e)/288) - 431308800*d**2*e**3 - 3143688192*d*
*2*e**2*(9*d/32 - sqrt(3)*I*(13*d - 32*e)/288) + 9917005824*d**2*e*(9*d/32
- sqrt(3)*I*(13*d - 32*e)/288)**2 + 11878244352*d**2*(9*d/32 - sqrt(3)*I*(1
3*d - 32*e)/288)**3 + 142606336*e**5 + 754974720*e**4*(9*d/32 - sqrt(3)*I*(
13*d - 32*e)/288) + 3850371072*e**3*(9*d/32 - sqrt(3)*I*(13*d - 32*e)/288)*
*2 + 20384317440*e**2*(9*d/32 - sqrt(3)*I*(13*d - 32*e)/288)**3)/(217696167
*d**5 - 1217128448*d**3*e**2 - 617611264*d*e**4)) + (9*d/32 + sqrt(3)*I*(13
*d - 32*e)/288)*log(x + (-1025428432*d**4*e - 334752912*d**4*(9*d/32 + sqrt
(3)*I*(13*d - 32*e)/288) - 431308800*d**2*e**3 - 3143688192*d**2*e**2*(9*d/
32 + sqrt(3)*I*(13*d - 32*e)/288) + 9917005824*d**2*e*(9*d/32 + sqrt(3)*I*(
13*d - 32*e)/288)**2 + 11878244352*d**2*(9*d/32 + sqrt(3)*I*(13*d - 32*e)/2
88)**3 + 142606336*e**5 + 754974720*e**4*(9*d/32 + sqrt(3)*I*(13*d - 32*e)/
288) + 3850371072*e**3*(9*d/32 + sqrt(3)*I*(13*d - 32*e)/288)**2 + 20384317
440*e**2*(9*d/32 + sqrt(3)*I*(13*d - 32*e)/288)**3)/(217696167*d**5 - 12171
28448*d**3*e**2 - 617611264*d*e**4)) + (-7*d*x**7 - 5*d*x**5 - 7*d*x**3 + 4
*d*x + 8*e*x**6 + 12*e*x**4 + 16*e*x**2 + 6*e)/(24*x**8 + 48*x**6 + 72*x**4
 + 48*x**2 + 24)
```

3.48 $\int \frac{d+ex+fx^2}{\left(1+x^2+x^4\right)^3} \, dx$

Optimal. Leaf size=223

$$-\frac{1}{32}(9d-4f)\log\left(x^2-x+1\right)+\frac{1}{32}(9d-4f)\log\left(x^2+x+1\right)+\frac{x\left(-7x^2(d-f)+2d+3f\right)}{24\left(x^4+x^2+1\right)}+\frac{x\left(-\left(x^2(d-2f)\right)+d\right.}{12\left(x^4+x^2+1\right)}$$

```
[Out] 1/12*e*(2*x^2+1)/(x^4+x^2+1)^2+1/12*x*(d+f-(d-2*f)*x^2)/(x^4+x^2+1)^2+1/6*e
*(2*x^2+1)/(x^4+x^2+1)+1/24*x*(2*d+3*f-7*(d-f)*x^2)/(x^4+x^2+1)-1/32*(9*d-4
*f)*ln(x^2-x+1)+1/32*(9*d-4*f)*ln(x^2+x+1)-1/144*(13*d+2*f)*arctan(1/3*(1-2
*x)*3^(1/2))*3^(1/2)+1/144*(13*d+2*f)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+2
/9*e*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)
```

Rubi [A] time = 0.21, antiderivative size = 223, normalized size of antiderivative = 1.00, number of steps used = 18, number of rules used = 10, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.476, Rules used = {1673, 1178, 1169, 634, 618, 204, 628, 12, 1107, 614}

$$\frac{x\left(-7x^2(d-f)+2d+3f\right)}{24\left(x^4+x^2+1\right)}+\frac{x\left(x^2(-(d-2f))+d+f\right)}{12\left(x^4+x^2+1\right)^2}-\frac{1}{32}(9d-4f)\log\left(x^2-x+1\right)+\frac{1}{32}(9d-4f)\log\left(x^2+x+\right.$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)/(1 + x^2 + x^4)^3,x]
```

```
[Out] (e*(1 + 2*x^2))/(12*(1 + x^2 + x^4)^2) + (x*(d + f - (d - 2*f)*x^2))/(12*(1
 + x^2 + x^4)^2) + (e*(1 + 2*x^2))/(6*(1 + x^2 + x^4)) + (x*(2*d + 3*f - 7*
(d - f)*x^2))/(24*(1 + x^2 + x^4)) - ((13*d + 2*f)*ArcTan[(1 - 2*x)/Sqrt[3]
])/(48*Sqrt[3]) + ((13*d + 2*f)*ArcTan[(1 + 2*x)/Sqrt[3]])/(48*Sqrt[3]) + (
2*e*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((9*d - 4*f)*Log[1 - x + x^2
])/32 + ((9*d - 4*f)*Log[1 + x + x^2])/32
```

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 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2}{\left(1+x^2+x^4\right)^3}dx = \int \frac{ex}{\left(1+x^2+x^4\right)^3}dx + \int \frac{d+fx^2}{\left(1+x^2+x^4\right)^3}dx$$
$$= \frac{x\left(d+f-(d-2f)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{1}{12}\int \frac{11d-f-5(d-2f)x^2}{\left(1+x^2+x^4\right)^2}dx + e\int \frac{x}{\left(1+x^2+x^4\right)^3}dx$$
$$= \frac{x\left(d+f-(d-2f)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(2d+3f-7(d-f)x^2\right)}{24\left(1+x^2+x^4\right)} + \frac{1}{72}\int \frac{15(4d-f)-21(d-f)x^2}{1+x^2+x^4} d$$
$$= \frac{e\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-(d-2f)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(2d+3f-7(d-f)x^2\right)}{24\left(1+x^2+x^4\right)} + \frac{1}{144}\int 15(4d$$
$$= \frac{e\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-(d-2f)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{x\left(2d+3f-7(d-f)x\right.}{24\left(1+x^2+x^4\right)}$$
$$= \frac{e\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-(d-2f)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{x\left(2d+3f-7(d-f)x\right.}{24\left(1+x^2+x^4\right)}$$
$$= \frac{e\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-(d-2f)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e\left(1+2x^2\right)}{6\left(1+x^2+x^4\right)} + \frac{x\left(2d+3f-7(d-f)x\right.}{24\left(1+x^2+x^4\right)}$$

Mathematica [C] time = 0.59, size = 235, normalized size = 1.05

$$\frac{1}{144}\left(\frac{12\left(x\left(-dx^2+d+2fx^2+f\right)+2ex^2+e\right)}{\left(x^4+x^2+1\right)^2} + \frac{6\left(-7dx^3+2dx+e\left(8x^2+4\right)+7fx^3+3fx\right)}{x^4+x^2+1} - \frac{\left(\left(7\sqrt{3}-47i\right.\right.}{}\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x + f*x^2)/(1 + x^2 + x^4)^3,x]
```

```
[Out] ((6*(2*d*x + 3*f*x - 7*d*x^3 + 7*f*x^3 + e*(4 + 8*x^2)))/(1 + x^2 + x^4) +
(12*(e + 2*e*x^2 + x*(d + f - d*x^2 + 2*f*x^2)))/(1 + x^2 + x^4)^2 - (((-47
*I + 7*Sqrt[3])*d + (17*I - 7*Sqrt[3])*f)*ArcTan[((-I + Sqrt[3])*x)/2])/Sqr
t[(1 + I*Sqrt[3])/6] - (((47*I + 7*Sqrt[3])*d - (17*I + 7*Sqrt[3])*f)*ArcTa
n[((I + Sqrt[3])*x)/2])/Sqrt[(1 - I*Sqrt[3])/6] - 32*Sqrt[3]*e*ArcTan[Sqrt[
3]/(1 + 2*x^2)])/144
```

fricas [A] time = 0.89, size = 384, normalized size = 1.72

$$-\frac{84\left(d-f\right)x^7-96\,ex^6+60\left(d-2\,f\right)x^5-144\,ex^4+84\left(d-2\,f\right)x^3-192\,ex^2-2\sqrt{3}\left(\left(13\,d-32\,e+2\,f\right)x^8+2\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="fricas")
```

```
[Out] -1/288*(84*(d - f)*x^7 - 96*e*x^6 + 60*(d - 2*f)*x^5 - 144*e*x^4 + 84*(d -
2*f)*x^3 - 192*e*x^2 - 2*sqrt(3)*((13*d - 32*e + 2*f)*x^8 + 2*(13*d - 32*e
+ 2*f)*x^6 + 3*(13*d - 32*e + 2*f)*x^4 + 2*(13*d - 32*e + 2*f)*x^2 + 13*d -
 32*e + 2*f)*arctan(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(3)*((13*d + 32*e + 2*f)
*x^8 + 2*(13*d + 32*e + 2*f)*x^6 + 3*(13*d + 32*e + 2*f)*x^4 + 2*(13*d + 32
*e + 2*f)*x^2 + 13*d + 32*e + 2*f)*arctan(1/3*sqrt(3)*(2*x - 1)) - 12*(4*d
+ 5*f)*x - 9*((9*d - 4*f)*x^8 + 2*(9*d - 4*f)*x^6 + 3*(9*d - 4*f)*x^4 + 2*(
```

```
9*d - 4*f)*x^2 + 9*d - 4*f)*log(x^2 + x + 1) + 9*((9*d - 4*f)*x^8 + 2*(9*d
- 4*f)*x^6 + 3*(9*d - 4*f)*x^4 + 2*(9*d - 4*f)*x^2 + 9*d - 4*f)*log(x^2 - x
 + 1) - 72*e)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)
```

giac [A] time = 0.37, size = 171, normalized size = 0.77

$$\frac{1}{144}\sqrt{3}\left(13\,d+2\,f-32\,e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2\,x+1\right)\right)+\frac{1}{144}\sqrt{3}\left(13\,d+2\,f+32\,e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2\,x-1\right)\right)+\frac{1}{32}\left(9\,d\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="giac")
```

```
[Out] 1/144*sqrt(3)*(13*d + 2*f - 32*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/144*sqr
t(3)*(13*d + 2*f + 32*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/32*(9*d - 4*f)*l
og(x^2 + x + 1) - 1/32*(9*d - 4*f)*log(x^2 - x + 1) - 1/24*(7*d*x^7 - 7*f*x
^7 - 8*x^6*e + 5*d*x^5 - 10*f*x^5 - 12*x^4*e + 7*d*x^3 - 14*f*x^3 - 16*x^2*
e - 4*d*x - 5*f*x - 6*e)/(x^4 + x^2 + 1)^2
```

maple [A] time = 0.02, size = 264, normalized size = 1.18

$$\frac{13\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144}+\frac{13\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144}-\frac{9d\ln\left(x^{2}-x+1\right)}{32}+\frac{9d\ln\left(x^{2}+x+1\right)}{32}-\frac{2\sqrt{3}\,e\arctan\left(\frac{(2x\cdots}{\cdots}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)/(x^4+x^2+1)^3,x)
```

```
[Out] 1/16*((-7/3*d+7/3*f-4/3*e)*x^3+(-6*d+4*f)*x^2+(-20/3*d+13/3*f+1/3*e)*x-4*d+
4/3*f+2*e)/(x^2+x+1)^2+9/32*d*ln(x^2+x+1)-1/8*f*ln(x^2+x+1)+13/144*3^(1/2)*
d*arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))+1/7
2*3^(1/2)*f*arctan(1/3*(2*x+1)*3^(1/2))-1/16*((7/3*d-7/3*f-4/3*e)*x^3+(-6*d
+4*f)*x^2+(20/3*d-13/3*f+1/3*e)*x-4*d+4/3*f-2*e)/(x^2-x+1)^2-9/32*d*ln(x^2-
x+1)+1/8*f*ln(x^2-x+1)+13/144*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(
1/2)*e*arctan(1/3*(2*x-1)*3^(1/2))+1/72*3^(1/2)*f*arctan(1/3*(2*x-1)*3^(1/2
))
```

maxima [A] time = 2.57, size = 173, normalized size = 0.78

$$\frac{1}{144}\sqrt{3}\left(13\,d-32\,e+2\,f\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2\,x+1\right)\right)+\frac{1}{144}\sqrt{3}\left(13\,d+32\,e+2\,f\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2\,x-1\right)\right)+\frac{1}{32}\left(9\,d\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="maxima")
```

```
[Out] 1/144*sqrt(3)*(13*d - 32*e + 2*f)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/144*sqr
t(3)*(13*d + 32*e + 2*f)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/32*(9*d - 4*f)*l
og(x^2 + x + 1) - 1/32*(9*d - 4*f)*log(x^2 - x + 1) - 1/24*(7*(d - f)*x^7 -
 8*e*x^6 + 5*(d - 2*f)*x^5 - 12*e*x^4 + 7*(d - 2*f)*x^3 - 16*e*x^2 - (4*d +
 5*f)*x - 6*e)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)
```

mupad [B] time = 1.01, size = 249, normalized size = 1.12

$$\frac{\left(\frac{7\,f}{24}-\frac{7\,d}{24}\right)\,x^7+\frac{e\,x^6}{3}+\left(\frac{5\,f}{12}-\frac{5\,d}{24}\right)\,x^5+\frac{e\,x^4}{2}+\left(\frac{7\,f}{12}-\frac{7\,d}{24}\right)\,x^3+\frac{2\,e\,x^2}{3}+\left(\frac{d}{6}+\frac{5\,f}{24}\right)\,x+\frac{e}{4}}{x^8+2\,x^6+3\,x^4+2\,x^2+1}-\ln\left(x-\frac{1}{2}-\frac{\sqrt{3}\,1{}\mathrm{i}}{2}\right)\,\left(\frac{9\,d}{32}-\frac{f}{8}\cdots\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2)/(x^2 + x^4 + 1)^3,x)
```

```
[Out] (e/4 - x^5*((5*d)/24 - (5*f)/12) - x^3*((7*d)/24 - (7*f)/12) - x^7*((7*d)/2
4 - (7*f)/24) + (2*e*x^2)/3 + (e*x^4)/2 + (e*x^6)/3 + x*(d/6 + (5*f)/24))/(
2*x^2 + 3*x^4 + 2*x^6 + x^8 + 1) - log(x - (3^(1/2)*1i)/2 - 1/2)*((9*d)/32
- f/8 + (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144) - log(
x - (3^(1/2)*1i)/2 + 1/2)*(f/8 - (9*d)/32 + (3^(1/2)*d*13i)/288 - (3^(1/2)*
e*1i)/9 + (3^(1/2)*f*1i)/144) + log(x + (3^(1/2)*1i)/2 - 1/2)*(f/8 - (9*d)/
32 + (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144) + log(x +
 (3^(1/2)*1i)/2 + 1/2)*((9*d)/32 - f/8 + (3^(1/2)*d*13i)/288 - (3^(1/2)*e*1
i)/9 + (3^(1/2)*f*1i)/144)
```

sympy [C] time = 117.11, size = 4496, normalized size = 20.16

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(x**4+x**2+1)**3,x)
```

```
[Out] (-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)*log(x + (-1025428432*d*
*5*e - 334752912*d**5*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) +
 2008961360*d**4*e*f + 1151575920*d**4*f*(-9*d/32 + f/8 - sqrt(3)*I*(13*d +
 32*e + 2*f)/288) - 431308800*d**3*e**3 - 3143688192*d**3*e**2*(-9*d/32 + f
/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 1598857120*d**3*e*f**2 + 99170058
24*d**3*e*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**2 - 94430016
0*d**3*f**2*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) + 118782443
52*d**3*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**3 + 233164800*
d**2*e**3*f + 4409634816*d**2*e**2*f*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*
e + 2*f)/288) + 662937520*d**2*e*f**3 - 13004623872*d**2*e*f*(-9*d/32 + f/8
 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**2 + 231796080*d**2*f**3*(-9*d/32 + f
/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 10089639936*d**2*f*(-9*d/32 + f/8
 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**3 + 142606336*d*e**5 + 754974720*d*e
**4*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 1843200*d*e**3*f*
*2 + 3850371072*d*e**3*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)*
*2 - 1926291456*d*e**2*f**2*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/
288) + 20384317440*d*e**2*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/28
8)**3 - 146756960*d*e*f**4 + 5813379072*d*e*f**2*(-9*d/32 + f/8 - sqrt(3)*I
*(13*d + 32*e + 2*f)/288)**2 + 12679200*d*f**4*(-9*d/32 + f/8 - sqrt(3)*I*(
13*d + 32*e + 2*f)/288) + 1116758016*d*f**2*(-9*d/32 + f/8 - sqrt(3)*I*(13*
d + 32*e + 2*f)/288)**3 - 79691776*e**5*f - 188743680*e**4*f*(-9*d/32 + f/8
 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 7372800*e**3*f**3 - 2151677952*e**3
*f*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**2 + 287096832*e**2*
f**3*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 5096079360*e**2*
f*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**3 + 14093632*e*f**5
- 859521024*e*f**3*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**2 -
 7648128*f**5*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) + 4538695
68*f**3*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**3)/(217696167*
d**6 - 301346487*d**5*f - 1217128448*d**4*e**2 + 130506255*d**4*f**2 + 2181
281792*d**3*e**2*f - 5619240*d**3*f**3 - 617611264*d**2*e**4 - 1450149888*d
**2*e**2*f**2 - 8036820*d**2*f**4 + 495976448*d*e**4*f + 430088192*d*e**2*f
**3 + 783648*d*f**5 - 114294784*e**4*f**2 - 47771648*e**2*f**4 + 188352*f**
6)) + (-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288)*log(x + (-1025428
432*d**5*e - 334752912*d**5*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/
288) + 2008961360*d**4*e*f + 1151575920*d**4*f*(-9*d/32 + f/8 + sqrt(3)*I*(
13*d + 32*e + 2*f)/288) - 431308800*d**3*e**3 - 3143688192*d**3*e**2*(-9*d/
32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 1598857120*d**3*e*f**2 + 99
17005824*d**3*e*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288)**2 - 94
4300160*d**3*f**2*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288) + 118
78244352*d**3*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288)**3 + 2331
64800*d**2*e**3*f + 4409634816*d**2*e**2*f*(-9*d/32 + f/8 + sqrt(3)*I*(13*d
```

```
 + 32*e + 2*f)/288) + 662937520*d**2*e*f**3 - 13004623872*d**2*e*f*(-9*d/32
 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288)**2 + 231796080*d**2*f**3*(-9*d/
32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 10089639936*d**2*f*(-9*d/32
 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288)**3 + 142606336*d*e**5 + 7549747
20*d*e**4*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 1843200*d*e
**3*f**2 + 3850371072*d*e**3*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)
/288)**2 - 1926291456*d*e**2*f**2*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e +
 2*f)/288) + 20384317440*d*e**2*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2
*f)/288)**3 - 146756960*d*e*f**4 + 5813379072*d*e*f**2*(-9*d/32 + f/8 + sqr
t(3)*I*(13*d + 32*e + 2*f)/288)**2 + 12679200*d*f**4*(-9*d/32 + f/8 + sqrt(
3)*I*(13*d + 32*e + 2*f)/288) + 1116758016*d*f**2*(-9*d/32 + f/8 + sqrt(3)*
I*(13*d + 32*e + 2*f)/288)**3 - 79691776*e**5*f - 188743680*e**4*f*(-9*d/32
 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 7372800*e**3*f**3 - 215167795
2*e**3*f*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288)**2 + 287096832
*e**2*f**3*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 5096079360
*e**2*f*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288)**3 + 14093632*e
*f**5 - 859521024*e*f**3*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288
)**2 - 7648128*f**5*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288) + 4
53869568*f**3*(-9*d/32 + f/8 + sqrt(3)*I*(13*d + 32*e + 2*f)/288)**3)/(2176
96167*d**6 - 301346487*d**5*f - 1217128448*d**4*e**2 + 130506255*d**4*f**2
 + 2181281792*d**3*e**2*f - 5619240*d**3*f**3 - 617611264*d**2*e**4 - 145014
9888*d**2*e**2*f**2 - 8036820*d**2*f**4 + 495976448*d*e**4*f + 430088192*d*
e**2*f**3 + 783648*d*f**5 - 114294784*e**4*f**2 - 47771648*e**2*f**4 + 1883
52*f**6)) + (9*d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288)*log(x + (-10
25428432*d**5*e - 334752912*d**5*(9*d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2
*f)/288) + 2008961360*d**4*e*f + 1151575920*d**4*f*(9*d/32 - f/8 - sqrt(3)*
I*(13*d - 32*e + 2*f)/288) - 431308800*d**3*e**3 - 3143688192*d**3*e**2*(9*
d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288) - 1598857120*d**3*e*f**2 +
9917005824*d**3*e*(9*d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288)**2 - 9
44300160*d**3*f**2*(9*d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288) + 118
78244352*d**3*(9*d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288)**3 + 23316
4800*d**2*e**3*f + 4409634816*d**2*e**2*f*(9*d/32 - f/8 - sqrt(3)*I*(13*d -
 32*e + 2*f)/288) + 662937520*d**2*e*f**3 - 13004623872*d**2*e*f*(9*d/32 -
f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288)**2 + 231796080*d**2*f**3*(9*d/32 -
 f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288) - 10089639936*d**2*f*(9*d/32 - f/
8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288)**3 + 142606336*d*e**5 + 754974720*d*
e**4*(9*d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288) - 1843200*d*e**3*f*
*2 + 3850371072*d*e**3*(9*d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288)**
2 - 1926291456*d*e**2*f**2*(9*d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/28
8) + 20384317440*d*e**2*(9*d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288)*
*3 - 146756960*d*e*f**4 + 5813379072*d*e*f**2*(9*d/32 - f/8 - sqrt(3)*I*(13
*d - 32*e + 2*f)/288)**2 + 12679200*d*f**4*(9*d/32 - f/8 - sqrt(3)*I*(13*d
- 32*e + 2*f)/288) + 1116758016*d*f**2*(9*d/32 - f/8 - sqrt(3)*I*(13*d - 32
*e + 2*f)/288)**3 - 79691776*e**5*f - 188743680*e**4*f*(9*d/32 - f/8 - sqrt
(3)*I*(13*d - 32*e + 2*f)/288) - 7372800*e**3*f**3 - 2151677952*e**3*f*(9*d
/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288)**2 + 287096832*e**2*f**3*(9*
d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288) - 5096079360*e**2*f*(9*d/32
 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288)**3 + 14093632*e*f**5 - 85952102
4*e*f**3*(9*d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288)**2 - 7648128*f*
*5*(9*d/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288) + 453869568*f**3*(9*d
/32 - f/8 - sqrt(3)*I*(13*d - 32*e + 2*f)/288)**3)/(217696167*d**6 - 301346
487*d**5*f - 1217128448*d**4*e**2 + 130506255*d**4*f**2 + 2181281792*d**3*e
**2*f - 5619240*d**3*f**3 - 617611264*d**2*e**4 - 1450149888*d**2*e**2*f**2
 - 8036820*d**2*f**4 + 495976448*d*e**4*f + 430088192*d*e**2*f**3 + 783648*
d*f**5 - 114294784*e**4*f**2 - 47771648*e**2*f**4 + 188352*f**6)) + (9*d/32
 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/288)*log(x + (-1025428432*d**5*e - 3
34752912*d**5*(9*d/32 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/288) + 20089613
60*d**4*e*f + 1151575920*d**4*f*(9*d/32 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*
f)/288) - 431308800*d**3*e**3 - 3143688192*d**3*e**2*(9*d/32 - f/8 + sqrt(3
```

```
)*I*(13*d - 32*e + 2*f)/288) - 1598857120*d**3*e*f**2 + 9917005824*d**3*e*(
9*d/32 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/288)**2 - 944300160*d**3*f**2*
(9*d/32 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/288) + 11878244352*d**3*(9*d/
32 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/288)**3 + 233164800*d**2*e**3*f +
4409634816*d**2*e**2*f*(9*d/32 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/288) +
 662937520*d**2*e*f**3 - 13004623872*d**2*e*f*(9*d/32 - f/8 + sqrt(3)*I*(13
*d - 32*e + 2*f)/288)**2 + 231796080*d**2*f**3*(9*d/32 - f/8 + sqrt(3)*I*(1
3*d - 32*e + 2*f)/288) - 10089639936*d**2*f*(9*d/32 - f/8 + sqrt(3)*I*(13*d
 - 32*e + 2*f)/288)**3 + 142606336*d*e**5 + 754974720*d*e**4*(9*d/32 - f/8
+ sqrt(3)*I*(13*d - 32*e + 2*f)/288) - 1843200*d*e**3*f**2 + 3850371072*d*e
**3*(9*d/32 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/288)**2 - 1926291456*d*e*
*2*f**2*(9*d/32 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/288) + 20384317440*d*
e**2*(9*d/32 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/288)**3 - 146756960*d*e*
f**4 + 5813379072*d*e*f**2*(9*d/32 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/28
8)**2 + 12679200*d*f**4*(9*d/32 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/288)
+ 1116758016*d*f**2*(9*d/32 - f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/288)**3 -
 79691776*e**5*f - 188743680*e**4*f*(9*d/32 - f/8 + sqrt(3)*I*(13*d - 32*e
+ 2*f)/288) - 7372800*e**3*f**3 - 2151677952*e**3*f*(9*d/32 - f/8 + sqrt(3)
*I*(13*d - 32*e + 2*f)/288)**2 + 287096832*e**2*f**3*(9*d/32 - f/8 + sqrt(3
)*I*(13*d - 32*e + 2*f)/288) - 5096079360*e**2*f*(9*d/32 - f/8 + sqrt(3)*I*
(13*d - 32*e + 2*f)/288)**3 + 14093632*e*f**5 - 859521024*e*f**3*(9*d/32 -
f/8 + sqrt(3)*I*(13*d - 32*e + 2*f)/288)**2 - 7648128*f**5*(9*d/32 - f/8 +
sqrt(3)*I*(13*d - 32*e + 2*f)/288) + 453869568*f**3*(9*d/32 - f/8 + sqrt(3)
*I*(13*d - 32*e + 2*f)/288)**3)/(217696167*d**6 - 301346487*d**5*f - 121712
8448*d**4*e**2 + 130506255*d**4*f**2 + 2181281792*d**3*e**2*f - 5619240*d**
3*f**3 - 617611264*d**2*e**4 - 1450149888*d**2*e**2*f**2 - 8036820*d**2*f**
4 + 495976448*d*e**4*f + 430088192*d*e**2*f**3 + 783648*d*f**5 - 114294784*
e**4*f**2 - 47771648*e**2*f**4 + 188352*f**6)) + (8*e*x**6 + 12*e*x**4 + 16
*e*x**2 + 6*e + x**7*(-7*d + 7*f) + x**5*(-5*d + 10*f) + x**3*(-7*d + 14*f)
 + x*(4*d + 5*f))/(24*x**8 + 48*x**6 + 72*x**4 + 48*x**2 + 24)
```

3.49 $\int \frac{d+ex+fx^2+gx^3}{(1+x^2+x^4)^3}\,dx$

Optimal. Leaf size=243

$$-\frac{1}{32}(9d-4f)\log\left(x^2-x+1\right)+\frac{1}{32}(9d-4f)\log\left(x^2+x+1\right)+\frac{x\left(-7x^2(d-f)+2d+3f\right)}{24\left(x^4+x^2+1\right)}+\frac{x\left(-\left(x^2(d-2f)\right)+d+\right.}{12\left(x^4+x^2+1\right)^2}$$

```
[Out] 1/12*x*(d+f-(d-2*f)*x^2)/(x^4+x^2+1)^2+1/12*(e-2*g+(2*e-g)*x^2)/(x^4+x^2+1)
^2+1/12*(2*e-g)*(2*x^2+1)/(x^4+x^2+1)+1/24*x*(2*d+3*f-7*(d-f)*x^2)/(x^4+x^2
+1)-1/32*(9*d-4*f)*ln(x^2-x+1)+1/32*(9*d-4*f)*ln(x^2+x+1)-1/144*(13*d+2*f)*
arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/144*(13*d+2*f)*arctan(1/3*(1+2*x)*3^(
1/2))*3^(1/2)+1/9*(2*e-g)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)
```

Rubi [A] time = 0.23, antiderivative size = 243, normalized size of antiderivative = 1.00, number of steps used = 17, number of rules used = 10, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.385, Rules used = {1673, 1178, 1169, 634, 618, 204, 628, 1247, 638, 614}

$$\frac{x\left(-7x^2(d-f)+2d+3f\right)}{24\left(x^4+x^2+1\right)}+\frac{x\left(x^2(-(d-2f))+d+f\right)}{12\left(x^4+x^2+1\right)^2}-\frac{1}{32}(9d-4f)\log\left(x^2-x+1\right)+\frac{1}{32}(9d-4f)\log\left(x^2+x+1\right)$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^3,x]
```

```
[Out] (x*(d + f - (d - 2*f)*x^2))/(12*(1 + x^2 + x^4)^2) + (e - 2*g + (2*e - g)*x
^2)/(12*(1 + x^2 + x^4)^2) + ((2*e - g)*(1 + 2*x^2))/(12*(1 + x^2 + x^4)) +
 (x*(2*d + 3*f - 7*(d - f)*x^2))/(24*(1 + x^2 + x^4)) - ((13*d + 2*f)*ArcTa
n[(1 - 2*x)/Sqrt[3]])/(48*Sqrt[3]) + ((13*d + 2*f)*ArcTan[(1 + 2*x)/Sqrt[3]
])/(48*Sqrt[3]) + ((2*e - g)*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((9
*d - 4*f)*Log[1 - x + x^2])/32 + ((9*d - 4*f)*Log[1 + x + x^2])/32
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3}{\left(1+x^2+x^4\right)^3}\,dx = \int \frac{d+fx^2}{\left(1+x^2+x^4\right)^3}\,dx + \int \frac{x\left(e+gx^2\right)}{\left(1+x^2+x^4\right)^3}\,dx$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{1}{12}\int \frac{11d-f-5(d-2f)x^2}{\left(1+x^2+x^4\right)^2}\,dx + \frac{1}{2}\,\text{Subst}\left(\int \frac{e+gx}{\left(1+x+x^2\right)\right.$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e-2g+(2e-g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(2d+3f-7(d-f)x^2\right)}{24\left(1+x^2+x^4\right)} + \frac{1}{72}\int 15$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e-2g+(2e-g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{(2e-g)\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)} + \frac{x\left(2d+3f-7(\right.}{24\left(1+x^2+\right.}$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e-2g+(2e-g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{(2e-g)\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)} + \frac{x\left(2d+3f-7(\right.}{24\left(1+x^2+\right.}$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e-2g+(2e-g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{(2e-g)\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)} + \frac{x\left(2d+3f-7(\right.}{24\left(1+x^2+\right.}$$

$$= \frac{x\left(d+f-(d-2f)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{e-2g+(2e-g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{(2e-g)\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)} + \frac{x\left(2d+3f-7(\right.}{24\left(1+x^2+\right.}$$

Mathematica [C] time = 0.66, size = 259, normalized size = 1.07

$$\frac{1}{144}\left(\frac{12\left(x\left(-dx^2+d+2fx^2+f\right)+2ex^2+e-g\left(x^2+2\right)\right)}{\left(x^4+x^2+1\right)^2} + \frac{6\left(-7dx^3+2dx+e\left(8x^2+4\right)+7fx^3+3fx-2g\left(2\right.\right.}{x^4+x^2+1}\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^3,x]
```

```
[Out] ((6*(2*d*x + 3*f*x - 7*d*x^3 + 7*f*x^3 - 2*g*(1 + 2*x^2) + e*(4 + 8*x^2)))/
(1 + x^2 + x^4) + (12*(e + 2*e*x^2 - g*(2 + x^2) + x*(d + f - d*x^2 + 2*f*x
^2)))/(1 + x^2 + x^4)^2 - (((-47*I + 7*Sqrt[3])*d + (17*I - 7*Sqrt[3])*f)*A
rcTan[((-I + Sqrt[3])*x)/2])/Sqrt[(1 + I*Sqrt[3])/6] - (((47*I + 7*Sqrt[3])
*d - (17*I + 7*Sqrt[3])*f)*ArcTan[((I + Sqrt[3])*x)/2])/Sqrt[(1 - I*Sqrt[3]
)/6] - 16*Sqrt[3]*(2*e - g)*ArcTan[Sqrt[3]/(1 + 2*x^2)])/144
```

fricas [A] time = 2.17, size = 435, normalized size = 1.79

$$-\frac{84\left(d-f\right)x^7-48\left(2\,e-g\right)x^6+60\left(d-2\,f\right)x^5-72\left(2\,e-g\right)x^4+84\left(d-2\,f\right)x^3-96\left(2\,e-g\right)x^2-2\,\sqrt{3}\left(\left(13\,d-\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="fricas")
```

```
[Out] -1/288*(84*(d - f)*x^7 - 48*(2*e - g)*x^6 + 60*(d - 2*f)*x^5 - 72*(2*e - g)
*x^4 + 84*(d - 2*f)*x^3 - 96*(2*e - g)*x^2 - 2*sqrt(3)*((13*d - 32*e + 2*f
+ 16*g)*x^8 + 2*(13*d - 32*e + 2*f + 16*g)*x^6 + 3*(13*d - 32*e + 2*f + 16*
g)*x^4 + 2*(13*d - 32*e + 2*f + 16*g)*x^2 + 13*d - 32*e + 2*f + 16*g)*arcta
n(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(3)*((13*d + 32*e + 2*f - 16*g)*x^8 + 2*(1
3*d + 32*e + 2*f - 16*g)*x^6 + 3*(13*d + 32*e + 2*f - 16*g)*x^4 + 2*(13*d +
```

```
32*e + 2*f - 16*g)*x^2 + 13*d + 32*e + 2*f - 16*g)*arctan(1/3*sqrt(3)*(2*x
 - 1)) - 12*(4*d + 5*f)*x - 9*((9*d - 4*f)*x^8 + 2*(9*d - 4*f)*x^6 + 3*(9*d
 - 4*f)*x^4 + 2*(9*d - 4*f)*x^2 + 9*d - 4*f)*log(x^2 + x + 1) + 9*((9*d - 4
*f)*x^8 + 2*(9*d - 4*f)*x^6 + 3*(9*d - 4*f)*x^4 + 2*(9*d - 4*f)*x^2 + 9*d -
 4*f)*log(x^2 - x + 1) - 72*e + 72*g)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)
```

giac [A] time = 0.38, size = 198, normalized size = 0.81

$$\frac{1}{144}\sqrt{3}\left(13\,d+2\,f+16\,g-32\,e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2\,x+1\right)\right)+\frac{1}{144}\sqrt{3}\left(13\,d+2\,f-16\,g+32\,e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2\,x\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="giac")
```

```
[Out] 1/144*sqrt(3)*(13*d + 2*f + 16*g - 32*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/
144*sqrt(3)*(13*d + 2*f - 16*g + 32*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/32
*(9*d - 4*f)*log(x^2 + x + 1) - 1/32*(9*d - 4*f)*log(x^2 - x + 1) - 1/24*(7
*d*x^7 - 7*f*x^7 + 4*g*x^6 - 8*x^6*e + 5*d*x^5 - 10*f*x^5 + 6*g*x^4 - 12*x^
4*e + 7*d*x^3 - 14*f*x^3 + 8*g*x^2 - 16*x^2*e - 4*d*x - 5*f*x + 6*g - 6*e)/
(x^4 + x^2 + 1)^2
```

maple [A] time = 0.02, size = 322, normalized size = 1.33

$$\frac{13\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144}+\frac{13\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144}-\frac{9d\ln\left(x^2-x+1\right)}{32}+\frac{9d\ln\left(x^2+x+1\right)}{32}-\frac{2\sqrt{3}\,e\arctan\left(\right.}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x)
```

```
[Out] 1/16*((-7/3*d+7/3*f-4/3*e-1/3*g)*x^3+(-6*d+4*f-2*g)*x^2+(-20/3*d+13/3*f+1/3
*e-8/3*g)*x-4*d+4/3*f+2*e-2*g)/(x^2+x+1)^2+9/32*d*ln(x^2+x+1)-1/8*f*ln(x^2+
x+1)+13/144*3^(1/2)*d*arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*arctan(1/3*
(2*x+1)*3^(1/2))+1/72*3^(1/2)*f*arctan(1/3*(2*x+1)*3^(1/2))+1/9*3^(1/2)*g*a
rctan(1/3*(2*x+1)*3^(1/2))-1/16*((7/3*d-7/3*f-4/3*e-1/3*g)*x^3+(-6*d+4*f+2*
g)*x^2+(20/3*d-13/3*f+1/3*e-8/3*g)*x-4*d+4/3*f-2*e+2*g)/(x^2-x+1)^2-9/32*d*
ln(x^2-x+1)+1/8*f*ln(x^2-x+1)+13/144*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+
2/9*3^(1/2)*e*arctan(1/3*(2*x-1)*3^(1/2))+1/72*3^(1/2)*f*arctan(1/3*(2*x-1)
*3^(1/2))-1/9*3^(1/2)*g*arctan(1/3*(2*x-1)*3^(1/2))
```

maxima [A] time = 2.61, size = 200, normalized size = 0.82

$$\frac{1}{144}\sqrt{3}\left(13\,d-32\,e+2\,f+16\,g\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2\,x+1\right)\right)+\frac{1}{144}\sqrt{3}\left(13\,d+32\,e+2\,f-16\,g\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2\,x\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="maxima")
```

```
[Out] 1/144*sqrt(3)*(13*d - 32*e + 2*f + 16*g)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/
144*sqrt(3)*(13*d + 32*e + 2*f - 16*g)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/32
*(9*d - 4*f)*log(x^2 + x + 1) - 1/32*(9*d - 4*f)*log(x^2 - x + 1) - 1/24*(7
*(d - f)*x^7 - 4*(2*e - g)*x^6 + 5*(d - 2*f)*x^5 - 6*(2*e - g)*x^4 + 7*(d -
 2*f)*x^3 - 8*(2*e - g)*x^2 - (4*d + 5*f)*x - 6*e + 6*g)/(x^8 + 2*x^6 + 3*x
^4 + 2*x^2 + 1)
```

mupad [B] time = 1.17, size = 295, normalized size = 1.21

$$\frac{\left(\frac{7\,f}{24}-\frac{7\,d}{24}\right)\,x^7+\left(\frac{e}{3}-\frac{g}{6}\right)\,x^6+\left(\frac{5\,f}{12}-\frac{5\,d}{24}\right)\,x^5+\left(\frac{e}{2}-\frac{g}{4}\right)\,x^4+\left(\frac{7\,f}{12}-\frac{7\,d}{24}\right)\,x^3+\left(\frac{2\,e}{3}-\frac{g}{3}\right)\,x^2+\left(\frac{d}{6}+\frac{5\,f}{24}\right)\,x+\frac{e}{4}-\frac{g}{4}}{x^8+2\,x^6+3\,x^4+2\,x^2+1}-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3)/(x^2 + x^4 + 1)^3,x)
```

```
[Out] (e/4 - g/4 - x^5*((5*d)/24 - (5*f)/12) - x^3*((7*d)/24 - (7*f)/12) - x^7*((
7*d)/24 - (7*f)/24) + x^2*((2*e)/3 - g/3) + x^4*(e/2 - g/4) + x^6*(e/3 - g/
6) + x*(d/6 + (5*f)/24))/(2*x^2 + 3*x^4 + 2*x^6 + x^8 + 1) - log(x - (3^(1/
2)*1i)/2 - 1/2)*((9*d)/32 - f/8 + (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9 +
(3^(1/2)*f*1i)/144 - (3^(1/2)*g*1i)/18) - log(x - (3^(1/2)*1i)/2 + 1/2)*(f/
8 - (9*d)/32 + (3^(1/2)*d*13i)/288 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144
+ (3^(1/2)*g*1i)/18) + log(x + (3^(1/2)*1i)/2 - 1/2)*(f/8 - (9*d)/32 + (3^(
1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144 - (3^(1/2)*g*1i)/18
) + log(x + (3^(1/2)*1i)/2 + 1/2)*((9*d)/32 - f/8 + (3^(1/2)*d*13i)/288 - (
3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144 + (3^(1/2)*g*1i)/18)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(x**4+x**2+1)**3,x)
```

```
[Out] Timed out
```

3.50 $\int \frac{d+ex+fx^2+gx^3+hx^4}{\left(1+x^2+x^4\right)^3} \, dx$

Optimal. Leaf size=263

$$-\frac{1}{32}\log\left(x^2-x+1\right)(9d-4f+3h)+\frac{1}{32}\log\left(x^2+x+1\right)(9d-4f+3h)+\frac{x\left(-\left(x^2(7d-7f+4h)\right)+2d+3f-h\right)}{24\left(x^4+x^2+1\right)}$$

```
[Out] 1/12*(e-2*g+(2*e-g)*x^2)/(x^4+x^2+1)^2+1/12*x*(d+f-2*h-(d-2*f+h)*x^2)/(x^4+
x^2+1)^2+1/12*(2*e-g)*(2*x^2+1)/(x^4+x^2+1)+1/24*x*(2*d+3*f-h-(7*d-7*f+4*h)
*x^2)/(x^4+x^2+1)-1/32*(9*d-4*f+3*h)*ln(x^2-x+1)+1/32*(9*d-4*f+3*h)*ln(x^2+
x+1)-1/144*(13*d+2*f+h)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/144*(13*d+2*f
+h)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/9*(2*e-g)*arctan(1/3*(2*x^2+1)*3^
(1/2))*3^(1/2)
```

Rubi [A] time = 0.26, antiderivative size = 263, normalized size of antiderivative = 1.00, number of steps used = 17, number of rules used = 11, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.355, Rules used = {1673, 1678, 1178, 1169, 634, 618, 204, 628, 1247, 638, 614}

$$\frac{x\left(x^2(-(7d-7f+4h))+2d+3f-h\right)}{24\left(x^4+x^2+1\right)}+\frac{x\left(x^2(-(d-2f+h))+d+f-2h\right)}{12\left(x^4+x^2+1\right)^2}-\frac{1}{32}\log\left(x^2-x+1\right)(9d-4f+3h)$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^3,x]
```

```
[Out] (e - 2*g + (2*e - g)*x^2)/(12*(1 + x^2 + x^4)^2) + (x*(d + f - 2*h - (d - 2
*f + h)*x^2))/(12*(1 + x^2 + x^4)^2) + ((2*e - g)*(1 + 2*x^2))/(12*(1 + x^2
 + x^4)) + (x*(2*d + 3*f - h - (7*d - 7*f + 4*h)*x^2))/(24*(1 + x^2 + x^4))
 - ((13*d + 2*f + h)*ArcTan[(1 - 2*x)/Sqrt[3]])/(48*Sqrt[3]) + ((13*d + 2*f
 + h)*ArcTan[(1 + 2*x)/Sqrt[3]])/(48*Sqrt[3]) + ((2*e - g)*ArcTan[(1 + 2*x^
2)/Sqrt[3]])/(3*Sqrt[3]) - ((9*d - 4*f + 3*h)*Log[1 - x + x^2])/32 + ((9*d
- 4*f + 3*h)*Log[1 + x + x^2])/32
```

Rule 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
```

```
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4}{\left(1+x^2+x^4\right)^3}\,dx = \int \frac{x\left(e+gx^2\right)}{\left(1+x^2+x^4\right)^3}\,dx + \int \frac{d+fx^2+hx^4}{\left(1+x^2+x^4\right)^3}\,dx$$

$$= \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{1}{12}\int \frac{11d-f+2h-5(d-2f+h)x^2}{\left(1+x^2+x^4\right)^2}\,dx$$

$$= \frac{e-2g+(2e-g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(2d+3f-h-(\right.}{24\left(1+x\right.}$$

$$= \frac{e-2g+(2e-g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{(2e-g)\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)}$$

$$= \frac{e-2g+(2e-g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{(2e-g)\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)}$$

$$= \frac{e-2g+(2e-g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{(2e-g)\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)}$$

$$= \frac{e-2g+(2e-g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{(2e-g)\left(1+2x^2\right)}{12\left(1+x^2+x^4\right)}$$

Mathematica [C] time = 0.90, size = 303, normalized size = 1.15

$$\frac{1}{144}\left(-\frac{6\left(x\left(7dx^2-2d-7fx^2-3f+4hx^2+h\right)-4e\left(2x^2+1\right)+g\left(4x^2+2\right)\right)}{x^4+x^2+1} + \frac{12\left(x\left(-dx^2+d+2fx^2+f-\right.\right.}{\left(x^4\right.}\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^3,x]
```

```
[Out] ((-6*(-4*e*(1 + 2*x^2) + g*(2 + 4*x^2) + x*(-2*d - 3*f + h + 7*d*x^2 - 7*f*
x^2 + 4*h*x^2)))/(1 + x^2 + x^4) + (12*(e + 2*e*x^2 - g*(2 + x^2) + x*(d +
f - d*x^2 + 2*f*x^2 - h*(2 + x^2))))/(1 + x^2 + x^4)^2 - (((-47*I + 7*Sqrt[
3])*d + (17*I - 7*Sqrt[3])*f + 2*(-7*I + 2*Sqrt[3])*h)*ArcTan[((-I + Sqrt[3
])*x)/2])/Sqrt[(1 + I*Sqrt[3])/6] - (((47*I + 7*Sqrt[3])*d - (17*I + 7*Sqrt
[3])*f + 2*(7*I + 2*Sqrt[3])*h)*ArcTan[((I + Sqrt[3])*x)/2])/Sqrt[(1 - I*Sq
rt[3])/6] - 16*Sqrt[3]*(2*e - g)*ArcTan[Sqrt[3]/(1 + 2*x^2)])/144
```

fricas [B] time = 5.21, size = 485, normalized size = 1.84

$$-\frac{12\left(7d-7f+4h\right)x^7-48\left(2e-g\right)x^6+60\left(d-2f+h\right)x^5-72\left(2e-g\right)x^4+84\left(d-2f+h\right)x^3-96\left(2e-\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="fricas")
```

```
[Out] -1/288*(12*(7*d - 7*f + 4*h)*x^7 - 48*(2*e - g)*x^6 + 60*(d - 2*f + h)*x^5
- 72*(2*e - g)*x^4 + 84*(d - 2*f + h)*x^3 - 96*(2*e - g)*x^2 - 2*sqrt(3)*((
13*d - 32*e + 2*f + 16*g + h)*x^8 + 2*(13*d - 32*e + 2*f + 16*g + h)*x^6 +
3*(13*d - 32*e + 2*f + 16*g + h)*x^4 + 2*(13*d - 32*e + 2*f + 16*g + h)*x^2
 + 13*d - 32*e + 2*f + 16*g + h)*arctan(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(3)*
((13*d + 32*e + 2*f - 16*g + h)*x^8 + 2*(13*d + 32*e + 2*f - 16*g + h)*x^6
+ 3*(13*d + 32*e + 2*f - 16*g + h)*x^4 + 2*(13*d + 32*e + 2*f - 16*g + h)*x
^2 + 13*d + 32*e + 2*f - 16*g + h)*arctan(1/3*sqrt(3)*(2*x - 1)) - 12*(4*d
+ 5*f - 5*h)*x - 9*((9*d - 4*f + 3*h)*x^8 + 2*(9*d - 4*f + 3*h)*x^6 + 3*(9*
d - 4*f + 3*h)*x^4 + 2*(9*d - 4*f + 3*h)*x^2 + 9*d - 4*f + 3*h)*log(x^2 + x
 + 1) + 9*((9*d - 4*f + 3*h)*x^8 + 2*(9*d - 4*f + 3*h)*x^6 + 3*(9*d - 4*f +
 3*h)*x^4 + 2*(9*d - 4*f + 3*h)*x^2 + 9*d - 4*f + 3*h)*log(x^2 - x + 1) - 7
2*e + 72*g)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)
```

giac [A] time = 0.39, size = 228, normalized size = 0.87

$$\frac{1}{144}\sqrt{3}\left(13\,d+2\,f+16\,g+h-32\,e\right)\arctan\left(\frac{1}{3}\sqrt{3}\,(2\,x+1)\right)+\frac{1}{144}\sqrt{3}\left(13\,d+2\,f-16\,g+h+32\,e\right)\arctan\left(\frac{1}{3}\sqrt{\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="giac")
```

```
[Out] 1/144*sqrt(3)*(13*d + 2*f + 16*g + h - 32*e)*arctan(1/3*sqrt(3)*(2*x + 1))
+ 1/144*sqrt(3)*(13*d + 2*f - 16*g + h + 32*e)*arctan(1/3*sqrt(3)*(2*x - 1)
) + 1/32*(9*d - 4*f + 3*h)*log(x^2 + x + 1) - 1/32*(9*d - 4*f + 3*h)*log(x^
2 - x + 1) - 1/24*(7*d*x^7 - 7*f*x^7 + 4*h*x^7 + 4*g*x^6 - 8*x^6*e + 5*d*x^
5 - 10*f*x^5 + 5*h*x^5 + 6*g*x^4 - 12*x^4*e + 7*d*x^3 - 14*f*x^3 + 7*h*x^3
+ 8*g*x^2 - 16*x^2*e - 4*d*x - 5*f*x + 5*h*x + 6*g - 6*e)/(x^4 + x^2 + 1)^2
```

maple [A] time = 0.02, size = 396, normalized size = 1.51

$$\frac{13\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144}+\frac{13\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144}-\frac{9d\ln\left(x^2-x+1\right)}{32}+\frac{9d\ln\left(x^2+x+1\right)}{32}-\frac{2\sqrt{3}\,e\arctan\left(\frac{(2x}{\right.}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x)
```

```
[Out] 1/16*((-7/3*d+7/3*f-4/3*h-4/3*e-1/3*g)*x^3+(-6*d+4*f-2*h-2*g)*x^2+(-20/3*d+
13/3*f-5/3*h+1/3*e-8/3*g)*x-4*d+4/3*f+2*e-2*g)/(x^2+x+1)^2+9/32*d*ln(x^2+x+
1)-1/8*f*ln(x^2+x+1)+3/32*h*ln(x^2+x+1)+13/144*3^(1/2)*d*arctan(1/3*(2*x+1)
*3^(1/2))-2/9*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))+1/72*3^(1/2)*f*arctan(1
/3*(2*x+1)*3^(1/2))+1/9*3^(1/2)*g*arctan(1/3*(2*x+1)*3^(1/2))+1/144*3^(1/2)
*h*arctan(1/3*(2*x+1)*3^(1/2))-1/16*((7/3*d-7/3*f+4/3*h-4/3*e-1/3*g)*x^3+(-
6*d+4*f-2*h+2*g)*x^2+(20/3*d-13/3*f+5/3*h+1/3*e-8/3*g)*x-4*d+4/3*f-2*e+2*g)
/(x^2-x+1)^2-9/32*d*ln(x^2-x+1)+1/8*f*ln(x^2-x+1)-3/32*h*ln(x^2-x+1)+13/144
*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(1/2)*e*arctan(1/3*(2*x-1)*3^(
1/2))+1/72*3^(1/2)*f*arctan(1/3*(2*x-1)*3^(1/2))-1/9*3^(1/2)*g*arctan(1/3*(
2*x-1)*3^(1/2))+1/144*3^(1/2)*h*arctan(1/3*(2*x-1)*3^(1/2))
```

maxima [A] time = 3.15, size = 217, normalized size = 0.83

$$\frac{1}{144}\sqrt{3}\left(13\,d-32\,e+2\,f+16\,g+h\right)\arctan\left(\frac{1}{3}\sqrt{3}\,(2\,x+1)\right)+\frac{1}{144}\sqrt{3}\left(13\,d+32\,e+2\,f-16\,g+h\right)\arctan\left(\frac{1}{3}\sqrt{\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="maxima")
```

```
[Out] 1/144*sqrt(3)*(13*d - 32*e + 2*f + 16*g + h)*arctan(1/3*sqrt(3)*(2*x + 1))
+ 1/144*sqrt(3)*(13*d + 32*e + 2*f - 16*g + h)*arctan(1/3*sqrt(3)*(2*x - 1)
) + 1/32*(9*d - 4*f + 3*h)*log(x^2 + x + 1) - 1/32*(9*d - 4*f + 3*h)*log(x^
2 - x + 1) - 1/24*((7*d - 7*f + 4*h)*x^7 - 4*(2*e - g)*x^6 + 5*(d - 2*f + h
)*x^5 - 6*(2*e - g)*x^4 + 7*(d - 2*f + h)*x^3 - 8*(2*e - g)*x^2 - (4*d + 5*
f - 5*h)*x - 6*e + 6*g)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)
```

mupad [B] time = 5.45, size = 1611, normalized size = 6.13

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^2 + x^4 + 1)^3,x)
```

```
[Out] (e/4 - g/4 + x^2*((2*e)/3 - g/3) + x^4*(e/2 - g/4) + x^6*(e/3 - g/6) + x*(d
/6 + (5*f)/24 - (5*h)/24) - x^7*((7*d)/24 - (7*f)/24 + h/6) - x^5*((5*d)/24
 - (5*f)/12 + (5*h)/24) - x^3*((7*d)/24 - (7*f)/12 + (7*h)/24))/(2*x^2 + 3*
x^4 + 2*x^6 + x^8 + 1) - log(960*d*g - 2763*d*f - 1920*d*e + 480*e*f + 1971
*d*h - 480*e*h - 240*f*g - 981*f*h + 240*g*h + 3^(1/2)*d^2*1620i + 3^(1/2)*
f^2*180i + 3^(1/2)*h^2*135i - 3807*d^2*x - 612*f^2*x - 378*h^2*x + 2754*d^2
 + 684*f^2 + 351*h^2 + 3^(1/2)*d*e*1088i - 3^(1/2)*d*f*1125i - 3^(1/2)*d*g*
544i - 3^(1/2)*e*f*608i + 3^(1/2)*d*h*945i + 3^(1/2)*e*h*416i + 3^(1/2)*f*g
*304i - 3^(1/2)*f*h*315i - 3^(1/2)*g*h*208i - 672*d*e*x + 3069*d*f*x + 336*
d*g*x + 672*e*f*x - 2403*d*h*x - 384*e*h*x - 336*f*g*x + 963*f*h*x + 192*g*
h*x + 3^(1/2)*d^2*x*567i + 3^(1/2)*f^2*x*252i + 3^(1/2)*h^2*x*108i - 3^(1/2
)*d*f*x*819i + 3^(1/2)*d*g*x*752i + 3^(1/2)*e*f*x*544i + 3^(1/2)*d*h*x*513i
 - 3^(1/2)*e*h*x*448i - 3^(1/2)*f*g*x*272i - 3^(1/2)*f*h*x*333i + 3^(1/2)*g
*h*x*224i - 3^(1/2)*d*e*x*1504i)*((9*d)/32 - f/8 + (3*h)/32 + (3^(1/2)*d*13
i)/288 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144 - (3^(1/2)*g*1i)/18 + (3^(1/
2)*h*1i)/288) - log(1920*d*e - 2763*d*f - 960*d*g - 480*e*f + 1971*d*h + 48
0*e*h + 240*f*g - 981*f*h - 240*g*h - 3^(1/2)*d^2*1620i - 3^(1/2)*f^2*180i
- 3^(1/2)*h^2*135i + 3807*d^2*x + 612*f^2*x + 378*h^2*x + 2754*d^2 + 684*f^
2 + 351*h^2 + 3^(1/2)*d*e*1088i + 3^(1/2)*d*f*1125i - 3^(1/2)*d*g*544i - 3^
(1/2)*e*f*608i - 3^(1/2)*d*h*945i + 3^(1/2)*e*h*416i + 3^(1/2)*f*g*304i + 3
^(1/2)*f*h*315i - 3^(1/2)*g*h*208i - 672*d*e*x - 3069*d*f*x + 336*d*g*x + 6
72*e*f*x + 2403*d*h*x - 384*e*h*x - 336*f*g*x - 963*f*h*x + 192*g*h*x + 3^(
1/2)*d^2*x*567i + 3^(1/2)*f^2*x*252i + 3^(1/2)*h^2*x*108i - 3^(1/2)*d*f*x*8
19i - 3^(1/2)*d*g*x*752i - 3^(1/2)*e*f*x*544i + 3^(1/2)*d*h*x*513i + 3^(1/2
)*e*h*x*448i + 3^(1/2)*f*g*x*272i - 3^(1/2)*f*h*x*333i - 3^(1/2)*g*h*x*224i
 + 3^(1/2)*d*e*x*1504i)*(f/8 - (9*d)/32 - (3*h)/32 + (3^(1/2)*d*13i)/288 -
(3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144 + (3^(1/2)*g*1i)/18 + (3^(1/2)*h*1i)/
288) + log(1920*d*e - 2763*d*f - 960*d*g - 480*e*f + 1971*d*h + 480*e*h + 2
40*f*g - 981*f*h - 240*g*h + 3^(1/2)*d^2*1620i + 3^(1/2)*f^2*180i + 3^(1/2)
*h^2*135i + 3807*d^2*x + 612*f^2*x + 378*h^2*x + 2754*d^2 + 684*f^2 + 351*h
^2 - 3^(1/2)*d*e*1088i - 3^(1/2)*d*f*1125i + 3^(1/2)*d*g*544i + 3^(1/2)*e*f
*608i + 3^(1/2)*d*h*945i - 3^(1/2)*e*h*416i - 3^(1/2)*f*g*304i - 3^(1/2)*f*
h*315i + 3^(1/2)*g*h*208i - 672*d*e*x - 3069*d*f*x + 336*d*g*x + 672*e*f*x
+ 2403*d*h*x - 384*e*h*x - 336*f*g*x - 963*f*h*x + 192*g*h*x - 3^(1/2)*d^2*
x*567i - 3^(1/2)*f^2*x*252i - 3^(1/2)*h^2*x*108i + 3^(1/2)*d*f*x*819i + 3^(
1/2)*d*g*x*752i + 3^(1/2)*e*f*x*544i - 3^(1/2)*d*h*x*513i - 3^(1/2)*e*h*x*4
48i - 3^(1/2)*f*g*x*272i + 3^(1/2)*f*h*x*333i + 3^(1/2)*g*h*x*224i - 3^(1/2
)*d*e*x*1504i)*((9*d)/32 - f/8 + (3*h)/32 + (3^(1/2)*d*13i)/288 - (3^(1/2)*
e*1i)/9 + (3^(1/2)*f*1i)/144 + (3^(1/2)*g*1i)/18 + (3^(1/2)*h*1i)/288) + lo
g(1920*d*e + 2763*d*f - 960*d*g - 480*e*f - 1971*d*h + 480*e*h + 240*f*g +
981*f*h - 240*g*h + 3^(1/2)*d^2*1620i + 3^(1/2)*f^2*180i + 3^(1/2)*h^2*135i
 + 3807*d^2*x + 612*f^2*x + 378*h^2*x - 2754*d^2 - 684*f^2 - 351*h^2 + 3^(1
/2)*d*e*1088i - 3^(1/2)*d*f*1125i - 3^(1/2)*d*g*544i - 3^(1/2)*e*f*608i + 3
^(1/2)*d*h*945i + 3^(1/2)*e*h*416i + 3^(1/2)*f*g*304i - 3^(1/2)*f*h*315i -
3^(1/2)*g*h*208i + 672*d*e*x - 3069*d*f*x - 336*d*g*x - 672*e*f*x + 2403*d*
h*x + 384*e*h*x + 336*f*g*x - 963*f*h*x - 192*g*h*x + 3^(1/2)*d^2*x*567i +
```

```
3^(1/2)*f^2*x*252i + 3^(1/2)*h^2*x*108i - 3^(1/2)*d*f*x*819i + 3^(1/2)*d*g*
x*752i + 3^(1/2)*e*f*x*544i + 3^(1/2)*d*h*x*513i - 3^(1/2)*e*h*x*448i - 3^(
1/2)*f*g*x*272i - 3^(1/2)*f*h*x*333i + 3^(1/2)*g*h*x*224i - 3^(1/2)*d*e*x*1
504i)*(f/8 - (9*d)/32 - (3*h)/32 + (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9 +
 (3^(1/2)*f*1i)/144 - (3^(1/2)*g*1i)/18 + (3^(1/2)*h*1i)/288)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(x**4+x**2+1)**3,x)
```

```
[Out] Timed out
```

3.51 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(1+x^2+x^4)^3}\,dx$

Optimal. Leaf size=269

$$-\frac{1}{32}\log\left(x^2-x+1\right)(9d-4f+3h)+\frac{1}{32}\log\left(x^2+x+1\right)(9d-4f+3h)+\frac{x\left(-\left(x^2(7d-7f+4h)\right)+2d+3f-h\right)}{24\left(x^4+x^2+1\right)}$$

```
[Out] 1/12*x*(d+f-2*h-(d-2*f+h)*x^2)/(x^4+x^2+1)^2+1/12*(e-2*g+i+(2*e-g-i)*x^2)/(
x^4+x^2+1)^2+1/12*(2*e-g+i)*(2*x^2+1)/(x^4+x^2+1)+1/24*x*(2*d+3*f-h-(7*d-7*
f+4*h)*x^2)/(x^4+x^2+1)-1/32*(9*d-4*f+3*h)*ln(x^2-x+1)+1/32*(9*d-4*f+3*h)*l
n(x^2+x+1)-1/144*(13*d+2*f+h)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/144*(13
*d+2*f+h)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/9*(2*e-g+i)*arctan(1/3*(2*x
^2+1)*3^(1/2))*3^(1/2)
```

Rubi [A] time = 0.29, antiderivative size = 269, normalized size of antiderivative = 1.00, number of steps used = 18, number of rules used = 12, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {1673, 1678, 1178, 1169, 634, 618, 204, 628, 1663, 1660, 12, 614}

$$\frac{x\left(x^2(-(7d-7f+4h))+2d+3f-h\right)}{24\left(x^4+x^2+1\right)}+\frac{x\left(x^2(-(d-2f+h))+d+f-2h\right)}{12\left(x^4+x^2+1\right)^2}-\frac{1}{32}\log\left(x^2-x+1\right)(9d-4f+3h)$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4)^3,x]
```

```
[Out] (x*(d + f - 2*h - (d - 2*f + h)*x^2))/(12*(1 + x^2 + x^4)^2) + (e - 2*g + i
 + (2*e - g - i)*x^2)/(12*(1 + x^2 + x^4)^2) + ((2*e - g + i)*(1 + 2*x^2))/
(12*(1 + x^2 + x^4)) + (x*(2*d + 3*f - h - (7*d - 7*f + 4*h)*x^2))/(24*(1 +
 x^2 + x^4)) - ((13*d + 2*f + h)*ArcTan[(1 - 2*x)/Sqrt[3]])/(48*Sqrt[3]) +
((13*d + 2*f + h)*ArcTan[(1 + 2*x)/Sqrt[3]])/(48*Sqrt[3]) + ((2*e - g + i)*
ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((9*d - 4*f + 3*h)*Log[1 - x + x
^2])/32 + ((9*d - 4*f + 3*h)*Log[1 + x + x^2])/32
```

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 204

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[
-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[
a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
```

```
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
 (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^
(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
 - 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+51x^5}{\left(1+x^2+x^4\right)^3}\,dx = \int \frac{x\left(e+gx^2+51x^4\right)}{\left(1+x^2+x^4\right)^3}\,dx + \int \frac{d+fx^2+hx^4}{\left(1+x^2+x^4\right)^3}\,dx$$

$$= \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \frac{1}{12}\int \frac{11d-f+2h-5(d-2f+}{\left(1+x^2+x^4\right)^2}$$

$$= \frac{51+e-2g-(51-2e+g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \cdots$$

$$= \frac{51+e-2g-(51-2e+g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \cdots$$

$$= \frac{51+e-2g-(51-2e+g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \cdots$$

$$= \frac{51+e-2g-(51-2e+g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \cdots$$

$$= \frac{51+e-2g-(51-2e+g)x^2}{12\left(1+x^2+x^4\right)^2} + \frac{x\left(d+f-2h-(d-2f+h)x^2\right)}{12\left(1+x^2+x^4\right)^2} + \cdots$$

Mathematica [C] time = 0.98, size = 325, normalized size = 1.21

$$\frac{1}{144}\left(\frac{12\left(-dx^3+dx+2ex^2+e+2fx^3+fx-g\left(x^2+2\right)-hx^3-2hx-ix^2+i\right)}{\left(x^4+x^2+1\right)^2} + \frac{6\left(-7dx^3+2dx+e\left(8x^2+\cdots\right.\right.}{\cdots}\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4)^3,x]
```

```
[Out] ((12*(e + i + d*x + f*x - 2*h*x + 2*e*x^2 - i*x^2 - d*x^3 + 2*f*x^3 - h*x^3
 - g*(2 + x^2)))/(1 + x^2 + x^4)^2 + (6*(2*i + 2*d*x + 3*f*x - h*x + 4*i*x^
2 - 7*d*x^3 + 7*f*x^3 - 4*h*x^3 - 2*g*(1 + 2*x^2) + e*(4 + 8*x^2)))/(1 + x^
2 + x^4) - (((-47*I + 7*Sqrt[3])*d + (17*I - 7*Sqrt[3])*f + 2*(-7*I + 2*Sqr
t[3])*h)*ArcTan[((-I + Sqrt[3])*x)/2])/Sqrt[(1 + I*Sqrt[3])/6] - (((47*I +
7*Sqrt[3])*d - (17*I + 7*Sqrt[3])*f + 2*(7*I + 2*Sqrt[3])*h)*ArcTan[((I + S
qrt[3])*x)/2])/Sqrt[(1 - I*Sqrt[3])/6] - 16*Sqrt[3]*(2*e - g + i)*ArcTan[Sq
rt[3]/(1 + 2*x^2)])/144
```

fricas [B] time = 23.87, size = 521, normalized size = 1.94

$$-\frac{12\left(7d-7f+4h\right)x^7-48\left(2e-g+i\right)x^6+60\left(d-2f+h\right)x^5-72\left(2e-g+i\right)x^4+84\left(d-2f+h\right)x^3-48\left(4\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="frica
s")
```

```
[Out] -1/288*(12*(7*d - 7*f + 4*h)*x^7 - 48*(2*e - g + i)*x^6 + 60*(d - 2*f + h)*
x^5 - 72*(2*e - g + i)*x^4 + 84*(d - 2*f + h)*x^3 - 48*(4*e - 2*g + i)*x^2
- 2*sqrt(3)*((13*d - 32*e + 2*f + 16*g + h - 16*i)*x^8 + 2*(13*d - 32*e + 2
*f + 16*g + h - 16*i)*x^6 + 3*(13*d - 32*e + 2*f + 16*g + h - 16*i)*x^4 + 2
*(13*d - 32*e + 2*f + 16*g + h - 16*i)*x^2 + 13*d - 32*e + 2*f + 16*g + h -
 16*i)*arctan(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(3)*((13*d + 32*e + 2*f - 16*g
 + h + 16*i)*x^8 + 2*(13*d + 32*e + 2*f - 16*g + h + 16*i)*x^6 + 3*(13*d +
32*e + 2*f - 16*g + h + 16*i)*x^4 + 2*(13*d + 32*e + 2*f - 16*g + h + 16*i)
*x^2 + 13*d + 32*e + 2*f - 16*g + h + 16*i)*arctan(1/3*sqrt(3)*(2*x - 1)) -
 12*(4*d + 5*f - 5*h)*x - 9*((9*d - 4*f + 3*h)*x^8 + 2*(9*d - 4*f + 3*h)*x^
6 + 3*(9*d - 4*f + 3*h)*x^4 + 2*(9*d - 4*f + 3*h)*x^2 + 9*d - 4*f + 3*h)*lo
g(x^2 + x + 1) + 9*((9*d - 4*f + 3*h)*x^8 + 2*(9*d - 4*f + 3*h)*x^6 + 3*(9*
d - 4*f + 3*h)*x^4 + 2*(9*d - 4*f + 3*h)*x^2 + 9*d - 4*f + 3*h)*log(x^2 - x
 + 1) - 72*e + 72*g - 48*i)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)
```

giac [A] time = 0.37, size = 255, normalized size = 0.95

$$\frac{1}{144}\sqrt{3}\left(13d+2f+16g+h-16i-32e\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{144}\sqrt{3}\left(13d+2f-16g+h+16i+32e\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="giac"
)
```

```
[Out] 1/144*sqrt(3)*(13*d + 2*f + 16*g + h - 16*i - 32*e)*arctan(1/3*sqrt(3)*(2*x
 + 1)) + 1/144*sqrt(3)*(13*d + 2*f - 16*g + h + 16*i + 32*e)*arctan(1/3*sqr
t(3)*(2*x - 1)) + 1/32*(9*d - 4*f + 3*h)*log(x^2 + x + 1) - 1/32*(9*d - 4*f
 + 3*h)*log(x^2 - x + 1) - 1/24*(7*d*x^7 - 7*f*x^7 + 4*h*x^7 + 4*g*x^6 - 4*
i*x^6 - 8*x^6*e + 5*d*x^5 - 10*f*x^5 + 5*h*x^5 + 6*g*x^4 - 6*i*x^4 - 12*x^4
*e + 7*d*x^3 - 14*f*x^3 + 7*h*x^3 + 8*g*x^2 - 4*i*x^2 - 16*x^2*e - 4*d*x -
5*f*x + 5*h*x + 6*g - 4*i - 6*e)/(x^4 + x^2 + 1)^2
```

maple [A] time = 0.02, size = 454, normalized size = 1.69

$$\frac{13\sqrt{3}\,d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144}+\frac{13\sqrt{3}\,d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144}-\frac{9d\ln\left(x^2-x+1\right)}{32}+\frac{9d\ln\left(x^2+x+1\right)}{32}-\frac{2\sqrt{3}\,e\arctan\left(\frac{(2x}{}\right.}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x)
```

```
[Out] 1/16*((-7/3*d+7/3*f-4/3*h-4/3*e-1/3*g+1/3*i)*x^3+(-6*d+4*f-2*h-2*g+2*i)*x^2
+(-20/3*d+13/3*f-5/3*h+1/3*e-8/3*g+7/3*i)*x-4*d+4/3*f+2*e-2*g+4/3*i)/(x^2+x
+1)^2+9/32*d*ln(x^2+x+1)-1/8*f*ln(x^2+x+1)+3/32*h*ln(x^2+x+1)+13/144*3^(1/2
)*d*arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))+1
/72*3^(1/2)*f*arctan(1/3*(2*x+1)*3^(1/2))+1/9*3^(1/2)*g*arctan(1/3*(2*x+1)*
3^(1/2))+1/144*3^(1/2)*h*arctan(1/3*(2*x+1)*3^(1/2))-1/9*3^(1/2)*i*arctan(1
```

```
/3*(2*x+1)*3^(1/2))-1/16*((7/3*d-7/3*f+4/3*h-4/3*e-1/3*g+1/3*i)*x^3+(-6*d+4
*f-2*h+2*g-2*i)*x^2+(20/3*d-13/3*f+5/3*h+1/3*e-8/3*g+7/3*i)*x-4*d+4/3*f-2*e
+2*g-4/3*i)/(x^2-x+1)^2-9/32*d*ln(x^2-x+1)+1/8*f*ln(x^2-x+1)-3/32*h*ln(x^2-
x+1)+13/144*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(1/2)*e*arctan(1/3*
(2*x-1)*3^(1/2))+1/72*3^(1/2)*f*arctan(1/3*(2*x-1)*3^(1/2))-1/9*3^(1/2)*g*a
rctan(1/3*(2*x-1)*3^(1/2))+1/144*3^(1/2)*h*arctan(1/3*(2*x-1)*3^(1/2))+1/9*
3^(1/2)*i*arctan(1/3*(2*x-1)*3^(1/2))
```

maxima [A] time = 2.12, size = 229, normalized size = 0.85

$$\frac{1}{144}\sqrt{3}\left(13d-32e+2f+16g+h-16i\right)\arctan\left(\frac{1}{3}\sqrt{3}\left(2x+1\right)\right)+\frac{1}{144}\sqrt{3}\left(13d+32e+2f-16g+h+16\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="maxim
a")
```

```
[Out] 1/144*sqrt(3)*(13*d - 32*e + 2*f + 16*g + h - 16*i)*arctan(1/3*sqrt(3)*(2*x
 + 1)) + 1/144*sqrt(3)*(13*d + 32*e + 2*f - 16*g + h + 16*i)*arctan(1/3*sqr
t(3)*(2*x - 1)) + 1/32*(9*d - 4*f + 3*h)*log(x^2 + x + 1) - 1/32*(9*d - 4*f
 + 3*h)*log(x^2 - x + 1) - 1/24*((7*d - 7*f + 4*h)*x^7 - 4*(2*e - g + i)*x^
6 + 5*(d - 2*f + h)*x^5 - 6*(2*e - g + i)*x^4 + 7*(d - 2*f + h)*x^3 - 4*(4*
e - 2*g + i)*x^2 - (4*d + 5*f - 5*h)*x - 6*e + 6*g - 4*i)/(x^8 + 2*x^6 + 3*
x^4 + 2*x^2 + 1)
```

mupad [B] time = 8.22, size = 1963, normalized size = 7.30

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^2 + x^4 + 1)^3,x)
```

```
[Out] (e/4 - g/4 + i/6 + x*(d/6 + (5*f)/24 - (5*h)/24) - x^7*((7*d)/24 - (7*f)/24
 + h/6) - x^5*((5*d)/24 - (5*f)/12 + (5*h)/24) - x^3*((7*d)/24 - (7*f)/12 +
 (7*h)/24) + x^4*(e/2 - g/4 + i/4) + x^2*((2*e)/3 - g/3 + i/6) + x^6*(e/3 -
 g/6 + i/6))/(2*x^2 + 3*x^4 + 2*x^6 + x^8 + 1) - log(960*d*g - 2763*d*f - 1
920*d*e + 480*e*f + 1971*d*h - 960*d*i - 480*e*h - 240*f*g - 981*f*h + 240*
f*i + 240*g*h - 240*h*i + 3^(1/2)*d^2*1620i + 3^(1/2)*f^2*180i + 3^(1/2)*h^
2*135i - 3807*d^2*x - 612*f^2*x - 378*h^2*x + 2754*d^2 + 684*f^2 + 351*h^2
+ 3^(1/2)*d*e*1088i - 3^(1/2)*d*f*1125i - 3^(1/2)*d*g*544i - 3^(1/2)*e*f*60
8i + 3^(1/2)*d*h*945i + 3^(1/2)*d*i*544i + 3^(1/2)*e*h*416i + 3^(1/2)*f*g*3
04i - 3^(1/2)*f*h*315i - 3^(1/2)*f*i*304i - 3^(1/2)*g*h*208i + 3^(1/2)*h*i*
208i - 672*d*e*x + 3069*d*f*x + 336*d*g*x + 672*e*f*x - 2403*d*h*x - 336*d*
i*x - 384*e*h*x - 336*f*g*x + 963*f*h*x + 336*f*i*x + 192*g*h*x - 192*h*i*x
 + 3^(1/2)*d^2*x*567i + 3^(1/2)*f^2*x*252i + 3^(1/2)*h^2*x*108i - 3^(1/2)*d
*f*x*819i + 3^(1/2)*d*g*x*752i + 3^(1/2)*e*f*x*544i + 3^(1/2)*d*h*x*513i -
3^(1/2)*d*i*x*752i - 3^(1/2)*e*h*x*448i - 3^(1/2)*f*g*x*272i - 3^(1/2)*f*h*
x*333i + 3^(1/2)*f*i*x*272i + 3^(1/2)*g*h*x*224i - 3^(1/2)*h*i*x*224i - 3^(
1/2)*d*e*x*1504i)*((9*d)/32 - f/8 + (3*h)/32 + (3^(1/2)*d*13i)/288 + (3^(1/
2)*e*1i)/9 + (3^(1/2)*f*1i)/144 - (3^(1/2)*g*1i)/18 + (3^(1/2)*h*1i)/288 +
(3^(1/2)*i*1i)/18) - log(1920*d*e - 2763*d*f - 960*d*g - 480*e*f + 1971*d*h
 + 960*d*i + 480*e*h + 240*f*g - 981*f*h - 240*f*i - 240*g*h + 240*h*i - 3^
(1/2)*d^2*1620i - 3^(1/2)*f^2*180i - 3^(1/2)*h^2*135i + 3807*d^2*x + 612*f^
2*x + 378*h^2*x + 2754*d^2 + 684*f^2 + 351*h^2 + 3^(1/2)*d*e*1088i + 3^(1/2
)*d*f*1125i - 3^(1/2)*d*g*544i - 3^(1/2)*e*f*608i - 3^(1/2)*d*h*945i + 3^(1
/2)*d*i*544i + 3^(1/2)*e*h*416i + 3^(1/2)*f*g*304i + 3^(1/2)*f*h*315i - 3^(
1/2)*f*i*304i - 3^(1/2)*g*h*208i + 3^(1/2)*h*i*208i - 672*d*e*x - 3069*d*f*
x + 336*d*g*x + 672*e*f*x + 2403*d*h*x - 336*d*i*x - 384*e*h*x - 336*f*g*x
- 963*f*h*x + 336*f*i*x + 192*g*h*x - 192*h*i*x + 3^(1/2)*d^2*x*567i + 3^(1
```

```
/2)*f^2*x*252i + 3^(1/2)*h^2*x*108i - 3^(1/2)*d*f*x*819i - 3^(1/2)*d*g*x*75
2i - 3^(1/2)*e*f*x*544i + 3^(1/2)*d*h*x*513i + 3^(1/2)*d*i*x*752i + 3^(1/2)
*e*h*x*448i + 3^(1/2)*f*g*x*272i - 3^(1/2)*f*h*x*333i - 3^(1/2)*f*i*x*272i
- 3^(1/2)*g*h*x*224i + 3^(1/2)*h*i*x*224i + 3^(1/2)*d*e*x*1504i)*(f/8 - (9*
d)/32 - (3*h)/32 + (3^(1/2)*d*13i)/288 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/
144 + (3^(1/2)*g*1i)/18 + (3^(1/2)*h*1i)/288 - (3^(1/2)*i*1i)/18) + log(192
0*d*e - 2763*d*f - 960*d*g - 480*e*f + 1971*d*h + 960*d*i + 480*e*h + 240*f
*g - 981*f*h - 240*f*i - 240*g*h + 240*h*i + 3^(1/2)*d^2*1620i + 3^(1/2)*f^
2*180i + 3^(1/2)*h^2*135i + 3807*d^2*x + 612*f^2*x + 378*h^2*x + 2754*d^2 +
 684*f^2 + 351*h^2 - 3^(1/2)*d*e*1088i - 3^(1/2)*d*f*1125i + 3^(1/2)*d*g*54
4i + 3^(1/2)*e*f*608i + 3^(1/2)*d*h*945i - 3^(1/2)*d*i*544i - 3^(1/2)*e*h*4
16i - 3^(1/2)*f*g*304i - 3^(1/2)*f*h*315i + 3^(1/2)*f*i*304i + 3^(1/2)*g*h*
208i - 3^(1/2)*h*i*208i - 672*d*e*x - 3069*d*f*x + 336*d*g*x + 672*e*f*x +
2403*d*h*x - 336*d*i*x - 384*e*h*x - 336*f*g*x - 963*f*h*x + 336*f*i*x + 19
2*g*h*x - 192*h*i*x - 3^(1/2)*d^2*x*567i - 3^(1/2)*f^2*x*252i - 3^(1/2)*h^2
*x*108i + 3^(1/2)*d*f*x*819i + 3^(1/2)*d*g*x*752i + 3^(1/2)*e*f*x*544i - 3^
(1/2)*d*h*x*513i - 3^(1/2)*d*i*x*752i - 3^(1/2)*e*h*x*448i - 3^(1/2)*f*g*x*
272i + 3^(1/2)*f*h*x*333i + 3^(1/2)*f*i*x*272i + 3^(1/2)*g*h*x*224i - 3^(1/
2)*h*i*x*224i - 3^(1/2)*d*e*x*1504i)*((9*d)/32 - f/8 + (3*h)/32 + (3^(1/2)*
d*13i)/288 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144 + (3^(1/2)*g*1i)/18 + (3
^(1/2)*h*1i)/288 - (3^(1/2)*i*1i)/18) + log(1920*d*e + 2763*d*f - 960*d*g -
 480*e*f - 1971*d*h + 960*d*i + 480*e*h + 240*f*g + 981*f*h - 240*f*i - 240
*g*h + 240*h*i + 3^(1/2)*d^2*1620i + 3^(1/2)*f^2*180i + 3^(1/2)*h^2*135i +
3807*d^2*x + 612*f^2*x + 378*h^2*x - 2754*d^2 - 684*f^2 - 351*h^2 + 3^(1/2)
*d*e*1088i - 3^(1/2)*d*f*1125i - 3^(1/2)*d*g*544i - 3^(1/2)*e*f*608i + 3^(1
/2)*d*h*945i + 3^(1/2)*d*i*544i + 3^(1/2)*e*h*416i + 3^(1/2)*f*g*304i - 3^(
1/2)*f*h*315i - 3^(1/2)*f*i*304i - 3^(1/2)*g*h*208i + 3^(1/2)*h*i*208i + 67
2*d*e*x - 3069*d*f*x - 336*d*g*x - 672*e*f*x + 2403*d*h*x + 336*d*i*x + 384
*e*h*x + 336*f*g*x - 963*f*h*x - 336*f*i*x - 192*g*h*x + 192*h*i*x + 3^(1/2
)*d^2*x*567i + 3^(1/2)*f^2*x*252i + 3^(1/2)*h^2*x*108i - 3^(1/2)*d*f*x*819i
 + 3^(1/2)*d*g*x*752i + 3^(1/2)*e*f*x*544i + 3^(1/2)*d*h*x*513i - 3^(1/2)*d
*i*x*752i - 3^(1/2)*e*h*x*448i - 3^(1/2)*f*g*x*272i - 3^(1/2)*f*h*x*333i +
3^(1/2)*f*i*x*272i + 3^(1/2)*g*h*x*224i - 3^(1/2)*h*i*x*224i - 3^(1/2)*d*e*
x*1504i)*(f/8 - (9*d)/32 - (3*h)/32 + (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/
9 + (3^(1/2)*f*1i)/144 - (3^(1/2)*g*1i)/18 + (3^(1/2)*h*1i)/288 + (3^(1/2)*
i*1i)/18)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4+x**2+1)**3,x)
```

```
[Out] Timed out
```

3.52 $\int \frac{d+ex}{\left(a+bx^2+cx^4\right)^3}\,dx$

Optimal. Leaf size=474

$$\frac{dx\left(3bcx^2\left(b^2-8ac\right)+\left(b^2-7ac\right)\left(3b^2-4ac\right)\right)}{8a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)}+\frac{3\sqrt{c}\,d\left(56a^2c^2-10ab^2c+b\left(b^2-8ac\right)\sqrt{b^2-4ac}+b^4\right)\tan^{-1}}{8\sqrt{2}\,a^2\left(b^2-4ac\right)^{5/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

```
[Out] -1/4*e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/4*d*x*(b*c*x^2-2*a*c+b^
2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+3/2*c*e*(2*c*x^2+b)/(-4*a*c+b^2)^2/(c*x
^4+b*x^2+a)+1/8*d*x*((-7*a*c+b^2)*(-4*a*c+3*b^2)+3*b*c*(-8*a*c+b^2)*x^2)/a^
2/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)-6*c^2*e*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(
1/2))/(-4*a*c+b^2)^(5/2)+3/16*d*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1
/2))^(1/2))*c^(1/2)*(b^4-10*a*b^2*c+56*a^2*c^2+b*(-8*a*c+b^2)*(-4*a*c+b^2)^
(1/2))/a^2/(-4*a*c+b^2)^(5/2)*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+3/16*d*a
rctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(b^3-8*a*b*c+
(-56*a^2*c^2+10*a*b^2*c-b^4)/(-4*a*c+b^2)^(1/2))/a^2/(-4*a*c+b^2)^2*2^(1/2)
/(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 2.19, antiderivative size = 474, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 10, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.500, Rules used = {1673, 12, 1092, 1178, 1166, 205, 1107, 614, 618, 206}

$$\frac{3\sqrt{c}\,d\left(56a^2c^2-10ab^2c+b\left(b^2-8ac\right)\sqrt{b^2-4ac}+b^4\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{8\sqrt{2}\,a^2\left(b^2-4ac\right)^{5/2}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{3\sqrt{c}\,d\left(-\frac{56a^2c^2-10ab^2c+b^4}{\sqrt{b^2-4ac}}-8abc+\right.}{8\sqrt{2}\,a^2\left(b^2-4ac\right)^2\sqrt{\ }}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)/(a + b*x^2 + c*x^4)^3,x]
```

```
[Out] -(e*(b + 2*c*x^2))/(4*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (d*x*(b^2 - 2*
a*c + b*c*x^2))/(4*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (3*c*e*(b + 2*c
*x^2))/(2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (d*x*((b^2 - 7*a*c)*(3*b^2
 - 4*a*c) + 3*b*c*(b^2 - 8*a*c)*x^2))/(8*a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c
*x^4)) + (3*Sqrt[c]*(b^4 - 10*a*b^2*c + 56*a^2*c^2 + b*(b^2 - 8*a*c)*Sqrt[b
^2 - 4*a*c])*d*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(8*
Sqrt[2]*a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (3*Sqrt[c]*(
b^3 - 8*a*b*c - (b^4 - 10*a*b^2*c + 56*a^2*c^2)/Sqrt[b^2 - 4*a*c])*d*ArcTan
[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*(b^2 - 4*
a*c)^2*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - (6*c^2*e*ArcTanh[(b + 2*c*x^2)/Sqrt[b
^2 - 4*a*c]])/(b^2 - 4*a*c)^(5/2)
```

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 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
```

```
Q[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1092

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> -Simp[(x*(b^2 -
 2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)),
 x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(b^2 - 2*a*c + 2*(p + 1)*(b^2
 - 4*a*c) + b*c*(4*p + 7)*x^2)*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ
[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 && !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex}{\left(a+bx^2+cx^4\right)^3}\,dx = \int \frac{d}{\left(a+bx^2+cx^4\right)^3}\,dx + \int \frac{ex}{\left(a+bx^2+cx^4\right)^3}\,dx$$

$$= d\int \frac{1}{\left(a+bx^2+cx^4\right)^3}\,dx + e\int \frac{x}{\left(a+bx^2+cx^4\right)^3}\,dx$$

$$= \frac{dx\left(b^2-2ac+bcx^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} - \frac{d\int \frac{b^2-2ac-4\left(b^2-4ac\right)-5bcx^2}{\left(a+bx^2+cx^4\right)^2}dx}{4a\left(b^2-4ac\right)} + \frac{1}{2}e\,\text{Subst}\Bigg(\int \frac{}{\left(a+bx\right.}$$

$$= -\frac{e\left(b+2cx^2\right)}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{dx\left(b^2-2ac+bcx^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{dx\left(\left(b^2-7ac\right)(3\right.}{8a^2\left(b^2-\right.}$$

$$= -\frac{e\left(b+2cx^2\right)}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{dx\left(b^2-2ac+bcx^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{3ce\left(b+2\right.}{2\left(b^2-4ac\right)^2\left(a+\right.}$$

$$= -\frac{e\left(b+2cx^2\right)}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{dx\left(b^2-2ac+bcx^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{3ce\left(b+2\right.}{2\left(b^2-4ac\right)^2\left(a+\right.}$$

$$= -\frac{e\left(b+2cx^2\right)}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{dx\left(b^2-2ac+bcx^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{3ce\left(b+2\right.}{2\left(b^2-4ac\right)^2\left(a+\right.}$$

Mathematica [A] time = 1.91, size = 488, normalized size = 1.03

$$\frac{1}{16}\left(\frac{8a^2c(3be+cx(7d+6ex))-2abcdx\left(25b+24cx^2\right)+6b^3dx\left(b+cx^2\right)}{a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)} + \frac{3\sqrt{2}\sqrt{c}\,d\left(56a^2c^2-10ab^2c-8abc\right.}{a^2\left(b^2-\right.}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)/(a + b*x^2 + c*x^4)^3,x]
```

```
[Out] ((4*a*b*e + 8*a*c*x*(d + e*x) - 4*b*d*x*(b + c*x^2))/(a*(-b^2 + 4*a*c)*(a +
 b*x^2 + c*x^4)^2) + (6*b^3*d*x*(b + c*x^2) - 2*a*b*c*d*x*(25*b + 24*c*x^2)
 + 8*a^2*c*(3*b*e + c*x*(7*d + 6*e*x)))/(a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c
*x^4)) + (3*Sqrt[2]*Sqrt[c]*(b^4 - 10*a*b^2*c + 56*a^2*c^2 + b^3*Sqrt[b^2 -
 4*a*c] - 8*a*b*c*Sqrt[b^2 - 4*a*c])*d*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b -
Sqrt[b^2 - 4*a*c]]])/(a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]])
- (3*Sqrt[2]*Sqrt[c]*(b^4 - 10*a*b^2*c + 56*a^2*c^2 - b^3*Sqrt[b^2 - 4*a*c]
 + 8*a*b*c*Sqrt[b^2 - 4*a*c])*d*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^
2 - 4*a*c]]])/(a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + (48*c
^2*e*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(5/2) - (48*c^2*e
*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(5/2))/16
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 13.32, size = 3397, normalized size = 7.17

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="giac")
```

```
[Out] 3/32*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^8 - 17*sqrt(2)*sqrt(b*c + s
qrt(b^2 - 4*a*c)*c)*a*b^6*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^7
*c - 2*b^8*c + 116*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + 26
*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*b^6*c^2 + 34*a*b^6*c^2 + 2*b^7*c^2 - 368*sqrt(2)*sqrt(b*c
 + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*a^2*b^3*c^3 - 13*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^3 -
 232*a^2*b^4*c^3 - 30*a*b^5*c^3 + 448*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*a^4*c^4 + 224*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 64*sqr
t(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176*a^
2*b^3*c^4 - 112*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^5 - 896*a^4*c
^5 - 352*a^3*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*b^7 + 15*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^
5*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^6*c - 8
8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 - 2
2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 - sqr
t(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^2 + 176*sqrt(2
)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 + 88*sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 11*sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 - 44*sqrt(2)*sq
rt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 + 2*(b^2 - 4*a*c)
*b^6*c - 26*(b^2 - 4*a*c)*a*b^4*c^2 - 2*(b^2 - 4*a*c)*b^5*c^2 + 128*(b^2 -
4*a*c)*a^2*b^2*c^3 + 22*(b^2 - 4*a*c)*a*b^3*c^3 - 224*(b^2 - 4*a*c)*a^3*c^4
 - 88*(b^2 - 4*a*c)*a^2*b*c^4)*d*arctan(2*sqrt(1/2)*x/sqrt((a^2*b^5 - 8*a^3
*b^3*c + 16*a^4*b*c^2 + sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(
a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3
)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c - 2
*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^
3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*
b^2*c^4 - 64*a^6*c^5)*abs(c)) + 3/32*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*
c)*b^8 - 17*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^6*c - 2*sqrt(2)*sqr
t(b*c - sqrt(b^2 - 4*a*c)*c)*b^7*c + 2*b^8*c + 116*sqrt(2)*sqrt(b*c - sqrt(
b^2 - 4*a*c)*c)*a^2*b^4*c^2 + 26*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*
b^5*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^6*c^2 - 34*a*b^6*c^2 -
2*b^7*c^2 - 368*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 128*s
qrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 - 13*sqrt(2)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*a*b^4*c^3 + 232*a^2*b^4*c^3 + 30*a*b^5*c^3 + 448*sqrt(
2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*c^4 + 224*sqrt(2)*sqrt(b*c - sqrt(b^
2 - 4*a*c)*c)*a^3*b*c^4 + 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^
2*c^4 - 736*a^3*b^2*c^4 - 176*a^2*b^3*c^4 - 112*sqrt(2)*sqrt(b*c - sqrt(b^2
 - 4*a*c)*c)*a^3*c^5 + 896*a^4*c^5 + 352*a^3*b*c^5 + sqrt(2)*sqrt(b^2 - 4*a
*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^7 - 15*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
- sqrt(b^2 - 4*a*c)*c)*b^6*c + 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt
(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt
(b^2 - 4*a*c)*c)*a*b^4*c^2 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2
- 4*a*c)*c)*b^5*c^2 - 176*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4
*a*c)*c)*a^3*b*c^3 - 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a
*c)*c)*a^2*b^2*c^3 - 11*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a
```

```
*c)*c)*a*b^3*c^3 + 44*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c
)*c)*a^2*b*c^4 - 2*(b^2 - 4*a*c)*b^6*c + 26*(b^2 - 4*a*c)*a*b^4*c^2 + 2*(b^
2 - 4*a*c)*b^5*c^2 - 128*(b^2 - 4*a*c)*a^2*b^2*c^3 - 22*(b^2 - 4*a*c)*a*b^3
*c^3 + 224*(b^2 - 4*a*c)*a^3*c^4 + 88*(b^2 - 4*a*c)*a^2*b*c^4)*d*arctan(2*s
qrt(1/2)*x/sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5 - 8*a
^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^
4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3
)))/((a^3*b^8 - 16*a^4*b^6*c - 2*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c^
2 + a^3*b^6*c^2 - 256*a^6*b^2*c^3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*a
^7*c^4 + 128*a^6*b*c^4 + 48*a^5*b^2*c^4 - 64*a^6*c^5)*abs(c)) - 3*(b^2*c^4
- 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(a^2*b^5 - 8*a
^3*b^3*c + 16*a^4*b*c^2 + sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4
*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c
^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^6*c - 2*b^7*
c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*
c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*
c^5)*c^2) + 3*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e*log(x
^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5 - 8*a^3*b^3*
c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8
*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^
8 - 16*a*b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^
3*b^2*c^3 - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 4
8*a^2*b^2*c^4 - 64*a^3*c^5)*c^2) + 1/8*(3*b^3*c^2*d*x^7 - 24*a*b*c^3*d*x^7
+ 24*a^2*c^3*x^6*e + 6*b^4*c*d*x^5 - 49*a*b^2*c^2*d*x^5 + 28*a^2*c^3*d*x^5
+ 36*a^2*b*c^2*x^4*e + 3*b^5*d*x^3 - 20*a*b^3*c*d*x^3 - 4*a^2*b*c^2*d*x^3 +
 8*a^2*b^2*c*x^2*e + 40*a^3*c^2*x^2*e + 5*a*b^4*d*x - 37*a^2*b^2*c*d*x + 44
*a^3*c^2*d*x - 2*a^2*b^3*e + 20*a^3*b*c*e)/((a^2*b^4 - 8*a^3*b^2*c + 16*a^4
*c^2)*(c*x^4 + b*x^2 + a)^2)
```

maple [B] time = 0.36, size = 3725, normalized size = 7.86

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)/(c*x^4+b*x^2+a)^3,x)
```

```
[Out] 3/16*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a^2*2^(1/2)/((-b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4
*a*c+b^2)^(1/2)*b^4*d-15/8*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a*2^(
1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2)
)*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*d+3/16*c/(16*a^2*c^2-8*a*b^2*c+b^4)/
(4*a*c-b^2)/a^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b
+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^4*d-15/8*c^2/(16*a^
2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2
)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)
*b^2*d+3/16*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a^2*2^(1/2)/((-b+(-4*a
*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c
*x)*b^5*d-15/8*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-
4*a*c+b^2)^(1/2)/c)^2/a*d*x^3*(-4*a*c+b^2)^(1/2)*b^2+9/4*c^2/(16*a^2*c^2-8*
a*b^2*c+b^4)/(4*a*c-b^2)/a*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(
2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*d-3/16*c/(16*a^2*c^2-8*a*
b^2*c+b^4)/(4*a*c-b^2)/a^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(
2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^5*d+15/8*c/(16*a^2*c^2-8*a*
b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)^2/a*d*x^3*(-4
*a*c+b^2)^(1/2)*b^2-9/4*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a*2^(1/2
)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2)
)*c)^(1/2)*c*x)*b^3*d-3*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)*(-4*a*c+
b^2)^(1/2)*e*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))+3*c^2/(16*a^2*c^2-8*a*b^2*c+
b^4)/(4*a*c-b^2)*(-4*a*c+b^2)^(1/2)*e*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))-1/(1
6*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)
```

```
^2*e*(-4*a*c+b^2)^(1/2)*b^2+1/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1
/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)^2*e*(-4*a*c+b^2)^(1/2)*b^2-3/4/(16*a^2*c^2
-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)^2*e*b^3-
3/4/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1
/2)/c)^2*e*b^3-3/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2
*(-4*a*c+b^2)^(1/2)/c)^2/a^2*d*x^3*b^5-5/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a
*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)^2*d/a*x*b^4-3/16/(16*a^2*c^2
-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)^2/a^2*d*
x^3*b^5-5/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*
c+b^2)^(1/2)/c)^2*d/a*x*b^4+9/2*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/
(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)^2*d*x^3*(-4*a*c+b^2)^(1/2)-6*c^2/(16
*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)^
2*d*x^3*b+6*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4
*a*c+b^2)^(1/2)/c)^2*e*x^2*a-3/2*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(
x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)^2*e*x^2*b^2-11*c^2/(16*a^2*c^2-8*a*b^
2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)^2*d*a*x+4*c/(16
*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)^
2*d*x*b^2+4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a
*c+b^2)^(1/2)/c)^2*e*(-4*a*c+b^2)^(1/2)*a+3*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4
*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)^2*e*a*b-9/2*c^2/(16*a^2*c^
2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)^2*d*x^3
*(-4*a*c+b^2)^(1/2)-6*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b
/c-1/2*(-4*a*c+b^2)^(1/2)/c)^2*d*x^3*b+6*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*
a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)^2*e*x^2*a-3/2*c/(16*a^2*c^2
-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)^2*e*x^2*
b^2-11*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+
b^2)^(1/2)/c)^2*d*a*x+4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b
/c-1/2*(-4*a*c+b^2)^(1/2)/c)^2*d*x*b^2-4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*
c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)^2*e*(-4*a*c+b^2)^(1/2)*a+3*c/
(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/
c)^2*e*a*b+9/4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-
4*a*c+b^2)^(1/2)/c)^2/a*d*x^3*b^3+5/4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b
^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)^2*d*x*b*(-4*a*c+b^2)^(1/2)+9/4*c
/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)
/c)^2/a*d*x^3*b^3-5/4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c
+1/2*(-4*a*c+b^2)^(1/2)/c)^2*d*x*b*(-4*a*c+b^2)^(1/2)+21/2*c^3/(16*a^2*c^2-
8*a*b^2*c+b^4)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(
2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d-6*c^3/(1
6*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/
2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*d+21/2*c^3/(16*a^
2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*
arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d
+3/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^
(1/2)/c)^2/a^2*d*x^3*(-4*a*c+b^2)^(1/2)*b^4+5/16/(16*a^2*c^2-8*a*b^2*c+b^4)
/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)^2*d/a*x*b^3*(-4*a*c+b^2
)^(1/2)-3/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*
c+b^2)^(1/2)/c)^2/a^2*d*x^3*(-4*a*c+b^2)^(1/2)*b^4-5/16/(16*a^2*c^2-8*a*b^2
*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)^2*d/a*x*b^3*(-4*
a*c+b^2)^(1/2)+6*c^3/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)*2^(1/2)/((-b+(-
4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2
)*c*x)*b*d
```

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

$$\frac{24\,a^2c^3ex^6 + 36\,a^2bc^2ex^4 + 3\left(b^3c^2 - 8\,abc^3\right)dx^7 + \left(6\,b^4c - 49\,ab^2c^2 + 28\,a^2c^3\right)dx^5 + \left(3\,b^5 - 20\,ab^3c - 4\,a^2bc^2\right)dx^3}{8\left(\left(a^2b^4c^2 - 8\,a^3b^2c^3 + 16\,a^4c^4\right)x^8 + a^4b^4 - 8\,a^5b^2c + 16\,a^6c^2 + 2\left(a^2b^5c - 8\,a^3b^3c^2 + 16\,a^4bc^3\right)x^6 +}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="maxima")
```

```
[Out] 1/8*(24*a^2*c^3*e*x^6 + 36*a^2*b*c^2*e*x^4 + 3*(b^3*c^2 - 8*a*b*c^3)*d*x^7
+ (6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3)*d*x^5 + (3*b^5 - 20*a*b^3*c - 4*a^2
*b*c^2)*d*x^3 + 8*(a^2*b^2*c + 5*a^3*c^2)*e*x^2 + (5*a*b^4 - 37*a^2*b^2*c +
 44*a^3*c^2)*d*x - 2*(a^2*b^3 - 10*a^3*b*c)*e)/((a^2*b^4*c^2 - 8*a^3*b^2*c^
3 + 16*a^4*c^4)*x^8 + a^4*b^4 - 8*a^5*b^2*c + 16*a^6*c^2 + 2*(a^2*b^5*c - 8
*a^3*b^3*c^2 + 16*a^4*b*c^3)*x^6 + (a^2*b^6 - 6*a^3*b^4*c + 32*a^5*c^3)*x^4
 + 2*(a^3*b^5 - 8*a^4*b^3*c + 16*a^5*b*c^2)*x^2) - 3/8*integrate(-(16*a^2*c
^2*e*x + (b^3*c - 8*a*b*c^2)*d*x^2 + (b^4 - 9*a*b^2*c + 28*a^2*c^2)*d)/(c*x
^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)
```

mupad [B] time = 2.34, size = 4225, normalized size = 8.91

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x)/(a + b*x^2 + c*x^4)^3,x)
```

```
[Out] symsum(log(root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 +
 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a
^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5
*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a
^15*c^10*z^4 + 65536*a^5*b^20*z^4 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 246487
4496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^
2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 7
54974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 - 188743680*a^
7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 + 23592960*a^6*b^8*c^5*e
^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 177
1776*a^2*b^15*c^2*d^2*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 2304*b^19*d^2*z^2
 - 428544*a*b^12*c^3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a
^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z - 46725120*a^3*b^8*c^5*d
^2*e*z + 5930496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 13824*b
^14*c^2*d^2*e*z + 34836480*a^4*b*c^8*d^2*e^2 - 435456*a*b^7*c^5*d^2*e^2 - 1
7418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 20736*b^9*c^4*d
^2*e^2 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 734832*a*b^6*
c^6*d^4 + 49787136*a^4*c^9*d^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z
, k)*(root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 4718
5920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b
^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4
+ 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c
^10*z^4 + 65536*a^5*b^20*z^4 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*
a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8
*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974
720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 - 188743680*a^7*b^6
*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^
2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*
a^2*b^15*c^2*d^2*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 2304*b^19*d^2*z^2 - 42
8544*a*b^12*c^3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^
4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z - 46725120*a^3*b^8*c^5*d^2*e*
z + 5930496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 13824*b^14*c
^2*d^2*e*z + 34836480*a^4*b*c^8*d^2*e^2 - 435456*a*b^7*c^5*d^2*e^2 - 174182
40*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 20736*b^9*c^4*d^2*e^
2 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 734832*a*b^6*c^6*d
^4 + 49787136*a^4*c^9*d^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*
((x*(786432*a^9*c^9*e - 768*a^4*b^10*c^4*e + 15360*a^5*b^8*c^5*e - 122880*a
^6*b^6*c^6*e + 491520*a^7*b^4*c^7*e - 983040*a^8*b^2*c^8*e))/(32*(a^4*b^12
+ 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840
*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - (3*(7340032*a^9*c^9*d - 256*a^2*b^14*c^
2*d + 7424*a^3*b^12*c^3*d - 94208*a^4*b^10*c^4*d + 675840*a^5*b^8*c^5*d - 2
949120*a^6*b^6*c^6*d + 7798784*a^7*b^4*c^7*d - 11534336*a^8*b^2*c^8*d))/(51
2*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^
```

6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (root(56371445760*a^11*b^8*
c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 17179869
1840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b
^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 -
2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 + 6
936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280
*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^
7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054
656*a^5*b^9*c^5*d^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^1
1*c^4*d^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^
2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 120795955
2*a^10*c^9*e^2*z^2 + 2304*b^19*d^2*z^2 - 428544*a*b^12*c^3*d^2*e*z + 102275
4816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^
6*c^6*d^2*e*z - 46725120*a^3*b^8*c^5*d^2*e*z + 5930496*a^2*b^10*c^4*d^2*e*z
 - 693633024*a^7*c^9*d^2*e*z + 13824*b^14*c^2*d^2*e*z + 34836480*a^4*b*c^8*
d^2*e^2 - 435456*a*b^7*c^5*d^2*e^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104
*a^2*b^5*c^6*d^2*e^2 + 20736*b^9*c^4*d^2*e^2 - 27433728*a^3*b^2*c^8*d^4 + 6
446304*a^2*b^4*c^7*d^4 - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 5308
416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*x*(4194304*a^11*b*c^9 - 256*a^4*
b^15*c^2 + 7168*a^5*b^13*c^3 - 86016*a^6*b^11*c^4 + 573440*a^7*b^9*c^5 - 22
93760*a^8*b^7*c^6 + 5505024*a^9*b^5*c^7 - 7340032*a^10*b^3*c^8))/(32*(a^4*b
^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 +
3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))) + (3*(1081344*a^6*b*c^8*d*e + 1536*a
^2*b^9*c^4*d*e - 29184*a^3*b^7*c^5*d*e + 227328*a^4*b^5*c^6*d*e - 811008*a^
5*b^3*c^7*d*e))/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^
8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - (x*(2257
92*a^6*c^9*d^2 + 9*b^12*c^3*d^2 - 252*a*b^10*c^4*d^2 - 36864*a^6*b*c^8*e^2
+ 3114*a^2*b^8*c^5*d^2 - 21312*a^3*b^6*c^6*d^2 + 88128*a^4*b^4*c^7*d^2 - 21
1968*a^5*b^2*c^8*d^2 - 2304*a^4*b^5*c^6*e^2 + 18432*a^5*b^3*c^7*e^2))/(32*(
a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c
^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))) + (3*(3456*a*b^5*c^6*d^3 - 189*
b^7*c^5*d^3 + 56448*a^3*b*c^8*d^3 + 64512*a^4*c^8*d*e^2 - 22608*a^2*b^3*c^7
*d^3 + 2304*a^2*b^4*c^6*d*e^2 - 20736*a^3*b^2*c^7*d*e^2))/(512*(a^4*b^12 +
4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a
^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(6912*a^4*c^8*e^3 - 27*b^7*c^5*d^2*e +
 486*a*b^5*c^6*d^2*e + 12096*a^3*b*c^8*d^2*e - 3672*a^2*b^3*c^7*d^2*e))/(32
*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6
*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)))*root(56371445760*a^11*b^8*c^6
*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 17179869184
0*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*
c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 262
1440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 + 6936
330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^
9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d
^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656
*a^5*b^9*c^5*d^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c
^4*d^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 -
 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1207959552*a
^10*c^9*e^2*z^2 + 2304*b^19*d^2*z^2 - 428544*a*b^12*c^3*d^2*e*z + 102275481
6*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c
^6*d^2*e*z - 46725120*a^3*b^8*c^5*d^2*e*z + 5930496*a^2*b^10*c^4*d^2*e*z -
693633024*a^7*c^9*d^2*e*z + 13824*b^14*c^2*d^2*e*z + 34836480*a^4*b*c^8*d^2
*e^2 - 435456*a*b^7*c^5*d^2*e^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^
2*b^5*c^6*d^2*e^2 + 20736*b^9*c^4*d^2*e^2 - 27433728*a^3*b^2*c^8*d^4 + 6446
304*a^2*b^4*c^7*d^4 - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 5308416
*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k), k, 1, 4) + ((x^2*(5*a*c^2*e + b^2*
c*e))/(b^4 + 16*a^2*c^2 - 8*a*b^2*c) - (b^3*e - 10*a*b*c*e)/(4*(b^4 + 16*a^
2*c^2 - 8*a*b^2*c)) + (3*c^3*e*x^6)/(b^4 + 16*a^2*c^2 - 8*a*b^2*c) + (9*b*c
^2*e*x^4)/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (d*x^3*(4*a^2*b*c^2 - 3*b^5

```
+ 20*a*b^3*c))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (d*x*(5*b^4 + 44*a^
2*c^2 - 37*a*b^2*c))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (d*x^5*(6*b^4*c
 + 28*a^2*c^3 - 49*a*b^2*c^2))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*
c*d*x^7*(b^3*c - 8*a*b*c^2))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(
2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x**4+b*x**2+a)**3,x)
```

```
[Out] Timed out
```

3.53 $\int \frac{d+ex+fx^2}{(a+bx^2+cx^4)^3}\,dx$

Optimal. Leaf size=621

$$\frac{x\left(cx^2\left(20a^2cf+ab^2f-24abcd+3b^3d\right)+8a^2bcf+28a^2c^2d+ab^3f-25ab^2cd+3b^4d\right)}{8a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\left(-\frac{-52a^2bcf+168a^2c^2d+}{\sqrt{b^2-}}\right.}{}$$

```
[Out] -1/4*e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/4*x*(b^2*d-2*a*c*d-a*b*
f+c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+3/2*c*e*(2*c*x^2+b)/
(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/8*x*(3*b^4*d-25*a*b^2*c*d+28*a^2*c^2*d+a*b
^3*f+8*a^2*b*c*f+c*(20*a^2*c*f+a*b^2*f-24*a*b*c*d+3*b^3*d)*x^2)/a^2/(-4*a*c
+b^2)^2/(c*x^4+b*x^2+a)-6*c^2*e*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/(-4
*a*c+b^2)^(5/2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))
*c^(1/2)*(3*b^4*d+b^3*(a*f+3*d*(-4*a*c+b^2)^(1/2))-4*a*b*c*(13*a*f+6*d*(-4*
a*c+b^2)^(1/2))-a*b^2*(30*c*d-f*(-4*a*c+b^2)^(1/2))+4*a^2*c*(42*c*d+5*f*(-4
*a*c+b^2)^(1/2)))/a^2/(-4*a*c+b^2)^(5/2)*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/
2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(3*b
^3*d-24*a*b*c*d+a*b^2*f+20*a^2*c*f+(52*a^2*b*c*f-168*a^2*c^2*d-a*b^3*f+30*a
*b^2*c*d-3*b^4*d)/(-4*a*c+b^2)^(1/2))/a^2/(-4*a*c+b^2)^2*2^(1/2)/(b+(-4*a*c
+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 4.51, antiderivative size = 621, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.360, Rules used = {1673, 1178, 1166, 205, 12, 1107, 614, 618, 206}

$$\frac{x\left(cx^2\left(20a^2cf+ab^2f-24abcd+3b^3d\right)+8a^2bcf+28a^2c^2d-25ab^2cd+ab^3f+3b^4d\right)}{8a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\left(-\frac{-52a^2bcf+168a^2c^2d-}{\sqrt{b^2-}}\right.}{}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4)^3,x]
```

```
[Out] -(e*(b + 2*c*x^2))/(4*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (x*(b^2*d - 2*
a*c*d - a*b*f + c*(b*d - 2*a*f)*x^2))/(4*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4
)^2) + (3*c*e*(b + 2*c*x^2))/(2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (x*(
3*b^4*d - 25*a*b^2*c*d + 28*a^2*c^2*d + a*b^3*f + 8*a^2*b*c*f + c*(3*b^3*d
- 24*a*b*c*d + a*b^2*f + 20*a^2*c*f)*x^2))/(8*a^2*(b^2 - 4*a*c)^2*(a + b*x^
2 + c*x^4)) + (Sqrt[c]*(3*b^4*d + b^3*(3*Sqrt[b^2 - 4*a*c]*d + a*f) - 4*a*b
*c*(6*Sqrt[b^2 - 4*a*c]*d + 13*a*f) - a*b^2*(30*c*d - Sqrt[b^2 - 4*a*c]*f)
+ 4*a^2*c*(42*c*d + 5*Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt
[b - Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b - Sqrt[
b^2 - 4*a*c]]) + (Sqrt[c]*(3*b^3*d - 24*a*b*c*d + a*b^2*f + 20*a^2*c*f - (3
*b^4*d - 30*a*b^2*c*d + 168*a^2*c^2*d + a*b^3*f - 52*a^2*b*c*f)/Sqrt[b^2 -
4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]
*a^2*(b^2 - 4*a*c)^2*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - (6*c^2*e*ArcTanh[(b + 2
*c*x^2)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(5/2)
```

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 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2}{\left(a+bx^2+cx^4\right)^3}\,dx = \int \frac{ex}{\left(a+bx^2+cx^4\right)^3}\,dx + \int \frac{d+fx^2}{\left(a+bx^2+cx^4\right)^3}\,dx$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} - \frac{\int \frac{-3b^2d+14acd-abf-5c(bd-2af)x^2}{\left(a+bx^2+cx^4\right)^2}\,dx}{4a\left(b^2-4ac\right)} + e\int \frac{}{\left(a+bx^2\right.}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{x\left(3b^4d-25ab^2cd+28a^2c^2d+ab^3f+8a^2bcf\right.}{8a^2\left(b^2-4ac\right)^2\left(a\right.}$$

$$= -\frac{e\left(b+2cx^2\right)}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{x\left(3b^4d-25\right.}{}$$

$$= -\frac{e\left(b+2cx^2\right)}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{3ce\left(b\right.}{2\left(b^2-4ac\right)^2}$$

$$= -\frac{e\left(b+2cx^2\right)}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{3ce\left(b\right.}{2\left(b^2-4ac\right)^2}$$

$$= -\frac{e\left(b+2cx^2\right)}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{3ce\left(b\right.}{2\left(b^2-4ac\right)^2}$$

Mathematica [A] time = 3.61, size = 625, normalized size = 1.01

$$\frac{1}{16}\left(\frac{8a^2c\left(b(3e+2fx)+cx\left(7d+6ex+5fx^2\right)\right)+2abx\left(b^2f-25bcd+bcfx^2-24c^2dx^2\right)+6b^3dx\left(b+cx^2\right)}{a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)} + \frac{\sqrt{2}}{}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4)^3,x]
```

```
[Out] ((4*a*b*(e + f*x) - 4*b*d*x*(b + c*x^2) + 8*a*c*x*(d + x*(e + f*x)))/(a*(-b
^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (6*b^3*d*x*(b + c*x^2) + 2*a*b*x*(-25*
b*c*d + b^2*f - 24*c^2*d*x^2 + b*c*f*x^2) + 8*a^2*c*(b*(3*e + 2*f*x) + c*x*
(7*d + 6*e*x + 5*f*x^2)))/(a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (Sqrt
[2]*Sqrt[c]*(3*b^4*d + b^3*(3*Sqrt[b^2 - 4*a*c]*d + a*f) - 4*a*b*c*(6*Sqrt[
b^2 - 4*a*c]*d + 13*a*f) + a*b^2*(-30*c*d + Sqrt[b^2 - 4*a*c]*f) + 4*a^2*c*
(42*c*d + 5*Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[
b^2 - 4*a*c]]])/(a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sq
rt[2]*Sqrt[c]*(-3*b^4*d + b^3*(3*Sqrt[b^2 - 4*a*c]*d - a*f) + 4*a*b*c*(-6*S
qrt[b^2 - 4*a*c]*d + 13*a*f) + a*b^2*(30*c*d + Sqrt[b^2 - 4*a*c]*f) + 4*a^2
*c*(-42*c*d + 5*Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + S
qrt[b^2 - 4*a*c]]])/(a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) +
 (48*c^2*e*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(5/2) - (48
*c^2*e*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(5/2))/16
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 10.79, size = 5288, normalized size = 8.52

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="giac")
```

```
[Out] -3*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(a
^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*
b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^
2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^
6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 -
 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c
^4 - 64*a^3*c^5)*c^2) + 3*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*
a*c)*e*log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5
- 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a
^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^
4*c^3))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*
c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a
^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^2) + 1/32*(3*(sqrt(2)*sqrt(b*c +
sqrt(b^2 - 4*a*c)*c)*b^8 - 17*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6
*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^7*c - 2*b^8*c + 116*sqrt(2
)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + 26*sqrt(2)*sqrt(b*c + sqrt(
b^2 - 4*a*c)*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^6*c^2
 + 34*a*b^6*c^2 + 2*b^7*c^2 - 368*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 - 13*s
qrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^3 - 232*a^2*b^4*c^3 - 30*a*b
^5*c^3 + 448*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*c^4 + 224*sqrt(2)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 64*sqrt(2)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176*a^2*b^3*c^4 - 112*sqrt(2)*s
qrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^5 - 896*a^4*c^5 - 352*a^3*b*c^5 - sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^7 + 15*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c + 2*sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^6*c - 88*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 - 22*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sq
rt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^2 + 176*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 + 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 11*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 - 44*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
+ sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 + 2*(b^2 - 4*a*c)*b^6*c - 26*(b^2 - 4*a*c)
*a*b^4*c^2 - 2*(b^2 - 4*a*c)*b^5*c^2 + 128*(b^2 - 4*a*c)*a^2*b^2*c^3 + 22*(
b^2 - 4*a*c)*a*b^3*c^3 - 224*(b^2 - 4*a*c)*a^3*c^4 - 88*(b^2 - 4*a*c)*a^2*b
*c^4)*d + (sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^7 - 24*sqrt(2)*sqrt(
b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*
c)*c)*a*b^6*c - 2*a*b^7*c + 144*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3
*b^3*c^2 + 40*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + sqrt(2)
*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + 48*a^2*b^5*c^2 + 2*a*b^6*c^2 -
 256*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b*c^3 - 128*sqrt(2)*sqrt(b
*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 20*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*
```

a*c)*c)*a^2*b^3*c^3 - 288*a^3*b^3*c^3 - 44*a^2*b^4*c^3 + 64*sqrt(2)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 512*a^4*b*c^4 + 64*a^3*b^2*c^4 + 320*a
^4*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6 +
22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c + 2*
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c - 32*sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^2 - 36*sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 - sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 - 160*sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*c^3 - 80*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 + 18*sqrt(2)*sqrt(b
^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 40*sqrt(2)*sqrt(b
^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^4 + 2*(b^2 - 4*a*c)*a*b^5
c - 40(b^2 - 4*a*c)*a^2*b^3*c^2 - 2*(b^2 - 4*a*c)*a*b^4*c^2 + 128*(b^2 -
4*a*c)*a^3*b*c^3 + 36*(b^2 - 4*a*c)*a^2*b^2*c^3 + 80*(b^2 - 4*a*c)*a^3*c^4)
*f)*arctan(2*sqrt(1/2)*x/sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + sqrt(
(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^
5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^
2 + 16*a^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c - 2*a^3*b^7*c + 96*a^5*b^4*c^2 +
24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^3 - 96*a^5*b^3*c^3 - 12*a^4*b
^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*b^2*c^4 - 64*a^6*c^5)*abs(c))
+ 1/32*(3*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^8 - 17*sqrt(2)*sqrt(b
*c - sqrt(b^2 - 4*a*c)*c)*a*b^6*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*
c)*b^7*c + 2*b^8*c + 116*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^
2 + 26*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c
- sqrt(b^2 - 4*a*c)*c)*b^6*c^2 - 34*a*b^6*c^2 - 2*b^7*c^2 - 368*sqrt(2)*sq
rt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c - sqrt(b^2
- 4*a*c)*c)*a^2*b^3*c^3 - 13*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4
*c^3 + 232*a^2*b^4*c^3 + 30*a*b^5*c^3 + 448*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4
*a*c)*c)*a^4*c^4 + 224*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 +
64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^4 - 736*a^3*b^2*c^4 -
176*a^2*b^3*c^4 - 112*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^5 + 896
*a^4*c^5 + 352*a^3*b*c^5 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 -
4*a*c)*c)*b^7 - 15*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a*b^5*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^6
*c + 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c
^2 + 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2
+ sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^5*c^2 - 176*
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 - 88*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 11*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 + 44*sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 - 2*(b^2 -
4*a*c)*b^6*c + 26*(b^2 - 4*a*c)*a*b^4*c^2 + 2*(b^2 - 4*a*c)*b^5*c^2 - 128*(
b^2 - 4*a*c)*a^2*b^2*c^3 - 22*(b^2 - 4*a*c)*a*b^3*c^3 + 224*(b^2 - 4*a*c)*a
^3*c^4 + 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a
*c)*c)*a*b^7 - 24*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c - 2*sqr
t(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^6*c + 2*a*b^7*c + 144*sqrt(2)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^2 + 40*sqrt(2)*sqrt(b*c - sqrt(b^2 -
4*a*c)*c)*a^2*b^4*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 -
48*a^2*b^5*c^2 - 2*a*b^6*c^2 - 256*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)
*a^4*b*c^3 - 128*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 20*s
qrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 + 288*a^3*b^3*c^3 + 44*a
^2*b^4*c^3 + 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 - 512*a^4
*b*c^4 - 64*a^3*b^2*c^4 - 320*a^4*c^5 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
- sqrt(b^2 - 4*a*c)*c)*a*b^6 - 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt
(b^2 - 4*a*c)*c)*a^2*b^4*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^
2 - 4*a*c)*c)*a*b^5*c + 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 -
4*a*c)*c)*a^3*b^2*c^2 + 36*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 -
4*a*c)*c)*a^2*b^3*c^2 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a
*c)*c)*a*b^4*c^2 + 160*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*

```
c)*c)*a^4*c^3 + 80*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a^3*b*c^3 - 18*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*
a^2*b^2*c^3 - 40*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*
a^3*c^4 - 2*(b^2 - 4*a*c)*a*b^5*c + 40*(b^2 - 4*a*c)*a^2*b^3*c^2 + 2*(b^2 -
 4*a*c)*a*b^4*c^2 - 128*(b^2 - 4*a*c)*a^3*b*c^3 - 36*(b^2 - 4*a*c)*a^2*b^2*
c^3 - 80*(b^2 - 4*a*c)*a^3*c^4)*f)*arctan(2*sqrt(1/2)*x/sqrt((a^2*b^5 - 8*a
^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4
*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c
^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c -
 2*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*
c^3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^
5*b^2*c^4 - 64*a^6*c^5)*abs(c)) + 1/8*(3*b^3*c^2*d*x^7 - 24*a*b*c^3*d*x^7 +
 a*b^2*c^2*f*x^7 + 20*a^2*c^3*f*x^7 + 24*a^2*c^3*x^6*e + 6*b^4*c*d*x^5 - 49
*a*b^2*c^2*d*x^5 + 28*a^2*c^3*d*x^5 + 2*a*b^3*c*f*x^5 + 28*a^2*b*c^2*f*x^5
+ 36*a^2*b*c^2*x^4*e + 3*b^5*d*x^3 - 20*a*b^3*c*d*x^3 - 4*a^2*b*c^2*d*x^3 +
 a*b^4*f*x^3 + 5*a^2*b^2*c*f*x^3 + 36*a^3*c^2*f*x^3 + 8*a^2*b^2*c*x^2*e + 4
0*a^3*c^2*x^2*e + 5*a*b^4*d*x - 37*a^2*b^2*c*d*x + 44*a^3*c^2*d*x - a^2*b^3
*f*x + 16*a^3*b*c*f*x - 2*a^2*b^3*e + 20*a^3*b*c*e)/((a^2*b^4 - 8*a^3*b^2*c
 + 16*a^4*c^2)*(c*x^4 + b*x^2 + a)^2)
```

maple [B] time = 0.62, size = 7858, normalized size = 12.65

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x)
```

```
[Out] result too large to display
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="maxima")
```

```
[Out] 1/8*(24*a^2*c^3*e*x^6 + 36*a^2*b*c^2*e*x^4 + (3*(b^3*c^2 - 8*a*b*c^3)*d + (
a*b^2*c^2 + 20*a^2*c^3)*f)*x^7 + ((6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3)*d +
 2*(a*b^3*c + 14*a^2*b*c^2)*f)*x^5 + 8*(a^2*b^2*c + 5*a^3*c^2)*e*x^2 + ((3*
b^5 - 20*a*b^3*c - 4*a^2*b*c^2)*d + (a*b^4 + 5*a^2*b^2*c + 36*a^3*c^2)*f)*x
^3 - 2*(a^2*b^3 - 10*a^3*b*c)*e + ((5*a*b^4 - 37*a^2*b^2*c + 44*a^3*c^2)*d
- (a^2*b^3 - 16*a^3*b*c)*f)*x)/((a^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4)*
x^8 + a^4*b^4 - 8*a^5*b^2*c + 16*a^6*c^2 + 2*(a^2*b^5*c - 8*a^3*b^3*c^2 + 1
6*a^4*b*c^3)*x^6 + (a^2*b^6 - 6*a^3*b^4*c + 32*a^5*c^3)*x^4 + 2*(a^3*b^5 -
8*a^4*b^3*c + 16*a^5*b*c^2)*x^2) + 1/8*integrate((48*a^2*c^2*e*x + (3*(b^3*
c - 8*a*b*c^2)*d + (a*b^2*c + 20*a^2*c^2)*f)*x^2 + 3*(b^4 - 9*a*b^2*c + 28*
a^2*c^2)*d + (a*b^3 - 16*a^2*b*c)*f)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a
^3*b^2*c + 16*a^4*c^2)
```

mupad [B] time = 3.26, size = 8689, normalized size = 13.99

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2)/(a + b*x^2 + c*x^4)^3,x)
```

```
[Out] ((x^2*(5*a*c^2*e + b^2*c*e))/(b^4 + 16*a^2*c^2 - 8*a*b^2*c) - (b^3*e - 10*a
*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^5*(28*a^2*c^3*d + 6*b^4*c*d
 + 2*a*b^3*c*f - 49*a*b^2*c^2*d + 28*a^2*b*c^2*f))/(8*a^2*(b^4 + 16*a^2*c^2
```

```
 - 8*a*b^2*c)) + (x*(5*b^4*d + 44*a^2*c^2*d - a*b^3*f - 37*a*b^2*c*d + 16*a
^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*c^3*e*x^6)/(b^4 + 16*a
^2*c^2 - 8*a*b^2*c) + (x^3*(3*b^5*d + 36*a^3*c^2*f + a*b^4*f - 20*a*b^3*c*d
 - 4*a^2*b*c^2*d + 5*a^2*b^2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) +
 (9*b*c^2*e*x^4)/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^7*(20*a^2*c^2*f
+ 3*b^3*c*d - 24*a*b*c^2*d + a*b^2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2
*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6) + symsum(
log(root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 471859
20*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4
*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 +
3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^1
0*z^4 + 65536*a^5*b^20*z^4 - 73728*a^2*b^16*c*d*f*z^2 - 1321205760*a^9*b^2*
c^8*d*f*z^2 + 732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2
 - 330301440*a^8*b^4*c^7*d*f*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 15175680
*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 440401920*a^10*b*c^8
*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330
240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b
*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*
z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^
5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 174325760*a^8*b^5*c^6*f
^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 + 1
1206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^
8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2
 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^
2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 25
6*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216
*a*b^13*c^2*d*e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^5*b^5*c^6
*d*e*f*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350
208*a^2*b^11*c^3*d*e*f*z - 428544*a*b^12*c^3*d^2*e*z + 1022754816*a^6*b^2*c
^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z
 - 50724864*a^7*b^2*c^7*e*f^2*z + 26542080*a^6*b^4*c^6*e*f^2*z - 46725120*a^
3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z + 1013760*a^4*b^8*c^4*e*f^2
*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930496*a^2*b
^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f^2*z + 13
824*b^14*c^2*d^2*e*z + 13824*a*b^8*c^4*d*e^2*f - 7741440*a^4*b^2*c^7*d*e^2*
f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 37310976*a^3
*b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 8
068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5*
d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7*
c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f - 4262400
*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 35525376
*a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f
^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*
b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^
2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c^4*d^2*e^
2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4
 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^
4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 160
000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*(root(5637
1445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c
^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 12
8849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^
9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536
*a^5*b^20*z^4 - 73728*a^2*b^16*c*d*f*z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 +
 732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*
a^8*b^4*c^7*d*f*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 15175680*a^4*b^12*c^3
*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 440401920*a^10*b*c^8*f^2*z^2 + 17
61607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c
^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2
```

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- 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a
*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2
*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 1887
43680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 + 11206656*a^7*b
^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2
 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^
3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^
2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 256*a^2*b^17*f^
2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^13*c^2*d
*e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^5*b^5*c^6*d*e*f*z - 32
440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*
c^3*d*e*f*z - 428544*a*b^12*c^3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z -
642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z - 50724864*a^
7*b^2*c^7*e*f^2*z + 26542080*a^6*b^4*c^6*e*f^2*z - 46725120*a^3*b^8*c^5*d^2
*e*z - 7127040*a^5*b^6*c^5*e*f^2*z + 1013760*a^4*b^8*c^4*e*f^2*z - 69120*a^
3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930496*a^2*b^10*c^4*d^2*e
*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*
d^2*e*z + 13824*a*b^8*c^4*d*e^2*f - 7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a
^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 37310976*a^3*b^3*c^7*d^3*
f + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 8068032*a^2*b^
5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5*d*f^3 - 26019
0*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 -
 75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f - 4262400*a^5*b*c^7*d*
f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 35525376*a^4*b^2*c^7*
d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2
*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f
^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 11025*b^1
0*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c^4*d^2*e^2 + 492800*a^
5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b
^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9
*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f
^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*((768*a^2*b^14*c^2*d -
22020096*a^9*c^9*d - 22272*a^3*b^12*c^3*d + 282624*a^4*b^10*c^4*d - 2027520
*a^5*b^8*c^5*d + 8847360*a^6*b^6*c^6*d - 23396352*a^7*b^4*c^7*d + 34603008*
a^8*b^2*c^8*d + 256*a^3*b^13*c^2*f - 9216*a^4*b^11*c^3*f + 122880*a^5*b^9*c
^4*f - 819200*a^6*b^7*c^5*f + 2949120*a^7*b^5*c^6*f - 5505024*a^8*b^3*c^7*f
 + 4194304*a^9*b*c^8*f)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 24
0*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) +
(x*(786432*a^9*c^9*e - 768*a^4*b^10*c^4*e + 15360*a^5*b^8*c^5*e - 122880*a^
6*b^6*c^6*e + 491520*a^7*b^4*c^7*e - 983040*a^8*b^2*c^8*e))/(32*(a^4*b^12 +
 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*
a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (root(56371445760*a^11*b^8*c^6*z^4 - 503
316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2
*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 -
16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b
^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 73728*a^2*b^16
*c*d*f*z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 + 732168192*a^7*b^6*c^6*d*f*z^2
 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 96583680
*a^5*b^10*c^4*d*f*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^
2*d*f*z^2 - 440401920*a^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14
080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^
7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z
^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^
8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f
^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 14
6165760*a^4*b^11*c^4*d^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b
^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^
2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a
^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 +
```

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1207959552*a^10*c^9*e^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 16
9869312*a^7*b*c^8*d*e*f*z + 9216*a*b^13*c^2*d*e*f*z - 221773824*a^6*b^3*c^7
*d*e*f*z + 117964800*a^5*b^5*c^6*d*e*f*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4
792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z - 428544*a*b^12*c^
3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z
+ 223395840*a^4*b^6*c^6*d^2*e*z - 50724864*a^7*b^2*c^7*e*f^2*z + 26542080*a
^6*b^4*c^6*e*f^2*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f
^2*z + 1013760*a^4*b^8*c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*
b^12*c^2*e*f^2*z + 5930496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z
 + 39321600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z + 13824*a*b^8*c^4*d*e^
2*f - 7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^
2*b^6*c^5*d*e^2*f + 37310976*a^3*b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2
+ 34836480*a^4*b*c^8*d^2*e^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*
c^6*d*f^3 + 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a
^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15
482880*a^5*c^8*d*e^2*f - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f +
 7350*a*b^9*c^3*d*f^3 + 35525376*a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e
^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^
3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*
e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^
8*d^2*f^2 + 20736*b^9*c^4*d^2*e^2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4
*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*
c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*
d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 357
21*b^8*c^5*d^4, z, k)*x*(4194304*a^11*b*c^9 - 256*a^4*b^15*c^2 + 7168*a^5*b
^13*c^3 - 86016*a^6*b^11*c^4 + 573440*a^7*b^9*c^5 - 2293760*a^8*b^7*c^6 + 5
505024*a^9*b^5*c^7 - 7340032*a^10*b^3*c^8))/(32*(a^4*b^12 + 4096*a^10*c^6 -
 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 61
44*a^9*b^2*c^5))) + (3244032*a^6*b*c^8*d*e - 983040*a^7*c^8*e*f + 4608*a^2*
b^9*c^4*d*e - 87552*a^3*b^7*c^5*d*e + 681984*a^4*b^5*c^6*d*e - 2433024*a^5*
b^3*c^7*d*e + 1536*a^3*b^8*c^4*e*f - 39936*a^4*b^6*c^5*e*f + 184320*a^5*b^4
*c^6*e*f + 49152*a^6*b^2*c^7*e*f)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b
^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^
2*c^5)) - (x*(225792*a^6*c^9*d^2 + 9*b^12*c^3*d^2 - 12800*a^7*c^8*f^2 - 252
*a*b^10*c^4*d^2 - 36864*a^6*b*c^8*e^2 + 3114*a^2*b^8*c^5*d^2 - 21312*a^3*b^
6*c^6*d^2 + 88128*a^4*b^4*c^7*d^2 - 211968*a^5*b^2*c^8*d^2 - 2304*a^4*b^5*c
^6*e^2 + 18432*a^5*b^3*c^7*e^2 + a^2*b^10*c^3*f^2 - 42*a^3*b^8*c^4*f^2 + 17
60*a^4*b^6*c^5*f^2 - 13120*a^5*b^4*c^6*f^2 + 29952*a^6*b^2*c^7*f^2 + 6*a*b^
11*c^3*d*f - 109056*a^6*b*c^8*d*f - 210*a^2*b^9*c^4*d*f + 2496*a^3*b^7*c^5*
d*f - 18240*a^4*b^5*c^6*d*f + 72192*a^5*b^3*c^7*d*f))/(32*(a^4*b^12 + 4096*
a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^
4*c^4 - 6144*a^9*b^2*c^5))) - (567*b^7*c^5*d^3 + 8000*a^5*c^7*f^3 - 10368*a
*b^5*c^6*d^3 - 169344*a^3*b*c^8*d^3 - 193536*a^4*c^8*d*e^2 + 141120*a^4*c^8
*d^2*f - 315*b^8*c^4*d^2*f + 67824*a^2*b^3*c^7*d^3 - 35*a^2*b^6*c^4*f^3 - 8
4*a^3*b^4*c^5*f^3 + 12720*a^4*b^2*c^6*f^3 + 6237*a*b^6*c^5*d^2*f - 210*a*b^
7*c^4*d*f^2 - 116160*a^4*b*c^7*d*f^2 + 36864*a^4*b*c^7*e^2*f - 6912*a^2*b^4
*c^6*d*e^2 + 62208*a^3*b^2*c^7*d*e^2 - 42372*a^2*b^4*c^6*d^2*f + 1764*a^2*b
^5*c^5*d*f^2 + 96048*a^3*b^2*c^7*d^2*f + 4608*a^3*b^3*c^6*d*f^2 - 2304*a^3*
b^3*c^6*e^2*f)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8
*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(6912*
a^4*c^8*e^3 - 27*b^7*c^5*d^2*e - 10080*a^4*c^8*d*e*f + 486*a*b^5*c^6*d^2*e
+ 12096*a^3*b*c^8*d^2*e + 3120*a^4*b*c^7*e*f^2 - 3672*a^2*b^3*c^7*d^2*e - 3
*a^2*b^5*c^5*e*f^2 + 96*a^3*b^3*c^6*e*f^2 - 18*a*b^6*c^5*d*e*f + 450*a^2*b^
4*c^6*d*e*f - 2448*a^3*b^2*c^7*d*e*f))/(32*(a^4*b^12 + 4096*a^10*c^6 - 24*a
^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^
9*b^2*c^5)))*root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4
 + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320
*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c
^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736
```

```
*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 73728*a^2*b^16*c*d*f*z^2 - 1321205760
*a^9*b^2*c^8*d*f*z^2 + 732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^
5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 -
 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 440401920*a
^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2
+ 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617
280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5
*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730
054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 174325760*a^8*
b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^
2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 235929
60*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2
*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1
771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2
*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f
*z + 9216*a*b^13*c^2*d*e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^
5*b^5*c^6*d*e*f*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*
f*z - 350208*a^2*b^11*c^3*d*e*f*z - 428544*a*b^12*c^3*d^2*e*z + 1022754816*
a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6
*d^2*e*z - 50724864*a^7*b^2*c^7*e*f^2*z + 26542080*a^6*b^4*c^6*e*f^2*z - 46
725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z + 1013760*a^4*b^8*
c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930
496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f
^2*z + 13824*b^14*c^2*d^2*e*z + 13824*a*b^8*c^4*d*e^2*f - 7741440*a^4*b^2*c
^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 373
10976*a^3*b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^
2*e^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3
*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 4354
56*a*b^7*c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f
- 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 +
 35525376*a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*
c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 287
0784*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c
^6*d^2*e^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c
^4*d^2*e^2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^
6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b
^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*
d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k),
k, 1, 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(c*x**4+b*x**2+a)**3,x)
[Out] Timed out
```

3.54 $\int \frac{d+ex+fx^2+gx^3}{\left(a+bx^2+cx^4\right)^3} \, dx$

Optimal. Leaf size=646

$$\frac{x\left(cx^2\left(20a^2cf+ab^2f-24abcd+3b^3d\right)+8a^2bcf+28a^2c^2d+ab^3f-25ab^2cd+3b^4d\right)}{8a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\left(-\frac{-52a^2bcf+168a^2c^2d+}{\sqrt{b^2-}}\right.}{}$$

```
[Out] 1/4*x*(b^2*d-2*a*c*d-a*b*f+c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+
a)^2+1/4*(-b*e+2*a*g-(-b*g+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+3/4*(
-b*g+2*c*e)*(2*c*x^2+b)/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/8*x*(3*b^4*d-25*a*
b^2*c*d+28*a^2*c^2*d+a*b^3*f+8*a^2*b*c*f+c*(20*a^2*c*f+a*b^2*f-24*a*b*c*d+3
*b^3*d)*x^2)/a^2/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)-3*c*(-b*g+2*c*e)*arctanh((2
*c*x^2+b)/(-4*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(5/2)+1/16*arctan(x*2^(1/2)*c^(1
/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(3*b^4*d+b^3*(a*f+3*d*(-4*a*c+b^2
)^(1/2))-4*a*b*c*(13*a*f+6*d*(-4*a*c+b^2)^(1/2))-a*b^2*(30*c*d-f*(-4*a*c+b^
2)^(1/2))+4*a^2*c*(42*c*d+5*f*(-4*a*c+b^2)^(1/2)))/a^2/(-4*a*c+b^2)^(5/2)*2
^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*
c+b^2)^(1/2))^(1/2))*c^(1/2)*(3*b^3*d-24*a*b*c*d+a*b^2*f+20*a^2*c*f+(52*a^2
*b*c*f-168*a^2*c^2*d-a*b^3*f+30*a*b^2*c*d-3*b^4*d)/(-4*a*c+b^2)^(1/2))/a^2/
(-4*a*c+b^2)^2*2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 3.30, antiderivative size = 646, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.300, Rules used = {1673, 1178, 1166, 205, 1247, 638, 614, 618, 206}

$$\frac{x\left(cx^2\left(20a^2cf+ab^2f-24abcd+3b^3d\right)+8a^2bcf+28a^2c^2d-25ab^2cd+ab^3f+3b^4d\right)}{8a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\left(-\frac{-52a^2bcf+168a^2c^2d-}{\sqrt{b^2-}}\right.}{}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^3,x]
```

```
[Out] (x*(b^2*d - 2*a*c*d - a*b*f + c*(b*d - 2*a*f)*x^2))/(4*a*(b^2 - 4*a*c)*(a +
 b*x^2 + c*x^4)^2) - (b*e - 2*a*g + (2*c*e - b*g)*x^2)/(4*(b^2 - 4*a*c)*(a
+ b*x^2 + c*x^4)^2) + (3*(2*c*e - b*g)*(b + 2*c*x^2))/(4*(b^2 - 4*a*c)^2*(a
 + b*x^2 + c*x^4)) + (x*(3*b^4*d - 25*a*b^2*c*d + 28*a^2*c^2*d + a*b^3*f +
8*a^2*b*c*f + c*(3*b^3*d - 24*a*b*c*d + a*b^2*f + 20*a^2*c*f)*x^2))/(8*a^2*
(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (Sqrt[c]*(3*b^4*d + b^3*(3*Sqrt[b^2
- 4*a*c]*d + a*f) - 4*a*b*c*(6*Sqrt[b^2 - 4*a*c]*d + 13*a*f) - a*b^2*(30*c*
d - Sqrt[b^2 - 4*a*c]*f) + 4*a^2*c*(42*c*d + 5*Sqrt[b^2 - 4*a*c]*f))*ArcTan
[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*(b^2 - 4*
a*c)^(5/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[c]*(3*b^3*d - 24*a*b*c*d +
a*b^2*f + 20*a^2*c*f - (3*b^4*d - 30*a*b^2*c*d + 168*a^2*c^2*d + a*b^3*f -
52*a^2*b*c*f)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b
^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^2*Sqrt[b + Sqrt[b^2 - 4*a*c]])
- (3*c*(2*c*e - b*g)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c
)^(5/2)
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3}{\left(a+bx^2+cx^4\right)^3}\,dx = \int \frac{d+fx^2}{\left(a+bx^2+cx^4\right)^3}\,dx + \int \frac{x\left(e+gx^2\right)}{\left(a+bx^2+cx^4\right)^3}\,dx$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{1}{2}\text{Subst}\left(\int \frac{e+gx}{\left(a+bx+cx^2\right)^3}\,dx, x, x^2\right) - \frac{\int \cdots}{\cdots}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} - \frac{be-2ag+(2ce-bg)x^2}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{x\left(3b^4d-25\cdots\right.}{\cdots}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} - \frac{be-2ag+(2ce-bg)x^2}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{3(2ce-\cdots}{4\left(b^2-4ac\right)\cdots}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} - \frac{be-2ag+(2ce-bg)x^2}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{3(2ce-\cdots}{4\left(b^2-4ac\right)\cdots}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} - \frac{be-2ag+(2ce-bg)x^2}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{3(2ce-\cdots}{4\left(b^2-4ac\right)\cdots}$$

Mathematica [A] time = 4.29, size = 661, normalized size = 1.02

$$\frac{1}{16}\left(\frac{-8a^2g+4ab(e+x(f-gx))+8acx(d+x(e+fx))-4bdx\left(b+cx^2\right)}{a\left(4ac-b^2\right)\left(a+bx^2+cx^4\right)^2} + \frac{2\left(a^2\left(-6b^2g+4bc\left(3e+2fx-3gx^2\right)\cdots\right.\right.}{\cdots}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^3,x]
```

```
[Out] ((-8*a^2*g - 4*b*d*x*(b + c*x^2) + 8*a*c*x*(d + x*(e + f*x)) + 4*a*b*(e + x
*(f - g*x)))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (2*(3*b^3*d*x*(b +
c*x^2) + a*b*x*(-25*b*c*d + b^2*f - 24*c^2*d*x^2 + b*c*f*x^2) + a^2*(-6*b^2
*g + 4*c^2*x*(7*d + 6*e*x + 5*f*x^2) + 4*b*c*(3*e + 2*f*x - 3*g*x^2))))/(a^
2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (Sqrt[2]*Sqrt[c]*(3*b^4*d + b^3*(3
*Sqrt[b^2 - 4*a*c]*d + a*f) - 4*a*b*c*(6*Sqrt[b^2 - 4*a*c]*d + 13*a*f) + a*
b^2*(-30*c*d + Sqrt[b^2 - 4*a*c]*f) + 4*a^2*c*(42*c*d + 5*Sqrt[b^2 - 4*a*c]
*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(a^2*(b^2 - 4
*a*c)^(5/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*Sqrt[c]*(-3*b^4*d + b^3
*(3*Sqrt[b^2 - 4*a*c]*d - a*f) + 4*a*b*c*(-6*Sqrt[b^2 - 4*a*c]*d + 13*a*f)
+ a*b^2*(30*c*d + Sqrt[b^2 - 4*a*c]*f) + 4*a^2*c*(-42*c*d + 5*Sqrt[b^2 - 4*
a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(a^2*(b^2
 - 4*a*c)^(5/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - (24*c*(-2*c*e + b*g)*Log[-b
+ Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(5/2) + (24*c*(-2*c*e + b*g)*
Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(5/2))/16
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 10.39, size = 5439, normalized size = 8.42

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="giac")
```

```
[Out] 1/32*(3*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^8 - 17*sqrt(2)*sqrt(b*c
+ sqrt(b^2 - 4*a*c)*c)*a*b^6*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*
b^7*c - 2*b^8*c + 116*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 +
 26*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c +
sqrt(b^2 - 4*a*c)*c)*b^6*c^2 + 34*a*b^6*c^2 + 2*b^7*c^2 - 368*sqrt(2)*sqrt(
b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 -
4*a*c)*c)*a^2*b^3*c^3 - 13*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^
3 - 232*a^2*b^4*c^3 - 30*a*b^5*c^3 + 448*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*
c)*c)*a^4*c^4 + 224*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 64*
sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176
*a^2*b^3*c^4 - 112*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^5 - 896*a^
4*c^5 - 352*a^3*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*b^7 + 15*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
*b^5*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^6*c
- 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2
- 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 -
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^2 + 176*sqr
t(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 + 88*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 11*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 - 44*sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 + 2*(b^2 - 4*a
*c)*b^6*c - 26*(b^2 - 4*a*c)*a*b^4*c^2 - 2*(b^2 - 4*a*c)*b^5*c^2 + 128*(b^2
 - 4*a*c)*a^2*b^2*c^3 + 22*(b^2 - 4*a*c)*a*b^3*c^3 - 224*(b^2 - 4*a*c)*a^3*
c^4 - 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*a*b^7 - 24*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c - 2*sqrt(2
)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6*c - 2*a*b^7*c + 144*sqrt(2)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^2 + 40*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*a^2*b^4*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + 48
*a^2*b^5*c^2 + 2*a*b^6*c^2 - 256*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^
4*b*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 20*sqrt
(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 - 288*a^3*b^3*c^3 - 44*a^2*
b^4*c^3 + 64*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 512*a^4*b*
c^4 + 64*a^3*b^2*c^4 + 320*a^4*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + s
qrt(b^2 - 4*a*c)*c)*a*b^6 + 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^
2 - 4*a*c)*c)*a^2*b^4*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 -
 4*a*c)*c)*a*b^5*c - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*a^3*b^2*c^2 - 36*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*a^2*b^3*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*a*b^4*c^2 - 160*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*a^4*c^3 - 80*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
^3*b*c^3 + 18*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2
*b^2*c^3 + 40*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3
*c^4 + 2*(b^2 - 4*a*c)*a*b^5*c - 40*(b^2 - 4*a*c)*a^2*b^3*c^2 - 2*(b^2 - 4*
a*c)*a*b^4*c^2 + 128*(b^2 - 4*a*c)*a^3*b*c^3 + 36*(b^2 - 4*a*c)*a^2*b^2*c^3
 + 80*(b^2 - 4*a*c)*a^3*c^4)*f)*arctan(2*sqrt(1/2)*x/sqrt((a^2*b^5 - 8*a^3*
b^3*c + 16*a^4*b*c^2 + sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a
^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)
```

))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c - 2*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*b^2*c^4 - 64*a^6*c^5)*abs(c)) + 1/32*(3*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^8 - 17*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^6*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^7*c + 2*b^8*c + 116*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + 26*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^6*c^2 - 34*a*b^6*c^2 - 2*b^7*c^2 - 368*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 - 13*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^3 + 232*a^2*b^4*c^3 + 30*a*b^5*c^3 + 448*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*c^4 + 224*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^4 - 736*a^3*b^2*c^4 - 176*a^2*b^3*c^4 - 112*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^5 + 896*a^4*c^5 + 352*a^3*b*c^5 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^7 - 15*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^6*c + 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^5*c^2 - 176*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 - 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 11*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 + 44*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 - 2*(b^2 - 4*a*c)*b^6*c + 26*(b^2 - 4*a*c)*a*b^4*c^2 + 2*(b^2 - 4*a*c)*b^5*c^2 - 128*(b^2 - 4*a*c)*a^2*b^2*c^3 - 22*(b^2 - 4*a*c)*a*b^3*c^3 + 224*(b^2 - 4*a*c)*a^3*c^4 + 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^7 - 24*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^6*c + 2*a*b^7*c + 144*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^2 + 40*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 - 48*a^2*b^5*c^2 - 2*a*b^6*c^2 - 256*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b*c^3 - 128*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 20*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 + 288*a^3*b^3*c^3 + 44*a^2*b^4*c^3 + 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 - 512*a^4*b*c^4 - 64*a^3*b^2*c^4 - 320*a^4*c^5 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^6 - 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c + 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^2 + 36*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 + 160*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*c^3 + 80*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 - 18*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 40*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^4 - 2*(b^2 - 4*a*c)*a*b^5*c + 40*(b^2 - 4*a*c)*a^2*b^3*c^2 + 2*(b^2 - 4*a*c)*a*b^4*c^2 - 128*(b^2 - 4*a*c)*a^3*b*c^3 - 36*(b^2 - 4*a*c)*a^2*b^2*c^3 - 80*(b^2 - 4*a*c)*a^3*c^4)*f)*arctan(2*sqrt(1/2)*x/sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c - 2*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*b^2*c^4 - 64*a^6*c^5)*abs(c)) + 3/2*((b^3*c^3 - 4*a*b*c^4 - 2*b^2*c^4 + b*c^5)*sqrt(b^2 - 4*a*c)*g - 2*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e)*log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96*

```
a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 1
2*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^
2) - 3/2*((b^3*c^3 - 4*a*b*c^4 - 2*b^2*c^4 + b*c^5)*sqrt(b^2 - 4*a*c)*g - 2
*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e)*log(x^2 + 1/2*(a^
2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b
*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2
 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^6
*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 -
96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^
4 - 64*a^3*c^5)*c^2) + 1/8*(3*b^3*c^2*d*x^7 - 24*a*b*c^3*d*x^7 + a*b^2*c^2*
f*x^7 + 20*a^2*c^3*f*x^7 - 12*a^2*b*c^2*g*x^6 + 24*a^2*c^3*x^6*e + 6*b^4*c*
d*x^5 - 49*a*b^2*c^2*d*x^5 + 28*a^2*c^3*d*x^5 + 2*a*b^3*c*f*x^5 + 28*a^2*b*
c^2*f*x^5 - 18*a^2*b^2*c*g*x^4 + 36*a^2*b*c^2*x^4*e + 3*b^5*d*x^3 - 20*a*b^
3*c*d*x^3 - 4*a^2*b*c^2*d*x^3 + a*b^4*f*x^3 + 5*a^2*b^2*c*f*x^3 + 36*a^3*c^
2*f*x^3 - 4*a^2*b^3*g*x^2 - 20*a^3*b*c*g*x^2 + 8*a^2*b^2*c*x^2*e + 40*a^3*c
^2*x^2*e + 5*a*b^4*d*x - 37*a^2*b^2*c*d*x + 44*a^3*c^2*d*x - a^2*b^3*f*x +
16*a^3*b*c*f*x - 2*a^3*b^2*g - 16*a^4*c*g - 2*a^2*b^3*e + 20*a^3*b*c*e)/((a
^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)*(c*x^4 + b*x^2 + a)^2)
```

maple [B] time = 0.45, size = 10222, normalized size = 15.82

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x)
```

```
[Out] result too large to display
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="maxima")
```

```
[Out] 1/8*((3*(b^3*c^2 - 8*a*b*c^3)*d + (a*b^2*c^2 + 20*a^2*c^3)*f)*x^7 + 12*(2*a
^2*c^3*e - a^2*b*c^2*g)*x^6 + ((6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3)*d + 2*
(a*b^3*c + 14*a^2*b*c^2)*f)*x^5 + 18*(2*a^2*b*c^2*e - a^2*b^2*c*g)*x^4 + ((
3*b^5 - 20*a*b^3*c - 4*a^2*b*c^2)*d + (a*b^4 + 5*a^2*b^2*c + 36*a^3*c^2)*f)
*x^3 + 4*(2*(a^2*b^2*c + 5*a^3*c^2)*e - (a^2*b^3 + 5*a^3*b*c)*g)*x^2 - 2*(a
^2*b^3 - 10*a^3*b*c)*e - 2*(a^3*b^2 + 8*a^4*c)*g + ((5*a*b^4 - 37*a^2*b^2*c
 + 44*a^3*c^2)*d - (a^2*b^3 - 16*a^3*b*c)*f)*x)/((a^2*b^4*c^2 - 8*a^3*b^2*c
^3 + 16*a^4*c^4)*x^8 + a^4*b^4 - 8*a^5*b^2*c + 16*a^6*c^2 + 2*(a^2*b^5*c -
8*a^3*b^3*c^2 + 16*a^4*b*c^3)*x^6 + (a^2*b^6 - 6*a^3*b^4*c + 32*a^5*c^3)*x^
4 + 2*(a^3*b^5 - 8*a^4*b^3*c + 16*a^5*b*c^2)*x^2) + 1/8*integrate(((3*(b^3*
c - 8*a*b*c^2)*d + (a*b^2*c + 20*a^2*c^2)*f)*x^2 + 3*(b^4 - 9*a*b^2*c + 28*
a^2*c^2)*d + (a*b^3 - 16*a^2*b*c)*f + 24*(2*a^2*c^2*e - a^2*b*c*g)*x)/(c*x^
4 + b*x^2 + a), x)/(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)
```

mupad [B] time = 4.56, size = 13431, normalized size = 20.79

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^3,x)
```

```
[Out] symsum(log((x*(13824*a^4*c^8*e^3 - 54*b^7*c^5*d^2*e + 27*b^8*c^4*d^2*g - 17
28*a^4*b^3*c^5*g^3 - 20160*a^4*c^8*d*e*f + 972*a*b^5*c^6*d^2*e + 24192*a^3*
b*c^8*d^2*e - 486*a*b^6*c^5*d^2*g + 6240*a^4*b*c^7*e*f^2 - 20736*a^4*b*c^7*
```

e^2*g - 7344*a^2*b^3*c^7*d^2*e + 3672*a^2*b^4*c^6*d^2*g - 6*a^2*b^5*c^5*e*f
^2 - 12096*a^3*b^2*c^7*d^2*g + 192*a^3*b^3*c^6*e*f^2 + 10368*a^4*b^2*c^6*e*
g^2 + 3*a^2*b^6*c^4*f^2*g - 96*a^3*b^4*c^5*f^2*g - 3120*a^4*b^2*c^6*f^2*g -
36*a*b^6*c^5*d*e*f + 18*a*b^7*c^4*d*f*g + 10080*a^4*b*c^7*d*f*g + 900*a^2*
b^4*c^6*d*e*f - 4896*a^3*b^2*c^7*d*e*f - 450*a^2*b^5*c^5*d*f*g + 2448*a^3*b
^3*c^6*d*f*g))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*
c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - root(56371
445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^
2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128
849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9
*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*
a^5*b^20*z^4 - 73728*a^2*b^16*c*d*f*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 -
1321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*
a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7
*d*f*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 -
23592960*a^6*b^9*c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 - 15175680*a^4*
b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g
*z^2 - 440401920*a^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a
^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6
*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 -
5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4
*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^
2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^10*b^2*c^7*g^2*z^2 + 188743
680*a^8*b^6*c^5*g^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6
*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^
2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 294912*a^5*b^12*c^2*g^2*z^2 + 11206656*a
^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2
*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 1986048
0*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^
2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 256*a^2*b^1
7*f^2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^13*c
^2*d*e*f*z - 4608*a*b^14*c*d*f*g*z - 221773824*a^6*b^3*c^7*d*e*f*z + 110886
912*a^6*b^4*c^6*d*f*g*z - 84934656*a^7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*
c^6*d*e*f*z - 58982400*a^5*b^6*c^5*d*f*g*z + 16220160*a^4*b^8*c^4*d*f*g*z -
2396160*a^3*b^10*c^3*d*f*g*z + 175104*a^2*b^12*c^2*d*f*g*z - 32440320*a^4*
b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z
+ 346816512*a^7*b*c^8*d^2*g*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^13*
c*f^2*g*z + 214272*a*b^13*c^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z + 1022754
816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3
*c^7*d^2*g*z + 321159168*a^5*b^5*c^6*d^2*g*z + 223395840*a^4*b^6*c^6*d^2*e*
z - 111697920*a^4*b^7*c^5*d^2*g*z + 25362432*a^7*b^3*c^6*f^2*g*z - 50724864
*a^7*b^2*c^7*e*f^2*z - 13271040*a^6*b^5*c^5*f^2*g*z + 3563520*a^5*b^7*c^4*f
^2*g*z - 506880*a^4*b^9*c^3*f^2*g*z + 34560*a^3*b^11*c^2*f^2*g*z + 26542080
*a^6*b^4*c^6*e*f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*
d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1013
760*a^4*b^8*c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*
f^2*z + 5930496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600
*a^8*c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z - 6912*b^15*c*d^2*g*z + 15482880*
a^5*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g + 7741440*a^4*b^3*c^6*d*e*f*g -
2903040*a^3*b^5*c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g + 3456*a*b^10*c^2
*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 13824*a*b^8*c^4*d*e^2*f - 3870720*a^5
*b^2*c^6*e*f^2*g - 34836480*a^4*b^2*c^7*d^2*e*g - 645120*a^4*b^4*c^5*e*f^2*
g + 80640*a^3*b^6*c^4*e*f^2*g - 2304*a^2*b^8*c^3*e*f^2*g - 3870720*a^5*b^2*
c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2 + 725760*a^3*b^6*c^4*d*f*g^2 + 17
418240*a^3*b^4*c^6*d^2*e*g - 96768*a^2*b^8*c^3*d*f*g^2 - 3919104*a^2*b^6*c^
5*d^2*e*g - 7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387
072*a^2*b^6*c^5*d*e^2*f + 37310976*a^3*b^3*c^7*d^3*f - 2654208*a^5*b^3*c^5*
e*g^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864*a*b
^9*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 17

37792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f
^3 - 435456*a*b^7*c^5*d^2*e^2 - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8
*d^3*f - 15482880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 4262400*a^5*
b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 967680*a^5*b^
3*c^5*f^2*g^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 57
6*a^2*b^9*c^2*f^2*g^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*
d^2*f^2 + 8709120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 97977
6*a^2*b^7*c^4*d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*
f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2
*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e
^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f
^2 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^
4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 -
27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9*c^4*d^3*f -
734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416
*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*((983040*a^7*c^8*e*f - 3244032*a^6*
b*c^8*d*e - 491520*a^7*b*c^7*f*g - 4608*a^2*b^9*c^4*d*e + 87552*a^3*b^7*c^5
*d*e - 681984*a^4*b^5*c^6*d*e + 2433024*a^5*b^3*c^7*d*e + 2304*a^2*b^10*c^3
*d*g - 43776*a^3*b^8*c^4*d*g - 1536*a^3*b^8*c^4*e*f + 340992*a^4*b^6*c^5*d*
g + 39936*a^4*b^6*c^5*e*f - 1216512*a^5*b^4*c^6*d*g - 184320*a^5*b^4*c^6*e*
f + 1622016*a^6*b^2*c^7*d*g - 49152*a^6*b^2*c^7*e*f + 768*a^3*b^9*c^3*f*g -
19968*a^4*b^7*c^4*f*g + 92160*a^5*b^5*c^5*f*g + 24576*a^6*b^3*c^6*f*g)/(51
2*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^
6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - root(56371445760*a^11*b^8*c
^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798691
840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^
6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2
621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 73
728*a^2*b^16*c*d*f*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1321205760*a^9*b^
2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a^7*b^6*c^6*d*f*z
^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 188743
680*a^7*b^7*c^5*e*g*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 23592960*a^6*b^9*
c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2
+ 1428480*a^3*b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 440401920*
a^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2
+ 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 396361
7280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^
5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 73
0054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9
*b^4*c^6*g^2*z^2 + 301989888*a^10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g
^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 14
6165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 + 5898240*a^6*b
^10*c^3*g^2*z^2 - 294912*a^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^
2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^
5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^
2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*
a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*
b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^13*c^2*d*e*f*z - 4608
*a*b^14*c*d*f*g*z - 221773824*a^6*b^3*c^7*d*e*f*z + 110886912*a^6*b^4*c^6*d
*f*g*z - 84934656*a^7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z - 589
82400*a^5*b^6*c^5*d*f*g*z + 16220160*a^4*b^8*c^4*d*f*g*z - 2396160*a^3*b^10
*c^3*d*f*g*z + 175104*a^2*b^12*c^2*d*f*g*z - 32440320*a^4*b^7*c^5*d*e*f*z +
4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*
b*c^8*d^2*g*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z + 21427
2*a*b^13*c^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z + 1022754816*a^6*b^2*c^8*d
^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 32
1159168*a^5*b^5*c^6*d^2*g*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*a^4
*b^7*c^5*d^2*g*z + 25362432*a^7*b^3*c^6*f^2*g*z - 50724864*a^7*b^2*c^7*e*f^
2*z - 13271040*a^6*b^5*c^5*f^2*g*z + 3563520*a^5*b^7*c^4*f^2*g*z - 506880*a

^4*b^9*c^3*f^2*g*z + 34560*a^3*b^11*c^2*f^2*g*z + 26542080*a^6*b^4*c^6*e*f^
2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7127040
*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1013760*a^4*b^8*c^4*e
*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930496*a
^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f^2*z
+ 13824*b^14*c^2*d^2*e*z - 6912*b^15*c*d^2*g*z + 15482880*a^5*b*c^7*d*e*f*g
- 13824*a*b^9*c^3*d*e*f*g + 7741440*a^4*b^3*c^6*d*e*f*g - 2903040*a^3*b^5*
c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g + 3456*a*b^10*c^2*d*f*g^2 + 435456
*a*b^8*c^4*d^2*e*g + 13824*a*b^8*c^4*d*e^2*f - 3870720*a^5*b^2*c^6*e*f^2*g
- 34836480*a^4*b^2*c^7*d^2*e*g - 645120*a^4*b^4*c^5*e*f^2*g + 80640*a^3*b^6
*c^4*e*f^2*g - 2304*a^2*b^8*c^3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 193
5360*a^4*b^4*c^5*d*f*g^2 + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^4*c^
6*d^2*e*g - 96768*a^2*b^8*c^3*d*f*g^2 - 3919104*a^2*b^6*c^5*d^2*e*g - 77414
40*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d
*e^2*f + 37310976*a^3*b^3*c^7*d^3*f - 2654208*a^5*b^3*c^5*e*g^3 + 3870720*a
^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2 -
8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5
*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7
*c^5*d^2*e^2 - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 15482880
*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 4262400*a^5*b*c^7*d*f^3 + 852
768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 967680*a^5*b^3*c^5*f^2*g^2 + 1
61280*a^4*b^5*c^4*f^2*g^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2*f^2
*g^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 + 8709120
*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*d^2
*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^
7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2
- 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 5184*b^11*c^
2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c^
4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^
4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2
*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6
*d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35
721*b^8*c^5*d^4, z, k)*((768*a^2*b^14*c^2*d - 22020096*a^9*c^9*d - 22272*a^
3*b^12*c^3*d + 282624*a^4*b^10*c^4*d - 2027520*a^5*b^8*c^5*d + 8847360*a^6*
b^6*c^6*d - 23396352*a^7*b^4*c^7*d + 34603008*a^8*b^2*c^8*d + 256*a^3*b^13*
c^2*f - 9216*a^4*b^11*c^3*f + 122880*a^5*b^9*c^4*f - 819200*a^6*b^7*c^5*f +
2949120*a^7*b^5*c^6*f - 5505024*a^8*b^3*c^7*f + 4194304*a^9*b*c^8*f)/(512*
(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*
c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(1572864*a^9*c^9*e - 1536*
a^4*b^10*c^4*e + 30720*a^5*b^8*c^5*e - 245760*a^6*b^6*c^6*e + 983040*a^7*b^
4*c^7*e - 1966080*a^8*b^2*c^8*e + 768*a^4*b^11*c^3*g - 15360*a^5*b^9*c^4*g
+ 122880*a^6*b^7*c^5*g - 491520*a^7*b^5*c^6*g + 983040*a^8*b^3*c^7*g - 7864
32*a^9*b*c^8*g))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^
8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (root(56
371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16
*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 -
128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*
a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 655
36*a^5*b^20*z^4 - 73728*a^2*b^16*c*d*f*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2
- 1321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 7321681
92*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*
c^7*d*f*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2
- 23592960*a^6*b^9*c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 - 15175680*a
^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*
e*g*z^2 - 440401920*a^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 1408
0*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*
c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2
- 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*
b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2

*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^10*b^2*c^7*g^2*z^2 + 188
743680*a^8*b^6*c^5*g^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*
b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2
*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 294912*a^5*b^12*c^2*g^2*z^2 + 1120665
6*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*
e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 1986
0480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15
*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 256*a^2*
b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^1
3*c^2*d*e*f*z - 4608*a*b^14*c*d*f*g*z - 221773824*a^6*b^3*c^7*d*e*f*z + 110
886912*a^6*b^4*c^6*d*f*g*z - 84934656*a^7*b^2*c^7*d*f*g*z + 117964800*a^5*b
^5*c^6*d*e*f*z - 58982400*a^5*b^6*c^5*d*f*g*z + 16220160*a^4*b^8*c^4*d*f*g*
z - 2396160*a^3*b^10*c^3*d*f*g*z + 175104*a^2*b^12*c^2*d*f*g*z - 32440320*a
^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*
f*z + 346816512*a^7*b*c^8*d^2*g*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^
13*c*f^2*g*z + 214272*a*b^13*c^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z + 1022
754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*
b^3*c^7*d^2*g*z + 321159168*a^5*b^5*c^6*d^2*g*z + 223395840*a^4*b^6*c^6*d^2
*e*z - 111697920*a^4*b^7*c^5*d^2*g*z + 25362432*a^7*b^3*c^6*f^2*g*z - 50724
864*a^7*b^2*c^7*e*f^2*z - 13271040*a^6*b^5*c^5*f^2*g*z + 3563520*a^5*b^7*c^
4*f^2*g*z - 506880*a^4*b^9*c^3*f^2*g*z + 34560*a^3*b^11*c^2*f^2*g*z + 26542
080*a^6*b^4*c^6*e*f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c
^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1
013760*a^4*b^8*c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2
*e*f^2*z + 5930496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321
600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z - 6912*b^15*c*d^2*g*z + 154828
80*a^5*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g + 7741440*a^4*b^3*c^6*d*e*f*
g - 2903040*a^3*b^5*c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g + 3456*a*b^10*
c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 13824*a*b^8*c^4*d*e^2*f - 3870720*
a^5*b^2*c^6*e*f^2*g - 34836480*a^4*b^2*c^7*d^2*e*g - 645120*a^4*b^4*c^5*e*f
^2*g + 80640*a^3*b^6*c^4*e*f^2*g - 2304*a^2*b^8*c^3*e*f^2*g - 3870720*a^5*b
^2*c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2 + 725760*a^3*b^6*c^4*d*f*g^2 +
 17418240*a^3*b^4*c^6*d^2*e*g - 96768*a^2*b^8*c^3*d*f*g^2 - 3919104*a^2*b^6
*c^5*d^2*e*g - 7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f -
387072*a^2*b^6*c^5*d*e^2*f + 37310976*a^3*b^3*c^7*d^3*f - 2654208*a^5*b^3*c
^5*e*g^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864*
a*b^9*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 +
 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*
d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*
c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 4262400*a
^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 967680*a^5
*b^3*c^5*f^2*g^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 20160*a^3*b^7*c^3*f^2*g^2 +
 576*a^2*b^9*c^2*f^2*g^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c
^7*d^2*f^2 + 8709120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 97
9776*a^2*b^7*c^4*d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e
^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*
a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^
2*e^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^
2*f^2 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6
*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^
4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9*c^4*d^3*
f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308
416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*x*(8388608*a^11*b*c^9 - 512*a^4*
b^15*c^2 + 14336*a^5*b^13*c^3 - 172032*a^6*b^11*c^4 + 1146880*a^7*b^9*c^5 -
 4587520*a^8*b^7*c^6 + 11010048*a^9*b^5*c^7 - 14680064*a^10*b^3*c^8))/(64*(
a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c
^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))) + (x*(451584*a^6*c^9*d^2 + 18*b
^12*c^3*d^2 - 25600*a^7*c^8*f^2 - 504*a*b^10*c^4*d^2 - 73728*a^6*b*c^8*e^2
+ 6228*a^2*b^8*c^5*d^2 - 42624*a^3*b^6*c^6*d^2 + 176256*a^4*b^4*c^7*d^2 - 4

```
23936*a^5*b^2*c^8*d^2 - 4608*a^4*b^5*c^6*e^2 + 36864*a^5*b^3*c^7*e^2 + 2*a^
2*b^10*c^3*f^2 - 84*a^3*b^8*c^4*f^2 + 3520*a^4*b^6*c^5*f^2 - 26240*a^5*b^4*
c^6*f^2 + 59904*a^6*b^2*c^7*f^2 - 1152*a^4*b^7*c^4*g^2 + 9216*a^5*b^5*c^5*g
^2 - 18432*a^6*b^3*c^6*g^2 + 12*a*b^11*c^3*d*f - 218112*a^6*b*c^8*d*f - 420
*a^2*b^9*c^4*d*f + 4992*a^3*b^7*c^5*d*f - 36480*a^4*b^5*c^6*d*f + 144384*a^
5*b^3*c^7*d*f + 4608*a^4*b^6*c^5*e*g - 36864*a^5*b^4*c^6*e*g + 73728*a^6*b^
2*c^7*e*g))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2
 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))) - (567*b^7*c^5
*d^3 + 8000*a^5*c^7*f^3 - 10368*a*b^5*c^6*d^3 - 169344*a^3*b*c^8*d^3 - 1935
36*a^4*c^8*d*e^2 + 141120*a^4*c^8*d^2*f - 315*b^8*c^4*d^2*f + 67824*a^2*b^3
*c^7*d^3 - 35*a^2*b^6*c^4*f^3 - 84*a^3*b^4*c^5*f^3 + 12720*a^4*b^2*c^6*f^3
+ 6237*a*b^6*c^5*d^2*f - 210*a*b^7*c^4*d*f^2 - 116160*a^4*b*c^7*d*f^2 + 368
64*a^4*b*c^7*e^2*f - 6912*a^2*b^4*c^6*d*e^2 + 62208*a^3*b^2*c^7*d*e^2 - 423
72*a^2*b^4*c^6*d^2*f + 1764*a^2*b^5*c^5*d*f^2 + 96048*a^3*b^2*c^7*d^2*f + 4
608*a^3*b^3*c^6*d*f^2 - 1728*a^2*b^6*c^4*d*g^2 - 2304*a^3*b^3*c^6*e^2*f + 1
5552*a^3*b^4*c^5*d*g^2 - 48384*a^4*b^2*c^6*d*g^2 - 576*a^3*b^5*c^4*f*g^2 +
9216*a^4*b^3*c^5*f*g^2 + 193536*a^4*b*c^7*d*e*g + 6912*a^2*b^5*c^5*d*e*g -
62208*a^3*b^3*c^6*d*e*g + 2304*a^3*b^4*c^5*e*f*g - 36864*a^4*b^2*c^6*e*f*g)
/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^
7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)))*root(56371445760*a^11*b^
8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798
691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12
*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4
- 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 -
 73728*a^2*b^16*c*d*f*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1321205760*a^9
*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a^7*b^6*c^6*d*
f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 188
743680*a^7*b^7*c^5*e*g*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 23592960*a^6*b
^9*c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 - 15175680*a^4*b^12*c^3*d*f*z
^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 4404019
20*a^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*
z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 396
3617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7
*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 -
 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360*
a^9*b^4*c^6*g^2*z^2 + 301989888*a^10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^
5*g^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 +
 146165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 + 5898240*a^
6*b^10*c^3*g^2*z^2 - 294912*a^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2
*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960
*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3
*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 15
36*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 256*a^2*b^17*f^2*z^2 + 23
04*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^13*c^2*d*e*f*z - 4
608*a*b^14*c*d*f*g*z - 221773824*a^6*b^3*c^7*d*e*f*z + 110886912*a^6*b^4*c^
6*d*f*g*z - 84934656*a^7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z -
58982400*a^5*b^6*c^5*d*f*g*z + 16220160*a^4*b^8*c^4*d*f*g*z - 2396160*a^3*b
^10*c^3*d*f*g*z + 175104*a^2*b^12*c^2*d*f*g*z - 32440320*a^4*b^7*c^5*d*e*f*
z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a
^7*b*c^8*d^2*g*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z + 21
4272*a*b^13*c^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z + 1022754816*a^6*b^2*c^
8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z +
 321159168*a^5*b^5*c^6*d^2*g*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*
a^4*b^7*c^5*d^2*g*z + 25362432*a^7*b^3*c^6*f^2*g*z - 50724864*a^7*b^2*c^7*e
*f^2*z - 13271040*a^6*b^5*c^5*f^2*g*z + 3563520*a^5*b^7*c^4*f^2*g*z - 50688
0*a^4*b^9*c^3*f^2*g*z + 34560*a^3*b^11*c^2*f^2*g*z + 26542080*a^6*b^4*c^6*e
*f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7127
040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1013760*a^4*b^8*c^
4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 593049
```

```
6*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f^2
*z + 13824*b^14*c^2*d^2*e*z - 6912*b^15*c*d^2*g*z + 15482880*a^5*b*c^7*d*e*
f*g - 13824*a*b^9*c^3*d*e*f*g + 7741440*a^4*b^3*c^6*d*e*f*g - 2903040*a^3*b
^5*c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g + 3456*a*b^10*c^2*d*f*g^2 + 435
456*a*b^8*c^4*d^2*e*g + 13824*a*b^8*c^4*d*e^2*f - 3870720*a^5*b^2*c^6*e*f^2
*g - 34836480*a^4*b^2*c^7*d^2*e*g - 645120*a^4*b^4*c^5*e*f^2*g + 80640*a^3*
b^6*c^4*e*f^2*g - 2304*a^2*b^8*c^3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 -
1935360*a^4*b^4*c^5*d*f*g^2 + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^4
*c^6*d^2*e*g - 96768*a^2*b^8*c^3*d*f*g^2 - 3919104*a^2*b^6*c^5*d^2*e*g - 77
41440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^
5*d*e^2*f + 37310976*a^3*b^3*c^7*d^3*f - 2654208*a^5*b^3*c^5*e*g^3 + 387072
0*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2
 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*
c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*
b^7*c^5*d^2*e^2 - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 15482
880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 4262400*a^5*b*c^7*d*f^3 +
852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 967680*a^5*b^3*c^5*f^2*g^2
+ 161280*a^4*b^5*c^4*f^2*g^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2*
f^2*g^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 + 8709
120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*
d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2
*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f
^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 5184*b^11
*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9
*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4
*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*
b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*
c^6*d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 +
 35721*b^8*c^5*d^4, z, k), k, 1, 4) + ((9*x^4*(2*b*c^2*e - b^2*c*g))/(4*(b^
4 + 16*a^2*c^2 - 8*a*b^2*c)) - (x^2*(b^3*g - 10*a*c^2*e - 2*b^2*c*e + 5*a*b
*c*g))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (b^3*e + a*b^2*g + 8*a^2*c*g -
10*a*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^5*(28*a^2*c^3*d + 6*b^4
*c*d + 2*a*b^3*c*f - 49*a*b^2*c^2*d + 28*a^2*b*c^2*f))/(8*a^2*(b^4 + 16*a^2
*c^2 - 8*a*b^2*c)) + (x*(5*b^4*d + 44*a^2*c^2*d - a*b^3*f - 37*a*b^2*c*d +
16*a^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^3*(3*b^5*d + 36*a^
3*c^2*f + a*b^4*f - 20*a*b^3*c*d - 4*a^2*b*c^2*d + 5*a^2*b^2*c*f))/(8*a^2*(
b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*c^2*x^6*(2*c*e - b*g))/(2*(b^4 + 16*a^2
*c^2 - 8*a*b^2*c)) + (c*x^7*(20*a^2*c^2*f + 3*b^3*c*d - 24*a*b*c^2*d + a*b^
2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(2*a*c + b^2) + a^2 +
c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**3,x)
```

```
[Out] Timed out
```

3.55 $\int \frac{d+ex+fx^2+gx^3+hx^4}{\left(a+bx^2+cx^4\right)^3}\,dx$

Optimal. Leaf size=679

$$\frac{x\left(cx^2\left(20a^2cf+ab^2f-12ab(ah+2cd)+3b^3d\right)+8a^2bcf+4a^2c(ah+7cd)+ab^3f-ab^2(7ah+25cd)+3b^4d\right)}{8a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)}+$$

```
[Out] 1/4*(-b*e+2*a*g-(-b*g+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/4*x*(b^2
*d-a*b*f-2*a*(-a*h+c*d)+(a*b*h-2*a*c*f+b*c*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*
x^2+a)^2+3/4*(-b*g+2*c*e)*(2*c*x^2+b)/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/8*x*
(3*b^4*d+a*b^3*f+8*a^2*b*c*f+4*a^2*c*(a*h+7*c*d)-a*b^2*(7*a*h+25*c*d)+c*(3*
b^3*d+a*b^2*f+20*a^2*c*f-12*a*b*(a*h+2*c*d))*x^2)/a^2/(-4*a*c+b^2)^2/(c*x^4
+b*x^2+a)-3*c*(-b*g+2*c*e)*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/(-4*a*c+
b^2)^(5/2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))*c^(1
/2)*(3*b^3*d+a*b^2*f+20*a^2*c*f-12*a*b*(a*h+2*c*d)+(3*b^4*d+a*b^3*f-52*a^2*
b*c*f-6*a*b^2*(-3*a*h+5*c*d)+24*a^2*c*(a*h+7*c*d))/(-4*a*c+b^2)^(1/2))/a^2/
(-4*a*c+b^2)^2*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/16*arctan(x*2^(1/2)*c
^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(3*b^3*d+a*b^2*f+20*a^2*c*f-12
*a*b*(a*h+2*c*d)+(-3*b^4*d-a*b^3*f+52*a^2*b*c*f+6*a*b^2*(-3*a*h+5*c*d)-24*a
^2*c*(a*h+7*c*d))/(-4*a*c+b^2)^(1/2))/a^2/(-4*a*c+b^2)^2*2^(1/2)/(b+(-4*a*c
+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 4.18, antiderivative size = 679, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286, Rules used = {1673, 1678, 1178, 1166, 205, 1247, 638, 614, 618, 206}

$$\frac{x\left(cx^2\left(20a^2cf+ab^2f-12ab(ah+2cd)+3b^3d\right)+8a^2bcf+4a^2c(ah+7cd)-ab^2(7ah+25cd)+ab^3f+3b^4d\right)}{8a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)}+$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^3,x]
```

```
[Out] -(b*e - 2*a*g + (2*c*e - b*g)*x^2)/(4*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2)
+ (x*(b^2*d - a*b*f - 2*a*(c*d - a*h) + (b*c*d - 2*a*c*f + a*b*h)*x^2))/(4*
a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (3*(2*c*e - b*g)*(b + 2*c*x^2))/(4
*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (x*(3*b^4*d + a*b^3*f + 8*a^2*b*c*f
 + 4*a^2*c*(7*c*d + a*h) - a*b^2*(25*c*d + 7*a*h) + c*(3*b^3*d + a*b^2*f +
20*a^2*c*f - 12*a*b*(2*c*d + a*h))*x^2))/(8*a^2*(b^2 - 4*a*c)^2*(a + b*x^2
+ c*x^4)) + (Sqrt[c]*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h)
 + (3*b^4*d + a*b^3*f - 52*a^2*b*c*f - 6*a*b^2*(5*c*d - 3*a*h) + 24*a^2*c*(
7*c*d + a*h))/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b
^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^2*Sqrt[b - Sqrt[b^2 - 4*a*c]])
+ (Sqrt[c]*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h) - (3*b^4*
d + a*b^3*f - 52*a^2*b*c*f - 6*a*b^2*(5*c*d - 3*a*h) + 24*a^2*c*(7*c*d + a*
h))/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c
]]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^2*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - (3*c*(2*
c*e - b*g)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(5/2)
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4}{\left(a+bx^2+cx^4\right)^3}\,dx=\int \frac{x\left(e+gx^2\right)}{\left(a+bx^2+cx^4\right)^3}\,dx+\int \frac{d+fx^2+hx^4}{\left(a+bx^2+cx^4\right)^3}\,dx$$

$$=\frac{x\left(b^2d-abf-2a(cd-ah)+(bcd-2acf+abh)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2}+\frac{1}{2}\text{Subst}\left(\int \frac{e+gx}{\left(a+bx+c\right.}\right.$$

$$=-\frac{be-2ag+(2ce-bg)x^2}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2}+\frac{x\left(b^2d-abf-2a(cd-ah)+(bcd-2acf+a\right.}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2}$$

$$=-\frac{be-2ag+(2ce-bg)x^2}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2}+\frac{x\left(b^2d-abf-2a(cd-ah)+(bcd-2acf+a\right.}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2}$$

$$=-\frac{be-2ag+(2ce-bg)x^2}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2}+\frac{x\left(b^2d-abf-2a(cd-ah)+(bcd-2acf+a\right.}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2}$$

$$=-\frac{be-2ag+(2ce-bg)x^2}{4\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2}+\frac{x\left(b^2d-abf-2a(cd-ah)+(bcd-2acf+a\right.}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2}$$

Mathematica [A] time = 6.55, size = 845, normalized size = 1.24

$$-\frac{bcdx^3-2acfx^3+abhx^3-2acex^2+abgx^2+b^2dx-2acdx-abfx+2a^2hx-abe+2a^2g}{4a\left(4ac-b^2\right)\left(cx^4+bx^2+a\right)^2}+\frac{\sqrt{c}\left(3db^4+3\sqrt{b^2-4\right.}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^3,x]
```

```
[Out] -1/4*(-(a*b*e) + 2*a^2*g + b^2*d*x - 2*a*c*d*x - a*b*f*x + 2*a^2*h*x - 2*a*
c*e*x^2 + a*b*g*x^2 + b*c*d*x^3 - 2*a*c*f*x^3 + a*b*h*x^3)/(a*(-b^2 + 4*a*c
)*(a + b*x^2 + c*x^4)^2) + (12*a^2*b*c*e - 6*a^2*b^2*g + 3*b^4*d*x - 25*a*b
^2*c*d*x + 28*a^2*c^2*d*x + a*b^3*f*x + 8*a^2*b*c*f*x - 7*a^2*b^2*h*x + 4*a
^3*c*h*x + 24*a^2*c^2*e*x^2 - 12*a^2*b*c*g*x^2 + 3*b^3*c*d*x^3 - 24*a*b*c^2
*d*x^3 + a*b^2*c*f*x^3 + 20*a^2*c^2*f*x^3 - 12*a^2*b*c*h*x^3)/(8*a^2*(-b^2
```

```
+ 4*a*c)^2*(a + b*x^2 + c*x^4)) + (Sqrt[c]*(3*b^4*d - 30*a*b^2*c*d + 168*a^
2*c^2*d + 3*b^3*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c*Sqrt[b^2 - 4*a*c]*d + a*b^3*
f - 52*a^2*b*c*f + a*b^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c*Sqrt[b^2 - 4*a*c]*f
 + 18*a^2*b^2*h + 24*a^3*c*h - 12*a^2*b*Sqrt[b^2 - 4*a*c]*h)*ArcTan[(Sqrt[2
]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5/
2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[c]*(-3*b^4*d + 30*a*b^2*c*d - 168*a
^2*c^2*d + 3*b^3*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c*Sqrt[b^2 - 4*a*c]*d - a*b^3
*f + 52*a^2*b*c*f + a*b^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c*Sqrt[b^2 - 4*a*c]*
f - 18*a^2*b^2*h - 24*a^3*c*h - 12*a^2*b*Sqrt[b^2 - 4*a*c]*h)*ArcTan[(Sqrt[
2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5
/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + (3*c*(2*c*e - b*g)*Log[-b + Sqrt[b^2 - 4
*a*c] - 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2)) - (3*c*(2*c*e - b*g)*Log[b + Sqrt
[b^2 - 4*a*c] + 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2))
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="fricas"
)
```

```
[Out] Timed out
```

giac [B] time = 13.22, size = 6861, normalized size = 10.10

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="giac")
```

```
[Out] 1/32*(3*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^8 - 17*sqrt(2)*sqrt(b*c
+ sqrt(b^2 - 4*a*c)*c)*a*b^6*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*
b^7*c - 2*b^8*c + 116*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 +
 26*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c +
sqrt(b^2 - 4*a*c)*c)*b^6*c^2 + 34*a*b^6*c^2 + 2*b^7*c^2 - 368*sqrt(2)*sqrt(
b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 -
4*a*c)*c)*a^2*b^3*c^3 - 13*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^
3 - 232*a^2*b^4*c^3 - 30*a*b^5*c^3 + 448*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*
c)*c)*a^4*c^4 + 224*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 64*
sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176
*a^2*b^3*c^4 - 112*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^5 - 896*a^
4*c^5 - 352*a^3*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*b^7 + 15*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
*b^5*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^6*c
- 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2
- 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 -
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^2 + 176*sqr
t(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 + 88*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 11*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 - 44*sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 + 2*(b^2 - 4*a
*c)*b^6*c - 26*(b^2 - 4*a*c)*a*b^4*c^2 - 2*(b^2 - 4*a*c)*b^5*c^2 + 128*(b^2
 - 4*a*c)*a^2*b^2*c^3 + 22*(b^2 - 4*a*c)*a*b^3*c^3 - 224*(b^2 - 4*a*c)*a^3*
c^4 - 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*a*b^7 - 24*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c - 2*sqrt(2
)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6*c - 2*a*b^7*c + 144*sqrt(2)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^2 + 40*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*a^2*b^4*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + 48
*a^2*b^5*c^2 + 2*a*b^6*c^2 - 256*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^
```

```
4*b*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 20*sqrt
(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 - 288*a^3*b^3*c^3 - 44*a^2*
b^4*c^3 + 64*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 512*a^4*b*
c^4 + 64*a^3*b^2*c^4 + 320*a^4*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + s
qrt(b^2 - 4*a*c)*c)*a*b^6 + 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^
2 - 4*a*c)*c)*a^2*b^4*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 -
 4*a*c)*c)*a*b^5*c - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*a^3*b^2*c^2 - 36*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*a^2*b^3*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
*c)*a*b^4*c^2 - 160*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*a^4*c^3 - 80*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
^3*b*c^3 + 18*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2
*b^2*c^3 + 40*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3
*c^4 + 2*(b^2 - 4*a*c)*a*b^5*c - 40*(b^2 - 4*a*c)*a^2*b^3*c^2 - 2*(b^2 - 4*
a*c)*a*b^4*c^2 + 128*(b^2 - 4*a*c)*a^3*b*c^3 + 36*(b^2 - 4*a*c)*a^2*b^2*c^3
 + 80*(b^2 - 4*a*c)*a^3*c^4)*f + 3*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)
*a^2*b^6 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c - 2*sqrt(2)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c - 2*a^2*b^6*c - 16*sqrt(2)*sqrt(b
*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c
)*c)*a^2*b^4*c^2 + 8*a^3*b^4*c^2 + 2*a^2*b^5*c^2 + 64*sqrt(2)*sqrt(b*c + sq
rt(b^2 - 4*a*c)*c)*a^5*c^3 + 32*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4
*b*c^3 + 32*a^4*b^2*c^3 + 16*a^3*b^3*c^3 - 16*sqrt(2)*sqrt(b*c + sqrt(b^2 -
 4*a*c)*c)*a^4*c^4 - 128*a^5*c^4 - 96*a^4*b*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c + 48*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
+ sqrt(b^2 - 4*a*c)*c)*a^4*b*c^2 + 24*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c +
sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*a^2*b^3*c^2 - 12*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*a^3*b*c^3 + 2*(b^2 - 4*a*c)*a^2*b^4*c - 2*(b^2 - 4*a*c)*a
^2*b^3*c^2 - 32*(b^2 - 4*a*c)*a^4*c^3 - 24*(b^2 - 4*a*c)*a^3*b*c^3)*h)*arct
an(2*sqrt(1/2)*x/sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + sqrt((a^2*b^5
 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(
a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a
^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c - 2*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*
b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 +
 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*b^2*c^4 - 64*a^6*c^5)*abs(c)) + 1/32*
(3*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^8 - 17*sqrt(2)*sqrt(b*c - sqr
t(b^2 - 4*a*c)*c)*a*b^6*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^7*c
 + 2*b^8*c + 116*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + 26*s
qrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c - sqrt(
b^2 - 4*a*c)*c)*b^6*c^2 - 34*a*b^6*c^2 - 2*b^7*c^2 - 368*sqrt(2)*sqrt(b*c -
 sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c
)*c)*a^2*b^3*c^3 - 13*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^3 + 2
32*a^2*b^4*c^3 + 30*a*b^5*c^3 + 448*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)
*a^4*c^4 + 224*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 64*sqrt(
2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^4 - 736*a^3*b^2*c^4 - 176*a^2*
b^3*c^4 - 112*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^5 + 896*a^4*c^5
 + 352*a^3*b*c^5 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*b^7 - 15*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*
c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^6*c + 88*
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + 22*
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 + sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^5*c^2 - 176*sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 - 88*sqrt(2)*sq
rt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 11*sqrt(2)*sq
rt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 + 44*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 - 2*(b^2 - 4*a*c)*b
^6*c + 26*(b^2 - 4*a*c)*a*b^4*c^2 + 2*(b^2 - 4*a*c)*b^5*c^2 - 128*(b^2 - 4*
```

```
a*c)*a^2*b^2*c^3 - 22*(b^2 - 4*a*c)*a*b^3*c^3 + 224*(b^2 - 4*a*c)*a^3*c^4 +
 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a
*b^7 - 24*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c - 2*sqrt(2)*sqr
t(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^6*c + 2*a*b^7*c + 144*sqrt(2)*sqrt(b*c - s
qrt(b^2 - 4*a*c)*c)*a^3*b^3*c^2 + 40*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a^2*b^4*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 - 48*a^2*
b^5*c^2 - 2*a*b^6*c^2 - 256*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b*c
^3 - 128*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 20*sqrt(2)*s
qrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 + 288*a^3*b^3*c^3 + 44*a^2*b^4*c
^3 + 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 - 512*a^4*b*c^4 -
 64*a^3*b^2*c^4 - 320*a^4*c^5 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b
^2 - 4*a*c)*c)*a*b^6 - 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4
*a*c)*c)*a^2*b^4*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*
c)*c)*a*b^5*c + 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a^3*b^2*c^2 + 36*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a^2*b^3*c^2 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a
*b^4*c^2 + 160*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^
4*c^3 + 80*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*
c^3 - 18*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*
c^3 - 40*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^4
 - 2*(b^2 - 4*a*c)*a*b^5*c + 40*(b^2 - 4*a*c)*a^2*b^3*c^2 + 2*(b^2 - 4*a*c)*
a*b^4*c^2 - 128*(b^2 - 4*a*c)*a^3*b*c^3 - 36*(b^2 - 4*a*c)*a^2*b^2*c^3 - 80
*(b^2 - 4*a*c)*a^3*c^4)*f + 3*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*
b^6 - 4*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c - 2*sqrt(2)*sqrt(
b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c + 2*a^2*b^6*c - 16*sqrt(2)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*
a^2*b^4*c^2 - 8*a^3*b^4*c^2 - 2*a^2*b^5*c^2 + 64*sqrt(2)*sqrt(b*c - sqrt(b^
2 - 4*a*c)*c)*a^5*c^3 + 32*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b*c^
3 - 32*a^4*b^2*c^3 - 16*a^3*b^3*c^3 - 16*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*
c)*c)*a^4*c^4 + 128*a^5*c^4 + 96*a^4*b*c^4 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^5 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
- sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - s
qrt(b^2 - 4*a*c)*c)*a^2*b^4*c - 48*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqr
t(b^2 - 4*a*c)*c)*a^4*b*c^2 - 24*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(
b^2 - 4*a*c)*c)*a^3*b^2*c^2 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2
 - 4*a*c)*c)*a^2*b^3*c^2 + 12*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2
 - 4*a*c)*c)*a^3*b*c^3 - 2*(b^2 - 4*a*c)*a^2*b^4*c + 2*(b^2 - 4*a*c)*a^2*b^
3*c^2 + 32*(b^2 - 4*a*c)*a^4*c^3 + 24*(b^2 - 4*a*c)*a^3*b*c^3)*h)*arctan(2*
sqrt(1/2)*x/sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5 - 8*
a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b
^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^
3)))/((a^3*b^8 - 16*a^4*b^6*c - 2*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c
^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*
a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*b^2*c^4 - 64*a^6*c^5)*abs(c)) + 3/2*((b^3*
c^3 - 4*a*b*c^4 - 2*b^2*c^4 + b*c^5)*sqrt(b^2 - 4*a*c)*g - 2*(b^2*c^4 - 4*a
*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e)*log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b
^3*c + 16*a^4*b*c^2 + sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^
3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))
)/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^6*c - 2*b^7*c +
96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3
- 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)
*c^2) - 3/2*((b^3*c^3 - 4*a*b*c^4 - 2*b^2*c^4 + b*c^5)*sqrt(b^2 - 4*a*c)*g
- 2*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e)*log(x^2 + 1/2*
(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^
4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*
c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*
b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3
 - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2
*c^4 - 64*a^3*c^5)*c^2) + 1/8*(3*b^3*c^2*d*x^7 - 24*a*b*c^3*d*x^7 + a*b^2*c
```

```
^2*f*x^7 + 20*a^2*c^3*f*x^7 - 12*a^2*b*c^2*h*x^7 - 12*a^2*b*c^2*g*x^6 + 24*
a^2*c^3*x^6*e + 6*b^4*c*d*x^5 - 49*a*b^2*c^2*d*x^5 + 28*a^2*c^3*d*x^5 + 2*a
*b^3*c*f*x^5 + 28*a^2*b*c^2*f*x^5 - 19*a^2*b^2*c*h*x^5 + 4*a^3*c^2*h*x^5 -
18*a^2*b^2*c*g*x^4 + 36*a^2*b*c^2*x^4*e + 3*b^5*d*x^3 - 20*a*b^3*c*d*x^3 -
4*a^2*b*c^2*d*x^3 + a*b^4*f*x^3 + 5*a^2*b^2*c*f*x^3 + 36*a^3*c^2*f*x^3 - 5*
a^2*b^3*h*x^3 - 16*a^3*b*c*h*x^3 - 4*a^2*b^3*g*x^2 - 20*a^3*b*c*g*x^2 + 8*a
^2*b^2*c*x^2*e + 40*a^3*c^2*x^2*e + 5*a*b^4*d*x - 37*a^2*b^2*c*d*x + 44*a^3
*c^2*d*x - a^2*b^3*f*x + 16*a^3*b*c*f*x - 3*a^3*b^2*h*x - 12*a^4*c*h*x - 2*
a^3*b^2*g - 16*a^4*c*g - 2*a^2*b^3*e + 20*a^3*b*c*e)/((a^2*b^4 - 8*a^3*b^2*
c + 16*a^4*c^2)*(c*x^4 + b*x^2 + a)^2)
```

maple [B] time = 0.10, size = 3492, normalized size = 5.14

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x)
```

```
[Out] -15/2/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+
b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)
*(-4*a*c+b^2)^(1/2)*b^2*d+3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^
2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^4*d+3/4/a^2/(16*a^2*c^2-8*a*b^2*
c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2
^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^4*d+1/4/
a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/
2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c
+b^2)^(1/2)*b^3*f+1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)
/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)
^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^3*f-15/2/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/
(16*a*c-4*b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+
(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*d+(-1/8*c^2*(12*a^
2*b*h-20*a^2*c*f-a*b^2*f+24*a*b*c*d-3*b^3*d)/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)
*x^7-3/2*c^2*(b*g-2*c*e)/(16*a^2*c^2-8*a*b^2*c+b^4)*x^6+1/8/a^2*c*(4*a^3*c*
h-19*a^2*b^2*h+28*a^2*b*c*f+28*a^2*c^2*d+2*a*b^3*f-49*a*b^2*c*d+6*b^4*d)/(1
6*a^2*c^2-8*a*b^2*c+b^4)*x^5-9/4*b*c*(b*g-2*c*e)/(16*a^2*c^2-8*a*b^2*c+b^4)
*x^4-1/8*(16*a^3*b*c*h-36*a^3*c^2*f+5*a^2*b^3*h-5*a^2*b^2*c*f+4*a^2*b*c^2*d
-a*b^4*f+20*a*b^3*c*d-3*b^5*d)/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*x^3-1/2*(5*a*
c+b^2)*(b*g-2*c*e)/(16*a^2*c^2-8*a*b^2*c+b^4)*x^2-1/8*(12*a^3*c*h+3*a^2*b^2
*h-16*a^2*b*c*f-44*a^2*c^2*d+a*b^3*f+37*a*b^2*c*d-5*b^4*d)/(16*a^2*c^2-8*a*
b^2*c+b^4)/a*x-1/4*(8*a^2*c*g+a*b^2*g-10*a*b*c*e+b^3*e)/(16*a^2*c^2-8*a*b^2
*c+b^4))/(c*x^4+b*x^2+a)^2-4/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*
2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*c*x)*b^2*f-24/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2
^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/
2))*c)^(1/2)*c*x)*b*d+4/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/
2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2
))*c)^(1/2)*c*x)*b^2*f+24/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(
1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*c*x)*b*d+3/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2
)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c
)^(1/2)*c*x)*b^3*h+20*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/
2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*
c)^(1/2)*c*x)*f-20*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/2)/
((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*
c)^(1/2)*c*x)*f-3/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((-b+
(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1
/2)*c*x)*b^3*h+42/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/2)/((-
b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^
(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d+42/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4
```

```
*b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b
^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d+6/(16*a^2*c^2-8*a*b^2*c+b^4)*
c/(16*a*c-4*b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b*g-6
/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2
))*(-4*a*c+b^2)^(1/2)*b*g-12*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2
)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^
(1/2))*c)^(1/2)*c*x)*b*h+9/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*
2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*c*x)*b^3*d-9/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*
2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*c*x)*b^3*d-1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^
2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*c*x)*b^4*f+3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*
b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*c*x)*b^5*d-13/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-
4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a
*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b*f+9/2/(16*a^2*c^2-8*a*b^2
*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(
2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*h+9/2
/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2)
)*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2
)^(1/2)*b^2*h-13/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((b+
(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2
)*c*x)*(-4*a*c+b^2)^(1/2)*b*f-3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-
4*b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+
b^2)^(1/2))*c)^(1/2)*c*x)*b^5*d+1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-
4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a
*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^4*f+6*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a
*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-
4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*h+12*a/(16*a^2*c^2-8*a*b
^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arct
anh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*h+6*a/(16*a^2*c^2-8*a*
b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arct
an(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*h-12/(1
6*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2
))*(-4*a*c+b^2)^(1/2)*e+12/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*ln
(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*e
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="maxima"
)
```

```
[Out] -1/8*((12*a^2*b*c^2*h - 3*(b^3*c^2 - 8*a*b*c^3)*d - (a*b^2*c^2 + 20*a^2*c^3
)*f)*x^7 - 12*(2*a^2*c^3*e - a^2*b*c^2*g)*x^6 - ((6*b^4*c - 49*a*b^2*c^2 +
28*a^2*c^3)*d + 2*(a*b^3*c + 14*a^2*b*c^2)*f - (19*a^2*b^2*c - 4*a^3*c^2)*h
)*x^5 - 18*(2*a^2*b*c^2*e - a^2*b^2*c*g)*x^4 - ((3*b^5 - 20*a*b^3*c - 4*a^2
*b*c^2)*d + (a*b^4 + 5*a^2*b^2*c + 36*a^3*c^2)*f - (5*a^2*b^3 + 16*a^3*b*c)
*h)*x^3 - 4*(2*(a^2*b^2*c + 5*a^3*c^2)*e - (a^2*b^3 + 5*a^3*b*c)*g)*x^2 + 2
*(a^2*b^3 - 10*a^3*b*c)*e + 2*(a^3*b^2 + 8*a^4*c)*g - ((5*a*b^4 - 37*a^2*b^
2*c + 44*a^3*c^2)*d - (a^2*b^3 - 16*a^3*b*c)*f - 3*(a^3*b^2 + 4*a^4*c)*h)*x
)/((a^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4)*x^8 + a^4*b^4 - 8*a^5*b^2*c +
 16*a^6*c^2 + 2*(a^2*b^5*c - 8*a^3*b^3*c^2 + 16*a^4*b*c^3)*x^6 + (a^2*b^6 -
 6*a^3*b^4*c + 32*a^5*c^3)*x^4 + 2*(a^3*b^5 - 8*a^4*b^3*c + 16*a^5*b*c^2)*x
^2) - 1/8*integrate(((12*a^2*b*c*h - 3*(b^3*c - 8*a*b*c^2)*d - (a*b^2*c + 2
0*a^2*c^2)*f)*x^2 - 3*(b^4 - 9*a*b^2*c + 28*a^2*c^2)*d - (a*b^3 - 16*a^2*b*
```

```
c)*f - 3*(a^2*b^2 + 4*a^3*c)*h - 24*(2*a^2*c^2*e - a^2*b*c*g)*x)/(c*x^4 + b
*x^2 + a), x)/(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)
```

mupad [B] time = 5.35, size = 23811, normalized size = 35.07

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^3,x)
```

```
[Out] ((9*x^4*(2*b*c^2*e - b^2*c*g))/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (x^2*(b
^3*g - 10*a*c^2*e - 2*b^2*c*e + 5*a*b*c*g))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*
c)) - (b^3*e + a*b^2*g + 8*a^2*c*g - 10*a*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a
*b^2*c)) + (x^5*(28*a^2*c^3*d + 4*a^3*c^2*h + 6*b^4*c*d + 2*a*b^3*c*f - 49*
a*b^2*c^2*d + 28*a^2*b*c^2*f - 19*a^2*b^2*c*h))/(8*a^2*(b^4 + 16*a^2*c^2 -
8*a*b^2*c)) + (x^3*(3*b^5*d + 36*a^3*c^2*f - 5*a^2*b^3*h + a*b^4*f - 20*a*b
^3*c*d - 16*a^3*b*c*h - 4*a^2*b*c^2*d + 5*a^2*b^2*c*f))/(8*a^2*(b^4 + 16*a^
2*c^2 - 8*a*b^2*c)) - (x*(3*a^2*b^2*h - 44*a^2*c^2*d - 5*b^4*d + a*b^3*f +
12*a^3*c*h + 37*a*b^2*c*d - 16*a^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2
*c)) + (3*c^2*x^6*(2*c*e - b*g))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^
7*(20*a^2*c^2*f + 3*b^3*c*d - 24*a*b*c^2*d + a*b^2*c*f - 12*a^2*b*c*h))/(8*
a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2
*a*b*x^2 + 2*b*c*x^6) + symsum(log((10368*a*b^5*c^6*d^3 - 8000*a^5*c^7*f^3
- 567*b^7*c^5*d^3 + 169344*a^3*b*c^8*d^3 + 193536*a^4*c^8*d*e^2 - 141120*a^
4*c^8*d^2*f + 1728*a^6*b*c^5*h^3 + 315*b^8*c^4*d^2*f + 27648*a^5*c^7*e^2*h
- 135*b^9*c^3*d^2*h - 2880*a^6*c^6*f*h^2 - 67824*a^2*b^3*c^7*d^3 + 35*a^2*b
^6*c^4*f^3 + 84*a^3*b^4*c^5*f^3 - 12720*a^4*b^2*c^6*f^3 + 540*a^4*b^5*c^3*h
^3 + 4320*a^5*b^3*c^4*h^3 - 40320*a^5*c^7*d*f*h - 6237*a*b^6*c^5*d^2*f + 21
0*a*b^7*c^4*d*f^2 + 116160*a^4*b*c^7*d*f^2 - 36864*a^4*b*c^7*e^2*f + 2430*a
*b^7*c^4*d^2*h + 133056*a^4*b*c^7*d^2*h + 27648*a^5*b*c^6*d*h^2 + 26880*a^5
*b*c^6*f^2*h + 6912*a^2*b^4*c^6*d*e^2 - 62208*a^3*b^2*c^7*d*e^2 + 42372*a^2
*b^4*c^6*d^2*f - 1764*a^2*b^5*c^5*d*f^2 - 96048*a^3*b^2*c^7*d^2*f - 4608*a^
3*b^3*c^6*d*f^2 + 1728*a^2*b^6*c^4*d*g^2 + 2304*a^3*b^3*c^6*e^2*f - 15552*a
^3*b^4*c^5*d*g^2 + 48384*a^4*b^2*c^6*d*g^2 - 13716*a^2*b^5*c^5*d^2*h + 405*
a^2*b^7*c^3*d*h^2 + 12096*a^3*b^3*c^6*d^2*h - 5400*a^3*b^5*c^4*d*h^2 + 2894
4*a^4*b^3*c^5*d*h^2 + 576*a^3*b^5*c^4*f*g^2 + 6912*a^4*b^2*c^6*e^2*h - 9216
*a^4*b^3*c^5*f*g^2 - 15*a^2*b^7*c^3*f^2*h - 360*a^3*b^5*c^4*f^2*h + 135*a^3
*b^6*c^3*f*h^2 + 15696*a^4*b^3*c^5*f^2*h - 5580*a^4*b^4*c^4*f*h^2 - 20592*a
^5*b^2*c^5*f*h^2 + 1728*a^4*b^4*c^4*g^2*h + 6912*a^5*b^2*c^5*g^2*h - 193536
*a^4*b*c^7*d*e*g - 90*a*b^8*c^3*d*f*h - 27648*a^5*b*c^6*e*g*h - 6912*a^2*b^
5*c^5*d*e*g + 62208*a^3*b^3*c^6*d*e*g - 270*a^2*b^6*c^4*d*f*h + 16056*a^3*b
^4*c^5*d*f*h - 2304*a^3*b^4*c^5*e*f*g - 127008*a^4*b^2*c^6*d*f*h + 36864*a^
4*b^2*c^6*e*f*g - 6912*a^4*b^3*c^5*e*g*h)/(512*(a^4*b^12 + 4096*a^10*c^6 -
24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 614
4*a^9*b^2*c^5)) - root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^
3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 1932735
28320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b
^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 687194
76736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 46080*a^4*b^14*c*f*h*z^2 - 10598
4*a^3*b^15*c*d*h*z^2 - 73728*a^2*b^16*c*d*f*z^2 + 2548039680*a^9*b^3*c^7*d*
h*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*z^2 - 1
321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a
^7*b^6*c^6*d*f*z^2 - 456130560*a^9*b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c^5*
d*h*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 2
54017536*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680*a^
10*b^2*c^7*f*h*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 - 61931520*a^7*b^8*c^4*f
*h*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + 614
4000*a^6*b^10*c^3*f*h*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^9*c
^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 + 3
68640*a^5*b^11*c^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^
```

```
14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 440401920*a^10*b*c^8*f^2*z
^2 - 188743680*a^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 + 46080*a^5
*b^13*c*h^2*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2
 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 15099494
40*a^9*b^2*c^8*e^2*z^2 + 251658240*a^11*c^8*f*h*z^2 + 1536*a^3*b^16*f*h*z^2
 + 4608*a^2*b^17*d*h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*
d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 4
77102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^
10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^10*b^3*c^6
*h^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 +
146165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 - 26542080*a^
8*b^7*c^4*h^2*z^2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5*c^5*h^2*z
^2 - 1290240*a^6*b^11*c^2*h^2*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 294912*a
^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^
2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 29184
0*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c
^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 120795955
2*a^10*c^9*e^2*z^2 + 2304*a^4*b^15*h^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^
19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 99090432*a^8*b*c^7*d*g*h*z - 460
8*a^3*b^12*c*f*g*h*z - 9437184*a^8*b*c^7*e*f*h*z - 13824*a^2*b^13*c*d*g*h*z
 + 9216*a*b^13*c^2*d*e*f*z - 4608*a*b^14*c*d*f*g*z + 219414528*a^7*b^2*c^7*
d*e*h*z - 221773824*a^6*b^3*c^7*d*e*f*z - 109707264*a^7*b^3*c^6*d*g*h*z + 1
10886912*a^6*b^4*c^6*d*f*g*z - 88473600*a^6*b^4*c^6*d*e*h*z - 84934656*a^7*
b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z + 44236800*a^6*b^5*c^5*d*g*
h*z - 5898240*a^7*b^4*c^5*f*g*h*z + 4718592*a^8*b^2*c^6*f*g*h*z + 2949120*a
^6*b^6*c^4*f*g*h*z - 737280*a^5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g*h*
z - 58982400*a^5*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^6*e*f*h*z - 6635520*a
^5*b^7*c^4*d*g*h*z - 5898240*a^6*b^5*c^5*e*f*h*z + 1474560*a^5*b^7*c^4*e*f*
h*z - 276480*a^4*b^9*c^3*d*g*h*z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a^3*
b^11*c^2*d*g*h*z + 9216*a^3*b^11*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*g*z
 + 13271040*a^5*b^6*c^5*d*e*h*z - 2396160*a^3*b^10*c^3*d*f*g*z + 552960*a^4
*b^8*c^4*d*e*h*z - 359424*a^3*b^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f*g*
z + 27648*a^2*b^12*c^2*d*e*h*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3
*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2*g*
z + 7077888*a^9*b*c^6*g*h^2*z - 6912*a^4*b^11*c*g*h^2*z - 19660800*a^8*b*c^
7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z + 214272*a*b^13*c^2*d^2*g*z - 428544*a*b
^12*c^3*d^2*e*z - 198180864*a^8*c^8*d*e*h*z + 1022754816*a^6*b^2*c^8*d^2*e*
z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 3211591
68*a^5*b^5*c^6*d^2*g*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*a^4*b^7*
c^5*d^2*g*z - 8847360*a^8*b^3*c^5*g*h^2*z + 4423680*a^7*b^5*c^4*g*h^2*z - 1
105920*a^6*b^7*c^3*g*h^2*z + 138240*a^5*b^9*c^2*g*h^2*z + 25362432*a^7*b^3*
c^6*f^2*g*z + 17694720*a^8*b^2*c^6*e*h^2*z - 50724864*a^7*b^2*c^7*e*f^2*z -
 13271040*a^6*b^5*c^5*f^2*g*z - 8847360*a^7*b^4*c^5*e*h^2*z + 3563520*a^5*b
^7*c^4*f^2*g*z + 2211840*a^6*b^6*c^4*e*h^2*z - 506880*a^4*b^9*c^3*f^2*g*z -
 276480*a^5*b^8*c^3*e*h^2*z + 34560*a^3*b^11*c^2*f^2*g*z + 13824*a^4*b^10*c
^2*e*h^2*z + 26542080*a^6*b^4*c^6*e*f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z -
46725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^
11*c^3*d^2*g*z + 1013760*a^4*b^8*c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z +
 1536*a^2*b^12*c^2*e*f^2*z + 5930496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c
^9*d^2*e*z - 14155776*a^9*c^7*e*h^2*z + 39321600*a^8*c^8*e*f^2*z + 13824*b^
14*c^2*d^2*e*z - 6912*b^15*c*d^2*g*z + 2211840*a^6*b*c^6*e*f*g*h + 15482880
*a^5*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g + 4423680*a^5*b^3*c^5*e*f*g*h
+ 138240*a^4*b^5*c^4*e*f*g*h - 13824*a^3*b^7*c^3*e*f*g*h - 16588800*a^5*b^2
*c^6*d*e*g*h + 1658880*a^4*b^4*c^5*d*e*g*h + 124416*a^3*b^6*c^4*d*e*g*h - 4
1472*a^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 2903040*a^3*b^5*c^
5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g - 37062144*a^5*b*c^7*d^2*f*h - 59857
92*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*c^3*d^2*f*h - 6300*a*b^10*c^2*d*f^2*h +
 16588800*a^5*b*c^7*d*e^2*h + 3456*a*b^10*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^
2*e*g + 13824*a*b^8*c^4*d*e^2*f + 1350*a*b^11*c*d*f*h^2 - 1105920*a^5*b^4*c
```

^4*f*g^2*h - 552960*a^6*b^2*c^5*f*g^2*h - 34560*a^4*b^6*c^3*f*g^2*h + 3456*
a^3*b^8*c^2*f*g^2*h - 1658880*a^6*b^2*c^5*e*g*h^2 - 829440*a^5*b^4*c^4*e*g*
h^2 - 20736*a^4*b^6*c^3*e*g*h^2 - 4423680*a^5*b^2*c^6*e^2*f*h + 4147200*a^5
*b^3*c^5*d*g^2*h - 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4*b^4*c^5*e^2*f*h
- 31104*a^3*b^7*c^3*d*g^2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c^2
*d*g^2*h + 15630336*a^5*b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + 96
30144*a^3*b^5*c^5*d^2*f*h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2*c
^6*e*f^2*g + 2867328*a^4*b^4*c^5*d*f^2*h - 2095200*a^2*b^7*c^4*d^2*f*h - 14
14080*a^3*b^6*c^4*d*f^2*h - 34836480*a^4*b^2*c^7*d^2*e*g - 645120*a^4*b^4*c
^5*e*f^2*g + 306720*a^3*b^7*c^3*d*f*h^2 + 197820*a^2*b^8*c^3*d*f^2*h + 1468
80*a^4*b^5*c^4*d*f*h^2 + 80640*a^3*b^6*c^4*e*f^2*g - 55350*a^2*b^9*c^2*d*f*
h^2 - 2304*a^2*b^8*c^3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 1935360*a^4*
b^4*c^5*d*f*g^2 - 1658880*a^4*b^3*c^6*d*e^2*h + 725760*a^3*b^6*c^4*d*f*g^2
+ 17418240*a^3*b^4*c^6*d^2*e*g - 124416*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b^8
*c^3*d*f*g^2 + 41472*a^2*b^7*c^4*d*e^2*h - 3919104*a^2*b^6*c^5*d^2*e*g - 77
41440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^
5*d*e^2*f - 1648128*a^5*b^3*c^5*f^3*h - 898560*a^6*b^3*c^4*f*h^3 - 354240*a
^5*b^5*c^3*f*h^3 - 354240*a^4*b^5*c^4*f^3*h + 43680*a^3*b^7*c^3*f^3*h - 216
00*a^4*b^7*c^2*f*h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2 + 16
58880*a^6*b*c^6*e^2*h^2 + 16547328*a^4*b^2*c^7*d^3*h - 12306816*a^3*b^4*c^6
*d^3*h + 37310976*a^3*b^3*c^7*d^3*f + 3037824*a^2*b^6*c^5*d^3*h - 2654208*a
^5*b^3*c^5*e*g^3 + 1949184*a^6*b^2*c^5*d*h^3 + 1296000*a^5*b^4*c^4*d*h^3 -
155520*a^4*b^6*c^3*d*h^3 - 40500*a*b^10*c^2*d^2*h^2 - 8100*a^3*b^8*c^2*d*h^
3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864*a*b^9*c
^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 173779
2*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 -
435456*a*b^7*c^5*d^2*e^2 - 2211840*a^6*c^7*e^2*f*h - 9450*b^11*c^2*d^2*f*h
+ 1612800*a^6*c^7*d*f^2*h - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^
3*f - 883200*a^6*b*c^6*f^3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f*h^
3 - 15482880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c^4*
d^3*h + 4050*a^2*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*
d^3*f + 7350*a*b^9*c^3*d*f^3 + 414720*a^6*b^3*c^4*g^2*h^2 + 207360*a^5*b^5*
c^3*g^2*h^2 + 5184*a^4*b^7*c^2*g^2*h^2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 1264
320*a^5*b^4*c^4*f^2*h^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^
2*h^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c^5*e^2*h^2 + 161280*a^
4*b^5*c^4*f^2*g^2 + 20736*a^4*b^5*c^4*e^2*h^2 - 20160*a^3*b^7*c^3*f^2*g^2 +
576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2*c^6*d^2*h^2 + 7962624*a^5*b^2*c
^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - 1412640*a^3*b^6*c^4*d^2*h^2 + 4
61376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*c^3*d^2*h^2 + 8709120*a^4*b^3*c^
6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*d^2*g^2 + 6451
20*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f
^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - 17418240*
a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 115200*a^7*c^6*f^2*h^2
+ 6096384*a^6*c^7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2
+ 5644800*a^5*c^8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*h^4
+ 32400*a^5*b^6*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 +
492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 +
1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 +
28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 5806
08*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 2025*a^4*b^8*c*h^4 - 734832*a*b^6*
c^6*d^4 + 20736*a^8*c^5*h^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5
308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*((983040*a^7*c^8*e*f - 324403
2*a^6*b*c^8*d*e - 884736*a^7*b*c^7*e*h - 491520*a^7*b*c^7*f*g - 4608*a^2*b^
9*c^4*d*e + 87552*a^3*b^7*c^5*d*e - 681984*a^4*b^5*c^6*d*e + 2433024*a^5*b^
3*c^7*d*e + 2304*a^2*b^10*c^3*d*g - 43776*a^3*b^8*c^4*d*g - 1536*a^3*b^8*c^
4*e*f + 340992*a^4*b^6*c^5*d*g + 39936*a^4*b^6*c^5*e*f - 1216512*a^5*b^4*c^
6*d*g - 184320*a^5*b^4*c^6*e*f + 1622016*a^6*b^2*c^7*d*g - 49152*a^6*b^2*c^
7*e*f + 768*a^3*b^9*c^3*f*g - 4608*a^4*b^7*c^4*e*h - 19968*a^4*b^7*c^4*f*g
- 18432*a^5*b^5*c^5*e*h + 92160*a^5*b^5*c^5*f*g + 368640*a^6*b^3*c^6*e*h +

```
24576*a^6*b^3*c^6*f*g + 2304*a^4*b^8*c^3*g*h + 9216*a^5*b^6*c^4*g*h - 18432
0*a^6*b^4*c^5*g*h + 442368*a^7*b^2*c^6*g*h)/(512*(a^4*b^12 + 4096*a^10*c^6
- 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6
144*a^9*b^2*c^5)) - root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*
c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 19327
3528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10
*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 6871
9476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 46080*a^4*b^14*c*f*h*z^2 - 105
984*a^3*b^15*c*d*h*z^2 - 73728*a^2*b^16*c*d*f*z^2 + 2548039680*a^9*b^3*c^7*
d*h*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*z^2 -
 1321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192
*a^7*b^6*c^6*d*f*z^2 - 456130560*a^9*b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c^
5*d*h*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 +
 254017536*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680*
a^10*b^2*c^7*f*h*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 - 61931520*a^7*b^8*c^4
*f*h*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + 6
144000*a^6*b^10*c^3*f*h*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^9
*c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 +
 368640*a^5*b^11*c^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*
b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 440401920*a^10*b*c^8*f^2
*z^2 - 188743680*a^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 + 46080*a
^5*b^13*c*h^2*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z
^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 150994
9440*a^9*b^2*c^8*e^2*z^2 + 251658240*a^11*c^8*f*h*z^2 + 1536*a^3*b^16*f*h*z
^2 + 4608*a^2*b^17*d*h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*
c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 +
 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*
a^10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^10*b^3*c
^6*h^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2
+ 146165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 - 26542080*
a^8*b^7*c^4*h^2*z^2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5*c^5*h^2
*z^2 - 1290240*a^6*b^11*c^2*h^2*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 294912
*a^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*
f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291
840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10
*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959
552*a^10*c^9*e^2*z^2 + 2304*a^4*b^15*h^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*
b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 99090432*a^8*b*c^7*d*g*h*z - 4
608*a^3*b^12*c*f*g*h*z - 9437184*a^8*b*c^7*e*f*h*z - 13824*a^2*b^13*c*d*g*h
*z + 9216*a*b^13*c^2*d*e*f*z - 4608*a*b^14*c*d*f*g*z + 219414528*a^7*b^2*c^
7*d*e*h*z - 221773824*a^6*b^3*c^7*d*e*f*z - 109707264*a^7*b^3*c^6*d*g*h*z +
 110886912*a^6*b^4*c^6*d*f*g*z - 88473600*a^6*b^4*c^6*d*e*h*z - 84934656*a^
7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z + 44236800*a^6*b^5*c^5*d*
g*h*z - 5898240*a^7*b^4*c^5*f*g*h*z + 4718592*a^8*b^2*c^6*f*g*h*z + 2949120
*a^6*b^6*c^4*f*g*h*z - 737280*a^5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g*
h*z - 58982400*a^5*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^6*e*f*h*z - 6635520
*a^5*b^7*c^4*d*g*h*z - 5898240*a^6*b^5*c^5*e*f*h*z + 1474560*a^5*b^7*c^4*e*
f*h*z - 276480*a^4*b^9*c^3*d*g*h*z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a^
3*b^11*c^2*d*g*h*z + 9216*a^3*b^11*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*g
*z + 13271040*a^5*b^6*c^5*d*e*h*z - 2396160*a^3*b^10*c^3*d*f*g*z + 552960*a
^4*b^8*c^4*d*e*h*z - 359424*a^3*b^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f*
g*z + 27648*a^2*b^12*c^2*d*e*h*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a
^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2*
g*z + 7077888*a^9*b*c^6*g*h^2*z - 6912*a^4*b^11*c*g*h^2*z - 19660800*a^8*b*
c^7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z + 214272*a*b^13*c^2*d^2*g*z - 428544*a
*b^12*c^3*d^2*e*z - 198180864*a^8*c^8*d*e*h*z + 1022754816*a^6*b^2*c^8*d^2*
e*z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 32115
9168*a^5*b^5*c^6*d^2*g*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*a^4*b^
7*c^5*d^2*g*z - 8847360*a^8*b^3*c^5*g*h^2*z + 4423680*a^7*b^5*c^4*g*h^2*z -
```

1105920*a^6*b^7*c^3*g*h^2*z + 138240*a^5*b^9*c^2*g*h^2*z + 25362432*a^7*b^
3*c^6*f^2*g*z + 17694720*a^8*b^2*c^6*e*h^2*z - 50724864*a^7*b^2*c^7*e*f^2*z
 - 13271040*a^6*b^5*c^5*f^2*g*z - 8847360*a^7*b^4*c^5*e*h^2*z + 3563520*a^5
*b^7*c^4*f^2*g*z + 2211840*a^6*b^6*c^4*e*h^2*z - 506880*a^4*b^9*c^3*f^2*g*z
 - 276480*a^5*b^8*c^3*e*h^2*z + 34560*a^3*b^11*c^2*f^2*g*z + 13824*a^4*b^10
*c^2*e*h^2*z + 26542080*a^6*b^4*c^6*e*f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z
 - 46725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*
b^11*c^3*d^2*g*z + 1013760*a^4*b^8*c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z
 + 1536*a^2*b^12*c^2*e*f^2*z + 5930496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7
*c^9*d^2*e*z - 14155776*a^9*c^7*e*h^2*z + 39321600*a^8*c^8*e*f^2*z + 13824*
b^14*c^2*d^2*e*z - 6912*b^15*c*d^2*g*z + 2211840*a^6*b*c^6*e*f*g*h + 154828
80*a^5*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g + 4423680*a^5*b^3*c^5*e*f*g*
h + 138240*a^4*b^5*c^4*e*f*g*h - 13824*a^3*b^7*c^3*e*f*g*h - 16588800*a^5*b
^2*c^6*d*e*g*h + 1658880*a^4*b^4*c^5*d*e*g*h + 124416*a^3*b^6*c^4*d*e*g*h -
 41472*a^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 2903040*a^3*b^5*
c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g - 37062144*a^5*b*c^7*d^2*f*h - 598
5792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*c^3*d^2*f*h - 6300*a*b^10*c^2*d*f^2*h
 + 16588800*a^5*b*c^7*d*e^2*h + 3456*a*b^10*c^2*d*f*g^2 + 435456*a*b^8*c^4*
d^2*e*g + 13824*a*b^8*c^4*d*e^2*f + 1350*a*b^11*c*d*f*h^2 - 1105920*a^5*b^4
*c^4*f*g^2*h - 552960*a^6*b^2*c^5*f*g^2*h - 34560*a^4*b^6*c^3*f*g^2*h + 345
6*a^3*b^8*c^2*f*g^2*h - 1658880*a^6*b^2*c^5*e*g*h^2 - 829440*a^5*b^4*c^4*e*
g*h^2 - 20736*a^4*b^6*c^3*e*g*h^2 - 4423680*a^5*b^2*c^6*e^2*f*h + 4147200*a
^5*b^3*c^5*d*g^2*h - 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4*b^4*c^5*e^2*f*
h - 31104*a^3*b^7*c^3*d*g^2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c
^2*d*g^2*h + 15630336*a^5*b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h +
9630144*a^3*b^5*c^5*d^2*f*h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2
*c^6*e*f^2*g + 2867328*a^4*b^4*c^5*d*f^2*h - 2095200*a^2*b^7*c^4*d^2*f*h -
1414080*a^3*b^6*c^4*d*f^2*h - 34836480*a^4*b^2*c^7*d^2*e*g - 645120*a^4*b^4
*c^5*e*f^2*g + 306720*a^3*b^7*c^3*d*f*h^2 + 197820*a^2*b^8*c^3*d*f^2*h + 14
6880*a^4*b^5*c^4*d*f*h^2 + 80640*a^3*b^6*c^4*e*f^2*g - 55350*a^2*b^9*c^2*d*
f*h^2 - 2304*a^2*b^8*c^3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 1935360*a^
4*b^4*c^5*d*f*g^2 - 1658880*a^4*b^3*c^6*d*e^2*h + 725760*a^3*b^6*c^4*d*f*g^
2 + 17418240*a^3*b^4*c^6*d^2*e*g - 124416*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b
^8*c^3*d*f*g^2 + 41472*a^2*b^7*c^4*d*e^2*h - 3919104*a^2*b^6*c^5*d^2*e*g -
7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*
c^5*d*e^2*f - 1648128*a^5*b^3*c^5*f^3*h - 898560*a^6*b^3*c^4*f*h^3 - 354240
*a^5*b^5*c^3*f*h^3 - 354240*a^4*b^5*c^4*f^3*h + 43680*a^3*b^7*c^3*f^3*h - 2
1600*a^4*b^7*c^2*f*h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2 +
1658880*a^6*b*c^6*e^2*h^2 + 16547328*a^4*b^2*c^7*d^3*h - 12306816*a^3*b^4*c
^6*d^3*h + 37310976*a^3*b^3*c^7*d^3*f + 3037824*a^2*b^6*c^5*d^3*h - 2654208
*a^5*b^3*c^5*e*g^3 + 1949184*a^6*b^2*c^5*d*h^3 + 1296000*a^5*b^4*c^4*d*h^3
 - 155520*a^4*b^6*c^3*d*h^3 - 40500*a*b^10*c^2*d^2*h^2 - 8100*a^3*b^8*c^2*d*
h^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864*a*b^9
*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737
792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3
 - 435456*a*b^7*c^5*d^2*e^2 - 2211840*a^6*c^7*e^2*f*h - 9450*b^11*c^2*d^2*f
*h + 1612800*a^6*c^7*d*f^2*h - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*
d^3*f - 883200*a^6*b*c^6*f^3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f*
h^3 - 15482880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c^
4*d^3*h + 4050*a^2*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^
5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 414720*a^6*b^3*c^4*g^2*h^2 + 207360*a^5*b^
5*c^3*g^2*h^2 + 5184*a^4*b^7*c^2*g^2*h^2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 12
64320*a^5*b^4*c^4*f^2*h^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*
f^2*h^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c^5*e^2*h^2 + 161280*
a^4*b^5*c^4*f^2*g^2 + 20736*a^4*b^5*c^4*e^2*h^2 - 20160*a^3*b^7*c^3*f^2*g^2
 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2*c^6*d^2*h^2 + 7962624*a^5*b^2
*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - 1412640*a^3*b^6*c^4*d^2*h^2 +
 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*c^3*d^2*h^2 + 8709120*a^4*b^3*
c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*d^2*g^2 + 64

```
5120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2
*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - 1741824
0*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 115200*a^7*c^6*f^2*h^
2 + 6096384*a^6*c^7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^
2 + 5644800*a^5*c^8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*h
^4 + 32400*a^5*b^6*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4
 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4
+ 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4
 + 28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 58
0608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 2025*a^4*b^8*c*h^4 - 734832*a*b^
6*c^6*d^4 + 20736*a^8*c^5*h^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 +
 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*((768*a^2*b^14*c^2*d - 3145
728*a^10*c^8*h - 22020096*a^9*c^9*d - 22272*a^3*b^12*c^3*d + 282624*a^4*b^1
0*c^4*d - 2027520*a^5*b^8*c^5*d + 8847360*a^6*b^6*c^6*d - 23396352*a^7*b^4*
c^7*d + 34603008*a^8*b^2*c^8*d + 256*a^3*b^13*c^2*f - 9216*a^4*b^11*c^3*f +
 122880*a^5*b^9*c^4*f - 819200*a^6*b^7*c^5*f + 2949120*a^7*b^5*c^6*f - 5505
024*a^8*b^3*c^7*f + 768*a^4*b^12*c^2*h - 12288*a^5*b^10*c^3*h + 61440*a^6*b
^8*c^4*h - 983040*a^8*b^4*c^6*h + 3145728*a^9*b^2*c^7*h + 4194304*a^9*b*c^8
*f)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280
*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(1572864*a^9*c^9*
e - 1536*a^4*b^10*c^4*e + 30720*a^5*b^8*c^5*e - 245760*a^6*b^6*c^6*e + 9830
40*a^7*b^4*c^7*e - 1966080*a^8*b^2*c^8*e + 768*a^4*b^11*c^3*g - 15360*a^5*b
^9*c^4*g + 122880*a^6*b^7*c^5*g - 491520*a^7*b^5*c^6*g + 983040*a^8*b^3*c^7
*g - 786432*a^9*b*c^8*g))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 2
40*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) +
 (root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920
*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c
^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 35
23215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*
z^4 + 65536*a^5*b^20*z^4 - 46080*a^4*b^14*c*f*h*z^2 - 105984*a^3*b^15*c*d*h
*z^2 - 73728*a^2*b^16*c*d*f*z^2 + 2548039680*a^9*b^3*c^7*d*h*z^2 + 15099494
40*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*z^2 - 1321205760*a^9*b^
2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a^7*b^6*c^6*d*f*z
^2 - 456130560*a^9*b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c^5*d*h*z^2 - 366280
704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 254017536*a^8*b^6
*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680*a^10*b^2*c^7*f*h*z
^2 + 188743680*a^7*b^7*c^5*e*g*z^2 - 61931520*a^7*b^8*c^4*f*h*z^2 + 9658368
0*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + 6144000*a^6*b^10*c^
3*f*h*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^9*c^4*e*g*z^2 + 117
9648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 + 368640*a^5*b^11*c
^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 -
 1207959552*a^10*b*c^8*e*g*z^2 - 440401920*a^10*b*c^8*f^2*z^2 - 188743680*a
^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 + 46080*a^5*b^13*c*h^2*z^2
- 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^
6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e
^2*z^2 + 251658240*a^11*c^8*f*h*z^2 + 1536*a^3*b^16*f*h*z^2 + 4608*a^2*b^17
*d*h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974
720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3
*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^10*b^2*c^7*g^2*z
^2 + 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^10*b^3*c^6*h^2*z^2 - 17432
5760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^
11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 - 26542080*a^8*b^7*c^4*h^2*z^
2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5*c^5*h^2*z^2 - 1290240*a^6
*b^11*c^2*h^2*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 294912*a^5*b^12*c^2*g^2*
z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960
*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f
^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 177
1776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z
^2 + 2304*a^4*b^15*h^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169
```

869312*a^7*b*c^8*d*e*f*z + 99090432*a^8*b*c^7*d*g*h*z - 4608*a^3*b^12*c*f*g
*h*z - 9437184*a^8*b*c^7*e*f*h*z - 13824*a^2*b^13*c*d*g*h*z + 9216*a*b^13*c
^2*d*e*f*z - 4608*a*b^14*c*d*f*g*z + 219414528*a^7*b^2*c^7*d*e*h*z - 221773
824*a^6*b^3*c^7*d*e*f*z - 109707264*a^7*b^3*c^6*d*g*h*z + 110886912*a^6*b^4
*c^6*d*f*g*z - 88473600*a^6*b^4*c^6*d*e*h*z - 84934656*a^7*b^2*c^7*d*f*g*z
+ 117964800*a^5*b^5*c^6*d*e*f*z + 44236800*a^6*b^5*c^5*d*g*h*z - 5898240*a^
7*b^4*c^5*f*g*h*z + 4718592*a^8*b^2*c^6*f*g*h*z + 2949120*a^6*b^6*c^4*f*g*h
*z - 737280*a^5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g*h*z - 58982400*a^5
*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^6*e*f*h*z - 6635520*a^5*b^7*c^4*d*g*h
*z - 5898240*a^6*b^5*c^5*e*f*h*z + 1474560*a^5*b^7*c^4*e*f*h*z - 276480*a^4
*b^9*c^3*d*g*h*z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a^3*b^11*c^2*d*g*h*z
+ 9216*a^3*b^11*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*g*z + 13271040*a^5*
b^6*c^5*d*e*h*z - 2396160*a^3*b^10*c^3*d*f*g*z + 552960*a^4*b^8*c^4*d*e*h*z
- 359424*a^3*b^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f*g*z + 27648*a^2*b^
12*c^2*d*e*h*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z
- 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2*g*z + 7077888*a^9*
b*c^6*g*h^2*z - 6912*a^4*b^11*c*g*h^2*z - 19660800*a^8*b*c^7*f^2*g*z - 768*
a^2*b^13*c*f^2*g*z + 214272*a*b^13*c^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z
- 198180864*a^8*c^8*d*e*h*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^
5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 321159168*a^5*b^5*c^6*d
^2*g*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*a^4*b^7*c^5*d^2*g*z - 88
47360*a^8*b^3*c^5*g*h^2*z + 4423680*a^7*b^5*c^4*g*h^2*z - 1105920*a^6*b^7*c
^3*g*h^2*z + 138240*a^5*b^9*c^2*g*h^2*z + 25362432*a^7*b^3*c^6*f^2*g*z + 17
694720*a^8*b^2*c^6*e*h^2*z - 50724864*a^7*b^2*c^7*e*f^2*z - 13271040*a^6*b^
5*c^5*f^2*g*z - 8847360*a^7*b^4*c^5*e*h^2*z + 3563520*a^5*b^7*c^4*f^2*g*z +
2211840*a^6*b^6*c^4*e*h^2*z - 506880*a^4*b^9*c^3*f^2*g*z - 276480*a^5*b^8*
c^3*e*h^2*z + 34560*a^3*b^11*c^2*f^2*g*z + 13824*a^4*b^10*c^2*e*h^2*z + 265
42080*a^6*b^4*c^6*e*f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8
*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^11*c^3*d^2*g*z +
1013760*a^4*b^8*c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c
^2*e*f^2*z + 5930496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z - 141
55776*a^9*c^7*e*h^2*z + 39321600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z -
6912*b^15*c*d^2*g*z + 2211840*a^6*b*c^6*e*f*g*h + 15482880*a^5*b*c^7*d*e*f
*g - 13824*a*b^9*c^3*d*e*f*g + 4423680*a^5*b^3*c^5*e*f*g*h + 138240*a^4*b^5
*c^4*e*f*g*h - 13824*a^3*b^7*c^3*e*f*g*h - 16588800*a^5*b^2*c^6*d*e*g*h + 1
658880*a^4*b^4*c^5*d*e*g*h + 124416*a^3*b^6*c^4*d*e*g*h - 41472*a^2*b^8*c^3
*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 2903040*a^3*b^5*c^5*d*e*f*g + 3870
72*a^2*b^7*c^4*d*e*f*g - 37062144*a^5*b*c^7*d^2*f*h - 5985792*a^6*b*c^6*d*f
*h^2 + 206010*a*b^9*c^3*d^2*f*h - 6300*a*b^10*c^2*d*f^2*h + 16588800*a^5*b*
c^7*d*e^2*h + 3456*a*b^10*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 13824*a*
b^8*c^4*d*e^2*f + 1350*a*b^11*c*d*f*h^2 - 1105920*a^5*b^4*c^4*f*g^2*h - 552
960*a^6*b^2*c^5*f*g^2*h - 34560*a^4*b^6*c^3*f*g^2*h + 3456*a^3*b^8*c^2*f*g^
2*h - 1658880*a^6*b^2*c^5*e*g*h^2 - 829440*a^5*b^4*c^4*e*g*h^2 - 20736*a^4*
b^6*c^3*e*g*h^2 - 4423680*a^5*b^2*c^6*e^2*f*h + 4147200*a^5*b^3*c^5*d*g^2*h
- 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4*b^4*c^5*e^2*f*h - 31104*a^3*b^7*
c^3*d*g^2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c^2*d*g^2*h + 15630
336*a^5*b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + 9630144*a^3*b^5*c^
5*d^2*f*h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2*c^6*e*f^2*g + 286
7328*a^4*b^4*c^5*d*f^2*h - 2095200*a^2*b^7*c^4*d^2*f*h - 1414080*a^3*b^6*c^
4*d*f^2*h - 34836480*a^4*b^2*c^7*d^2*e*g - 645120*a^4*b^4*c^5*e*f^2*g + 306
720*a^3*b^7*c^3*d*f*h^2 + 197820*a^2*b^8*c^3*d*f^2*h + 146880*a^4*b^5*c^4*d
*f*h^2 + 80640*a^3*b^6*c^4*e*f^2*g - 55350*a^2*b^9*c^2*d*f*h^2 - 2304*a^2*b
^8*c^3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2
- 1658880*a^4*b^3*c^6*d*e^2*h + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b
^4*c^6*d^2*e*g - 124416*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b^8*c^3*d*f*g^2 + 4
1472*a^2*b^7*c^4*d*e^2*h - 3919104*a^2*b^6*c^5*d^2*e*g - 7741440*a^4*b^2*c^
7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f - 1648
128*a^5*b^3*c^5*f^3*h - 898560*a^6*b^3*c^4*f*h^3 - 354240*a^5*b^5*c^3*f*h^3
- 354240*a^4*b^5*c^4*f^3*h + 43680*a^3*b^7*c^3*f^3*h - 21600*a^4*b^7*c^2*f

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*h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2 + 1658880*a^6*b*c^6*
e^2*h^2 + 16547328*a^4*b^2*c^7*d^3*h - 12306816*a^3*b^4*c^6*d^3*h + 3731097
6*a^3*b^3*c^7*d^3*f + 3037824*a^2*b^6*c^5*d^3*h - 2654208*a^5*b^3*c^5*e*g^3
 + 1949184*a^6*b^2*c^5*d*h^3 + 1296000*a^5*b^4*c^4*d*h^3 - 155520*a^4*b^6*c
^3*d*h^3 - 40500*a*b^10*c^2*d^2*h^2 - 8100*a^3*b^8*c^2*d*h^3 + 3870720*a^5*
b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2 - 806
8032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5*d*
f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^
5*d^2*e^2 - 2211840*a^6*c^7*e^2*f*h - 9450*b^11*c^2*d^2*f*h + 1612800*a^6*c
^7*d*f^2*h - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 883200*a^6
*b*c^6*f^3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f*h^3 - 15482880*a^5
*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c^4*d^3*h + 4050*a^2
*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b
^9*c^3*d*f^3 + 414720*a^6*b^3*c^4*g^2*h^2 + 207360*a^5*b^5*c^3*g^2*h^2 + 51
84*a^4*b^7*c^2*g^2*h^2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 1264320*a^5*b^4*c^4*
f^2*h^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 + 967680*a
^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c^5*e^2*h^2 + 161280*a^4*b^5*c^4*f^2*g^
2 + 20736*a^4*b^5*c^4*e^2*h^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2
*f^2*g^2 + 11487744*a^5*b^2*c^6*d^2*h^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 355
25376*a^4*b^2*c^7*d^2*f^2 - 1412640*a^3*b^6*c^4*d^2*h^2 + 461376*a^4*b^4*c^
5*d^2*h^2 + 375030*a^2*b^8*c^3*d^2*h^2 + 8709120*a^4*b^3*c^6*d^2*g^2 - 4354
560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*d^2*g^2 + 645120*a^4*b^3*c^6*e
^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^
3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*
e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 115200*a^7*c^6*f^2*h^2 + 6096384*a^6*c^
7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^
8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*h^4 + 32400*a^5*b^6
*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*
c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3
*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 + 28449792*a^5*c^
8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 580608*a^7*c^6*d*h^3
 - 39690*b^9*c^4*d^3*f + 2025*a^4*b^8*c*h^4 - 734832*a*b^6*c^6*d^4 + 20736*
a^8*c^5*h^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e
^4 + 35721*b^8*c^5*d^4, z, k)*x*(8388608*a^11*b*c^9 - 512*a^4*b^15*c^2 + 14
336*a^5*b^13*c^3 - 172032*a^6*b^11*c^4 + 1146880*a^7*b^9*c^5 - 4587520*a^8*
b^7*c^6 + 11010048*a^9*b^5*c^7 - 14680064*a^10*b^3*c^8))/(64*(a^4*b^12 + 40
96*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8
*b^4*c^4 - 6144*a^9*b^2*c^5))) + (x*(451584*a^6*c^9*d^2 + 18*b^12*c^3*d^2 -
 25600*a^7*c^8*f^2 + 9216*a^8*c^7*h^2 - 504*a*b^10*c^4*d^2 - 73728*a^6*b*c^
8*e^2 + 6228*a^2*b^8*c^5*d^2 - 42624*a^3*b^6*c^6*d^2 + 176256*a^4*b^4*c^7*d
^2 - 423936*a^5*b^2*c^8*d^2 - 4608*a^4*b^5*c^6*e^2 + 36864*a^5*b^3*c^7*e^2
+ 2*a^2*b^10*c^3*f^2 - 84*a^3*b^8*c^4*f^2 + 3520*a^4*b^6*c^5*f^2 - 26240*a^
5*b^4*c^6*f^2 + 59904*a^6*b^2*c^7*f^2 - 1152*a^4*b^7*c^4*g^2 + 9216*a^5*b^5
*c^5*g^2 - 18432*a^6*b^3*c^6*g^2 + 468*a^4*b^8*c^3*h^2 - 3456*a^5*b^6*c^4*h
^2 + 5760*a^6*b^4*c^5*h^2 + 129024*a^7*c^8*d*h + 12*a*b^11*c^3*d*f - 218112
*a^6*b*c^8*d*f - 9216*a^7*b*c^7*f*h - 420*a^2*b^9*c^4*d*f + 4992*a^3*b^7*c^
5*d*f - 36480*a^4*b^5*c^6*d*f + 144384*a^5*b^3*c^7*d*f + 36*a^2*b^10*c^3*d*
h - 360*a^3*b^8*c^4*d*h + 3456*a^4*b^6*c^5*d*h + 4608*a^4*b^6*c^5*e*g - 115
20*a^5*b^4*c^6*d*h - 36864*a^5*b^4*c^6*e*g - 27648*a^6*b^2*c^7*d*h + 73728*
a^6*b^2*c^7*e*g + 12*a^3*b^9*c^3*f*h - 2304*a^4*b^7*c^4*f*h + 17280*a^5*b^5
*c^5*f*h - 30720*a^6*b^3*c^6*f*h))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b
^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^
2*c^5))) + (x*(13824*a^4*c^8*e^3 - 54*b^7*c^5*d^2*e + 27*b^8*c^4*d^2*g - 17
28*a^4*b^3*c^5*g^3 - 20160*a^4*c^8*d*e*f - 2880*a^5*c^7*e*f*h + 972*a*b^5*c
^6*d^2*e + 24192*a^3*b*c^8*d^2*e - 486*a*b^6*c^5*d^2*g + 6240*a^4*b*c^7*e*f
^2 - 20736*a^4*b*c^7*e^2*g + 1728*a^5*b*c^6*e*h^2 - 7344*a^2*b^3*c^7*d^2*e
+ 3672*a^2*b^4*c^6*d^2*g - 6*a^2*b^5*c^5*e*f^2 - 12096*a^3*b^2*c^7*d^2*g +
192*a^3*b^3*c^6*e*f^2 + 10368*a^4*b^2*c^6*e*g^2 + 3*a^2*b^6*c^4*f^2*g - 96*
a^3*b^4*c^5*f^2*g - 3120*a^4*b^2*c^6*f^2*g + 1296*a^4*b^3*c^5*e*h^2 - 648*a
```

^4*b^4*c^4*g*h^2 - 864*a^5*b^2*c^5*g*h^2 - 36*a*b^6*c^5*d*e*f + 18*a*b^7*c^
4*d*f*g + 15552*a^4*b*c^7*d*e*h + 10080*a^4*b*c^7*d*f*g + 1440*a^5*b*c^6*f*
g*h + 900*a^2*b^4*c^6*d*e*f - 4896*a^3*b^2*c^7*d*e*f - 108*a^2*b^5*c^5*d*e*
h - 450*a^2*b^5*c^5*d*f*g + 2448*a^3*b^3*c^6*d*f*g + 54*a^2*b^6*c^4*d*g*h -
 36*a^3*b^4*c^5*e*f*h - 7776*a^4*b^2*c^6*d*g*h - 6048*a^4*b^2*c^6*e*f*h + 1
8*a^3*b^5*c^4*f*g*h + 3024*a^4*b^3*c^5*f*g*h))/(64*(a^4*b^12 + 4096*a^10*c^
6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 -
 6144*a^9*b^2*c^5)))*root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14
*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 1932
73528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^1
0*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 687
19476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 46080*a^4*b^14*c*f*h*z^2 - 10
5984*a^3*b^15*c*d*h*z^2 - 73728*a^2*b^16*c*d*f*z^2 + 2548039680*a^9*b^3*c^7
*d*h*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*z^2
- 1321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 73216819
2*a^7*b^6*c^6*d*f*z^2 - 456130560*a^9*b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c
^5*d*h*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2
+ 254017536*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680
*a^10*b^2*c^7*f*h*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 - 61931520*a^7*b^8*c^
4*f*h*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 +
6144000*a^6*b^10*c^3*f*h*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^
9*c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2
+ 368640*a^5*b^11*c^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3
*b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 440401920*a^10*b*c^8*f^
2*z^2 - 188743680*a^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 + 46080*
a^5*b^13*c*h^2*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*
z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 15099
49440*a^9*b^2*c^8*e^2*z^2 + 251658240*a^11*c^8*f*h*z^2 + 1536*a^3*b^16*f*h*
z^2 + 4608*a^2*b^17*d*h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17
*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2
+ 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888
*a^10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^10*b^3*
c^6*h^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2
 + 146165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 - 26542080
*a^8*b^7*c^4*h^2*z^2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5*c^5*h^
2*z^2 - 1290240*a^6*b^11*c^2*h^2*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 29491
2*a^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4
*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 29
1840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^1
0*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 120795
9552*a^10*c^9*e^2*z^2 + 2304*a^4*b^15*h^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304
*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 99090432*a^8*b*c^7*d*g*h*z -
4608*a^3*b^12*c*f*g*h*z - 9437184*a^8*b*c^7*e*f*h*z - 13824*a^2*b^13*c*d*g*
h*z + 9216*a*b^13*c^2*d*e*f*z - 4608*a*b^14*c*d*f*g*z + 219414528*a^7*b^2*c
^7*d*e*h*z - 221773824*a^6*b^3*c^7*d*e*f*z - 109707264*a^7*b^3*c^6*d*g*h*z
+ 110886912*a^6*b^4*c^6*d*f*g*z - 88473600*a^6*b^4*c^6*d*e*h*z - 84934656*a
^7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z + 44236800*a^6*b^5*c^5*d
*g*h*z - 5898240*a^7*b^4*c^5*f*g*h*z + 4718592*a^8*b^2*c^6*f*g*h*z + 294912
0*a^6*b^6*c^4*f*g*h*z - 737280*a^5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g
*h*z - 58982400*a^5*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^6*e*f*h*z - 663552
0*a^5*b^7*c^4*d*g*h*z - 5898240*a^6*b^5*c^5*e*f*h*z + 1474560*a^5*b^7*c^4*e
*f*h*z - 276480*a^4*b^9*c^3*d*g*h*z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a
^3*b^11*c^2*d*g*h*z + 9216*a^3*b^11*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*
g*z + 13271040*a^5*b^6*c^5*d*e*h*z - 2396160*a^3*b^10*c^3*d*f*g*z + 552960*
a^4*b^8*c^4*d*e*h*z - 359424*a^3*b^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f
*g*z + 27648*a^2*b^12*c^2*d*e*h*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*
a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2
*g*z + 7077888*a^9*b*c^6*g*h^2*z - 6912*a^4*b^11*c*g*h^2*z - 19660800*a^8*b
*c^7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z + 214272*a*b^13*c^2*d^2*g*z - 428544*

a*b^12*c^3*d^2*e*z - 198180864*a^8*c^8*d*e*h*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 321159168*a^5*b^5*c^6*d^2*g*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*a^4*b^7*c^5*d^2*g*z - 8847360*a^8*b^3*c^5*g*h^2*z + 4423680*a^7*b^5*c^4*g*h^2*z - 1105920*a^6*b^7*c^3*g*h^2*z + 138240*a^5*b^9*c^2*g*h^2*z + 25362432*a^7*b^3*c^6*f^2*g*z + 17694720*a^8*b^2*c^6*e*h^2*z - 50724864*a^7*b^2*c^7*e*f^2*z - 13271040*a^6*b^5*c^5*f^2*g*z - 8847360*a^7*b^4*c^5*e*h^2*z + 3563520*a^5*b^7*c^4*f^2*g*z + 2211840*a^6*b^6*c^4*e*h^2*z - 506880*a^4*b^9*c^3*f^2*g*z - 276480*a^5*b^8*c^3*e*h^2*z + 34560*a^3*b^11*c^2*f^2*g*z + 13824*a^4*b^10*c^2*e*h^2*z + 26542080*a^6*b^4*c^6*e*f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1013760*a^4*b^8*c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z - 14155776*a^9*c^7*e*h^2*z + 39321600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z - 6912*b^15*c*d^2*g*z + 2211840*a^6*b*c^6*e*f*g*h + 15482880*a^5*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g + 4423680*a^5*b^3*c^5*e*f*g*h + 138240*a^4*b^5*c^4*e*f*g*h - 13824*a^3*b^7*c^3*e*f*g*h - 16588800*a^5*b^2*c^6*d*e*g*h + 1658880*a^4*b^4*c^5*d*e*g*h + 124416*a^3*b^6*c^4*d*e*g*h - 41472*a^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 2903040*a^3*b^5*c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g - 37062144*a^5*b*c^7*d^2*f*h - 5985792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*c^3*d^2*f*h - 6300*a*b^10*c^2*d*f^2*h + 16588800*a^5*b*c^7*d*e^2*h + 3456*a*b^10*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 13824*a*b^8*c^4*d*e^2*f + 1350*a*b^11*c*d*f*h^2 - 1105920*a^5*b^4*c^4*f*g^2*h - 552960*a^6*b^2*c^5*f*g^2*h - 34560*a^4*b^6*c^3*f*g^2*h + 3456*a^3*b^8*c^2*f*g^2*h - 1658880*a^6*b^2*c^5*e*g*h^2 - 829440*a^5*b^4*c^4*e*g*h^2 - 20736*a^4*b^6*c^3*e*g*h^2 - 4423680*a^5*b^2*c^6*e^2*f*h + 4147200*a^5*b^3*c^5*d*g^2*h - 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4*b^4*c^5*e^2*f*h - 31104*a^3*b^7*c^3*d*g^2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c^2*d*g^2*h + 15630336*a^5*b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + 9630144*a^3*b^5*c^5*d^2*f*h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2*c^6*e*f^2*g + 2867328*a^4*b^4*c^5*d*f^2*h - 2095200*a^2*b^7*c^4*d^2*f*h - 1414080*a^3*b^6*c^4*d*f^2*h - 34836480*a^4*b^2*c^7*d^2*e*g - 645120*a^4*b^4*c^5*e*f^2*g + 306720*a^3*b^7*c^3*d*f*h^2 + 197820*a^2*b^8*c^3*d*f^2*h + 146880*a^4*b^5*c^4*d*f*h^2 + 80640*a^3*b^6*c^4*e*f^2*g - 55350*a^2*b^9*c^2*d*f*h^2 - 2304*a^2*b^8*c^3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2 - 1658880*a^4*b^3*c^6*d*e^2*h + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^4*c^6*d^2*e*g - 124416*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b^8*c^3*d*f*g^2 + 41472*a^2*b^7*c^4*d*e^2*h - 3919104*a^2*b^6*c^5*d^2*e*g - 7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f - 1648128*a^5*b^3*c^5*f^3*h - 898560*a^6*b^3*c^4*f*h^3 - 354240*a^5*b^5*c^3*f*h^3 - 354240*a^4*b^5*c^4*f^3*h + 43680*a^3*b^7*c^3*f^3*h - 21600*a^4*b^7*c^2*f*h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2 + 1658880*a^6*b*c^6*e^2*h^2 + 16547328*a^4*b^2*c^7*d^3*h - 12306816*a^3*b^4*c^6*d^3*h + 37310976*a^3*b^3*c^7*d^3*f + 3037824*a^2*b^6*c^5*d^3*h - 2654208*a^5*b^3*c^5*e*g^3 + 1949184*a^6*b^2*c^5*d*h^3 + 1296000*a^5*b^4*c^4*d*h^3 - 155520*a^4*b^6*c^3*d*h^3 - 40500*a*b^10*c^2*d^2*h^2 - 8100*a^3*b^8*c^2*d*h^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 2211840*a^6*c^7*e^2*f*h - 9450*b^11*c^2*d^2*f*h + 1612800*a^6*c^7*d*f^2*h - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 883200*a^6*b*c^6*f^3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f*h^3 - 15482880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c^4*d^3*h + 4050*a^2*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 414720*a^6*b^3*c^4*g^2*h^2 + 207360*a^5*b^5*c^3*g^2*h^2 + 5184*a^4*b^7*c^2*g^2*h^2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 1264320*a^5*b^4*c^4*f^2*h^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c^5*e^2*h^2 + 161280*a^4*b^5*c^4*f^2*g^2 + 20736*a^4*b^5*c^4*e^2*h^2 - 20160*a^3*b^7*c^3*f^2*g^

```
2 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2*c^6*d^2*h^2 + 7962624*a^5*b^
2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - 1412640*a^3*b^6*c^4*d^2*h^2
+ 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*c^3*d^2*h^2 + 8709120*a^4*b^3
*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*d^2*g^2 + 6
45120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^
2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - 174182
40*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 115200*a^7*c^6*f^2*h
^2 + 6096384*a^6*c^7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f
^2 + 5644800*a^5*c^8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*
h^4 + 32400*a^5*b^6*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^
4 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4
 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^
4 + 28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 5
80608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 2025*a^4*b^8*c*h^4 - 734832*a*b
^6*c^6*d^4 + 20736*a^8*c^5*h^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4
+ 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k), k, 1, 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**3,x)
```

```
[Out] Timed out
```

3.56 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{\left(a+bx^2+cx^4\right)^3} dx$

Optimal. Leaf size=728

$$\frac{x\left(cx^2\left(20a^2cf+ab^2f-12ab(ah+2cd)+3b^3d\right)+8a^2bcf+4a^2c(ah+7cd)+ab^3f-ab^2(7ah+25cd)+3b^4d}{8a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)}$$

```
[Out] 1/4*x*(b^2*d-a*b*f-2*a*(-a*h+c*d)+(a*b*h-2*a*c*f+b*c*d)*x^2)/a/(-4*a*c+b^2)
/(c*x^4+b*x^2+a)^2+1/4*(2*a*c*g-b*(a*i+c*e)-(-2*a*c*i+b^2*i-b*c*g+2*c^2*e)*
x^2)/c/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/4*(6*c*e-3*b*g+2*a*i+b^2*i/c)*(2*c*
x^2+b)/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/8*x*(3*b^4*d+a*b^3*f+8*a^2*b*c*f+4*
a^2*c*(a*h+7*c*d)-a*b^2*(7*a*h+25*c*d)+c*(3*b^3*d+a*b^2*f+20*a^2*c*f-12*a*b
*(a*h+2*c*d))*x^2)/a^2/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)-(2*a*c*i+b^2*i-3*b*c*
g+6*c^2*e)*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(5/2)+1/16*
arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(3*b^3*d+a*b
^2*f+20*a^2*c*f-12*a*b*(a*h+2*c*d)+(3*b^4*d+a*b^3*f-52*a^2*b*c*f-6*a*b^2*(-
3*a*h+5*c*d)+24*a^2*c*(a*h+7*c*d))/(-4*a*c+b^2)^(1/2))/a^2/(-4*a*c+b^2)^2*2
^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*
c+b^2)^(1/2))^(1/2))*c^(1/2)*(3*b^3*d+a*b^2*f+20*a^2*c*f-12*a*b*(a*h+2*c*d)
+(-3*b^4*d-a*b^3*f+52*a^2*b*c*f+6*a*b^2*(-3*a*h+5*c*d)-24*a^2*c*(a*h+7*c*d)
)/(-4*a*c+b^2)^(1/2))/a^2/(-4*a*c+b^2)^2*2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/
2)
```

Rubi [A] time = 2.73, antiderivative size = 728, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 11, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.275, Rules used = {1673, 1678, 1178, 1166, 205, 1663, 1660, 12, 614, 618, 206}

$$\frac{x\left(cx^2\left(20a^2cf+ab^2f-12ab(ah+2cd)+3b^3d\right)+8a^2bcf+4a^2c(ah+7cd)-ab^2(7ah+25cd)+ab^3f+3b^4d}{8a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4)^3,x]
```

```
[Out] (x*(b^2*d - a*b*f - 2*a*(c*d - a*h) + (b*c*d - 2*a*c*f + a*b*h)*x^2))/(4*a*
(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (2*a*c*g - b*(c*e + a*i) - (2*c^2*e
- b*c*g + b^2*i - 2*a*c*i)*x^2)/(4*c*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) +
 ((6*c*e - 3*b*g + 2*a*i + (b^2*i)/c)*(b + 2*c*x^2))/(4*(b^2 - 4*a*c)^2*(a
+ b*x^2 + c*x^4)) + (x*(3*b^4*d + a*b^3*f + 8*a^2*b*c*f + 4*a^2*c*(7*c*d +
a*h) - a*b^2*(25*c*d + 7*a*h) + c*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*
(2*c*d + a*h))*x^2))/(8*a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (Sqrt[c]
*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h) + (3*b^4*d + a*b^3*
f - 52*a^2*b*c*f - 6*a*b^2*(5*c*d - 3*a*h) + 24*a^2*c*(7*c*d + a*h))/Sqrt[b
^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(8*Sq
rt[2]*a^2*(b^2 - 4*a*c)^2*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[c]*(3*b^3*d
+ a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h) - (3*b^4*d + a*b^3*f - 52*a^2
*b*c*f - 6*a*b^2*(5*c*d - 3*a*h) + 24*a^2*c*(7*c*d + a*h))/Sqrt[b^2 - 4*a*c
])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*
(b^2 - 4*a*c)^2*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - ((6*c^2*e - 3*b*c*g + b^2*i
+ 2*a*c*i)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(5/2)
```

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 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^
(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
 - 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+56x^5}{\left(a+bx^2+cx^4\right)^3}\,dx = \int \frac{x\left(e+gx^2+56x^4\right)}{\left(a+bx^2+cx^4\right)^3}\,dx + \int \frac{d+fx^2+hx^4}{\left(a+bx^2+cx^4\right)^3}\,dx$$

$$= \frac{x\left(b^2d-abf-2a(cd-ah)+(bcd-2acf+abh)x^2\right)}{4a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{1}{2}\text{Subst}\Bigg(\int$$

$$= -\frac{56ab+bce-2acg+\left(56b^2-2c(56a-ce)-bcg\right)x^2}{4c\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{x\left(b^2d-ab\right.}{4}$$

$$= -\frac{56ab+bce-2acg+\left(56b^2-2c(56a-ce)-bcg\right)x^2}{4c\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{x\left(b^2d-ab\right.}{4}$$

$$= -\frac{56ab+bce-2acg+\left(56b^2-2c(56a-ce)-bcg\right)x^2}{4c\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{x\left(b^2d-ab\right.}{4}$$

$$= -\frac{56ab+bce-2acg+\left(56b^2-2c(56a-ce)-bcg\right)x^2}{4c\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{x\left(b^2d-ab\right.}{4}$$

$$= -\frac{56ab+bce-2acg+\left(56b^2-2c(56a-ce)-bcg\right)x^2}{4c\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^2} + \frac{x\left(b^2d-ab\right.}{4}$$

Mathematica [A] time = 6.67, size = 980, normalized size = 1.35

$$\frac{-bc^2dx^3+2ac^2fx^3-abchx^3+2ac^2ex^2-abcgx^2+ab^2ix^2-2a^2cix^2+2ac^2dx-b^2cdx+abcfx-2a^2chx+abce-}{4ac\left(4ac-b^2\right)\left(cx^4+bx^2+a\right)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4)^3,x
]
```

```
[Out] (a*b*c*e - 2*a^2*c*g + a^2*b*i - b^2*c*d*x + 2*a*c^2*d*x + a*b*c*f*x - 2*a^
2*c*h*x + 2*a*c^2*e*x^2 - a*b*c*g*x^2 + a*b^2*i*x^2 - 2*a^2*c*i*x^2 - b*c^2
*d*x^3 + 2*a*c^2*f*x^3 - a*b*c*h*x^3)/(4*a*c*(-b^2 + 4*a*c)*(a + b*x^2 + c*
x^4)^2) + (12*a^2*b*c^2*e - 6*a^2*b^2*c*g + 2*a^2*b^3*i + 4*a^3*b*c*i + 3*b
^4*c*d*x - 25*a*b^2*c^2*d*x + 28*a^2*c^3*d*x + a*b^3*c*f*x + 8*a^2*b*c^2*f*
x - 7*a^2*b^2*c*h*x + 4*a^3*c^2*h*x + 24*a^2*c^3*e*x^2 - 12*a^2*b*c^2*g*x^2
 + 4*a^2*b^2*c*i*x^2 + 8*a^3*c^2*i*x^2 + 3*b^3*c^2*d*x^3 - 24*a*b*c^3*d*x^3
 + a*b^2*c^2*f*x^3 + 20*a^2*c^3*f*x^3 - 12*a^2*b*c^2*h*x^3)/(8*a^2*c*(-b^2
+ 4*a*c)^2*(a + b*x^2 + c*x^4)) + (Sqrt[c]*(3*b^4*d - 30*a*b^2*c*d + 168*a^
2*c^2*d + 3*b^3*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c*Sqrt[b^2 - 4*a*c]*d + a*b^3*
f - 52*a^2*b*c*f + a*b^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c*Sqrt[b^2 - 4*a*c]*f
 + 18*a^2*b^2*h + 24*a^3*c*h - 12*a^2*b*Sqrt[b^2 - 4*a*c]*h)*ArcTan[(Sqrt[2
]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5/
2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[c]*(-3*b^4*d + 30*a*b^2*c*d - 168*a
^2*c^2*d + 3*b^3*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c*Sqrt[b^2 - 4*a*c]*d - a*b^3
*f + 52*a^2*b*c*f + a*b^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c*Sqrt[b^2 - 4*a*c]*
f - 18*a^2*b^2*h - 24*a^3*c*h - 12*a^2*b*Sqrt[b^2 - 4*a*c]*h)*ArcTan[(Sqrt[
2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5
/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((6*c^2*e - 3*b*c*g + b^2*i + 2*a*c*i)*L
og[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2)) + ((-6*c^2*e
+ 3*b*c*g - b^2*i - 2*a*c*i)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(2*(b^2
- 4*a*c)^(5/2))
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="f
ricas")
```

```
[Out] Timed out
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="g
iac")
```

```
[Out] Timed out
```

maple [B] time = 0.06, size = 3824, normalized size = 5.25

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x)

[Out] -15/2/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+
b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)
*(-4*a*c+b^2)^(1/2)*b^2*d+3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^
2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^4*d+3/4/a^2/(16*a^2*c^2-8*a*b^2*
c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2
^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^4*d+1/4/
a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/
2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c
+b^2)^(1/2)*b^3*f+1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)
/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)
^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^3*f-15/2/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/
(16*a*c-4*b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+
(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*d-4*a/(16*a^2*c^2-
8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b
^2)^(1/2)*i+4*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*ln(2*c*x^2+b+(-
4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*i+(-1/8*c^2*(12*a^2*b*h-20*a^2*c*f-a*b
^2*f+24*a*b*c*d-3*b^3*d)/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*x^7+1/2*c*(2*a*c*i+
b^2*i-3*b*c*g+6*c^2*e)/(16*a^2*c^2-8*a*b^2*c+b^4)*x^6+1/8/a^2*c*(4*a^3*c*h-
19*a^2*b^2*h+28*a^2*b*c*f+28*a^2*c^2*d+2*a*b^3*f-49*a*b^2*c*d+6*b^4*d)/(16*
a^2*c^2-8*a*b^2*c+b^4)*x^5+3/4*b*(2*a*c*i+b^2*i-3*b*c*g+6*c^2*e)/(16*a^2*c^
2-8*a*b^2*c+b^4)*x^4-1/8*(16*a^3*b*c*h-36*a^3*c^2*f+5*a^2*b^3*h-5*a^2*b^2*c
*f+4*a^2*b*c^2*d-a*b^4*f+20*a*b^3*c*d-3*b^5*d)/a^2/(16*a^2*c^2-8*a*b^2*c+b^
4)*x^3-1/2*(2*a^2*c*i-5*a*b^2*i+5*a*b*c*g-10*a*c^2*e+b^3*g-2*b^2*c*e)/(16*a
^2*c^2-8*a*b^2*c+b^4)*x^2-1/8*(12*a^3*c*h+3*a^2*b^2*h-16*a^2*b*c*f-44*a^2*c
^2*d+a*b^3*f+37*a*b^2*c*d-5*b^4*d)/(16*a^2*c^2-8*a*b^2*c+b^4)/a*x+1/4*(6*a^
2*b*i-8*a^2*c*g-a*b^2*g+10*a*b*c*e-b^3*e)/(16*a^2*c^2-8*a*b^2*c+b^4))/(c*x^
4+b*x^2+a)^2-4/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((b+(-
4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*
c*x)*b^2*f-24/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/2)/((b+(-4
*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c
*x)*b*d+4/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*
c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*
x)*b^2*f+24/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*
a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*
c*x)*b*d+3/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((b+(-4*a*c+
b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b
^3*h+20*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/2)/((b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*
f-20*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b
^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*
f-3/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*h
+42/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4
*a*c+b^2)^(1/2)*d+42/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/2)/
((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^
(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d+6/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^
2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b*g-6/(16*a^2*c^2-8
*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2
)^(1/2)*b*g-12*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((b+
(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2
)*c*x)*b*h+9/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((b+(-
4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*
c*x)*b^3*d-9/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((-b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/
2)*c*x)*b^3*d-1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((b
+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/
```

```
2)*c*x)*b^4*f+3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/(
(-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c
)^(1/2)*c*x)*b^5*d-13/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)
/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))
*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b*f+9/2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*
a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*h+9/2/(16*a^2*c^2-8
*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arc
tan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*h-
13/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c
+b^2)^(1/2)*b*f-3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)
/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)
^(1/2)*c*x)*b^5*d+1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)
/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))
*c)^(1/2)*c*x)*b^4*f+6*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1
/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/
2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*h+12*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/
(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((
-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*h+6*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2
/(16*a*c-4*b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b
+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*h-12/(16*a^2*c^2-8*a*
b^2*c+b^4)*c^2/(16*a*c-4*b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2
)^(1/2)*e+12/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*ln(2*c*x^2+b+(-4
*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*e+2/(16*a^2*c^2-8*a*b^2*c+b^4)/(16*a*c-
4*b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b^2*i-2/(16*a^2*
c^2-8*a*b^2*c+b^4)/(16*a*c-4*b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-4*a*c
+b^2)^(1/2)*b^2*i
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="m
axima")
```

```
[Out] -1/8*((12*a^2*b*c^2*h - 3*(b^3*c^2 - 8*a*b*c^3)*d - (a*b^2*c^2 + 20*a^2*c^3
)*f)*x^7 - 4*(6*a^2*c^3*e - 3*a^2*b*c^2*g + (a^2*b^2*c + 2*a^3*c^2)*i)*x^6
- 12*a^4*b*i - ((6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3)*d + 2*(a*b^3*c + 14*a
^2*b*c^2)*f - (19*a^2*b^2*c - 4*a^3*c^2)*h)*x^5 - 6*(6*a^2*b*c^2*e - 3*a^2*
b^2*c*g + (a^2*b^3 + 2*a^3*b*c)*i)*x^4 - ((3*b^5 - 20*a*b^3*c - 4*a^2*b*c^2
)*d + (a*b^4 + 5*a^2*b^2*c + 36*a^3*c^2)*f - (5*a^2*b^3 + 16*a^3*b*c)*h)*x^
3 - 4*(2*(a^2*b^2*c + 5*a^3*c^2)*e - (a^2*b^3 + 5*a^3*b*c)*g + (5*a^3*b^2 -
 2*a^4*c)*i)*x^2 + 2*(a^2*b^3 - 10*a^3*b*c)*e + 2*(a^3*b^2 + 8*a^4*c)*g - (
(5*a*b^4 - 37*a^2*b^2*c + 44*a^3*c^2)*d - (a^2*b^3 - 16*a^3*b*c)*f - 3*(a^3
*b^2 + 4*a^4*c)*h)*x)/((a^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4)*x^8 + a^4
*b^4 - 8*a^5*b^2*c + 16*a^6*c^2 + 2*(a^2*b^5*c - 8*a^3*b^3*c^2 + 16*a^4*b*c
^3)*x^6 + (a^2*b^6 - 6*a^3*b^4*c + 32*a^5*c^3)*x^4 + 2*(a^3*b^5 - 8*a^4*b^3
*c + 16*a^5*b*c^2)*x^2) - 1/8*integrate(((12*a^2*b*c*h - 3*(b^3*c - 8*a*b*c
^2)*d - (a*b^2*c + 20*a^2*c^2)*f)*x^2 - 3*(b^4 - 9*a*b^2*c + 28*a^2*c^2)*d
- (a*b^3 - 16*a^2*b*c)*f - 3*(a^2*b^2 + 4*a^3*c)*h - 8*(6*a^2*c^2*e - 3*a^2
*b*c*g + (a^2*b^2 + 2*a^3*c)*i)*x)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a^3
*b^2*c + 16*a^4*c^2)
```

mupad [B] time = 7.16, size = 36653, normalized size = 50.35

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4)^3,x)
```

```
[Out] ((x^5*(28*a^2*c^3*d + 4*a^3*c^2*h + 6*b^4*c*d + 2*a*b^3*c*f - 49*a*b^2*c^2*
d + 28*a^2*b*c^2*f - 19*a^2*b^2*c*h))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)
) - (x^2*(b^3*g - 10*a*c^2*e - 2*b^2*c*e - 5*a*b^2*i + 2*a^2*c*i + 5*a*b*c*
g))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (b^3*e + a*b^2*g + 8*a^2*c*g - 6*a
^2*b*i - 10*a*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*b*x^4*(6*c^2*e
 + b^2*i - 3*b*c*g + 2*a*c*i))/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^6*
(6*c^2*e + b^2*i - 3*b*c*g + 2*a*c*i))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) +
 (x^3*(3*b^5*d + 36*a^3*c^2*f - 5*a^2*b^3*h + a*b^4*f - 20*a*b^3*c*d - 16*a
^3*b*c*h - 4*a^2*b*c^2*d + 5*a^2*b^2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b
^2*c)) - (x*(3*a^2*b^2*h - 44*a^2*c^2*d - 5*b^4*d + a*b^3*f + 12*a^3*c*h +
37*a*b^2*c*d - 16*a^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^7
*(20*a^2*c^2*f + 3*b^3*c*d - 24*a*b*c^2*d + a*b^2*c*f - 12*a^2*b*c*h))/(8*a
^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*
a*b*x^2 + 2*b*c*x^6) + symsum(log((10368*a*b^5*c^6*d^3 - 8000*a^5*c^7*f^3 -
 567*b^7*c^5*d^3 + 169344*a^3*b*c^8*d^3 + 193536*a^4*c^8*d*e^2 - 141120*a^4
*c^8*d^2*f + 1728*a^6*b*c^5*h^3 + 315*b^8*c^4*d^2*f + 27648*a^5*c^7*e^2*h +
 21504*a^6*c^6*d*i^2 - 135*b^9*c^3*d^2*h - 2880*a^6*c^6*f*h^2 + 3072*a^7*c^
5*h*i^2 - 67824*a^2*b^3*c^7*d^3 + 35*a^2*b^6*c^4*f^3 + 84*a^3*b^4*c^5*f^3 -
 12720*a^4*b^2*c^6*f^3 + 540*a^4*b^5*c^3*h^3 + 4320*a^5*b^3*c^4*h^3 + 12902
4*a^5*c^7*d*e*i - 40320*a^5*c^7*d*f*h + 18432*a^6*c^6*e*h*i - 6237*a*b^6*c^
5*d^2*f + 210*a*b^7*c^4*d*f^2 + 116160*a^4*b*c^7*d*f^2 - 36864*a^4*b*c^7*e^
2*f + 2430*a*b^7*c^4*d^2*h + 133056*a^4*b*c^7*d^2*h + 27648*a^5*b*c^6*d*h^2
 + 26880*a^5*b*c^6*f^2*h - 4096*a^6*b*c^5*f*i^2 + 6912*a^2*b^4*c^6*d*e^2 -
62208*a^3*b^2*c^7*d*e^2 + 42372*a^2*b^4*c^6*d^2*f - 1764*a^2*b^5*c^5*d*f^2
- 96048*a^3*b^2*c^7*d^2*f - 4608*a^3*b^3*c^6*d*f^2 + 1728*a^2*b^6*c^4*d*g^2
 + 2304*a^3*b^3*c^6*e^2*f - 15552*a^3*b^4*c^5*d*g^2 + 48384*a^4*b^2*c^6*d*g
^2 - 13716*a^2*b^5*c^5*d^2*h + 405*a^2*b^7*c^3*d*h^2 + 12096*a^3*b^3*c^6*d^
2*h - 5400*a^3*b^5*c^4*d*h^2 + 28944*a^4*b^3*c^5*d*h^2 + 192*a^2*b^8*c^2*d*
i^2 + 576*a^3*b^5*c^4*f*g^2 - 960*a^3*b^6*c^3*d*i^2 + 6912*a^4*b^2*c^6*e^2*
h - 9216*a^4*b^3*c^5*f*g^2 - 768*a^4*b^4*c^4*d*i^2 + 14592*a^5*b^2*c^5*d*i^
2 - 15*a^2*b^7*c^3*f^2*h - 360*a^3*b^5*c^4*f^2*h + 135*a^3*b^6*c^3*f*h^2 +
15696*a^4*b^3*c^5*f^2*h - 5580*a^4*b^4*c^4*f*h^2 - 20592*a^5*b^2*c^5*f*h^2
+ 64*a^3*b^7*c^2*f*i^2 + 1728*a^4*b^4*c^4*g^2*h - 768*a^4*b^5*c^3*f*i^2 + 6
912*a^5*b^2*c^5*g^2*h - 3840*a^5*b^3*c^4*f*i^2 + 192*a^4*b^6*c^2*h*i^2 + 15
36*a^5*b^4*c^3*h*i^2 + 3840*a^6*b^2*c^4*h*i^2 - 193536*a^4*b*c^7*d*e*g - 90
*a*b^8*c^3*d*f*h - 64512*a^5*b*c^6*d*g*i - 24576*a^5*b*c^6*e*f*i - 27648*a^
5*b*c^6*e*g*h - 9216*a^6*b*c^5*g*h*i - 6912*a^2*b^5*c^5*d*e*g + 62208*a^3*b
^3*c^6*d*e*g + 2304*a^2*b^6*c^4*d*e*i - 270*a^2*b^6*c^4*d*f*h - 16128*a^3*b
^4*c^5*d*e*i + 16056*a^3*b^4*c^5*d*f*h - 2304*a^3*b^4*c^5*e*f*g + 23040*a^4
*b^2*c^6*d*e*i - 127008*a^4*b^2*c^6*d*f*h + 36864*a^4*b^2*c^6*e*f*g - 1152*
a^2*b^7*c^3*d*g*i + 8064*a^3*b^5*c^4*d*g*i + 768*a^3*b^5*c^4*e*f*i - 11520*
a^4*b^3*c^5*d*g*i - 10752*a^4*b^3*c^5*e*f*i - 6912*a^4*b^3*c^5*e*g*h - 384*
a^3*b^6*c^3*f*g*i + 2304*a^4*b^4*c^4*e*h*i + 5376*a^4*b^4*c^4*f*g*i + 13824
*a^5*b^2*c^5*e*h*i + 12288*a^5*b^2*c^5*f*g*i - 1152*a^4*b^5*c^3*g*h*i - 691
2*a^5*b^3*c^4*g*h*i)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a
^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + roo
t(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*
b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^
4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215
360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 +
 65536*a^5*b^20*z^4 + 196608*a^5*b^13*c*g*i*z^2 - 46080*a^4*b^14*c*f*h*z^2
- 105984*a^3*b^15*c*d*h*z^2 - 73728*a^2*b^16*c*d*f*z^2 + 2548039680*a^9*b^3
*c^7*d*h*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*
z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 7321
68192*a^7*b^6*c^6*d*f*z^2 - 603979776*a^10*b^2*c^7*e*i*z^2 - 456130560*a^9*
b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c^5*d*h*z^2 + 301989888*a^10*b^3*c^6*g*
i*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 254
017536*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680*a^10
```

*b^2*c^7*f*h*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 + 125829120*a^8*b^6*c^5*e*i*z^2 - 62914560*a^8*b^7*c^4*g*i*z^2 - 61931520*a^7*b^8*c^4*f*h*z^2 + 23592960*a^7*b^9*c^3*g*i*z^2 - 47185920*a^7*b^8*c^4*e*i*z^2 - 3538944*a^6*b^11*c^2*g*i*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + 7077888*a^6*b^10*c^3*e*i*z^2 + 6144000*a^6*b^10*c^3*f*h*z^2 - 393216*a^5*b^12*c^2*e*i*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^9*c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 + 368640*a^5*b^11*c^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 402653184*a^11*b*c^7*g*i*z^2 - 440401920*a^10*b*c^8*f^2*z^2 - 188743680*a^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 + 524288*a^6*b^12*c*i^2*z^2 + 46080*a^5*b^13*c*h^2*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 + 805306368*a^11*c^8*e*i*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 + 251658240*a^11*c^8*f*h*z^2 + 1536*a^3*b^16*f*h*z^2 + 4608*a^2*b^17*d*h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^10*b^3*c^6*h^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 - 50331648*a^10*b^4*c^5*i^2*z^2 - 33554432*a^11*b^2*c^6*i^2*z^2 + 20971520*a^9*b^6*c^4*i^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 - 26542080*a^8*b^7*c^4*h^2*z^2 - 2752512*a^7*b^10*c^2*i^2*z^2 + 2621440*a^8*b^8*c^3*i^2*z^2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5*c^5*h^2*z^2 - 1290240*a^6*b^11*c^2*h^2*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 294912*a^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 134217728*a^12*c^7*i^2*z^2 - 32768*a^5*b^14*i^2*z^2 + 2304*a^4*b^15*h^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 99090432*a^8*b*c^7*d*g*h*z - 3145728*a^9*b*c^6*f*h*i*z - 27648*a^4*b^11*c*f*h*i*z + 56623104*a^8*b*c^7*d*f*i*z - 50688*a^3*b^12*c*d*h*i*z - 4608*a^3*b^12*c*f*g*h*z - 9437184*a^8*b*c^7*e*f*h*z - 55296*a^2*b^13*c*d*f*i*z - 13824*a^2*b^13*c*d*g*h*z + 9216*a*b^13*c^2*d*e*f*z - 4608*a*b^14*c*d*f*g*z + 219414528*a^7*b^2*c^7*d*e*h*z - 221773824*a^6*b^3*c^7*d*e*f*z - 109707264*a^7*b^3*c^6*d*g*h*z + 110886912*a^6*b^4*c^6*d*f*g*z + 40108032*a^8*b^2*c^6*d*h*i*z + 2359296*a^8*b^3*c^5*f*h*i*z - 491520*a^6*b^7*c^3*f*h*i*z + 184320*a^5*b^9*c^2*f*h*i*z - 88473600*a^6*b^4*c^6*d*e*h*z - 84934656*a^7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z - 45613056*a^7*b^3*c^6*d*f*i*z + 44236800*a^6*b^5*c^5*d*g*h*z - 10321920*a^6*b^6*c^4*d*h*i*z + 7077888*a^7*b^4*c^5*d*h*i*z - 5898240*a^7*b^4*c^5*f*g*h*z + 4718592*a^8*b^2*c^6*f*g*h*z + 2949120*a^6*b^6*c^4*f*g*h*z + 2396160*a^5*b^8*c^3*d*h*i*z - 737280*a^5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g*h*z - 27648*a^4*b^10*c^2*d*h*i*z - 58982400*a^5*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^6*e*f*h*z + 8847360*a^5*b^7*c^4*d*f*i*z - 6635520*a^5*b^7*c^4*d*g*h*z - 5898240*a^6*b^5*c^5*e*f*h*z - 3809280*a^4*b^9*c^3*d*f*i*z + 2359296*a^6*b^5*c^5*d*f*i*z + 1474560*a^5*b^7*c^4*e*f*h*z + 681984*a^3*b^11*c^2*d*f*i*z - 276480*a^4*b^9*c^3*d*g*h*z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a^3*b^11*c^2*d*g*h*z + 9216*a^3*b^11*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*g*z + 13271040*a^5*b^6*c^5*d*e*h*z - 2396160*a^3*b^10*c^3*d*f*g*z + 552960*a^4*b^8*c^4*d*e*h*z - 359424*a^3*b^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f*g*z + 27648*a^2*b^12*c^2*d*e*h*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2*g*z - 41472*a^5*b^10*c*h^2*i*z + 7077888*a^9*b*c^6*g*h^2*z - 11008*a^3*b^12*c*f^2*i*z - 6912*a^4*b^11*c*g*h^2*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z + 214272*a*b^13*c^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z - 198180864*a^8*c^8*d*e*h*z - 66060288*a^9*c^7*d*h*i*z + 1536*a^3*b^13*f*h*i*z + 4608*a^2*b^14*d*h*i*z - 66816*a*b^14*c*d^2*i*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 321159168*a^

5*b^5*c^6*d^2*g*z + 225312768*a^7*b^2*c^7*d^2*i*z + 223395840*a^4*b^6*c^6*d
^2*e*z - 111697920*a^4*b^7*c^5*d^2*g*z + 3538944*a^9*b^2*c^5*h^2*i*z - 7372
80*a^7*b^6*c^3*h^2*i*z + 276480*a^6*b^8*c^2*h^2*i*z - 10354688*a^8*b^2*c^6*
f^2*i*z - 43646976*a^6*b^4*c^6*d^2*i*z - 8847360*a^8*b^3*c^5*g*h^2*z + 4423
680*a^7*b^5*c^4*g*h^2*z + 2048000*a^6*b^6*c^4*f^2*i*z - 1105920*a^6*b^7*c^3
*g*h^2*z - 849920*a^5*b^8*c^3*f^2*i*z + 393216*a^7*b^4*c^5*f^2*i*z + 145920
*a^4*b^10*c^2*f^2*i*z + 138240*a^5*b^9*c^2*g*h^2*z - 32587776*a^5*b^6*c^5*d
^2*i*z + 25362432*a^7*b^3*c^6*f^2*g*z + 21657600*a^4*b^8*c^4*d^2*i*z + 1769
4720*a^8*b^2*c^6*e*h^2*z - 50724864*a^7*b^2*c^7*e*f^2*z - 13271040*a^6*b^5*
c^5*f^2*g*z - 8847360*a^7*b^4*c^5*e*h^2*z - 5810688*a^3*b^10*c^3*d^2*i*z +
3563520*a^5*b^7*c^4*f^2*g*z + 2211840*a^6*b^6*c^4*e*h^2*z + 845568*a^2*b^12
*c^2*d^2*i*z - 506880*a^4*b^9*c^3*f^2*g*z - 276480*a^5*b^8*c^3*e*h^2*z + 34
560*a^3*b^11*c^2*f^2*g*z + 13824*a^4*b^10*c^2*e*h^2*z + 26542080*a^6*b^4*c^
6*e*f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7
127040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1013760*a^4*b^8
*c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 593
0496*a^2*b^10*c^4*d^2*e*z + 1536*a*b^15*d*f*i*z - 693633024*a^7*c^9*d^2*e*z
- 231211008*a^8*c^8*d^2*i*z - 4718592*a^10*c^6*h^2*i*z + 2304*a^4*b^12*h^2
*i*z + 13107200*a^9*c^7*f^2*i*z + 256*a^2*b^14*f^2*i*z - 14155776*a^9*c^7*e
*h^2*z + 39321600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z - 6912*b^15*c*d^
2*g*z + 2304*b^16*d^2*i*z + 737280*a^7*b*c^5*f*g*h*i - 2304*a^3*b^9*c*f*g*h
*i - 6912*a^2*b^10*c*d*g*h*i + 11059200*a^6*b*c^6*d*e*h*i + 5160960*a^6*b*c
^6*d*f*g*i + 2211840*a^6*b*c^6*e*f*g*h + 4608*a*b^10*c^2*d*e*f*i + 15482880
*a^5*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g - 2304*a*b^11*c*d*f*g*i + 1843
200*a^6*b^3*c^4*f*g*h*i + 783360*a^5*b^5*c^3*f*g*h*i + 18432*a^4*b^7*c^2*f*
g*h*i - 5529600*a^6*b^2*c^5*d*g*h*i - 3686400*a^6*b^2*c^5*e*f*h*i - 2211840
*a^5*b^4*c^4*d*g*h*i - 1566720*a^5*b^4*c^4*e*f*h*i + 317952*a^4*b^6*c^3*d*g
*h*i - 36864*a^4*b^6*c^3*e*f*h*i + 6912*a^3*b^8*c^2*d*g*h*i + 4608*a^3*b^8*
c^2*e*f*h*i + 5160960*a^5*b^3*c^5*d*f*g*i + 4423680*a^5*b^3*c^5*e*f*g*h + 4
423680*a^5*b^3*c^5*d*e*h*i - 635904*a^4*b^5*c^4*d*e*h*i - 354816*a^3*b^7*c^
3*d*f*g*i + 322560*a^4*b^5*c^4*d*f*g*i + 138240*a^4*b^5*c^4*e*f*g*h + 59904
*a^2*b^9*c^2*d*f*g*i - 13824*a^3*b^7*c^3*e*f*g*h - 13824*a^3*b^7*c^3*d*e*h*
i + 13824*a^2*b^9*c^2*d*e*h*i - 16588800*a^5*b^2*c^6*d*e*g*h - 10321920*a^5
*b^2*c^6*d*e*f*i + 1658880*a^4*b^4*c^5*d*e*g*h + 709632*a^3*b^6*c^4*d*e*f*i
- 645120*a^4*b^4*c^5*d*e*f*i + 124416*a^3*b^6*c^4*d*e*g*h - 119808*a^2*b^8
*c^3*d*e*f*i - 41472*a^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 29
03040*a^3*b^5*c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g - 3456*a^4*b^8*c*g*h
^2*i - 2304*a^4*b^8*c*f*h*i^2 + 1105920*a^7*b*c^5*e*h^2*i - 384*a^2*b^10*c*
f^2*g*i - 10616832*a^6*b*c^6*e^2*g*i - 3538944*a^7*b*c^5*e*g*i^2 + 1843200*
a^7*b*c^5*d*h*i^2 + 1152*a^3*b^9*c*d*h*i^2 - 37062144*a^5*b*c^7*d^2*f*h + 2
580480*a^6*b*c^6*e*f^2*i + 65664*a*b^10*c^2*d^2*g*i + 23224320*a^5*b*c^7*d^
2*e*i - 9216*a^2*b^10*c*d*f*i^2 - 5985792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*
c^3*d^2*f*h - 131328*a*b^9*c^3*d^2*e*i - 6300*a*b^10*c^2*d*f^2*h + 16588800
*a^5*b*c^7*d*e^2*h + 3456*a*b^10*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 1
3824*a*b^8*c^4*d*e^2*f - 1474560*a^7*c^6*e*f*h*i - 10321920*a^6*c^7*d*e*f*i
+ 1350*a*b^11*c*d*f*h^2 - 552960*a^7*b^2*c^4*g*h^2*i - 552960*a^6*b^4*c^3*
g*h^2*i - 145152*a^5*b^6*c^2*g*h^2*i - 737280*a^7*b^2*c^4*f*h*i^2 - 568320*
a^6*b^4*c^3*f*h*i^2 - 136704*a^5*b^6*c^2*f*h*i^2 - 1290240*a^6*b^2*c^5*f^2*
g*i + 1105920*a^6*b^3*c^4*e*h^2*i - 860160*a^5*b^4*c^4*f^2*g*i + 290304*a^5
*b^5*c^3*e*h^2*i - 80640*a^4*b^6*c^3*f^2*g*i + 12672*a^3*b^8*c^2*f^2*g*i +
6912*a^4*b^7*c^2*e*h^2*i + 5308416*a^6*b^2*c^5*e*g^2*i - 5308416*a^5*b^3*c^
5*e^2*g*i - 3538944*a^6*b^3*c^4*e*g*i^2 + 2654208*a^5*b^4*c^4*e*g^2*i + 165
8880*a^6*b^3*c^4*d*h*i^2 - 1105920*a^5*b^4*c^4*f*g^2*h - 884736*a^5*b^5*c^3
*e*g*i^2 - 552960*a^6*b^2*c^5*f*g^2*h + 262656*a^5*b^5*c^3*d*h*i^2 - 55296*
a^4*b^7*c^2*d*h*i^2 - 34560*a^4*b^6*c^3*f*g^2*h + 3456*a^3*b^8*c^2*f*g^2*h
- 11612160*a^5*b^2*c^6*d^2*g*i + 1720320*a^5*b^3*c^5*e*f^2*i - 1658880*a^6*
b^2*c^5*e*g*h^2 + 1596672*a^3*b^6*c^4*d^2*g*i - 829440*a^5*b^4*c^4*e*g*h^2
- 508032*a^2*b^8*c^3*d^2*g*i + 161280*a^4*b^5*c^4*e*f^2*i - 25344*a^3*b^7*c
^3*e*f^2*i - 20736*a^4*b^6*c^3*e*g*h^2 + 768*a^2*b^9*c^2*e*f^2*i - 4423680*

```
a^5*b^2*c^6*e^2*f*h + 4147200*a^5*b^3*c^5*d*g^2*h - 2580480*a^6*b^2*c^5*d*f
*i^2 - 967680*a^5*b^4*c^4*d*f*i^2 - 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4
*b^4*c^5*e^2*f*h + 64512*a^4*b^6*c^3*d*f*i^2 + 39168*a^3*b^8*c^2*d*f*i^2 -
31104*a^3*b^7*c^3*d*g^2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c^2*d
*g^2*h + 15630336*a^5*b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + 9630
144*a^3*b^5*c^5*d^2*f*h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2*c^6
*e*f^2*g - 3193344*a^3*b^5*c^5*d^2*e*i + 2867328*a^4*b^4*c^5*d*f^2*h - 2095
200*a^2*b^7*c^4*d^2*f*h - 1414080*a^3*b^6*c^4*d*f^2*h - 34836480*a^4*b^2*c^
7*d^2*e*g + 1016064*a^2*b^7*c^4*d^2*e*i - 645120*a^4*b^4*c^5*e*f^2*g + 3067
20*a^3*b^7*c^3*d*f*h^2 + 197820*a^2*b^8*c^3*d*f^2*h + 146880*a^4*b^5*c^4*d*
f*h^2 + 80640*a^3*b^6*c^4*e*f^2*g - 55350*a^2*b^9*c^2*d*f*h^2 - 2304*a^2*b^
8*c^3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2 -
 1658880*a^4*b^3*c^6*d*e^2*h + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^
4*c^6*d^2*e*g - 124416*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b^8*c^3*d*f*g^2 + 41
472*a^2*b^7*c^4*d*e^2*h - 3919104*a^2*b^6*c^5*d^2*e*g - 7741440*a^4*b^2*c^7
*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 18432
0*a^8*b*c^4*h^2*i^2 + 25344*a^5*b^7*c*h^2*i^2 - 884736*a^6*b^3*c^4*g^3*i -
589824*a^7*b^3*c^3*g*i^3 - 442368*a^5*b^5*c^3*g^3*i - 294912*a^6*b^5*c^2*g*
i^3 + 430080*a^7*b*c^5*f^2*i^2 - 1984*a^3*b^9*c*f^2*i^2 + 3538944*a^5*b^2*c
^6*e^3*i - 1648128*a^5*b^3*c^5*f^3*h + 1179648*a^7*b^2*c^4*e*i^3 - 898560*a
^6*b^3*c^4*f*h^3 + 589824*a^6*b^4*c^3*e*i^3 - 354240*a^5*b^5*c^3*f*h^3 - 35
4240*a^4*b^5*c^4*f^3*h + 98304*a^5*b^6*c^2*e*i^3 + 43680*a^3*b^7*c^3*f^3*h
- 21600*a^4*b^7*c^2*f*h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2
 + 3870720*a^6*b*c^6*d^2*i^2 + 1658880*a^6*b*c^6*e^2*h^2 + 16547328*a^4*b^2
*c^7*d^3*h - 12306816*a^3*b^4*c^6*d^3*h + 37310976*a^3*b^3*c^7*d^3*f + 3037
824*a^2*b^6*c^5*d^3*h - 2654208*a^5*b^3*c^5*e*g^3 + 1949184*a^6*b^2*c^5*d*h
^3 + 1296000*a^5*b^4*c^4*d*h^3 - 155520*a^4*b^6*c^3*d*h^3 - 40500*a*b^10*c^
2*d^2*h^2 - 8100*a^3*b^8*c^2*d*h^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a
^4*b*c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5
623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2
*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 245760*a^8*c^5
*f*h*i^2 + 384*a^3*b^10*f*h*i^2 + 1152*a^2*b^11*d*h*i^2 - 2211840*a^6*c^7*e
^2*f*h - 1720320*a^7*c^6*d*f*i^2 - 9450*b^11*c^2*d^2*f*h + 6912*b^11*c^2*d^
2*e*i + 1612800*a^6*c^7*d*f^2*h - 393216*a^8*b*c^4*g*i^3 - 49152*a^5*b^7*c*
g*i^3 - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 883200*a^6*b*c^
6*f^3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f*h^3 - 15482880*a^5*c^8*
d*e^2*f - 9792*a*b^11*c*d^2*i^2 - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c
^4*d^3*h + 4050*a^2*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c
^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 276480*a^7*b^3*c^3*h^2*i^2 + 140544*a^6*b
^5*c^2*h^2*i^2 + 884736*a^7*b^2*c^4*g^2*i^2 + 884736*a^6*b^4*c^3*g^2*i^2 +
221184*a^5*b^6*c^2*g^2*i^2 + 501760*a^6*b^3*c^4*f^2*i^2 + 414720*a^6*b^3*c^
4*g^2*h^2 + 207360*a^5*b^5*c^3*g^2*h^2 + 170240*a^5*b^5*c^3*f^2*i^2 + 9216*
a^4*b^7*c^2*f^2*i^2 + 5184*a^4*b^7*c^2*g^2*h^2 + 3538944*a^6*b^2*c^5*e^2*i^
2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 1264320*a^5*b^4*c^4*f^2*h^2 + 884736*a^5*
b^4*c^4*e^2*i^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 +
1935360*a^5*b^3*c^5*d^2*i^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c
^5*e^2*h^2 - 532224*a^4*b^5*c^4*d^2*i^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 9676
8*a^3*b^7*c^3*d^2*i^2 + 62784*a^2*b^9*c^2*d^2*i^2 + 20736*a^4*b^5*c^4*e^2*h
^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2
*c^6*d^2*h^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 -
 1412640*a^3*b^6*c^4*d^2*h^2 + 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*
c^3*d^2*h^2 + 8709120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 9
79776*a^2*b^7*c^4*d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*
e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784
*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d
^2*e^2 - 3456*b^12*c*d^2*g*i + 384*a*b^12*d*f*i^2 + 576*a^4*b^9*h^2*i^2 + 3
538944*a^7*c^6*e^2*i^2 + 115200*a^7*c^6*f^2*h^2 + 64*a^2*b^11*f^2*i^2 + 609
6384*a^6*c^7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 131072*a^8*b^2*c^3*i^4 + 983
04*a^7*b^4*c^2*i^4 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 142
```

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560*a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*h^4 + 32400*a^5*b^6*c^2*h^4 + 2073
6*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 35145
6*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728
*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 + 7077888*a^6*c^7*e^3*i + 786432
*a^8*c^5*e*i^3 + 28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*
c*d^2*h^2 + 580608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 32768*a^6*b^6*c*i^
4 + 2025*a^4*b^8*c*h^4 - 734832*a*b^6*c^6*d^4 + 576*b^13*d^2*i^2 + 65536*a^
9*c^4*i^4 + 20736*a^8*c^5*h^4 + 4096*a^5*b^8*i^4 + 49787136*a^4*c^9*d^4 + 1
60000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, l)*(root(56
371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16
*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 -
128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*
a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 655
36*a^5*b^20*z^4 + 196608*a^5*b^13*c*g*i*z^2 - 46080*a^4*b^14*c*f*h*z^2 - 10
5984*a^3*b^15*c*d*h*z^2 - 73728*a^2*b^16*c*d*f*z^2 + 2548039680*a^9*b^3*c^7
*d*h*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*z^2
- 1321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 73216819
2*a^7*b^6*c^6*d*f*z^2 - 603979776*a^10*b^2*c^7*e*i*z^2 - 456130560*a^9*b^4*
c^6*f*h*z^2 + 390463488*a^7*b^7*c^5*d*h*z^2 + 301989888*a^10*b^3*c^6*g*i*z^
2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 2540175
36*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680*a^10*b^2
*c^7*f*h*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 + 125829120*a^8*b^6*c^5*e*i*z^
2 - 62914560*a^8*b^7*c^4*g*i*z^2 - 61931520*a^7*b^8*c^4*f*h*z^2 + 23592960*
a^7*b^9*c^3*g*i*z^2 - 47185920*a^7*b^8*c^4*e*i*z^2 - 3538944*a^6*b^11*c^2*g
*i*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + 707
7888*a^6*b^10*c^3*e*i*z^2 + 6144000*a^6*b^10*c^3*f*h*z^2 - 393216*a^5*b^12*
c^2*e*i*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^9*c^4*e*g*z^2 + 1
179648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 + 368640*a^5*b^11
*c^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2
 - 1207959552*a^10*b*c^8*e*g*z^2 - 402653184*a^11*b*c^7*g*i*z^2 - 440401920
*a^10*b*c^8*f^2*z^2 - 188743680*a^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^9*d*
f*z^2 + 524288*a^6*b^12*c*i^2*z^2 + 46080*a^5*b^13*c*h^2*z^2 - 14080*a^3*b^
15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*
z^2 - 3963617280*a^9*b*c^9*d^2*z^2 + 805306368*a^11*c^8*e*i*z^2 - 150994944
0*a^9*b^2*c^8*e^2*z^2 + 251658240*a^11*c^8*f*h*z^2 + 1536*a^3*b^16*f*h*z^2
+ 4608*a^2*b^17*d*h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d
^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 47
7102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^1
0*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^10*b^3*c^6*
h^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 1
46165760*a^4*b^11*c^4*d^2*z^2 - 50331648*a^10*b^4*c^5*i^2*z^2 - 33554432*a^
11*b^2*c^6*i^2*z^2 + 20971520*a^9*b^6*c^4*i^2*z^2 - 47185920*a^7*b^8*c^4*g^
2*z^2 - 26542080*a^8*b^7*c^4*h^2*z^2 - 2752512*a^7*b^10*c^2*i^2*z^2 + 26214
40*a^8*b^8*c^3*i^2*z^2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5*c^5*
h^2*z^2 - 1290240*a^6*b^11*c^2*h^2*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 294
912*a^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c
^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 +
291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b
^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207
959552*a^10*c^9*e^2*z^2 + 134217728*a^12*c^7*i^2*z^2 - 32768*a^5*b^14*i^2*z
^2 + 2304*a^4*b^15*h^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169
869312*a^7*b*c^8*d*e*f*z + 99090432*a^8*b*c^7*d*g*h*z - 3145728*a^9*b*c^6*f
*h*i*z - 27648*a^4*b^11*c*f*h*i*z + 56623104*a^8*b*c^7*d*f*i*z - 50688*a^3*
b^12*c*d*h*i*z - 4608*a^3*b^12*c*f*g*h*z - 9437184*a^8*b*c^7*e*f*h*z - 5529
6*a^2*b^13*c*d*f*i*z - 13824*a^2*b^13*c*d*g*h*z + 9216*a*b^13*c^2*d*e*f*z -
 4608*a*b^14*c*d*f*g*z + 219414528*a^7*b^2*c^7*d*e*h*z - 221773824*a^6*b^3*
c^7*d*e*f*z - 109707264*a^7*b^3*c^6*d*g*h*z + 110886912*a^6*b^4*c^6*d*f*g*z
 + 40108032*a^8*b^2*c^6*d*h*i*z + 2359296*a^8*b^3*c^5*f*h*i*z - 491520*a^6*
b^7*c^3*f*h*i*z + 184320*a^5*b^9*c^2*f*h*i*z - 88473600*a^6*b^4*c^6*d*e*h*z
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 - 84934656*a^7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z - 45613056*
a^7*b^3*c^6*d*f*i*z + 44236800*a^6*b^5*c^5*d*g*h*z - 10321920*a^6*b^6*c^4*d
*h*i*z + 7077888*a^7*b^4*c^5*d*h*i*z - 5898240*a^7*b^4*c^5*f*g*h*z + 471859
2*a^8*b^2*c^6*f*g*h*z + 2949120*a^6*b^6*c^4*f*g*h*z + 2396160*a^5*b^8*c^3*d
*h*i*z - 737280*a^5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g*h*z - 27648*a^
4*b^10*c^2*d*h*i*z - 58982400*a^5*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^6*e*
f*h*z + 8847360*a^5*b^7*c^4*d*f*i*z - 6635520*a^5*b^7*c^4*d*g*h*z - 5898240
*a^6*b^5*c^5*e*f*h*z - 3809280*a^4*b^9*c^3*d*f*i*z + 2359296*a^6*b^5*c^5*d*
f*i*z + 1474560*a^5*b^7*c^4*e*f*h*z + 681984*a^3*b^11*c^2*d*f*i*z - 276480*
a^4*b^9*c^3*d*g*h*z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a^3*b^11*c^2*d*g*
h*z + 9216*a^3*b^11*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*g*z + 13271040*a
^5*b^6*c^5*d*e*h*z - 2396160*a^3*b^10*c^3*d*f*g*z + 552960*a^4*b^8*c^4*d*e*
h*z - 359424*a^3*b^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f*g*z + 27648*a^2
*b^12*c^2*d*e*h*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*
f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2*g*z - 41472*a^5
*b^10*c*h^2*i*z + 7077888*a^9*b*c^6*g*h^2*z - 11008*a^3*b^12*c*f^2*i*z - 69
12*a^4*b^11*c*g*h^2*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z
 + 214272*a*b^13*c^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z - 198180864*a^8*c^
8*d*e*h*z - 66060288*a^9*c^7*d*h*i*z + 1536*a^3*b^13*f*h*i*z + 4608*a^2*b^1
4*d*h*i*z - 66816*a*b^14*c*d^2*i*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 64231
8336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 321159168*a^5*b^
5*c^6*d^2*g*z + 225312768*a^7*b^2*c^7*d^2*i*z + 223395840*a^4*b^6*c^6*d^2*e
*z - 111697920*a^4*b^7*c^5*d^2*g*z + 3538944*a^9*b^2*c^5*h^2*i*z - 737280*a
^7*b^6*c^3*h^2*i*z + 276480*a^6*b^8*c^2*h^2*i*z - 10354688*a^8*b^2*c^6*f^2*
i*z - 43646976*a^6*b^4*c^6*d^2*i*z - 8847360*a^8*b^3*c^5*g*h^2*z + 4423680*
a^7*b^5*c^4*g*h^2*z + 2048000*a^6*b^6*c^4*f^2*i*z - 1105920*a^6*b^7*c^3*g*h
^2*z - 849920*a^5*b^8*c^3*f^2*i*z + 393216*a^7*b^4*c^5*f^2*i*z + 145920*a^4
*b^10*c^2*f^2*i*z + 138240*a^5*b^9*c^2*g*h^2*z - 32587776*a^5*b^6*c^5*d^2*i
*z + 25362432*a^7*b^3*c^6*f^2*g*z + 21657600*a^4*b^8*c^4*d^2*i*z + 17694720
*a^8*b^2*c^6*e*h^2*z - 50724864*a^7*b^2*c^7*e*f^2*z - 13271040*a^6*b^5*c^5*
f^2*g*z - 8847360*a^7*b^4*c^5*e*h^2*z - 5810688*a^3*b^10*c^3*d^2*i*z + 3563
520*a^5*b^7*c^4*f^2*g*z + 2211840*a^6*b^6*c^4*e*h^2*z + 845568*a^2*b^12*c^2
*d^2*i*z - 506880*a^4*b^9*c^3*f^2*g*z - 276480*a^5*b^8*c^3*e*h^2*z + 34560*
a^3*b^11*c^2*f^2*g*z + 13824*a^4*b^10*c^2*e*h^2*z + 26542080*a^6*b^4*c^6*e*
f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 71270
40*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1013760*a^4*b^8*c^4
*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930496
*a^2*b^10*c^4*d^2*e*z + 1536*a*b^15*d*f*i*z - 693633024*a^7*c^9*d^2*e*z - 2
31211008*a^8*c^8*d^2*i*z - 4718592*a^10*c^6*h^2*i*z + 2304*a^4*b^12*h^2*i*z
 + 13107200*a^9*c^7*f^2*i*z + 256*a^2*b^14*f^2*i*z - 14155776*a^9*c^7*e*h^2
*z + 39321600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z - 6912*b^15*c*d^2*g*
z + 2304*b^16*d^2*i*z + 737280*a^7*b*c^5*f*g*h*i - 2304*a^3*b^9*c*f*g*h*i -
 6912*a^2*b^10*c*d*g*h*i + 11059200*a^6*b*c^6*d*e*h*i + 5160960*a^6*b*c^6*d
*f*g*i + 2211840*a^6*b*c^6*e*f*g*h + 4608*a*b^10*c^2*d*e*f*i + 15482880*a^5
*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g - 2304*a*b^11*c*d*f*g*i + 1843200*
a^6*b^3*c^4*f*g*h*i + 783360*a^5*b^5*c^3*f*g*h*i + 18432*a^4*b^7*c^2*f*g*h*
i - 5529600*a^6*b^2*c^5*d*g*h*i - 3686400*a^6*b^2*c^5*e*f*h*i - 2211840*a^5
*b^4*c^4*d*g*h*i - 1566720*a^5*b^4*c^4*e*f*h*i + 317952*a^4*b^6*c^3*d*g*h*i
 - 36864*a^4*b^6*c^3*e*f*h*i + 6912*a^3*b^8*c^2*d*g*h*i + 4608*a^3*b^8*c^2*
e*f*h*i + 5160960*a^5*b^3*c^5*d*f*g*i + 4423680*a^5*b^3*c^5*e*f*g*h + 44236
80*a^5*b^3*c^5*d*e*h*i - 635904*a^4*b^5*c^4*d*e*h*i - 354816*a^3*b^7*c^3*d*
f*g*i + 322560*a^4*b^5*c^4*d*f*g*i + 138240*a^4*b^5*c^4*e*f*g*h + 59904*a^2
*b^9*c^2*d*f*g*i - 13824*a^3*b^7*c^3*e*f*g*h - 13824*a^3*b^7*c^3*d*e*h*i +
13824*a^2*b^9*c^2*d*e*h*i - 16588800*a^5*b^2*c^6*d*e*g*h - 10321920*a^5*b^2
*c^6*d*e*f*i + 1658880*a^4*b^4*c^5*d*e*g*h + 709632*a^3*b^6*c^4*d*e*f*i - 6
45120*a^4*b^4*c^5*d*e*f*i + 124416*a^3*b^6*c^4*d*e*g*h - 119808*a^2*b^8*c^3
*d*e*f*i - 41472*a^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 290304
0*a^3*b^5*c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g - 3456*a^4*b^8*c*g*h^2*i
 - 2304*a^4*b^8*c*f*h*i^2 + 1105920*a^7*b*c^5*e*h^2*i - 384*a^2*b^10*c*f^2*
```

g*i - 10616832*a^6*b*c^6*e^2*g*i - 3538944*a^7*b*c^5*e*g*i^2 + 1843200*a^7*
b*c^5*d*h*i^2 + 1152*a^3*b^9*c*d*h*i^2 - 37062144*a^5*b*c^7*d^2*f*h + 25804
80*a^6*b*c^6*e*f^2*i + 65664*a*b^10*c^2*d^2*g*i + 23224320*a^5*b*c^7*d^2*e*
i - 9216*a^2*b^10*c*d*f*i^2 - 5985792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*c^3*
d^2*f*h - 131328*a*b^9*c^3*d^2*e*i - 6300*a*b^10*c^2*d*f^2*h + 16588800*a^5
*b*c^7*d*e^2*h + 3456*a*b^10*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 13824
*a*b^8*c^4*d*e^2*f - 1474560*a^7*c^6*e*f*h*i - 10321920*a^6*c^7*d*e*f*i + 1
350*a*b^11*c*d*f*h^2 - 552960*a^7*b^2*c^4*g*h^2*i - 552960*a^6*b^4*c^3*g*h^
2*i - 145152*a^5*b^6*c^2*g*h^2*i - 737280*a^7*b^2*c^4*f*h*i^2 - 568320*a^6*
b^4*c^3*f*h*i^2 - 136704*a^5*b^6*c^2*f*h*i^2 - 1290240*a^6*b^2*c^5*f^2*g*i
+ 1105920*a^6*b^3*c^4*e*h^2*i - 860160*a^5*b^4*c^4*f^2*g*i + 290304*a^5*b^5
*c^3*e*h^2*i - 80640*a^4*b^6*c^3*f^2*g*i + 12672*a^3*b^8*c^2*f^2*g*i + 6912
*a^4*b^7*c^2*e*h^2*i + 5308416*a^6*b^2*c^5*e*g^2*i - 5308416*a^5*b^3*c^5*e^
2*g*i - 3538944*a^6*b^3*c^4*e*g*i^2 + 2654208*a^5*b^4*c^4*e*g^2*i + 1658880
*a^6*b^3*c^4*d*h*i^2 - 1105920*a^5*b^4*c^4*f*g^2*h - 884736*a^5*b^5*c^3*e*g
*i^2 - 552960*a^6*b^2*c^5*f*g^2*h + 262656*a^5*b^5*c^3*d*h*i^2 - 55296*a^4*
b^7*c^2*d*h*i^2 - 34560*a^4*b^6*c^3*f*g^2*h + 3456*a^3*b^8*c^2*f*g^2*h - 11
612160*a^5*b^2*c^6*d^2*g*i + 1720320*a^5*b^3*c^5*e*f^2*i - 1658880*a^6*b^2*
c^5*e*g*h^2 + 1596672*a^3*b^6*c^4*d^2*g*i - 829440*a^5*b^4*c^4*e*g*h^2 - 50
8032*a^2*b^8*c^3*d^2*g*i + 161280*a^4*b^5*c^4*e*f^2*i - 25344*a^3*b^7*c^3*e
*f^2*i - 20736*a^4*b^6*c^3*e*g*h^2 + 768*a^2*b^9*c^2*e*f^2*i - 4423680*a^5*
b^2*c^6*e^2*f*h + 4147200*a^5*b^3*c^5*d*g^2*h - 2580480*a^6*b^2*c^5*d*f*i^2
 - 967680*a^5*b^4*c^4*d*f*i^2 - 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4*b^4
*c^5*e^2*f*h + 64512*a^4*b^6*c^3*d*f*i^2 + 39168*a^3*b^8*c^2*d*f*i^2 - 3110
4*a^3*b^7*c^3*d*g^2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c^2*d*g^2
*h + 15630336*a^5*b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + 9630144*
a^3*b^5*c^5*d^2*f*h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2*c^6*e*f
^2*g - 3193344*a^3*b^5*c^5*d^2*e*i + 2867328*a^4*b^4*c^5*d*f^2*h - 2095200*
a^2*b^7*c^4*d^2*f*h - 1414080*a^3*b^6*c^4*d*f^2*h - 34836480*a^4*b^2*c^7*d^
2*e*g + 1016064*a^2*b^7*c^4*d^2*e*i - 645120*a^4*b^4*c^5*e*f^2*g + 306720*a
^3*b^7*c^3*d*f*h^2 + 197820*a^2*b^8*c^3*d*f^2*h + 146880*a^4*b^5*c^4*d*f*h^
2 + 80640*a^3*b^6*c^4*e*f^2*g - 55350*a^2*b^9*c^2*d*f*h^2 - 2304*a^2*b^8*c^
3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2 - 165
8880*a^4*b^3*c^6*d*e^2*h + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^4*c^
6*d^2*e*g - 124416*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b^8*c^3*d*f*g^2 + 41472*
a^2*b^7*c^4*d*e^2*h - 3919104*a^2*b^6*c^5*d^2*e*g - 7741440*a^4*b^2*c^7*d*e
^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 184320*a^
8*b*c^4*h^2*i^2 + 25344*a^5*b^7*c*h^2*i^2 - 884736*a^6*b^3*c^4*g^3*i - 5898
24*a^7*b^3*c^3*g*i^3 - 442368*a^5*b^5*c^3*g^3*i - 294912*a^6*b^5*c^2*g*i^3
+ 430080*a^7*b*c^5*f^2*i^2 - 1984*a^3*b^9*c*f^2*i^2 + 3538944*a^5*b^2*c^6*e
^3*i - 1648128*a^5*b^3*c^5*f^3*h + 1179648*a^7*b^2*c^4*e*i^3 - 898560*a^6*b
^3*c^4*f*h^3 + 589824*a^6*b^4*c^3*e*i^3 - 354240*a^5*b^5*c^3*f*h^3 - 354240
*a^4*b^5*c^4*f^3*h + 98304*a^5*b^6*c^2*e*i^3 + 43680*a^3*b^7*c^3*f^3*h - 21
600*a^4*b^7*c^2*f*h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2 + 3
870720*a^6*b*c^6*d^2*i^2 + 1658880*a^6*b*c^6*e^2*h^2 + 16547328*a^4*b^2*c^7
*d^3*h - 12306816*a^3*b^4*c^6*d^3*h + 37310976*a^3*b^3*c^7*d^3*f + 3037824*
a^2*b^6*c^5*d^3*h - 2654208*a^5*b^3*c^5*e*g^3 + 1949184*a^6*b^2*c^5*d*h^3 +
 1296000*a^5*b^4*c^4*d*h^3 - 155520*a^4*b^6*c^3*d*h^3 - 40500*a*b^10*c^2*d^
2*h^2 - 8100*a^3*b^8*c^2*d*h^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b
*c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 56232
96*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2
 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 245760*a^8*c^5*f*h
*i^2 + 384*a^3*b^10*f*h*i^2 + 1152*a^2*b^11*d*h*i^2 - 2211840*a^6*c^7*e^2*f
*h - 1720320*a^7*c^6*d*f*i^2 - 9450*b^11*c^2*d^2*f*h + 6912*b^11*c^2*d^2*e*
i + 1612800*a^6*c^7*d*f^2*h - 393216*a^8*b*c^4*g*i^3 - 49152*a^5*b^7*c*g*i^
3 - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 883200*a^6*b*c^6*f^
3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f*h^3 - 15482880*a^5*c^8*d*e^
2*f - 9792*a*b^11*c*d^2*i^2 - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c^4*d
^3*h + 4050*a^2*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d

^3*f + 7350*a*b^9*c^3*d*f^3 + 276480*a^7*b^3*c^3*h^2*i^2 + 140544*a^6*b^5*c
^2*h^2*i^2 + 884736*a^7*b^2*c^4*g^2*i^2 + 884736*a^6*b^4*c^3*g^2*i^2 + 2211
84*a^5*b^6*c^2*g^2*i^2 + 501760*a^6*b^3*c^4*f^2*i^2 + 414720*a^6*b^3*c^4*g^
2*h^2 + 207360*a^5*b^5*c^3*g^2*h^2 + 170240*a^5*b^5*c^3*f^2*i^2 + 9216*a^4*
b^7*c^2*f^2*i^2 + 5184*a^4*b^7*c^2*g^2*h^2 + 3538944*a^6*b^2*c^5*e^2*i^2 +
1684224*a^6*b^2*c^5*f^2*h^2 + 1264320*a^5*b^4*c^4*f^2*h^2 + 884736*a^5*b^4*
c^4*e^2*i^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 + 1935
360*a^5*b^3*c^5*d^2*i^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c^5*e
^2*h^2 - 532224*a^4*b^5*c^4*d^2*i^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 96768*a^
3*b^7*c^3*d^2*i^2 + 62784*a^2*b^9*c^2*d^2*i^2 + 20736*a^4*b^5*c^4*e^2*h^2 -
20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2*c^6
*d^2*h^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - 141
2640*a^3*b^6*c^4*d^2*h^2 + 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*c^3*
d^2*h^2 + 8709120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 97977
6*a^2*b^7*c^4*d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*
f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2
*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e
^2 - 3456*b^12*c*d^2*g*i + 384*a*b^12*d*f*i^2 + 576*a^4*b^9*h^2*i^2 + 35389
44*a^7*c^6*e^2*i^2 + 115200*a^7*c^6*f^2*h^2 + 64*a^2*b^11*f^2*i^2 + 6096384
*a^6*c^7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 131072*a^8*b^2*c^3*i^4 + 98304*a
^7*b^4*c^2*i^4 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 142560*
a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*h^4 + 32400*a^5*b^6*c^2*h^4 + 20736*b^
9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 351456*a^
4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3
*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 + 7077888*a^6*c^7*e^3*i + 786432*a^8
*c^5*e*i^3 + 28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^
2*h^2 + 580608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 32768*a^6*b^6*c*i^4 +
2025*a^4*b^8*c*h^4 - 734832*a*b^6*c^6*d^4 + 576*b^13*d^2*i^2 + 65536*a^9*c^
4*i^4 + 20736*a^8*c^5*h^4 + 4096*a^5*b^8*i^4 + 49787136*a^4*c^9*d^4 + 16000
0*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, l)*((768*a^2*b^
14*c^2*d - 3145728*a^10*c^8*h - 22020096*a^9*c^9*d - 22272*a^3*b^12*c^3*d +
282624*a^4*b^10*c^4*d - 2027520*a^5*b^8*c^5*d + 8847360*a^6*b^6*c^6*d - 23
396352*a^7*b^4*c^7*d + 34603008*a^8*b^2*c^8*d + 256*a^3*b^13*c^2*f - 9216*a
^4*b^11*c^3*f + 122880*a^5*b^9*c^4*f - 819200*a^6*b^7*c^5*f + 2949120*a^7*b
^5*c^6*f - 5505024*a^8*b^3*c^7*f + 768*a^4*b^12*c^2*h - 12288*a^5*b^10*c^3*
h + 61440*a^6*b^8*c^4*h - 983040*a^8*b^4*c^6*h + 3145728*a^9*b^2*c^7*h + 41
94304*a^9*b*c^8*f)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6
*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(1
572864*a^9*c^9*e + 524288*a^10*c^8*i - 1536*a^4*b^10*c^4*e + 30720*a^5*b^8*
c^5*e - 245760*a^6*b^6*c^6*e + 983040*a^7*b^4*c^7*e - 1966080*a^8*b^2*c^8*e
+ 768*a^4*b^11*c^3*g - 15360*a^5*b^9*c^4*g + 122880*a^6*b^7*c^5*g - 491520
*a^7*b^5*c^6*g + 983040*a^8*b^3*c^7*g - 256*a^4*b^12*c^2*i + 4608*a^5*b^10*
c^3*i - 30720*a^6*b^8*c^4*i + 81920*a^7*b^6*c^5*i - 393216*a^9*b^2*c^7*i -
786432*a^9*b*c^8*g))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^
6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (roo
t(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*
b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^
4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215
360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 +
65536*a^5*b^20*z^4 + 196608*a^5*b^13*c*g*i*z^2 - 46080*a^4*b^14*c*f*h*z^2
- 105984*a^3*b^15*c*d*h*z^2 - 73728*a^2*b^16*c*d*f*z^2 + 2548039680*a^9*b^3
*c^7*d*h*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*
z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 7321
68192*a^7*b^6*c^6*d*f*z^2 - 603979776*a^10*b^2*c^7*e*i*z^2 - 456130560*a^9*
b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c^5*d*h*z^2 + 301989888*a^10*b^3*c^6*g*
i*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 254
017536*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680*a^10
*b^2*c^7*f*h*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 + 125829120*a^8*b^6*c^5*e*
i*z^2 - 62914560*a^8*b^7*c^4*g*i*z^2 - 61931520*a^7*b^8*c^4*f*h*z^2 + 23592

960*a^7*b^9*c^3*g*i*z^2 - 47185920*a^7*b^8*c^4*e*i*z^2 - 3538944*a^6*b^11*c
^2*g*i*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 +
7077888*a^6*b^10*c^3*e*i*z^2 + 6144000*a^6*b^10*c^3*f*h*z^2 - 393216*a^5*b
^12*c^2*e*i*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^9*c^4*e*g*z^2
+ 1179648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 + 368640*a^5*
b^11*c^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f
*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 402653184*a^11*b*c^7*g*i*z^2 - 44040
1920*a^10*b*c^8*f^2*z^2 - 188743680*a^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^
9*d*f*z^2 + 524288*a^6*b^12*c*i^2*z^2 + 46080*a^5*b^13*c*h^2*z^2 - 14080*a^
3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*
d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 + 805306368*a^11*c^8*e*i*z^2 - 15099
49440*a^9*b^2*c^8*e^2*z^2 + 251658240*a^11*c^8*f*h*z^2 + 1536*a^3*b^16*f*h*
z^2 + 4608*a^2*b^17*d*h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17
*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2
+ 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888
*a^10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^10*b^3*
c^6*h^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2
+ 146165760*a^4*b^11*c^4*d^2*z^2 - 50331648*a^10*b^4*c^5*i^2*z^2 - 3355443
2*a^11*b^2*c^6*i^2*z^2 + 20971520*a^9*b^6*c^4*i^2*z^2 - 47185920*a^7*b^8*c^
4*g^2*z^2 - 26542080*a^8*b^7*c^4*h^2*z^2 - 2752512*a^7*b^10*c^2*i^2*z^2 + 2
621440*a^8*b^8*c^3*i^2*z^2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5*
c^5*h^2*z^2 - 1290240*a^6*b^11*c^2*h^2*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 -
294912*a^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b
^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^
2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a
^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 +
1207959552*a^10*c^9*e^2*z^2 + 134217728*a^12*c^7*i^2*z^2 - 32768*a^5*b^14*i
^2*z^2 + 2304*a^4*b^15*h^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 +
169869312*a^7*b*c^8*d*e*f*z + 99090432*a^8*b*c^7*d*g*h*z - 3145728*a^9*b*c
^6*f*h*i*z - 27648*a^4*b^11*c*f*h*i*z + 56623104*a^8*b*c^7*d*f*i*z - 50688*
a^3*b^12*c*d*h*i*z - 4608*a^3*b^12*c*f*g*h*z - 9437184*a^8*b*c^7*e*f*h*z -
55296*a^2*b^13*c*d*f*i*z - 13824*a^2*b^13*c*d*g*h*z + 9216*a*b^13*c^2*d*e*f
*z - 4608*a*b^14*c*d*f*g*z + 219414528*a^7*b^2*c^7*d*e*h*z - 221773824*a^6*
b^3*c^7*d*e*f*z - 109707264*a^7*b^3*c^6*d*g*h*z + 110886912*a^6*b^4*c^6*d*f
*g*z + 40108032*a^8*b^2*c^6*d*h*i*z + 2359296*a^8*b^3*c^5*f*h*i*z - 491520*
a^6*b^7*c^3*f*h*i*z + 184320*a^5*b^9*c^2*f*h*i*z - 88473600*a^6*b^4*c^6*d*e
*h*z - 84934656*a^7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z - 45613
056*a^7*b^3*c^6*d*f*i*z + 44236800*a^6*b^5*c^5*d*g*h*z - 10321920*a^6*b^6*c
^4*d*h*i*z + 7077888*a^7*b^4*c^5*d*h*i*z - 5898240*a^7*b^4*c^5*f*g*h*z + 47
18592*a^8*b^2*c^6*f*g*h*z + 2949120*a^6*b^6*c^4*f*g*h*z + 2396160*a^5*b^8*c
^3*d*h*i*z - 737280*a^5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g*h*z - 2764
8*a^4*b^10*c^2*d*h*i*z - 58982400*a^5*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^
6*e*f*h*z + 8847360*a^5*b^7*c^4*d*f*i*z - 6635520*a^5*b^7*c^4*d*g*h*z - 589
8240*a^6*b^5*c^5*e*f*h*z - 3809280*a^4*b^9*c^3*d*f*i*z + 2359296*a^6*b^5*c^
5*d*f*i*z + 1474560*a^5*b^7*c^4*e*f*h*z + 681984*a^3*b^11*c^2*d*f*i*z - 276
480*a^4*b^9*c^3*d*g*h*z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a^3*b^11*c^2*
d*g*h*z + 9216*a^3*b^11*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*g*z + 132710
40*a^5*b^6*c^5*d*e*h*z - 2396160*a^3*b^10*c^3*d*f*g*z + 552960*a^4*b^8*c^4*
d*e*h*z - 359424*a^3*b^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f*g*z + 27648
*a^2*b^12*c^2*d*e*h*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*
d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2*g*z - 41472
*a^5*b^10*c*h^2*i*z + 7077888*a^9*b*c^6*g*h^2*z - 11008*a^3*b^12*c*f^2*i*z
- 6912*a^4*b^11*c*g*h^2*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^13*c*f^2
*g*z + 214272*a*b^13*c^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z - 198180864*a^
8*c^8*d*e*h*z - 66060288*a^9*c^7*d*h*i*z + 1536*a^3*b^13*f*h*i*z + 4608*a^2
*b^14*d*h*i*z - 66816*a*b^14*c*d^2*i*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 6
42318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 321159168*a^
5*b^5*c^6*d^2*g*z + 225312768*a^7*b^2*c^7*d^2*i*z + 223395840*a^4*b^6*c^6*d
^2*e*z - 111697920*a^4*b^7*c^5*d^2*g*z + 3538944*a^9*b^2*c^5*h^2*i*z - 7372

80*a^7*b^6*c^3*h^2*i*z + 276480*a^6*b^8*c^2*h^2*i*z - 10354688*a^8*b^2*c^6*
f^2*i*z - 43646976*a^6*b^4*c^6*d^2*i*z - 8847360*a^8*b^3*c^5*g*h^2*z + 4423
680*a^7*b^5*c^4*g*h^2*z + 2048000*a^6*b^6*c^4*f^2*i*z - 1105920*a^6*b^7*c^3
*g*h^2*z - 849920*a^5*b^8*c^3*f^2*i*z + 393216*a^7*b^4*c^5*f^2*i*z + 145920
*a^4*b^10*c^2*f^2*i*z + 138240*a^5*b^9*c^2*g*h^2*z - 32587776*a^5*b^6*c^5*d
^2*i*z + 25362432*a^7*b^3*c^6*f^2*g*z + 21657600*a^4*b^8*c^4*d^2*i*z + 1769
4720*a^8*b^2*c^6*e*h^2*z - 50724864*a^7*b^2*c^7*e*f^2*z - 13271040*a^6*b^5*
c^5*f^2*g*z - 8847360*a^7*b^4*c^5*e*h^2*z - 5810688*a^3*b^10*c^3*d^2*i*z +
3563520*a^5*b^7*c^4*f^2*g*z + 2211840*a^6*b^6*c^4*e*h^2*z + 845568*a^2*b^12
*c^2*d^2*i*z - 506880*a^4*b^9*c^3*f^2*g*z - 276480*a^5*b^8*c^3*e*h^2*z + 34
560*a^3*b^11*c^2*f^2*g*z + 13824*a^4*b^10*c^2*e*h^2*z + 26542080*a^6*b^4*c^
6*e*f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7
127040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1013760*a^4*b^8
*c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 593
0496*a^2*b^10*c^4*d^2*e*z + 1536*a*b^15*d*f*i*z - 693633024*a^7*c^9*d^2*e*z
 - 231211008*a^8*c^8*d^2*i*z - 4718592*a^10*c^6*h^2*i*z + 2304*a^4*b^12*h^2
*i*z + 13107200*a^9*c^7*f^2*i*z + 256*a^2*b^14*f^2*i*z - 14155776*a^9*c^7*e
*h^2*z + 39321600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z - 6912*b^15*c*d^
2*g*z + 2304*b^16*d^2*i*z + 737280*a^7*b*c^5*f*g*h*i - 2304*a^3*b^9*c*f*g*h
*i - 6912*a^2*b^10*c*d*g*h*i + 11059200*a^6*b*c^6*d*e*h*i + 5160960*a^6*b*c
^6*d*f*g*i + 2211840*a^6*b*c^6*e*f*g*h + 4608*a*b^10*c^2*d*e*f*i + 15482880
*a^5*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g - 2304*a*b^11*c*d*f*g*i + 1843
200*a^6*b^3*c^4*f*g*h*i + 783360*a^5*b^5*c^3*f*g*h*i + 18432*a^4*b^7*c^2*f*
g*h*i - 5529600*a^6*b^2*c^5*d*g*h*i - 3686400*a^6*b^2*c^5*e*f*h*i - 2211840
*a^5*b^4*c^4*d*g*h*i - 1566720*a^5*b^4*c^4*e*f*h*i + 317952*a^4*b^6*c^3*d*g
*h*i - 36864*a^4*b^6*c^3*e*f*h*i + 6912*a^3*b^8*c^2*d*g*h*i + 4608*a^3*b^8*
c^2*e*f*h*i + 5160960*a^5*b^3*c^5*d*f*g*i + 4423680*a^5*b^3*c^5*e*f*g*h + 4
423680*a^5*b^3*c^5*d*e*h*i - 635904*a^4*b^5*c^4*d*e*h*i - 354816*a^3*b^7*c^
3*d*f*g*i + 322560*a^4*b^5*c^4*d*f*g*i + 138240*a^4*b^5*c^4*e*f*g*h + 59904
*a^2*b^9*c^2*d*f*g*i - 13824*a^3*b^7*c^3*e*f*g*h - 13824*a^3*b^7*c^3*d*e*h*
i + 13824*a^2*b^9*c^2*d*e*h*i - 16588800*a^5*b^2*c^6*d*e*g*h - 10321920*a^5
*b^2*c^6*d*e*f*i + 1658880*a^4*b^4*c^5*d*e*g*h + 709632*a^3*b^6*c^4*d*e*f*i
 - 645120*a^4*b^4*c^5*d*e*f*i + 124416*a^3*b^6*c^4*d*e*g*h - 119808*a^2*b^8
*c^3*d*e*f*i - 41472*a^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 29
03040*a^3*b^5*c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g - 3456*a^4*b^8*c*g*h
^2*i - 2304*a^4*b^8*c*f*h*i^2 + 1105920*a^7*b*c^5*e*h^2*i - 384*a^2*b^10*c*
f^2*g*i - 10616832*a^6*b*c^6*e^2*g*i - 3538944*a^7*b*c^5*e*g*i^2 + 1843200*
a^7*b*c^5*d*h*i^2 + 1152*a^3*b^9*c*d*h*i^2 - 37062144*a^5*b*c^7*d^2*f*h + 2
580480*a^6*b*c^6*e*f^2*i + 65664*a*b^10*c^2*d^2*g*i + 23224320*a^5*b*c^7*d^
2*e*i - 9216*a^2*b^10*c*d*f*i^2 - 5985792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*
c^3*d^2*f*h - 131328*a*b^9*c^3*d^2*e*i - 6300*a*b^10*c^2*d*f^2*h + 16588800
*a^5*b*c^7*d*e^2*h + 3456*a*b^10*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 1
3824*a*b^8*c^4*d*e^2*f - 1474560*a^7*c^6*e*f*h*i - 10321920*a^6*c^7*d*e*f*i
 + 1350*a*b^11*c*d*f*h^2 - 552960*a^7*b^2*c^4*g*h^2*i - 552960*a^6*b^4*c^3*
g*h^2*i - 145152*a^5*b^6*c^2*g*h^2*i - 737280*a^7*b^2*c^4*f*h*i^2 - 568320*
a^6*b^4*c^3*f*h*i^2 - 136704*a^5*b^6*c^2*f*h*i^2 - 1290240*a^6*b^2*c^5*f^2*
g*i + 1105920*a^6*b^3*c^4*e*h^2*i - 860160*a^5*b^4*c^4*f^2*g*i + 290304*a^5
*b^5*c^3*e*h^2*i - 80640*a^4*b^6*c^3*f^2*g*i + 12672*a^3*b^8*c^2*f^2*g*i +
6912*a^4*b^7*c^2*e*h^2*i + 5308416*a^6*b^2*c^5*e*g^2*i - 5308416*a^5*b^3*c^
5*e^2*g*i - 3538944*a^6*b^3*c^4*e*g*i^2 + 2654208*a^5*b^4*c^4*e*g^2*i + 165
8880*a^6*b^3*c^4*d*h*i^2 - 1105920*a^5*b^4*c^4*f*g^2*h - 884736*a^5*b^5*c^3
*e*g*i^2 - 552960*a^6*b^2*c^5*f*g^2*h + 262656*a^5*b^5*c^3*d*h*i^2 - 55296*
a^4*b^7*c^2*d*h*i^2 - 34560*a^4*b^6*c^3*f*g^2*h + 3456*a^3*b^8*c^2*f*g^2*h
 - 11612160*a^5*b^2*c^6*d^2*g*i + 1720320*a^5*b^3*c^5*e*f^2*i - 1658880*a^6*
b^2*c^5*e*g*h^2 + 1596672*a^3*b^6*c^4*d^2*g*i - 829440*a^5*b^4*c^4*e*g*h^2
 - 508032*a^2*b^8*c^3*d^2*g*i + 161280*a^4*b^5*c^4*e*f^2*i - 25344*a^3*b^7*c
^3*e*f^2*i - 20736*a^4*b^6*c^3*e*g*h^2 + 768*a^2*b^9*c^2*e*f^2*i - 4423680*
a^5*b^2*c^6*e^2*f*h + 4147200*a^5*b^3*c^5*d*g^2*h - 2580480*a^6*b^2*c^5*d*f
*i^2 - 967680*a^5*b^4*c^4*d*f*i^2 - 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4

*b^4*c^5*e^2*f*h + 64512*a^4*b^6*c^3*d*f*i^2 + 39168*a^3*b^8*c^2*d*f*i^2 -
31104*a^3*b^7*c^3*d*g^2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c^2*d
*g^2*h + 15630336*a^5*b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + 9630
144*a^3*b^5*c^5*d^2*f*h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2*c^6
*e*f^2*g - 3193344*a^3*b^5*c^5*d^2*e*i + 2867328*a^4*b^4*c^5*d*f^2*h - 2095
200*a^2*b^7*c^4*d^2*f*h - 1414080*a^3*b^6*c^4*d*f^2*h - 34836480*a^4*b^2*c^
7*d^2*e*g + 1016064*a^2*b^7*c^4*d^2*e*i - 645120*a^4*b^4*c^5*e*f^2*g + 3067
20*a^3*b^7*c^3*d*f*h^2 + 197820*a^2*b^8*c^3*d*f^2*h + 146880*a^4*b^5*c^4*d*
f*h^2 + 80640*a^3*b^6*c^4*e*f^2*g - 55350*a^2*b^9*c^2*d*f*h^2 - 2304*a^2*b^
8*c^3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2 -
 1658880*a^4*b^3*c^6*d*e^2*h + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^
4*c^6*d^2*e*g - 124416*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b^8*c^3*d*f*g^2 + 41
472*a^2*b^7*c^4*d*e^2*h - 3919104*a^2*b^6*c^5*d^2*e*g - 7741440*a^4*b^2*c^7
*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 18432
0*a^8*b*c^4*h^2*i^2 + 25344*a^5*b^7*c*h^2*i^2 - 884736*a^6*b^3*c^4*g^3*i -
589824*a^7*b^3*c^3*g*i^3 - 442368*a^5*b^5*c^3*g^3*i - 294912*a^6*b^5*c^2*g*
i^3 + 430080*a^7*b*c^5*f^2*i^2 - 1984*a^3*b^9*c*f^2*i^2 + 3538944*a^5*b^2*c
^6*e^3*i - 1648128*a^5*b^3*c^5*f^3*h + 1179648*a^7*b^2*c^4*e*i^3 - 898560*a
^6*b^3*c^4*f*h^3 + 589824*a^6*b^4*c^3*e*i^3 - 354240*a^5*b^5*c^3*f*h^3 - 35
4240*a^4*b^5*c^4*f^3*h + 98304*a^5*b^6*c^2*e*i^3 + 43680*a^3*b^7*c^3*f^3*h
- 21600*a^4*b^7*c^2*f*h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2
 + 3870720*a^6*b*c^6*d^2*i^2 + 1658880*a^6*b*c^6*e^2*h^2 + 16547328*a^4*b^2
*c^7*d^3*h - 12306816*a^3*b^4*c^6*d^3*h + 37310976*a^3*b^3*c^7*d^3*f + 3037
824*a^2*b^6*c^5*d^3*h - 2654208*a^5*b^3*c^5*e*g^3 + 1949184*a^6*b^2*c^5*d*h
^3 + 1296000*a^5*b^4*c^4*d*h^3 - 155520*a^4*b^6*c^3*d*h^3 - 40500*a*b^10*c^
2*d^2*h^2 - 8100*a^3*b^8*c^2*d*h^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a
^4*b*c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5
623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2
*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 245760*a^8*c^5
*f*h*i^2 + 384*a^3*b^10*f*h*i^2 + 1152*a^2*b^11*d*h*i^2 - 2211840*a^6*c^7*e
^2*f*h - 1720320*a^7*c^6*d*f*i^2 - 9450*b^11*c^2*d^2*f*h + 6912*b^11*c^2*d^
2*e*i + 1612800*a^6*c^7*d*f^2*h - 393216*a^8*b*c^4*g*i^3 - 49152*a^5*b^7*c*
g*i^3 - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 883200*a^6*b*c^
6*f^3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f*h^3 - 15482880*a^5*c^8*
d*e^2*f - 9792*a*b^11*c*d^2*i^2 - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c
^4*d^3*h + 4050*a^2*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c
^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 276480*a^7*b^3*c^3*h^2*i^2 + 140544*a^6*b
^5*c^2*h^2*i^2 + 884736*a^7*b^2*c^4*g^2*i^2 + 884736*a^6*b^4*c^3*g^2*i^2 +
221184*a^5*b^6*c^2*g^2*i^2 + 501760*a^6*b^3*c^4*f^2*i^2 + 414720*a^6*b^3*c^
4*g^2*h^2 + 207360*a^5*b^5*c^3*g^2*h^2 + 170240*a^5*b^5*c^3*f^2*i^2 + 9216*
a^4*b^7*c^2*f^2*i^2 + 5184*a^4*b^7*c^2*g^2*h^2 + 3538944*a^6*b^2*c^5*e^2*i^
2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 1264320*a^5*b^4*c^4*f^2*h^2 + 884736*a^5*
b^4*c^4*e^2*i^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 +
1935360*a^5*b^3*c^5*d^2*i^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c
^5*e^2*h^2 - 532224*a^4*b^5*c^4*d^2*i^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 9676
8*a^3*b^7*c^3*d^2*i^2 + 62784*a^2*b^9*c^2*d^2*i^2 + 20736*a^4*b^5*c^4*e^2*h
^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2
*c^6*d^2*h^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 -
 1412640*a^3*b^6*c^4*d^2*h^2 + 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*
c^3*d^2*h^2 + 8709120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 9
79776*a^2*b^7*c^4*d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*
e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784
*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d
^2*e^2 - 3456*b^12*c*d^2*g*i + 384*a*b^12*d*f*i^2 + 576*a^4*b^9*h^2*i^2 + 3
538944*a^7*c^6*e^2*i^2 + 115200*a^7*c^6*f^2*h^2 + 64*a^2*b^11*f^2*i^2 + 609
6384*a^6*c^7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 131072*a^8*b^2*c^3*i^4 + 983
04*a^7*b^4*c^2*i^4 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 142
560*a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*h^4 + 32400*a^5*b^6*c^2*h^4 + 2073
6*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 35145

6*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728
*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 + 7077888*a^6*c^7*e^3*i + 786432
*a^8*c^5*e*i^3 + 28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*
c*d^2*h^2 + 580608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 32768*a^6*b^6*c*i^
4 + 2025*a^4*b^8*c*h^4 - 734832*a*b^6*c^6*d^4 + 576*b^13*d^2*i^2 + 65536*a^
9*c^4*i^4 + 20736*a^8*c^5*h^4 + 4096*a^5*b^8*i^4 + 49787136*a^4*c^9*d^4 + 1
60000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, l)*x*(83886
08*a^11*b*c^9 - 512*a^4*b^15*c^2 + 14336*a^5*b^13*c^3 - 172032*a^6*b^11*c^4
 + 1146880*a^7*b^9*c^5 - 4587520*a^8*b^7*c^6 + 11010048*a^9*b^5*c^7 - 14680
064*a^10*b^3*c^8))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*
b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))) + (3244
032*a^6*b*c^8*d*e - 327680*a^8*c^7*f*i - 983040*a^7*c^8*e*f + 1081344*a^7*b
*c^7*d*i + 884736*a^7*b*c^7*e*h + 491520*a^7*b*c^7*f*g + 294912*a^8*b*c^6*h
*i + 4608*a^2*b^9*c^4*d*e - 87552*a^3*b^7*c^5*d*e + 681984*a^4*b^5*c^6*d*e
- 2433024*a^5*b^3*c^7*d*e - 2304*a^2*b^10*c^3*d*g + 43776*a^3*b^8*c^4*d*g +
 1536*a^3*b^8*c^4*e*f - 340992*a^4*b^6*c^5*d*g - 39936*a^4*b^6*c^5*e*f + 12
16512*a^5*b^4*c^6*d*g + 184320*a^5*b^4*c^6*e*f - 1622016*a^6*b^2*c^7*d*g +
49152*a^6*b^2*c^7*e*f + 768*a^2*b^11*c^2*d*i - 13056*a^3*b^9*c^3*d*i - 768*
a^3*b^9*c^3*f*g + 84480*a^4*b^7*c^4*d*i + 4608*a^4*b^7*c^4*e*h + 19968*a^4*
b^7*c^4*f*g - 178176*a^5*b^5*c^5*d*i + 18432*a^5*b^5*c^5*e*h - 92160*a^5*b^
5*c^5*f*g - 270336*a^6*b^3*c^6*d*i - 368640*a^6*b^3*c^6*e*h - 24576*a^6*b^3
*c^6*f*g + 256*a^3*b^10*c^2*f*i - 6144*a^4*b^8*c^3*f*i - 2304*a^4*b^8*c^3*g
*h + 17408*a^5*b^6*c^4*f*i - 9216*a^5*b^6*c^4*g*h + 69632*a^6*b^4*c^5*f*i +
 184320*a^6*b^4*c^5*g*h - 147456*a^7*b^2*c^6*f*i - 442368*a^7*b^2*c^6*g*h +
 768*a^4*b^9*c^2*h*i + 4608*a^5*b^7*c^3*h*i - 55296*a^6*b^5*c^4*h*i + 24576
*a^7*b^3*c^5*h*i)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*
b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - (x*(45
1584*a^6*c^9*d^2 + 18*b^12*c^3*d^2 - 25600*a^7*c^8*f^2 + 9216*a^8*c^7*h^2 -
 504*a*b^10*c^4*d^2 - 73728*a^6*b*c^8*e^2 - 8192*a^8*b*c^6*i^2 + 6228*a^2*b
^8*c^5*d^2 - 42624*a^3*b^6*c^6*d^2 + 176256*a^4*b^4*c^7*d^2 - 423936*a^5*b^
2*c^8*d^2 - 4608*a^4*b^5*c^6*e^2 + 36864*a^5*b^3*c^7*e^2 + 2*a^2*b^10*c^3*f
^2 - 84*a^3*b^8*c^4*f^2 + 3520*a^4*b^6*c^5*f^2 - 26240*a^5*b^4*c^6*f^2 + 59
904*a^6*b^2*c^7*f^2 - 1152*a^4*b^7*c^4*g^2 + 9216*a^5*b^5*c^5*g^2 - 18432*a
^6*b^3*c^6*g^2 + 468*a^4*b^8*c^3*h^2 - 3456*a^5*b^6*c^4*h^2 + 5760*a^6*b^4*
c^5*h^2 - 128*a^4*b^9*c^2*i^2 + 512*a^5*b^7*c^3*i^2 + 1536*a^6*b^5*c^4*i^2
- 4096*a^7*b^3*c^5*i^2 + 129024*a^7*c^8*d*h + 12*a*b^11*c^3*d*f - 218112*a^
6*b*c^8*d*f - 49152*a^7*b*c^7*e*i - 9216*a^7*b*c^7*f*h - 420*a^2*b^9*c^4*d*
f + 4992*a^3*b^7*c^5*d*f - 36480*a^4*b^5*c^6*d*f + 144384*a^5*b^3*c^7*d*f +
 36*a^2*b^10*c^3*d*h - 360*a^3*b^8*c^4*d*h + 3456*a^4*b^6*c^5*d*h + 4608*a^
4*b^6*c^5*e*g - 11520*a^5*b^4*c^6*d*h - 36864*a^5*b^4*c^6*e*g - 27648*a^6*b
^2*c^7*d*h + 73728*a^6*b^2*c^7*e*g + 12*a^3*b^9*c^3*f*h - 1536*a^4*b^7*c^4*
e*i - 2304*a^4*b^7*c^4*f*h + 9216*a^5*b^5*c^5*e*i + 17280*a^5*b^5*c^5*f*h -
 30720*a^6*b^3*c^6*f*h + 768*a^4*b^8*c^3*g*i - 4608*a^5*b^6*c^4*g*i + 24576
*a^7*b^2*c^6*g*i))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*
b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))) + (x*(1
3824*a^4*c^8*e^3 + 512*a^7*c^5*i^3 - 54*b^7*c^5*d^2*e + 27*b^8*c^4*d^2*g +
13824*a^5*c^7*e^2*i + 4608*a^6*c^6*e*i^2 - 9*b^9*c^3*d^2*i - 1728*a^4*b^3*c
^5*g^3 + 64*a^4*b^6*c^2*i^3 + 384*a^5*b^4*c^3*i^3 + 768*a^6*b^2*c^4*i^3 - 2
0160*a^4*c^8*d*e*f - 6720*a^5*c^7*d*f*i - 2880*a^5*c^7*e*f*h - 960*a^6*c^6*
f*h*i + 972*a*b^5*c^6*d^2*e + 24192*a^3*b*c^8*d^2*e - 486*a*b^6*c^5*d^2*g +
 6240*a^4*b*c^7*e*f^2 - 20736*a^4*b*c^7*e^2*g + 144*a*b^7*c^4*d^2*i + 8064*
a^4*b*c^7*d^2*i + 1728*a^5*b*c^6*e*h^2 + 2080*a^5*b*c^6*f^2*i - 2304*a^6*b*
c^5*g*i^2 + 576*a^6*b*c^5*h^2*i - 7344*a^2*b^3*c^7*d^2*e + 3672*a^2*b^4*c^6
*d^2*g - 6*a^2*b^5*c^5*e*f^2 - 12096*a^3*b^2*c^7*d^2*g + 192*a^3*b^3*c^6*e*
f^2 + 10368*a^4*b^2*c^6*e*g^2 - 900*a^2*b^5*c^5*d^2*i + 3*a^2*b^6*c^4*f^2*g
 + 1584*a^3*b^3*c^6*d^2*i - 96*a^3*b^4*c^5*f^2*g - 3120*a^4*b^2*c^6*f^2*g +
 1296*a^4*b^3*c^5*e*h^2 + 6912*a^4*b^2*c^6*e^2*i + 1152*a^4*b^4*c^4*e*i^2 +
 4608*a^5*b^2*c^5*e*i^2 - a^2*b^7*c^3*f^2*i + 30*a^3*b^5*c^4*f^2*i + 1104*a
^4*b^3*c^5*f^2*i - 648*a^4*b^4*c^4*g*h^2 - 864*a^5*b^2*c^5*g*h^2 + 1728*a^4

```
*b^4*c^4*g^2*i - 576*a^4*b^5*c^3*g*i^2 + 3456*a^5*b^2*c^5*g^2*i - 2304*a^5*
b^3*c^4*g*i^2 + 216*a^4*b^5*c^3*h^2*i + 720*a^5*b^3*c^4*h^2*i - 36*a*b^6*c^
5*d*e*f + 18*a*b^7*c^4*d*f*g + 15552*a^4*b*c^7*d*e*h + 10080*a^4*b*c^7*d*f*
g - 6*a*b^8*c^3*d*f*i + 5184*a^5*b*c^6*d*h*i - 13824*a^5*b*c^6*e*g*i + 1440
*a^5*b*c^6*f*g*h + 900*a^2*b^4*c^6*d*e*f - 4896*a^3*b^2*c^7*d*e*f - 108*a^2
*b^5*c^5*d*e*h - 450*a^2*b^5*c^5*d*f*g + 2448*a^3*b^3*c^6*d*f*g + 138*a^2*b
^6*c^4*d*f*i + 54*a^2*b^6*c^4*d*g*h - 516*a^3*b^4*c^5*d*f*i - 36*a^3*b^4*c^
5*e*f*h - 4992*a^4*b^2*c^6*d*f*i - 7776*a^4*b^2*c^6*d*g*h - 6048*a^4*b^2*c^
6*e*f*h - 18*a^2*b^7*c^3*d*h*i - 36*a^3*b^5*c^4*d*h*i + 18*a^3*b^5*c^4*f*g*
h + 2592*a^4*b^3*c^5*d*h*i - 6912*a^4*b^3*c^5*e*g*i + 3024*a^4*b^3*c^5*f*g*
h - 6*a^3*b^6*c^3*f*h*i - 1020*a^4*b^4*c^4*f*h*i - 2496*a^5*b^2*c^5*f*h*i))
/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7
*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)))*root(56371445760*a^11*b^8
*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 1717986
91840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*
b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 -
 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 +
196608*a^5*b^13*c*g*i*z^2 - 46080*a^4*b^14*c*f*h*z^2 - 105984*a^3*b^15*c*d*
h*z^2 - 73728*a^2*b^16*c*d*f*z^2 + 2548039680*a^9*b^3*c^7*d*h*z^2 + 1509949
440*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*z^2 - 1321205760*a^9*b
^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a^7*b^6*c^6*d*f*
z^2 - 603979776*a^10*b^2*c^7*e*i*z^2 - 456130560*a^9*b^4*c^6*f*h*z^2 + 3904
63488*a^7*b^7*c^5*d*h*z^2 + 301989888*a^10*b^3*c^6*g*i*z^2 - 366280704*a^6*
b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 254017536*a^8*b^6*c^5*f*h
*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680*a^10*b^2*c^7*f*h*z^2 + 188
743680*a^7*b^7*c^5*e*g*z^2 + 125829120*a^8*b^6*c^5*e*i*z^2 - 62914560*a^8*b
^7*c^4*g*i*z^2 - 61931520*a^7*b^8*c^4*f*h*z^2 + 23592960*a^7*b^9*c^3*g*i*z^
2 - 47185920*a^7*b^8*c^4*e*i*z^2 - 3538944*a^6*b^11*c^2*g*i*z^2 + 96583680*
a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + 7077888*a^6*b^10*c^3*
e*i*z^2 + 6144000*a^6*b^10*c^3*f*h*z^2 - 393216*a^5*b^12*c^2*e*i*z^2 + 6144
0*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^9*c^4*e*g*z^2 + 1179648*a^5*b^11*c^
3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 + 368640*a^5*b^11*c^3*d*h*z^2 - 151
75680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 1207959552*a^10
*b*c^8*e*g*z^2 - 402653184*a^11*b*c^7*g*i*z^2 - 440401920*a^10*b*c^8*f^2*z^
2 - 188743680*a^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 + 524288*a^6
*b^12*c*i^2*z^2 + 46080*a^5*b^13*c*h^2*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 693
6330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a
^9*b*c^9*d^2*z^2 + 805306368*a^11*c^8*e*i*z^2 - 1509949440*a^9*b^2*c^8*e^2*
z^2 + 251658240*a^11*c^8*f*h*z^2 + 1536*a^3*b^16*f*h*z^2 + 4608*a^2*b^17*d*
h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720
*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^
7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^10*b^2*c^7*g^2*z^2
+ 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^10*b^3*c^6*h^2*z^2 - 17432576
0*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*
c^4*d^2*z^2 - 50331648*a^10*b^4*c^5*i^2*z^2 - 33554432*a^11*b^2*c^6*i^2*z^2
 + 20971520*a^9*b^6*c^4*i^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 - 26542080*a
^8*b^7*c^4*h^2*z^2 - 2752512*a^7*b^10*c^2*i^2*z^2 + 2621440*a^8*b^8*c^3*i^2
*z^2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5*c^5*h^2*z^2 - 1290240*
a^6*b^11*c^2*h^2*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 294912*a^5*b^12*c^2*g
^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592
960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^
2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 +
1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^
2*z^2 + 134217728*a^12*c^7*i^2*z^2 - 32768*a^5*b^14*i^2*z^2 + 2304*a^4*b^15
*h^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d
*e*f*z + 99090432*a^8*b*c^7*d*g*h*z - 3145728*a^9*b*c^6*f*h*i*z - 27648*a^4
*b^11*c*f*h*i*z + 56623104*a^8*b*c^7*d*f*i*z - 50688*a^3*b^12*c*d*h*i*z - 4
608*a^3*b^12*c*f*g*h*z - 9437184*a^8*b*c^7*e*f*h*z - 55296*a^2*b^13*c*d*f*i
*z - 13824*a^2*b^13*c*d*g*h*z + 9216*a*b^13*c^2*d*e*f*z - 4608*a*b^14*c*d*f
```

*g*z + 219414528*a^7*b^2*c^7*d*e*h*z - 221773824*a^6*b^3*c^7*d*e*f*z - 1097
07264*a^7*b^3*c^6*d*g*h*z + 110886912*a^6*b^4*c^6*d*f*g*z + 40108032*a^8*b^
2*c^6*d*h*i*z + 2359296*a^8*b^3*c^5*f*h*i*z - 491520*a^6*b^7*c^3*f*h*i*z +
184320*a^5*b^9*c^2*f*h*i*z - 88473600*a^6*b^4*c^6*d*e*h*z - 84934656*a^7*b^
2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z - 45613056*a^7*b^3*c^6*d*f*i*
z + 44236800*a^6*b^5*c^5*d*g*h*z - 10321920*a^6*b^6*c^4*d*h*i*z + 7077888*a
^7*b^4*c^5*d*h*i*z - 5898240*a^7*b^4*c^5*f*g*h*z + 4718592*a^8*b^2*c^6*f*g*
h*z + 2949120*a^6*b^6*c^4*f*g*h*z + 2396160*a^5*b^8*c^3*d*h*i*z - 737280*a^
5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g*h*z - 27648*a^4*b^10*c^2*d*h*i*z
 - 58982400*a^5*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^6*e*f*h*z + 8847360*a^
5*b^7*c^4*d*f*i*z - 6635520*a^5*b^7*c^4*d*g*h*z - 5898240*a^6*b^5*c^5*e*f*h
*z - 3809280*a^4*b^9*c^3*d*f*i*z + 2359296*a^6*b^5*c^5*d*f*i*z + 1474560*a^
5*b^7*c^4*e*f*h*z + 681984*a^3*b^11*c^2*d*f*i*z - 276480*a^4*b^9*c^3*d*g*h*
z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a^3*b^11*c^2*d*g*h*z + 9216*a^3*b^1
1*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*g*z + 13271040*a^5*b^6*c^5*d*e*h*z
 - 2396160*a^3*b^10*c^3*d*f*g*z + 552960*a^4*b^8*c^4*d*e*h*z - 359424*a^3*b
^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f*g*z + 27648*a^2*b^12*c^2*d*e*h*z
- 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b
^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2*g*z - 41472*a^5*b^10*c*h^2*i*z +
7077888*a^9*b*c^6*g*h^2*z - 11008*a^3*b^12*c*f^2*i*z - 6912*a^4*b^11*c*g*h^
2*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z + 214272*a*b^13*c
^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z - 198180864*a^8*c^8*d*e*h*z - 660602
88*a^9*c^7*d*h*i*z + 1536*a^3*b^13*f*h*i*z + 4608*a^2*b^14*d*h*i*z - 66816*
a*b^14*c*d^2*i*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d
^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 321159168*a^5*b^5*c^6*d^2*g*z + 22
5312768*a^7*b^2*c^7*d^2*i*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*a^4
*b^7*c^5*d^2*g*z + 3538944*a^9*b^2*c^5*h^2*i*z - 737280*a^7*b^6*c^3*h^2*i*z
 + 276480*a^6*b^8*c^2*h^2*i*z - 10354688*a^8*b^2*c^6*f^2*i*z - 43646976*a^6
*b^4*c^6*d^2*i*z - 8847360*a^8*b^3*c^5*g*h^2*z + 4423680*a^7*b^5*c^4*g*h^2*
z + 2048000*a^6*b^6*c^4*f^2*i*z - 1105920*a^6*b^7*c^3*g*h^2*z - 849920*a^5*
b^8*c^3*f^2*i*z + 393216*a^7*b^4*c^5*f^2*i*z + 145920*a^4*b^10*c^2*f^2*i*z
+ 138240*a^5*b^9*c^2*g*h^2*z - 32587776*a^5*b^6*c^5*d^2*i*z + 25362432*a^7*
b^3*c^6*f^2*g*z + 21657600*a^4*b^8*c^4*d^2*i*z + 17694720*a^8*b^2*c^6*e*h^2
*z - 50724864*a^7*b^2*c^7*e*f^2*z - 13271040*a^6*b^5*c^5*f^2*g*z - 8847360*
a^7*b^4*c^5*e*h^2*z - 5810688*a^3*b^10*c^3*d^2*i*z + 3563520*a^5*b^7*c^4*f^
2*g*z + 2211840*a^6*b^6*c^4*e*h^2*z + 845568*a^2*b^12*c^2*d^2*i*z - 506880*
a^4*b^9*c^3*f^2*g*z - 276480*a^5*b^8*c^3*e*h^2*z + 34560*a^3*b^11*c^2*f^2*g
*z + 13824*a^4*b^10*c^2*e*h^2*z + 26542080*a^6*b^4*c^6*e*f^2*z + 23362560*a
^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f
^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1013760*a^4*b^8*c^4*e*f^2*z - 69120*a
^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930496*a^2*b^10*c^4*d^2*
e*z + 1536*a*b^15*d*f*i*z - 693633024*a^7*c^9*d^2*e*z - 231211008*a^8*c^8*d
^2*i*z - 4718592*a^10*c^6*h^2*i*z + 2304*a^4*b^12*h^2*i*z + 13107200*a^9*c^
7*f^2*i*z + 256*a^2*b^14*f^2*i*z - 14155776*a^9*c^7*e*h^2*z + 39321600*a^8*
c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z - 6912*b^15*c*d^2*g*z + 2304*b^16*d^2*
i*z + 737280*a^7*b*c^5*f*g*h*i - 2304*a^3*b^9*c*f*g*h*i - 6912*a^2*b^10*c*d
*g*h*i + 11059200*a^6*b*c^6*d*e*h*i + 5160960*a^6*b*c^6*d*f*g*i + 2211840*a
^6*b*c^6*e*f*g*h + 4608*a*b^10*c^2*d*e*f*i + 15482880*a^5*b*c^7*d*e*f*g - 1
3824*a*b^9*c^3*d*e*f*g - 2304*a*b^11*c*d*f*g*i + 1843200*a^6*b^3*c^4*f*g*h*
i + 783360*a^5*b^5*c^3*f*g*h*i + 18432*a^4*b^7*c^2*f*g*h*i - 5529600*a^6*b^
2*c^5*d*g*h*i - 3686400*a^6*b^2*c^5*e*f*h*i - 2211840*a^5*b^4*c^4*d*g*h*i -
 1566720*a^5*b^4*c^4*e*f*h*i + 317952*a^4*b^6*c^3*d*g*h*i - 36864*a^4*b^6*c
^3*e*f*h*i + 6912*a^3*b^8*c^2*d*g*h*i + 4608*a^3*b^8*c^2*e*f*h*i + 5160960*
a^5*b^3*c^5*d*f*g*i + 4423680*a^5*b^3*c^5*e*f*g*h + 4423680*a^5*b^3*c^5*d*e
*h*i - 635904*a^4*b^5*c^4*d*e*h*i - 354816*a^3*b^7*c^3*d*f*g*i + 322560*a^4
*b^5*c^4*d*f*g*i + 138240*a^4*b^5*c^4*e*f*g*h + 59904*a^2*b^9*c^2*d*f*g*i -
 13824*a^3*b^7*c^3*e*f*g*h - 13824*a^3*b^7*c^3*d*e*h*i + 13824*a^2*b^9*c^2*
d*e*h*i - 16588800*a^5*b^2*c^6*d*e*g*h - 10321920*a^5*b^2*c^6*d*e*f*i + 165
8880*a^4*b^4*c^5*d*e*g*h + 709632*a^3*b^6*c^4*d*e*f*i - 645120*a^4*b^4*c^5*

d*e*f*i + 124416*a^3*b^6*c^4*d*e*g*h - 119808*a^2*b^8*c^3*d*e*f*i - 41472*a
^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 2903040*a^3*b^5*c^5*d*e*
f*g + 387072*a^2*b^7*c^4*d*e*f*g - 3456*a^4*b^8*c*g*h^2*i - 2304*a^4*b^8*c*
f*h*i^2 + 1105920*a^7*b*c^5*e*h^2*i - 384*a^2*b^10*c*f^2*g*i - 10616832*a^6
*b*c^6*e^2*g*i - 3538944*a^7*b*c^5*e*g*i^2 + 1843200*a^7*b*c^5*d*h*i^2 + 11
52*a^3*b^9*c*d*h*i^2 - 37062144*a^5*b*c^7*d^2*f*h + 2580480*a^6*b*c^6*e*f^2
*i + 65664*a*b^10*c^2*d^2*g*i + 23224320*a^5*b*c^7*d^2*e*i - 9216*a^2*b^10*
c*d*f*i^2 - 5985792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*c^3*d^2*f*h - 131328*a
*b^9*c^3*d^2*e*i - 6300*a*b^10*c^2*d*f^2*h + 16588800*a^5*b*c^7*d*e^2*h + 3
456*a*b^10*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 13824*a*b^8*c^4*d*e^2*f
 - 1474560*a^7*c^6*e*f*h*i - 10321920*a^6*c^7*d*e*f*i + 1350*a*b^11*c*d*f*h
^2 - 552960*a^7*b^2*c^4*g*h^2*i - 552960*a^6*b^4*c^3*g*h^2*i - 145152*a^5*b
^6*c^2*g*h^2*i - 737280*a^7*b^2*c^4*f*h*i^2 - 568320*a^6*b^4*c^3*f*h*i^2 -
136704*a^5*b^6*c^2*f*h*i^2 - 1290240*a^6*b^2*c^5*f^2*g*i + 1105920*a^6*b^3*
c^4*e*h^2*i - 860160*a^5*b^4*c^4*f^2*g*i + 290304*a^5*b^5*c^3*e*h^2*i - 806
40*a^4*b^6*c^3*f^2*g*i + 12672*a^3*b^8*c^2*f^2*g*i + 6912*a^4*b^7*c^2*e*h^2
*i + 5308416*a^6*b^2*c^5*e*g^2*i - 5308416*a^5*b^3*c^5*e^2*g*i - 3538944*a^
6*b^3*c^4*e*g*i^2 + 2654208*a^5*b^4*c^4*e*g^2*i + 1658880*a^6*b^3*c^4*d*h*i
^2 - 1105920*a^5*b^4*c^4*f*g^2*h - 884736*a^5*b^5*c^3*e*g*i^2 - 552960*a^6*
b^2*c^5*f*g^2*h + 262656*a^5*b^5*c^3*d*h*i^2 - 55296*a^4*b^7*c^2*d*h*i^2 -
34560*a^4*b^6*c^3*f*g^2*h + 3456*a^3*b^8*c^2*f*g^2*h - 11612160*a^5*b^2*c^6
*d^2*g*i + 1720320*a^5*b^3*c^5*e*f^2*i - 1658880*a^6*b^2*c^5*e*g*h^2 + 1596
672*a^3*b^6*c^4*d^2*g*i - 829440*a^5*b^4*c^4*e*g*h^2 - 508032*a^2*b^8*c^3*d
^2*g*i + 161280*a^4*b^5*c^4*e*f^2*i - 25344*a^3*b^7*c^3*e*f^2*i - 20736*a^4
*b^6*c^3*e*g*h^2 + 768*a^2*b^9*c^2*e*f^2*i - 4423680*a^5*b^2*c^6*e^2*f*h +
4147200*a^5*b^3*c^5*d*g^2*h - 2580480*a^6*b^2*c^5*d*f*i^2 - 967680*a^5*b^4*
c^4*d*f*i^2 - 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4*b^4*c^5*e^2*f*h + 645
12*a^4*b^6*c^3*d*f*i^2 + 39168*a^3*b^8*c^2*d*f*i^2 - 31104*a^3*b^7*c^3*d*g^
2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c^2*d*g^2*h + 15630336*a^5*
b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + 9630144*a^3*b^5*c^5*d^2*f*
h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2*c^6*e*f^2*g - 3193344*a^3
*b^5*c^5*d^2*e*i + 2867328*a^4*b^4*c^5*d*f^2*h - 2095200*a^2*b^7*c^4*d^2*f*
h - 1414080*a^3*b^6*c^4*d*f^2*h - 34836480*a^4*b^2*c^7*d^2*e*g + 1016064*a^
2*b^7*c^4*d^2*e*i - 645120*a^4*b^4*c^5*e*f^2*g + 306720*a^3*b^7*c^3*d*f*h^2
 + 197820*a^2*b^8*c^3*d*f^2*h + 146880*a^4*b^5*c^4*d*f*h^2 + 80640*a^3*b^6*
c^4*e*f^2*g - 55350*a^2*b^9*c^2*d*f*h^2 - 2304*a^2*b^8*c^3*e*f^2*g - 387072
0*a^5*b^2*c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2 - 1658880*a^4*b^3*c^6*d
*e^2*h + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^4*c^6*d^2*e*g - 124416
*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b^8*c^3*d*f*g^2 + 41472*a^2*b^7*c^4*d*e^2*
h - 3919104*a^2*b^6*c^5*d^2*e*g - 7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3
*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 184320*a^8*b*c^4*h^2*i^2 +
25344*a^5*b^7*c*h^2*i^2 - 884736*a^6*b^3*c^4*g^3*i - 589824*a^7*b^3*c^3*g*i
^3 - 442368*a^5*b^5*c^3*g^3*i - 294912*a^6*b^5*c^2*g*i^3 + 430080*a^7*b*c^5
*f^2*i^2 - 1984*a^3*b^9*c*f^2*i^2 + 3538944*a^5*b^2*c^6*e^3*i - 1648128*a^5
*b^3*c^5*f^3*h + 1179648*a^7*b^2*c^4*e*i^3 - 898560*a^6*b^3*c^4*f*h^3 + 589
824*a^6*b^4*c^3*e*i^3 - 354240*a^5*b^5*c^3*f*h^3 - 354240*a^4*b^5*c^4*f^3*h
 + 98304*a^5*b^6*c^2*e*i^3 + 43680*a^3*b^7*c^3*f^3*h - 21600*a^4*b^7*c^2*f*
h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2 + 3870720*a^6*b*c^6*d
^2*i^2 + 1658880*a^6*b*c^6*e^2*h^2 + 16547328*a^4*b^2*c^7*d^3*h - 12306816*
a^3*b^4*c^6*d^3*h + 37310976*a^3*b^3*c^7*d^3*f + 3037824*a^2*b^6*c^5*d^3*h
- 2654208*a^5*b^3*c^5*e*g^3 + 1949184*a^6*b^2*c^5*d*h^3 + 1296000*a^5*b^4*c
^4*d*h^3 - 155520*a^4*b^6*c^3*d*h^3 - 40500*a*b^10*c^2*d^2*h^2 - 8100*a^3*b
^8*c^2*d*h^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108
864*a*b^9*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f
^3 + 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*
c^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 245760*a^8*c^5*f*h*i^2 + 384*a^3*b^1
0*f*h*i^2 + 1152*a^2*b^11*d*h*i^2 - 2211840*a^6*c^7*e^2*f*h - 1720320*a^7*c
^6*d*f*i^2 - 9450*b^11*c^2*d^2*f*h + 6912*b^11*c^2*d^2*e*i + 1612800*a^6*c^
7*d*f^2*h - 393216*a^8*b*c^4*g*i^3 - 49152*a^5*b^7*c*g*i^3 - 20736*b^10*c^3

```
*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 883200*a^6*b*c^6*f^3*h - 317952*a^7*b
*c^5*f*h^3 + 1350*a^3*b^9*c*f*h^3 - 15482880*a^5*c^8*d*e^2*f - 9792*a*b^11*
c*d^2*i^2 - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c^4*d^3*h + 4050*a^2*b^
10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*
c^3*d*f^3 + 276480*a^7*b^3*c^3*h^2*i^2 + 140544*a^6*b^5*c^2*h^2*i^2 + 88473
6*a^7*b^2*c^4*g^2*i^2 + 884736*a^6*b^4*c^3*g^2*i^2 + 221184*a^5*b^6*c^2*g^2
*i^2 + 501760*a^6*b^3*c^4*f^2*i^2 + 414720*a^6*b^3*c^4*g^2*h^2 + 207360*a^5
*b^5*c^3*g^2*h^2 + 170240*a^5*b^5*c^3*f^2*i^2 + 9216*a^4*b^7*c^2*f^2*i^2 +
5184*a^4*b^7*c^2*g^2*h^2 + 3538944*a^6*b^2*c^5*e^2*i^2 + 1684224*a^6*b^2*c^
5*f^2*h^2 + 1264320*a^5*b^4*c^4*f^2*h^2 + 884736*a^5*b^4*c^4*e^2*i^2 + 1267
20*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 + 1935360*a^5*b^3*c^5*d^
2*i^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c^5*e^2*h^2 - 532224*a^
4*b^5*c^4*d^2*i^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 96768*a^3*b^7*c^3*d^2*i^2
+ 62784*a^2*b^9*c^2*d^2*i^2 + 20736*a^4*b^5*c^4*e^2*h^2 - 20160*a^3*b^7*c^3
*f^2*g^2 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2*c^6*d^2*h^2 + 7962624
*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - 1412640*a^3*b^6*c^4*d
^2*h^2 + 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*c^3*d^2*h^2 + 8709120*
a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*d^2*
g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7
*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 -
 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 - 3456*b^12*c*d
^2*g*i + 384*a*b^12*d*f*i^2 + 576*a^4*b^9*h^2*i^2 + 3538944*a^7*c^6*e^2*i^2
 + 115200*a^7*c^6*f^2*h^2 + 64*a^2*b^11*f^2*i^2 + 6096384*a^6*c^7*d^2*h^2 +
 5184*b^11*c^2*d^2*g^2 + 131072*a^8*b^2*c^3*i^4 + 98304*a^7*b^4*c^2*i^4 + 1
1025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 +
103680*a^7*b^2*c^4*h^4 + 32400*a^5*b^6*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 33
1776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43
120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 644
6304*a^2*b^4*c^7*d^4 + 7077888*a^6*c^7*e^3*i + 786432*a^8*c^5*e*i^3 + 28449
792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 580608*a^7
*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 32768*a^6*b^6*c*i^4 + 2025*a^4*b^8*c*h^4
 - 734832*a*b^6*c^6*d^4 + 576*b^13*d^2*i^2 + 65536*a^9*c^4*i^4 + 20736*a^8*
c^5*h^4 + 4096*a^5*b^8*i^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 53
08416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, l), l, 1, 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**3,x)
```

```
[Out] Timed out
```

3.57 $\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{\left(a+bx^2+cx^4\right)^3} dx$

Optimal. Leaf size=1150

$$\frac{-\frac{lb^4}{c^2}+\frac{jb^3}{c}-\left(3g-\frac{5al}{c}\right)b^2+2(3ce+aj)b+2\left(jb^2-3cgb-3alb+6c^2e+2acj\right)x^2-16a^2l}{4\left(b^2-4ac\right)^2\left(cx^4+bx^2+a\right)}+\frac{\left(\left(ma^2+3c^2d\right)b^3+\right.}{}$$

```
[Out] 1/4*(-b*c*(a*j+c*e)+a*b^2*l+2*a*c*(-a*l+c*g)-(2*c^3*e-c^2*(2*a*j+b*g)-b^3*l
+b*c*(3*a*l+b*j))*x^2)/c^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2-1/4*x*(a*b*c*(a*k
+c*f)-b^2*(a^2*m+c^2*d)+2*a*c*(a^2*m-a*c*h+c^2*d)+(a*b^2*c*k+2*a*c^2*(-a*k+
c*f)-a*b^3*m-b*c*(-3*a^2*m+a*c*h+c^2*d))*x^2)/a/c^2/(-4*a*c+b^2)/(c*x^4+b*x
^2+a)^2+1/4*(b^3*j/c+2*b*(a*j+3*c*e)-16*a^2*l-b^4*l/c^2-b^2*(3*g-5*a*l/c)+2
*(-3*a*b*l+2*a*c*j+b^2*j-3*b*c*g+6*c^2*e)*x^2)/(-4*a*c+b^2)^2/(c*x^4+b*x^2+
a)+1/8*x*(4*a^2*b*c^2*(a*k+2*c*f)+a*b^3*c*(2*a*k+c*f)-a*b^2*c*(-11*a^2*m+7*
a*c*h+25*c^2*d)+4*a^2*c^2*(-9*a^2*m+a*c*h+7*c^2*d)+b^4*(-2*a^2*m+3*c^2*d)+c
*(a*b^2*c*(3*a*k+c*f)+4*a^2*c^2*(3*a*k+5*c*f)+b^3*(a^2*m+3*c^2*d)-4*a*b*c*(
4*a^2*m+3*a*c*h+6*c^2*d))*x^2)/a^2/c^2/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)-(-3*a
*b*l+2*a*c*j+b^2*j-3*b*c*g+6*c^2*e)*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))
/(-4*a*c+b^2)^(5/2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1
/2))*(a*b^2*c*(3*a*k+c*f)+4*a^2*c^2*(3*a*k+5*c*f)+b^3*(a^2*m+3*c^2*d)-4*a*b
*c*(4*a^2*m+3*a*c*h+6*c^2*d)+(a*b^3*c*(-3*a*k+c*f)-4*a^2*b*c^2*(9*a*k+13*c*
f)-6*a*b^2*c*(-3*a^2*m-3*a*c*h+5*c^2*d)+b^4*(-a^2*m+3*c^2*d)+8*a^2*c^2*(5*a
^2*m+3*a*c*h+21*c^2*d))/(-4*a*c+b^2)^(1/2))/a^2/c^(3/2)/(-4*a*c+b^2)^2*2^(1
/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b
^2)^(1/2))^(1/2))*(a*b^2*c*(3*a*k+c*f)+4*a^2*c^2*(3*a*k+5*c*f)+b^3*(a^2*m+3
*c^2*d)-4*a*b*c*(4*a^2*m+3*a*c*h+6*c^2*d)+(-a*b^3*c*(-3*a*k+c*f)+4*a^2*b*c^
2*(9*a*k+13*c*f)+6*a*b^2*c*(-3*a^2*m-3*a*c*h+5*c^2*d)-b^4*(-a^2*m+3*c^2*d)-
8*a^2*c^2*(5*a^2*m+3*a*c*h+21*c^2*d))/(-4*a*c+b^2)^(1/2))/a^2/c^(3/2)/(-4*a
*c+b^2)^2*2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 8.16, antiderivative size = 1144, normalized size of antiderivative = 0.99, number of steps used = 11, number of rules used = 9, integrand size = 55, $\frac{\text{number of rules}}{\text{integrand size}} = 0.164$, Rules used = {1673, 1678, 1166, 205, 1663, 1660, 638, 618, 206}

$$\frac{-\frac{lb^4}{c^2}+\frac{jb^3}{c}-\left(3g-\frac{5al}{c}\right)b^2+2(3ce+aj)b+2\left(jb^2-3cgb-3alb+6c^2e+2acj\right)x^2-16a^2l}{4\left(b^2-4ac\right)^2\left(cx^4+bx^2+a\right)}+\frac{\left(\left(\frac{ma^2}{c}+3cd\right)b^3+a\right.}{}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a +
b*x^2 + c*x^4)^3,x]
```

```
[Out] -(b*c*(c*e + a*j) - a*b^2*l - 2*a*c*(c*g - a*l) + (2*c^3*e - c^2*(b*g + 2*a
*j) - b^3*l + b*c*(b*j + 3*a*l))*x^2)/(4*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x
^4)^2) - (x*(a*b*c*(c*f + a*k) - b^2*(c^2*d + a^2*m) + 2*a*c*(c^2*d - a*c*h
 + a^2*m) + (a*b^2*c*k + 2*a*c^2*(c*f - a*k) - a*b^3*m - b*c*(c^2*d + a*c*h
 - 3*a^2*m))*x^2))/(4*a*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + ((b^3*j)
/c + 2*b*(3*c*e + a*j) - 16*a^2*l - (b^4*l)/c^2 - b^2*(3*g - (5*a*l)/c) + 2
*(6*c^2*e - 3*b*c*g + b^2*j + 2*a*c*j - 3*a*b*l)*x^2)/(4*(b^2 - 4*a*c)^2*(a
 + b*x^2 + c*x^4)) + (x*(4*a^2*b*c*(2*c*f + a*k) + a*b^3*(c*f + 2*a*k) - a*
b^2*(25*c^2*d + 7*a*c*h - 11*a^2*m) + 4*a^2*c*(7*c^2*d + a*c*h - 9*a^2*m) +
 b^4*(3*c*d - (2*a^2*m)/c) + (a*b^2*c*(c*f + 3*a*k) + 4*a^2*c^2*(5*c*f + 3*
a*k) + b^3*(3*c^2*d + a^2*m) - 4*a*b*c*(6*c^2*d + 3*a*c*h + 4*a^2*m))*x^2))
```

```
/(8*a^2*c*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + ((a*b^2*(c*f + 3*a*k) + 4*
a^2*c*(5*c*f + 3*a*k) - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*m) + b^3*(3*c*d +
(a^2*m)/c) + (a*b^3*c*(c*f - 3*a*k) - 4*a^2*b*c^2*(13*c*f + 9*a*k) - 6*a*b^
2*c*(5*c^2*d - 3*a*c*h - 3*a^2*m) + b^4*(3*c^2*d - a^2*m) + 8*a^2*c^2*(21*c
^2*d + 3*a*c*h + 5*a^2*m))/(c*Sqrt[b^2 - 4*a*c]))*ArcTan[(Sqrt[2]*Sqrt[c]*x
)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*Sqrt[c]*(b^2 - 4*a*c)^2*Sqrt
[b - Sqrt[b^2 - 4*a*c]]) + ((a*b^2*(c*f + 3*a*k) + 4*a^2*c*(5*c*f + 3*a*k)
- 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*m) + b^3*(3*c*d + (a^2*m)/c) - (a*b^3*c*
(c*f - 3*a*k) - 4*a^2*b*c^2*(13*c*f + 9*a*k) - 6*a*b^2*c*(5*c^2*d - 3*a*c*h
 - 3*a^2*m) + b^4*(3*c^2*d - a^2*m) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2
*m))/(c*Sqrt[b^2 - 4*a*c]))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 -
4*a*c]]])/(8*Sqrt[2]*a^2*Sqrt[c]*(b^2 - 4*a*c)^2*Sqrt[b + Sqrt[b^2 - 4*a*c]
]) - ((6*c^2*e - 3*b*c*g + b^2*j + 2*a*c*j - 3*a*b*l)*ArcTanh[(b + 2*c*x^2)
/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(5/2)
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^
(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
 - 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{\left(a+bx^2+cx^4\right)^3}\,dx = \int \frac{x\left(e+gx^2+jx^4+lx^6\right)}{\left(a+bx^2+cx^4\right)^3}\,dx + \int \frac{d+fx^2+hx^4+\ldots}{\left(a+bx^2+\ldots\right.}$$

$$= -\frac{x\left(abc(cf+ak)-b^2\left(c^2d+a^2m\right)+2ac\left(c^2d-ac\ldots\right.\right.}{4ac^2\ldots}$$

$$= -\frac{bc(ce+aj)-ab^2l-2ac(cg-al)+\left(2c^3e-c^2(bg\ldots\right.}{4c^2\left(b^2-4ac\right)\left(a+bx^2+\ldots\right.}$$

$$= -\frac{bc(ce+aj)-ab^2l-2ac(cg-al)+\left(2c^3e-c^2(bg\ldots\right.}{4c^2\left(b^2-4ac\right)\left(a+bx^2+\ldots\right.}$$

$$= -\frac{bc(ce+aj)-ab^2l-2ac(cg-al)+\left(2c^3e-c^2(bg\ldots\right.}{4c^2\left(b^2-4ac\right)\left(a+bx^2+\ldots\right.}$$

$$= -\frac{bc(ce+aj)-ab^2l-2ac(cg-al)+\left(2c^3e-c^2(bg\ldots\right.}{4c^2\left(b^2-4ac\right)\left(a+bx^2+\ldots\right.}$$

Mathematica [A] time = 7.48, size = 1590, normalized size = 1.38

$$\frac{2cla^3 + 2cmxa^3 - 2c^2kx^3a^2 + 3bcmx^3a^2 - 2c^2jx^2a^2 + 3bclx^2a^2 - 2c^2ga^2 + bcja^2 - b^2la^2 - 2c^2hxa^2 + bckxa^2 - b^2}{4ac^2(}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)
/(a + b*x^2 + c*x^4)^3,x]
```

```
[Out] (a*b*c^2*e - 2*a^2*c^2*g + a^2*b*c*j - a^2*b^2*l + 2*a^3*c*l - b^2*c^2*d*x
+ 2*a*c^3*d*x + a*b*c^2*f*x - 2*a^2*c^2*h*x + a^2*b*c*k*x - a^2*b^2*m*x + 2
*a^3*c*m*x + 2*a*c^3*e*x^2 - a*b*c^2*g*x^2 + a*b^2*c*j*x^2 - 2*a^2*c^2*j*x^
2 - a*b^3*l*x^2 + 3*a^2*b*c*l*x^2 - b*c^3*d*x^3 + 2*a*c^3*f*x^3 - a*b*c^2*h
*x^3 + a*b^2*c*k*x^3 - 2*a^2*c^2*k*x^3 - a*b^3*m*x^3 + 3*a^2*b*c*m*x^3)/(4*
a*c^2*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (12*a^2*b*c^3*e - 6*a^2*b^2*c
^2*g + 2*a^2*b^3*c*j + 4*a^3*b*c^2*j - 2*a^2*b^4*l + 10*a^3*b^2*c*l - 32*a^
4*c^2*l + 3*b^4*c^2*d*x - 25*a*b^2*c^3*d*x + 28*a^2*c^4*d*x + a*b^3*c^2*f*x
 + 8*a^2*b*c^3*f*x - 7*a^2*b^2*c^2*h*x + 4*a^3*c^3*h*x + 2*a^2*b^3*c*k*x +
4*a^3*b*c^2*k*x - 2*a^2*b^4*m*x + 11*a^3*b^2*c*m*x - 36*a^4*c^2*m*x + 24*a^
2*c^4*e*x^2 - 12*a^2*b*c^3*g*x^2 + 4*a^2*b^2*c^2*j*x^2 + 8*a^3*c^3*j*x^2 -
12*a^3*b*c^2*l*x^2 + 3*b^3*c^3*d*x^3 - 24*a*b*c^4*d*x^3 + a*b^2*c^3*f*x^3 +
 20*a^2*c^4*f*x^3 - 12*a^2*b*c^3*h*x^3 + 3*a^2*b^2*c^2*k*x^3 + 12*a^3*c^3*k
*x^3 + a^2*b^3*c*m*x^3 - 16*a^3*b*c^2*m*x^3)/(8*a^2*c^2*(-b^2 + 4*a*c)^2*(a
 + b*x^2 + c*x^4)) + ((3*b^4*c^2*d - 30*a*b^2*c^3*d + 168*a^2*c^4*d + 3*b^3
*c^2*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c^3*Sqrt[b^2 - 4*a*c]*d + a*b^3*c^2*f - 5
2*a^2*b*c^3*f + a*b^2*c^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c^3*Sqrt[b^2 - 4*a*c
]*f + 18*a^2*b^2*c^2*h + 24*a^3*c^3*h - 12*a^2*b*c^2*Sqrt[b^2 - 4*a*c]*h -
3*a^2*b^3*c*k - 36*a^3*b*c^2*k + 3*a^2*b^2*c*Sqrt[b^2 - 4*a*c]*k + 12*a^3*c
^2*Sqrt[b^2 - 4*a*c]*k - a^2*b^4*m + 18*a^3*b^2*c*m + 40*a^4*c^2*m + a^2*b^
3*Sqrt[b^2 - 4*a*c]*m - 16*a^3*b*c*Sqrt[b^2 - 4*a*c]*m)*ArcTan[(Sqrt[2]*Sqr
t[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*c^(3/2)*(b^2 - 4*a*c)^
(5/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((-3*b^4*c^2*d + 30*a*b^2*c^3*d - 168*
a^2*c^4*d + 3*b^3*c^2*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c^3*Sqrt[b^2 - 4*a*c]*d
- a*b^3*c^2*f + 52*a^2*b*c^3*f + a*b^2*c^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c^3
*Sqrt[b^2 - 4*a*c]*f - 18*a^2*b^2*c^2*h - 24*a^3*c^3*h - 12*a^2*b*c^2*Sqrt[
b^2 - 4*a*c]*h + 3*a^2*b^3*c*k + 36*a^3*b*c^2*k + 3*a^2*b^2*c*Sqrt[b^2 - 4*
a*c]*k + 12*a^3*c^2*Sqrt[b^2 - 4*a*c]*k + a^2*b^4*m - 18*a^3*b^2*c*m - 40*a
^4*c^2*m + a^2*b^3*Sqrt[b^2 - 4*a*c]*m - 16*a^3*b*c*Sqrt[b^2 - 4*a*c]*m)*Ar
cTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*c^(3/
2)*(b^2 - 4*a*c)^(5/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((6*c^2*e - 3*b*c*g +
 b^2*j + 2*a*c*j - 3*a*b*l)*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(2*(b^2
- 4*a*c)^(5/2)) + ((-6*c^2*e + 3*b*c*g - b^2*j - 2*a*c*j + 3*a*b*l)*Log[b +
 Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2))
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)
^3,x, algorithm="fricas")
```

```
[Out] Timed out
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)
^3,x, algorithm="giac")
```

```
[Out] Timed out
```

maple [B] time = 0.12, size = 6026, normalized size = 5.24

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x)
```

```
[Out] result too large to display
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)
^3,x, algorithm="maxima")
```

```
[Out] -1/8*((12*a^2*b*c^3*h - 3*(b^3*c^3 - 8*a*b*c^4)*d - (a*b^2*c^3 + 20*a^2*c^4
)*f - 3*(a^2*b^2*c^2 + 4*a^3*c^3)*k - (a^2*b^3*c - 16*a^3*b*c^2)*m)*x^7 - 1
2*a^4*b*c*j - 4*(6*a^2*c^4*e - 3*a^2*b*c^3*g - 3*a^3*b*c^2*l + (a^2*b^2*c^2
 + 2*a^3*c^3)*j)*x^6 - ((6*b^4*c^2 - 49*a*b^2*c^3 + 28*a^2*c^4)*d + 2*(a*b^
3*c^2 + 14*a^2*b*c^3)*f - (19*a^2*b^2*c^2 - 4*a^3*c^3)*h + (5*a^2*b^3*c + 1
6*a^3*b*c^2)*k - (a^2*b^4 + 5*a^3*b^2*c + 36*a^4*c^2)*m)*x^5 - 2*(18*a^2*b*
c^3*e - 9*a^2*b^2*c^2*g + 3*(a^2*b^3*c + 2*a^3*b*c^2)*j - (a^2*b^4 + a^3*b^
2*c + 16*a^4*c^2)*l)*x^4 - ((3*b^5*c - 20*a*b^3*c^2 - 4*a^2*b*c^3)*d + (a*b
^4*c + 5*a^2*b^2*c^2 + 36*a^3*c^3)*f - (5*a^2*b^3*c + 16*a^3*b*c^2)*h + (19
*a^3*b^2*c - 4*a^4*c^2)*k - 2*(a^3*b^3 + 14*a^4*b*c)*m)*x^3 - 4*(2*(a^2*b^2
*c^2 + 5*a^3*c^3)*e - (a^2*b^3*c + 5*a^3*b*c^2)*g + (5*a^3*b^2*c - 2*a^4*c^
2)*j - (a^3*b^3 + 5*a^4*b*c)*l)*x^2 + 2*(a^2*b^3*c - 10*a^3*b*c^2)*e + 2*(a
^3*b^2*c + 8*a^4*c^2)*g + 2*(a^4*b^2 + 8*a^5*c)*l - (12*a^4*b*c*k + (5*a*b^
4*c - 37*a^2*b^2*c^2 + 44*a^3*c^3)*d - (a^2*b^3*c - 16*a^3*b*c^2)*f - 3*(a^
3*b^2*c + 4*a^4*c^2)*h - (a^4*b^2 + 20*a^5*c)*m)*x)/(a^4*b^4*c - 8*a^5*b^2*
c^2 + 16*a^6*c^3 + (a^2*b^4*c^3 - 8*a^3*b^2*c^4 + 16*a^4*c^5)*x^8 + 2*(a^2*
b^5*c^2 - 8*a^3*b^3*c^3 + 16*a^4*b*c^4)*x^6 + (a^2*b^6*c - 6*a^3*b^4*c^2 +
32*a^5*c^4)*x^4 + 2*(a^3*b^5*c - 8*a^4*b^3*c^2 + 16*a^5*b*c^3)*x^2) - 1/8*i
ntegrate((12*a^3*b*c*k + (12*a^2*b*c^2*h - 3*(b^3*c^2 - 8*a*b*c^3)*d - (a*b
^2*c^2 + 20*a^2*c^3)*f - 3*(a^2*b^2*c + 4*a^3*c^2)*k - (a^2*b^3 - 16*a^3*b*
c)*m)*x^2 - 3*(b^4*c - 9*a*b^2*c^2 + 28*a^2*c^3)*d - (a*b^3*c - 16*a^2*b*c^
2)*f - 3*(a^2*b^2*c + 4*a^3*c^2)*h - (a^3*b^2 + 20*a^4*c)*m - 8*(6*a^2*c^3*
e - 3*a^2*b*c^2*g - 3*a^3*b*c*l + (a^2*b^2*c + 2*a^3*c^2)*j)*x)/(c*x^4 + b*
x^2 + a), x)/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)
```

mupad [B] time = 20.57, size = 114377, normalized size = 99.46

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a +
b*x^2 + c*x^4)^3,x)
```

```
[Out] symsum(log(root(56371445760*a^11*b^8*c^9*z^4 - 503316480*a^8*b^14*c^6*z^4 +
 47185920*a^7*b^16*c^5*z^4 - 2621440*a^6*b^18*c^4*z^4 + 65536*a^5*b^20*c^3*
z^4 - 171798691840*a^14*b^2*c^12*z^4 + 193273528320*a^13*b^4*c^11*z^4 - 128
```

849018880*a^12*b^6*c^10*z^4 - 16911433728*a^10*b^10*c^8*z^4 + 3523215360*a^9*b^12*c^7*z^4 + 68719476736*a^15*c^13*z^4 + 1536*a^5*b^16*c*k*m*z^2 + 1536*a*b^18*c^3*d*f*z^2 - 2571632640*a^9*b^5*c^8*d*m*z^2 + 2548039680*a^9*b^3*c^10*d*h*z^2 + 1509949440*a^10*b^3*c^9*e*l*z^2 + 1509949440*a^9*b^3*c^10*e*g*z^2 - 1401421824*a^8*b^5*c^9*d*h*z^2 - 1321205760*a^9*b^2*c^11*d*f*z^2 - 2793406464*a^11*b*c^10*d*m*z^2 + 890634240*a^8*b^7*c^7*d*m*z^2 - 754974720*a^10*b^4*c^8*g*l*z^2 - 754974720*a^9*b^5*c^8*e*l*z^2 + 719585280*a^8*b^6*c^8*d*k*z^2 - 707788800*a^9*b^4*c^9*d*k*z^2 - 754974720*a^8*b^5*c^9*e*g*z^2 + 603979776*a^11*b^2*c^9*g*l*z^2 - 581959680*a^10*b^4*c^8*f*m*z^2 + 732168192*a^7*b^6*c^9*d*f*z^2 + 534773760*a^11*b^3*c^8*h*m*z^2 - 456130560*a^11*b^4*c^7*k*m*z^2 - 603979776*a^10*b^2*c^10*e*j*z^2 + 534773760*a^10*b^3*c^9*f*k*z^2 + 384040960*a^9*b^6*c^7*f*m*z^2 + 377487360*a^9*b^6*c^7*g*l*z^2 - 456130560*a^9*b^4*c^9*f*h*z^2 + 301989888*a^11*b^3*c^8*j*l*z^2 - 415236096*a^10*b^2*c^10*d*k*z^2 + 254017536*a^10*b^6*c^6*k*m*z^2 - 330301440*a^10*b^4*c^8*h*k*z^2 + 390463488*a^7*b^7*c^8*d*h*z^2 + 188743680*a^12*b^2*c^8*k*m*z^2 + 301989888*a^10*b^3*c^9*g*j*z^2 - 297861120*a^7*b^8*c^7*d*k*z^2 - 366280704*a^6*b^8*c^8*d*f*z^2 + 188743680*a^11*b^2*c^9*h*k*z^2 - 330301440*a^8*b^4*c^10*d*f*z^2 + 254017536*a^8*b^6*c^8*f*h*z^2 - 1887436800*a^10*b*c^11*d*h*z^2 + 188743680*a^8*b^7*c^7*e*l*z^2 + 153354240*a^9*b^6*c^7*h*k*z^2 - 185303040*a^7*b^9*c^6*d*m*z^2 - 117964800*a^10*b^5*c^7*h*m*z^2 - 61931520*a^9*b^8*c^5*k*m*z^2 + 121634816*a^11*b^2*c^9*f*m*z^2 - 115671040*a^8*b^8*c^6*f*m*z^2 - 62914560*a^9*b^7*c^6*j*l*z^2 + 188743680*a^10*b^2*c^10*f*h*z^2 - 94371840*a^8*b^8*c^6*g*l*z^2 + 6144000*a^8*b^10*c^4*k*m*z^2 - 117964800*a^9*b^5*c^8*f*k*z^2 + 61440*a^7*b^12*c^3*k*m*z^2 - 46080*a^6*b^14*c^2*k*m*z^2 + 23592960*a^8*b^9*c^5*j*l*z^2 + 188743680*a^7*b^7*c^8*e*g*z^2 - 37355520*a^9*b^7*c^6*h*m*z^2 + 125829120*a^8*b^6*c^8*e*j*z^2 + 23101440*a^8*b^9*c^5*h*m*z^2 - 3538944*a^7*b^11*c^4*j*l*z^2 + 196608*a^6*b^13*c^3*j*l*z^2 - 4349952*a^7*b^11*c^4*h*m*z^2 + 337920*a^6*b^13*c^3*h*m*z^2 - 7680*a^5*b^15*c^2*h*m*z^2 - 62914560*a^8*b^7*c^7*g*j*z^2 - 26542080*a^8*b^8*c^6*h*k*z^2 + 17940480*a^7*b^10*c^5*f*m*z^2 + 11796480*a^7*b^10*c^5*g*l*z^2 - 37355520*a^8*b^7*c^7*f*k*z^2 - 1347584*a^6*b^12*c^4*f*m*z^2 + 68272128*a^6*b^10*c^6*d*k*z^2 - 589824*a^6*b^12*c^4*g*l*z^2 + 552960*a^6*b^12*c^4*h*k*z^2 - 147456*a^7*b^10*c^5*h*k*z^2 - 46080*a^5*b^14*c^3*h*k*z^2 + 35840*a^5*b^14*c^3*f*m*z^2 + 23592960*a^7*b^9*c^6*g*j*z^2 - 23592960*a^7*b^9*c^6*e*l*z^2 + 23371776*a^6*b^11*c^5*d*m*z^2 + 23101440*a^7*b^9*c^6*f*k*z^2 - 47185920*a^7*b^8*c^7*e*j*z^2 - 61931520*a^7*b^8*c^7*f*h*z^2 - 4349952*a^6*b^11*c^5*f*k*z^2 - 3538944*a^6*b^11*c^5*g*j*z^2 - 1677312*a^5*b^13*c^4*d*m*z^2 + 1179648*a^6*b^11*c^5*e*l*z^2 + 337920*a^5*b^13*c^4*f*k*z^2 + 196608*a^5*b^13*c^4*g*j*z^2 + 53760*a^4*b^15*c^3*d*m*z^2 - 7680*a^4*b^15*c^3*f*k*z^2 + 96583680*a^5*b^10*c^7*d*f*z^2 - 9179136*a^5*b^12*c^5*d*k*z^2 + 7077888*a^6*b^10*c^6*e*j*z^2 - 51609600*a^6*b^9*c^7*d*h*z^2 + 691200*a^4*b^14*c^4*d*k*z^2 - 393216*a^5*b^12*c^5*e*j*z^2 - 23040*a^3*b^16*c^3*d*k*z^2 + 6144000*a^6*b^10*c^6*f*h*z^2 + 61440*a^5*b^12*c^5*f*h*z^2 - 46080*a^4*b^14*c^4*f*h*z^2 + 1536*a^3*b^16*c^3*f*h*z^2 - 23592960*a^6*b^9*c^7*e*g*z^2 + 1179648*a^5*b^11*c^6*e*g*z^2 + 829440*a^4*b^13*c^5*d*h*z^2 + 368640*a^5*b^11*c^6*d*h*z^2 - 105984*a^3*b^15*c^4*d*h*z^2 + 4608*a^2*b^17*c^3*d*h*z^2 - 15175680*a^4*b^12*c^6*d*f*z^2 + 1428480*a^3*b^14*c^5*d*f*z^2 - 73728*a^2*b^16*c^4*d*f*z^2 + 4108320768*a^10*b^3*c^9*d*m*z^2 - 1207959552*a^11*b*c^10*e*l*z^2 - 1207959552*a^10*b*c^11*e*g*z^2 - 578813952*a^12*b*c^9*h*m*z^2 - 578813952*a^11*b*c^10*f*k*z^2 - 402653184*a^12*b*c^9*j*l*z^2 - 402653184*a^11*b*c^10*g*j*z^2 - 440401920*a^10*b*c^11*f^2*z^2 - 188743680*a^12*b*c^9*k^2*z^2 - 188743680*a^11*b*c^10*h^2*z^2 + 1761607680*a^10*c^12*d*f*z^2 - 14080*a^6*b^15*c*m^2*z^2 - 94464*a*b^17*c^4*d^2*z^2 + 6936330240*a^8*b^3*c^11*d^2*z^2 + 2464874496*a^6*b^7*c^9*d^2*z^2 - 3963617280*a^9*b*c^12*d^2*z^2 + 1056964608*a^11*c^11*d*k*z^2 + 805306368*a^11*c^11*e*j*z^2 + 419430400*a^12*c^10*f*m*z^2 + 251658240*a^13*c^9*k*m*z^2 - 1509949440*a^9*b^2*c^11*e^2*z^2 + 251658240*a^11*c^11*f*h*z^2 + 150994944*a^12*c^10*h*k*z^2 - 5400428544*a^7*b^5*c^10*d^2*z^2 + 754974720*a^8*b^4*c^10*e^2*z^2 - 730054656*a^5*b^9*c^8*d^2*z^2 + 477102080*a^12*b^3*c^7*m^2*z^2 - 377487360*a^11*b^4*c^7*l^2*z^2 + 477102080*a^9*b^3*c^10*f^2*z^2 + 3019898

88*a^12*b^2*c^8*l^2*z^2 - 377487360*a^9*b^4*c^9*g^2*z^2 + 301989888*a^10*b^
2*c^10*g^2*z^2 - 174325760*a^11*b^5*c^6*m^2*z^2 + 188743680*a^10*b^6*c^6*l^
2*z^2 + 141557760*a^11*b^3*c^8*k^2*z^2 + 188743680*a^8*b^6*c^8*g^2*z^2 + 14
1557760*a^10*b^3*c^9*h^2*z^2 - 174325760*a^8*b^5*c^9*f^2*z^2 - 188743680*a^
7*b^6*c^9*e^2*z^2 - 47185920*a^9*b^8*c^5*l^2*z^2 + 11206656*a^10*b^7*c^5*m^
2*z^2 + 8929280*a^9*b^9*c^4*m^2*z^2 - 2600960*a^8*b^11*c^3*m^2*z^2 + 291840
*a^7*b^13*c^2*m^2*z^2 - 50331648*a^10*b^4*c^8*j^2*z^2 + 146165760*a^4*b^11*
c^7*d^2*z^2 - 26542080*a^9*b^7*c^6*k^2*z^2 + 5898240*a^8*b^10*c^4*l^2*z^2 -
294912*a^7*b^12*c^3*l^2*z^2 - 33554432*a^11*b^2*c^9*j^2*z^2 + 9584640*a^8*
b^9*c^5*k^2*z^2 + 20971520*a^9*b^6*c^7*j^2*z^2 - 2359296*a^10*b^5*c^7*k^2*z
^2 - 1290240*a^7*b^11*c^4*k^2*z^2 + 46080*a^6*b^13*c^3*k^2*z^2 + 2304*a^5*b
^15*c^2*k^2*z^2 - 2752512*a^7*b^10*c^5*j^2*z^2 + 2621440*a^8*b^8*c^6*j^2*z^
2 + 524288*a^6*b^12*c^4*j^2*z^2 - 32768*a^5*b^14*c^3*j^2*z^2 - 47185920*a^7
*b^8*c^7*g^2*z^2 - 26542080*a^8*b^7*c^7*h^2*z^2 + 9584640*a^7*b^9*c^6*h^2*z
^2 - 2359296*a^9*b^5*c^8*h^2*z^2 - 1290240*a^6*b^11*c^5*h^2*z^2 + 46080*a^5
*b^13*c^4*h^2*z^2 + 2304*a^4*b^15*c^3*h^2*z^2 + 5898240*a^6*b^10*c^6*g^2*z^
2 - 294912*a^5*b^12*c^5*g^2*z^2 + 11206656*a^7*b^7*c^8*f^2*z^2 + 8929280*a^
6*b^9*c^7*f^2*z^2 + 23592960*a^6*b^8*c^8*e^2*z^2 - 2600960*a^5*b^11*c^6*f^2
*z^2 + 291840*a^4*b^13*c^5*f^2*z^2 - 14080*a^3*b^15*c^4*f^2*z^2 + 256*a^2*b
^17*c^3*f^2*z^2 - 19860480*a^3*b^13*c^6*d^2*z^2 - 1179648*a^5*b^10*c^7*e^2*
z^2 + 1771776*a^2*b^15*c^5*d^2*z^2 - 440401920*a^13*b*c^8*m^2*z^2 + 1207959
552*a^10*c^12*e^2*z^2 + 134217728*a^12*c^10*j^2*z^2 + 256*a^5*b^17*m^2*z^2
+ 2304*b^19*c^3*d^2*z^2 - 23592960*a^10*b*c^8*f*k*l*z + 99090432*a^9*b*c^9*
d*h*l*z + 9437184*a^10*b*c^8*e*k*m*z + 23592960*a^10*b*c^8*g*h*m*z + 141557
760*a^8*b*c^10*d*e*k*z + 47185920*a^9*b*c^9*d*j*k*z - 23592960*a^9*b*c^9*f*
g*k*z + 169869312*a^7*b*c^11*d*e*f*z + 99090432*a^8*b*c^10*d*g*h*z - 314572
8*a^9*b*c^9*f*h*j*z + 56623104*a^8*b*c^10*d*f*j*z + 1536*a*b^15*c^3*d*f*j*z
- 9437184*a^8*b*c^10*e*f*h*z - 4608*a*b^14*c^4*d*f*g*z + 9216*a*b^13*c^5*d
*e*f*z + 412876800*a^8*b^2*c^9*d*e*m*z - 206438400*a^9*b^3*c^7*d*l*m*z + 58
98240*a^10*b^4*c^5*k*l*m*z - 206438400*a^8*b^3*c^8*d*g*m*z - 4718592*a^11*b
^2*c^6*k*l*m*z - 2949120*a^9*b^6*c^4*k*l*m*z + 737280*a^8*b^8*c^3*k*l*m*z -
92160*a^7*b^10*c^2*k*l*m*z + 103219200*a^8*b^5*c^6*d*l*m*z - 29491200*a^10
*b^3*c^6*h*l*m*z - 206438400*a^7*b^4*c^8*d*e*m*z - 2359296*a^10*b^3*c^6*j*k
*m*z + 491520*a^8*b^7*c^4*j*k*m*z - 184320*a^7*b^9*c^3*j*k*m*z + 27648*a^6*
b^11*c^2*j*k*m*z + 14745600*a^9*b^5*c^5*h*l*m*z - 3686400*a^8*b^7*c^4*h*l*m
*z + 460800*a^7*b^9*c^3*h*l*m*z - 23040*a^6*b^11*c^2*h*l*m*z + 88473600*a^8
*b^4*c^7*d*k*l*z + 82575360*a^9*b^2*c^8*d*j*m*z + 11796480*a^10*b^2*c^7*h*j
*m*z + 5898240*a^9*b^4*c^6*g*k*m*z - 4718592*a^10*b^2*c^7*g*k*m*z - 7077888
0*a^9*b^2*c^8*d*k*l*z - 2949120*a^8*b^6*c^5*g*k*m*z - 2457600*a^8*b^6*c^5*h
*j*m*z + 921600*a^7*b^8*c^4*h*j*m*z + 737280*a^7*b^8*c^4*g*k*m*z - 138240*a
^6*b^10*c^3*h*j*m*z - 92160*a^6*b^10*c^3*g*k*m*z + 7680*a^5*b^12*c^2*h*j*m*
z + 4608*a^5*b^12*c^2*g*k*m*z + 29491200*a^9*b^3*c^7*f*k*l*z - 176947200*a^
7*b^3*c^9*d*e*k*z - 109707264*a^8*b^3*c^8*d*h*l*z - 25804800*a^7*b^7*c^5*d*
l*m*z + 103219200*a^7*b^5*c^7*d*g*m*z + 219414528*a^7*b^2*c^10*d*e*h*z - 14
745600*a^8*b^5*c^6*f*k*l*z - 29491200*a^9*b^3*c^7*g*h*m*z - 11796480*a^9*b^
3*c^7*e*k*m*z - 44236800*a^7*b^6*c^6*d*k*l*z + 58982400*a^9*b^2*c^8*e*h*m*z
+ 5898240*a^8*b^5*c^6*e*k*m*z + 3686400*a^7*b^7*c^5*f*k*l*z + 3225600*a^6*
b^9*c^4*d*l*m*z - 1474560*a^7*b^7*c^5*e*k*m*z - 460800*a^6*b^9*c^4*f*k*l*z
+ 184320*a^6*b^9*c^4*e*k*m*z - 161280*a^5*b^11*c^3*d*l*m*z + 23040*a^5*b^11
*c^3*f*k*l*z - 9216*a^5*b^11*c^3*e*k*m*z + 14745600*a^8*b^5*c^6*g*h*m*z + 1
10886912*a^7*b^4*c^8*d*f*l*z - 3686400*a^7*b^7*c^5*g*h*m*z - 221773824*a^6*
b^3*c^10*d*e*f*z + 460800*a^6*b^9*c^4*g*h*m*z - 17203200*a^7*b^6*c^6*d*j*m*
z - 23040*a^5*b^11*c^3*g*h*m*z - 29491200*a^8*b^4*c^7*e*h*m*z - 11796480*a^
9*b^2*c^8*f*j*k*z + 11059200*a^6*b^8*c^5*d*k*l*z + 6451200*a^6*b^8*c^5*d*j*
m*z + 88473600*a^7*b^4*c^8*d*g*k*z + 2457600*a^7*b^6*c^6*f*j*k*z - 35389440
*a^8*b^3*c^8*d*j*k*z - 1382400*a^5*b^10*c^4*d*k*l*z - 84934656*a^8*b^2*c^9*
d*f*l*z - 967680*a^5*b^10*c^4*d*j*m*z - 921600*a^6*b^8*c^5*f*j*k*z + 138240
*a^5*b^10*c^4*f*j*k*z + 69120*a^4*b^12*c^3*d*k*l*z + 53760*a^4*b^12*c^3*d*j
*m*z - 7680*a^4*b^12*c^3*f*j*k*z + 44236800*a^7*b^5*c^7*d*h*l*z + 7372800*a

^7*b^6*c^6*e*h*m*z - 5898240*a^8*b^4*c^7*f*h*l*z + 4718592*a^9*b^2*c^8*f*h*
l*z - 70778880*a^8*b^2*c^9*d*g*k*z + 2949120*a^7*b^6*c^6*f*h*l*z - 921600*a
^6*b^8*c^5*e*h*m*z - 737280*a^6*b^8*c^5*f*h*l*z + 92160*a^5*b^10*c^4*f*h*l*
z + 46080*a^5*b^10*c^4*e*h*m*z - 4608*a^4*b^12*c^3*f*h*l*z + 29491200*a^8*b
^3*c^8*f*g*k*z - 109707264*a^7*b^3*c^9*d*g*h*z - 25804800*a^6*b^7*c^6*d*g*m
*z - 58982400*a^8*b^2*c^9*e*f*k*z - 58982400*a^6*b^6*c^7*d*f*l*z + 7372800*
a^6*b^7*c^6*d*j*k*z + 88473600*a^6*b^5*c^8*d*e*k*z - 2764800*a^5*b^9*c^5*d*
j*k*z + 51609600*a^6*b^6*c^7*d*e*m*z + 414720*a^4*b^11*c^4*d*j*k*z - 23040*
a^3*b^13*c^3*d*j*k*z - 14745600*a^7*b^5*c^7*f*g*k*z - 44236800*a^6*b^6*c^7*
d*g*k*z - 6635520*a^6*b^7*c^6*d*h*l*z + 40108032*a^8*b^2*c^9*d*h*j*z + 3686
400*a^6*b^7*c^6*f*g*k*z + 3225600*a^5*b^9*c^5*d*g*m*z + 2359296*a^8*b^3*c^8
*f*h*j*z - 491520*a^6*b^7*c^6*f*h*j*z - 460800*a^5*b^9*c^5*f*g*k*z - 276480
*a^5*b^9*c^5*d*h*l*z + 184320*a^5*b^9*c^5*f*h*j*z + 179712*a^4*b^11*c^4*d*h
*l*z - 161280*a^4*b^11*c^4*d*g*m*z - 27648*a^4*b^11*c^4*f*h*j*z + 23040*a^4
*b^11*c^4*f*g*k*z - 13824*a^3*b^13*c^3*d*h*l*z + 1536*a^3*b^13*c^3*f*h*j*z
+ 29491200*a^7*b^4*c^8*e*f*k*z + 110886912*a^6*b^4*c^9*d*f*g*z + 16220160*a
^5*b^8*c^6*d*f*l*z - 45613056*a^7*b^3*c^9*d*f*j*z + 11059200*a^5*b^8*c^6*d*
g*k*z - 10321920*a^6*b^6*c^7*d*h*j*z - 7372800*a^6*b^6*c^7*e*f*k*z + 707788
8*a^7*b^4*c^8*d*h*j*z - 6451200*a^5*b^8*c^6*d*e*m*z - 88473600*a^6*b^4*c^9*
d*e*h*z + 2396160*a^5*b^8*c^6*d*h*j*z - 2396160*a^4*b^10*c^5*d*f*l*z - 1382
400*a^4*b^10*c^5*d*g*k*z - 84934656*a^7*b^2*c^10*d*f*g*z + 921600*a^5*b^8*c
^6*e*f*k*z + 117964800*a^5*b^5*c^9*d*e*f*z + 322560*a^4*b^10*c^5*d*e*m*z +
175104*a^3*b^12*c^4*d*f*l*z + 69120*a^3*b^12*c^4*d*g*k*z - 50688*a^3*b^12*c
^4*d*h*j*z - 46080*a^4*b^10*c^5*e*f*k*z - 27648*a^4*b^10*c^5*d*h*j*z + 4608
*a^2*b^14*c^3*d*h*j*z - 4608*a^2*b^14*c^3*d*f*l*z + 44236800*a^6*b^5*c^8*d*
g*h*z - 5898240*a^7*b^4*c^8*f*g*h*z - 22118400*a^5*b^7*c^7*d*e*k*z + 471859
2*a^8*b^2*c^9*f*g*h*z + 2949120*a^6*b^6*c^7*f*g*h*z - 737280*a^5*b^8*c^6*f*
g*h*z + 92160*a^4*b^10*c^5*f*g*h*z - 4608*a^3*b^12*c^4*f*g*h*z + 8847360*a^
5*b^7*c^7*d*f*j*z - 58982400*a^5*b^6*c^8*d*f*g*z - 3809280*a^4*b^9*c^6*d*f*
j*z + 2764800*a^4*b^9*c^6*d*e*k*z + 2359296*a^6*b^5*c^8*d*f*j*z + 681984*a^
3*b^11*c^5*d*f*j*z - 138240*a^3*b^11*c^5*d*e*k*z - 55296*a^2*b^13*c^4*d*f*j
*z + 11796480*a^7*b^3*c^9*e*f*h*z - 6635520*a^5*b^7*c^7*d*g*h*z - 5898240*a
^6*b^5*c^8*e*f*h*z + 1474560*a^5*b^7*c^7*e*f*h*z - 276480*a^4*b^9*c^6*d*g*h
*z - 184320*a^4*b^9*c^6*e*f*h*z + 179712*a^3*b^11*c^5*d*g*h*z - 13824*a^2*b
^13*c^4*d*g*h*z + 9216*a^3*b^11*c^5*e*f*h*z + 16220160*a^4*b^8*c^7*d*f*g*z
+ 13271040*a^5*b^6*c^8*d*e*h*z - 2396160*a^3*b^10*c^6*d*f*g*z + 552960*a^4*
b^8*c^7*d*e*h*z - 359424*a^3*b^10*c^6*d*e*h*z + 175104*a^2*b^12*c^5*d*f*g*z
+ 27648*a^2*b^12*c^5*d*e*h*z - 32440320*a^4*b^7*c^8*d*e*f*z + 4792320*a^3*
b^9*c^7*d*e*f*z - 350208*a^2*b^11*c^6*d*e*f*z + 165150720*a^10*b*c^8*d*l*m*
z + 4608*a^6*b^12*c*k*l*m*z + 23592960*a^11*b*c^7*h*l*m*z + 3145728*a^11*b*
c^7*j*k*m*z - 1536*a^5*b^13*c*j*k*m*z + 165150720*a^9*b*c^9*d*g*m*z + 34681
6512*a^7*b*c^11*d^2*g*z + 19660800*a^12*b*c^6*l*m^2*z - 34560*a^7*b^11*c*l*
m^2*z - 7077888*a^11*b*c^7*k^2*l*z + 11008*a^6*b^12*c*j*m^2*z + 19660800*a^
11*b*c^7*g*m^2*z + 7077888*a^10*b*c^8*h^2*l*z + 768*a^5*b^13*c*g*m^2*z - 19
660800*a^9*b*c^9*f^2*l*z - 7077888*a^10*b*c^8*g*k^2*z - 6912*a*b^15*c^3*d^2
*l*z + 7077888*a^9*b*c^9*g*h^2*z - 19660800*a^8*b*c^10*f^2*g*z - 66816*a*b^
14*c^4*d^2*j*z + 214272*a*b^13*c^5*d^2*g*z - 428544*a*b^12*c^6*d^2*e*z - 33
0301440*a^9*c^10*d*e*m*z - 110100480*a^10*c^9*d*j*m*z - 15728640*a^11*c^8*h
*j*m*z - 47185920*a^10*c^9*e*h*m*z - 198180864*a^8*c^11*d*e*h*z + 15728640*
a^10*c^9*f*j*k*z - 66060288*a^9*c^10*d*h*j*z + 47185920*a^9*c^10*e*f*k*z +
1022754816*a^6*b^2*c^11*d^2*e*z - 642318336*a^5*b^4*c^10*d^2*e*z - 51137740
8*a^7*b^3*c^9*d^2*l*z - 511377408*a^6*b^3*c^10*d^2*g*z + 321159168*a^6*b^5*
c^8*d^2*l*z + 321159168*a^5*b^5*c^9*d^2*g*z + 225312768*a^7*b^2*c^10*d^2*j*
z - 25362432*a^11*b^3*c^5*l*m^2*z + 13271040*a^10*b^5*c^4*l*m^2*z - 3563520
*a^9*b^7*c^3*l*m^2*z + 506880*a^8*b^9*c^2*l*m^2*z + 10354688*a^11*b^2*c^6*j
*m^2*z + 8847360*a^10*b^3*c^6*k^2*l*z - 4423680*a^9*b^5*c^5*k^2*l*z - 20480
00*a^9*b^6*c^4*j*m^2*z + 1105920*a^8*b^7*c^4*k^2*l*z + 849920*a^8*b^8*c^3*j
*m^2*z - 393216*a^10*b^4*c^5*j*m^2*z - 145920*a^7*b^10*c^2*j*m^2*z - 138240
*a^7*b^9*c^3*k^2*l*z + 6912*a^6*b^11*c^2*k^2*l*z - 111697920*a^5*b^7*c^7*d^

2*l*z + 223395840*a^4*b^6*c^9*d^2*e*z - 25362432*a^10*b^3*c^6*g*m^2*z - 353
8944*a^10*b^2*c^7*j*k^2*z + 737280*a^8*b^6*c^5*j*k^2*z + 50724864*a^10*b^2*
c^7*e*m^2*z - 276480*a^7*b^8*c^4*j*k^2*z + 41472*a^6*b^10*c^3*j*k^2*z - 230
4*a^5*b^12*c^2*j*k^2*z + 13271040*a^9*b^5*c^5*g*m^2*z - 8847360*a^9*b^3*c^7
*h^2*l*z + 4423680*a^8*b^5*c^6*h^2*l*z - 3563520*a^8*b^7*c^4*g*m^2*z - 1105
920*a^7*b^7*c^5*h^2*l*z + 506880*a^7*b^9*c^3*g*m^2*z + 138240*a^6*b^9*c^4*h
^2*l*z - 34560*a^6*b^11*c^2*g*m^2*z - 6912*a^5*b^11*c^3*h^2*l*z - 26542080*
a^9*b^4*c^6*e*m^2*z + 25362432*a^8*b^3*c^8*f^2*l*z - 13271040*a^7*b^5*c^7*f
^2*l*z + 8847360*a^9*b^3*c^7*g*k^2*z + 7127040*a^8*b^6*c^5*e*m^2*z - 442368
0*a^8*b^5*c^6*g*k^2*z + 3563520*a^6*b^7*c^6*f^2*l*z + 3538944*a^9*b^2*c^8*h
^2*j*z + 1105920*a^7*b^7*c^5*g*k^2*z - 1013760*a^7*b^8*c^4*e*m^2*z - 737280
*a^7*b^6*c^6*h^2*j*z - 506880*a^5*b^9*c^5*f^2*l*z + 276480*a^6*b^8*c^5*h^2*
j*z - 138240*a^6*b^9*c^4*g*k^2*z + 69120*a^6*b^10*c^3*e*m^2*z - 41472*a^5*b
^10*c^4*h^2*j*z + 34560*a^4*b^11*c^4*f^2*l*z + 6912*a^5*b^11*c^3*g*k^2*z +
2304*a^4*b^12*c^3*h^2*j*z - 1536*a^5*b^12*c^2*e*m^2*z - 768*a^3*b^13*c^3*f^
2*l*z - 111697920*a^4*b^7*c^8*d^2*g*z + 23362560*a^4*b^9*c^6*d^2*l*z - 1769
4720*a^9*b^2*c^8*e*k^2*z - 10354688*a^8*b^2*c^9*f^2*j*z - 43646976*a^6*b^4*
c^9*d^2*j*z + 8847360*a^8*b^4*c^7*e*k^2*z - 2965248*a^3*b^11*c^5*d^2*l*z -
2211840*a^7*b^6*c^6*e*k^2*z + 2048000*a^6*b^6*c^7*f^2*j*z - 849920*a^5*b^8*
c^6*f^2*j*z + 393216*a^7*b^4*c^8*f^2*j*z + 276480*a^6*b^8*c^5*e*k^2*z + 214
272*a^2*b^13*c^4*d^2*l*z + 145920*a^4*b^10*c^5*f^2*j*z - 13824*a^5*b^10*c^4
*e*k^2*z - 11008*a^3*b^12*c^4*f^2*j*z + 256*a^2*b^14*c^3*f^2*j*z - 32587776
*a^5*b^6*c^8*d^2*j*z - 8847360*a^8*b^3*c^8*g*h^2*z + 21657600*a^4*b^8*c^7*d
^2*j*z + 4423680*a^7*b^5*c^7*g*h^2*z - 1105920*a^6*b^7*c^6*g*h^2*z + 138240
*a^5*b^9*c^5*g*h^2*z - 6912*a^4*b^11*c^4*g*h^2*z + 25362432*a^7*b^3*c^9*f^2
*g*z - 5810688*a^3*b^10*c^6*d^2*j*z + 17694720*a^8*b^2*c^9*e*h^2*z + 845568
*a^2*b^12*c^5*d^2*j*z - 50724864*a^7*b^2*c^10*e*f^2*z - 13271040*a^6*b^5*c^
8*f^2*g*z - 8847360*a^7*b^4*c^8*e*h^2*z + 3563520*a^5*b^7*c^7*f^2*g*z + 221
1840*a^6*b^6*c^7*e*h^2*z - 506880*a^4*b^9*c^6*f^2*g*z - 276480*a^5*b^8*c^6*
e*h^2*z + 34560*a^3*b^11*c^5*f^2*g*z + 13824*a^4*b^10*c^5*e*h^2*z - 768*a^2
*b^13*c^4*f^2*g*z + 26542080*a^6*b^4*c^9*e*f^2*z + 23362560*a^3*b^9*c^7*d^2
*g*z - 46725120*a^3*b^8*c^8*d^2*e*z - 7127040*a^5*b^6*c^8*e*f^2*z - 2965248
*a^2*b^11*c^6*d^2*g*z + 1013760*a^4*b^8*c^7*e*f^2*z - 69120*a^3*b^10*c^6*e*
f^2*z + 1536*a^2*b^12*c^5*e*f^2*z + 5930496*a^2*b^10*c^7*d^2*e*z + 34681651
2*a^8*b*c^10*d^2*l*z - 693633024*a^7*c^12*d^2*e*z - 231211008*a^8*c^11*d^2*
j*z + 768*a^6*b^13*l*m^2*z - 13107200*a^12*c^7*j*m^2*z - 256*a^5*b^14*j*m^2
*z + 4718592*a^11*c^8*j*k^2*z - 39321600*a^11*c^8*e*m^2*z - 4718592*a^10*c^
9*h^2*j*z + 14155776*a^10*c^9*e*k^2*z + 13107200*a^9*c^10*f^2*j*z + 2304*b^
16*c^3*d^2*j*z - 14155776*a^9*c^10*e*h^2*z + 39321600*a^8*c^11*e*f^2*z - 69
12*b^15*c^4*d^2*g*z + 13824*b^14*c^5*d^2*e*z + 737280*a^10*b*c^5*j*k*l*m -
2304*a^6*b^9*c*j*k*l*m + 2211840*a^9*b*c^6*e*k*l*m + 1228800*a^9*b*c^6*f*j*
l*m + 737280*a^9*b*c^6*g*j*k*m + 442368*a^9*b*c^6*h*j*k*l + 36*a^3*b^12*c*f
*h*k*m + 3096576*a^8*b*c^7*d*j*k*l - 12745728*a^8*b*c^7*d*h*k*m + 3686400*a
^8*b*c^7*e*f*l*m + 3391488*a^8*b*c^7*e*h*j*m + 2211840*a^8*b*c^7*e*g*k*m +
1327104*a^8*b*c^7*e*h*k*l + 1228800*a^8*b*c^7*f*g*j*m + 737280*a^8*b*c^7*f*
h*j*l + 442368*a^8*b*c^7*g*h*j*k + 108*a^2*b^13*c*d*h*k*m + 16367616*a^7*b*
c^8*d*e*j*m + 9289728*a^7*b*c^8*d*e*k*l + 5160960*a^7*b*c^8*d*f*j*l + 33914
88*a^7*b*c^8*e*f*j*k + 3096576*a^7*b*c^8*d*g*j*k - 19307520*a^7*b*c^8*d*f*h
*m + 3686400*a^7*b*c^8*e*f*g*m + 2211840*a^7*b*c^8*e*f*h*l + 1327104*a^7*b*
c^8*e*g*h*k + 737280*a^7*b*c^8*f*g*h*j - 180*a*b^13*c^2*d*f*h*m - 540*a*b^1
2*c^3*d*f*h*k + 15482880*a^6*b*c^9*d*e*f*l + 11059200*a^6*b*c^9*d*e*h*j + 9
289728*a^6*b*c^9*d*e*g*k + 5160960*a^6*b*c^9*d*f*g*j - 2304*a*b^11*c^4*d*f*
g*j + 2211840*a^6*b*c^9*e*f*g*h + 4608*a*b^10*c^5*d*e*f*j + 15482880*a^5*b*
c^10*d*e*f*g - 13824*a*b^9*c^6*d*e*f*g + 36*a*b^14*c*d*f*k*m + 1843200*a^9*
b^3*c^4*j*k*l*m + 783360*a^8*b^5*c^3*j*k*l*m + 18432*a^7*b^7*c^2*j*k*l*m -
2211840*a^8*b^4*c^4*g*k*l*m - 1695744*a^9*b^2*c^5*h*j*l*m - 1400832*a^8*b^4
*c^4*h*j*l*m - 1105920*a^9*b^2*c^5*g*k*l*m - 253440*a^7*b^6*c^3*h*j*l*m - 6
9120*a^7*b^6*c^3*g*k*l*m + 11520*a^6*b^8*c^2*h*j*l*m + 6912*a^6*b^8*c^2*g*k
*l*m + 4423680*a^8*b^3*c^5*e*k*l*m + 2506752*a^8*b^3*c^5*f*j*l*m + 1843200*

a^8*b^3*c^5*g*j*k*m + 1327104*a^8*b^3*c^5*h*j*k*l + 838656*a^7*b^5*c^4*f*j*l*m + 783360*a^7*b^5*c^4*g*j*k*m + 691200*a^7*b^5*c^4*h*j*k*l + 138240*a^7*b^5*c^4*e*k*l*m + 69120*a^6*b^7*c^3*h*j*k*l - 53760*a^6*b^7*c^3*f*j*l*m + 18432*a^6*b^7*c^3*g*j*k*m - 13824*a^6*b^7*c^3*e*k*l*m - 2304*a^5*b^9*c^2*g*j*k*m + 2543616*a^8*b^3*c^5*g*h*l*m + 829440*a^7*b^5*c^4*g*h*l*m - 34560*a^6*b^7*c^3*g*h*l*m - 8183808*a^8*b^2*c^6*d*j*l*m - 3686400*a^8*b^2*c^6*e*j*k*m - 2285568*a^7*b^4*c^5*d*j*l*m - 1695744*a^8*b^2*c^6*f*j*k*l - 1566720*a^7*b^4*c^5*e*j*k*m - 1400832*a^7*b^4*c^5*f*j*k*l + 741888*a^6*b^6*c^4*d*j*l*m - 253440*a^6*b^6*c^4*f*j*k*l - 80640*a^5*b^8*c^3*d*j*l*m - 36864*a^6*b^6*c^4*e*j*k*m + 11520*a^5*b^8*c^3*f*j*k*l + 4608*a^5*b^8*c^3*e*j*k*m + 6700032*a^8*b^2*c^6*f*h*k*m + 5103360*a^7*b^4*c^5*f*h*k*m - 5087232*a^8*b^2*c^6*e*h*l*m - 2838528*a^7*b^4*c^5*f*g*l*m - 1843200*a^8*b^2*c^6*f*g*l*m - 1695744*a^8*b^2*c^6*g*h*j*m - 1658880*a^7*b^4*c^5*g*h*k*l - 1658880*a^7*b^4*c^5*e*h*l*m - 1400832*a^7*b^4*c^5*g*h*j*m - 663552*a^8*b^2*c^6*g*h*k*l + 483840*a^6*b^6*c^4*f*h*k*m - 253440*a^6*b^6*c^4*g*h*j*m - 207360*a^6*b^6*c^4*g*h*k*l + 161280*a^6*b^6*c^4*f*g*l*m + 69120*a^6*b^6*c^4*e*h*l*m - 50040*a^5*b^8*c^3*f*h*k*m + 11520*a^5*b^8*c^3*g*h*j*m + 180*a^4*b^10*c^2*f*h*k*m + 4202496*a^7*b^3*c^6*d*j*k*l + 635904*a^6*b^5*c^5*d*j*k*l - 276480*a^5*b^7*c^4*d*j*k*l + 34560*a^4*b^9*c^3*d*j*k*l - 16671744*a^7*b^3*c^6*d*h*k*m + 12275712*a^7*b^3*c^6*d*g*l*m + 5677056*a^7*b^3*c^6*e*f*l*m + 4423680*a^7*b^3*c^6*e*g*k*m + 3317760*a^7*b^3*c^6*e*h*k*l + 2801664*a^7*b^3*c^6*e*h*j*m - 2709504*a^6*b^5*c^5*d*g*l*m + 2543616*a^7*b^3*c^6*f*g*k*l + 2506752*a^7*b^3*c^6*f*g*j*m + 1843200*a^7*b^3*c^6*f*h*j*l + 1327104*a^7*b^3*c^6*g*h*j*k + 838656*a^6*b^5*c^5*f*g*j*m + 829440*a^6*b^5*c^5*f*g*k*l + 783360*a^6*b^5*c^5*f*h*j*l + 691200*a^6*b^5*c^5*g*h*j*k + 665280*a^5*b^7*c^4*d*h*k*m + 506880*a^6*b^5*c^5*e*h*j*m + 414720*a^6*b^5*c^5*e*h*k*l - 322560*a^6*b^5*c^5*e*f*l*m + 241920*a^5*b^7*c^4*d*g*l*m + 138240*a^6*b^5*c^5*e*g*k*m - 108540*a^4*b^9*c^3*d*h*k*m + 69120*a^5*b^7*c^4*g*h*j*k - 53760*a^5*b^7*c^4*f*g*j*m - 51840*a^6*b^5*c^5*d*h*k*m - 34560*a^5*b^7*c^4*f*g*k*l - 23040*a^5*b^7*c^4*e*h*j*m + 18432*a^5*b^7*c^4*f*h*j*l - 13824*a^5*b^7*c^4*e*g*k*m - 2304*a^4*b^9*c^3*f*h*j*l + 1296*a^3*b^11*c^2*d*h*k*m + 31924224*a^7*b^2*c^7*d*f*k*m - 24551424*a^7*b^2*c^7*d*e*l*m + 10616832*a^7*b^2*c^7*e*g*j*l - 8183808*a^7*b^2*c^7*d*g*j*m - 5529600*a^7*b^2*c^7*d*h*j*l + 5419008*a^6*b^4*c^6*d*e*l*m + 5308416*a^6*b^4*c^6*e*g*j*l - 5087232*a^7*b^2*c^7*e*f*k*l - 5013504*a^7*b^2*c^7*e*f*j*m + 4868352*a^6*b^4*c^6*d*f*k*m - 4644864*a^7*b^2*c^7*d*g*k*l - 3981312*a^6*b^4*c^6*d*g*k*l - 2654208*a^7*b^2*c^7*e*h*j*k - 2367360*a^5*b^6*c^5*d*f*k*m - 2285568*a^6*b^4*c^6*d*g*j*m - 2211840*a^6*b^4*c^6*d*h*j*l - 1695744*a^7*b^2*c^7*f*g*j*k - 1677312*a^6*b^4*c^6*e*f*j*m - 1658880*a^6*b^4*c^6*e*f*k*l - 1400832*a^6*b^4*c^6*f*g*j*k - 1382400*a^6*b^4*c^6*e*h*j*k + 1036800*a^5*b^6*c^5*d*g*k*l + 741888*a^5*b^6*c^5*d*g*j*m - 483840*a^5*b^6*c^5*d*e*l*m + 317952*a^5*b^6*c^5*d*h*j*l + 268920*a^4*b^8*c^4*d*f*k*m - 253440*a^5*b^6*c^5*f*g*j*k - 138240*a^5*b^6*c^5*e*h*j*k + 107520*a^5*b^6*c^5*e*f*j*m - 103680*a^4*b^8*c^4*d*g*k*l - 80640*a^4*b^8*c^4*d*g*j*m + 69120*a^5*b^6*c^5*e*f*k*l + 11520*a^4*b^8*c^4*f*g*j*k + 6912*a^4*b^8*c^4*d*h*j*l - 6912*a^3*b^10*c^3*d*h*j*l + 6120*a^3*b^10*c^3*d*f*k*m - 1368*a^2*b^12*c^2*d*f*k*m - 5087232*a^7*b^2*c^7*e*g*h*m - 2211840*a^6*b^4*c^6*f*g*h*l - 1658880*a^6*b^4*c^6*e*g*h*m - 1105920*a^7*b^2*c^7*f*g*h*l - 69120*a^5*b^6*c^5*f*g*h*l + 69120*a^5*b^6*c^5*e*g*h*m + 6912*a^4*b^8*c^4*f*g*h*l + 7962624*a^6*b^3*c^7*d*e*k*l - 22164480*a^6*b^3*c^7*d*f*h*m + 5160960*a^6*b^3*c^7*d*f*j*l + 4571136*a^6*b^3*c^7*d*e*j*m + 4202496*a^6*b^3*c^7*d*g*j*k + 2801664*a^6*b^3*c^7*e*f*j*k - 2073600*a^5*b^5*c^6*d*e*k*l - 1483776*a^5*b^5*c^6*d*e*j*m + 635904*a^5*b^5*c^6*d*g*j*k + 506880*a^5*b^5*c^6*e*f*j*k - 354816*a^4*b^7*c^5*d*f*j*l + 322560*a^5*b^5*c^6*d*f*j*l - 276480*a^4*b^7*c^5*d*g*j*k + 207360*a^4*b^7*c^5*d*e*k*l + 161280*a^4*b^7*c^5*d*e*j*m + 59904*a^3*b^9*c^4*d*f*j*l + 34560*a^3*b^9*c^4*d*g*j*k - 23040*a^4*b^7*c^5*e*f*j*k - 2304*a^2*b^11*c^3*d*f*j*l + 8294400*a^6*b^3*c^7*d*g*h*l + 5677056*a^6*b^3*c^7*e*f*g*m + 4423680*a^6*b^3*c^7*e*f*h*l + 3317760*a^6*b^3*c^7*e*g*h*k + 2805120*a^5*b^5*c^6*d*f*h*m + 1843200*a^6*b^3*c^7*f*g*h*j - 829440*a^5*b^5*c^6*d*g*h*l + 783360*a^5*b^5*c^6*f*g*h*j + 437184*a^4*b^7*c^5*d*f*h*m + 414720*a^5*b^5*c^6*e*g

*h*k - 322560*a^5*b^5*c^6*e*f*g*m - 146268*a^3*b^9*c^4*d*f*h*m + 138240*a^5
*b^5*c^6*e*f*h*l - 62208*a^4*b^7*c^5*d*g*h*l + 20736*a^3*b^9*c^4*d*g*h*l +
18432*a^4*b^7*c^5*f*g*h*j - 13824*a^4*b^7*c^5*e*f*h*l + 9360*a^2*b^11*c^3*d
*f*h*m - 2304*a^3*b^9*c^4*f*g*h*j - 8404992*a^6*b^2*c^8*d*e*j*k - 24551424*
a^6*b^2*c^8*d*e*g*m + 21150720*a^6*b^2*c^8*d*f*h*k - 1271808*a^5*b^4*c^7*d*
e*j*k + 552960*a^4*b^6*c^6*d*e*j*k - 69120*a^3*b^8*c^5*d*e*j*k - 16588800*a
^6*b^2*c^8*d*e*h*l - 7741440*a^6*b^2*c^8*d*f*g*l + 6946560*a^5*b^4*c^7*d*f*
h*k - 5529600*a^6*b^2*c^8*d*g*h*j + 5419008*a^5*b^4*c^7*d*e*g*m - 5087232*a
^6*b^2*c^8*e*f*g*k - 3870720*a^5*b^4*c^7*d*f*g*l - 3686400*a^6*b^2*c^8*e*f*
h*j - 2211840*a^5*b^4*c^7*d*g*h*j - 1755648*a^4*b^6*c^6*d*f*h*k - 1658880*a
^5*b^4*c^7*e*f*g*k + 1658880*a^5*b^4*c^7*d*e*h*l - 1566720*a^5*b^4*c^7*e*f*
h*j + 1451520*a^4*b^6*c^6*d*f*g*l - 483840*a^4*b^6*c^6*d*e*g*m + 317952*a^4
*b^6*c^6*d*g*h*j - 193536*a^3*b^8*c^5*d*f*g*l + 124416*a^4*b^6*c^6*d*e*h*l
+ 114696*a^3*b^8*c^5*d*f*h*k + 69120*a^4*b^6*c^6*e*f*g*k - 41472*a^3*b^8*c^
5*d*e*h*l - 36864*a^4*b^6*c^6*e*f*h*j + 14580*a^2*b^10*c^4*d*f*h*k + 6912*a
^3*b^8*c^5*d*g*h*j - 6912*a^2*b^10*c^4*d*g*h*j + 6912*a^2*b^10*c^4*d*f*g*l
+ 4608*a^3*b^8*c^5*e*f*h*j + 7962624*a^5*b^3*c^8*d*e*g*k + 7741440*a^5*b^3*
c^8*d*e*f*l + 5160960*a^5*b^3*c^8*d*f*g*j + 4423680*a^5*b^3*c^8*d*e*h*j - 2
903040*a^4*b^5*c^7*d*e*f*l - 2073600*a^4*b^5*c^7*d*e*g*k - 635904*a^4*b^5*c
^7*d*e*h*j + 387072*a^3*b^7*c^6*d*e*f*l - 354816*a^3*b^7*c^6*d*f*g*j + 3225
60*a^4*b^5*c^7*d*f*g*j + 207360*a^3*b^7*c^6*d*e*g*k + 59904*a^2*b^9*c^5*d*f
*g*j - 13824*a^3*b^7*c^6*d*e*h*j + 13824*a^2*b^9*c^5*d*e*h*j - 13824*a^2*b^
9*c^5*d*e*f*l + 4423680*a^5*b^3*c^8*e*f*g*h + 138240*a^4*b^5*c^7*e*f*g*h -
13824*a^3*b^7*c^6*e*f*g*h - 10321920*a^5*b^2*c^9*d*e*f*j + 709632*a^3*b^6*c
^7*d*e*f*j - 645120*a^4*b^4*c^8*d*e*f*j - 119808*a^2*b^8*c^6*d*e*f*j - 1658
8800*a^5*b^2*c^9*d*e*g*h + 1658880*a^4*b^4*c^8*d*e*g*h + 124416*a^3*b^6*c^7
*d*e*g*h - 41472*a^2*b^8*c^6*d*e*g*h + 7741440*a^4*b^3*c^9*d*e*f*g - 290304
0*a^3*b^5*c^8*d*e*f*g + 387072*a^2*b^7*c^7*d*e*f*g + 3456*a^7*b^8*c*k*l^2*m
 + 12672*a^7*b^8*c*j*l*m^2 + 384*a^5*b^10*c*j^2*k*m - 1635840*a^10*b*c^5*h*
k*m^2 - 1009152*a^9*b*c^6*h^2*k*m + 3690*a^6*b^9*c*h*k*m^2 + 1152*a^6*b^9*c
*g*l*m^2 - 540*a^5*b^10*c*h*k^2*m + 54*a^4*b^11*c*h^2*k*m + 565248*a^9*b*c^
6*h*j^2*m - 39771648*a^7*b*c^8*d^2*k*m - 2496000*a^8*b*c^7*f^2*k*m - 154368
0*a^9*b*c^6*f*k^2*m + 1980*a^5*b^10*c*f*k*m^2 - 384*a^5*b^10*c*g*j*m^2 - 18
0*a^4*b^11*c*f*k^2*m + 6*a^2*b^13*c*f^2*k*m - 10298880*a^9*b*c^6*d*k*m^2 +
2580480*a^9*b*c^6*e*j*m^2 + 5310*a^4*b^11*c*d*k*m^2 - 1674*a*b^13*c^2*d^2*k
*m - 540*a^3*b^12*c*d*k^2*m - 10616832*a^7*b*c^8*e^2*j*l - 3538944*a^8*b*c^
7*e*j^2*l + 2727936*a^8*b*c^7*d*j^2*m - 2496000*a^9*b*c^6*f*h*m^2 - 1543680
*a^8*b*c^7*f*h^2*m + 565248*a^8*b*c^7*f*j^2*k - 270*a^4*b^11*c*f*h*m^2 - 59
512320*a^6*b*c^9*d^2*f*m + 5087232*a^7*b*c^8*e^2*h*m + 1105920*a^8*b*c^7*e*
j*k^2 - 3456*a*b^12*c^3*d^2*j*l - 1635840*a^7*b*c^8*f^2*h*k - 1009152*a^8*b
*c^7*f*h*k^2 + 10260*a*b^12*c^3*d^2*h*m - 684*a^3*b^12*c*d*h*m^2 - 24675840
*a^6*b*c^9*d^2*h*k - 15552000*a^8*b*c^7*d*f*m^2 + 24551424*a^6*b*c^9*d*e^2*
m - 3939840*a^7*b*c^8*d*h^2*k + 1105920*a^7*b*c^8*e*h^2*j - 25074*a*b^11*c^
4*d^2*f*m + 10530*a*b^11*c^4*d^2*h*k + 10368*a*b^11*c^4*d^2*g*l + 420*a*b^1
2*c^3*d*f^2*m - 378*a^2*b^13*c*d*f*m^2 - 10616832*a^6*b*c^9*e^2*g*j + 50872
32*a^6*b*c^9*e^2*f*k - 3538944*a^7*b*c^8*e*g*j^2 + 1843200*a^7*b*c^8*d*h*j^
2 - 7994880*a^6*b*c^9*d*f^2*k - 4990464*a^7*b*c^8*d*f*k^2 + 2580480*a^6*b*c
^9*e*f^2*j + 65664*a*b^10*c^5*d^2*g*j - 27972*a*b^10*c^5*d^2*f*k - 20736*a*
b^10*c^5*d^2*e*l + 1260*a*b^11*c^4*d*f^2*k + 54*a*b^13*c^2*d*f*k^2 + 232243
20*a^5*b*c^10*d^2*e*j - 37062144*a^5*b*c^10*d^2*f*h + 384*a*b^12*c^3*d*f*j^
2 - 131328*a*b^9*c^6*d^2*e*j - 5985792*a^6*b*c^9*d*f*h^2 + 206010*a*b^9*c^6
*d^2*f*h - 6300*a*b^10*c^5*d*f^2*h + 1350*a*b^11*c^4*d*f*h^2 + 16588800*a^5
*b*c^10*d*e^2*h + 3456*a*b^10*c^5*d*f*g^2 + 435456*a*b^8*c^7*d^2*e*g + 1382
4*a*b^8*c^7*d*e^2*f - 1474560*a^9*c^7*e*j*k*m + 460800*a^9*c^7*f*h*k*m + 32
25600*a^8*c^8*d*f*k*m - 2457600*a^8*c^8*e*f*j*m - 884736*a^8*c^8*e*h*j*k -
6193152*a^7*c^9*d*e*j*k + 1935360*a^7*c^9*d*f*h*k - 1474560*a^7*c^9*e*f*h*j
 - 10321920*a^6*c^10*d*e*f*j - 1105920*a^9*b^4*c^3*k*l^2*m - 552960*a^10*b^
2*c^4*k*l^2*m - 34560*a^8*b^6*c^2*k*l^2*m - 1290240*a^10*b^2*c^4*j*l*m^2 -
860160*a^9*b^4*c^3*j*l*m^2 - 80640*a^8*b^6*c^2*j*l*m^2 - 737280*a^9*b^2*c^5

*j^2*k*m - 568320*a^8*b^4*c^4*j^2*k*m - 136704*a^7*b^6*c^3*j^2*k*m - 2304*a
^6*b^8*c^2*j^2*k*m + 1271808*a^9*b^3*c^4*h*l^2*m - 552960*a^9*b^2*c^5*j*k^2
*l - 552960*a^8*b^4*c^4*j*k^2*l + 414720*a^8*b^5*c^3*h*l^2*m - 145152*a^7*b
^6*c^3*j*k^2*l - 17280*a^7*b^7*c^2*h*l^2*m - 3456*a^6*b^8*c^2*j*k^2*l - 364
0320*a^9*b^3*c^4*h*k*m^2 - 2626560*a^8*b^3*c^5*h^2*k*m + 2211840*a^9*b^2*c^
5*h*k^2*m + 2056320*a^8*b^4*c^4*h*k^2*m + 1935360*a^9*b^3*c^4*g*l*m^2 - 114
3360*a^8*b^5*c^3*h*k*m^2 - 1097280*a^7*b^5*c^4*h^2*k*m + 364608*a^7*b^6*c^3
*h*k^2*m + 322560*a^8*b^5*c^3*g*l*m^2 - 56160*a^6*b^7*c^3*h^2*k*m - 40320*a
^7*b^7*c^2*g*l*m^2 + 27936*a^7*b^7*c^2*h*k*m^2 - 3780*a^6*b^8*c^2*h*k^2*m +
 2970*a^5*b^9*c^2*h^2*k*m - 1419264*a^8*b^4*c^4*f*l^2*m - 1105920*a^7*b^4*c
^5*g^2*k*m - 921600*a^9*b^2*c^5*f*l^2*m - 829440*a^8*b^4*c^4*h*k*l^2 + 7495
68*a^8*b^3*c^5*h*j^2*m - 552960*a^8*b^2*c^6*g^2*k*m - 331776*a^9*b^2*c^5*h*
k*l^2 + 317952*a^7*b^5*c^4*h*j^2*m - 103680*a^7*b^6*c^3*h*k*l^2 + 80640*a^7
*b^6*c^3*f*l^2*m + 38400*a^6*b^7*c^3*h*j^2*m - 34560*a^6*b^6*c^4*g^2*k*m +
3456*a^5*b^8*c^3*g^2*k*m - 1920*a^5*b^9*c^2*h*j^2*m - 5142528*a^7*b^3*c^6*f
^2*k*m + 5068800*a^9*b^2*c^5*f*k*m^2 - 3870720*a^9*b^2*c^5*e*l*m^2 - 375552
0*a^8*b^3*c^5*f*k^2*m + 3000960*a^8*b^4*c^4*f*k*m^2 - 1290240*a^9*b^2*c^5*g
*j*m^2 - 1085760*a^7*b^5*c^4*f*k^2*m - 959040*a^6*b^5*c^5*f^2*k*m - 860160*
a^8*b^4*c^4*g*j*m^2 + 829440*a^8*b^3*c^5*g*k^2*l - 645120*a^8*b^4*c^4*e*l*m
^2 - 552960*a^8*b^2*c^6*h^2*j*l - 552960*a^7*b^4*c^5*h^2*j*l + 414720*a^7*b
^5*c^4*g*k^2*l - 145152*a^6*b^6*c^4*h^2*j*l + 103200*a^5*b^7*c^4*f^2*k*m -
80640*a^7*b^6*c^3*g*j*m^2 + 80640*a^7*b^6*c^3*e*l*m^2 + 41280*a^7*b^6*c^3*f
*k*m^2 - 37188*a^6*b^8*c^2*f*k*m^2 + 13536*a^6*b^7*c^3*f*k^2*m + 12672*a^6*
b^8*c^2*g*j*m^2 + 10368*a^6*b^7*c^3*g*k^2*l + 5490*a^5*b^9*c^2*f*k^2*m - 34
56*a^5*b^8*c^3*h^2*j*l - 2304*a^6*b^8*c^2*e*l*m^2 + 810*a^4*b^9*c^3*f^2*k*m
 - 270*a^3*b^11*c^2*f^2*k*m + 6137856*a^8*b^3*c^5*d*l^2*m - 4423680*a^7*b^2
*c^7*e^2*k*m - 2654208*a^8*b^3*c^5*g*j*l^2 - 2654208*a^7*b^3*c^6*g^2*j*l +
1769472*a^8*b^2*c^6*g*j^2*l + 1769472*a^7*b^4*c^5*g*j^2*l - 1354752*a^7*b^5
*c^4*d*l^2*m - 1327104*a^7*b^5*c^4*g*j*l^2 - 1327104*a^6*b^5*c^5*g^2*j*l +
1271808*a^8*b^3*c^5*f*k*l^2 - 1040384*a^8*b^2*c^6*f*j^2*m - 697344*a^7*b^4*
c^5*f*j^2*m - 516096*a^8*b^2*c^6*h*j^2*k - 451584*a^7*b^4*c^5*h*j^2*k + 442
368*a^6*b^6*c^4*g*j^2*l + 414720*a^7*b^5*c^4*f*k*l^2 - 138240*a^6*b^6*c^4*h
*j^2*k - 138240*a^6*b^4*c^6*e^2*k*m - 121856*a^6*b^6*c^4*f*j^2*m + 120960*a
^6*b^7*c^3*d*l^2*m - 17280*a^6*b^7*c^3*f*k*l^2 + 13824*a^5*b^6*c^5*e^2*k*m
 - 11520*a^5*b^8*c^3*h*j^2*k + 8960*a^5*b^8*c^3*f*j^2*m + 10851840*a^8*b^2*c
^6*d*k^2*m - 10464768*a^6*b^3*c^7*d^2*k*m - 10275840*a^8*b^3*c^5*d*k*m^2 +
7121088*a^5*b^5*c^6*d^2*k*m + 3127680*a^7*b^4*c^5*d*k^2*m + 1720320*a^8*b^3
*c^5*e*j*m^2 - 1658880*a^8*b^2*c^6*e*k^2*l - 1290240*a^7*b^2*c^7*f^2*j*l +
1271808*a^7*b^3*c^6*g^2*h*m - 1222560*a^4*b^7*c^5*d^2*k*m + 999360*a^7*b^5*
c^4*d*k*m^2 - 860160*a^6*b^4*c^6*f^2*j*l - 829440*a^7*b^4*c^5*e*k^2*l - 705
024*a^6*b^6*c^4*d*k^2*m - 552960*a^8*b^2*c^6*g*j*k^2 - 552960*a^7*b^4*c^5*g
*j*k^2 + 414720*a^6*b^5*c^5*g^2*h*m + 319392*a^6*b^7*c^3*d*k*m^2 + 161280*a
^7*b^5*c^4*e*j*m^2 - 145152*a^6*b^6*c^4*g*j*k^2 - 85734*a^5*b^9*c^2*d*k*m^2
 - 80640*a^5*b^6*c^5*f^2*j*l - 25344*a^6*b^7*c^3*e*j*m^2 + 23490*a^3*b^9*c^
4*d^2*k*m - 20736*a^6*b^6*c^4*e*k^2*l - 17280*a^5*b^7*c^4*g^2*h*m + 14148*a
^5*b^8*c^3*d*k^2*m + 13716*a^2*b^11*c^3*d^2*k*m + 12690*a^4*b^10*c^2*d*k^2*
m + 12672*a^4*b^8*c^4*f^2*j*l - 3456*a^5*b^8*c^3*g*j*k^2 + 768*a^5*b^9*c^2*
e*j*m^2 - 384*a^3*b^10*c^3*f^2*j*l + 5308416*a^8*b^2*c^6*e*j*l^2 - 5308416*
a^6*b^3*c^7*e^2*j*l - 5142528*a^8*b^3*c^5*f*h*m^2 + 5068800*a^7*b^2*c^7*f^2
*h*m - 3755520*a^7*b^3*c^6*f*h^2*m - 3538944*a^7*b^3*c^6*e*j^2*l + 3000960*
a^6*b^4*c^6*f^2*h*m + 2654208*a^7*b^4*c^5*e*j*l^2 - 2322432*a^8*b^2*c^6*d*k
*l^2 + 2125824*a^7*b^3*c^6*d*j^2*m - 1990656*a^7*b^4*c^5*d*k*l^2 - 1085760*
a^6*b^5*c^5*f*h^2*m - 959040*a^7*b^5*c^4*f*h*m^2 - 884736*a^6*b^5*c^5*e*j^2
*l + 829440*a^7*b^3*c^6*g*h^2*l + 749568*a^7*b^3*c^6*f*j^2*k + 518400*a^6*b
^6*c^4*d*k*l^2 + 414720*a^6*b^5*c^5*g*h^2*l + 317952*a^6*b^5*c^5*f*j^2*k +
133632*a^6*b^5*c^5*d*j^2*m + 103200*a^6*b^7*c^3*f*h*m^2 - 96768*a^5*b^7*c^4
*d*j^2*m - 51840*a^5*b^8*c^3*d*k*l^2 + 41280*a^5*b^6*c^5*f^2*h*m + 38400*a^
5*b^7*c^4*f*j^2*k - 37188*a^4*b^8*c^4*f^2*h*m + 13536*a^5*b^7*c^4*f*h^2*m +
 13440*a^4*b^9*c^3*d*j^2*m + 10368*a^5*b^7*c^4*g*h^2*l + 5490*a^4*b^9*c^3*f

*h^2*m + 1980*a^3*b^10*c^3*f^2*h*m - 1920*a^4*b^9*c^3*f*j^2*k + 810*a^5*b^9
*c^2*f*h*m^2 - 180*a^3*b^11*c^2*f*h^2*m - 30*a^2*b^12*c^2*f^2*h*m + 3006720
0*a^6*b^2*c^8*d^2*h*m - 11612160*a^6*b^2*c^8*d^2*j*l + 1658880*a^6*b^3*c^7*
e^2*h*m + 1596672*a^4*b^6*c^6*d^2*j*l - 1419264*a^6*b^4*c^6*f*g^2*m - 11059
20*a^7*b^4*c^5*f*h*l^2 + 1105920*a^7*b^3*c^6*e*j*k^2 - 921600*a^7*b^2*c^7*f
*g^2*m - 829440*a^6*b^4*c^6*g^2*h*k - 552960*a^8*b^2*c^6*f*h*l^2 - 508032*a
^3*b^8*c^5*d^2*j*l - 331776*a^7*b^2*c^7*g^2*h*k + 290304*a^6*b^5*c^5*e*j*k^
2 - 103680*a^5*b^6*c^5*g^2*h*k + 80640*a^5*b^6*c^5*f*g^2*m - 69120*a^5*b^5*
c^6*e^2*h*m + 65664*a^2*b^10*c^4*d^2*j*l - 34560*a^6*b^6*c^4*f*h*l^2 + 6912
*a^5*b^7*c^4*e*j*k^2 + 3456*a^5*b^8*c^3*f*h*l^2 + 11930112*a^8*b^2*c^6*d*h*
m^2 + 8432640*a^7*b^2*c^7*d*h^2*m + 4450176*a^7*b^4*c^5*d*h*m^2 + 4337280*a
^6*b^4*c^6*d*h^2*m - 3870720*a^8*b^2*c^6*e*g*m^2 - 3640320*a^6*b^3*c^7*f^2*
h*k - 2885760*a^5*b^4*c^7*d^2*h*m - 2844288*a^4*b^6*c^6*d^2*h*m - 2626560*a
^7*b^3*c^6*f*h*k^2 + 2211840*a^7*b^2*c^7*f*h^2*k + 2056320*a^6*b^4*c^6*f*h^
2*k + 1935360*a^6*b^3*c^7*f^2*g*l - 1916928*a^7*b^2*c^7*d*j^2*k - 1687680*a
^6*b^6*c^4*d*h*m^2 - 1658880*a^7*b^2*c^7*e*h^2*l - 1143360*a^5*b^5*c^6*f^2*
h*k - 1097280*a^6*b^5*c^5*f*h*k^2 + 1019412*a^3*b^8*c^5*d^2*h*m - 1007424*a
^5*b^6*c^5*d*h^2*m - 912384*a^6*b^4*c^6*d*j^2*k - 829440*a^6*b^4*c^6*e*h^2*
l - 645120*a^7*b^4*c^5*e*g*m^2 - 552960*a^7*b^2*c^7*g*h^2*j - 552960*a^6*b^
4*c^6*g*h^2*j + 364608*a^5*b^6*c^5*f*h^2*k + 322560*a^5*b^5*c^6*f^2*g*l + 1
97460*a^5*b^8*c^3*d*h*m^2 - 145152*a^5*b^6*c^5*g*h^2*j - 143802*a^2*b^10*c^
4*d^2*h*m + 80640*a^6*b^6*c^4*e*g*m^2 - 56160*a^5*b^7*c^4*f*h*k^2 + 51948*a
^4*b^8*c^4*d*h^2*m - 40320*a^4*b^7*c^5*f^2*g*l + 34560*a^4*b^8*c^4*d*j^2*k
+ 27936*a^4*b^7*c^5*f^2*h*k - 20736*a^5*b^6*c^5*e*h^2*l - 13824*a^5*b^6*c^5
*d*j^2*k + 10800*a^3*b^10*c^3*d*h^2*m - 5760*a^3*b^10*c^3*d*j^2*k - 3780*a^
4*b^8*c^4*f*h^2*k + 3690*a^3*b^9*c^4*f^2*h*k - 3456*a^4*b^8*c^4*g*h^2*j + 2
970*a^4*b^9*c^3*f*h*k^2 - 2304*a^5*b^8*c^3*e*g*m^2 + 1152*a^3*b^9*c^4*f^2*g
*l - 540*a^3*b^10*c^3*f*h^2*k - 540*a^2*b^12*c^2*d*h^2*m - 90*a^4*b^10*c^2*
d*h*m^2 - 90*a^2*b^11*c^3*f^2*h*k + 54*a^3*b^11*c^2*f*h*k^2 + 15925248*a^6*
b^2*c^8*e^2*g*l - 7962624*a^7*b^3*c^6*e*g*l^2 - 7962624*a^6*b^3*c^7*e*g^2*l
+ 23385600*a^6*b^2*c^8*d*f^2*m + 6137856*a^6*b^3*c^7*d*g^2*m - 5677056*a^6
*b^2*c^8*e^2*f*m + 4147200*a^7*b^3*c^6*d*h*l^2 - 3317760*a^6*b^2*c^8*e^2*h*
k - 1354752*a^5*b^5*c^6*d*g^2*m + 1271808*a^6*b^3*c^7*f*g^2*k - 737280*a^7*
b^2*c^7*f*h*j^2 + 17418240*a^5*b^3*c^8*d^2*g*l - 568320*a^6*b^4*c^6*f*h*j^2
- 414720*a^6*b^5*c^5*d*h*l^2 + 414720*a^5*b^5*c^6*f*g^2*k - 414720*a^5*b^4
*c^7*e^2*h*k + 322560*a^5*b^4*c^7*e^2*f*m - 136704*a^5*b^6*c^5*f*h*j^2 + 12
0960*a^4*b^7*c^5*d*g^2*m - 31104*a^5*b^7*c^4*d*h*l^2 - 17280*a^4*b^7*c^5*f*
g^2*k + 10368*a^4*b^9*c^3*d*h*l^2 - 2304*a^4*b^8*c^4*f*h*j^2 + 384*a^3*b^10
*c^3*f*h*j^2 + 50042880*a^5*b^2*c^9*d^2*f*k - 13271040*a^5*b^3*c^8*d^2*h*k
- 13149696*a^7*b^3*c^6*d*f*m^2 + 10906560*a^4*b^5*c^7*d^2*f*m - 8709120*a^4
*b^5*c^7*d^2*g*l - 7418880*a^5*b^3*c^8*d^2*f*m + 7133184*a^7*b^2*c^7*d*h*k^
2 - 6428160*a^6*b^3*c^7*d*h^2*k + 5593536*a^4*b^5*c^7*d^2*h*k - 3870720*a^6
*b^2*c^8*e*f^2*l + 3369600*a^6*b^4*c^6*d*h*k^2 + 3148992*a^6*b^5*c^5*d*f*m^
2 - 2985696*a^3*b^7*c^6*d^2*f*m + 1959552*a^3*b^7*c^6*d^2*g*l - 1658880*a^7
*b^2*c^7*e*g*k^2 - 1505280*a^4*b^6*c^6*d*f^2*m - 1290240*a^6*b^2*c^8*f^2*g*
j - 34836480*a^5*b^2*c^9*d^2*e*l + 1105920*a^6*b^3*c^7*e*h^2*j - 860160*a^5
*b^4*c^7*f^2*g*j - 829440*a^6*b^4*c^6*e*g*k^2 - 692064*a^3*b^7*c^6*d^2*h*k
- 689472*a^5*b^5*c^6*d*h^2*k - 645120*a^5*b^4*c^7*e*f^2*l - 388800*a^5*b^6*
c^5*d*h*k^2 + 378954*a^2*b^9*c^5*d^2*f*m + 362880*a^5*b^4*c^7*d*f^2*m + 296
964*a^3*b^8*c^5*d*f^2*m + 290304*a^5*b^5*c^6*e*h^2*j + 277344*a^4*b^7*c^5*d
*h^2*k - 217728*a^2*b^9*c^5*d^2*g*l - 80640*a^4*b^6*c^6*f^2*g*j + 80640*a^4
*b^6*c^6*e*f^2*l - 77070*a^4*b^9*c^3*d*f*m^2 - 30240*a^5*b^7*c^4*d*f*m^2 -
28350*a^3*b^9*c^4*d*h^2*k - 26406*a^2*b^9*c^5*d^2*h*k - 21060*a^4*b^8*c^4*d
*h*k^2 - 20736*a^5*b^6*c^5*e*g*k^2 - 19278*a^2*b^10*c^4*d*f^2*m + 12672*a^3
*b^8*c^5*f^2*g*j + 10044*a^3*b^10*c^3*d*h*k^2 + 8820*a^3*b^11*c^2*d*f*m^2 +
6912*a^4*b^7*c^5*e*h^2*j - 2304*a^3*b^8*c^5*e*f^2*l - 1620*a^2*b^11*c^3*d*
h^2*k - 384*a^2*b^10*c^4*f^2*g*j + 162*a^2*b^12*c^2*d*h*k^2 - 5419008*a^5*b
^3*c^8*d*e^2*m + 5308416*a^6*b^2*c^8*e*g^2*j - 5308416*a^5*b^3*c^8*e^2*g*j
- 3870720*a^7*b^2*c^7*d*f*l^2 - 3538944*a^6*b^3*c^7*e*g*j^2 + 2654208*a^5*b

^4*c^7*e*g^2*j - 2322432*a^6*b^2*c^8*d*g^2*k - 1990656*a^5*b^4*c^7*d*g^2*k
- 1935360*a^6*b^4*c^6*d*f*l^2 + 1658880*a^6*b^3*c^7*d*h*j^2 + 1658880*a^5*b
^3*c^8*e^2*f*k - 884736*a^5*b^5*c^6*e*g*j^2 + 725760*a^5*b^6*c^5*d*f*l^2 +
17418240*a^4*b^4*c^8*d^2*e*l + 518400*a^4*b^6*c^6*d*g^2*k + 483840*a^4*b^5*
c^7*d*e^2*m + 262656*a^5*b^5*c^6*d*h*j^2 - 96768*a^4*b^8*c^4*d*f*l^2 - 6912
0*a^4*b^5*c^7*e^2*f*k - 55296*a^4*b^7*c^5*d*h*j^2 - 51840*a^3*b^8*c^5*d*g^2
*k + 3456*a^3*b^10*c^3*d*f*l^2 + 1152*a^3*b^9*c^4*d*h*j^2 + 1152*a^2*b^11*c
^3*d*h*j^2 - 15431040*a^4*b^4*c^8*d^2*f*k - 13248000*a^5*b^3*c^8*d*f^2*k -
11612160*a^5*b^2*c^9*d^2*g*j - 10063872*a^6*b^3*c^7*d*f*k^2 - 3919104*a^3*b
^6*c^7*d^2*e*l + 2554560*a^4*b^5*c^7*d*f^2*k + 1720320*a^5*b^3*c^8*e*f^2*j
+ 1596672*a^3*b^6*c^7*d^2*g*j + 1518912*a^3*b^6*c^7*d^2*f*k - 1105920*a^5*b
^4*c^7*f*g^2*h + 838080*a^5*b^5*c^6*d*f*k^2 - 552960*a^6*b^2*c^8*f*g^2*h -
508032*a^2*b^8*c^6*d^2*g*j + 435456*a^2*b^8*c^6*d^2*e*l + 161280*a^4*b^5*c^
7*e*f^2*j + 116640*a^4*b^7*c^5*d*f*k^2 + 106812*a^2*b^8*c^6*d^2*f*k - 98208
*a^3*b^7*c^6*d*f^2*k - 34560*a^4*b^6*c^6*f*g^2*h - 27270*a^3*b^9*c^4*d*f*k^
2 - 26334*a^2*b^9*c^5*d*f^2*k - 25344*a^3*b^7*c^6*e*f^2*j + 3456*a^3*b^8*c^
5*f*g^2*h + 768*a^2*b^9*c^5*e*f^2*j - 702*a^2*b^11*c^3*d*f*k^2 - 7962624*a^
5*b^2*c^9*d*e^2*k - 2580480*a^6*b^2*c^8*d*f*j^2 + 2073600*a^4*b^4*c^8*d*e^2
*k - 1658880*a^6*b^2*c^8*e*g*h^2 - 967680*a^5*b^4*c^7*d*f*j^2 - 829440*a^5*
b^4*c^7*e*g*h^2 - 207360*a^3*b^6*c^7*d*e^2*k + 64512*a^4*b^6*c^6*d*f*j^2 +
39168*a^3*b^8*c^5*d*f*j^2 - 20736*a^4*b^6*c^6*e*g*h^2 - 9216*a^2*b^10*c^4*d
*f*j^2 - 4423680*a^5*b^2*c^9*e^2*f*h + 4147200*a^5*b^3*c^8*d*g^2*h - 319334
4*a^3*b^5*c^8*d^2*e*j + 1016064*a^2*b^7*c^7*d^2*e*j - 414720*a^4*b^5*c^7*d*
g^2*h - 138240*a^4*b^4*c^8*e^2*f*h - 31104*a^3*b^7*c^6*d*g^2*h + 13824*a^3*
b^6*c^7*e^2*f*h + 10368*a^2*b^9*c^5*d*g^2*h + 15630336*a^5*b^2*c^9*d*f^2*h
- 14459904*a^4*b^3*c^9*d^2*f*h + 9630144*a^3*b^5*c^8*d^2*f*h - 8764416*a^5*
b^3*c^8*d*f*h^2 - 3870720*a^5*b^2*c^9*e*f^2*g + 2867328*a^4*b^4*c^8*d*f^2*h
 - 2095200*a^2*b^7*c^7*d^2*f*h - 1414080*a^3*b^6*c^7*d*f^2*h - 34836480*a^4
*b^2*c^10*d^2*e*g - 645120*a^4*b^4*c^8*e*f^2*g + 306720*a^3*b^7*c^6*d*f*h^2
 + 197820*a^2*b^8*c^6*d*f^2*h + 146880*a^4*b^5*c^7*d*f*h^2 + 80640*a^3*b^6*
c^7*e*f^2*g - 55350*a^2*b^9*c^5*d*f*h^2 - 2304*a^2*b^8*c^6*e*f^2*g - 387072
0*a^5*b^2*c^9*d*f*g^2 - 1935360*a^4*b^4*c^8*d*f*g^2 - 1658880*a^4*b^3*c^9*d
*e^2*h + 725760*a^3*b^6*c^7*d*f*g^2 + 17418240*a^3*b^4*c^9*d^2*e*g - 124416
*a^3*b^5*c^8*d*e^2*h - 96768*a^2*b^8*c^6*d*f*g^2 + 41472*a^2*b^7*c^7*d*e^2*
h - 3919104*a^2*b^6*c^8*d^2*e*g - 7741440*a^4*b^2*c^10*d*e^2*f + 2903040*a^
3*b^4*c^9*d*e^2*f - 387072*a^2*b^6*c^8*d*e^2*f - 20160*a^8*b^7*c*l^2*m^2 -
1648128*a^10*b^3*c^3*k*m^3 - 898560*a^9*b^3*c^4*k^3*m - 354240*a^9*b^5*c^2*
k*m^3 - 354240*a^8*b^5*c^3*k^3*m - 21600*a^7*b^7*c^2*k^3*m - 13950*a^7*b^8*
c*k^2*m^2 + 430080*a^10*b*c^5*j^2*m^2 - 1984*a^6*b^9*c*j^2*m^2 - 884736*a^9
*b^3*c^4*j*l^3 - 589824*a^8*b^3*c^5*j^3*l - 442368*a^8*b^5*c^3*j*l^3 - 2949
12*a^7*b^5*c^4*j^3*l - 49152*a^6*b^7*c^3*j^3*l + 1359360*a^10*b^2*c^4*h*m^3
 + 1173120*a^9*b^4*c^3*h*m^3 + 743040*a^7*b^4*c^5*h^3*m + 622080*a^8*b^2*c^
6*h^3*m + 184320*a^9*b*c^6*j^2*k^2 + 107136*a^6*b^6*c^4*h^3*m - 32640*a^8*b
^6*c^2*h*m^3 + 540*a^5*b^8*c^3*h^3*m - 270*a^4*b^10*c^2*h^3*m - 180*a^5*b^1
0*c*h^2*m^2 - 2293760*a^9*b^3*c^4*f*m^3 - 2293760*a^6*b^3*c^7*f^3*m + 13271
04*a^8*b^4*c^4*g*l^3 + 1327104*a^6*b^4*c^6*g^3*l - 622080*a^8*b^3*c^5*h*k^3
 - 622080*a^7*b^3*c^6*h^3*k - 326592*a^7*b^5*c^4*h*k^3 - 326592*a^6*b^5*c^5
*h^3*k - 199360*a^8*b^5*c^3*f*m^3 - 199360*a^5*b^5*c^6*f^3*m + 61920*a^7*b^
7*c^2*f*m^3 + 61920*a^4*b^7*c^5*f^3*m - 38880*a^6*b^7*c^3*h*k^3 - 38880*a^5
*b^7*c^4*h^3*k - 3682*a^3*b^9*c^4*f^3*m - 810*a^5*b^9*c^2*h*k^3 - 810*a^4*b
^9*c^3*h^3*k - 70*a^3*b^12*c*f^2*m^2 + 70*a^2*b^11*c^3*f^3*m + 3870720*a^8*
b*c^7*e^2*m^2 + 184320*a^8*b*c^7*h^2*j^2 - 14152320*a^4*b^4*c^8*d^3*m + 106
44480*a^5*b^2*c^9*d^3*m + 5483520*a^9*b^2*c^5*d*m^3 + 4269888*a^3*b^6*c^7*d
^3*m - 2654208*a^8*b^3*c^5*e*l^3 + 1359360*a^6*b^2*c^8*f^3*k + 1330560*a^8*
b^4*c^4*d*m^3 + 1173120*a^5*b^4*c^7*f^3*k - 884736*a^6*b^3*c^7*g^3*j - 8265
60*a^7*b^6*c^3*d*m^3 + 743040*a^7*b^4*c^5*f*k^3 + 622080*a^8*b^2*c^6*f*k^3
- 607068*a^2*b^8*c^6*d^3*m - 589824*a^7*b^3*c^6*g*j^3 - 442368*a^5*b^5*c^6*
g^3*j - 294912*a^6*b^5*c^5*g*j^3 + 145188*a^6*b^8*c^2*d*m^3 + 107136*a^6*b^
6*c^4*f*k^3 - 49152*a^5*b^7*c^4*g*j^3 - 32640*a^4*b^6*c^6*f^3*k - 5796*a^3*

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b^8*c^5*f^3*k + 540*a^5*b^8*c^3*f*k^3 - 270*a^4*b^10*c^2*f*k^3 + 210*a^2*b^
10*c^4*f^3*k + 19077120*a^4*b^3*c^9*d^3*k + 1658880*a^7*b*c^8*e^2*k^2 + 430
080*a^7*b*c^8*f^2*j^2 + 3538944*a^5*b^2*c^9*e^3*j - 2488320*a^7*b^3*c^6*d*k
^3 - 2379456*a^3*b^5*c^8*d^3*k + 1179648*a^7*b^2*c^7*e*j^3 + 589824*a^6*b^4
*c^6*e*j^3 + 98304*a^5*b^6*c^5*e*j^3 - 95904*a^2*b^7*c^7*d^3*k - 57024*a^6*
b^5*c^5*d*k^3 + 49248*a^5*b^7*c^4*d*k^3 - 4050*a^4*b^9*c^3*d*k^3 - 810*a^3*
b^11*c^2*d*k^3 - 486*a*b^12*c^3*d^2*k^2 + 3870720*a^6*b*c^9*d^2*j^2 - 16481
28*a^5*b^3*c^8*f^3*h - 898560*a^6*b^3*c^7*f*h^3 - 354240*a^5*b^5*c^6*f*h^3
- 354240*a^4*b^5*c^7*f^3*h + 43680*a^3*b^7*c^6*f^3*h - 21600*a^4*b^7*c^5*f*
h^3 - 9792*a*b^11*c^4*d^2*j^2 + 1350*a^3*b^9*c^4*f*h^3 - 1050*a^2*b^9*c^5*f
^3*h + 1658880*a^6*b*c^9*e^2*h^2 + 16547328*a^4*b^2*c^10*d^3*h - 12306816*a
^3*b^4*c^9*d^3*h + 37310976*a^3*b^3*c^10*d^3*f + 3037824*a^2*b^6*c^8*d^3*h
- 2654208*a^5*b^3*c^8*e*g^3 + 1949184*a^6*b^2*c^8*d*h^3 + 1296000*a^5*b^4*c
^7*d*h^3 - 155520*a^4*b^6*c^6*d*h^3 - 40500*a*b^10*c^5*d^2*h^2 - 8100*a^3*b
^8*c^5*d*h^3 + 4050*a^2*b^10*c^4*d*h^3 + 3870720*a^5*b*c^10*e^2*f^2 + 34836
480*a^4*b*c^11*d^2*e^2 - 108864*a*b^9*c^6*d^2*g^2 - 8068032*a^2*b^5*c^9*d^3
*f - 5623296*a^4*b^3*c^9*d*f^3 + 1737792*a^3*b^5*c^8*d*f^3 - 260190*a*b^8*c
^7*d^2*f^2 - 211680*a^2*b^7*c^7*d*f^3 - 435456*a*b^7*c^8*d^2*e^2 - 245760*a
^10*c^6*j^2*k*m - 384*a^6*b^10*j*l*m^2 + 138240*a^10*c^6*h*k^2*m - 90*a^5*b
^11*h*k*m^2 + 384000*a^10*c^6*f*k*m^2 - 2211840*a^8*c^8*e^2*k*m - 409600*a^
9*c^7*f*j^2*m - 147456*a^9*c^7*h*j^2*k - 30*a^4*b^12*f*k*m^2 + 967680*a^9*c
^7*d*k^2*m + 384000*a^8*c^8*f^2*h*m - 90*a^3*b^13*d*k*m^2 + 20321280*a^7*c^
9*d^2*h*m - 883200*a^11*b*c^4*k*m^3 - 317952*a^10*b*c^5*k^3*m + 43680*a^8*b
^7*c*k*m^3 + 1350*a^6*b^9*c*k^3*m - 270*b^14*c^2*d^2*h*m + 6*a^3*b^13*f*h*m
^2 + 4838400*a^9*c^7*d*h*m^2 + 2903040*a^8*c^8*d*h^2*m - 1032192*a^8*c^8*d*
j^2*k + 138240*a^8*c^8*f*h^2*k - 3686400*a^7*c^9*e^2*f*m - 1327104*a^7*c^9*
e^2*h*k - 393216*a^9*b*c^6*j^3*l - 245760*a^8*c^8*f*h*j^2 - 810*b^13*c^3*d^
2*h*k + 630*b^13*c^3*d^2*f*m + 18*a^2*b^14*d*h*m^2 + 2688000*a^7*c^9*d*f^2*
m + 580608*a^8*c^8*d*h*k^2 - 5796*a^7*b^8*c*h*m^3 - 3456*b^12*c^4*d^2*g*j +
 1890*b^12*c^4*d^2*f*k + 6773760*a^6*c^10*d^2*f*k - 1344000*a^10*b*c^5*f*m^
3 - 1344000*a^7*b*c^8*f^3*m - 207360*a^9*b*c^6*h*k^3 - 207360*a^8*b*c^7*h^3
*k - 3682*a^6*b^9*c*f*m^3 - 9289728*a^6*c^10*d*e^2*k - 1720320*a^7*c^9*d*f*
j^2 - 50803200*a^5*b*c^10*d^3*k + 6912*b^11*c^5*d^2*e*j - 10616832*a^6*b*c^
9*e^3*l - 2211840*a^6*c^10*e^2*f*h - 393216*a^8*b*c^7*g*j^3 + 43416*a*b^10*
c^5*d^3*m - 9576*a^5*b^10*c*d*m^3 - 9450*b^11*c^5*d^2*f*h - 504*a*b^14*c*d^
2*m^2 + 1612800*a^6*c^10*d*f^2*h - 1036800*a^8*b*c^7*d*k^3 + 45198*a*b^9*c^
6*d^3*k - 20736*b^10*c^6*d^2*e*g - 75188736*a^4*b*c^11*d^3*f - 883200*a^6*b
*c^9*f^3*h - 317952*a^7*b*c^8*f*h^3 - 15482880*a^5*c^11*d*e^2*f - 10616832*
a^5*b*c^10*e^3*g - 345060*a*b^8*c^7*d^3*h - 4262400*a^5*b*c^10*d*f^3 + 8527
68*a*b^7*c^8*d^3*f + 7350*a*b^9*c^6*d*f^3 + 967680*a^10*b^3*c^3*l^2*m^2 + 1
61280*a^9*b^5*c^2*l^2*m^2 + 1684224*a^10*b^2*c^4*k^2*m^2 + 1264320*a^9*b^4*
c^3*k^2*m^2 + 126720*a^8*b^6*c^2*k^2*m^2 + 501760*a^9*b^3*c^4*j^2*m^2 + 414
720*a^9*b^3*c^4*k^2*l^2 + 207360*a^8*b^5*c^3*k^2*l^2 + 170240*a^8*b^5*c^3*j
^2*m^2 + 9216*a^7*b^7*c^2*j^2*m^2 + 5184*a^7*b^7*c^2*k^2*l^2 + 884736*a^9*b
^2*c^5*j^2*l^2 + 884736*a^8*b^4*c^4*j^2*l^2 + 221184*a^7*b^6*c^3*j^2*l^2 +
1419840*a^8*b^4*c^4*h^2*m^2 + 1387008*a^9*b^2*c^5*h^2*m^2 + 276480*a^8*b^3*
c^5*j^2*k^2 + 140544*a^7*b^5*c^4*j^2*k^2 + 84960*a^7*b^6*c^3*h^2*m^2 + 2534
4*a^6*b^7*c^3*j^2*k^2 - 8010*a^6*b^8*c^2*h^2*m^2 + 576*a^5*b^9*c^2*j^2*k^2
+ 967680*a^8*b^3*c^5*g^2*m^2 + 414720*a^8*b^3*c^5*h^2*l^2 + 207360*a^7*b^5*
c^4*h^2*l^2 + 161280*a^7*b^5*c^4*g^2*m^2 - 20160*a^6*b^7*c^3*g^2*m^2 + 5184
*a^6*b^7*c^3*h^2*l^2 + 576*a^5*b^9*c^2*g^2*m^2 + 3808000*a^8*b^2*c^6*f^2*m^
2 + 1990656*a^7*b^4*c^5*g^2*l^2 + 1643712*a^7*b^4*c^5*f^2*m^2 + 803520*a^7*
b^4*c^5*h^2*k^2 + 725760*a^8*b^2*c^6*h^2*k^2 + 207360*a^6*b^6*c^4*h^2*k^2 -
 125440*a^6*b^6*c^4*f^2*m^2 - 13790*a^5*b^8*c^3*f^2*m^2 + 10530*a^5*b^8*c^3
*h^2*k^2 + 1785*a^4*b^10*c^2*f^2*m^2 + 81*a^4*b^10*c^2*h^2*k^2 + 18427392*a
^7*b^2*c^7*d^2*m^2 + 967680*a^7*b^3*c^6*f^2*l^2 + 645120*a^7*b^3*c^6*e^2*m^
2 + 414720*a^7*b^3*c^6*g^2*k^2 + 276480*a^7*b^3*c^6*h^2*j^2 + 207360*a^6*b^
5*c^5*g^2*k^2 + 161280*a^6*b^5*c^5*f^2*l^2 + 140544*a^6*b^5*c^5*h^2*j^2 - 8
0640*a^6*b^5*c^5*e^2*m^2 + 25344*a^5*b^7*c^4*h^2*j^2 - 20160*a^5*b^7*c^4*f^
```

2*l^2 + 5184*a^5*b^7*c^4*g^2*k^2 + 2304*a^5*b^7*c^4*e^2*m^2 + 576*a^4*b^9*c
^3*h^2*j^2 + 576*a^4*b^9*c^3*f^2*l^2 + 7962624*a^7*b^2*c^7*e^2*l^2 - 414892
8*a^6*b^4*c^6*d^2*m^2 + 1419840*a^6*b^4*c^6*f^2*k^2 + 1387008*a^7*b^2*c^7*f
^2*k^2 - 1183392*a^5*b^6*c^5*d^2*m^2 + 884736*a^7*b^2*c^7*g^2*j^2 + 884736*
a^6*b^4*c^6*g^2*j^2 + 645750*a^4*b^8*c^4*d^2*m^2 + 221184*a^5*b^6*c^5*g^2*j
^2 - 115920*a^3*b^10*c^3*d^2*m^2 + 84960*a^5*b^6*c^5*f^2*k^2 + 10836*a^2*b^
12*c^2*d^2*m^2 - 8010*a^4*b^8*c^4*f^2*k^2 - 180*a^3*b^10*c^3*f^2*k^2 + 9*a^
2*b^12*c^2*f^2*k^2 + 8709120*a^6*b^3*c^7*d^2*l^2 - 4354560*a^5*b^5*c^6*d^2*
l^2 + 979776*a^4*b^7*c^5*d^2*l^2 + 829440*a^6*b^3*c^7*e^2*k^2 + 17480448*a^
6*b^2*c^8*d^2*k^2 + 501760*a^6*b^3*c^7*f^2*j^2 + 170240*a^5*b^5*c^6*f^2*j^2
 - 108864*a^3*b^9*c^4*d^2*l^2 + 20736*a^5*b^5*c^6*e^2*k^2 + 9216*a^4*b^7*c^
5*f^2*j^2 + 5184*a^2*b^11*c^3*d^2*l^2 - 1984*a^3*b^9*c^4*f^2*j^2 + 64*a^2*b
^11*c^3*f^2*j^2 + 3538944*a^6*b^2*c^8*e^2*j^2 - 3302208*a^5*b^4*c^7*d^2*k^2
 + 884736*a^5*b^4*c^7*e^2*j^2 + 414720*a^6*b^3*c^7*g^2*h^2 + 207360*a^5*b^5
*c^6*g^2*h^2 - 103680*a^4*b^6*c^6*d^2*k^2 + 101250*a^3*b^8*c^5*d^2*k^2 - 57
51*a^2*b^10*c^4*d^2*k^2 + 5184*a^4*b^7*c^5*g^2*h^2 + 1935360*a^5*b^3*c^8*d^
2*j^2 + 1684224*a^6*b^2*c^8*f^2*h^2 + 1264320*a^5*b^4*c^7*f^2*h^2 - 532224*
a^4*b^5*c^7*d^2*j^2 + 126720*a^4*b^6*c^6*f^2*h^2 - 96768*a^3*b^7*c^6*d^2*j^
2 + 62784*a^2*b^9*c^5*d^2*j^2 - 13950*a^3*b^8*c^5*f^2*h^2 + 225*a^2*b^10*c^
4*f^2*h^2 + 967680*a^5*b^3*c^8*f^2*g^2 + 829440*a^5*b^3*c^8*e^2*h^2 + 16128
0*a^4*b^5*c^7*f^2*g^2 + 20736*a^4*b^5*c^7*e^2*h^2 - 20160*a^3*b^7*c^6*f^2*g
^2 + 576*a^2*b^9*c^5*f^2*g^2 + 11487744*a^5*b^2*c^9*d^2*h^2 + 7962624*a^5*b
^2*c^9*e^2*g^2 + 35525376*a^4*b^2*c^10*d^2*f^2 - 1412640*a^3*b^6*c^7*d^2*h^
2 + 461376*a^4*b^4*c^8*d^2*h^2 + 375030*a^2*b^8*c^6*d^2*h^2 + 8709120*a^4*b
^3*c^9*d^2*g^2 - 4354560*a^3*b^5*c^8*d^2*g^2 + 979776*a^2*b^7*c^7*d^2*g^2 +
 645120*a^4*b^3*c^9*e^2*f^2 - 80640*a^3*b^5*c^8*e^2*f^2 + 2304*a^2*b^7*c^7*
e^2*f^2 - 15269184*a^3*b^4*c^9*d^2*f^2 + 2870784*a^2*b^6*c^8*d^2*f^2 - 1741
8240*a^3*b^3*c^10*d^2*e^2 + 3919104*a^2*b^5*c^9*d^2*e^2 + 54*b^15*c*d^2*k*m
 + 6*a*b^15*d*f*m^2 + 115200*a^11*c^5*k^2*m^2 + 576*a^7*b^9*l^2*m^2 + 225*a
^6*b^10*k^2*m^2 + 64*a^5*b^11*j^2*m^2 + 345600*a^10*c^6*h^2*m^2 + 9*a^4*b^1
2*h^2*m^2 + 320000*a^9*c^7*f^2*m^2 + 41472*a^9*c^7*h^2*k^2 + 16934400*a^8*c
^8*d^2*m^2 + 345600*a^8*c^8*f^2*k^2 + 81*b^14*c^2*d^2*k^2 + 3538944*a^7*c^9
*e^2*j^2 + 2032128*a^7*c^9*d^2*k^2 + 492800*a^11*b^2*c^3*m^4 + 351456*a^10*
b^4*c^2*m^4 + 576*b^13*c^3*d^2*j^2 + 331776*a^9*b^4*c^3*l^4 + 115200*a^7*c^
9*f^2*h^2 + 142560*a^8*b^4*c^4*k^4 + 103680*a^9*b^2*c^5*k^4 + 32400*a^7*b^6
*c^3*k^4 + 2025*b^12*c^4*d^2*h^2 + 2025*a^6*b^8*c^2*k^4 + 6096384*a^6*c^10*
d^2*h^2 + 131072*a^8*b^2*c^6*j^4 + 98304*a^7*b^4*c^5*j^4 + 32768*a^6*b^6*c^
4*j^4 + 5184*b^11*c^5*d^2*g^2 + 4096*a^5*b^8*c^3*j^4 + 11025*b^10*c^6*d^2*f
^2 + 5644800*a^5*c^11*d^2*f^2 + 142560*a^6*b^4*c^6*h^4 + 103680*a^7*b^2*c^7
*h^4 + 32400*a^5*b^6*c^5*h^4 + 20736*b^9*c^7*d^2*e^2 + 2025*a^4*b^8*c^4*h^4
 + 331776*a^5*b^4*c^7*g^4 + 492800*a^5*b^2*c^9*f^4 + 351456*a^4*b^4*c^8*f^4
 - 43120*a^3*b^6*c^7*f^4 + 1225*a^2*b^8*c^6*f^4 - 27433728*a^3*b^2*c^11*d^4
 + 6446304*a^2*b^4*c^10*d^4 - 1050*a^7*b^9*k*m^3 + 384000*a^11*c^5*h*m^3 +
138240*a^9*c^7*h^3*m + 210*a^6*b^10*h*m^3 + 47416320*a^6*c^10*d^3*m - 1134*
b^12*c^4*d^3*m + 70*a^5*b^11*f*m^3 + 2688000*a^10*c^6*d*m^3 + 384000*a^7*c^
9*f^3*k + 138240*a^9*c^7*f*k^3 - 3402*b^11*c^5*d^3*k + 210*a^4*b^12*d*m^3 +
 7077888*a^6*c^10*e^3*j + 786432*a^8*c^8*e*j^3 - 43120*a^9*b^6*c*m^4 + 2844
9792*a^5*c^11*d^3*h + 17010*b^10*c^6*d^3*h + 580608*a^7*c^9*d*h^3 - 39690*b
^9*c^7*d^3*f - 734832*a*b^6*c^9*d^4 + 9*b^16*d^2*m^2 + 160000*a^12*c^4*m^4
+ 1225*a^8*b^8*m^4 + 20736*a^10*c^6*k^4 + 65536*a^9*c^7*j^4 + 20736*a^8*c^8
*h^4 + 49787136*a^4*c^12*d^4 + 160000*a^6*c^10*f^4 + 5308416*a^5*c^11*e^4 +
 35721*b^8*c^8*d^4 + a^2*b^14*f^2*m^2, z, k1)*(root(56371445760*a^11*b^8*c^
9*z^4 - 503316480*a^8*b^14*c^6*z^4 + 47185920*a^7*b^16*c^5*z^4 - 2621440*a^
6*b^18*c^4*z^4 + 65536*a^5*b^20*c^3*z^4 - 171798691840*a^14*b^2*c^12*z^4 +
193273528320*a^13*b^4*c^11*z^4 - 128849018880*a^12*b^6*c^10*z^4 - 169114337
28*a^10*b^10*c^8*z^4 + 3523215360*a^9*b^12*c^7*z^4 + 68719476736*a^15*c^13*
z^4 + 1536*a^5*b^16*c*k*m*z^2 + 1536*a*b^18*c^3*d*f*z^2 - 2571632640*a^9*b^
5*c^8*d*m*z^2 + 2548039680*a^9*b^3*c^10*d*h*z^2 + 1509949440*a^10*b^3*c^9*e
*l*z^2 + 1509949440*a^9*b^3*c^10*e*g*z^2 - 1401421824*a^8*b^5*c^9*d*h*z^2 -

1321205760*a^9*b^2*c^11*d*f*z^2 - 2793406464*a^11*b*c^10*d*m*z^2 + 8906342
40*a^8*b^7*c^7*d*m*z^2 - 754974720*a^10*b^4*c^8*g*l*z^2 - 754974720*a^9*b^5
*c^8*e*l*z^2 + 719585280*a^8*b^6*c^8*d*k*z^2 - 707788800*a^9*b^4*c^9*d*k*z^
2 - 754974720*a^8*b^5*c^9*e*g*z^2 + 603979776*a^11*b^2*c^9*g*l*z^2 - 581959
680*a^10*b^4*c^8*f*m*z^2 + 732168192*a^7*b^6*c^9*d*f*z^2 + 534773760*a^11*b
^3*c^8*h*m*z^2 - 456130560*a^11*b^4*c^7*k*m*z^2 - 603979776*a^10*b^2*c^10*e
*j*z^2 + 534773760*a^10*b^3*c^9*f*k*z^2 + 384040960*a^9*b^6*c^7*f*m*z^2 + 3
77487360*a^9*b^6*c^7*g*l*z^2 - 456130560*a^9*b^4*c^9*f*h*z^2 + 301989888*a^
11*b^3*c^8*j*l*z^2 - 415236096*a^10*b^2*c^10*d*k*z^2 + 254017536*a^10*b^6*c
^6*k*m*z^2 - 330301440*a^10*b^4*c^8*h*k*z^2 + 390463488*a^7*b^7*c^8*d*h*z^2
 + 188743680*a^12*b^2*c^8*k*m*z^2 + 301989888*a^10*b^3*c^9*g*j*z^2 - 297861
120*a^7*b^8*c^7*d*k*z^2 - 366280704*a^6*b^8*c^8*d*f*z^2 + 188743680*a^11*b^
2*c^9*h*k*z^2 - 330301440*a^8*b^4*c^10*d*f*z^2 + 254017536*a^8*b^6*c^8*f*h*
z^2 - 1887436800*a^10*b*c^11*d*h*z^2 + 188743680*a^8*b^7*c^7*e*l*z^2 + 1533
54240*a^9*b^6*c^7*h*k*z^2 - 185303040*a^7*b^9*c^6*d*m*z^2 - 117964800*a^10*
b^5*c^7*h*m*z^2 - 61931520*a^9*b^8*c^5*k*m*z^2 + 121634816*a^11*b^2*c^9*f*m
*z^2 - 115671040*a^8*b^8*c^6*f*m*z^2 - 62914560*a^9*b^7*c^6*j*l*z^2 + 18874
3680*a^10*b^2*c^10*f*h*z^2 - 94371840*a^8*b^8*c^6*g*l*z^2 + 6144000*a^8*b^1
0*c^4*k*m*z^2 - 117964800*a^9*b^5*c^8*f*k*z^2 + 61440*a^7*b^12*c^3*k*m*z^2
- 46080*a^6*b^14*c^2*k*m*z^2 + 23592960*a^8*b^9*c^5*j*l*z^2 + 188743680*a^7
*b^7*c^8*e*g*z^2 - 37355520*a^9*b^7*c^6*h*m*z^2 + 125829120*a^8*b^6*c^8*e*j
*z^2 + 23101440*a^8*b^9*c^5*h*m*z^2 - 3538944*a^7*b^11*c^4*j*l*z^2 + 196608
*a^6*b^13*c^3*j*l*z^2 - 4349952*a^7*b^11*c^4*h*m*z^2 + 337920*a^6*b^13*c^3*
h*m*z^2 - 7680*a^5*b^15*c^2*h*m*z^2 - 62914560*a^8*b^7*c^7*g*j*z^2 - 265420
80*a^8*b^8*c^6*h*k*z^2 + 17940480*a^7*b^10*c^5*f*m*z^2 + 11796480*a^7*b^10*
c^5*g*l*z^2 - 37355520*a^8*b^7*c^7*f*k*z^2 - 1347584*a^6*b^12*c^4*f*m*z^2 +
 68272128*a^6*b^10*c^6*d*k*z^2 - 589824*a^6*b^12*c^4*g*l*z^2 + 552960*a^6*b
^12*c^4*h*k*z^2 - 147456*a^7*b^10*c^5*h*k*z^2 - 46080*a^5*b^14*c^3*h*k*z^2
+ 35840*a^5*b^14*c^3*f*m*z^2 + 23592960*a^7*b^9*c^6*g*j*z^2 - 23592960*a^7*
b^9*c^6*e*l*z^2 + 23371776*a^6*b^11*c^5*d*m*z^2 + 23101440*a^7*b^9*c^6*f*k*
z^2 - 47185920*a^7*b^8*c^7*e*j*z^2 - 61931520*a^7*b^8*c^7*f*h*z^2 - 4349952
*a^6*b^11*c^5*f*k*z^2 - 3538944*a^6*b^11*c^5*g*j*z^2 - 1677312*a^5*b^13*c^4
*d*m*z^2 + 1179648*a^6*b^11*c^5*e*l*z^2 + 337920*a^5*b^13*c^4*f*k*z^2 + 196
608*a^5*b^13*c^4*g*j*z^2 + 53760*a^4*b^15*c^3*d*m*z^2 - 7680*a^4*b^15*c^3*f
*k*z^2 + 96583680*a^5*b^10*c^7*d*f*z^2 - 9179136*a^5*b^12*c^5*d*k*z^2 + 707
7888*a^6*b^10*c^6*e*j*z^2 - 51609600*a^6*b^9*c^7*d*h*z^2 + 691200*a^4*b^14*
c^4*d*k*z^2 - 393216*a^5*b^12*c^5*e*j*z^2 - 23040*a^3*b^16*c^3*d*k*z^2 + 61
44000*a^6*b^10*c^6*f*h*z^2 + 61440*a^5*b^12*c^5*f*h*z^2 - 46080*a^4*b^14*c^
4*f*h*z^2 + 1536*a^3*b^16*c^3*f*h*z^2 - 23592960*a^6*b^9*c^7*e*g*z^2 + 1179
648*a^5*b^11*c^6*e*g*z^2 + 829440*a^4*b^13*c^5*d*h*z^2 + 368640*a^5*b^11*c^
6*d*h*z^2 - 105984*a^3*b^15*c^4*d*h*z^2 + 4608*a^2*b^17*c^3*d*h*z^2 - 15175
680*a^4*b^12*c^6*d*f*z^2 + 1428480*a^3*b^14*c^5*d*f*z^2 - 73728*a^2*b^16*c^
4*d*f*z^2 + 4108320768*a^10*b^3*c^9*d*m*z^2 - 1207959552*a^11*b*c^10*e*l*z^
2 - 1207959552*a^10*b*c^11*e*g*z^2 - 578813952*a^12*b*c^9*h*m*z^2 - 5788139
52*a^11*b*c^10*f*k*z^2 - 402653184*a^12*b*c^9*j*l*z^2 - 402653184*a^11*b*c^
10*g*j*z^2 - 440401920*a^10*b*c^11*f^2*z^2 - 188743680*a^12*b*c^9*k^2*z^2 -
 188743680*a^11*b*c^10*h^2*z^2 + 1761607680*a^10*c^12*d*f*z^2 - 14080*a^6*b
^15*c*m^2*z^2 - 94464*a*b^17*c^4*d^2*z^2 + 6936330240*a^8*b^3*c^11*d^2*z^2
+ 2464874496*a^6*b^7*c^9*d^2*z^2 - 3963617280*a^9*b*c^12*d^2*z^2 + 10569646
08*a^11*c^11*d*k*z^2 + 805306368*a^11*c^11*e*j*z^2 + 419430400*a^12*c^10*f*
m*z^2 + 251658240*a^13*c^9*k*m*z^2 - 1509949440*a^9*b^2*c^11*e^2*z^2 + 2516
58240*a^11*c^11*f*h*z^2 + 150994944*a^12*c^10*h*k*z^2 - 5400428544*a^7*b^5*
c^10*d^2*z^2 + 754974720*a^8*b^4*c^10*e^2*z^2 - 730054656*a^5*b^9*c^8*d^2*z
^2 + 477102080*a^12*b^3*c^7*m^2*z^2 - 377487360*a^11*b^4*c^7*l^2*z^2 + 4771
02080*a^9*b^3*c^10*f^2*z^2 + 301989888*a^12*b^2*c^8*l^2*z^2 - 377487360*a^9
*b^4*c^9*g^2*z^2 + 301989888*a^10*b^2*c^10*g^2*z^2 - 174325760*a^11*b^5*c^6
*m^2*z^2 + 188743680*a^10*b^6*c^6*l^2*z^2 + 141557760*a^11*b^3*c^8*k^2*z^2
+ 188743680*a^8*b^6*c^8*g^2*z^2 + 141557760*a^10*b^3*c^9*h^2*z^2 - 17432576
0*a^8*b^5*c^9*f^2*z^2 - 188743680*a^7*b^6*c^9*e^2*z^2 - 47185920*a^9*b^8*c^

5*l^2*z^2 + 11206656*a^10*b^7*c^5*m^2*z^2 + 8929280*a^9*b^9*c^4*m^2*z^2 - 2
600960*a^8*b^11*c^3*m^2*z^2 + 291840*a^7*b^13*c^2*m^2*z^2 - 50331648*a^10*b
^4*c^8*j^2*z^2 + 146165760*a^4*b^11*c^7*d^2*z^2 - 26542080*a^9*b^7*c^6*k^2*
z^2 + 5898240*a^8*b^10*c^4*l^2*z^2 - 294912*a^7*b^12*c^3*l^2*z^2 - 33554432
*a^11*b^2*c^9*j^2*z^2 + 9584640*a^8*b^9*c^5*k^2*z^2 + 20971520*a^9*b^6*c^7*
j^2*z^2 - 2359296*a^10*b^5*c^7*k^2*z^2 - 1290240*a^7*b^11*c^4*k^2*z^2 + 460
80*a^6*b^13*c^3*k^2*z^2 + 2304*a^5*b^15*c^2*k^2*z^2 - 2752512*a^7*b^10*c^5*
j^2*z^2 + 2621440*a^8*b^8*c^6*j^2*z^2 + 524288*a^6*b^12*c^4*j^2*z^2 - 32768
*a^5*b^14*c^3*j^2*z^2 - 47185920*a^7*b^8*c^7*g^2*z^2 - 26542080*a^8*b^7*c^7
*h^2*z^2 + 9584640*a^7*b^9*c^6*h^2*z^2 - 2359296*a^9*b^5*c^8*h^2*z^2 - 1290
240*a^6*b^11*c^5*h^2*z^2 + 46080*a^5*b^13*c^4*h^2*z^2 + 2304*a^4*b^15*c^3*h
^2*z^2 + 5898240*a^6*b^10*c^6*g^2*z^2 - 294912*a^5*b^12*c^5*g^2*z^2 + 11206
656*a^7*b^7*c^8*f^2*z^2 + 8929280*a^6*b^9*c^7*f^2*z^2 + 23592960*a^6*b^8*c^
8*e^2*z^2 - 2600960*a^5*b^11*c^6*f^2*z^2 + 291840*a^4*b^13*c^5*f^2*z^2 - 14
080*a^3*b^15*c^4*f^2*z^2 + 256*a^2*b^17*c^3*f^2*z^2 - 19860480*a^3*b^13*c^6
*d^2*z^2 - 1179648*a^5*b^10*c^7*e^2*z^2 + 1771776*a^2*b^15*c^5*d^2*z^2 - 44
0401920*a^13*b*c^8*m^2*z^2 + 1207959552*a^10*c^12*e^2*z^2 + 134217728*a^12*
c^10*j^2*z^2 + 256*a^5*b^17*m^2*z^2 + 2304*b^19*c^3*d^2*z^2 - 23592960*a^10
*b*c^8*f*k*l*z + 99090432*a^9*b*c^9*d*h*l*z + 9437184*a^10*b*c^8*e*k*m*z +
23592960*a^10*b*c^8*g*h*m*z + 141557760*a^8*b*c^10*d*e*k*z + 47185920*a^9*b
*c^9*d*j*k*z - 23592960*a^9*b*c^9*f*g*k*z + 169869312*a^7*b*c^11*d*e*f*z +
99090432*a^8*b*c^10*d*g*h*z - 3145728*a^9*b*c^9*f*h*j*z + 56623104*a^8*b*c^
10*d*f*j*z + 1536*a*b^15*c^3*d*f*j*z - 9437184*a^8*b*c^10*e*f*h*z - 4608*a*
b^14*c^4*d*f*g*z + 9216*a*b^13*c^5*d*e*f*z + 412876800*a^8*b^2*c^9*d*e*m*z
- 206438400*a^9*b^3*c^7*d*l*m*z + 5898240*a^10*b^4*c^5*k*l*m*z - 206438400*
a^8*b^3*c^8*d*g*m*z - 4718592*a^11*b^2*c^6*k*l*m*z - 2949120*a^9*b^6*c^4*k*
l*m*z + 737280*a^8*b^8*c^3*k*l*m*z - 92160*a^7*b^10*c^2*k*l*m*z + 103219200
*a^8*b^5*c^6*d*l*m*z - 29491200*a^10*b^3*c^6*h*l*m*z - 206438400*a^7*b^4*c^
8*d*e*m*z - 2359296*a^10*b^3*c^6*j*k*m*z + 491520*a^8*b^7*c^4*j*k*m*z - 184
320*a^7*b^9*c^3*j*k*m*z + 27648*a^6*b^11*c^2*j*k*m*z + 14745600*a^9*b^5*c^5
*h*l*m*z - 3686400*a^8*b^7*c^4*h*l*m*z + 460800*a^7*b^9*c^3*h*l*m*z - 23040
*a^6*b^11*c^2*h*l*m*z + 88473600*a^8*b^4*c^7*d*k*l*z + 82575360*a^9*b^2*c^8
*d*j*m*z + 11796480*a^10*b^2*c^7*h*j*m*z + 5898240*a^9*b^4*c^6*g*k*m*z - 47
18592*a^10*b^2*c^7*g*k*m*z - 70778880*a^9*b^2*c^8*d*k*l*z - 2949120*a^8*b^6
*c^5*g*k*m*z - 2457600*a^8*b^6*c^5*h*j*m*z + 921600*a^7*b^8*c^4*h*j*m*z + 7
37280*a^7*b^8*c^4*g*k*m*z - 138240*a^6*b^10*c^3*h*j*m*z - 92160*a^6*b^10*c^
3*g*k*m*z + 7680*a^5*b^12*c^2*h*j*m*z + 4608*a^5*b^12*c^2*g*k*m*z + 2949120
0*a^9*b^3*c^7*f*k*l*z - 176947200*a^7*b^3*c^9*d*e*k*z - 109707264*a^8*b^3*c
^8*d*h*l*z - 25804800*a^7*b^7*c^5*d*l*m*z + 103219200*a^7*b^5*c^7*d*g*m*z +
219414528*a^7*b^2*c^10*d*e*h*z - 14745600*a^8*b^5*c^6*f*k*l*z - 29491200*a
^9*b^3*c^7*g*h*m*z - 11796480*a^9*b^3*c^7*e*k*m*z - 44236800*a^7*b^6*c^6*d*
k*l*z + 58982400*a^9*b^2*c^8*e*h*m*z + 5898240*a^8*b^5*c^6*e*k*m*z + 368640
0*a^7*b^7*c^5*f*k*l*z + 3225600*a^6*b^9*c^4*d*l*m*z - 1474560*a^7*b^7*c^5*e
*k*m*z - 460800*a^6*b^9*c^4*f*k*l*z + 184320*a^6*b^9*c^4*e*k*m*z - 161280*a
^5*b^11*c^3*d*l*m*z + 23040*a^5*b^11*c^3*f*k*l*z - 9216*a^5*b^11*c^3*e*k*m*
z + 14745600*a^8*b^5*c^6*g*h*m*z + 110886912*a^7*b^4*c^8*d*f*l*z - 3686400*
a^7*b^7*c^5*g*h*m*z - 221773824*a^6*b^3*c^10*d*e*f*z + 460800*a^6*b^9*c^4*g
*h*m*z - 17203200*a^7*b^6*c^6*d*j*m*z - 23040*a^5*b^11*c^3*g*h*m*z - 294912
00*a^8*b^4*c^7*e*h*m*z - 11796480*a^9*b^2*c^8*f*j*k*z + 11059200*a^6*b^8*c^
5*d*k*l*z + 6451200*a^6*b^8*c^5*d*j*m*z + 88473600*a^7*b^4*c^8*d*g*k*z + 24
57600*a^7*b^6*c^6*f*j*k*z - 35389440*a^8*b^3*c^8*d*j*k*z - 1382400*a^5*b^10
*c^4*d*k*l*z - 84934656*a^8*b^2*c^9*d*f*l*z - 967680*a^5*b^10*c^4*d*j*m*z -
921600*a^6*b^8*c^5*f*j*k*z + 138240*a^5*b^10*c^4*f*j*k*z + 69120*a^4*b^12*
c^3*d*k*l*z + 53760*a^4*b^12*c^3*d*j*m*z - 7680*a^4*b^12*c^3*f*j*k*z + 4423
6800*a^7*b^5*c^7*d*h*l*z + 7372800*a^7*b^6*c^6*e*h*m*z - 5898240*a^8*b^4*c^
7*f*h*l*z + 4718592*a^9*b^2*c^8*f*h*l*z - 70778880*a^8*b^2*c^9*d*g*k*z + 29
49120*a^7*b^6*c^6*f*h*l*z - 921600*a^6*b^8*c^5*e*h*m*z - 737280*a^6*b^8*c^5
*f*h*l*z + 92160*a^5*b^10*c^4*f*h*l*z + 46080*a^5*b^10*c^4*e*h*m*z - 4608*a
^4*b^12*c^3*f*h*l*z + 29491200*a^8*b^3*c^8*f*g*k*z - 109707264*a^7*b^3*c^9*

```
d*g*h*z - 25804800*a^6*b^7*c^6*d*g*m*z - 58982400*a^8*b^2*c^9*e*f*k*z - 589
82400*a^6*b^6*c^7*d*f*l*z + 7372800*a^6*b^7*c^6*d*j*k*z + 88473600*a^6*b^5*
c^8*d*e*k*z - 2764800*a^5*b^9*c^5*d*j*k*z + 51609600*a^6*b^6*c^7*d*e*m*z +
414720*a^4*b^11*c^4*d*j*k*z - 23040*a^3*b^13*c^3*d*j*k*z - 14745600*a^7*b^5
*c^7*f*g*k*z - 44236800*a^6*b^6*c^7*d*g*k*z - 6635520*a^6*b^7*c^6*d*h*l*z +
 40108032*a^8*b^2*c^9*d*h*j*z + 3686400*a^6*b^7*c^6*f*g*k*z + 3225600*a^5*b
^9*c^5*d*g*m*z + 2359296*a^8*b^3*c^8*f*h*j*z - 491520*a^6*b^7*c^6*f*h*j*z -
 460800*a^5*b^9*c^5*f*g*k*z - 276480*a^5*b^9*c^5*d*h*l*z + 184320*a^5*b^9*c
^5*f*h*j*z + 179712*a^4*b^11*c^4*d*h*l*z - 161280*a^4*b^11*c^4*d*g*m*z - 27
648*a^4*b^11*c^4*f*h*j*z + 23040*a^4*b^11*c^4*f*g*k*z - 13824*a^3*b^13*c^3*
d*h*l*z + 1536*a^3*b^13*c^3*f*h*j*z + 29491200*a^7*b^4*c^8*e*f*k*z + 110886
912*a^6*b^4*c^9*d*f*g*z + 16220160*a^5*b^8*c^6*d*f*l*z - 45613056*a^7*b^3*c
^9*d*f*j*z + 11059200*a^5*b^8*c^6*d*g*k*z - 10321920*a^6*b^6*c^7*d*h*j*z -
7372800*a^6*b^6*c^7*e*f*k*z + 7077888*a^7*b^4*c^8*d*h*j*z - 6451200*a^5*b^8
*c^6*d*e*m*z - 88473600*a^6*b^4*c^9*d*e*h*z + 2396160*a^5*b^8*c^6*d*h*j*z -
 2396160*a^4*b^10*c^5*d*f*l*z - 1382400*a^4*b^10*c^5*d*g*k*z - 84934656*a^7
*b^2*c^10*d*f*g*z + 921600*a^5*b^8*c^6*e*f*k*z + 117964800*a^5*b^5*c^9*d*e*
f*z + 322560*a^4*b^10*c^5*d*e*m*z + 175104*a^3*b^12*c^4*d*f*l*z + 69120*a^3
*b^12*c^4*d*g*k*z - 50688*a^3*b^12*c^4*d*h*j*z - 46080*a^4*b^10*c^5*e*f*k*z
 - 27648*a^4*b^10*c^5*d*h*j*z + 4608*a^2*b^14*c^3*d*h*j*z - 4608*a^2*b^14*c
^3*d*f*l*z + 44236800*a^6*b^5*c^8*d*g*h*z - 5898240*a^7*b^4*c^8*f*g*h*z - 2
2118400*a^5*b^7*c^7*d*e*k*z + 4718592*a^8*b^2*c^9*f*g*h*z + 2949120*a^6*b^6
*c^7*f*g*h*z - 737280*a^5*b^8*c^6*f*g*h*z + 92160*a^4*b^10*c^5*f*g*h*z - 46
08*a^3*b^12*c^4*f*g*h*z + 8847360*a^5*b^7*c^7*d*f*j*z - 58982400*a^5*b^6*c^
8*d*f*g*z - 3809280*a^4*b^9*c^6*d*f*j*z + 2764800*a^4*b^9*c^6*d*e*k*z + 235
9296*a^6*b^5*c^8*d*f*j*z + 681984*a^3*b^11*c^5*d*f*j*z - 138240*a^3*b^11*c^
5*d*e*k*z - 55296*a^2*b^13*c^4*d*f*j*z + 11796480*a^7*b^3*c^9*e*f*h*z - 663
5520*a^5*b^7*c^7*d*g*h*z - 5898240*a^6*b^5*c^8*e*f*h*z + 1474560*a^5*b^7*c^
7*e*f*h*z - 276480*a^4*b^9*c^6*d*g*h*z - 184320*a^4*b^9*c^6*e*f*h*z + 17971
2*a^3*b^11*c^5*d*g*h*z - 13824*a^2*b^13*c^4*d*g*h*z + 9216*a^3*b^11*c^5*e*f
*h*z + 16220160*a^4*b^8*c^7*d*f*g*z + 13271040*a^5*b^6*c^8*d*e*h*z - 239616
0*a^3*b^10*c^6*d*f*g*z + 552960*a^4*b^8*c^7*d*e*h*z - 359424*a^3*b^10*c^6*d
*e*h*z + 175104*a^2*b^12*c^5*d*f*g*z + 27648*a^2*b^12*c^5*d*e*h*z - 3244032
0*a^4*b^7*c^8*d*e*f*z + 4792320*a^3*b^9*c^7*d*e*f*z - 350208*a^2*b^11*c^6*d
*e*f*z + 165150720*a^10*b*c^8*d*l*m*z + 4608*a^6*b^12*c*k*l*m*z + 23592960*
a^11*b*c^7*h*l*m*z + 3145728*a^11*b*c^7*j*k*m*z - 1536*a^5*b^13*c*j*k*m*z +
 165150720*a^9*b*c^9*d*g*m*z + 346816512*a^7*b*c^11*d^2*g*z + 19660800*a^12
*b*c^6*l*m^2*z - 34560*a^7*b^11*c*l*m^2*z - 7077888*a^11*b*c^7*k^2*l*z + 11
008*a^6*b^12*c*j*m^2*z + 19660800*a^11*b*c^7*g*m^2*z + 7077888*a^10*b*c^8*h
^2*l*z + 768*a^5*b^13*c*g*m^2*z - 19660800*a^9*b*c^9*f^2*l*z - 7077888*a^10
*b*c^8*g*k^2*z - 6912*a*b^15*c^3*d^2*l*z + 7077888*a^9*b*c^9*g*h^2*z - 1966
0800*a^8*b*c^10*f^2*g*z - 66816*a*b^14*c^4*d^2*j*z + 214272*a*b^13*c^5*d^2*
g*z - 428544*a*b^12*c^6*d^2*e*z - 330301440*a^9*c^10*d*e*m*z - 110100480*a^
10*c^9*d*j*m*z - 15728640*a^11*c^8*h*j*m*z - 47185920*a^10*c^9*e*h*m*z - 19
8180864*a^8*c^11*d*e*h*z + 15728640*a^10*c^9*f*j*k*z - 66060288*a^9*c^10*d*
h*j*z + 47185920*a^9*c^10*e*f*k*z + 1022754816*a^6*b^2*c^11*d^2*e*z - 64231
8336*a^5*b^4*c^10*d^2*e*z - 511377408*a^7*b^3*c^9*d^2*l*z - 511377408*a^6*b
^3*c^10*d^2*g*z + 321159168*a^6*b^5*c^8*d^2*l*z + 321159168*a^5*b^5*c^9*d^2
*g*z + 225312768*a^7*b^2*c^10*d^2*j*z - 25362432*a^11*b^3*c^5*l*m^2*z + 132
71040*a^10*b^5*c^4*l*m^2*z - 3563520*a^9*b^7*c^3*l*m^2*z + 506880*a^8*b^9*c
^2*l*m^2*z + 10354688*a^11*b^2*c^6*j*m^2*z + 8847360*a^10*b^3*c^6*k^2*l*z -
 4423680*a^9*b^5*c^5*k^2*l*z - 2048000*a^9*b^6*c^4*j*m^2*z + 1105920*a^8*b^
7*c^4*k^2*l*z + 849920*a^8*b^8*c^3*j*m^2*z - 393216*a^10*b^4*c^5*j*m^2*z -
145920*a^7*b^10*c^2*j*m^2*z - 138240*a^7*b^9*c^3*k^2*l*z + 6912*a^6*b^11*c^
2*k^2*l*z - 111697920*a^5*b^7*c^7*d^2*l*z + 223395840*a^4*b^6*c^9*d^2*e*z -
 25362432*a^10*b^3*c^6*g*m^2*z - 3538944*a^10*b^2*c^7*j*k^2*z + 737280*a^8*
b^6*c^5*j*k^2*z + 50724864*a^10*b^2*c^7*e*m^2*z - 276480*a^7*b^8*c^4*j*k^2*
z + 41472*a^6*b^10*c^3*j*k^2*z - 2304*a^5*b^12*c^2*j*k^2*z + 13271040*a^9*b
^5*c^5*g*m^2*z - 8847360*a^9*b^3*c^7*h^2*l*z + 4423680*a^8*b^5*c^6*h^2*l*z
```

- 3563520*a^8*b^7*c^4*g*m^2*z - 1105920*a^7*b^7*c^5*h^2*l*z + 506880*a^7*b^9*c^3*g*m^2*z + 138240*a^6*b^9*c^4*h^2*l*z - 34560*a^6*b^11*c^2*g*m^2*z - 6912*a^5*b^11*c^3*h^2*l*z - 26542080*a^9*b^4*c^6*e*m^2*z + 25362432*a^8*b^3*c^8*f^2*l*z - 13271040*a^7*b^5*c^7*f^2*l*z + 8847360*a^9*b^3*c^7*g*k^2*z + 7127040*a^8*b^6*c^5*e*m^2*z - 4423680*a^8*b^5*c^6*g*k^2*z + 3563520*a^6*b^7*c^6*f^2*l*z + 3538944*a^9*b^2*c^8*h^2*j*z + 1105920*a^7*b^7*c^5*g*k^2*z - 1013760*a^7*b^8*c^4*e*m^2*z - 737280*a^7*b^6*c^6*h^2*j*z - 506880*a^5*b^9*c^5*f^2*l*z + 276480*a^6*b^8*c^5*h^2*j*z - 138240*a^6*b^9*c^4*g*k^2*z + 69120*a^6*b^10*c^3*e*m^2*z - 41472*a^5*b^10*c^4*h^2*j*z + 34560*a^4*b^11*c^4*f^2*l*z + 6912*a^5*b^11*c^3*g*k^2*z + 2304*a^4*b^12*c^3*h^2*j*z - 1536*a^5*b^12*c^2*e*m^2*z - 768*a^3*b^13*c^3*f^2*l*z - 111697920*a^4*b^7*c^8*d^2*g*z + 23362560*a^4*b^9*c^6*d^2*l*z - 17694720*a^9*b^2*c^8*e*k^2*z - 10354688*a^8*b^2*c^9*f^2*j*z - 43646976*a^6*b^4*c^9*d^2*j*z + 8847360*a^8*b^4*c^7*e*k^2*z - 2965248*a^3*b^11*c^5*d^2*l*z - 2211840*a^7*b^6*c^6*e*k^2*z + 2048000*a^6*b^6*c^7*f^2*j*z - 849920*a^5*b^8*c^6*f^2*j*z + 393216*a^7*b^4*c^8*f^2*j*z + 276480*a^6*b^8*c^5*e*k^2*z + 214272*a^2*b^13*c^4*d^2*l*z + 145920*a^4*b^10*c^5*f^2*j*z - 13824*a^5*b^10*c^4*e*k^2*z - 11008*a^3*b^12*c^4*f^2*j*z + 256*a^2*b^14*c^3*f^2*j*z - 32587776*a^5*b^6*c^8*d^2*j*z - 8847360*a^8*b^3*c^8*g*h^2*z + 21657600*a^4*b^8*c^7*d^2*j*z + 4423680*a^7*b^5*c^7*g*h^2*z - 1105920*a^6*b^7*c^6*g*h^2*z + 138240*a^5*b^9*c^5*g*h^2*z - 6912*a^4*b^11*c^4*g*h^2*z + 25362432*a^7*b^3*c^9*f^2*g*z - 5810688*a^3*b^10*c^6*d^2*j*z + 17694720*a^8*b^2*c^9*e*h^2*z + 845568*a^2*b^12*c^5*d^2*j*z - 50724864*a^7*b^2*c^10*e*f^2*z - 13271040*a^6*b^5*c^8*f^2*g*z - 8847360*a^7*b^4*c^8*e*h^2*z + 3563520*a^5*b^7*c^7*f^2*g*z + 2211840*a^6*b^6*c^7*e*h^2*z - 506880*a^4*b^9*c^6*f^2*g*z - 276480*a^5*b^8*c^6*e*h^2*z + 34560*a^3*b^11*c^5*f^2*g*z + 13824*a^4*b^10*c^5*e*h^2*z - 768*a^2*b^13*c^4*f^2*g*z + 26542080*a^6*b^4*c^9*e*f^2*z + 23362560*a^3*b^9*c^7*d^2*g*z - 46725120*a^3*b^8*c^8*d^2*e*z - 7127040*a^5*b^6*c^8*e*f^2*z - 2965248*a^2*b^11*c^6*d^2*g*z + 1013760*a^4*b^8*c^7*e*f^2*z - 69120*a^3*b^10*c^6*e*f^2*z + 1536*a^2*b^12*c^5*e*f^2*z + 5930496*a^2*b^10*c^7*d^2*e*z + 346816512*a^8*b*c^10*d^2*l*z - 693633024*a^7*c^12*d^2*e*z - 231211008*a^8*c^11*d^2*j*z + 768*a^6*b^13*l*m^2*z - 13107200*a^12*c^7*j*m^2*z - 256*a^5*b^14*j*m^2*z + 4718592*a^11*c^8*j*k^2*z - 39321600*a^11*c^8*e*m^2*z - 4718592*a^10*c^9*h^2*j*z + 14155776*a^10*c^9*e*k^2*z + 13107200*a^9*c^10*f^2*j*z + 2304*b^16*c^3*d^2*j*z - 14155776*a^9*c^10*e*h^2*z + 39321600*a^8*c^11*e*f^2*z - 6912*b^15*c^4*d^2*g*z + 13824*b^14*c^5*d^2*e*z + 737280*a^10*b*c^5*j*k*l*m - 2304*a^6*b^9*c*j*k*l*m + 2211840*a^9*b*c^6*e*k*l*m + 1228800*a^9*b*c^6*f*j*l*m + 737280*a^9*b*c^6*g*j*k*m + 442368*a^9*b*c^6*h*j*k*l + 36*a^3*b^12*c*f*h*k*m + 3096576*a^8*b*c^7*d*j*k*l - 12745728*a^8*b*c^7*d*h*k*m + 3686400*a^8*b*c^7*e*f*l*m + 3391488*a^8*b*c^7*e*h*j*m + 2211840*a^8*b*c^7*e*g*k*m + 1327104*a^8*b*c^7*e*h*k*l + 1228800*a^8*b*c^7*f*g*j*m + 737280*a^8*b*c^7*f*h*j*l + 442368*a^8*b*c^7*g*h*j*k + 108*a^2*b^13*c*d*h*k*m + 16367616*a^7*b*c^8*d*e*j*m + 9289728*a^7*b*c^8*d*e*k*l + 5160960*a^7*b*c^8*d*f*j*l + 3391488*a^7*b*c^8*e*f*j*k + 3096576*a^7*b*c^8*d*g*j*k - 19307520*a^7*b*c^8*d*f*h*m + 3686400*a^7*b*c^8*e*f*g*m + 2211840*a^7*b*c^8*e*f*h*l + 1327104*a^7*b*c^8*e*g*h*k + 737280*a^7*b*c^8*f*g*h*j - 180*a*b^13*c^2*d*f*h*m - 540*a*b^12*c^3*d*f*h*k + 15482880*a^6*b*c^9*d*e*f*l + 11059200*a^6*b*c^9*d*e*h*j + 9289728*a^6*b*c^9*d*e*g*k + 5160960*a^6*b*c^9*d*f*g*j - 2304*a*b^11*c^4*d*f*g*j + 2211840*a^6*b*c^9*e*f*g*h + 4608*a*b^10*c^5*d*e*f*j + 15482880*a^5*b*c^10*d*e*f*g - 13824*a*b^9*c^6*d*e*f*g + 36*a*b^14*c*d*f*k*m + 1843200*a^9*b^3*c^4*j*k*l*m + 783360*a^8*b^5*c^3*j*k*l*m + 18432*a^7*b^7*c^2*j*k*l*m - 2211840*a^8*b^4*c^4*g*k*l*m - 1695744*a^9*b^2*c^5*h*j*l*m - 1400832*a^8*b^4*c^4*h*j*l*m - 1105920*a^9*b^2*c^5*g*k*l*m - 253440*a^7*b^6*c^3*h*j*l*m - 69120*a^7*b^6*c^3*g*k*l*m + 11520*a^6*b^8*c^2*h*j*l*m + 6912*a^6*b^8*c^2*g*k*l*m + 4423680*a^8*b^3*c^5*e*k*l*m + 2506752*a^8*b^3*c^5*f*j*l*m + 1843200*a^8*b^3*c^5*g*j*k*m + 1327104*a^8*b^3*c^5*h*j*k*l + 838656*a^7*b^5*c^4*f*j*l*m + 783360*a^7*b^5*c^4*g*j*k*m + 691200*a^7*b^5*c^4*h*j*k*l + 138240*a^7*b^5*c^4*e*k*l*m + 69120*a^6*b^7*c^3*h*j*k*l - 53760*a^6*b^7*c^3*f*j*l*m + 18432*a^6*b^7*c^3*g*j*k*m - 13824*a^6*b^7*c^3*e*k*l*m - 2304*a^5*b^9*c^2*g*j*k*m + 2543616*a^8*b^3*c^5*g*h*l*m + 82

9440*a^7*b^5*c^4*g*h*l*m - 34560*a^6*b^7*c^3*g*h*l*m - 8183808*a^8*b^2*c^6*
d*j*l*m - 3686400*a^8*b^2*c^6*e*j*k*m - 2285568*a^7*b^4*c^5*d*j*l*m - 16957
44*a^8*b^2*c^6*f*j*k*l - 1566720*a^7*b^4*c^5*e*j*k*m - 1400832*a^7*b^4*c^5*
f*j*k*l + 741888*a^6*b^6*c^4*d*j*l*m - 253440*a^6*b^6*c^4*f*j*k*l - 80640*a
^5*b^8*c^3*d*j*l*m - 36864*a^6*b^6*c^4*e*j*k*m + 11520*a^5*b^8*c^3*f*j*k*l
+ 4608*a^5*b^8*c^3*e*j*k*m + 6700032*a^8*b^2*c^6*f*h*k*m + 5103360*a^7*b^4*
c^5*f*h*k*m - 5087232*a^8*b^2*c^6*e*h*l*m - 2838528*a^7*b^4*c^5*f*g*l*m - 1
843200*a^8*b^2*c^6*f*g*l*m - 1695744*a^8*b^2*c^6*g*h*j*m - 1658880*a^7*b^4*
c^5*g*h*k*l - 1658880*a^7*b^4*c^5*e*h*l*m - 1400832*a^7*b^4*c^5*g*h*j*m - 6
63552*a^8*b^2*c^6*g*h*k*l + 483840*a^6*b^6*c^4*f*h*k*m - 253440*a^6*b^6*c^4
*g*h*j*m - 207360*a^6*b^6*c^4*g*h*k*l + 161280*a^6*b^6*c^4*f*g*l*m + 69120*
a^6*b^6*c^4*e*h*l*m - 50040*a^5*b^8*c^3*f*h*k*m + 11520*a^5*b^8*c^3*g*h*j*m
+ 180*a^4*b^10*c^2*f*h*k*m + 4202496*a^7*b^3*c^6*d*j*k*l + 635904*a^6*b^5*
c^5*d*j*k*l - 276480*a^5*b^7*c^4*d*j*k*l + 34560*a^4*b^9*c^3*d*j*k*l - 1667
1744*a^7*b^3*c^6*d*h*k*m + 12275712*a^7*b^3*c^6*d*g*l*m + 5677056*a^7*b^3*c
^6*e*f*l*m + 4423680*a^7*b^3*c^6*e*g*k*m + 3317760*a^7*b^3*c^6*e*h*k*l + 28
01664*a^7*b^3*c^6*e*h*j*m - 2709504*a^6*b^5*c^5*d*g*l*m + 2543616*a^7*b^3*c
^6*f*g*k*l + 2506752*a^7*b^3*c^6*f*g*j*m + 1843200*a^7*b^3*c^6*f*h*j*l + 13
27104*a^7*b^3*c^6*g*h*j*k + 838656*a^6*b^5*c^5*f*g*j*m + 829440*a^6*b^5*c^5
*f*g*k*l + 783360*a^6*b^5*c^5*f*h*j*l + 691200*a^6*b^5*c^5*g*h*j*k + 665280
*a^5*b^7*c^4*d*h*k*m + 506880*a^6*b^5*c^5*e*h*j*m + 414720*a^6*b^5*c^5*e*h*
k*l - 322560*a^6*b^5*c^5*e*f*l*m + 241920*a^5*b^7*c^4*d*g*l*m + 138240*a^6*
b^5*c^5*e*g*k*m - 108540*a^4*b^9*c^3*d*h*k*m + 69120*a^5*b^7*c^4*g*h*j*k -
53760*a^5*b^7*c^4*f*g*j*m - 51840*a^6*b^5*c^5*d*h*k*m - 34560*a^5*b^7*c^4*f
*g*k*l - 23040*a^5*b^7*c^4*e*h*j*m + 18432*a^5*b^7*c^4*f*h*j*l - 13824*a^5*
b^7*c^4*e*g*k*m - 2304*a^4*b^9*c^3*f*h*j*l + 1296*a^3*b^11*c^2*d*h*k*m + 31
924224*a^7*b^2*c^7*d*f*k*m - 24551424*a^7*b^2*c^7*d*e*l*m + 10616832*a^7*b^
2*c^7*e*g*j*l - 8183808*a^7*b^2*c^7*d*g*j*m - 5529600*a^7*b^2*c^7*d*h*j*l +
5419008*a^6*b^4*c^6*d*e*l*m + 5308416*a^6*b^4*c^6*e*g*j*l - 5087232*a^7*b^
2*c^7*e*f*k*l - 5013504*a^7*b^2*c^7*e*f*j*m + 4868352*a^6*b^4*c^6*d*f*k*m -
4644864*a^7*b^2*c^7*d*g*k*l - 3981312*a^6*b^4*c^6*d*g*k*l - 2654208*a^7*b^
2*c^7*e*h*j*k - 2367360*a^5*b^6*c^5*d*f*k*m - 2285568*a^6*b^4*c^6*d*g*j*m -
2211840*a^6*b^4*c^6*d*h*j*l - 1695744*a^7*b^2*c^7*f*g*j*k - 1677312*a^6*b^
4*c^6*e*f*j*m - 1658880*a^6*b^4*c^6*e*f*k*l - 1400832*a^6*b^4*c^6*f*g*j*k -
1382400*a^6*b^4*c^6*e*h*j*k + 1036800*a^5*b^6*c^5*d*g*k*l + 741888*a^5*b^6
*c^5*d*g*j*m - 483840*a^5*b^6*c^5*d*e*l*m + 317952*a^5*b^6*c^5*d*h*j*l + 26
8920*a^4*b^8*c^4*d*f*k*m - 253440*a^5*b^6*c^5*f*g*j*k - 138240*a^5*b^6*c^5*
e*h*j*k + 107520*a^5*b^6*c^5*e*f*j*m - 103680*a^4*b^8*c^4*d*g*k*l - 80640*a
^4*b^8*c^4*d*g*j*m + 69120*a^5*b^6*c^5*e*f*k*l + 11520*a^4*b^8*c^4*f*g*j*k
+ 6912*a^4*b^8*c^4*d*h*j*l - 6912*a^3*b^10*c^3*d*h*j*l + 6120*a^3*b^10*c^3*
d*f*k*m - 1368*a^2*b^12*c^2*d*f*k*m - 5087232*a^7*b^2*c^7*e*g*h*m - 2211840
*a^6*b^4*c^6*f*g*h*l - 1658880*a^6*b^4*c^6*e*g*h*m - 1105920*a^7*b^2*c^7*f*
g*h*l - 69120*a^5*b^6*c^5*f*g*h*l + 69120*a^5*b^6*c^5*e*g*h*m + 6912*a^4*b^
8*c^4*f*g*h*l + 7962624*a^6*b^3*c^7*d*e*k*l - 22164480*a^6*b^3*c^7*d*f*h*m
+ 5160960*a^6*b^3*c^7*d*f*j*l + 4571136*a^6*b^3*c^7*d*e*j*m + 4202496*a^6*b
^3*c^7*d*g*j*k + 2801664*a^6*b^3*c^7*e*f*j*k - 2073600*a^5*b^5*c^6*d*e*k*l
- 1483776*a^5*b^5*c^6*d*e*j*m + 635904*a^5*b^5*c^6*d*g*j*k + 506880*a^5*b^5
*c^6*e*f*j*k - 354816*a^4*b^7*c^5*d*f*j*l + 322560*a^5*b^5*c^6*d*f*j*l - 27
6480*a^4*b^7*c^5*d*g*j*k + 207360*a^4*b^7*c^5*d*e*k*l + 161280*a^4*b^7*c^5*
d*e*j*m + 59904*a^3*b^9*c^4*d*f*j*l + 34560*a^3*b^9*c^4*d*g*j*k - 23040*a^4
*b^7*c^5*e*f*j*k - 2304*a^2*b^11*c^3*d*f*j*l + 8294400*a^6*b^3*c^7*d*g*h*l
+ 5677056*a^6*b^3*c^7*e*f*g*m + 4423680*a^6*b^3*c^7*e*f*h*l + 3317760*a^6*b
^3*c^7*e*g*h*k + 2805120*a^5*b^5*c^6*d*f*h*m + 1843200*a^6*b^3*c^7*f*g*h*j
- 829440*a^5*b^5*c^6*d*g*h*l + 783360*a^5*b^5*c^6*f*g*h*j + 437184*a^4*b^7*
c^5*d*f*h*m + 414720*a^5*b^5*c^6*e*g*h*k - 322560*a^5*b^5*c^6*e*f*g*m - 146
268*a^3*b^9*c^4*d*f*h*m + 138240*a^5*b^5*c^6*e*f*h*l - 62208*a^4*b^7*c^5*d*
g*h*l + 20736*a^3*b^9*c^4*d*g*h*l + 18432*a^4*b^7*c^5*f*g*h*j - 13824*a^4*b
^7*c^5*e*f*h*l + 9360*a^2*b^11*c^3*d*f*h*m - 2304*a^3*b^9*c^4*f*g*h*j - 840
4992*a^6*b^2*c^8*d*e*j*k - 24551424*a^6*b^2*c^8*d*e*g*m + 21150720*a^6*b^2*

c^8*d*f*h*k - 1271808*a^5*b^4*c^7*d*e*j*k + 552960*a^4*b^6*c^6*d*e*j*k - 69
120*a^3*b^8*c^5*d*e*j*k - 16588800*a^6*b^2*c^8*d*e*h*l - 7741440*a^6*b^2*c^
8*d*f*g*l + 6946560*a^5*b^4*c^7*d*f*h*k - 5529600*a^6*b^2*c^8*d*g*h*j + 541
9008*a^5*b^4*c^7*d*e*g*m - 5087232*a^6*b^2*c^8*e*f*g*k - 3870720*a^5*b^4*c^
7*d*f*g*l - 3686400*a^6*b^2*c^8*e*f*h*j - 2211840*a^5*b^4*c^7*d*g*h*j - 175
5648*a^4*b^6*c^6*d*f*h*k - 1658880*a^5*b^4*c^7*e*f*g*k + 1658880*a^5*b^4*c^
7*d*e*h*l - 1566720*a^5*b^4*c^7*e*f*h*j + 1451520*a^4*b^6*c^6*d*f*g*l - 483
840*a^4*b^6*c^6*d*e*g*m + 317952*a^4*b^6*c^6*d*g*h*j - 193536*a^3*b^8*c^5*d
*f*g*l + 124416*a^4*b^6*c^6*d*e*h*l + 114696*a^3*b^8*c^5*d*f*h*k + 69120*a^
4*b^6*c^6*e*f*g*k - 41472*a^3*b^8*c^5*d*e*h*l - 36864*a^4*b^6*c^6*e*f*h*j +
 14580*a^2*b^10*c^4*d*f*h*k + 6912*a^3*b^8*c^5*d*g*h*j - 6912*a^2*b^10*c^4*
d*g*h*j + 6912*a^2*b^10*c^4*d*f*g*l + 4608*a^3*b^8*c^5*e*f*h*j + 7962624*a^
5*b^3*c^8*d*e*g*k + 7741440*a^5*b^3*c^8*d*e*f*l + 5160960*a^5*b^3*c^8*d*f*g
*j + 4423680*a^5*b^3*c^8*d*e*h*j - 2903040*a^4*b^5*c^7*d*e*f*l - 2073600*a^
4*b^5*c^7*d*e*g*k - 635904*a^4*b^5*c^7*d*e*h*j + 387072*a^3*b^7*c^6*d*e*f*l
 - 354816*a^3*b^7*c^6*d*f*g*j + 322560*a^4*b^5*c^7*d*f*g*j + 207360*a^3*b^7
*c^6*d*e*g*k + 59904*a^2*b^9*c^5*d*f*g*j - 13824*a^3*b^7*c^6*d*e*h*j + 1382
4*a^2*b^9*c^5*d*e*h*j - 13824*a^2*b^9*c^5*d*e*f*l + 4423680*a^5*b^3*c^8*e*f
*g*h + 138240*a^4*b^5*c^7*e*f*g*h - 13824*a^3*b^7*c^6*e*f*g*h - 10321920*a^
5*b^2*c^9*d*e*f*j + 709632*a^3*b^6*c^7*d*e*f*j - 645120*a^4*b^4*c^8*d*e*f*j
 - 119808*a^2*b^8*c^6*d*e*f*j - 16588800*a^5*b^2*c^9*d*e*g*h + 1658880*a^4*
b^4*c^8*d*e*g*h + 124416*a^3*b^6*c^7*d*e*g*h - 41472*a^2*b^8*c^6*d*e*g*h +
7741440*a^4*b^3*c^9*d*e*f*g - 2903040*a^3*b^5*c^8*d*e*f*g + 387072*a^2*b^7*
c^7*d*e*f*g + 3456*a^7*b^8*c*k*l^2*m + 12672*a^7*b^8*c*j*l*m^2 + 384*a^5*b^
10*c*j^2*k*m - 1635840*a^10*b*c^5*h*k*m^2 - 1009152*a^9*b*c^6*h^2*k*m + 369
0*a^6*b^9*c*h*k*m^2 + 1152*a^6*b^9*c*g*l*m^2 - 540*a^5*b^10*c*h*k^2*m + 54*
a^4*b^11*c*h^2*k*m + 565248*a^9*b*c^6*h*j^2*m - 39771648*a^7*b*c^8*d^2*k*m
- 2496000*a^8*b*c^7*f^2*k*m - 1543680*a^9*b*c^6*f*k^2*m + 1980*a^5*b^10*c*f
*k*m^2 - 384*a^5*b^10*c*g*j*m^2 - 180*a^4*b^11*c*f*k^2*m + 6*a^2*b^13*c*f^2
*k*m - 10298880*a^9*b*c^6*d*k*m^2 + 2580480*a^9*b*c^6*e*j*m^2 + 5310*a^4*b^
11*c*d*k*m^2 - 1674*a*b^13*c^2*d^2*k*m - 540*a^3*b^12*c*d*k^2*m - 10616832*
a^7*b*c^8*e^2*j*l - 3538944*a^8*b*c^7*e*j^2*l + 2727936*a^8*b*c^7*d*j^2*m -
 2496000*a^9*b*c^6*f*h*m^2 - 1543680*a^8*b*c^7*f*h^2*m + 565248*a^8*b*c^7*f
*j^2*k - 270*a^4*b^11*c*f*h*m^2 - 59512320*a^6*b*c^9*d^2*f*m + 5087232*a^7*
b*c^8*e^2*h*m + 1105920*a^8*b*c^7*e*j*k^2 - 3456*a*b^12*c^3*d^2*j*l - 16358
40*a^7*b*c^8*f^2*h*k - 1009152*a^8*b*c^7*f*h*k^2 + 10260*a*b^12*c^3*d^2*h*m
 - 684*a^3*b^12*c*d*h*m^2 - 24675840*a^6*b*c^9*d^2*h*k - 15552000*a^8*b*c^7
*d*f*m^2 + 24551424*a^6*b*c^9*d*e^2*m - 3939840*a^7*b*c^8*d*h^2*k + 1105920
*a^7*b*c^8*e*h^2*j - 25074*a*b^11*c^4*d^2*f*m + 10530*a*b^11*c^4*d^2*h*k +
10368*a*b^11*c^4*d^2*g*l + 420*a*b^12*c^3*d*f^2*m - 378*a^2*b^13*c*d*f*m^2
- 10616832*a^6*b*c^9*e^2*g*j + 5087232*a^6*b*c^9*e^2*f*k - 3538944*a^7*b*c^
8*e*g*j^2 + 1843200*a^7*b*c^8*d*h*j^2 - 7994880*a^6*b*c^9*d*f^2*k - 4990464
*a^7*b*c^8*d*f*k^2 + 2580480*a^6*b*c^9*e*f^2*j + 65664*a*b^10*c^5*d^2*g*j -
 27972*a*b^10*c^5*d^2*f*k - 20736*a*b^10*c^5*d^2*e*l + 1260*a*b^11*c^4*d*f^
2*k + 54*a*b^13*c^2*d*f*k^2 + 23224320*a^5*b*c^10*d^2*e*j - 37062144*a^5*b*
c^10*d^2*f*h + 384*a*b^12*c^3*d*f*j^2 - 131328*a*b^9*c^6*d^2*e*j - 5985792*
a^6*b*c^9*d*f*h^2 + 206010*a*b^9*c^6*d^2*f*h - 6300*a*b^10*c^5*d*f^2*h + 13
50*a*b^11*c^4*d*f*h^2 + 16588800*a^5*b*c^10*d*e^2*h + 3456*a*b^10*c^5*d*f*g
^2 + 435456*a*b^8*c^7*d^2*e*g + 13824*a*b^8*c^7*d*e^2*f - 1474560*a^9*c^7*e
*j*k*m + 460800*a^9*c^7*f*h*k*m + 3225600*a^8*c^8*d*f*k*m - 2457600*a^8*c^8
*e*f*j*m - 884736*a^8*c^8*e*h*j*k - 6193152*a^7*c^9*d*e*j*k + 1935360*a^7*c
^9*d*f*h*k - 1474560*a^7*c^9*e*f*h*j - 10321920*a^6*c^10*d*e*f*j - 1105920*
a^9*b^4*c^3*k*l^2*m - 552960*a^10*b^2*c^4*k*l^2*m - 34560*a^8*b^6*c^2*k*l^2
*m - 1290240*a^10*b^2*c^4*j*l*m^2 - 860160*a^9*b^4*c^3*j*l*m^2 - 80640*a^8*
b^6*c^2*j*l*m^2 - 737280*a^9*b^2*c^5*j^2*k*m - 568320*a^8*b^4*c^4*j^2*k*m -
 136704*a^7*b^6*c^3*j^2*k*m - 2304*a^6*b^8*c^2*j^2*k*m + 1271808*a^9*b^3*c^
4*h*l^2*m - 552960*a^9*b^2*c^5*j*k^2*l - 552960*a^8*b^4*c^4*j*k^2*l + 41472
0*a^8*b^5*c^3*h*l^2*m - 145152*a^7*b^6*c^3*j*k^2*l - 17280*a^7*b^7*c^2*h*l^
2*m - 3456*a^6*b^8*c^2*j*k^2*l - 3640320*a^9*b^3*c^4*h*k*m^2 - 2626560*a^8*

b^3*c^5*h^2*k*m + 2211840*a^9*b^2*c^5*h*k^2*m + 2056320*a^8*b^4*c^4*h*k^2*m
 + 1935360*a^9*b^3*c^4*g*l*m^2 - 1143360*a^8*b^5*c^3*h*k*m^2 - 1097280*a^7*
b^5*c^4*h^2*k*m + 364608*a^7*b^6*c^3*h*k^2*m + 322560*a^8*b^5*c^3*g*l*m^2 -
 56160*a^6*b^7*c^3*h^2*k*m - 40320*a^7*b^7*c^2*g*l*m^2 + 27936*a^7*b^7*c^2*
h*k*m^2 - 3780*a^6*b^8*c^2*h*k^2*m + 2970*a^5*b^9*c^2*h^2*k*m - 1419264*a^8
*b^4*c^4*f*l^2*m - 1105920*a^7*b^4*c^5*g^2*k*m - 921600*a^9*b^2*c^5*f*l^2*m
 - 829440*a^8*b^4*c^4*h*k*l^2 + 749568*a^8*b^3*c^5*h*j^2*m - 552960*a^8*b^2
*c^6*g^2*k*m - 331776*a^9*b^2*c^5*h*k*l^2 + 317952*a^7*b^5*c^4*h*j^2*m - 10
3680*a^7*b^6*c^3*h*k*l^2 + 80640*a^7*b^6*c^3*f*l^2*m + 38400*a^6*b^7*c^3*h*
j^2*m - 34560*a^6*b^6*c^4*g^2*k*m + 3456*a^5*b^8*c^3*g^2*k*m - 1920*a^5*b^9
*c^2*h*j^2*m - 5142528*a^7*b^3*c^6*f^2*k*m + 5068800*a^9*b^2*c^5*f*k*m^2 -
3870720*a^9*b^2*c^5*e*l*m^2 - 3755520*a^8*b^3*c^5*f*k^2*m + 3000960*a^8*b^4
*c^4*f*k*m^2 - 1290240*a^9*b^2*c^5*g*j*m^2 - 1085760*a^7*b^5*c^4*f*k^2*m -
959040*a^6*b^5*c^5*f^2*k*m - 860160*a^8*b^4*c^4*g*j*m^2 + 829440*a^8*b^3*c^
5*g*k^2*l - 645120*a^8*b^4*c^4*e*l*m^2 - 552960*a^8*b^2*c^6*h^2*j*l - 55296
0*a^7*b^4*c^5*h^2*j*l + 414720*a^7*b^5*c^4*g*k^2*l - 145152*a^6*b^6*c^4*h^2
*j*l + 103200*a^5*b^7*c^4*f^2*k*m - 80640*a^7*b^6*c^3*g*j*m^2 + 80640*a^7*b
^6*c^3*e*l*m^2 + 41280*a^7*b^6*c^3*f*k*m^2 - 37188*a^6*b^8*c^2*f*k*m^2 + 13
536*a^6*b^7*c^3*f*k^2*m + 12672*a^6*b^8*c^2*g*j*m^2 + 10368*a^6*b^7*c^3*g*k
^2*l + 5490*a^5*b^9*c^2*f*k^2*m - 3456*a^5*b^8*c^3*h^2*j*l - 2304*a^6*b^8*c
^2*e*l*m^2 + 810*a^4*b^9*c^3*f^2*k*m - 270*a^3*b^11*c^2*f^2*k*m + 6137856*a
^8*b^3*c^5*d*l^2*m - 4423680*a^7*b^2*c^7*e^2*k*m - 2654208*a^8*b^3*c^5*g*j*
l^2 - 2654208*a^7*b^3*c^6*g^2*j*l + 1769472*a^8*b^2*c^6*g*j^2*l + 1769472*a
^7*b^4*c^5*g*j^2*l - 1354752*a^7*b^5*c^4*d*l^2*m - 1327104*a^7*b^5*c^4*g*j*
l^2 - 1327104*a^6*b^5*c^5*g^2*j*l + 1271808*a^8*b^3*c^5*f*k*l^2 - 1040384*a
^8*b^2*c^6*f*j^2*m - 697344*a^7*b^4*c^5*f*j^2*m - 516096*a^8*b^2*c^6*h*j^2*
k - 451584*a^7*b^4*c^5*h*j^2*k + 442368*a^6*b^6*c^4*g*j^2*l + 414720*a^7*b^
5*c^4*f*k*l^2 - 138240*a^6*b^6*c^4*h*j^2*k - 138240*a^6*b^4*c^6*e^2*k*m - 1
21856*a^6*b^6*c^4*f*j^2*m + 120960*a^6*b^7*c^3*d*l^2*m - 17280*a^6*b^7*c^3*
f*k*l^2 + 13824*a^5*b^6*c^5*e^2*k*m - 11520*a^5*b^8*c^3*h*j^2*k + 8960*a^5*
b^8*c^3*f*j^2*m + 10851840*a^8*b^2*c^6*d*k^2*m - 10464768*a^6*b^3*c^7*d^2*k
*m - 10275840*a^8*b^3*c^5*d*k*m^2 + 7121088*a^5*b^5*c^6*d^2*k*m + 3127680*a
^7*b^4*c^5*d*k^2*m + 1720320*a^8*b^3*c^5*e*j*m^2 - 1658880*a^8*b^2*c^6*e*k^
2*l - 1290240*a^7*b^2*c^7*f^2*j*l + 1271808*a^7*b^3*c^6*g^2*h*m - 1222560*a
^4*b^7*c^5*d^2*k*m + 999360*a^7*b^5*c^4*d*k*m^2 - 860160*a^6*b^4*c^6*f^2*j*
l - 829440*a^7*b^4*c^5*e*k^2*l - 705024*a^6*b^6*c^4*d*k^2*m - 552960*a^8*b^
2*c^6*g*j*k^2 - 552960*a^7*b^4*c^5*g*j*k^2 + 414720*a^6*b^5*c^5*g^2*h*m + 3
19392*a^6*b^7*c^3*d*k*m^2 + 161280*a^7*b^5*c^4*e*j*m^2 - 145152*a^6*b^6*c^4
*g*j*k^2 - 85734*a^5*b^9*c^2*d*k*m^2 - 80640*a^5*b^6*c^5*f^2*j*l - 25344*a^
6*b^7*c^3*e*j*m^2 + 23490*a^3*b^9*c^4*d^2*k*m - 20736*a^6*b^6*c^4*e*k^2*l -
 17280*a^5*b^7*c^4*g^2*h*m + 14148*a^5*b^8*c^3*d*k^2*m + 13716*a^2*b^11*c^3
*d^2*k*m + 12690*a^4*b^10*c^2*d*k^2*m + 12672*a^4*b^8*c^4*f^2*j*l - 3456*a^
5*b^8*c^3*g*j*k^2 + 768*a^5*b^9*c^2*e*j*m^2 - 384*a^3*b^10*c^3*f^2*j*l + 53
08416*a^8*b^2*c^6*e*j*l^2 - 5308416*a^6*b^3*c^7*e^2*j*l - 5142528*a^8*b^3*c
^5*f*h*m^2 + 5068800*a^7*b^2*c^7*f^2*h*m - 3755520*a^7*b^3*c^6*f*h^2*m - 35
38944*a^7*b^3*c^6*e*j^2*l + 3000960*a^6*b^4*c^6*f^2*h*m + 2654208*a^7*b^4*c
^5*e*j*l^2 - 2322432*a^8*b^2*c^6*d*k*l^2 + 2125824*a^7*b^3*c^6*d*j^2*m - 19
90656*a^7*b^4*c^5*d*k*l^2 - 1085760*a^6*b^5*c^5*f*h^2*m - 959040*a^7*b^5*c^
4*f*h*m^2 - 884736*a^6*b^5*c^5*e*j^2*l + 829440*a^7*b^3*c^6*g*h^2*l + 74956
8*a^7*b^3*c^6*f*j^2*k + 518400*a^6*b^6*c^4*d*k*l^2 + 414720*a^6*b^5*c^5*g*h
^2*l + 317952*a^6*b^5*c^5*f*j^2*k + 133632*a^6*b^5*c^5*d*j^2*m + 103200*a^6
*b^7*c^3*f*h*m^2 - 96768*a^5*b^7*c^4*d*j^2*m - 51840*a^5*b^8*c^3*d*k*l^2 +
41280*a^5*b^6*c^5*f^2*h*m + 38400*a^5*b^7*c^4*f*j^2*k - 37188*a^4*b^8*c^4*f
^2*h*m + 13536*a^5*b^7*c^4*f*h^2*m + 13440*a^4*b^9*c^3*d*j^2*m + 10368*a^5*
b^7*c^4*g*h^2*l + 5490*a^4*b^9*c^3*f*h^2*m + 1980*a^3*b^10*c^3*f^2*h*m - 19
20*a^4*b^9*c^3*f*j^2*k + 810*a^5*b^9*c^2*f*h*m^2 - 180*a^3*b^11*c^2*f*h^2*m
 - 30*a^2*b^12*c^2*f^2*h*m + 30067200*a^6*b^2*c^8*d^2*h*m - 11612160*a^6*b^
2*c^8*d^2*j*l + 1658880*a^6*b^3*c^7*e^2*h*m + 1596672*a^4*b^6*c^6*d^2*j*l -
 1419264*a^6*b^4*c^6*f*g^2*m - 1105920*a^7*b^4*c^5*f*h*l^2 + 1105920*a^7*b^

3*c^6*e*j*k^2 - 921600*a^7*b^2*c^7*f*g^2*m - 829440*a^6*b^4*c^6*g^2*h*k - 5
52960*a^8*b^2*c^6*f*h*l^2 - 508032*a^3*b^8*c^5*d^2*j*l - 331776*a^7*b^2*c^7
*g^2*h*k + 290304*a^6*b^5*c^5*e*j*k^2 - 103680*a^5*b^6*c^5*g^2*h*k + 80640*
a^5*b^6*c^5*f*g^2*m - 69120*a^5*b^5*c^6*e^2*h*m + 65664*a^2*b^10*c^4*d^2*j*
l - 34560*a^6*b^6*c^4*f*h*l^2 + 6912*a^5*b^7*c^4*e*j*k^2 + 3456*a^5*b^8*c^3
*f*h*l^2 + 11930112*a^8*b^2*c^6*d*h*m^2 + 8432640*a^7*b^2*c^7*d*h^2*m + 445
0176*a^7*b^4*c^5*d*h*m^2 + 4337280*a^6*b^4*c^6*d*h^2*m - 3870720*a^8*b^2*c^
6*e*g*m^2 - 3640320*a^6*b^3*c^7*f^2*h*k - 2885760*a^5*b^4*c^7*d^2*h*m - 284
4288*a^4*b^6*c^6*d^2*h*m - 2626560*a^7*b^3*c^6*f*h*k^2 + 2211840*a^7*b^2*c^
7*f*h^2*k + 2056320*a^6*b^4*c^6*f*h^2*k + 1935360*a^6*b^3*c^7*f^2*g*l - 191
6928*a^7*b^2*c^7*d*j^2*k - 1687680*a^6*b^6*c^4*d*h*m^2 - 1658880*a^7*b^2*c^
7*e*h^2*l - 1143360*a^5*b^5*c^6*f^2*h*k - 1097280*a^6*b^5*c^5*f*h*k^2 + 101
9412*a^3*b^8*c^5*d^2*h*m - 1007424*a^5*b^6*c^5*d*h^2*m - 912384*a^6*b^4*c^6
*d*j^2*k - 829440*a^6*b^4*c^6*e*h^2*l - 645120*a^7*b^4*c^5*e*g*m^2 - 552960
*a^7*b^2*c^7*g*h^2*j - 552960*a^6*b^4*c^6*g*h^2*j + 364608*a^5*b^6*c^5*f*h^
2*k + 322560*a^5*b^5*c^6*f^2*g*l + 197460*a^5*b^8*c^3*d*h*m^2 - 145152*a^5*
b^6*c^5*g*h^2*j - 143802*a^2*b^10*c^4*d^2*h*m + 80640*a^6*b^6*c^4*e*g*m^2 -
56160*a^5*b^7*c^4*f*h*k^2 + 51948*a^4*b^8*c^4*d*h^2*m - 40320*a^4*b^7*c^5*
f^2*g*l + 34560*a^4*b^8*c^4*d*j^2*k + 27936*a^4*b^7*c^5*f^2*h*k - 20736*a^5
*b^6*c^5*e*h^2*l - 13824*a^5*b^6*c^5*d*j^2*k + 10800*a^3*b^10*c^3*d*h^2*m -
5760*a^3*b^10*c^3*d*j^2*k - 3780*a^4*b^8*c^4*f*h^2*k + 3690*a^3*b^9*c^4*f^
2*h*k - 3456*a^4*b^8*c^4*g*h^2*j + 2970*a^4*b^9*c^3*f*h*k^2 - 2304*a^5*b^8*
c^3*e*g*m^2 + 1152*a^3*b^9*c^4*f^2*g*l - 540*a^3*b^10*c^3*f*h^2*k - 540*a^2
*b^12*c^2*d*h^2*m - 90*a^4*b^10*c^2*d*h*m^2 - 90*a^2*b^11*c^3*f^2*h*k + 54*
a^3*b^11*c^2*f*h*k^2 + 15925248*a^6*b^2*c^8*e^2*g*l - 7962624*a^7*b^3*c^6*e
*g*l^2 - 7962624*a^6*b^3*c^7*e*g^2*l + 23385600*a^6*b^2*c^8*d*f^2*m + 61378
56*a^6*b^3*c^7*d*g^2*m - 5677056*a^6*b^2*c^8*e^2*f*m + 4147200*a^7*b^3*c^6*
d*h*l^2 - 3317760*a^6*b^2*c^8*e^2*h*k - 1354752*a^5*b^5*c^6*d*g^2*m + 12718
08*a^6*b^3*c^7*f*g^2*k - 737280*a^7*b^2*c^7*f*h*j^2 + 17418240*a^5*b^3*c^8*
d^2*g*l - 568320*a^6*b^4*c^6*f*h*j^2 - 414720*a^6*b^5*c^5*d*h*l^2 + 414720*
a^5*b^5*c^6*f*g^2*k - 414720*a^5*b^4*c^7*e^2*h*k + 322560*a^5*b^4*c^7*e^2*f
*m - 136704*a^5*b^6*c^5*f*h*j^2 + 120960*a^4*b^7*c^5*d*g^2*m - 31104*a^5*b^
7*c^4*d*h*l^2 - 17280*a^4*b^7*c^5*f*g^2*k + 10368*a^4*b^9*c^3*d*h*l^2 - 230
4*a^4*b^8*c^4*f*h*j^2 + 384*a^3*b^10*c^3*f*h*j^2 + 50042880*a^5*b^2*c^9*d^2
*f*k - 13271040*a^5*b^3*c^8*d^2*h*k - 13149696*a^7*b^3*c^6*d*f*m^2 + 109065
60*a^4*b^5*c^7*d^2*f*m - 8709120*a^4*b^5*c^7*d^2*g*l - 7418880*a^5*b^3*c^8*
d^2*f*m + 7133184*a^7*b^2*c^7*d*h*k^2 - 6428160*a^6*b^3*c^7*d*h^2*k + 55935
36*a^4*b^5*c^7*d^2*h*k - 3870720*a^6*b^2*c^8*e*f^2*l + 3369600*a^6*b^4*c^6*
d*h*k^2 + 3148992*a^6*b^5*c^5*d*f*m^2 - 2985696*a^3*b^7*c^6*d^2*f*m + 19595
52*a^3*b^7*c^6*d^2*g*l - 1658880*a^7*b^2*c^7*e*g*k^2 - 1505280*a^4*b^6*c^6*
d*f^2*m - 1290240*a^6*b^2*c^8*f^2*g*j - 34836480*a^5*b^2*c^9*d^2*e*l + 1105
920*a^6*b^3*c^7*e*h^2*j - 860160*a^5*b^4*c^7*f^2*g*j - 829440*a^6*b^4*c^6*e
*g*k^2 - 692064*a^3*b^7*c^6*d^2*h*k - 689472*a^5*b^5*c^6*d*h^2*k - 645120*a
^5*b^4*c^7*e*f^2*l - 388800*a^5*b^6*c^5*d*h*k^2 + 378954*a^2*b^9*c^5*d^2*f*
m + 362880*a^5*b^4*c^7*d*f^2*m + 296964*a^3*b^8*c^5*d*f^2*m + 290304*a^5*b^
5*c^6*e*h^2*j + 277344*a^4*b^7*c^5*d*h^2*k - 217728*a^2*b^9*c^5*d^2*g*l - 8
0640*a^4*b^6*c^6*f^2*g*j + 80640*a^4*b^6*c^6*e*f^2*l - 77070*a^4*b^9*c^3*d*
f*m^2 - 30240*a^5*b^7*c^4*d*f*m^2 - 28350*a^3*b^9*c^4*d*h^2*k - 26406*a^2*b
^9*c^5*d^2*h*k - 21060*a^4*b^8*c^4*d*h*k^2 - 20736*a^5*b^6*c^5*e*g*k^2 - 19
278*a^2*b^10*c^4*d*f^2*m + 12672*a^3*b^8*c^5*f^2*g*j + 10044*a^3*b^10*c^3*d
*h*k^2 + 8820*a^3*b^11*c^2*d*f*m^2 + 6912*a^4*b^7*c^5*e*h^2*j - 2304*a^3*b^
8*c^5*e*f^2*l - 1620*a^2*b^11*c^3*d*h^2*k - 384*a^2*b^10*c^4*f^2*g*j + 162*
a^2*b^12*c^2*d*h*k^2 - 5419008*a^5*b^3*c^8*d*e^2*m + 5308416*a^6*b^2*c^8*e*
g^2*j - 5308416*a^5*b^3*c^8*e^2*g*j - 3870720*a^7*b^2*c^7*d*f*l^2 - 3538944
*a^6*b^3*c^7*e*g*j^2 + 2654208*a^5*b^4*c^7*e*g^2*j - 2322432*a^6*b^2*c^8*d*
g^2*k - 1990656*a^5*b^4*c^7*d*g^2*k - 1935360*a^6*b^4*c^6*d*f*l^2 + 1658880
*a^6*b^3*c^7*d*h*j^2 + 1658880*a^5*b^3*c^8*e^2*f*k - 884736*a^5*b^5*c^6*e*g
*j^2 + 725760*a^5*b^6*c^5*d*f*l^2 + 17418240*a^4*b^4*c^8*d^2*e*l + 518400*a
^4*b^6*c^6*d*g^2*k + 483840*a^4*b^5*c^7*d*e^2*m + 262656*a^5*b^5*c^6*d*h*j^

2 - 96768*a^4*b^8*c^4*d*f*l^2 - 69120*a^4*b^5*c^7*e^2*f*k - 55296*a^4*b^7*c
^5*d*h*j^2 - 51840*a^3*b^8*c^5*d*g^2*k + 3456*a^3*b^10*c^3*d*f*l^2 + 1152*a
^3*b^9*c^4*d*h*j^2 + 1152*a^2*b^11*c^3*d*h*j^2 - 15431040*a^4*b^4*c^8*d^2*f
*k - 13248000*a^5*b^3*c^8*d*f^2*k - 11612160*a^5*b^2*c^9*d^2*g*j - 10063872
*a^6*b^3*c^7*d*f*k^2 - 3919104*a^3*b^6*c^7*d^2*e*l + 2554560*a^4*b^5*c^7*d*
f^2*k + 1720320*a^5*b^3*c^8*e*f^2*j + 1596672*a^3*b^6*c^7*d^2*g*j + 1518912
*a^3*b^6*c^7*d^2*f*k - 1105920*a^5*b^4*c^7*f*g^2*h + 838080*a^5*b^5*c^6*d*f
*k^2 - 552960*a^6*b^2*c^8*f*g^2*h - 508032*a^2*b^8*c^6*d^2*g*j + 435456*a^2
*b^8*c^6*d^2*e*l + 161280*a^4*b^5*c^7*e*f^2*j + 116640*a^4*b^7*c^5*d*f*k^2
+ 106812*a^2*b^8*c^6*d^2*f*k - 98208*a^3*b^7*c^6*d*f^2*k - 34560*a^4*b^6*c^
6*f*g^2*h - 27270*a^3*b^9*c^4*d*f*k^2 - 26334*a^2*b^9*c^5*d*f^2*k - 25344*a
^3*b^7*c^6*e*f^2*j + 3456*a^3*b^8*c^5*f*g^2*h + 768*a^2*b^9*c^5*e*f^2*j - 7
02*a^2*b^11*c^3*d*f*k^2 - 7962624*a^5*b^2*c^9*d*e^2*k - 2580480*a^6*b^2*c^8
*d*f*j^2 + 2073600*a^4*b^4*c^8*d*e^2*k - 1658880*a^6*b^2*c^8*e*g*h^2 - 9676
80*a^5*b^4*c^7*d*f*j^2 - 829440*a^5*b^4*c^7*e*g*h^2 - 207360*a^3*b^6*c^7*d*
e^2*k + 64512*a^4*b^6*c^6*d*f*j^2 + 39168*a^3*b^8*c^5*d*f*j^2 - 20736*a^4*b
^6*c^6*e*g*h^2 - 9216*a^2*b^10*c^4*d*f*j^2 - 4423680*a^5*b^2*c^9*e^2*f*h +
4147200*a^5*b^3*c^8*d*g^2*h - 3193344*a^3*b^5*c^8*d^2*e*j + 1016064*a^2*b^7
*c^7*d^2*e*j - 414720*a^4*b^5*c^7*d*g^2*h - 138240*a^4*b^4*c^8*e^2*f*h - 31
104*a^3*b^7*c^6*d*g^2*h + 13824*a^3*b^6*c^7*e^2*f*h + 10368*a^2*b^9*c^5*d*g
^2*h + 15630336*a^5*b^2*c^9*d*f^2*h - 14459904*a^4*b^3*c^9*d^2*f*h + 963014
4*a^3*b^5*c^8*d^2*f*h - 8764416*a^5*b^3*c^8*d*f*h^2 - 3870720*a^5*b^2*c^9*e
*f^2*g + 2867328*a^4*b^4*c^8*d*f^2*h - 2095200*a^2*b^7*c^7*d^2*f*h - 141408
0*a^3*b^6*c^7*d*f^2*h - 34836480*a^4*b^2*c^10*d^2*e*g - 645120*a^4*b^4*c^8*
e*f^2*g + 306720*a^3*b^7*c^6*d*f*h^2 + 197820*a^2*b^8*c^6*d*f^2*h + 146880*
a^4*b^5*c^7*d*f*h^2 + 80640*a^3*b^6*c^7*e*f^2*g - 55350*a^2*b^9*c^5*d*f*h^2
- 2304*a^2*b^8*c^6*e*f^2*g - 3870720*a^5*b^2*c^9*d*f*g^2 - 1935360*a^4*b^4
*c^8*d*f*g^2 - 1658880*a^4*b^3*c^9*d*e^2*h + 725760*a^3*b^6*c^7*d*f*g^2 + 1
7418240*a^3*b^4*c^9*d^2*e*g - 124416*a^3*b^5*c^8*d*e^2*h - 96768*a^2*b^8*c^
6*d*f*g^2 + 41472*a^2*b^7*c^7*d*e^2*h - 3919104*a^2*b^6*c^8*d^2*e*g - 77414
40*a^4*b^2*c^10*d*e^2*f + 2903040*a^3*b^4*c^9*d*e^2*f - 387072*a^2*b^6*c^8*
d*e^2*f - 20160*a^8*b^7*c*l^2*m^2 - 1648128*a^10*b^3*c^3*k*m^3 - 898560*a^9
*b^3*c^4*k^3*m - 354240*a^9*b^5*c^2*k*m^3 - 354240*a^8*b^5*c^3*k^3*m - 2160
0*a^7*b^7*c^2*k^3*m - 13950*a^7*b^8*c*k^2*m^2 + 430080*a^10*b*c^5*j^2*m^2 -
1984*a^6*b^9*c*j^2*m^2 - 884736*a^9*b^3*c^4*j*l^3 - 589824*a^8*b^3*c^5*j^3
*l - 442368*a^8*b^5*c^3*j*l^3 - 294912*a^7*b^5*c^4*j^3*l - 49152*a^6*b^7*c^
3*j^3*l + 1359360*a^10*b^2*c^4*h*m^3 + 1173120*a^9*b^4*c^3*h*m^3 + 743040*a
^7*b^4*c^5*h^3*m + 622080*a^8*b^2*c^6*h^3*m + 184320*a^9*b*c^6*j^2*k^2 + 10
7136*a^6*b^6*c^4*h^3*m - 32640*a^8*b^6*c^2*h*m^3 + 540*a^5*b^8*c^3*h^3*m -
270*a^4*b^10*c^2*h^3*m - 180*a^5*b^10*c*h^2*m^2 - 2293760*a^9*b^3*c^4*f*m^3
- 2293760*a^6*b^3*c^7*f^3*m + 1327104*a^8*b^4*c^4*g*l^3 + 1327104*a^6*b^4*
c^6*g^3*l - 622080*a^8*b^3*c^5*h*k^3 - 622080*a^7*b^3*c^6*h^3*k - 326592*a^
7*b^5*c^4*h*k^3 - 326592*a^6*b^5*c^5*h^3*k - 199360*a^8*b^5*c^3*f*m^3 - 199
360*a^5*b^5*c^6*f^3*m + 61920*a^7*b^7*c^2*f*m^3 + 61920*a^4*b^7*c^5*f^3*m -
38880*a^6*b^7*c^3*h*k^3 - 38880*a^5*b^7*c^4*h^3*k - 3682*a^3*b^9*c^4*f^3*m
- 810*a^5*b^9*c^2*h*k^3 - 810*a^4*b^9*c^3*h^3*k - 70*a^3*b^12*c*f^2*m^2 +
70*a^2*b^11*c^3*f^3*m + 3870720*a^8*b*c^7*e^2*m^2 + 184320*a^8*b*c^7*h^2*j^
2 - 14152320*a^4*b^4*c^8*d^3*m + 10644480*a^5*b^2*c^9*d^3*m + 5483520*a^9*b
^2*c^5*d*m^3 + 4269888*a^3*b^6*c^7*d^3*m - 2654208*a^8*b^3*c^5*e*l^3 + 1359
360*a^6*b^2*c^8*f^3*k + 1330560*a^8*b^4*c^4*d*m^3 + 1173120*a^5*b^4*c^7*f^3
*k - 884736*a^6*b^3*c^7*g^3*j - 826560*a^7*b^6*c^3*d*m^3 + 743040*a^7*b^4*c
^5*f*k^3 + 622080*a^8*b^2*c^6*f*k^3 - 607068*a^2*b^8*c^6*d^3*m - 589824*a^7
*b^3*c^6*g*j^3 - 442368*a^5*b^5*c^6*g^3*j - 294912*a^6*b^5*c^5*g*j^3 + 1451
88*a^6*b^8*c^2*d*m^3 + 107136*a^6*b^6*c^4*f*k^3 - 49152*a^5*b^7*c^4*g*j^3 -
32640*a^4*b^6*c^6*f^3*k - 5796*a^3*b^8*c^5*f^3*k + 540*a^5*b^8*c^3*f*k^3 -
270*a^4*b^10*c^2*f*k^3 + 210*a^2*b^10*c^4*f^3*k + 19077120*a^4*b^3*c^9*d^3
*k + 1658880*a^7*b*c^8*e^2*k^2 + 430080*a^7*b*c^8*f^2*j^2 + 3538944*a^5*b^2
*c^9*e^3*j - 2488320*a^7*b^3*c^6*d*k^3 - 2379456*a^3*b^5*c^8*d^3*k + 117964
8*a^7*b^2*c^7*e*j^3 + 589824*a^6*b^4*c^6*e*j^3 + 98304*a^5*b^6*c^5*e*j^3 -

95904*a^2*b^7*c^7*d^3*k - 57024*a^6*b^5*c^5*d*k^3 + 49248*a^5*b^7*c^4*d*k^3
 - 4050*a^4*b^9*c^3*d*k^3 - 810*a^3*b^11*c^2*d*k^3 - 486*a*b^12*c^3*d^2*k^2
 + 3870720*a^6*b*c^9*d^2*j^2 - 1648128*a^5*b^3*c^8*f^3*h - 898560*a^6*b^3*c
^7*f*h^3 - 354240*a^5*b^5*c^6*f*h^3 - 354240*a^4*b^5*c^7*f^3*h + 43680*a^3*
b^7*c^6*f^3*h - 21600*a^4*b^7*c^5*f*h^3 - 9792*a*b^11*c^4*d^2*j^2 + 1350*a^
3*b^9*c^4*f*h^3 - 1050*a^2*b^9*c^5*f^3*h + 1658880*a^6*b*c^9*e^2*h^2 + 1654
7328*a^4*b^2*c^10*d^3*h - 12306816*a^3*b^4*c^9*d^3*h + 37310976*a^3*b^3*c^1
0*d^3*f + 3037824*a^2*b^6*c^8*d^3*h - 2654208*a^5*b^3*c^8*e*g^3 + 1949184*a
^6*b^2*c^8*d*h^3 + 1296000*a^5*b^4*c^7*d*h^3 - 155520*a^4*b^6*c^6*d*h^3 - 4
0500*a*b^10*c^5*d^2*h^2 - 8100*a^3*b^8*c^5*d*h^3 + 4050*a^2*b^10*c^4*d*h^3
 + 3870720*a^5*b*c^10*e^2*f^2 + 34836480*a^4*b*c^11*d^2*e^2 - 108864*a*b^9*c
^6*d^2*g^2 - 8068032*a^2*b^5*c^9*d^3*f - 5623296*a^4*b^3*c^9*d*f^3 + 173779
2*a^3*b^5*c^8*d*f^3 - 260190*a*b^8*c^7*d^2*f^2 - 211680*a^2*b^7*c^7*d*f^3 -
 435456*a*b^7*c^8*d^2*e^2 - 245760*a^10*c^6*j^2*k*m - 384*a^6*b^10*j*l*m^2
 + 138240*a^10*c^6*h*k^2*m - 90*a^5*b^11*h*k*m^2 + 384000*a^10*c^6*f*k*m^2 -
 2211840*a^8*c^8*e^2*k*m - 409600*a^9*c^7*f*j^2*m - 147456*a^9*c^7*h*j^2*k
 - 30*a^4*b^12*f*k*m^2 + 967680*a^9*c^7*d*k^2*m + 384000*a^8*c^8*f^2*h*m - 9
0*a^3*b^13*d*k*m^2 + 20321280*a^7*c^9*d^2*h*m - 883200*a^11*b*c^4*k*m^3 - 3
17952*a^10*b*c^5*k^3*m + 43680*a^8*b^7*c*k*m^3 + 1350*a^6*b^9*c*k^3*m - 270
*b^14*c^2*d^2*h*m + 6*a^3*b^13*f*h*m^2 + 4838400*a^9*c^7*d*h*m^2 + 2903040*
a^8*c^8*d*h^2*m - 1032192*a^8*c^8*d*j^2*k + 138240*a^8*c^8*f*h^2*k - 368640
0*a^7*c^9*e^2*f*m - 1327104*a^7*c^9*e^2*h*k - 393216*a^9*b*c^6*j^3*l - 2457
60*a^8*c^8*f*h*j^2 - 810*b^13*c^3*d^2*h*k + 630*b^13*c^3*d^2*f*m + 18*a^2*b
^14*d*h*m^2 + 2688000*a^7*c^9*d*f^2*m + 580608*a^8*c^8*d*h*k^2 - 5796*a^7*b
^8*c*h*m^3 - 3456*b^12*c^4*d^2*g*j + 1890*b^12*c^4*d^2*f*k + 6773760*a^6*c^
10*d^2*f*k - 1344000*a^10*b*c^5*f*m^3 - 1344000*a^7*b*c^8*f^3*m - 207360*a^
9*b*c^6*h*k^3 - 207360*a^8*b*c^7*h^3*k - 3682*a^6*b^9*c*f*m^3 - 9289728*a^6
*c^10*d*e^2*k - 1720320*a^7*c^9*d*f*j^2 - 50803200*a^5*b*c^10*d^3*k + 6912*
b^11*c^5*d^2*e*j - 10616832*a^6*b*c^9*e^3*l - 2211840*a^6*c^10*e^2*f*h - 39
3216*a^8*b*c^7*g*j^3 + 43416*a*b^10*c^5*d^3*m - 9576*a^5*b^10*c*d*m^3 - 945
0*b^11*c^5*d^2*f*h - 504*a*b^14*c*d^2*m^2 + 1612800*a^6*c^10*d*f^2*h - 1036
800*a^8*b*c^7*d*k^3 + 45198*a*b^9*c^6*d^3*k - 20736*b^10*c^6*d^2*e*g - 7518
8736*a^4*b*c^11*d^3*f - 883200*a^6*b*c^9*f^3*h - 317952*a^7*b*c^8*f*h^3 - 1
5482880*a^5*c^11*d*e^2*f - 10616832*a^5*b*c^10*e^3*g - 345060*a*b^8*c^7*d^3
*h - 4262400*a^5*b*c^10*d*f^3 + 852768*a*b^7*c^8*d^3*f + 7350*a*b^9*c^6*d*f
^3 + 967680*a^10*b^3*c^3*l^2*m^2 + 161280*a^9*b^5*c^2*l^2*m^2 + 1684224*a^1
0*b^2*c^4*k^2*m^2 + 1264320*a^9*b^4*c^3*k^2*m^2 + 126720*a^8*b^6*c^2*k^2*m^
2 + 501760*a^9*b^3*c^4*j^2*m^2 + 414720*a^9*b^3*c^4*k^2*l^2 + 207360*a^8*b^
5*c^3*k^2*l^2 + 170240*a^8*b^5*c^3*j^2*m^2 + 9216*a^7*b^7*c^2*j^2*m^2 + 518
4*a^7*b^7*c^2*k^2*l^2 + 884736*a^9*b^2*c^5*j^2*l^2 + 884736*a^8*b^4*c^4*j^2
*l^2 + 221184*a^7*b^6*c^3*j^2*l^2 + 1419840*a^8*b^4*c^4*h^2*m^2 + 1387008*a
^9*b^2*c^5*h^2*m^2 + 276480*a^8*b^3*c^5*j^2*k^2 + 140544*a^7*b^5*c^4*j^2*k^
2 + 84960*a^7*b^6*c^3*h^2*m^2 + 25344*a^6*b^7*c^3*j^2*k^2 - 8010*a^6*b^8*c^
2*h^2*m^2 + 576*a^5*b^9*c^2*j^2*k^2 + 967680*a^8*b^3*c^5*g^2*m^2 + 414720*a
^8*b^3*c^5*h^2*l^2 + 207360*a^7*b^5*c^4*h^2*l^2 + 161280*a^7*b^5*c^4*g^2*m^
2 - 20160*a^6*b^7*c^3*g^2*m^2 + 5184*a^6*b^7*c^3*h^2*l^2 + 576*a^5*b^9*c^2*
g^2*m^2 + 3808000*a^8*b^2*c^6*f^2*m^2 + 1990656*a^7*b^4*c^5*g^2*l^2 + 16437
12*a^7*b^4*c^5*f^2*m^2 + 803520*a^7*b^4*c^5*h^2*k^2 + 725760*a^8*b^2*c^6*h^
2*k^2 + 207360*a^6*b^6*c^4*h^2*k^2 - 125440*a^6*b^6*c^4*f^2*m^2 - 13790*a^5
*b^8*c^3*f^2*m^2 + 10530*a^5*b^8*c^3*h^2*k^2 + 1785*a^4*b^10*c^2*f^2*m^2 +
81*a^4*b^10*c^2*h^2*k^2 + 18427392*a^7*b^2*c^7*d^2*m^2 + 967680*a^7*b^3*c^6
*f^2*l^2 + 645120*a^7*b^3*c^6*e^2*m^2 + 414720*a^7*b^3*c^6*g^2*k^2 + 276480
*a^7*b^3*c^6*h^2*j^2 + 207360*a^6*b^5*c^5*g^2*k^2 + 161280*a^6*b^5*c^5*f^2*
l^2 + 140544*a^6*b^5*c^5*h^2*j^2 - 80640*a^6*b^5*c^5*e^2*m^2 + 25344*a^5*b^
7*c^4*h^2*j^2 - 20160*a^5*b^7*c^4*f^2*l^2 + 5184*a^5*b^7*c^4*g^2*k^2 + 2304
*a^5*b^7*c^4*e^2*m^2 + 576*a^4*b^9*c^3*h^2*j^2 + 576*a^4*b^9*c^3*f^2*l^2 +
7962624*a^7*b^2*c^7*e^2*l^2 - 4148928*a^6*b^4*c^6*d^2*m^2 + 1419840*a^6*b^4
*c^6*f^2*k^2 + 1387008*a^7*b^2*c^7*f^2*k^2 - 1183392*a^5*b^6*c^5*d^2*m^2 +
884736*a^7*b^2*c^7*g^2*j^2 + 884736*a^6*b^4*c^6*g^2*j^2 + 645750*a^4*b^8*c^

```
4*d^2*m^2 + 221184*a^5*b^6*c^5*g^2*j^2 - 115920*a^3*b^10*c^3*d^2*m^2 + 8496
0*a^5*b^6*c^5*f^2*k^2 + 10836*a^2*b^12*c^2*d^2*m^2 - 8010*a^4*b^8*c^4*f^2*k
^2 - 180*a^3*b^10*c^3*f^2*k^2 + 9*a^2*b^12*c^2*f^2*k^2 + 8709120*a^6*b^3*c^
7*d^2*l^2 - 4354560*a^5*b^5*c^6*d^2*l^2 + 979776*a^4*b^7*c^5*d^2*l^2 + 8294
40*a^6*b^3*c^7*e^2*k^2 + 17480448*a^6*b^2*c^8*d^2*k^2 + 501760*a^6*b^3*c^7*
f^2*j^2 + 170240*a^5*b^5*c^6*f^2*j^2 - 108864*a^3*b^9*c^4*d^2*l^2 + 20736*a
^5*b^5*c^6*e^2*k^2 + 9216*a^4*b^7*c^5*f^2*j^2 + 5184*a^2*b^11*c^3*d^2*l^2 -
 1984*a^3*b^9*c^4*f^2*j^2 + 64*a^2*b^11*c^3*f^2*j^2 + 3538944*a^6*b^2*c^8*e
^2*j^2 - 3302208*a^5*b^4*c^7*d^2*k^2 + 884736*a^5*b^4*c^7*e^2*j^2 + 414720*
a^6*b^3*c^7*g^2*h^2 + 207360*a^5*b^5*c^6*g^2*h^2 - 103680*a^4*b^6*c^6*d^2*k
^2 + 101250*a^3*b^8*c^5*d^2*k^2 - 5751*a^2*b^10*c^4*d^2*k^2 + 5184*a^4*b^7*
c^5*g^2*h^2 + 1935360*a^5*b^3*c^8*d^2*j^2 + 1684224*a^6*b^2*c^8*f^2*h^2 + 1
264320*a^5*b^4*c^7*f^2*h^2 - 532224*a^4*b^5*c^7*d^2*j^2 + 126720*a^4*b^6*c^
6*f^2*h^2 - 96768*a^3*b^7*c^6*d^2*j^2 + 62784*a^2*b^9*c^5*d^2*j^2 - 13950*a
^3*b^8*c^5*f^2*h^2 + 225*a^2*b^10*c^4*f^2*h^2 + 967680*a^5*b^3*c^8*f^2*g^2
+ 829440*a^5*b^3*c^8*e^2*h^2 + 161280*a^4*b^5*c^7*f^2*g^2 + 20736*a^4*b^5*c
^7*e^2*h^2 - 20160*a^3*b^7*c^6*f^2*g^2 + 576*a^2*b^9*c^5*f^2*g^2 + 11487744
*a^5*b^2*c^9*d^2*h^2 + 7962624*a^5*b^2*c^9*e^2*g^2 + 35525376*a^4*b^2*c^10*
d^2*f^2 - 1412640*a^3*b^6*c^7*d^2*h^2 + 461376*a^4*b^4*c^8*d^2*h^2 + 375030
*a^2*b^8*c^6*d^2*h^2 + 8709120*a^4*b^3*c^9*d^2*g^2 - 4354560*a^3*b^5*c^8*d^
2*g^2 + 979776*a^2*b^7*c^7*d^2*g^2 + 645120*a^4*b^3*c^9*e^2*f^2 - 80640*a^3
*b^5*c^8*e^2*f^2 + 2304*a^2*b^7*c^7*e^2*f^2 - 15269184*a^3*b^4*c^9*d^2*f^2
+ 2870784*a^2*b^6*c^8*d^2*f^2 - 17418240*a^3*b^3*c^10*d^2*e^2 + 3919104*a^2
*b^5*c^9*d^2*e^2 + 54*b^15*c*d^2*k*m + 6*a*b^15*d*f*m^2 + 115200*a^11*c^5*k
^2*m^2 + 576*a^7*b^9*l^2*m^2 + 225*a^6*b^10*k^2*m^2 + 64*a^5*b^11*j^2*m^2 +
 345600*a^10*c^6*h^2*m^2 + 9*a^4*b^12*h^2*m^2 + 320000*a^9*c^7*f^2*m^2 + 41
472*a^9*c^7*h^2*k^2 + 16934400*a^8*c^8*d^2*m^2 + 345600*a^8*c^8*f^2*k^2 + 8
1*b^14*c^2*d^2*k^2 + 3538944*a^7*c^9*e^2*j^2 + 2032128*a^7*c^9*d^2*k^2 + 49
2800*a^11*b^2*c^3*m^4 + 351456*a^10*b^4*c^2*m^4 + 576*b^13*c^3*d^2*j^2 + 33
1776*a^9*b^4*c^3*l^4 + 115200*a^7*c^9*f^2*h^2 + 142560*a^8*b^4*c^4*k^4 + 10
3680*a^9*b^2*c^5*k^4 + 32400*a^7*b^6*c^3*k^4 + 2025*b^12*c^4*d^2*h^2 + 2025
*a^6*b^8*c^2*k^4 + 6096384*a^6*c^10*d^2*h^2 + 131072*a^8*b^2*c^6*j^4 + 9830
4*a^7*b^4*c^5*j^4 + 32768*a^6*b^6*c^4*j^4 + 5184*b^11*c^5*d^2*g^2 + 4096*a^
5*b^8*c^3*j^4 + 11025*b^10*c^6*d^2*f^2 + 5644800*a^5*c^11*d^2*f^2 + 142560*
a^6*b^4*c^6*h^4 + 103680*a^7*b^2*c^7*h^4 + 32400*a^5*b^6*c^5*h^4 + 20736*b^
9*c^7*d^2*e^2 + 2025*a^4*b^8*c^4*h^4 + 331776*a^5*b^4*c^7*g^4 + 492800*a^5*
b^2*c^9*f^4 + 351456*a^4*b^4*c^8*f^4 - 43120*a^3*b^6*c^7*f^4 + 1225*a^2*b^8
*c^6*f^4 - 27433728*a^3*b^2*c^11*d^4 + 6446304*a^2*b^4*c^10*d^4 - 1050*a^7*
b^9*k*m^3 + 384000*a^11*c^5*h*m^3 + 138240*a^9*c^7*h^3*m + 210*a^6*b^10*h*m
^3 + 47416320*a^6*c^10*d^3*m - 1134*b^12*c^4*d^3*m + 70*a^5*b^11*f*m^3 + 26
88000*a^10*c^6*d*m^3 + 384000*a^7*c^9*f^3*k + 138240*a^9*c^7*f*k^3 - 3402*b
^11*c^5*d^3*k + 210*a^4*b^12*d*m^3 + 7077888*a^6*c^10*e^3*j + 786432*a^8*c^
8*e*j^3 - 43120*a^9*b^6*c*m^4 + 28449792*a^5*c^11*d^3*h + 17010*b^10*c^6*d^
3*h + 580608*a^7*c^9*d*h^3 - 39690*b^9*c^7*d^3*f - 734832*a*b^6*c^9*d^4 + 9
*b^16*d^2*m^2 + 160000*a^12*c^4*m^4 + 1225*a^8*b^8*m^4 + 20736*a^10*c^6*k^4
 + 65536*a^9*c^7*j^4 + 20736*a^8*c^8*h^4 + 49787136*a^4*c^12*d^4 + 160000*a
^6*c^10*f^4 + 5308416*a^5*c^11*e^4 + 35721*b^8*c^8*d^4 + a^2*b^14*f^2*m^2,
z, k1)*((768*a^2*b^14*c^3*d - 3145728*a^10*c^9*h - 5242880*a^11*c^8*m - 220
20096*a^9*c^10*d - 22272*a^3*b^12*c^4*d + 282624*a^4*b^10*c^5*d - 2027520*a
^5*b^8*c^6*d + 8847360*a^6*b^6*c^7*d - 23396352*a^7*b^4*c^8*d + 34603008*a^
8*b^2*c^9*d + 256*a^3*b^13*c^3*f - 9216*a^4*b^11*c^4*f + 122880*a^5*b^9*c^5
*f - 819200*a^6*b^7*c^6*f + 2949120*a^7*b^5*c^7*f - 5505024*a^8*b^3*c^8*f +
 768*a^4*b^12*c^3*h - 12288*a^5*b^10*c^4*h + 61440*a^6*b^8*c^5*h - 983040*a
^8*b^4*c^7*h + 3145728*a^9*b^2*c^8*h - 3072*a^5*b^11*c^3*k + 61440*a^6*b^9*
c^4*k - 491520*a^7*b^7*c^5*k + 1966080*a^8*b^5*c^6*k - 3932160*a^9*b^3*c^7*
k + 256*a^5*b^12*c^2*m - 61440*a^7*b^8*c^4*m + 655360*a^8*b^6*c^5*m - 29491
20*a^9*b^4*c^6*m + 6291456*a^10*b^2*c^7*m + 4194304*a^9*b*c^9*f + 3145728*a
^10*b*c^8*k)/(512*(4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^2 + 240*a^6*b
^8*c^3 - 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6)) + (x*(157
```

2864*a^9*c^10*e + 524288*a^10*c^9*j - 1536*a^4*b^10*c^5*e + 30720*a^5*b^8*c
^6*e - 245760*a^6*b^6*c^7*e + 983040*a^7*b^4*c^8*e - 1966080*a^8*b^2*c^9*e
+ 768*a^4*b^11*c^4*g - 15360*a^5*b^9*c^5*g + 122880*a^6*b^7*c^6*g - 491520*
a^7*b^5*c^7*g + 983040*a^8*b^3*c^8*g - 256*a^4*b^12*c^3*j + 4608*a^5*b^10*c
^4*j - 30720*a^6*b^8*c^5*j + 81920*a^7*b^6*c^6*j - 393216*a^9*b^2*c^8*j + 7
68*a^5*b^11*c^3*l - 15360*a^6*b^9*c^4*l + 122880*a^7*b^7*c^5*l - 491520*a^8
*b^5*c^6*l + 983040*a^9*b^3*c^7*l - 786432*a^9*b*c^9*g - 786432*a^10*b*c^8*
l))/(64*(4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^2 + 240*a^6*b^8*c^3 - 1
280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6)) + (root(56371445760
*a^11*b^8*c^9*z^4 - 503316480*a^8*b^14*c^6*z^4 + 47185920*a^7*b^16*c^5*z^4
- 2621440*a^6*b^18*c^4*z^4 + 65536*a^5*b^20*c^3*z^4 - 171798691840*a^14*b^2
*c^12*z^4 + 193273528320*a^13*b^4*c^11*z^4 - 128849018880*a^12*b^6*c^10*z^4
- 16911433728*a^10*b^10*c^8*z^4 + 3523215360*a^9*b^12*c^7*z^4 + 6871947673
6*a^15*c^13*z^4 + 1536*a^5*b^16*c*k*m*z^2 + 1536*a*b^18*c^3*d*f*z^2 - 25716
32640*a^9*b^5*c^8*d*m*z^2 + 2548039680*a^9*b^3*c^10*d*h*z^2 + 1509949440*a^
10*b^3*c^9*e*l*z^2 + 1509949440*a^9*b^3*c^10*e*g*z^2 - 1401421824*a^8*b^5*c
^9*d*h*z^2 - 1321205760*a^9*b^2*c^11*d*f*z^2 - 2793406464*a^11*b*c^10*d*m*z
^2 + 890634240*a^8*b^7*c^7*d*m*z^2 - 754974720*a^10*b^4*c^8*g*l*z^2 - 75497
4720*a^9*b^5*c^8*e*l*z^2 + 719585280*a^8*b^6*c^8*d*k*z^2 - 707788800*a^9*b^
4*c^9*d*k*z^2 - 754974720*a^8*b^5*c^9*e*g*z^2 + 603979776*a^11*b^2*c^9*g*l*
z^2 - 581959680*a^10*b^4*c^8*f*m*z^2 + 732168192*a^7*b^6*c^9*d*f*z^2 + 5347
73760*a^11*b^3*c^8*h*m*z^2 - 456130560*a^11*b^4*c^7*k*m*z^2 - 603979776*a^1
0*b^2*c^10*e*j*z^2 + 534773760*a^10*b^3*c^9*f*k*z^2 + 384040960*a^9*b^6*c^7
*f*m*z^2 + 377487360*a^9*b^6*c^7*g*l*z^2 - 456130560*a^9*b^4*c^9*f*h*z^2 +
301989888*a^11*b^3*c^8*j*l*z^2 - 415236096*a^10*b^2*c^10*d*k*z^2 + 25401753
6*a^10*b^6*c^6*k*m*z^2 - 330301440*a^10*b^4*c^8*h*k*z^2 + 390463488*a^7*b^7
*c^8*d*h*z^2 + 188743680*a^12*b^2*c^8*k*m*z^2 + 301989888*a^10*b^3*c^9*g*j*
z^2 - 297861120*a^7*b^8*c^7*d*k*z^2 - 366280704*a^6*b^8*c^8*d*f*z^2 + 18874
3680*a^11*b^2*c^9*h*k*z^2 - 330301440*a^8*b^4*c^10*d*f*z^2 + 254017536*a^8*
b^6*c^8*f*h*z^2 - 1887436800*a^10*b*c^11*d*h*z^2 + 188743680*a^8*b^7*c^7*e*
l*z^2 + 153354240*a^9*b^6*c^7*h*k*z^2 - 185303040*a^7*b^9*c^6*d*m*z^2 - 117
964800*a^10*b^5*c^7*h*m*z^2 - 61931520*a^9*b^8*c^5*k*m*z^2 + 121634816*a^11
*b^2*c^9*f*m*z^2 - 115671040*a^8*b^8*c^6*f*m*z^2 - 62914560*a^9*b^7*c^6*j*l
*z^2 + 188743680*a^10*b^2*c^10*f*h*z^2 - 94371840*a^8*b^8*c^6*g*l*z^2 + 614
4000*a^8*b^10*c^4*k*m*z^2 - 117964800*a^9*b^5*c^8*f*k*z^2 + 61440*a^7*b^12*
c^3*k*m*z^2 - 46080*a^6*b^14*c^2*k*m*z^2 + 23592960*a^8*b^9*c^5*j*l*z^2 + 1
88743680*a^7*b^7*c^8*e*g*z^2 - 37355520*a^9*b^7*c^6*h*m*z^2 + 125829120*a^8
*b^6*c^8*e*j*z^2 + 23101440*a^8*b^9*c^5*h*m*z^2 - 3538944*a^7*b^11*c^4*j*l*
z^2 + 196608*a^6*b^13*c^3*j*l*z^2 - 4349952*a^7*b^11*c^4*h*m*z^2 + 337920*a
^6*b^13*c^3*h*m*z^2 - 7680*a^5*b^15*c^2*h*m*z^2 - 62914560*a^8*b^7*c^7*g*j*
z^2 - 26542080*a^8*b^8*c^6*h*k*z^2 + 17940480*a^7*b^10*c^5*f*m*z^2 + 117964
80*a^7*b^10*c^5*g*l*z^2 - 37355520*a^8*b^7*c^7*f*k*z^2 - 1347584*a^6*b^12*c
^4*f*m*z^2 + 68272128*a^6*b^10*c^6*d*k*z^2 - 589824*a^6*b^12*c^4*g*l*z^2 +
552960*a^6*b^12*c^4*h*k*z^2 - 147456*a^7*b^10*c^5*h*k*z^2 - 46080*a^5*b^14*
c^3*h*k*z^2 + 35840*a^5*b^14*c^3*f*m*z^2 + 23592960*a^7*b^9*c^6*g*j*z^2 - 2
3592960*a^7*b^9*c^6*e*l*z^2 + 23371776*a^6*b^11*c^5*d*m*z^2 + 23101440*a^7*
b^9*c^6*f*k*z^2 - 47185920*a^7*b^8*c^7*e*j*z^2 - 61931520*a^7*b^8*c^7*f*h*z
^2 - 4349952*a^6*b^11*c^5*f*k*z^2 - 3538944*a^6*b^11*c^5*g*j*z^2 - 1677312*
a^5*b^13*c^4*d*m*z^2 + 1179648*a^6*b^11*c^5*e*l*z^2 + 337920*a^5*b^13*c^4*f
*k*z^2 + 196608*a^5*b^13*c^4*g*j*z^2 + 53760*a^4*b^15*c^3*d*m*z^2 - 7680*a^
4*b^15*c^3*f*k*z^2 + 96583680*a^5*b^10*c^7*d*f*z^2 - 9179136*a^5*b^12*c^5*d
*k*z^2 + 7077888*a^6*b^10*c^6*e*j*z^2 - 51609600*a^6*b^9*c^7*d*h*z^2 + 6912
00*a^4*b^14*c^4*d*k*z^2 - 393216*a^5*b^12*c^5*e*j*z^2 - 23040*a^3*b^16*c^3*
d*k*z^2 + 6144000*a^6*b^10*c^6*f*h*z^2 + 61440*a^5*b^12*c^5*f*h*z^2 - 46080
*a^4*b^14*c^4*f*h*z^2 + 1536*a^3*b^16*c^3*f*h*z^2 - 23592960*a^6*b^9*c^7*e*
g*z^2 + 1179648*a^5*b^11*c^6*e*g*z^2 + 829440*a^4*b^13*c^5*d*h*z^2 + 368640
*a^5*b^11*c^6*d*h*z^2 - 105984*a^3*b^15*c^4*d*h*z^2 + 4608*a^2*b^17*c^3*d*h
*z^2 - 15175680*a^4*b^12*c^6*d*f*z^2 + 1428480*a^3*b^14*c^5*d*f*z^2 - 73728
*a^2*b^16*c^4*d*f*z^2 + 4108320768*a^10*b^3*c^9*d*m*z^2 - 1207959552*a^11*b

```
*c^10*e*l*z^2 - 1207959552*a^10*b*c^11*e*g*z^2 - 578813952*a^12*b*c^9*h*m*z
^2 - 578813952*a^11*b*c^10*f*k*z^2 - 402653184*a^12*b*c^9*j*l*z^2 - 4026531
84*a^11*b*c^10*g*j*z^2 - 440401920*a^10*b*c^11*f^2*z^2 - 188743680*a^12*b*c
^9*k^2*z^2 - 188743680*a^11*b*c^10*h^2*z^2 + 1761607680*a^10*c^12*d*f*z^2 -
 14080*a^6*b^15*c*m^2*z^2 - 94464*a*b^17*c^4*d^2*z^2 + 6936330240*a^8*b^3*c
^11*d^2*z^2 + 2464874496*a^6*b^7*c^9*d^2*z^2 - 3963617280*a^9*b*c^12*d^2*z^
2 + 1056964608*a^11*c^11*d*k*z^2 + 805306368*a^11*c^11*e*j*z^2 + 419430400*
a^12*c^10*f*m*z^2 + 251658240*a^13*c^9*k*m*z^2 - 1509949440*a^9*b^2*c^11*e^
2*z^2 + 251658240*a^11*c^11*f*h*z^2 + 150994944*a^12*c^10*h*k*z^2 - 5400428
544*a^7*b^5*c^10*d^2*z^2 + 754974720*a^8*b^4*c^10*e^2*z^2 - 730054656*a^5*b
^9*c^8*d^2*z^2 + 477102080*a^12*b^3*c^7*m^2*z^2 - 377487360*a^11*b^4*c^7*l^
2*z^2 + 477102080*a^9*b^3*c^10*f^2*z^2 + 301989888*a^12*b^2*c^8*l^2*z^2 - 3
77487360*a^9*b^4*c^9*g^2*z^2 + 301989888*a^10*b^2*c^10*g^2*z^2 - 174325760*
a^11*b^5*c^6*m^2*z^2 + 188743680*a^10*b^6*c^6*l^2*z^2 + 141557760*a^11*b^3*
c^8*k^2*z^2 + 188743680*a^8*b^6*c^8*g^2*z^2 + 141557760*a^10*b^3*c^9*h^2*z^
2 - 174325760*a^8*b^5*c^9*f^2*z^2 - 188743680*a^7*b^6*c^9*e^2*z^2 - 4718592
0*a^9*b^8*c^5*l^2*z^2 + 11206656*a^10*b^7*c^5*m^2*z^2 + 8929280*a^9*b^9*c^4
*m^2*z^2 - 2600960*a^8*b^11*c^3*m^2*z^2 + 291840*a^7*b^13*c^2*m^2*z^2 - 503
31648*a^10*b^4*c^8*j^2*z^2 + 146165760*a^4*b^11*c^7*d^2*z^2 - 26542080*a^9*
b^7*c^6*k^2*z^2 + 5898240*a^8*b^10*c^4*l^2*z^2 - 294912*a^7*b^12*c^3*l^2*z^
2 - 33554432*a^11*b^2*c^9*j^2*z^2 + 9584640*a^8*b^9*c^5*k^2*z^2 + 20971520*
a^9*b^6*c^7*j^2*z^2 - 2359296*a^10*b^5*c^7*k^2*z^2 - 1290240*a^7*b^11*c^4*k
^2*z^2 + 46080*a^6*b^13*c^3*k^2*z^2 + 2304*a^5*b^15*c^2*k^2*z^2 - 2752512*a
^7*b^10*c^5*j^2*z^2 + 2621440*a^8*b^8*c^6*j^2*z^2 + 524288*a^6*b^12*c^4*j^2
*z^2 - 32768*a^5*b^14*c^3*j^2*z^2 - 47185920*a^7*b^8*c^7*g^2*z^2 - 26542080
*a^8*b^7*c^7*h^2*z^2 + 9584640*a^7*b^9*c^6*h^2*z^2 - 2359296*a^9*b^5*c^8*h^
2*z^2 - 1290240*a^6*b^11*c^5*h^2*z^2 + 46080*a^5*b^13*c^4*h^2*z^2 + 2304*a^
4*b^15*c^3*h^2*z^2 + 5898240*a^6*b^10*c^6*g^2*z^2 - 294912*a^5*b^12*c^5*g^2
*z^2 + 11206656*a^7*b^7*c^8*f^2*z^2 + 8929280*a^6*b^9*c^7*f^2*z^2 + 2359296
0*a^6*b^8*c^8*e^2*z^2 - 2600960*a^5*b^11*c^6*f^2*z^2 + 291840*a^4*b^13*c^5*
f^2*z^2 - 14080*a^3*b^15*c^4*f^2*z^2 + 256*a^2*b^17*c^3*f^2*z^2 - 19860480*
a^3*b^13*c^6*d^2*z^2 - 1179648*a^5*b^10*c^7*e^2*z^2 + 1771776*a^2*b^15*c^5*
d^2*z^2 - 440401920*a^13*b*c^8*m^2*z^2 + 1207959552*a^10*c^12*e^2*z^2 + 134
217728*a^12*c^10*j^2*z^2 + 256*a^5*b^17*m^2*z^2 + 2304*b^19*c^3*d^2*z^2 - 2
3592960*a^10*b*c^8*f*k*l*z + 99090432*a^9*b*c^9*d*h*l*z + 9437184*a^10*b*c^
8*e*k*m*z + 23592960*a^10*b*c^8*g*h*m*z + 141557760*a^8*b*c^10*d*e*k*z + 47
185920*a^9*b*c^9*d*j*k*z - 23592960*a^9*b*c^9*f*g*k*z + 169869312*a^7*b*c^1
1*d*e*f*z + 99090432*a^8*b*c^10*d*g*h*z - 3145728*a^9*b*c^9*f*h*j*z + 56623
104*a^8*b*c^10*d*f*j*z + 1536*a*b^15*c^3*d*f*j*z - 9437184*a^8*b*c^10*e*f*h
*z - 4608*a*b^14*c^4*d*f*g*z + 9216*a*b^13*c^5*d*e*f*z + 412876800*a^8*b^2*
c^9*d*e*m*z - 206438400*a^9*b^3*c^7*d*l*m*z + 5898240*a^10*b^4*c^5*k*l*m*z
- 206438400*a^8*b^3*c^8*d*g*m*z - 4718592*a^11*b^2*c^6*k*l*m*z - 2949120*a^
9*b^6*c^4*k*l*m*z + 737280*a^8*b^8*c^3*k*l*m*z - 92160*a^7*b^10*c^2*k*l*m*z
 + 103219200*a^8*b^5*c^6*d*l*m*z - 29491200*a^10*b^3*c^6*h*l*m*z - 20643840
0*a^7*b^4*c^8*d*e*m*z - 2359296*a^10*b^3*c^6*j*k*m*z + 491520*a^8*b^7*c^4*j
*k*m*z - 184320*a^7*b^9*c^3*j*k*m*z + 27648*a^6*b^11*c^2*j*k*m*z + 14745600
*a^9*b^5*c^5*h*l*m*z - 3686400*a^8*b^7*c^4*h*l*m*z + 460800*a^7*b^9*c^3*h*l
*m*z - 23040*a^6*b^11*c^2*h*l*m*z + 88473600*a^8*b^4*c^7*d*k*l*z + 82575360
*a^9*b^2*c^8*d*j*m*z + 11796480*a^10*b^2*c^7*h*j*m*z + 5898240*a^9*b^4*c^6*
g*k*m*z - 4718592*a^10*b^2*c^7*g*k*m*z - 70778880*a^9*b^2*c^8*d*k*l*z - 294
9120*a^8*b^6*c^5*g*k*m*z - 2457600*a^8*b^6*c^5*h*j*m*z + 921600*a^7*b^8*c^4
*h*j*m*z + 737280*a^7*b^8*c^4*g*k*m*z - 138240*a^6*b^10*c^3*h*j*m*z - 92160
*a^6*b^10*c^3*g*k*m*z + 7680*a^5*b^12*c^2*h*j*m*z + 4608*a^5*b^12*c^2*g*k*m
*z + 29491200*a^9*b^3*c^7*f*k*l*z - 176947200*a^7*b^3*c^9*d*e*k*z - 1097072
64*a^8*b^3*c^8*d*h*l*z - 25804800*a^7*b^7*c^5*d*l*m*z + 103219200*a^7*b^5*c
^7*d*g*m*z + 219414528*a^7*b^2*c^10*d*e*h*z - 14745600*a^8*b^5*c^6*f*k*l*z
- 29491200*a^9*b^3*c^7*g*h*m*z - 11796480*a^9*b^3*c^7*e*k*m*z - 44236800*a^
7*b^6*c^6*d*k*l*z + 58982400*a^9*b^2*c^8*e*h*m*z + 5898240*a^8*b^5*c^6*e*k*
m*z + 3686400*a^7*b^7*c^5*f*k*l*z + 3225600*a^6*b^9*c^4*d*l*m*z - 1474560*a
```

^7*b^7*c^5*e*k*m*z - 460800*a^6*b^9*c^4*f*k*l*z + 184320*a^6*b^9*c^4*e*k*m*
z - 161280*a^5*b^11*c^3*d*l*m*z + 23040*a^5*b^11*c^3*f*k*l*z - 9216*a^5*b^1
1*c^3*e*k*m*z + 14745600*a^8*b^5*c^6*g*h*m*z + 110886912*a^7*b^4*c^8*d*f*l*
z - 3686400*a^7*b^7*c^5*g*h*m*z - 221773824*a^6*b^3*c^10*d*e*f*z + 460800*a
^6*b^9*c^4*g*h*m*z - 17203200*a^7*b^6*c^6*d*j*m*z - 23040*a^5*b^11*c^3*g*h*
m*z - 29491200*a^8*b^4*c^7*e*h*m*z - 11796480*a^9*b^2*c^8*f*j*k*z + 1105920
0*a^6*b^8*c^5*d*k*l*z + 6451200*a^6*b^8*c^5*d*j*m*z + 88473600*a^7*b^4*c^8*
d*g*k*z + 2457600*a^7*b^6*c^6*f*j*k*z - 35389440*a^8*b^3*c^8*d*j*k*z - 1382
400*a^5*b^10*c^4*d*k*l*z - 84934656*a^8*b^2*c^9*d*f*l*z - 967680*a^5*b^10*c
^4*d*j*m*z - 921600*a^6*b^8*c^5*f*j*k*z + 138240*a^5*b^10*c^4*f*j*k*z + 691
20*a^4*b^12*c^3*d*k*l*z + 53760*a^4*b^12*c^3*d*j*m*z - 7680*a^4*b^12*c^3*f*
j*k*z + 44236800*a^7*b^5*c^7*d*h*l*z + 7372800*a^7*b^6*c^6*e*h*m*z - 589824
0*a^8*b^4*c^7*f*h*l*z + 4718592*a^9*b^2*c^8*f*h*l*z - 70778880*a^8*b^2*c^9*
d*g*k*z + 2949120*a^7*b^6*c^6*f*h*l*z - 921600*a^6*b^8*c^5*e*h*m*z - 737280
*a^6*b^8*c^5*f*h*l*z + 92160*a^5*b^10*c^4*f*h*l*z + 46080*a^5*b^10*c^4*e*h*
m*z - 4608*a^4*b^12*c^3*f*h*l*z + 29491200*a^8*b^3*c^8*f*g*k*z - 109707264*
a^7*b^3*c^9*d*g*h*z - 25804800*a^6*b^7*c^6*d*g*m*z - 58982400*a^8*b^2*c^9*e
*f*k*z - 58982400*a^6*b^6*c^7*d*f*l*z + 7372800*a^6*b^7*c^6*d*j*k*z + 88473
600*a^6*b^5*c^8*d*e*k*z - 2764800*a^5*b^9*c^5*d*j*k*z + 51609600*a^6*b^6*c^
7*d*e*m*z + 414720*a^4*b^11*c^4*d*j*k*z - 23040*a^3*b^13*c^3*d*j*k*z - 1474
5600*a^7*b^5*c^7*f*g*k*z - 44236800*a^6*b^6*c^7*d*g*k*z - 6635520*a^6*b^7*c
^6*d*h*l*z + 40108032*a^8*b^2*c^9*d*h*j*z + 3686400*a^6*b^7*c^6*f*g*k*z + 3
225600*a^5*b^9*c^5*d*g*m*z + 2359296*a^8*b^3*c^8*f*h*j*z - 491520*a^6*b^7*c
^6*f*h*j*z - 460800*a^5*b^9*c^5*f*g*k*z - 276480*a^5*b^9*c^5*d*h*l*z + 1843
20*a^5*b^9*c^5*f*h*j*z + 179712*a^4*b^11*c^4*d*h*l*z - 161280*a^4*b^11*c^4*
d*g*m*z - 27648*a^4*b^11*c^4*f*h*j*z + 23040*a^4*b^11*c^4*f*g*k*z - 13824*a
^3*b^13*c^3*d*h*l*z + 1536*a^3*b^13*c^3*f*h*j*z + 29491200*a^7*b^4*c^8*e*f*
k*z + 110886912*a^6*b^4*c^9*d*f*g*z + 16220160*a^5*b^8*c^6*d*f*l*z - 456130
56*a^7*b^3*c^9*d*f*j*z + 11059200*a^5*b^8*c^6*d*g*k*z - 10321920*a^6*b^6*c^
7*d*h*j*z - 7372800*a^6*b^6*c^7*e*f*k*z + 7077888*a^7*b^4*c^8*d*h*j*z - 645
1200*a^5*b^8*c^6*d*e*m*z - 88473600*a^6*b^4*c^9*d*e*h*z + 2396160*a^5*b^8*c
^6*d*h*j*z - 2396160*a^4*b^10*c^5*d*f*l*z - 1382400*a^4*b^10*c^5*d*g*k*z -
84934656*a^7*b^2*c^10*d*f*g*z + 921600*a^5*b^8*c^6*e*f*k*z + 117964800*a^5*
b^5*c^9*d*e*f*z + 322560*a^4*b^10*c^5*d*e*m*z + 175104*a^3*b^12*c^4*d*f*l*z
 + 69120*a^3*b^12*c^4*d*g*k*z - 50688*a^3*b^12*c^4*d*h*j*z - 46080*a^4*b^10
*c^5*e*f*k*z - 27648*a^4*b^10*c^5*d*h*j*z + 4608*a^2*b^14*c^3*d*h*j*z - 460
8*a^2*b^14*c^3*d*f*l*z + 44236800*a^6*b^5*c^8*d*g*h*z - 5898240*a^7*b^4*c^8
*f*g*h*z - 22118400*a^5*b^7*c^7*d*e*k*z + 4718592*a^8*b^2*c^9*f*g*h*z + 294
9120*a^6*b^6*c^7*f*g*h*z - 737280*a^5*b^8*c^6*f*g*h*z + 92160*a^4*b^10*c^5*
f*g*h*z - 4608*a^3*b^12*c^4*f*g*h*z + 8847360*a^5*b^7*c^7*d*f*j*z - 5898240
0*a^5*b^6*c^8*d*f*g*z - 3809280*a^4*b^9*c^6*d*f*j*z + 2764800*a^4*b^9*c^6*d
*e*k*z + 2359296*a^6*b^5*c^8*d*f*j*z + 681984*a^3*b^11*c^5*d*f*j*z - 138240
*a^3*b^11*c^5*d*e*k*z - 55296*a^2*b^13*c^4*d*f*j*z + 11796480*a^7*b^3*c^9*e
*f*h*z - 6635520*a^5*b^7*c^7*d*g*h*z - 5898240*a^6*b^5*c^8*e*f*h*z + 147456
0*a^5*b^7*c^7*e*f*h*z - 276480*a^4*b^9*c^6*d*g*h*z - 184320*a^4*b^9*c^6*e*f
*h*z + 179712*a^3*b^11*c^5*d*g*h*z - 13824*a^2*b^13*c^4*d*g*h*z + 9216*a^3*
b^11*c^5*e*f*h*z + 16220160*a^4*b^8*c^7*d*f*g*z + 13271040*a^5*b^6*c^8*d*e*
h*z - 2396160*a^3*b^10*c^6*d*f*g*z + 552960*a^4*b^8*c^7*d*e*h*z - 359424*a^
3*b^10*c^6*d*e*h*z + 175104*a^2*b^12*c^5*d*f*g*z + 27648*a^2*b^12*c^5*d*e*h
*z - 32440320*a^4*b^7*c^8*d*e*f*z + 4792320*a^3*b^9*c^7*d*e*f*z - 350208*a^
2*b^11*c^6*d*e*f*z + 165150720*a^10*b*c^8*d*l*m*z + 4608*a^6*b^12*c*k*l*m*z
 + 23592960*a^11*b*c^7*h*l*m*z + 3145728*a^11*b*c^7*j*k*m*z - 1536*a^5*b^13
*c*j*k*m*z + 165150720*a^9*b*c^9*d*g*m*z + 346816512*a^7*b*c^11*d^2*g*z + 1
9660800*a^12*b*c^6*l*m^2*z - 34560*a^7*b^11*c*l*m^2*z - 7077888*a^11*b*c^7*
k^2*l*z + 11008*a^6*b^12*c*j*m^2*z + 19660800*a^11*b*c^7*g*m^2*z + 7077888*
a^10*b*c^8*h^2*l*z + 768*a^5*b^13*c*g*m^2*z - 19660800*a^9*b*c^9*f^2*l*z -
7077888*a^10*b*c^8*g*k^2*z - 6912*a*b^15*c^3*d^2*l*z + 7077888*a^9*b*c^9*g*
h^2*z - 19660800*a^8*b*c^10*f^2*g*z - 66816*a*b^14*c^4*d^2*j*z + 214272*a*b
^13*c^5*d^2*g*z - 428544*a*b^12*c^6*d^2*e*z - 330301440*a^9*c^10*d*e*m*z -

```
110100480*a^10*c^9*d*j*m*z - 15728640*a^11*c^8*h*j*m*z - 47185920*a^10*c^9*
e*h*m*z - 198180864*a^8*c^11*d*e*h*z + 15728640*a^10*c^9*f*j*k*z - 66060288
*a^9*c^10*d*h*j*z + 47185920*a^9*c^10*e*f*k*z + 1022754816*a^6*b^2*c^11*d^2
*e*z - 642318336*a^5*b^4*c^10*d^2*e*z - 511377408*a^7*b^3*c^9*d^2*l*z - 511
377408*a^6*b^3*c^10*d^2*g*z + 321159168*a^6*b^5*c^8*d^2*l*z + 321159168*a^5
*b^5*c^9*d^2*g*z + 225312768*a^7*b^2*c^10*d^2*j*z - 25362432*a^11*b^3*c^5*l
*m^2*z + 13271040*a^10*b^5*c^4*l*m^2*z - 3563520*a^9*b^7*c^3*l*m^2*z + 5068
80*a^8*b^9*c^2*l*m^2*z + 10354688*a^11*b^2*c^6*j*m^2*z + 8847360*a^10*b^3*c
^6*k^2*l*z - 4423680*a^9*b^5*c^5*k^2*l*z - 2048000*a^9*b^6*c^4*j*m^2*z + 11
05920*a^8*b^7*c^4*k^2*l*z + 849920*a^8*b^8*c^3*j*m^2*z - 393216*a^10*b^4*c^
5*j*m^2*z - 145920*a^7*b^10*c^2*j*m^2*z - 138240*a^7*b^9*c^3*k^2*l*z + 6912
*a^6*b^11*c^2*k^2*l*z - 111697920*a^5*b^7*c^7*d^2*l*z + 223395840*a^4*b^6*c
^9*d^2*e*z - 25362432*a^10*b^3*c^6*g*m^2*z - 3538944*a^10*b^2*c^7*j*k^2*z +
 737280*a^8*b^6*c^5*j*k^2*z + 50724864*a^10*b^2*c^7*e*m^2*z - 276480*a^7*b^
8*c^4*j*k^2*z + 41472*a^6*b^10*c^3*j*k^2*z - 2304*a^5*b^12*c^2*j*k^2*z + 13
271040*a^9*b^5*c^5*g*m^2*z - 8847360*a^9*b^3*c^7*h^2*l*z + 4423680*a^8*b^5*
c^6*h^2*l*z - 3563520*a^8*b^7*c^4*g*m^2*z - 1105920*a^7*b^7*c^5*h^2*l*z + 5
06880*a^7*b^9*c^3*g*m^2*z + 138240*a^6*b^9*c^4*h^2*l*z - 34560*a^6*b^11*c^2
*g*m^2*z - 6912*a^5*b^11*c^3*h^2*l*z - 26542080*a^9*b^4*c^6*e*m^2*z + 25362
432*a^8*b^3*c^8*f^2*l*z - 13271040*a^7*b^5*c^7*f^2*l*z + 8847360*a^9*b^3*c^
7*g*k^2*z + 7127040*a^8*b^6*c^5*e*m^2*z - 4423680*a^8*b^5*c^6*g*k^2*z + 356
3520*a^6*b^7*c^6*f^2*l*z + 3538944*a^9*b^2*c^8*h^2*j*z + 1105920*a^7*b^7*c^
5*g*k^2*z - 1013760*a^7*b^8*c^4*e*m^2*z - 737280*a^7*b^6*c^6*h^2*j*z - 5068
80*a^5*b^9*c^5*f^2*l*z + 276480*a^6*b^8*c^5*h^2*j*z - 138240*a^6*b^9*c^4*g*
k^2*z + 69120*a^6*b^10*c^3*e*m^2*z - 41472*a^5*b^10*c^4*h^2*j*z + 34560*a^4
*b^11*c^4*f^2*l*z + 6912*a^5*b^11*c^3*g*k^2*z + 2304*a^4*b^12*c^3*h^2*j*z -
 1536*a^5*b^12*c^2*e*m^2*z - 768*a^3*b^13*c^3*f^2*l*z - 111697920*a^4*b^7*c
^8*d^2*g*z + 23362560*a^4*b^9*c^6*d^2*l*z - 17694720*a^9*b^2*c^8*e*k^2*z -
10354688*a^8*b^2*c^9*f^2*j*z - 43646976*a^6*b^4*c^9*d^2*j*z + 8847360*a^8*b
^4*c^7*e*k^2*z - 2965248*a^3*b^11*c^5*d^2*l*z - 2211840*a^7*b^6*c^6*e*k^2*z
 + 2048000*a^6*b^6*c^7*f^2*j*z - 849920*a^5*b^8*c^6*f^2*j*z + 393216*a^7*b^
4*c^8*f^2*j*z + 276480*a^6*b^8*c^5*e*k^2*z + 214272*a^2*b^13*c^4*d^2*l*z +
145920*a^4*b^10*c^5*f^2*j*z - 13824*a^5*b^10*c^4*e*k^2*z - 11008*a^3*b^12*c
^4*f^2*j*z + 256*a^2*b^14*c^3*f^2*j*z - 32587776*a^5*b^6*c^8*d^2*j*z - 8847
360*a^8*b^3*c^8*g*h^2*z + 21657600*a^4*b^8*c^7*d^2*j*z + 4423680*a^7*b^5*c^
7*g*h^2*z - 1105920*a^6*b^7*c^6*g*h^2*z + 138240*a^5*b^9*c^5*g*h^2*z - 6912
*a^4*b^11*c^4*g*h^2*z + 25362432*a^7*b^3*c^9*f^2*g*z - 5810688*a^3*b^10*c^6
*d^2*j*z + 17694720*a^8*b^2*c^9*e*h^2*z + 845568*a^2*b^12*c^5*d^2*j*z - 507
24864*a^7*b^2*c^10*e*f^2*z - 13271040*a^6*b^5*c^8*f^2*g*z - 8847360*a^7*b^4
*c^8*e*h^2*z + 3563520*a^5*b^7*c^7*f^2*g*z + 2211840*a^6*b^6*c^7*e*h^2*z -
506880*a^4*b^9*c^6*f^2*g*z - 276480*a^5*b^8*c^6*e*h^2*z + 34560*a^3*b^11*c^
5*f^2*g*z + 13824*a^4*b^10*c^5*e*h^2*z - 768*a^2*b^13*c^4*f^2*g*z + 2654208
0*a^6*b^4*c^9*e*f^2*z + 23362560*a^3*b^9*c^7*d^2*g*z - 46725120*a^3*b^8*c^8
*d^2*e*z - 7127040*a^5*b^6*c^8*e*f^2*z - 2965248*a^2*b^11*c^6*d^2*g*z + 101
3760*a^4*b^8*c^7*e*f^2*z - 69120*a^3*b^10*c^6*e*f^2*z + 1536*a^2*b^12*c^5*e
*f^2*z + 5930496*a^2*b^10*c^7*d^2*e*z + 346816512*a^8*b*c^10*d^2*l*z - 6936
33024*a^7*c^12*d^2*e*z - 231211008*a^8*c^11*d^2*j*z + 768*a^6*b^13*l*m^2*z
- 13107200*a^12*c^7*j*m^2*z - 256*a^5*b^14*j*m^2*z + 4718592*a^11*c^8*j*k^2
*z - 39321600*a^11*c^8*e*m^2*z - 4718592*a^10*c^9*h^2*j*z + 14155776*a^10*c
^9*e*k^2*z + 13107200*a^9*c^10*f^2*j*z + 2304*b^16*c^3*d^2*j*z - 14155776*a
^9*c^10*e*h^2*z + 39321600*a^8*c^11*e*f^2*z - 6912*b^15*c^4*d^2*g*z + 13824
*b^14*c^5*d^2*e*z + 737280*a^10*b*c^5*j*k*l*m - 2304*a^6*b^9*c*j*k*l*m + 22
11840*a^9*b*c^6*e*k*l*m + 1228800*a^9*b*c^6*f*j*l*m + 737280*a^9*b*c^6*g*j*
k*m + 442368*a^9*b*c^6*h*j*k*l + 36*a^3*b^12*c*f*h*k*m + 3096576*a^8*b*c^7*
d*j*k*l - 12745728*a^8*b*c^7*d*h*k*m + 3686400*a^8*b*c^7*e*f*l*m + 3391488*
a^8*b*c^7*e*h*j*m + 2211840*a^8*b*c^7*e*g*k*m + 1327104*a^8*b*c^7*e*h*k*l +
 1228800*a^8*b*c^7*f*g*j*m + 737280*a^8*b*c^7*f*h*j*l + 442368*a^8*b*c^7*g*
h*j*k + 108*a^2*b^13*c*d*h*k*m + 16367616*a^7*b*c^8*d*e*j*m + 9289728*a^7*b
*c^8*d*e*k*l + 5160960*a^7*b*c^8*d*f*j*l + 3391488*a^7*b*c^8*e*f*j*k + 3096
```

576*a^7*b*c^8*d*g*j*k - 19307520*a^7*b*c^8*d*f*h*m + 3686400*a^7*b*c^8*e*f*
g*m + 2211840*a^7*b*c^8*e*f*h*l + 1327104*a^7*b*c^8*e*g*h*k + 737280*a^7*b*
c^8*f*g*h*j - 180*a*b^13*c^2*d*f*h*m - 540*a*b^12*c^3*d*f*h*k + 15482880*a^
6*b*c^9*d*e*f*l + 11059200*a^6*b*c^9*d*e*h*j + 9289728*a^6*b*c^9*d*e*g*k +
5160960*a^6*b*c^9*d*f*g*j - 2304*a*b^11*c^4*d*f*g*j + 2211840*a^6*b*c^9*e*f
*g*h + 4608*a*b^10*c^5*d*e*f*j + 15482880*a^5*b*c^10*d*e*f*g - 13824*a*b^9*
c^6*d*e*f*g + 36*a*b^14*c*d*f*k*m + 1843200*a^9*b^3*c^4*j*k*l*m + 783360*a^
8*b^5*c^3*j*k*l*m + 18432*a^7*b^7*c^2*j*k*l*m - 2211840*a^8*b^4*c^4*g*k*l*m
 - 1695744*a^9*b^2*c^5*h*j*l*m - 1400832*a^8*b^4*c^4*h*j*l*m - 1105920*a^9*
b^2*c^5*g*k*l*m - 253440*a^7*b^6*c^3*h*j*l*m - 69120*a^7*b^6*c^3*g*k*l*m +
11520*a^6*b^8*c^2*h*j*l*m + 6912*a^6*b^8*c^2*g*k*l*m + 4423680*a^8*b^3*c^5*
e*k*l*m + 2506752*a^8*b^3*c^5*f*j*l*m + 1843200*a^8*b^3*c^5*g*j*k*m + 13271
04*a^8*b^3*c^5*h*j*k*l + 838656*a^7*b^5*c^4*f*j*l*m + 783360*a^7*b^5*c^4*g*
j*k*m + 691200*a^7*b^5*c^4*h*j*k*l + 138240*a^7*b^5*c^4*e*k*l*m + 69120*a^6
*b^7*c^3*h*j*k*l - 53760*a^6*b^7*c^3*f*j*l*m + 18432*a^6*b^7*c^3*g*j*k*m -
13824*a^6*b^7*c^3*e*k*l*m - 2304*a^5*b^9*c^2*g*j*k*m + 2543616*a^8*b^3*c^5*
g*h*l*m + 829440*a^7*b^5*c^4*g*h*l*m - 34560*a^6*b^7*c^3*g*h*l*m - 8183808*
a^8*b^2*c^6*d*j*l*m - 3686400*a^8*b^2*c^6*e*j*k*m - 2285568*a^7*b^4*c^5*d*j
*l*m - 1695744*a^8*b^2*c^6*f*j*k*l - 1566720*a^7*b^4*c^5*e*j*k*m - 1400832*
a^7*b^4*c^5*f*j*k*l + 741888*a^6*b^6*c^4*d*j*l*m - 253440*a^6*b^6*c^4*f*j*k
*l - 80640*a^5*b^8*c^3*d*j*l*m - 36864*a^6*b^6*c^4*e*j*k*m + 11520*a^5*b^8*
c^3*f*j*k*l + 4608*a^5*b^8*c^3*e*j*k*m + 6700032*a^8*b^2*c^6*f*h*k*m + 5103
360*a^7*b^4*c^5*f*h*k*m - 5087232*a^8*b^2*c^6*e*h*l*m - 2838528*a^7*b^4*c^5
*f*g*l*m - 1843200*a^8*b^2*c^6*f*g*l*m - 1695744*a^8*b^2*c^6*g*h*j*m - 1658
880*a^7*b^4*c^5*g*h*k*l - 1658880*a^7*b^4*c^5*e*h*l*m - 1400832*a^7*b^4*c^5
*g*h*j*m - 663552*a^8*b^2*c^6*g*h*k*l + 483840*a^6*b^6*c^4*f*h*k*m - 253440
*a^6*b^6*c^4*g*h*j*m - 207360*a^6*b^6*c^4*g*h*k*l + 161280*a^6*b^6*c^4*f*g*
l*m + 69120*a^6*b^6*c^4*e*h*l*m - 50040*a^5*b^8*c^3*f*h*k*m + 11520*a^5*b^8
*c^3*g*h*j*m + 180*a^4*b^10*c^2*f*h*k*m + 4202496*a^7*b^3*c^6*d*j*k*l + 635
904*a^6*b^5*c^5*d*j*k*l - 276480*a^5*b^7*c^4*d*j*k*l + 34560*a^4*b^9*c^3*d*
j*k*l - 16671744*a^7*b^3*c^6*d*h*k*m + 12275712*a^7*b^3*c^6*d*g*l*m + 56770
56*a^7*b^3*c^6*e*f*l*m + 4423680*a^7*b^3*c^6*e*g*k*m + 3317760*a^7*b^3*c^6*
e*h*k*l + 2801664*a^7*b^3*c^6*e*h*j*m - 2709504*a^6*b^5*c^5*d*g*l*m + 25436
16*a^7*b^3*c^6*f*g*k*l + 2506752*a^7*b^3*c^6*f*g*j*m + 1843200*a^7*b^3*c^6*
f*h*j*l + 1327104*a^7*b^3*c^6*g*h*j*k + 838656*a^6*b^5*c^5*f*g*j*m + 829440
*a^6*b^5*c^5*f*g*k*l + 783360*a^6*b^5*c^5*f*h*j*l + 691200*a^6*b^5*c^5*g*h*
j*k + 665280*a^5*b^7*c^4*d*h*k*m + 506880*a^6*b^5*c^5*e*h*j*m + 414720*a^6*
b^5*c^5*e*h*k*l - 322560*a^6*b^5*c^5*e*f*l*m + 241920*a^5*b^7*c^4*d*g*l*m +
 138240*a^6*b^5*c^5*e*g*k*m - 108540*a^4*b^9*c^3*d*h*k*m + 69120*a^5*b^7*c^
4*g*h*j*k - 53760*a^5*b^7*c^4*f*g*j*m - 51840*a^6*b^5*c^5*d*h*k*m - 34560*a
^5*b^7*c^4*f*g*k*l - 23040*a^5*b^7*c^4*e*h*j*m + 18432*a^5*b^7*c^4*f*h*j*l
 - 13824*a^5*b^7*c^4*e*g*k*m - 2304*a^4*b^9*c^3*f*h*j*l + 1296*a^3*b^11*c^2*
d*h*k*m + 31924224*a^7*b^2*c^7*d*f*k*m - 24551424*a^7*b^2*c^7*d*e*l*m + 106
16832*a^7*b^2*c^7*e*g*j*l - 8183808*a^7*b^2*c^7*d*g*j*m - 5529600*a^7*b^2*c
^7*d*h*j*l + 5419008*a^6*b^4*c^6*d*e*l*m + 5308416*a^6*b^4*c^6*e*g*j*l - 50
87232*a^7*b^2*c^7*e*f*k*l - 5013504*a^7*b^2*c^7*e*f*j*m + 4868352*a^6*b^4*c
^6*d*f*k*m - 4644864*a^7*b^2*c^7*d*g*k*l - 3981312*a^6*b^4*c^6*d*g*k*l - 26
54208*a^7*b^2*c^7*e*h*j*k - 2367360*a^5*b^6*c^5*d*f*k*m - 2285568*a^6*b^4*c
^6*d*g*j*m - 2211840*a^6*b^4*c^6*d*h*j*l - 1695744*a^7*b^2*c^7*f*g*j*k - 16
77312*a^6*b^4*c^6*e*f*j*m - 1658880*a^6*b^4*c^6*e*f*k*l - 1400832*a^6*b^4*c
^6*f*g*j*k - 1382400*a^6*b^4*c^6*e*h*j*k + 1036800*a^5*b^6*c^5*d*g*k*l + 74
1888*a^5*b^6*c^5*d*g*j*m - 483840*a^5*b^6*c^5*d*e*l*m + 317952*a^5*b^6*c^5*
d*h*j*l + 268920*a^4*b^8*c^4*d*f*k*m - 253440*a^5*b^6*c^5*f*g*j*k - 138240*
a^5*b^6*c^5*e*h*j*k + 107520*a^5*b^6*c^5*e*f*j*m - 103680*a^4*b^8*c^4*d*g*k
*l - 80640*a^4*b^8*c^4*d*g*j*m + 69120*a^5*b^6*c^5*e*f*k*l + 11520*a^4*b^8*
c^4*f*g*j*k + 6912*a^4*b^8*c^4*d*h*j*l - 6912*a^3*b^10*c^3*d*h*j*l + 6120*a
^3*b^10*c^3*d*f*k*m - 1368*a^2*b^12*c^2*d*f*k*m - 5087232*a^7*b^2*c^7*e*g*h
*m - 2211840*a^6*b^4*c^6*f*g*h*l - 1658880*a^6*b^4*c^6*e*g*h*m - 1105920*a^
7*b^2*c^7*f*g*h*l - 69120*a^5*b^6*c^5*f*g*h*l + 69120*a^5*b^6*c^5*e*g*h*m +

6912*a^4*b^8*c^4*f*g*h*l + 7962624*a^6*b^3*c^7*d*e*k*l - 22164480*a^6*b^3*
c^7*d*f*h*m + 5160960*a^6*b^3*c^7*d*f*j*l + 4571136*a^6*b^3*c^7*d*e*j*m + 4
202496*a^6*b^3*c^7*d*g*j*k + 2801664*a^6*b^3*c^7*e*f*j*k - 2073600*a^5*b^5*
c^6*d*e*k*l - 1483776*a^5*b^5*c^6*d*e*j*m + 635904*a^5*b^5*c^6*d*g*j*k + 50
6880*a^5*b^5*c^6*e*f*j*k - 354816*a^4*b^7*c^5*d*f*j*l + 322560*a^5*b^5*c^6*
d*f*j*l - 276480*a^4*b^7*c^5*d*g*j*k + 207360*a^4*b^7*c^5*d*e*k*l + 161280*
a^4*b^7*c^5*d*e*j*m + 59904*a^3*b^9*c^4*d*f*j*l + 34560*a^3*b^9*c^4*d*g*j*k
 - 23040*a^4*b^7*c^5*e*f*j*k - 2304*a^2*b^11*c^3*d*f*j*l + 8294400*a^6*b^3*
c^7*d*g*h*l + 5677056*a^6*b^3*c^7*e*f*g*m + 4423680*a^6*b^3*c^7*e*f*h*l + 3
317760*a^6*b^3*c^7*e*g*h*k + 2805120*a^5*b^5*c^6*d*f*h*m + 1843200*a^6*b^3*
c^7*f*g*h*j - 829440*a^5*b^5*c^6*d*g*h*l + 783360*a^5*b^5*c^6*f*g*h*j + 437
184*a^4*b^7*c^5*d*f*h*m + 414720*a^5*b^5*c^6*e*g*h*k - 322560*a^5*b^5*c^6*e
*f*g*m - 146268*a^3*b^9*c^4*d*f*h*m + 138240*a^5*b^5*c^6*e*f*h*l - 62208*a^
4*b^7*c^5*d*g*h*l + 20736*a^3*b^9*c^4*d*g*h*l + 18432*a^4*b^7*c^5*f*g*h*j -
 13824*a^4*b^7*c^5*e*f*h*l + 9360*a^2*b^11*c^3*d*f*h*m - 2304*a^3*b^9*c^4*f
*g*h*j - 8404992*a^6*b^2*c^8*d*e*j*k - 24551424*a^6*b^2*c^8*d*e*g*m + 21150
720*a^6*b^2*c^8*d*f*h*k - 1271808*a^5*b^4*c^7*d*e*j*k + 552960*a^4*b^6*c^6*
d*e*j*k - 69120*a^3*b^8*c^5*d*e*j*k - 16588800*a^6*b^2*c^8*d*e*h*l - 774144
0*a^6*b^2*c^8*d*f*g*l + 6946560*a^5*b^4*c^7*d*f*h*k - 5529600*a^6*b^2*c^8*d
*g*h*j + 5419008*a^5*b^4*c^7*d*e*g*m - 5087232*a^6*b^2*c^8*e*f*g*k - 387072
0*a^5*b^4*c^7*d*f*g*l - 3686400*a^6*b^2*c^8*e*f*h*j - 2211840*a^5*b^4*c^7*d
*g*h*j - 1755648*a^4*b^6*c^6*d*f*h*k - 1658880*a^5*b^4*c^7*e*f*g*k + 165888
0*a^5*b^4*c^7*d*e*h*l - 1566720*a^5*b^4*c^7*e*f*h*j + 1451520*a^4*b^6*c^6*d
*f*g*l - 483840*a^4*b^6*c^6*d*e*g*m + 317952*a^4*b^6*c^6*d*g*h*j - 193536*a
^3*b^8*c^5*d*f*g*l + 124416*a^4*b^6*c^6*d*e*h*l + 114696*a^3*b^8*c^5*d*f*h*
k + 69120*a^4*b^6*c^6*e*f*g*k - 41472*a^3*b^8*c^5*d*e*h*l - 36864*a^4*b^6*c
^6*e*f*h*j + 14580*a^2*b^10*c^4*d*f*h*k + 6912*a^3*b^8*c^5*d*g*h*j - 6912*a
^2*b^10*c^4*d*g*h*j + 6912*a^2*b^10*c^4*d*f*g*l + 4608*a^3*b^8*c^5*e*f*h*j
+ 7962624*a^5*b^3*c^8*d*e*g*k + 7741440*a^5*b^3*c^8*d*e*f*l + 5160960*a^5*b
^3*c^8*d*f*g*j + 4423680*a^5*b^3*c^8*d*e*h*j - 2903040*a^4*b^5*c^7*d*e*f*l
- 2073600*a^4*b^5*c^7*d*e*g*k - 635904*a^4*b^5*c^7*d*e*h*j + 387072*a^3*b^7
*c^6*d*e*f*l - 354816*a^3*b^7*c^6*d*f*g*j + 322560*a^4*b^5*c^7*d*f*g*j + 20
7360*a^3*b^7*c^6*d*e*g*k + 59904*a^2*b^9*c^5*d*f*g*j - 13824*a^3*b^7*c^6*d*
e*h*j + 13824*a^2*b^9*c^5*d*e*h*j - 13824*a^2*b^9*c^5*d*e*f*l + 4423680*a^5
*b^3*c^8*e*f*g*h + 138240*a^4*b^5*c^7*e*f*g*h - 13824*a^3*b^7*c^6*e*f*g*h -
 10321920*a^5*b^2*c^9*d*e*f*j + 709632*a^3*b^6*c^7*d*e*f*j - 645120*a^4*b^4
*c^8*d*e*f*j - 119808*a^2*b^8*c^6*d*e*f*j - 16588800*a^5*b^2*c^9*d*e*g*h +
1658880*a^4*b^4*c^8*d*e*g*h + 124416*a^3*b^6*c^7*d*e*g*h - 41472*a^2*b^8*c^
6*d*e*g*h + 7741440*a^4*b^3*c^9*d*e*f*g - 2903040*a^3*b^5*c^8*d*e*f*g + 387
072*a^2*b^7*c^7*d*e*f*g + 3456*a^7*b^8*c*k*l^2*m + 12672*a^7*b^8*c*j*l*m^2
+ 384*a^5*b^10*c*j^2*k*m - 1635840*a^10*b*c^5*h*k*m^2 - 1009152*a^9*b*c^6*h
^2*k*m + 3690*a^6*b^9*c*h*k*m^2 + 1152*a^6*b^9*c*g*l*m^2 - 540*a^5*b^10*c*h
*k^2*m + 54*a^4*b^11*c*h^2*k*m + 565248*a^9*b*c^6*h*j^2*m - 39771648*a^7*b*
c^8*d^2*k*m - 2496000*a^8*b*c^7*f^2*k*m - 1543680*a^9*b*c^6*f*k^2*m + 1980*
a^5*b^10*c*f*k*m^2 - 384*a^5*b^10*c*g*j*m^2 - 180*a^4*b^11*c*f*k^2*m + 6*a^
2*b^13*c*f^2*k*m - 10298880*a^9*b*c^6*d*k*m^2 + 2580480*a^9*b*c^6*e*j*m^2 +
 5310*a^4*b^11*c*d*k*m^2 - 1674*a*b^13*c^2*d^2*k*m - 540*a^3*b^12*c*d*k^2*m
 - 10616832*a^7*b*c^8*e^2*j*l - 3538944*a^8*b*c^7*e*j^2*l + 2727936*a^8*b*c
^7*d*j^2*m - 2496000*a^9*b*c^6*f*h*m^2 - 1543680*a^8*b*c^7*f*h^2*m + 565248
*a^8*b*c^7*f*j^2*k - 270*a^4*b^11*c*f*h*m^2 - 59512320*a^6*b*c^9*d^2*f*m +
5087232*a^7*b*c^8*e^2*h*m + 1105920*a^8*b*c^7*e*j*k^2 - 3456*a*b^12*c^3*d^2
*j*l - 1635840*a^7*b*c^8*f^2*h*k - 1009152*a^8*b*c^7*f*h*k^2 + 10260*a*b^12
*c^3*d^2*h*m - 684*a^3*b^12*c*d*h*m^2 - 24675840*a^6*b*c^9*d^2*h*k - 155520
00*a^8*b*c^7*d*f*m^2 + 24551424*a^6*b*c^9*d*e^2*m - 3939840*a^7*b*c^8*d*h^2
*k + 1105920*a^7*b*c^8*e*h^2*j - 25074*a*b^11*c^4*d^2*f*m + 10530*a*b^11*c^
4*d^2*h*k + 10368*a*b^11*c^4*d^2*g*l + 420*a*b^12*c^3*d*f^2*m - 378*a^2*b^1
3*c*d*f*m^2 - 10616832*a^6*b*c^9*e^2*g*j + 5087232*a^6*b*c^9*e^2*f*k - 3538
944*a^7*b*c^8*e*g*j^2 + 1843200*a^7*b*c^8*d*h*j^2 - 7994880*a^6*b*c^9*d*f^2
*k - 4990464*a^7*b*c^8*d*f*k^2 + 2580480*a^6*b*c^9*e*f^2*j + 65664*a*b^10*c

^5*d^2*g*j - 27972*a*b^10*c^5*d^2*f*k - 20736*a*b^10*c^5*d^2*e*l + 1260*a*b
^11*c^4*d*f^2*k + 54*a*b^13*c^2*d*f*k^2 + 23224320*a^5*b*c^10*d^2*e*j - 370
62144*a^5*b*c^10*d^2*f*h + 384*a*b^12*c^3*d*f*j^2 - 131328*a*b^9*c^6*d^2*e*
j - 5985792*a^6*b*c^9*d*f*h^2 + 206010*a*b^9*c^6*d^2*f*h - 6300*a*b^10*c^5*
d*f^2*h + 1350*a*b^11*c^4*d*f*h^2 + 16588800*a^5*b*c^10*d*e^2*h + 3456*a*b^
10*c^5*d*f*g^2 + 435456*a*b^8*c^7*d^2*e*g + 13824*a*b^8*c^7*d*e^2*f - 14745
60*a^9*c^7*e*j*k*m + 460800*a^9*c^7*f*h*k*m + 3225600*a^8*c^8*d*f*k*m - 245
7600*a^8*c^8*e*f*j*m - 884736*a^8*c^8*e*h*j*k - 6193152*a^7*c^9*d*e*j*k + 1
935360*a^7*c^9*d*f*h*k - 1474560*a^7*c^9*e*f*h*j - 10321920*a^6*c^10*d*e*f*
j - 1105920*a^9*b^4*c^3*k*l^2*m - 552960*a^10*b^2*c^4*k*l^2*m - 34560*a^8*b
^6*c^2*k*l^2*m - 1290240*a^10*b^2*c^4*j*l*m^2 - 860160*a^9*b^4*c^3*j*l*m^2
- 80640*a^8*b^6*c^2*j*l*m^2 - 737280*a^9*b^2*c^5*j^2*k*m - 568320*a^8*b^4*c
^4*j^2*k*m - 136704*a^7*b^6*c^3*j^2*k*m - 2304*a^6*b^8*c^2*j^2*k*m + 127180
8*a^9*b^3*c^4*h*l^2*m - 552960*a^9*b^2*c^5*j*k^2*l - 552960*a^8*b^4*c^4*j*k
^2*l + 414720*a^8*b^5*c^3*h*l^2*m - 145152*a^7*b^6*c^3*j*k^2*l - 17280*a^7*
b^7*c^2*h*l^2*m - 3456*a^6*b^8*c^2*j*k^2*l - 3640320*a^9*b^3*c^4*h*k*m^2 -
2626560*a^8*b^3*c^5*h^2*k*m + 2211840*a^9*b^2*c^5*h*k^2*m + 2056320*a^8*b^4
*c^4*h*k^2*m + 1935360*a^9*b^3*c^4*g*l*m^2 - 1143360*a^8*b^5*c^3*h*k*m^2 -
1097280*a^7*b^5*c^4*h^2*k*m + 364608*a^7*b^6*c^3*h*k^2*m + 322560*a^8*b^5*c
^3*g*l*m^2 - 56160*a^6*b^7*c^3*h^2*k*m - 40320*a^7*b^7*c^2*g*l*m^2 + 27936*
a^7*b^7*c^2*h*k*m^2 - 3780*a^6*b^8*c^2*h*k^2*m + 2970*a^5*b^9*c^2*h^2*k*m -
 1419264*a^8*b^4*c^4*f*l^2*m - 1105920*a^7*b^4*c^5*g^2*k*m - 921600*a^9*b^2
*c^5*f*l^2*m - 829440*a^8*b^4*c^4*h*k*l^2 + 749568*a^8*b^3*c^5*h*j^2*m - 55
2960*a^8*b^2*c^6*g^2*k*m - 331776*a^9*b^2*c^5*h*k*l^2 + 317952*a^7*b^5*c^4*
h*j^2*m - 103680*a^7*b^6*c^3*h*k*l^2 + 80640*a^7*b^6*c^3*f*l^2*m + 38400*a^
6*b^7*c^3*h*j^2*m - 34560*a^6*b^6*c^4*g^2*k*m + 3456*a^5*b^8*c^3*g^2*k*m -
1920*a^5*b^9*c^2*h*j^2*m - 5142528*a^7*b^3*c^6*f^2*k*m + 5068800*a^9*b^2*c^
5*f*k*m^2 - 3870720*a^9*b^2*c^5*e*l*m^2 - 3755520*a^8*b^3*c^5*f*k^2*m + 300
0960*a^8*b^4*c^4*f*k*m^2 - 1290240*a^9*b^2*c^5*g*j*m^2 - 1085760*a^7*b^5*c^
4*f*k^2*m - 959040*a^6*b^5*c^5*f^2*k*m - 860160*a^8*b^4*c^4*g*j*m^2 + 82944
0*a^8*b^3*c^5*g*k^2*l - 645120*a^8*b^4*c^4*e*l*m^2 - 552960*a^8*b^2*c^6*h^2
*j*l - 552960*a^7*b^4*c^5*h^2*j*l + 414720*a^7*b^5*c^4*g*k^2*l - 145152*a^6
*b^6*c^4*h^2*j*l + 103200*a^5*b^7*c^4*f^2*k*m - 80640*a^7*b^6*c^3*g*j*m^2 +
 80640*a^7*b^6*c^3*e*l*m^2 + 41280*a^7*b^6*c^3*f*k*m^2 - 37188*a^6*b^8*c^2*
f*k*m^2 + 13536*a^6*b^7*c^3*f*k^2*m + 12672*a^6*b^8*c^2*g*j*m^2 + 10368*a^6
*b^7*c^3*g*k^2*l + 5490*a^5*b^9*c^2*f*k^2*m - 3456*a^5*b^8*c^3*h^2*j*l - 23
04*a^6*b^8*c^2*e*l*m^2 + 810*a^4*b^9*c^3*f^2*k*m - 270*a^3*b^11*c^2*f^2*k*m
 + 6137856*a^8*b^3*c^5*d*l^2*m - 4423680*a^7*b^2*c^7*e^2*k*m - 2654208*a^8*
b^3*c^5*g*j*l^2 - 2654208*a^7*b^3*c^6*g^2*j*l + 1769472*a^8*b^2*c^6*g*j^2*l
 + 1769472*a^7*b^4*c^5*g*j^2*l - 1354752*a^7*b^5*c^4*d*l^2*m - 1327104*a^7*
b^5*c^4*g*j*l^2 - 1327104*a^6*b^5*c^5*g^2*j*l + 1271808*a^8*b^3*c^5*f*k*l^2
 - 1040384*a^8*b^2*c^6*f*j^2*m - 697344*a^7*b^4*c^5*f*j^2*m - 516096*a^8*b^
2*c^6*h*j^2*k - 451584*a^7*b^4*c^5*h*j^2*k + 442368*a^6*b^6*c^4*g*j^2*l + 4
14720*a^7*b^5*c^4*f*k*l^2 - 138240*a^6*b^6*c^4*h*j^2*k - 138240*a^6*b^4*c^6
*e^2*k*m - 121856*a^6*b^6*c^4*f*j^2*m + 120960*a^6*b^7*c^3*d*l^2*m - 17280*
a^6*b^7*c^3*f*k*l^2 + 13824*a^5*b^6*c^5*e^2*k*m - 11520*a^5*b^8*c^3*h*j^2*k
 + 8960*a^5*b^8*c^3*f*j^2*m + 10851840*a^8*b^2*c^6*d*k^2*m - 10464768*a^6*b
^3*c^7*d^2*k*m - 10275840*a^8*b^3*c^5*d*k*m^2 + 7121088*a^5*b^5*c^6*d^2*k*m
 + 3127680*a^7*b^4*c^5*d*k^2*m + 1720320*a^8*b^3*c^5*e*j*m^2 - 1658880*a^8*
b^2*c^6*e*k^2*l - 1290240*a^7*b^2*c^7*f^2*j*l + 1271808*a^7*b^3*c^6*g^2*h*m
 - 1222560*a^4*b^7*c^5*d^2*k*m + 999360*a^7*b^5*c^4*d*k*m^2 - 860160*a^6*b^
4*c^6*f^2*j*l - 829440*a^7*b^4*c^5*e*k^2*l - 705024*a^6*b^6*c^4*d*k^2*m - 5
52960*a^8*b^2*c^6*g*j*k^2 - 552960*a^7*b^4*c^5*g*j*k^2 + 414720*a^6*b^5*c^5
*g^2*h*m + 319392*a^6*b^7*c^3*d*k*m^2 + 161280*a^7*b^5*c^4*e*j*m^2 - 145152
*a^6*b^6*c^4*g*j*k^2 - 85734*a^5*b^9*c^2*d*k*m^2 - 80640*a^5*b^6*c^5*f^2*j*
l - 25344*a^6*b^7*c^3*e*j*m^2 + 23490*a^3*b^9*c^4*d^2*k*m - 20736*a^6*b^6*c
^4*e*k^2*l - 17280*a^5*b^7*c^4*g^2*h*m + 14148*a^5*b^8*c^3*d*k^2*m + 13716*
a^2*b^11*c^3*d^2*k*m + 12690*a^4*b^10*c^2*d*k^2*m + 12672*a^4*b^8*c^4*f^2*j
*l - 3456*a^5*b^8*c^3*g*j*k^2 + 768*a^5*b^9*c^2*e*j*m^2 - 384*a^3*b^10*c^3*

f^2*j*l + 5308416*a^8*b^2*c^6*e*j*l^2 - 5308416*a^6*b^3*c^7*e^2*j*l - 51425
28*a^8*b^3*c^5*f*h*m^2 + 5068800*a^7*b^2*c^7*f^2*h*m - 3755520*a^7*b^3*c^6*
f*h^2*m - 3538944*a^7*b^3*c^6*e*j^2*l + 3000960*a^6*b^4*c^6*f^2*h*m + 26542
08*a^7*b^4*c^5*e*j*l^2 - 2322432*a^8*b^2*c^6*d*k*l^2 + 2125824*a^7*b^3*c^6*
d*j^2*m - 1990656*a^7*b^4*c^5*d*k*l^2 - 1085760*a^6*b^5*c^5*f*h^2*m - 95904
0*a^7*b^5*c^4*f*h*m^2 - 884736*a^6*b^5*c^5*e*j^2*l + 829440*a^7*b^3*c^6*g*h
^2*l + 749568*a^7*b^3*c^6*f*j^2*k + 518400*a^6*b^6*c^4*d*k*l^2 + 414720*a^6
*b^5*c^5*g*h^2*l + 317952*a^6*b^5*c^5*f*j^2*k + 133632*a^6*b^5*c^5*d*j^2*m
+ 103200*a^6*b^7*c^3*f*h*m^2 - 96768*a^5*b^7*c^4*d*j^2*m - 51840*a^5*b^8*c^
3*d*k*l^2 + 41280*a^5*b^6*c^5*f^2*h*m + 38400*a^5*b^7*c^4*f*j^2*k - 37188*a
^4*b^8*c^4*f^2*h*m + 13536*a^5*b^7*c^4*f*h^2*m + 13440*a^4*b^9*c^3*d*j^2*m
+ 10368*a^5*b^7*c^4*g*h^2*l + 5490*a^4*b^9*c^3*f*h^2*m + 1980*a^3*b^10*c^3*
f^2*h*m - 1920*a^4*b^9*c^3*f*j^2*k + 810*a^5*b^9*c^2*f*h*m^2 - 180*a^3*b^11
*c^2*f*h^2*m - 30*a^2*b^12*c^2*f^2*h*m + 30067200*a^6*b^2*c^8*d^2*h*m - 116
12160*a^6*b^2*c^8*d^2*j*l + 1658880*a^6*b^3*c^7*e^2*h*m + 1596672*a^4*b^6*c
^6*d^2*j*l - 1419264*a^6*b^4*c^6*f*g^2*m - 1105920*a^7*b^4*c^5*f*h*l^2 + 11
05920*a^7*b^3*c^6*e*j*k^2 - 921600*a^7*b^2*c^7*f*g^2*m - 829440*a^6*b^4*c^6
*g^2*h*k - 552960*a^8*b^2*c^6*f*h*l^2 - 508032*a^3*b^8*c^5*d^2*j*l - 331776
*a^7*b^2*c^7*g^2*h*k + 290304*a^6*b^5*c^5*e*j*k^2 - 103680*a^5*b^6*c^5*g^2*
h*k + 80640*a^5*b^6*c^5*f*g^2*m - 69120*a^5*b^5*c^6*e^2*h*m + 65664*a^2*b^1
0*c^4*d^2*j*l - 34560*a^6*b^6*c^4*f*h*l^2 + 6912*a^5*b^7*c^4*e*j*k^2 + 3456
*a^5*b^8*c^3*f*h*l^2 + 11930112*a^8*b^2*c^6*d*h*m^2 + 8432640*a^7*b^2*c^7*d
*h^2*m + 4450176*a^7*b^4*c^5*d*h*m^2 + 4337280*a^6*b^4*c^6*d*h^2*m - 387072
0*a^8*b^2*c^6*e*g*m^2 - 3640320*a^6*b^3*c^7*f^2*h*k - 2885760*a^5*b^4*c^7*d
^2*h*m - 2844288*a^4*b^6*c^6*d^2*h*m - 2626560*a^7*b^3*c^6*f*h*k^2 + 221184
0*a^7*b^2*c^7*f*h^2*k + 2056320*a^6*b^4*c^6*f*h^2*k + 1935360*a^6*b^3*c^7*f
^2*g*l - 1916928*a^7*b^2*c^7*d*j^2*k - 1687680*a^6*b^6*c^4*d*h*m^2 - 165888
0*a^7*b^2*c^7*e*h^2*l - 1143360*a^5*b^5*c^6*f^2*h*k - 1097280*a^6*b^5*c^5*f
*h*k^2 + 1019412*a^3*b^8*c^5*d^2*h*m - 1007424*a^5*b^6*c^5*d*h^2*m - 912384
*a^6*b^4*c^6*d*j^2*k - 829440*a^6*b^4*c^6*e*h^2*l - 645120*a^7*b^4*c^5*e*g*
m^2 - 552960*a^7*b^2*c^7*g*h^2*j - 552960*a^6*b^4*c^6*g*h^2*j + 364608*a^5*
b^6*c^5*f*h^2*k + 322560*a^5*b^5*c^6*f^2*g*l + 197460*a^5*b^8*c^3*d*h*m^2 -
145152*a^5*b^6*c^5*g*h^2*j - 143802*a^2*b^10*c^4*d^2*h*m + 80640*a^6*b^6*c
^4*e*g*m^2 - 56160*a^5*b^7*c^4*f*h*k^2 + 51948*a^4*b^8*c^4*d*h^2*m - 40320*
a^4*b^7*c^5*f^2*g*l + 34560*a^4*b^8*c^4*d*j^2*k + 27936*a^4*b^7*c^5*f^2*h*k
- 20736*a^5*b^6*c^5*e*h^2*l - 13824*a^5*b^6*c^5*d*j^2*k + 10800*a^3*b^10*c
^3*d*h^2*m - 5760*a^3*b^10*c^3*d*j^2*k - 3780*a^4*b^8*c^4*f*h^2*k + 3690*a^
3*b^9*c^4*f^2*h*k - 3456*a^4*b^8*c^4*g*h^2*j + 2970*a^4*b^9*c^3*f*h*k^2 - 2
304*a^5*b^8*c^3*e*g*m^2 + 1152*a^3*b^9*c^4*f^2*g*l - 540*a^3*b^10*c^3*f*h^2
*k - 540*a^2*b^12*c^2*d*h^2*m - 90*a^4*b^10*c^2*d*h*m^2 - 90*a^2*b^11*c^3*f
^2*h*k + 54*a^3*b^11*c^2*f*h*k^2 + 15925248*a^6*b^2*c^8*e^2*g*l - 7962624*a
^7*b^3*c^6*e*g*l^2 - 7962624*a^6*b^3*c^7*e*g^2*l + 23385600*a^6*b^2*c^8*d*f
^2*m + 6137856*a^6*b^3*c^7*d*g^2*m - 5677056*a^6*b^2*c^8*e^2*f*m + 4147200*
a^7*b^3*c^6*d*h*l^2 - 3317760*a^6*b^2*c^8*e^2*h*k - 1354752*a^5*b^5*c^6*d*g
^2*m + 1271808*a^6*b^3*c^7*f*g^2*k - 737280*a^7*b^2*c^7*f*h*j^2 + 17418240*
a^5*b^3*c^8*d^2*g*l - 568320*a^6*b^4*c^6*f*h*j^2 - 414720*a^6*b^5*c^5*d*h*l
^2 + 414720*a^5*b^5*c^6*f*g^2*k - 414720*a^5*b^4*c^7*e^2*h*k + 322560*a^5*b
^4*c^7*e^2*f*m - 136704*a^5*b^6*c^5*f*h*j^2 + 120960*a^4*b^7*c^5*d*g^2*m -
31104*a^5*b^7*c^4*d*h*l^2 - 17280*a^4*b^7*c^5*f*g^2*k + 10368*a^4*b^9*c^3*d
*h*l^2 - 2304*a^4*b^8*c^4*f*h*j^2 + 384*a^3*b^10*c^3*f*h*j^2 + 50042880*a^5
*b^2*c^9*d^2*f*k - 13271040*a^5*b^3*c^8*d^2*h*k - 13149696*a^7*b^3*c^6*d*f*
m^2 + 10906560*a^4*b^5*c^7*d^2*f*m - 8709120*a^4*b^5*c^7*d^2*g*l - 7418880*
a^5*b^3*c^8*d^2*f*m + 7133184*a^7*b^2*c^7*d*h*k^2 - 6428160*a^6*b^3*c^7*d*h
^2*k + 5593536*a^4*b^5*c^7*d^2*h*k - 3870720*a^6*b^2*c^8*e*f^2*l + 3369600*
a^6*b^4*c^6*d*h*k^2 + 3148992*a^6*b^5*c^5*d*f*m^2 - 2985696*a^3*b^7*c^6*d^2
*f*m + 1959552*a^3*b^7*c^6*d^2*g*l - 1658880*a^7*b^2*c^7*e*g*k^2 - 1505280*
a^4*b^6*c^6*d*f^2*m - 1290240*a^6*b^2*c^8*f^2*g*j - 34836480*a^5*b^2*c^9*d^
2*e*l + 1105920*a^6*b^3*c^7*e*h^2*j - 860160*a^5*b^4*c^7*f^2*g*j - 829440*a
^6*b^4*c^6*e*g*k^2 - 692064*a^3*b^7*c^6*d^2*h*k - 689472*a^5*b^5*c^6*d*h^2*

k - 645120*a^5*b^4*c^7*e*f^2*l - 388800*a^5*b^6*c^5*d*h*k^2 + 378954*a^2*b^
9*c^5*d^2*f*m + 362880*a^5*b^4*c^7*d*f^2*m + 296964*a^3*b^8*c^5*d*f^2*m + 2
90304*a^5*b^5*c^6*e*h^2*j + 277344*a^4*b^7*c^5*d*h^2*k - 217728*a^2*b^9*c^5
*d^2*g*l - 80640*a^4*b^6*c^6*f^2*g*j + 80640*a^4*b^6*c^6*e*f^2*l - 77070*a^
4*b^9*c^3*d*f*m^2 - 30240*a^5*b^7*c^4*d*f*m^2 - 28350*a^3*b^9*c^4*d*h^2*k -
 26406*a^2*b^9*c^5*d^2*h*k - 21060*a^4*b^8*c^4*d*h*k^2 - 20736*a^5*b^6*c^5*
e*g*k^2 - 19278*a^2*b^10*c^4*d*f^2*m + 12672*a^3*b^8*c^5*f^2*g*j + 10044*a^
3*b^10*c^3*d*h*k^2 + 8820*a^3*b^11*c^2*d*f*m^2 + 6912*a^4*b^7*c^5*e*h^2*j -
 2304*a^3*b^8*c^5*e*f^2*l - 1620*a^2*b^11*c^3*d*h^2*k - 384*a^2*b^10*c^4*f^
2*g*j + 162*a^2*b^12*c^2*d*h*k^2 - 5419008*a^5*b^3*c^8*d*e^2*m + 5308416*a^
6*b^2*c^8*e*g^2*j - 5308416*a^5*b^3*c^8*e^2*g*j - 3870720*a^7*b^2*c^7*d*f*l
^2 - 3538944*a^6*b^3*c^7*e*g*j^2 + 2654208*a^5*b^4*c^7*e*g^2*j - 2322432*a^
6*b^2*c^8*d*g^2*k - 1990656*a^5*b^4*c^7*d*g^2*k - 1935360*a^6*b^4*c^6*d*f*l
^2 + 1658880*a^6*b^3*c^7*d*h*j^2 + 1658880*a^5*b^3*c^8*e^2*f*k - 884736*a^5
*b^5*c^6*e*g*j^2 + 725760*a^5*b^6*c^5*d*f*l^2 + 17418240*a^4*b^4*c^8*d^2*e*
l + 518400*a^4*b^6*c^6*d*g^2*k + 483840*a^4*b^5*c^7*d*e^2*m + 262656*a^5*b^
5*c^6*d*h*j^2 - 96768*a^4*b^8*c^4*d*f*l^2 - 69120*a^4*b^5*c^7*e^2*f*k - 552
96*a^4*b^7*c^5*d*h*j^2 - 51840*a^3*b^8*c^5*d*g^2*k + 3456*a^3*b^10*c^3*d*f*
l^2 + 1152*a^3*b^9*c^4*d*h*j^2 + 1152*a^2*b^11*c^3*d*h*j^2 - 15431040*a^4*b
^4*c^8*d^2*f*k - 13248000*a^5*b^3*c^8*d*f^2*k - 11612160*a^5*b^2*c^9*d^2*g*
j - 10063872*a^6*b^3*c^7*d*f*k^2 - 3919104*a^3*b^6*c^7*d^2*e*l + 2554560*a^
4*b^5*c^7*d*f^2*k + 1720320*a^5*b^3*c^8*e*f^2*j + 1596672*a^3*b^6*c^7*d^2*g
*j + 1518912*a^3*b^6*c^7*d^2*f*k - 1105920*a^5*b^4*c^7*f*g^2*h + 838080*a^5
*b^5*c^6*d*f*k^2 - 552960*a^6*b^2*c^8*f*g^2*h - 508032*a^2*b^8*c^6*d^2*g*j
+ 435456*a^2*b^8*c^6*d^2*e*l + 161280*a^4*b^5*c^7*e*f^2*j + 116640*a^4*b^7*
c^5*d*f*k^2 + 106812*a^2*b^8*c^6*d^2*f*k - 98208*a^3*b^7*c^6*d*f^2*k - 3456
0*a^4*b^6*c^6*f*g^2*h - 27270*a^3*b^9*c^4*d*f*k^2 - 26334*a^2*b^9*c^5*d*f^2
*k - 25344*a^3*b^7*c^6*e*f^2*j + 3456*a^3*b^8*c^5*f*g^2*h + 768*a^2*b^9*c^5
*e*f^2*j - 702*a^2*b^11*c^3*d*f*k^2 - 7962624*a^5*b^2*c^9*d*e^2*k - 2580480
*a^6*b^2*c^8*d*f*j^2 + 2073600*a^4*b^4*c^8*d*e^2*k - 1658880*a^6*b^2*c^8*e*
g*h^2 - 967680*a^5*b^4*c^7*d*f*j^2 - 829440*a^5*b^4*c^7*e*g*h^2 - 207360*a^
3*b^6*c^7*d*e^2*k + 64512*a^4*b^6*c^6*d*f*j^2 + 39168*a^3*b^8*c^5*d*f*j^2 -
 20736*a^4*b^6*c^6*e*g*h^2 - 9216*a^2*b^10*c^4*d*f*j^2 - 4423680*a^5*b^2*c^
9*e^2*f*h + 4147200*a^5*b^3*c^8*d*g^2*h - 3193344*a^3*b^5*c^8*d^2*e*j + 101
6064*a^2*b^7*c^7*d^2*e*j - 414720*a^4*b^5*c^7*d*g^2*h - 138240*a^4*b^4*c^8*
e^2*f*h - 31104*a^3*b^7*c^6*d*g^2*h + 13824*a^3*b^6*c^7*e^2*f*h + 10368*a^2
*b^9*c^5*d*g^2*h + 15630336*a^5*b^2*c^9*d*f^2*h - 14459904*a^4*b^3*c^9*d^2*
f*h + 9630144*a^3*b^5*c^8*d^2*f*h - 8764416*a^5*b^3*c^8*d*f*h^2 - 3870720*a
^5*b^2*c^9*e*f^2*g + 2867328*a^4*b^4*c^8*d*f^2*h - 2095200*a^2*b^7*c^7*d^2*
f*h - 1414080*a^3*b^6*c^7*d*f^2*h - 34836480*a^4*b^2*c^10*d^2*e*g - 645120*
a^4*b^4*c^8*e*f^2*g + 306720*a^3*b^7*c^6*d*f*h^2 + 197820*a^2*b^8*c^6*d*f^2
*h + 146880*a^4*b^5*c^7*d*f*h^2 + 80640*a^3*b^6*c^7*e*f^2*g - 55350*a^2*b^9
*c^5*d*f*h^2 - 2304*a^2*b^8*c^6*e*f^2*g - 3870720*a^5*b^2*c^9*d*f*g^2 - 193
5360*a^4*b^4*c^8*d*f*g^2 - 1658880*a^4*b^3*c^9*d*e^2*h + 725760*a^3*b^6*c^7
*d*f*g^2 + 17418240*a^3*b^4*c^9*d^2*e*g - 124416*a^3*b^5*c^8*d*e^2*h - 9676
8*a^2*b^8*c^6*d*f*g^2 + 41472*a^2*b^7*c^7*d*e^2*h - 3919104*a^2*b^6*c^8*d^2
*e*g - 7741440*a^4*b^2*c^10*d*e^2*f + 2903040*a^3*b^4*c^9*d*e^2*f - 387072*
a^2*b^6*c^8*d*e^2*f - 20160*a^8*b^7*c*l^2*m^2 - 1648128*a^10*b^3*c^3*k*m^3
- 898560*a^9*b^3*c^4*k^3*m - 354240*a^9*b^5*c^2*k*m^3 - 354240*a^8*b^5*c^3*
k^3*m - 21600*a^7*b^7*c^2*k^3*m - 13950*a^7*b^8*c*k^2*m^2 + 430080*a^10*b*c
^5*j^2*m^2 - 1984*a^6*b^9*c*j^2*m^2 - 884736*a^9*b^3*c^4*j*l^3 - 589824*a^8
*b^3*c^5*j^3*l - 442368*a^8*b^5*c^3*j*l^3 - 294912*a^7*b^5*c^4*j^3*l - 4915
2*a^6*b^7*c^3*j^3*l + 1359360*a^10*b^2*c^4*h*m^3 + 1173120*a^9*b^4*c^3*h*m^
3 + 743040*a^7*b^4*c^5*h^3*m + 622080*a^8*b^2*c^6*h^3*m + 184320*a^9*b*c^6*
j^2*k^2 + 107136*a^6*b^6*c^4*h^3*m - 32640*a^8*b^6*c^2*h*m^3 + 540*a^5*b^8*
c^3*h^3*m - 270*a^4*b^10*c^2*h^3*m - 180*a^5*b^10*c*h^2*m^2 - 2293760*a^9*b
^3*c^4*f*m^3 - 2293760*a^6*b^3*c^7*f^3*m + 1327104*a^8*b^4*c^4*g*l^3 + 1327
104*a^6*b^4*c^6*g^3*l - 622080*a^8*b^3*c^5*h*k^3 - 622080*a^7*b^3*c^6*h^3*k
 - 326592*a^7*b^5*c^4*h*k^3 - 326592*a^6*b^5*c^5*h^3*k - 199360*a^8*b^5*c^3

*f*m^3 - 199360*a^5*b^5*c^6*f^3*m + 61920*a^7*b^7*c^2*f*m^3 + 61920*a^4*b^7
*c^5*f^3*m - 38880*a^6*b^7*c^3*h*k^3 - 38880*a^5*b^7*c^4*h^3*k - 3682*a^3*b
^9*c^4*f^3*m - 810*a^5*b^9*c^2*h*k^3 - 810*a^4*b^9*c^3*h^3*k - 70*a^3*b^12*
c*f^2*m^2 + 70*a^2*b^11*c^3*f^3*m + 3870720*a^8*b*c^7*e^2*m^2 + 184320*a^8*
b*c^7*h^2*j^2 - 14152320*a^4*b^4*c^8*d^3*m + 10644480*a^5*b^2*c^9*d^3*m + 5
483520*a^9*b^2*c^5*d*m^3 + 4269888*a^3*b^6*c^7*d^3*m - 2654208*a^8*b^3*c^5*
e*l^3 + 1359360*a^6*b^2*c^8*f^3*k + 1330560*a^8*b^4*c^4*d*m^3 + 1173120*a^5
*b^4*c^7*f^3*k - 884736*a^6*b^3*c^7*g^3*j - 826560*a^7*b^6*c^3*d*m^3 + 7430
40*a^7*b^4*c^5*f*k^3 + 622080*a^8*b^2*c^6*f*k^3 - 607068*a^2*b^8*c^6*d^3*m
- 589824*a^7*b^3*c^6*g*j^3 - 442368*a^5*b^5*c^6*g^3*j - 294912*a^6*b^5*c^5*
g*j^3 + 145188*a^6*b^8*c^2*d*m^3 + 107136*a^6*b^6*c^4*f*k^3 - 49152*a^5*b^7
*c^4*g*j^3 - 32640*a^4*b^6*c^6*f^3*k - 5796*a^3*b^8*c^5*f^3*k + 540*a^5*b^8
*c^3*f*k^3 - 270*a^4*b^10*c^2*f*k^3 + 210*a^2*b^10*c^4*f^3*k + 19077120*a^4
*b^3*c^9*d^3*k + 1658880*a^7*b*c^8*e^2*k^2 + 430080*a^7*b*c^8*f^2*j^2 + 353
8944*a^5*b^2*c^9*e^3*j - 2488320*a^7*b^3*c^6*d*k^3 - 2379456*a^3*b^5*c^8*d^
3*k + 1179648*a^7*b^2*c^7*e*j^3 + 589824*a^6*b^4*c^6*e*j^3 + 98304*a^5*b^6*
c^5*e*j^3 - 95904*a^2*b^7*c^7*d^3*k - 57024*a^6*b^5*c^5*d*k^3 + 49248*a^5*b
^7*c^4*d*k^3 - 4050*a^4*b^9*c^3*d*k^3 - 810*a^3*b^11*c^2*d*k^3 - 486*a*b^12
*c^3*d^2*k^2 + 3870720*a^6*b*c^9*d^2*j^2 - 1648128*a^5*b^3*c^8*f^3*h - 8985
60*a^6*b^3*c^7*f*h^3 - 354240*a^5*b^5*c^6*f*h^3 - 354240*a^4*b^5*c^7*f^3*h
+ 43680*a^3*b^7*c^6*f^3*h - 21600*a^4*b^7*c^5*f*h^3 - 9792*a*b^11*c^4*d^2*j
^2 + 1350*a^3*b^9*c^4*f*h^3 - 1050*a^2*b^9*c^5*f^3*h + 1658880*a^6*b*c^9*e^
2*h^2 + 16547328*a^4*b^2*c^10*d^3*h - 12306816*a^3*b^4*c^9*d^3*h + 37310976
*a^3*b^3*c^10*d^3*f + 3037824*a^2*b^6*c^8*d^3*h - 2654208*a^5*b^3*c^8*e*g^3
+ 1949184*a^6*b^2*c^8*d*h^3 + 1296000*a^5*b^4*c^7*d*h^3 - 155520*a^4*b^6*c
^6*d*h^3 - 40500*a*b^10*c^5*d^2*h^2 - 8100*a^3*b^8*c^5*d*h^3 + 4050*a^2*b^1
0*c^4*d*h^3 + 3870720*a^5*b*c^10*e^2*f^2 + 34836480*a^4*b*c^11*d^2*e^2 - 10
8864*a*b^9*c^6*d^2*g^2 - 8068032*a^2*b^5*c^9*d^3*f - 5623296*a^4*b^3*c^9*d*
f^3 + 1737792*a^3*b^5*c^8*d*f^3 - 260190*a*b^8*c^7*d^2*f^2 - 211680*a^2*b^7
*c^7*d*f^3 - 435456*a*b^7*c^8*d^2*e^2 - 245760*a^10*c^6*j^2*k*m - 384*a^6*b
^10*j*l*m^2 + 138240*a^10*c^6*h*k^2*m - 90*a^5*b^11*h*k*m^2 + 384000*a^10*c
^6*f*k*m^2 - 2211840*a^8*c^8*e^2*k*m - 409600*a^9*c^7*f*j^2*m - 147456*a^9*
c^7*h*j^2*k - 30*a^4*b^12*f*k*m^2 + 967680*a^9*c^7*d*k^2*m + 384000*a^8*c^8
*f^2*h*m - 90*a^3*b^13*d*k*m^2 + 20321280*a^7*c^9*d^2*h*m - 883200*a^11*b*c
^4*k*m^3 - 317952*a^10*b*c^5*k^3*m + 43680*a^8*b^7*c*k*m^3 + 1350*a^6*b^9*c
*k^3*m - 270*b^14*c^2*d^2*h*m + 6*a^3*b^13*f*h*m^2 + 4838400*a^9*c^7*d*h*m^
2 + 2903040*a^8*c^8*d*h^2*m - 1032192*a^8*c^8*d*j^2*k + 138240*a^8*c^8*f*h^
2*k - 3686400*a^7*c^9*e^2*f*m - 1327104*a^7*c^9*e^2*h*k - 393216*a^9*b*c^6*
j^3*l - 245760*a^8*c^8*f*h*j^2 - 810*b^13*c^3*d^2*h*k + 630*b^13*c^3*d^2*f*
m + 18*a^2*b^14*d*h*m^2 + 2688000*a^7*c^9*d*f^2*m + 580608*a^8*c^8*d*h*k^2
- 5796*a^7*b^8*c*h*m^3 - 3456*b^12*c^4*d^2*g*j + 1890*b^12*c^4*d^2*f*k + 67
73760*a^6*c^10*d^2*f*k - 1344000*a^10*b*c^5*f*m^3 - 1344000*a^7*b*c^8*f^3*m
- 207360*a^9*b*c^6*h*k^3 - 207360*a^8*b*c^7*h^3*k - 3682*a^6*b^9*c*f*m^3 -
9289728*a^6*c^10*d*e^2*k - 1720320*a^7*c^9*d*f*j^2 - 50803200*a^5*b*c^10*d
^3*k + 6912*b^11*c^5*d^2*e*j - 10616832*a^6*b*c^9*e^3*l - 2211840*a^6*c^10*
e^2*f*h - 393216*a^8*b*c^7*g*j^3 + 43416*a*b^10*c^5*d^3*m - 9576*a^5*b^10*c
*d*m^3 - 9450*b^11*c^5*d^2*f*h - 504*a*b^14*c*d^2*m^2 + 1612800*a^6*c^10*d*
f^2*h - 1036800*a^8*b*c^7*d*k^3 + 45198*a*b^9*c^6*d^3*k - 20736*b^10*c^6*d^
2*e*g - 75188736*a^4*b*c^11*d^3*f - 883200*a^6*b*c^9*f^3*h - 317952*a^7*b*c
^8*f*h^3 - 15482880*a^5*c^11*d*e^2*f - 10616832*a^5*b*c^10*e^3*g - 345060*a
*b^8*c^7*d^3*h - 4262400*a^5*b*c^10*d*f^3 + 852768*a*b^7*c^8*d^3*f + 7350*a
*b^9*c^6*d*f^3 + 967680*a^10*b^3*c^3*l^2*m^2 + 161280*a^9*b^5*c^2*l^2*m^2 +
1684224*a^10*b^2*c^4*k^2*m^2 + 1264320*a^9*b^4*c^3*k^2*m^2 + 126720*a^8*b^
6*c^2*k^2*m^2 + 501760*a^9*b^3*c^4*j^2*m^2 + 414720*a^9*b^3*c^4*k^2*l^2 + 2
07360*a^8*b^5*c^3*k^2*l^2 + 170240*a^8*b^5*c^3*j^2*m^2 + 9216*a^7*b^7*c^2*j
^2*m^2 + 5184*a^7*b^7*c^2*k^2*l^2 + 884736*a^9*b^2*c^5*j^2*l^2 + 884736*a^8
*b^4*c^4*j^2*l^2 + 221184*a^7*b^6*c^3*j^2*l^2 + 1419840*a^8*b^4*c^4*h^2*m^2
+ 1387008*a^9*b^2*c^5*h^2*m^2 + 276480*a^8*b^3*c^5*j^2*k^2 + 140544*a^7*b^
5*c^4*j^2*k^2 + 84960*a^7*b^6*c^3*h^2*m^2 + 25344*a^6*b^7*c^3*j^2*k^2 - 801

0*a^6*b^8*c^2*h^2*m^2 + 576*a^5*b^9*c^2*j^2*k^2 + 967680*a^8*b^3*c^5*g^2*m^
2 + 414720*a^8*b^3*c^5*h^2*l^2 + 207360*a^7*b^5*c^4*h^2*l^2 + 161280*a^7*b^
5*c^4*g^2*m^2 - 20160*a^6*b^7*c^3*g^2*m^2 + 5184*a^6*b^7*c^3*h^2*l^2 + 576*
a^5*b^9*c^2*g^2*m^2 + 3808000*a^8*b^2*c^6*f^2*m^2 + 1990656*a^7*b^4*c^5*g^2
*l^2 + 1643712*a^7*b^4*c^5*f^2*m^2 + 803520*a^7*b^4*c^5*h^2*k^2 + 725760*a^
8*b^2*c^6*h^2*k^2 + 207360*a^6*b^6*c^4*h^2*k^2 - 125440*a^6*b^6*c^4*f^2*m^2
 - 13790*a^5*b^8*c^3*f^2*m^2 + 10530*a^5*b^8*c^3*h^2*k^2 + 1785*a^4*b^10*c^
2*f^2*m^2 + 81*a^4*b^10*c^2*h^2*k^2 + 18427392*a^7*b^2*c^7*d^2*m^2 + 967680
*a^7*b^3*c^6*f^2*l^2 + 645120*a^7*b^3*c^6*e^2*m^2 + 414720*a^7*b^3*c^6*g^2*
k^2 + 276480*a^7*b^3*c^6*h^2*j^2 + 207360*a^6*b^5*c^5*g^2*k^2 + 161280*a^6*
b^5*c^5*f^2*l^2 + 140544*a^6*b^5*c^5*h^2*j^2 - 80640*a^6*b^5*c^5*e^2*m^2 +
25344*a^5*b^7*c^4*h^2*j^2 - 20160*a^5*b^7*c^4*f^2*l^2 + 5184*a^5*b^7*c^4*g^
2*k^2 + 2304*a^5*b^7*c^4*e^2*m^2 + 576*a^4*b^9*c^3*h^2*j^2 + 576*a^4*b^9*c^
3*f^2*l^2 + 7962624*a^7*b^2*c^7*e^2*l^2 - 4148928*a^6*b^4*c^6*d^2*m^2 + 141
9840*a^6*b^4*c^6*f^2*k^2 + 1387008*a^7*b^2*c^7*f^2*k^2 - 1183392*a^5*b^6*c^
5*d^2*m^2 + 884736*a^7*b^2*c^7*g^2*j^2 + 884736*a^6*b^4*c^6*g^2*j^2 + 64575
0*a^4*b^8*c^4*d^2*m^2 + 221184*a^5*b^6*c^5*g^2*j^2 - 115920*a^3*b^10*c^3*d^
2*m^2 + 84960*a^5*b^6*c^5*f^2*k^2 + 10836*a^2*b^12*c^2*d^2*m^2 - 8010*a^4*b
^8*c^4*f^2*k^2 - 180*a^3*b^10*c^3*f^2*k^2 + 9*a^2*b^12*c^2*f^2*k^2 + 870912
0*a^6*b^3*c^7*d^2*l^2 - 4354560*a^5*b^5*c^6*d^2*l^2 + 979776*a^4*b^7*c^5*d^
2*l^2 + 829440*a^6*b^3*c^7*e^2*k^2 + 17480448*a^6*b^2*c^8*d^2*k^2 + 501760*
a^6*b^3*c^7*f^2*j^2 + 170240*a^5*b^5*c^6*f^2*j^2 - 108864*a^3*b^9*c^4*d^2*l
^2 + 20736*a^5*b^5*c^6*e^2*k^2 + 9216*a^4*b^7*c^5*f^2*j^2 + 5184*a^2*b^11*c
^3*d^2*l^2 - 1984*a^3*b^9*c^4*f^2*j^2 + 64*a^2*b^11*c^3*f^2*j^2 + 3538944*a
^6*b^2*c^8*e^2*j^2 - 3302208*a^5*b^4*c^7*d^2*k^2 + 884736*a^5*b^4*c^7*e^2*j
^2 + 414720*a^6*b^3*c^7*g^2*h^2 + 207360*a^5*b^5*c^6*g^2*h^2 - 103680*a^4*b
^6*c^6*d^2*k^2 + 101250*a^3*b^8*c^5*d^2*k^2 - 5751*a^2*b^10*c^4*d^2*k^2 + 5
184*a^4*b^7*c^5*g^2*h^2 + 1935360*a^5*b^3*c^8*d^2*j^2 + 1684224*a^6*b^2*c^8
*f^2*h^2 + 1264320*a^5*b^4*c^7*f^2*h^2 - 532224*a^4*b^5*c^7*d^2*j^2 + 12672
0*a^4*b^6*c^6*f^2*h^2 - 96768*a^3*b^7*c^6*d^2*j^2 + 62784*a^2*b^9*c^5*d^2*j
^2 - 13950*a^3*b^8*c^5*f^2*h^2 + 225*a^2*b^10*c^4*f^2*h^2 + 967680*a^5*b^3*
c^8*f^2*g^2 + 829440*a^5*b^3*c^8*e^2*h^2 + 161280*a^4*b^5*c^7*f^2*g^2 + 207
36*a^4*b^5*c^7*e^2*h^2 - 20160*a^3*b^7*c^6*f^2*g^2 + 576*a^2*b^9*c^5*f^2*g^
2 + 11487744*a^5*b^2*c^9*d^2*h^2 + 7962624*a^5*b^2*c^9*e^2*g^2 + 35525376*a
^4*b^2*c^10*d^2*f^2 - 1412640*a^3*b^6*c^7*d^2*h^2 + 461376*a^4*b^4*c^8*d^2*
h^2 + 375030*a^2*b^8*c^6*d^2*h^2 + 8709120*a^4*b^3*c^9*d^2*g^2 - 4354560*a^
3*b^5*c^8*d^2*g^2 + 979776*a^2*b^7*c^7*d^2*g^2 + 645120*a^4*b^3*c^9*e^2*f^2
 - 80640*a^3*b^5*c^8*e^2*f^2 + 2304*a^2*b^7*c^7*e^2*f^2 - 15269184*a^3*b^4*
c^9*d^2*f^2 + 2870784*a^2*b^6*c^8*d^2*f^2 - 17418240*a^3*b^3*c^10*d^2*e^2 +
 3919104*a^2*b^5*c^9*d^2*e^2 + 54*b^15*c*d^2*k*m + 6*a*b^15*d*f*m^2 + 11520
0*a^11*c^5*k^2*m^2 + 576*a^7*b^9*l^2*m^2 + 225*a^6*b^10*k^2*m^2 + 64*a^5*b^
11*j^2*m^2 + 345600*a^10*c^6*h^2*m^2 + 9*a^4*b^12*h^2*m^2 + 320000*a^9*c^7*
f^2*m^2 + 41472*a^9*c^7*h^2*k^2 + 16934400*a^8*c^8*d^2*m^2 + 345600*a^8*c^8
*f^2*k^2 + 81*b^14*c^2*d^2*k^2 + 3538944*a^7*c^9*e^2*j^2 + 2032128*a^7*c^9*
d^2*k^2 + 492800*a^11*b^2*c^3*m^4 + 351456*a^10*b^4*c^2*m^4 + 576*b^13*c^3*
d^2*j^2 + 331776*a^9*b^4*c^3*l^4 + 115200*a^7*c^9*f^2*h^2 + 142560*a^8*b^4*
c^4*k^4 + 103680*a^9*b^2*c^5*k^4 + 32400*a^7*b^6*c^3*k^4 + 2025*b^12*c^4*d^
2*h^2 + 2025*a^6*b^8*c^2*k^4 + 6096384*a^6*c^10*d^2*h^2 + 131072*a^8*b^2*c^
6*j^4 + 98304*a^7*b^4*c^5*j^4 + 32768*a^6*b^6*c^4*j^4 + 5184*b^11*c^5*d^2*g
^2 + 4096*a^5*b^8*c^3*j^4 + 11025*b^10*c^6*d^2*f^2 + 5644800*a^5*c^11*d^2*f
^2 + 142560*a^6*b^4*c^6*h^4 + 103680*a^7*b^2*c^7*h^4 + 32400*a^5*b^6*c^5*h^
4 + 20736*b^9*c^7*d^2*e^2 + 2025*a^4*b^8*c^4*h^4 + 331776*a^5*b^4*c^7*g^4 +
 492800*a^5*b^2*c^9*f^4 + 351456*a^4*b^4*c^8*f^4 - 43120*a^3*b^6*c^7*f^4 +
1225*a^2*b^8*c^6*f^4 - 27433728*a^3*b^2*c^11*d^4 + 6446304*a^2*b^4*c^10*d^4
 - 1050*a^7*b^9*k*m^3 + 384000*a^11*c^5*h*m^3 + 138240*a^9*c^7*h^3*m + 210*
a^6*b^10*h*m^3 + 47416320*a^6*c^10*d^3*m - 1134*b^12*c^4*d^3*m + 70*a^5*b^1
1*f*m^3 + 2688000*a^10*c^6*d*m^3 + 384000*a^7*c^9*f^3*k + 138240*a^9*c^7*f*
k^3 - 3402*b^11*c^5*d^3*k + 210*a^4*b^12*d*m^3 + 7077888*a^6*c^10*e^3*j + 7
86432*a^8*c^8*e*j^3 - 43120*a^9*b^6*c*m^4 + 28449792*a^5*c^11*d^3*h + 17010

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*b^10*c^6*d^3*h + 580608*a^7*c^9*d*h^3 - 39690*b^9*c^7*d^3*f - 734832*a*b^6
*c^9*d^4 + 9*b^16*d^2*m^2 + 160000*a^12*c^4*m^4 + 1225*a^8*b^8*m^4 + 20736*
a^10*c^6*k^4 + 65536*a^9*c^7*j^4 + 20736*a^8*c^8*h^4 + 49787136*a^4*c^12*d^
4 + 160000*a^6*c^10*f^4 + 5308416*a^5*c^11*e^4 + 35721*b^8*c^8*d^4 + a^2*b^
14*f^2*m^2, z, k1)*x*(8388608*a^11*b*c^10 - 512*a^4*b^15*c^3 + 14336*a^5*b^
13*c^4 - 172032*a^6*b^11*c^5 + 1146880*a^7*b^9*c^6 - 4587520*a^8*b^7*c^7 +
11010048*a^9*b^5*c^8 - 14680064*a^10*b^3*c^9))/(64*(4096*a^10*c^7 + a^4*b^1
2*c - 24*a^5*b^10*c^2 + 240*a^6*b^8*c^3 - 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c
^5 - 6144*a^9*b^2*c^6))) - (983040*a^7*c^9*e*f + 589824*a^8*c^8*e*k + 32768
0*a^8*c^8*f*j + 196608*a^9*c^7*j*k - 3244032*a^6*b*c^9*d*e - 884736*a^7*b*c
^8*e*h - 491520*a^7*b*c^8*f*g - 1081344*a^7*b*c^8*d*j - 1277952*a^8*b*c^7*e
*m - 491520*a^8*b*c^7*f*l - 294912*a^8*b*c^7*g*k - 294912*a^8*b*c^7*h*j - 4
25984*a^9*b*c^6*j*m - 294912*a^9*b*c^6*k*l - 4608*a^2*b^9*c^5*d*e + 87552*a
^3*b^7*c^6*d*e - 681984*a^4*b^5*c^7*d*e + 2433024*a^5*b^3*c^8*d*e + 2304*a^
2*b^10*c^4*d*g - 43776*a^3*b^8*c^5*d*g - 1536*a^3*b^8*c^5*e*f + 340992*a^4*
b^6*c^6*d*g + 39936*a^4*b^6*c^6*e*f - 1216512*a^5*b^4*c^7*d*g - 184320*a^5*
b^4*c^7*e*f + 1622016*a^6*b^2*c^8*d*g - 49152*a^6*b^2*c^8*e*f + 768*a^3*b^9
*c^4*f*g - 4608*a^4*b^7*c^5*e*h - 19968*a^4*b^7*c^5*f*g - 18432*a^5*b^5*c^6
*e*h + 92160*a^5*b^5*c^6*f*g + 368640*a^6*b^3*c^7*e*h + 24576*a^6*b^3*c^7*f
*g - 768*a^2*b^11*c^3*d*j + 13056*a^3*b^9*c^4*d*j - 84480*a^4*b^7*c^5*d*j +
 178176*a^5*b^5*c^6*d*j + 270336*a^6*b^3*c^7*d*j + 2304*a^4*b^8*c^4*g*h + 9
216*a^5*b^6*c^5*g*h - 184320*a^6*b^4*c^6*g*h + 442368*a^7*b^2*c^7*g*h + 230
4*a^3*b^10*c^3*d*l - 256*a^3*b^10*c^3*f*j - 43776*a^4*b^8*c^4*d*l + 6144*a^
4*b^8*c^4*f*j + 340992*a^5*b^6*c^5*d*l + 27648*a^5*b^6*c^5*e*k - 17408*a^5*
b^6*c^5*f*j - 1216512*a^6*b^4*c^6*d*l - 184320*a^6*b^4*c^6*e*k - 69632*a^6*
b^4*c^6*f*j + 1622016*a^7*b^2*c^7*d*l + 147456*a^7*b^2*c^7*e*k + 147456*a^7
*b^2*c^7*f*j + 768*a^4*b^9*c^3*f*l - 768*a^4*b^9*c^3*h*j + 1536*a^5*b^7*c^4
*e*m - 19968*a^5*b^7*c^4*f*l - 13824*a^5*b^7*c^4*g*k - 4608*a^5*b^7*c^4*h*j
 - 92160*a^6*b^5*c^5*e*m + 92160*a^6*b^5*c^5*f*l + 92160*a^6*b^5*c^5*g*k +
55296*a^6*b^5*c^5*h*j + 663552*a^7*b^3*c^6*e*m + 24576*a^7*b^3*c^6*f*l - 73
728*a^7*b^3*c^6*g*k - 24576*a^7*b^3*c^6*h*j - 768*a^5*b^8*c^3*g*m + 2304*a^
5*b^8*c^3*h*l + 46080*a^6*b^6*c^4*g*m + 9216*a^6*b^6*c^4*h*l - 331776*a^7*b
^4*c^5*g*m - 184320*a^7*b^4*c^5*h*l + 638976*a^8*b^2*c^6*g*m + 442368*a^8*b
^2*c^6*h*l + 4608*a^5*b^8*c^3*j*k - 21504*a^6*b^6*c^4*j*k - 36864*a^7*b^4*c
^5*j*k + 147456*a^8*b^2*c^6*j*k + 256*a^5*b^9*c^2*j*m - 14848*a^6*b^7*c^3*j
*m - 13824*a^6*b^7*c^3*k*l + 79872*a^7*b^5*c^4*j*m + 92160*a^7*b^5*c^4*k*l
+ 8192*a^8*b^3*c^5*j*m - 73728*a^8*b^3*c^5*k*l - 768*a^6*b^8*c^2*l*m + 4608
0*a^7*b^6*c^3*l*m - 331776*a^8*b^4*c^4*l*m + 638976*a^9*b^2*c^5*l*m)/(512*(
4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^2 + 240*a^6*b^8*c^3 - 1280*a^7*b
^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6)) + (x*(25600*a^7*c^9*f^2 - 18
*b^12*c^4*d^2 - 451584*a^6*c^10*d^2 - 9216*a^8*c^8*h^2 + 9216*a^9*c^7*k^2 -
 2*a^4*b^12*m^2 - 25600*a^10*c^6*m^2 + 504*a*b^10*c^5*d^2 + 73728*a^6*b*c^9
*e^2 + 8192*a^8*b*c^7*j^2 + 88*a^5*b^10*c*m^2 - 6228*a^2*b^8*c^6*d^2 + 4262
4*a^3*b^6*c^7*d^2 - 176256*a^4*b^4*c^8*d^2 + 423936*a^5*b^2*c^9*d^2 + 4608*
a^4*b^5*c^7*e^2 - 36864*a^5*b^3*c^8*e^2 - 2*a^2*b^10*c^4*f^2 + 84*a^3*b^8*c
^5*f^2 - 3520*a^4*b^6*c^6*f^2 + 26240*a^5*b^4*c^7*f^2 - 59904*a^6*b^2*c^8*f
^2 + 1152*a^4*b^7*c^5*g^2 - 9216*a^5*b^5*c^6*g^2 + 18432*a^6*b^3*c^7*g^2 -
468*a^4*b^8*c^4*h^2 + 3456*a^5*b^6*c^5*h^2 - 5760*a^6*b^4*c^6*h^2 + 128*a^4
*b^9*c^3*j^2 - 512*a^5*b^7*c^4*j^2 - 1536*a^6*b^5*c^5*j^2 + 4096*a^7*b^3*c^
6*j^2 - 18*a^4*b^10*c^2*k^2 - 108*a^5*b^8*c^3*k^2 + 576*a^6*b^6*c^4*k^2 + 5
760*a^7*b^4*c^5*k^2 - 23040*a^8*b^2*c^6*k^2 + 1152*a^6*b^7*c^3*l^2 - 9216*a
^7*b^5*c^4*l^2 + 18432*a^8*b^3*c^5*l^2 - 1236*a^6*b^8*c^2*m^2 + 5760*a^7*b^
6*c^3*m^2 - 8320*a^8*b^4*c^4*m^2 + 6144*a^9*b^2*c^5*m^2 - 129024*a^7*c^9*d*
h - 215040*a^8*c^8*d*m + 30720*a^8*c^8*f*k - 30720*a^9*c^7*h*m - 12*a*b^11*
c^4*d*f + 218112*a^6*b*c^9*d*f + 9216*a^7*b*c^8*f*h + 156672*a^7*b*c^8*d*k
+ 49152*a^7*b*c^8*e*j + 25600*a^8*b*c^7*f*m + 9216*a^8*b*c^7*h*k - 12*a^4*b
^11*c*k*m + 21504*a^9*b*c^6*k*m + 420*a^2*b^9*c^5*d*f - 4992*a^3*b^7*c^6*d*
f + 36480*a^4*b^5*c^7*d*f - 144384*a^5*b^3*c^8*d*f - 36*a^2*b^10*c^4*d*h +
360*a^3*b^8*c^5*d*h - 3456*a^4*b^6*c^6*d*h - 4608*a^4*b^6*c^6*e*g + 11520*a
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^5*b^4*c^7*d*h + 36864*a^5*b^4*c^7*e*g + 27648*a^6*b^2*c^8*d*h - 73728*a^6*
b^2*c^8*e*g - 12*a^3*b^9*c^4*f*h + 2304*a^4*b^7*c^5*f*h - 17280*a^5*b^5*c^6
*f*h + 30720*a^6*b^3*c^7*f*h + 180*a^3*b^9*c^4*d*k - 2304*a^4*b^7*c^5*d*k +
 1536*a^4*b^7*c^5*e*j + 19584*a^5*b^5*c^6*d*k - 9216*a^5*b^5*c^6*e*j - 9216
0*a^6*b^3*c^7*d*k - 168*a^4*b^8*c^4*d*m - 360*a^4*b^8*c^4*f*k - 768*a^4*b^8
*c^4*g*j + 768*a^5*b^6*c^5*d*m - 4608*a^5*b^6*c^5*e*l - 768*a^5*b^6*c^5*f*k
 + 4608*a^5*b^6*c^5*g*j - 11520*a^6*b^4*c^6*d*m + 36864*a^6*b^4*c^6*e*l + 2
5344*a^6*b^4*c^6*f*k + 98304*a^7*b^2*c^7*d*m - 73728*a^7*b^2*c^7*e*l - 7372
8*a^7*b^2*c^7*f*k - 24576*a^7*b^2*c^7*g*j - 140*a^4*b^9*c^3*f*m + 180*a^4*b
^9*c^3*h*k + 3584*a^5*b^7*c^4*f*m + 2304*a^5*b^7*c^4*g*l - 20352*a^6*b^5*c^
5*f*m - 18432*a^6*b^5*c^5*g*l - 8064*a^6*b^5*c^5*h*k + 26624*a^7*b^3*c^6*f*
m + 36864*a^7*b^3*c^6*g*l + 18432*a^7*b^3*c^6*h*k + 60*a^4*b^10*c^2*h*m - 1
560*a^5*b^8*c^3*h*m + 8832*a^6*b^6*c^4*h*m - 13056*a^7*b^4*c^5*h*m + 3072*a
^8*b^2*c^6*h*m - 768*a^5*b^8*c^3*j*l + 4608*a^6*b^6*c^4*j*l - 24576*a^8*b^2
*c^6*j*l + 228*a^5*b^9*c^2*k*m + 384*a^6*b^7*c^3*k*m - 9600*a^7*b^5*c^4*k*m
 + 15360*a^8*b^3*c^5*k*m))/(64*(4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^
2 + 240*a^6*b^8*c^3 - 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^
6))) + (35*a^6*b^7*m^3 - 8000*a^5*c^8*f^3 - 1728*a^8*c^5*k^3 - 567*b^7*c^6*
d^3 + 10368*a*b^5*c^7*d^3 + 169344*a^3*b*c^9*d^3 + 193536*a^4*c^9*d*e^2 - 1
41120*a^4*c^9*d^2*f + 1728*a^6*b*c^6*h^3 + 315*b^8*c^5*d^2*f + 27648*a^5*c^
8*e^2*h - 135*b^9*c^4*d^2*h + 21504*a^6*c^7*d*j^2 - 2880*a^6*c^7*f*h^2 - 84
672*a^5*c^8*d^2*k - 1176*a^7*b^5*c*m^3 + 6400*a^9*b*c^3*m^3 + 3*a^2*b^11*d*
m^2 + 27*b^10*c^3*d^2*k - 14400*a^6*c^7*f^2*k - 8640*a^7*c^6*f*k^2 + a^3*b^
10*f*m^2 + 46080*a^6*c^7*e^2*m + 3072*a^7*c^6*h*j^2 + 9*b^11*c^2*d^2*m - 17
28*a^7*c^6*h^2*k - 8000*a^8*c^5*f*m^2 + 3*a^4*b^9*h*m^2 - 15*a^5*b^8*k*m^2
 + 5120*a^8*c^5*j^2*m - 4800*a^9*c^4*k*m^2 - 67824*a^2*b^3*c^8*d^3 + 35*a^2*
b^6*c^5*f^3 + 84*a^3*b^4*c^6*f^3 - 12720*a^4*b^2*c^7*f^3 + 540*a^4*b^5*c^4*
h^3 + 4320*a^5*b^3*c^5*h^3 - 135*a^5*b^6*c^2*k^3 - 1620*a^6*b^4*c^3*k^3 - 4
752*a^7*b^2*c^4*k^3 + 9456*a^8*b^3*c^2*m^3 - 40320*a^5*c^8*d*f*h + 129024*a
^5*c^8*d*e*j - 67200*a^6*c^7*d*f*m - 24192*a^6*c^7*d*h*k + 18432*a^6*c^7*e*
h*j - 9600*a^7*c^6*f*h*m - 40320*a^7*c^6*d*k*m + 30720*a^7*c^6*e*j*m - 5760
*a^8*c^5*h*k*m - 6237*a*b^6*c^6*d^2*f + 210*a*b^7*c^5*d*f^2 + 116160*a^4*b*
c^8*d*f^2 - 36864*a^4*b*c^8*e^2*f + 2430*a*b^7*c^5*d^2*h + 133056*a^4*b*c^8
*d^2*h + 27648*a^5*b*c^7*d*h^2 + 26880*a^5*b*c^7*f^2*h - 297*a*b^8*c^4*d^2*
k + 46656*a^6*b*c^6*d*k^2 - 27648*a^5*b*c^7*e^2*k - 4096*a^6*b*c^6*f*j^2 -
324*a*b^9*c^3*d^2*m - 132*a^3*b^9*c*d*m^2 + 193536*a^5*b*c^7*d^2*m + 63360*
a^7*b*c^5*d*m^2 - 51*a^4*b^8*c*f*m^2 + 40000*a^6*b*c^6*f^2*m + 10368*a^7*b*
c^5*h*k^2 - 78*a^5*b^7*c*h*m^2 + 8064*a^7*b*c^5*h^2*m - 3072*a^7*b*c^5*j^2*
k + 12480*a^8*b*c^4*h*m^2 - 90*a^5*b^7*c*k^2*m + 705*a^6*b^6*c*k*m^2 + 1555
2*a^8*b*c^4*k^2*m + 6912*a^2*b^4*c^7*d*e^2 - 62208*a^3*b^2*c^8*d*e^2 + 4237
2*a^2*b^4*c^7*d^2*f - 1764*a^2*b^5*c^6*d*f^2 - 96048*a^3*b^2*c^8*d^2*f - 46
08*a^3*b^3*c^7*d*f^2 + 1728*a^2*b^6*c^5*d*g^2 + 2304*a^3*b^3*c^7*e^2*f - 15
552*a^3*b^4*c^6*d*g^2 + 48384*a^4*b^2*c^7*d*g^2 - 13716*a^2*b^5*c^6*d^2*h +
 405*a^2*b^7*c^4*d*h^2 + 12096*a^3*b^3*c^7*d^2*h - 5400*a^3*b^5*c^5*d*h^2 +
 28944*a^4*b^3*c^6*d*h^2 + 576*a^3*b^5*c^5*f*g^2 + 6912*a^4*b^2*c^7*e^2*h -
 9216*a^4*b^3*c^6*f*g^2 - 15*a^2*b^7*c^4*f^2*h + 192*a^2*b^8*c^3*d*j^2 - 36
0*a^3*b^5*c^5*f^2*h - 960*a^3*b^6*c^4*d*j^2 + 135*a^3*b^6*c^4*f*h^2 + 15696
*a^4*b^3*c^6*f^2*h - 768*a^4*b^4*c^5*d*j^2 - 5580*a^4*b^4*c^5*f*h^2 + 14592
*a^5*b^2*c^6*d*j^2 - 20592*a^5*b^2*c^6*f*h^2 - 999*a^2*b^6*c^5*d^2*k + 27*a
^2*b^9*c^2*d*k^2 + 23004*a^3*b^4*c^6*d^2*k - 108*a^3*b^7*c^3*d*k^2 - 84240*
a^4*b^2*c^7*d^2*k + 1728*a^4*b^4*c^5*g^2*h - 1404*a^4*b^5*c^4*d*k^2 + 6912*
a^5*b^2*c^6*g^2*h + 14688*a^5*b^3*c^5*d*k^2 + 64*a^3*b^7*c^3*f*j^2 - 768*a^
4*b^5*c^4*f*j^2 + 1728*a^4*b^6*c^3*d*l^2 - 3840*a^5*b^3*c^5*f*j^2 - 15552*a
^5*b^4*c^4*d*l^2 + 48384*a^6*b^2*c^5*d*l^2 + 3717*a^2*b^7*c^4*d^2*m + 3*a^2
*b^8*c^3*f^2*k - 15192*a^3*b^5*c^5*d^2*m + 135*a^3*b^6*c^4*f^2*k + 9*a^3*b^
8*c^2*f*k^2 - 7920*a^4*b^3*c^6*d^2*m - 2988*a^4*b^4*c^5*f^2*k - 99*a^4*b^6*
c^3*f*k^2 + 2079*a^4*b^7*c^2*d*m^2 - 28272*a^5*b^2*c^6*f^2*k - 4500*a^5*b^4
*c^4*f*k^2 - 14448*a^5*b^5*c^3*d*m^2 - 20304*a^6*b^2*c^5*f*k^2 + 37104*a^6*
b^3*c^4*d*m^2 + 192*a^4*b^6*c^3*h*j^2 + 2304*a^5*b^2*c^6*e^2*m - 6912*a^5*b
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^3*c^5*g^2*k + 1536*a^5*b^4*c^4*h*j^2 + 576*a^5*b^5*c^3*f*l^2 + 3840*a^6*b^
2*c^5*h*j^2 - 9216*a^6*b^3*c^4*f*l^2 + a^2*b^9*c^2*f^2*m + 20*a^3*b^7*c^3*f
^2*m - 1596*a^4*b^5*c^4*f^2*m - 243*a^4*b^6*c^3*h^2*k + 27*a^4*b^7*c^2*h*k^
2 + 16736*a^5*b^3*c^5*f^2*m - 5940*a^5*b^4*c^4*h^2*k + 1728*a^5*b^5*c^3*h*k
^2 + 875*a^5*b^6*c^2*f*m^2 - 13392*a^6*b^2*c^5*h^2*k + 10800*a^6*b^3*c^4*h*
k^2 - 2716*a^6*b^4*c^3*f*m^2 - 39600*a^7*b^2*c^4*f*m^2 + 576*a^5*b^4*c^4*g^
2*m + 11520*a^6*b^2*c^5*g^2*m + 1728*a^6*b^4*c^3*h*l^2 + 6912*a^7*b^2*c^4*h
*l^2 - 81*a^4*b^7*c^2*h^2*m + 720*a^5*b^5*c^3*h^2*m - 768*a^5*b^5*c^3*j^2*k
 + 17136*a^6*b^3*c^4*h^2*m - 3072*a^6*b^3*c^4*j^2*k - 900*a^6*b^5*c^2*h*m^2
 + 22272*a^7*b^3*c^3*h*m^2 + 64*a^5*b^6*c^2*j^2*m + 1536*a^6*b^4*c^3*j^2*m
+ 5376*a^7*b^2*c^4*j^2*m - 6912*a^7*b^3*c^3*k*l^2 + 1260*a^6*b^5*c^2*k^2*m
+ 13248*a^7*b^3*c^3*k^2*m - 6084*a^7*b^4*c^2*k*m^2 - 26256*a^8*b^2*c^3*k*m^
2 + 576*a^7*b^4*c^2*l^2*m + 11520*a^8*b^2*c^3*l^2*m - 193536*a^4*b*c^8*d*e*
g - 90*a*b^8*c^4*d*f*h - 27648*a^5*b*c^7*e*g*h + 18*a*b^9*c^3*d*f*k - 19353
6*a^5*b*c^7*d*e*l + 147456*a^5*b*c^7*d*f*k - 64512*a^5*b*c^7*d*g*j - 24576*
a^5*b*c^7*e*f*j + 6*a*b^10*c^2*d*f*m + 84096*a^6*b*c^6*d*h*m - 46080*a^6*b*
c^6*e*g*m - 27648*a^6*b*c^6*e*h*l + 33408*a^6*b*c^6*f*h*k - 9216*a^6*b*c^6*
g*h*j - 64512*a^6*b*c^6*d*j*l - 18432*a^6*b*c^6*e*j*k + 18*a^2*b^10*c*d*k*m
 + 6*a^3*b^9*c*f*k*m - 46080*a^7*b*c^5*e*l*m + 49920*a^7*b*c^5*f*k*m - 1536
0*a^7*b*c^5*g*j*m - 9216*a^7*b*c^5*h*j*l + 18*a^4*b^8*c*h*k*m - 15360*a^8*b
*c^4*j*l*m - 6912*a^2*b^5*c^6*d*e*g + 62208*a^3*b^3*c^7*d*e*g - 270*a^2*b^6
*c^5*d*f*h + 16056*a^3*b^4*c^6*d*f*h - 2304*a^3*b^4*c^6*e*f*g - 127008*a^4*
b^2*c^7*d*f*h + 36864*a^4*b^2*c^7*e*f*g + 2304*a^2*b^6*c^5*d*e*j - 16128*a^
3*b^4*c^6*d*e*j + 23040*a^4*b^2*c^7*d*e*j - 6912*a^4*b^3*c^6*e*g*h + 306*a^
2*b^7*c^4*d*f*k - 1152*a^2*b^7*c^4*d*g*j - 6912*a^3*b^5*c^5*d*e*l - 5328*a^
3*b^5*c^5*d*f*k + 8064*a^3*b^5*c^5*d*g*j + 768*a^3*b^5*c^5*e*f*j + 62208*a^
4*b^3*c^6*d*e*l + 19872*a^4*b^3*c^6*d*f*k - 11520*a^4*b^3*c^6*d*g*j - 10752
*a^4*b^3*c^6*e*f*j - 48*a^2*b^8*c^3*d*f*m - 216*a^2*b^8*c^3*d*h*k - 2226*a^
3*b^6*c^4*d*f*m + 3456*a^3*b^6*c^4*d*g*l + 1998*a^3*b^6*c^4*d*h*k - 384*a^3
*b^6*c^4*f*g*j + 33384*a^4*b^4*c^5*d*f*m - 31104*a^4*b^4*c^5*d*g*l - 1944*a
^4*b^4*c^5*d*h*k - 2304*a^4*b^4*c^5*e*f*l + 2304*a^4*b^4*c^5*e*h*j + 5376*a
^4*b^4*c^5*f*g*j - 162528*a^5*b^2*c^6*d*f*m + 96768*a^5*b^2*c^6*d*g*l - 872
64*a^5*b^2*c^6*d*h*k + 36864*a^5*b^2*c^6*e*f*l + 27648*a^5*b^2*c^6*e*g*k +
13824*a^5*b^2*c^6*e*h*j + 12288*a^5*b^2*c^6*f*g*j - 72*a^2*b^9*c^2*d*h*m +
2016*a^3*b^7*c^3*d*h*m - 72*a^3*b^7*c^3*f*h*k - 18648*a^4*b^5*c^4*d*h*m + 1
152*a^4*b^5*c^4*f*g*l + 1800*a^4*b^5*c^4*f*h*k - 1152*a^4*b^5*c^4*g*h*j + 6
7392*a^5*b^3*c^5*d*h*m - 2304*a^5*b^3*c^5*e*g*m - 6912*a^5*b^3*c^5*e*h*l -
18432*a^5*b^3*c^5*f*g*l + 27072*a^5*b^3*c^5*f*h*k - 6912*a^5*b^3*c^5*g*h*j
- 1152*a^3*b^7*c^3*d*j*l + 8064*a^4*b^5*c^4*d*j*l - 11520*a^5*b^3*c^5*d*j*l
 - 9216*a^5*b^3*c^5*e*j*k - 24*a^3*b^8*c^2*f*h*m + 1050*a^4*b^6*c^3*f*h*m -
 9576*a^5*b^4*c^4*f*h*m + 3456*a^5*b^4*c^4*g*h*l - 57504*a^6*b^2*c^5*f*h*m
+ 13824*a^6*b^2*c^5*g*h*l - 432*a^3*b^8*c^2*d*k*m + 2394*a^4*b^6*c^3*d*k*m
- 384*a^4*b^6*c^3*f*j*l + 6552*a^5*b^4*c^4*d*k*m + 768*a^5*b^4*c^4*e*j*m +
5376*a^5*b^4*c^4*f*j*l + 4608*a^5*b^4*c^4*g*j*k - 114336*a^6*b^2*c^5*d*k*m
+ 16896*a^6*b^2*c^5*e*j*m + 27648*a^6*b^2*c^5*e*k*l + 12288*a^6*b^2*c^5*f*j
*l + 9216*a^6*b^2*c^5*g*j*k - 186*a^4*b^7*c^2*f*k*m - 384*a^5*b^5*c^3*g*j*m
 - 1152*a^5*b^5*c^3*h*j*l - 2304*a^6*b^3*c^4*e*l*m + 31584*a^6*b^3*c^4*f*k*
m - 8448*a^6*b^3*c^4*g*j*m - 13824*a^6*b^3*c^4*g*k*l - 6912*a^6*b^3*c^4*h*j
*l + 342*a^5*b^6*c^2*h*k*m + 1152*a^6*b^4*c^3*g*l*m - 12600*a^6*b^4*c^3*h*k
*m + 23040*a^7*b^2*c^4*g*l*m - 37728*a^7*b^2*c^4*h*k*m + 4608*a^6*b^4*c^3*j
*k*l + 9216*a^7*b^2*c^4*j*k*l - 384*a^6*b^5*c^2*j*l*m - 8448*a^7*b^3*c^3*j*
l*m)/(512*(4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^2 + 240*a^6*b^8*c^3 -
 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6)) + (x*(13824*a^4*c
^9*e^3 + 512*a^7*c^6*j^3 - 54*b^7*c^6*d^2*e + 27*b^8*c^5*d^2*g + 13824*a^5*
c^8*e^2*j + 4608*a^6*c^7*e*j^2 - 9*b^9*c^4*d^2*j + a^4*b^9*j*m^2 - 3*a^5*b^
8*l*m^2 - 1728*a^4*b^3*c^6*g^3 + 64*a^4*b^6*c^3*j^3 + 384*a^5*b^4*c^4*j^3 +
 768*a^6*b^2*c^5*j^3 - 1728*a^7*b^3*c^3*l^3 - 20160*a^4*c^9*d*e*f - 2880*a^
5*c^8*e*f*h - 12096*a^5*c^8*d*e*k - 6720*a^5*c^8*d*f*j - 4800*a^6*c^7*e*f*m
 - 1728*a^6*c^7*e*h*k - 960*a^6*c^7*f*h*j - 4032*a^6*c^7*d*j*k - 2880*a^7*c
```

^6*e*k*m - 1600*a^7*c^6*f*j*m - 576*a^7*c^6*h*j*k - 960*a^8*c^5*j*k*m + 972
*a*b^5*c^7*d^2*e + 24192*a^3*b*c^9*d^2*e - 486*a*b^6*c^6*d^2*g + 6240*a^4*b
*c^8*e*f^2 - 20736*a^4*b*c^8*e^2*g + 1728*a^5*b*c^7*e*h^2 + 144*a*b^7*c^5*d
^2*j + 8064*a^4*b*c^8*d^2*j + 27*a*b^8*c^4*d^2*l + 2080*a^5*b*c^7*f^2*j + 2
592*a^6*b*c^6*e*k^2 - 20736*a^5*b*c^7*e^2*l - 2304*a^6*b*c^6*g*j^2 + 576*a^
6*b*c^6*h^2*j + 3840*a^7*b*c^5*e*m^2 - 3*a^4*b^8*c*g*m^2 + 864*a^7*b*c^5*j*
k^2 - 2304*a^7*b*c^5*j^2*l - 32*a^5*b^7*c*j*m^2 + 1280*a^8*b*c^4*j*m^2 + 10
2*a^6*b^6*c*l*m^2 - 7344*a^2*b^3*c^8*d^2*e + 3672*a^2*b^4*c^7*d^2*g - 6*a^2
*b^5*c^6*e*f^2 - 12096*a^3*b^2*c^8*d^2*g + 192*a^3*b^3*c^7*e*f^2 + 10368*a^
4*b^2*c^7*e*g^2 + 3*a^2*b^6*c^5*f^2*g - 96*a^3*b^4*c^6*f^2*g - 3120*a^4*b^2
*c^7*f^2*g + 1296*a^4*b^3*c^6*e*h^2 - 900*a^2*b^5*c^6*d^2*j + 1584*a^3*b^3*
c^7*d^2*j + 6912*a^4*b^2*c^7*e^2*j + 1152*a^4*b^4*c^5*e*j^2 - 648*a^4*b^4*c
^5*g*h^2 + 4608*a^5*b^2*c^6*e*j^2 - 864*a^5*b^2*c^6*g*h^2 - 486*a^2*b^6*c^5
*d^2*l - a^2*b^7*c^4*f^2*j + 3672*a^3*b^4*c^6*d^2*l + 30*a^3*b^5*c^5*f^2*j
- 12096*a^4*b^2*c^7*d^2*l + 1104*a^4*b^3*c^6*f^2*j + 54*a^4*b^5*c^4*e*k^2 +
864*a^5*b^3*c^5*e*k^2 + 1728*a^4*b^4*c^5*g^2*j - 576*a^4*b^5*c^4*g*j^2 + 3
456*a^5*b^2*c^6*g^2*j - 2304*a^5*b^3*c^5*g*j^2 + 10368*a^6*b^2*c^5*e*l^2 +
3*a^3*b^6*c^4*f^2*l - 96*a^4*b^4*c^5*f^2*l + 216*a^4*b^5*c^4*h^2*j - 27*a^4
*b^6*c^3*g*k^2 + 6*a^4*b^7*c^2*e*m^2 - 3120*a^5*b^2*c^6*f^2*l + 720*a^5*b^3
*c^5*h^2*j - 432*a^5*b^4*c^4*g*k^2 - 204*a^5*b^5*c^3*e*m^2 - 1296*a^6*b^2*c
^5*g*k^2 + 1488*a^6*b^3*c^4*e*m^2 - 5184*a^5*b^3*c^5*g^2*l - 5184*a^6*b^3*c
^4*g*l^2 - 648*a^5*b^4*c^4*h^2*l + 102*a^5*b^6*c^2*g*m^2 - 864*a^6*b^2*c^5*
h^2*l - 744*a^6*b^4*c^3*g*m^2 - 1920*a^7*b^2*c^4*g*m^2 + 9*a^4*b^7*c^2*j*k^
2 + 162*a^5*b^5*c^3*j*k^2 + 720*a^6*b^3*c^4*j*k^2 - 576*a^5*b^5*c^3*j^2*l -
2304*a^6*b^3*c^4*j^2*l + 1728*a^6*b^4*c^3*j*l^2 + 3456*a^7*b^2*c^4*j*l^2 -
27*a^5*b^6*c^2*k^2*l - 432*a^6*b^4*c^3*k^2*l + 180*a^6*b^5*c^2*j*m^2 - 129
6*a^7*b^2*c^4*k^2*l + 1136*a^7*b^3*c^3*j*m^2 - 744*a^7*b^4*c^2*l*m^2 - 1920
*a^8*b^2*c^3*l*m^2 - 36*a*b^6*c^6*d*e*f + 18*a*b^7*c^5*d*f*g + 15552*a^4*b*
c^8*d*e*h + 10080*a^4*b*c^8*d*f*g - 6*a*b^8*c^4*d*f*j + 1440*a^5*b*c^7*f*g*
h + 21888*a^5*b*c^7*d*e*m + 10080*a^5*b*c^7*d*f*l + 6048*a^5*b*c^7*d*g*k +
5184*a^5*b*c^7*d*h*j + 8064*a^5*b*c^7*e*f*k - 13824*a^5*b*c^7*e*g*j + 5184*
a^6*b*c^6*e*h*m + 2400*a^6*b*c^6*f*g*m + 1440*a^6*b*c^6*f*h*l + 864*a^6*b*c
^6*g*h*k + 7296*a^6*b*c^6*d*j*m + 6048*a^6*b*c^6*d*k*l - 13824*a^6*b*c^6*e*
j*l + 2688*a^6*b*c^6*f*j*k + 2400*a^7*b*c^5*f*l*m + 1440*a^7*b*c^5*g*k*m +
1728*a^7*b*c^5*h*j*m + 864*a^7*b*c^5*h*k*l + 6*a^4*b^8*c*j*k*m - 18*a^5*b^7
*c*k*l*m + 1440*a^8*b*c^4*k*l*m + 900*a^2*b^4*c^7*d*e*f - 4896*a^3*b^2*c^8*
d*e*f - 108*a^2*b^5*c^6*d*e*h - 450*a^2*b^5*c^6*d*f*g + 2448*a^3*b^3*c^7*d*
f*g + 54*a^2*b^6*c^5*d*g*h - 36*a^3*b^4*c^6*e*f*h - 7776*a^4*b^2*c^7*d*g*h
- 6048*a^4*b^2*c^7*e*f*h + 138*a^2*b^6*c^5*d*f*j + 540*a^3*b^4*c^6*d*e*k -
516*a^3*b^4*c^6*d*f*j - 6048*a^4*b^2*c^7*d*e*k - 4992*a^4*b^2*c^7*d*f*j + 1
8*a^3*b^5*c^5*f*g*h + 3024*a^4*b^3*c^6*f*g*h + 18*a^2*b^7*c^4*d*f*l - 18*a^
2*b^7*c^4*d*h*j - 450*a^3*b^5*c^5*d*f*l - 270*a^3*b^5*c^5*d*g*k - 36*a^3*b^
5*c^5*d*h*j - 2016*a^4*b^3*c^6*d*e*m + 2448*a^4*b^3*c^6*d*f*l + 3024*a^4*b^
3*c^6*d*g*k + 2592*a^4*b^3*c^6*d*h*j + 1440*a^4*b^3*c^6*e*f*k - 6912*a^4*b^
3*c^6*e*g*j + 54*a^3*b^6*c^4*d*h*l - 6*a^3*b^6*c^4*f*h*j + 1008*a^4*b^4*c^5
*d*g*m + 420*a^4*b^4*c^5*e*f*m - 540*a^4*b^4*c^5*e*h*k - 720*a^4*b^4*c^5*f*
g*k - 1020*a^4*b^4*c^5*f*h*j - 10944*a^5*b^2*c^6*d*g*m - 7776*a^5*b^2*c^6*d
*h*l - 7392*a^5*b^2*c^6*e*f*m + 20736*a^5*b^2*c^6*e*g*l - 4320*a^5*b^2*c^6*
e*h*k - 4032*a^5*b^2*c^6*f*g*k - 2496*a^5*b^2*c^6*f*h*j + 90*a^3*b^6*c^4*d*
j*k - 828*a^4*b^4*c^5*d*j*k - 4032*a^5*b^2*c^6*d*j*k - 180*a^4*b^5*c^4*e*h*
m - 210*a^4*b^5*c^4*f*g*m + 18*a^4*b^5*c^4*f*h*l + 270*a^4*b^5*c^4*g*h*k +
2880*a^5*b^3*c^5*e*h*m + 3696*a^5*b^3*c^5*f*g*m + 3024*a^5*b^3*c^5*f*h*l +
2160*a^5*b^3*c^5*g*h*k - 336*a^4*b^5*c^4*d*j*m - 270*a^4*b^5*c^4*d*k*l + 24
0*a^4*b^5*c^4*f*j*k + 2976*a^5*b^3*c^5*d*j*m + 3024*a^5*b^3*c^5*d*k*l - 691
2*a^5*b^3*c^5*e*j*l + 1824*a^5*b^3*c^5*f*j*k + 90*a^4*b^6*c^3*g*h*m - 1440*
a^5*b^4*c^4*g*h*m - 2592*a^6*b^2*c^5*g*h*m + 36*a^4*b^6*c^3*e*k*m + 70*a^4*
b^6*c^3*f*j*m - 90*a^4*b^6*c^3*h*j*k + 1008*a^5*b^4*c^4*d*l*m - 324*a^5*b^4
*c^4*e*k*m - 1092*a^5*b^4*c^4*f*j*m - 720*a^5*b^4*c^4*f*k*l + 3456*a^5*b^4*
c^4*g*j*l - 900*a^5*b^4*c^4*h*j*k - 10944*a^6*b^2*c^5*d*l*m - 5472*a^6*b^2*

c^5*e*k*m - 3264*a^6*b^2*c^5*f*j*m - 4032*a^6*b^2*c^5*f*k*l + 6912*a^6*b^2*
c^5*g*j*l - 1728*a^6*b^2*c^5*h*j*k - 18*a^4*b^7*c^2*g*k*m - 30*a^4*b^7*c^2*
h*j*m - 210*a^5*b^5*c^3*f*l*m + 162*a^5*b^5*c^3*g*k*m + 420*a^5*b^5*c^3*h*j
*m + 270*a^5*b^5*c^3*h*k*l + 3696*a^6*b^3*c^4*f*l*m + 2736*a^6*b^3*c^4*g*k*
m + 1824*a^6*b^3*c^4*h*j*m + 2160*a^6*b^3*c^4*h*k*l + 90*a^5*b^6*c^2*h*l*m
- 1440*a^6*b^4*c^3*h*l*m - 2592*a^7*b^2*c^4*h*l*m - 42*a^5*b^6*c^2*j*k*m -
1020*a^6*b^4*c^3*j*k*m - 2304*a^7*b^2*c^4*j*k*m + 162*a^6*b^5*c^2*k*l*m + 2
736*a^7*b^3*c^3*k*l*m))/(64*(4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^2 +
240*a^6*b^8*c^3 - 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6))
)*root(56371445760*a^11*b^8*c^9*z^4 - 503316480*a^8*b^14*c^6*z^4 + 47185920
*a^7*b^16*c^5*z^4 - 2621440*a^6*b^18*c^4*z^4 + 65536*a^5*b^20*c^3*z^4 - 171
798691840*a^14*b^2*c^12*z^4 + 193273528320*a^13*b^4*c^11*z^4 - 128849018880
*a^12*b^6*c^10*z^4 - 16911433728*a^10*b^10*c^8*z^4 + 3523215360*a^9*b^12*c^
7*z^4 + 68719476736*a^15*c^13*z^4 + 1536*a^5*b^16*c*k*m*z^2 + 1536*a*b^18*c
^3*d*f*z^2 - 2571632640*a^9*b^5*c^8*d*m*z^2 + 2548039680*a^9*b^3*c^10*d*h*z
^2 + 1509949440*a^10*b^3*c^9*e*l*z^2 + 1509949440*a^9*b^3*c^10*e*g*z^2 - 14
01421824*a^8*b^5*c^9*d*h*z^2 - 1321205760*a^9*b^2*c^11*d*f*z^2 - 2793406464
*a^11*b*c^10*d*m*z^2 + 890634240*a^8*b^7*c^7*d*m*z^2 - 754974720*a^10*b^4*c
^8*g*l*z^2 - 754974720*a^9*b^5*c^8*e*l*z^2 + 719585280*a^8*b^6*c^8*d*k*z^2
- 707788800*a^9*b^4*c^9*d*k*z^2 - 754974720*a^8*b^5*c^9*e*g*z^2 + 603979776
*a^11*b^2*c^9*g*l*z^2 - 581959680*a^10*b^4*c^8*f*m*z^2 + 732168192*a^7*b^6*
c^9*d*f*z^2 + 534773760*a^11*b^3*c^8*h*m*z^2 - 456130560*a^11*b^4*c^7*k*m*z
^2 - 603979776*a^10*b^2*c^10*e*j*z^2 + 534773760*a^10*b^3*c^9*f*k*z^2 + 384
040960*a^9*b^6*c^7*f*m*z^2 + 377487360*a^9*b^6*c^7*g*l*z^2 - 456130560*a^9*
b^4*c^9*f*h*z^2 + 301989888*a^11*b^3*c^8*j*l*z^2 - 415236096*a^10*b^2*c^10*
d*k*z^2 + 254017536*a^10*b^6*c^6*k*m*z^2 - 330301440*a^10*b^4*c^8*h*k*z^2 +
390463488*a^7*b^7*c^8*d*h*z^2 + 188743680*a^12*b^2*c^8*k*m*z^2 + 301989888
*a^10*b^3*c^9*g*j*z^2 - 297861120*a^7*b^8*c^7*d*k*z^2 - 366280704*a^6*b^8*c
^8*d*f*z^2 + 188743680*a^11*b^2*c^9*h*k*z^2 - 330301440*a^8*b^4*c^10*d*f*z^
2 + 254017536*a^8*b^6*c^8*f*h*z^2 - 1887436800*a^10*b*c^11*d*h*z^2 + 188743
680*a^8*b^7*c^7*e*l*z^2 + 153354240*a^9*b^6*c^7*h*k*z^2 - 185303040*a^7*b^9
*c^6*d*m*z^2 - 117964800*a^10*b^5*c^7*h*m*z^2 - 61931520*a^9*b^8*c^5*k*m*z^
2 + 121634816*a^11*b^2*c^9*f*m*z^2 - 115671040*a^8*b^8*c^6*f*m*z^2 - 629145
60*a^9*b^7*c^6*j*l*z^2 + 188743680*a^10*b^2*c^10*f*h*z^2 - 94371840*a^8*b^8
*c^6*g*l*z^2 + 6144000*a^8*b^10*c^4*k*m*z^2 - 117964800*a^9*b^5*c^8*f*k*z^2
+ 61440*a^7*b^12*c^3*k*m*z^2 - 46080*a^6*b^14*c^2*k*m*z^2 + 23592960*a^8*b
^9*c^5*j*l*z^2 + 188743680*a^7*b^7*c^8*e*g*z^2 - 37355520*a^9*b^7*c^6*h*m*z
^2 + 125829120*a^8*b^6*c^8*e*j*z^2 + 23101440*a^8*b^9*c^5*h*m*z^2 - 3538944
*a^7*b^11*c^4*j*l*z^2 + 196608*a^6*b^13*c^3*j*l*z^2 - 4349952*a^7*b^11*c^4*
h*m*z^2 + 337920*a^6*b^13*c^3*h*m*z^2 - 7680*a^5*b^15*c^2*h*m*z^2 - 6291456
0*a^8*b^7*c^7*g*j*z^2 - 26542080*a^8*b^8*c^6*h*k*z^2 + 17940480*a^7*b^10*c^
5*f*m*z^2 + 11796480*a^7*b^10*c^5*g*l*z^2 - 37355520*a^8*b^7*c^7*f*k*z^2 -
1347584*a^6*b^12*c^4*f*m*z^2 + 68272128*a^6*b^10*c^6*d*k*z^2 - 589824*a^6*b
^12*c^4*g*l*z^2 + 552960*a^6*b^12*c^4*h*k*z^2 - 147456*a^7*b^10*c^5*h*k*z^2
- 46080*a^5*b^14*c^3*h*k*z^2 + 35840*a^5*b^14*c^3*f*m*z^2 + 23592960*a^7*b
^9*c^6*g*j*z^2 - 23592960*a^7*b^9*c^6*e*l*z^2 + 23371776*a^6*b^11*c^5*d*m*z
^2 + 23101440*a^7*b^9*c^6*f*k*z^2 - 47185920*a^7*b^8*c^7*e*j*z^2 - 61931520
*a^7*b^8*c^7*f*h*z^2 - 4349952*a^6*b^11*c^5*f*k*z^2 - 3538944*a^6*b^11*c^5*
g*j*z^2 - 1677312*a^5*b^13*c^4*d*m*z^2 + 1179648*a^6*b^11*c^5*e*l*z^2 + 337
920*a^5*b^13*c^4*f*k*z^2 + 196608*a^5*b^13*c^4*g*j*z^2 + 53760*a^4*b^15*c^3
*d*m*z^2 - 7680*a^4*b^15*c^3*f*k*z^2 + 96583680*a^5*b^10*c^7*d*f*z^2 - 9179
136*a^5*b^12*c^5*d*k*z^2 + 7077888*a^6*b^10*c^6*e*j*z^2 - 51609600*a^6*b^9*
c^7*d*h*z^2 + 691200*a^4*b^14*c^4*d*k*z^2 - 393216*a^5*b^12*c^5*e*j*z^2 - 2
3040*a^3*b^16*c^3*d*k*z^2 + 6144000*a^6*b^10*c^6*f*h*z^2 + 61440*a^5*b^12*c
^5*f*h*z^2 - 46080*a^4*b^14*c^4*f*h*z^2 + 1536*a^3*b^16*c^3*f*h*z^2 - 23592
960*a^6*b^9*c^7*e*g*z^2 + 1179648*a^5*b^11*c^6*e*g*z^2 + 829440*a^4*b^13*c^
5*d*h*z^2 + 368640*a^5*b^11*c^6*d*h*z^2 - 105984*a^3*b^15*c^4*d*h*z^2 + 460
8*a^2*b^17*c^3*d*h*z^2 - 15175680*a^4*b^12*c^6*d*f*z^2 + 1428480*a^3*b^14*c
^5*d*f*z^2 - 73728*a^2*b^16*c^4*d*f*z^2 + 4108320768*a^10*b^3*c^9*d*m*z^2 -

1207959552*a^11*b*c^10*e*l*z^2 - 1207959552*a^10*b*c^11*e*g*z^2 - 57881395
2*a^12*b*c^9*h*m*z^2 - 578813952*a^11*b*c^10*f*k*z^2 - 402653184*a^12*b*c^9
*j*l*z^2 - 402653184*a^11*b*c^10*g*j*z^2 - 440401920*a^10*b*c^11*f^2*z^2 -
188743680*a^12*b*c^9*k^2*z^2 - 188743680*a^11*b*c^10*h^2*z^2 + 1761607680*a
^10*c^12*d*f*z^2 - 14080*a^6*b^15*c*m^2*z^2 - 94464*a*b^17*c^4*d^2*z^2 + 69
36330240*a^8*b^3*c^11*d^2*z^2 + 2464874496*a^6*b^7*c^9*d^2*z^2 - 3963617280
*a^9*b*c^12*d^2*z^2 + 1056964608*a^11*c^11*d*k*z^2 + 805306368*a^11*c^11*e*
j*z^2 + 419430400*a^12*c^10*f*m*z^2 + 251658240*a^13*c^9*k*m*z^2 - 15099494
40*a^9*b^2*c^11*e^2*z^2 + 251658240*a^11*c^11*f*h*z^2 + 150994944*a^12*c^10
*h*k*z^2 - 5400428544*a^7*b^5*c^10*d^2*z^2 + 754974720*a^8*b^4*c^10*e^2*z^2
 - 730054656*a^5*b^9*c^8*d^2*z^2 + 477102080*a^12*b^3*c^7*m^2*z^2 - 3774873
60*a^11*b^4*c^7*l^2*z^2 + 477102080*a^9*b^3*c^10*f^2*z^2 + 301989888*a^12*b
^2*c^8*l^2*z^2 - 377487360*a^9*b^4*c^9*g^2*z^2 + 301989888*a^10*b^2*c^10*g^
2*z^2 - 174325760*a^11*b^5*c^6*m^2*z^2 + 188743680*a^10*b^6*c^6*l^2*z^2 + 1
41557760*a^11*b^3*c^8*k^2*z^2 + 188743680*a^8*b^6*c^8*g^2*z^2 + 141557760*a
^10*b^3*c^9*h^2*z^2 - 174325760*a^8*b^5*c^9*f^2*z^2 - 188743680*a^7*b^6*c^9
*e^2*z^2 - 47185920*a^9*b^8*c^5*l^2*z^2 + 11206656*a^10*b^7*c^5*m^2*z^2 + 8
929280*a^9*b^9*c^4*m^2*z^2 - 2600960*a^8*b^11*c^3*m^2*z^2 + 291840*a^7*b^13
*c^2*m^2*z^2 - 50331648*a^10*b^4*c^8*j^2*z^2 + 146165760*a^4*b^11*c^7*d^2*z
^2 - 26542080*a^9*b^7*c^6*k^2*z^2 + 5898240*a^8*b^10*c^4*l^2*z^2 - 294912*a
^7*b^12*c^3*l^2*z^2 - 33554432*a^11*b^2*c^9*j^2*z^2 + 9584640*a^8*b^9*c^5*k
^2*z^2 + 20971520*a^9*b^6*c^7*j^2*z^2 - 2359296*a^10*b^5*c^7*k^2*z^2 - 1290
240*a^7*b^11*c^4*k^2*z^2 + 46080*a^6*b^13*c^3*k^2*z^2 + 2304*a^5*b^15*c^2*k
^2*z^2 - 2752512*a^7*b^10*c^5*j^2*z^2 + 2621440*a^8*b^8*c^6*j^2*z^2 + 52428
8*a^6*b^12*c^4*j^2*z^2 - 32768*a^5*b^14*c^3*j^2*z^2 - 47185920*a^7*b^8*c^7*
g^2*z^2 - 26542080*a^8*b^7*c^7*h^2*z^2 + 9584640*a^7*b^9*c^6*h^2*z^2 - 2359
296*a^9*b^5*c^8*h^2*z^2 - 1290240*a^6*b^11*c^5*h^2*z^2 + 46080*a^5*b^13*c^4
*h^2*z^2 + 2304*a^4*b^15*c^3*h^2*z^2 + 5898240*a^6*b^10*c^6*g^2*z^2 - 29491
2*a^5*b^12*c^5*g^2*z^2 + 11206656*a^7*b^7*c^8*f^2*z^2 + 8929280*a^6*b^9*c^7
*f^2*z^2 + 23592960*a^6*b^8*c^8*e^2*z^2 - 2600960*a^5*b^11*c^6*f^2*z^2 + 29
1840*a^4*b^13*c^5*f^2*z^2 - 14080*a^3*b^15*c^4*f^2*z^2 + 256*a^2*b^17*c^3*f
^2*z^2 - 19860480*a^3*b^13*c^6*d^2*z^2 - 1179648*a^5*b^10*c^7*e^2*z^2 + 177
1776*a^2*b^15*c^5*d^2*z^2 - 440401920*a^13*b*c^8*m^2*z^2 + 1207959552*a^10*
c^12*e^2*z^2 + 134217728*a^12*c^10*j^2*z^2 + 256*a^5*b^17*m^2*z^2 + 2304*b^
19*c^3*d^2*z^2 - 23592960*a^10*b*c^8*f*k*l*z + 99090432*a^9*b*c^9*d*h*l*z +
 9437184*a^10*b*c^8*e*k*m*z + 23592960*a^10*b*c^8*g*h*m*z + 141557760*a^8*b
*c^10*d*e*k*z + 47185920*a^9*b*c^9*d*j*k*z - 23592960*a^9*b*c^9*f*g*k*z + 1
69869312*a^7*b*c^11*d*e*f*z + 99090432*a^8*b*c^10*d*g*h*z - 3145728*a^9*b*c
^9*f*h*j*z + 56623104*a^8*b*c^10*d*f*j*z + 1536*a*b^15*c^3*d*f*j*z - 943718
4*a^8*b*c^10*e*f*h*z - 4608*a*b^14*c^4*d*f*g*z + 9216*a*b^13*c^5*d*e*f*z +
412876800*a^8*b^2*c^9*d*e*m*z - 206438400*a^9*b^3*c^7*d*l*m*z + 5898240*a^1
0*b^4*c^5*k*l*m*z - 206438400*a^8*b^3*c^8*d*g*m*z - 4718592*a^11*b^2*c^6*k*
l*m*z - 2949120*a^9*b^6*c^4*k*l*m*z + 737280*a^8*b^8*c^3*k*l*m*z - 92160*a^
7*b^10*c^2*k*l*m*z + 103219200*a^8*b^5*c^6*d*l*m*z - 29491200*a^10*b^3*c^6*
h*l*m*z - 206438400*a^7*b^4*c^8*d*e*m*z - 2359296*a^10*b^3*c^6*j*k*m*z + 49
1520*a^8*b^7*c^4*j*k*m*z - 184320*a^7*b^9*c^3*j*k*m*z + 27648*a^6*b^11*c^2*
j*k*m*z + 14745600*a^9*b^5*c^5*h*l*m*z - 3686400*a^8*b^7*c^4*h*l*m*z + 4608
00*a^7*b^9*c^3*h*l*m*z - 23040*a^6*b^11*c^2*h*l*m*z + 88473600*a^8*b^4*c^7*
d*k*l*z + 82575360*a^9*b^2*c^8*d*j*m*z + 11796480*a^10*b^2*c^7*h*j*m*z + 58
98240*a^9*b^4*c^6*g*k*m*z - 4718592*a^10*b^2*c^7*g*k*m*z - 70778880*a^9*b^2
*c^8*d*k*l*z - 2949120*a^8*b^6*c^5*g*k*m*z - 2457600*a^8*b^6*c^5*h*j*m*z +
921600*a^7*b^8*c^4*h*j*m*z + 737280*a^7*b^8*c^4*g*k*m*z - 138240*a^6*b^10*c
^3*h*j*m*z - 92160*a^6*b^10*c^3*g*k*m*z + 7680*a^5*b^12*c^2*h*j*m*z + 4608*
a^5*b^12*c^2*g*k*m*z + 29491200*a^9*b^3*c^7*f*k*l*z - 176947200*a^7*b^3*c^9
*d*e*k*z - 109707264*a^8*b^3*c^8*d*h*l*z - 25804800*a^7*b^7*c^5*d*l*m*z + 1
03219200*a^7*b^5*c^7*d*g*m*z + 219414528*a^7*b^2*c^10*d*e*h*z - 14745600*a^
8*b^5*c^6*f*k*l*z - 29491200*a^9*b^3*c^7*g*h*m*z - 11796480*a^9*b^3*c^7*e*k
*m*z - 44236800*a^7*b^6*c^6*d*k*l*z + 58982400*a^9*b^2*c^8*e*h*m*z + 589824
0*a^8*b^5*c^6*e*k*m*z + 3686400*a^7*b^7*c^5*f*k*l*z + 3225600*a^6*b^9*c^4*d

*l*m*z - 1474560*a^7*b^7*c^5*e*k*m*z - 460800*a^6*b^9*c^4*f*k*l*z + 184320*
a^6*b^9*c^4*e*k*m*z - 161280*a^5*b^11*c^3*d*l*m*z + 23040*a^5*b^11*c^3*f*k*
l*z - 9216*a^5*b^11*c^3*e*k*m*z + 14745600*a^8*b^5*c^6*g*h*m*z + 110886912*
a^7*b^4*c^8*d*f*l*z - 3686400*a^7*b^7*c^5*g*h*m*z - 221773824*a^6*b^3*c^10*
d*e*f*z + 460800*a^6*b^9*c^4*g*h*m*z - 17203200*a^7*b^6*c^6*d*j*m*z - 23040
*a^5*b^11*c^3*g*h*m*z - 29491200*a^8*b^4*c^7*e*h*m*z - 11796480*a^9*b^2*c^8
*f*j*k*z + 11059200*a^6*b^8*c^5*d*k*l*z + 6451200*a^6*b^8*c^5*d*j*m*z + 884
73600*a^7*b^4*c^8*d*g*k*z + 2457600*a^7*b^6*c^6*f*j*k*z - 35389440*a^8*b^3*
c^8*d*j*k*z - 1382400*a^5*b^10*c^4*d*k*l*z - 84934656*a^8*b^2*c^9*d*f*l*z -
967680*a^5*b^10*c^4*d*j*m*z - 921600*a^6*b^8*c^5*f*j*k*z + 138240*a^5*b^10
*c^4*f*j*k*z + 69120*a^4*b^12*c^3*d*k*l*z + 53760*a^4*b^12*c^3*d*j*m*z - 76
80*a^4*b^12*c^3*f*j*k*z + 44236800*a^7*b^5*c^7*d*h*l*z + 7372800*a^7*b^6*c^
6*e*h*m*z - 5898240*a^8*b^4*c^7*f*h*l*z + 4718592*a^9*b^2*c^8*f*h*l*z - 707
78880*a^8*b^2*c^9*d*g*k*z + 2949120*a^7*b^6*c^6*f*h*l*z - 921600*a^6*b^8*c^
5*e*h*m*z - 737280*a^6*b^8*c^5*f*h*l*z + 92160*a^5*b^10*c^4*f*h*l*z + 46080
*a^5*b^10*c^4*e*h*m*z - 4608*a^4*b^12*c^3*f*h*l*z + 29491200*a^8*b^3*c^8*f*
g*k*z - 109707264*a^7*b^3*c^9*d*g*h*z - 25804800*a^6*b^7*c^6*d*g*m*z - 5898
2400*a^8*b^2*c^9*e*f*k*z - 58982400*a^6*b^6*c^7*d*f*l*z + 7372800*a^6*b^7*c
^6*d*j*k*z + 88473600*a^6*b^5*c^8*d*e*k*z - 2764800*a^5*b^9*c^5*d*j*k*z + 5
1609600*a^6*b^6*c^7*d*e*m*z + 414720*a^4*b^11*c^4*d*j*k*z - 23040*a^3*b^13*
c^3*d*j*k*z - 14745600*a^7*b^5*c^7*f*g*k*z - 44236800*a^6*b^6*c^7*d*g*k*z -
6635520*a^6*b^7*c^6*d*h*l*z + 40108032*a^8*b^2*c^9*d*h*j*z + 3686400*a^6*b
^7*c^6*f*g*k*z + 3225600*a^5*b^9*c^5*d*g*m*z + 2359296*a^8*b^3*c^8*f*h*j*z
- 491520*a^6*b^7*c^6*f*h*j*z - 460800*a^5*b^9*c^5*f*g*k*z - 276480*a^5*b^9*
c^5*d*h*l*z + 184320*a^5*b^9*c^5*f*h*j*z + 179712*a^4*b^11*c^4*d*h*l*z - 16
1280*a^4*b^11*c^4*d*g*m*z - 27648*a^4*b^11*c^4*f*h*j*z + 23040*a^4*b^11*c^4
*f*g*k*z - 13824*a^3*b^13*c^3*d*h*l*z + 1536*a^3*b^13*c^3*f*h*j*z + 2949120
0*a^7*b^4*c^8*e*f*k*z + 110886912*a^6*b^4*c^9*d*f*g*z + 16220160*a^5*b^8*c^
6*d*f*l*z - 45613056*a^7*b^3*c^9*d*f*j*z + 11059200*a^5*b^8*c^6*d*g*k*z - 1
0321920*a^6*b^6*c^7*d*h*j*z - 7372800*a^6*b^6*c^7*e*f*k*z + 7077888*a^7*b^4
*c^8*d*h*j*z - 6451200*a^5*b^8*c^6*d*e*m*z - 88473600*a^6*b^4*c^9*d*e*h*z +
2396160*a^5*b^8*c^6*d*h*j*z - 2396160*a^4*b^10*c^5*d*f*l*z - 1382400*a^4*b
^10*c^5*d*g*k*z - 84934656*a^7*b^2*c^10*d*f*g*z + 921600*a^5*b^8*c^6*e*f*k*
z + 117964800*a^5*b^5*c^9*d*e*f*z + 322560*a^4*b^10*c^5*d*e*m*z + 175104*a^
3*b^12*c^4*d*f*l*z + 69120*a^3*b^12*c^4*d*g*k*z - 50688*a^3*b^12*c^4*d*h*j*
z - 46080*a^4*b^10*c^5*e*f*k*z - 27648*a^4*b^10*c^5*d*h*j*z + 4608*a^2*b^14
*c^3*d*h*j*z - 4608*a^2*b^14*c^3*d*f*l*z + 44236800*a^6*b^5*c^8*d*g*h*z - 5
898240*a^7*b^4*c^8*f*g*h*z - 22118400*a^5*b^7*c^7*d*e*k*z + 4718592*a^8*b^2
*c^9*f*g*h*z + 2949120*a^6*b^6*c^7*f*g*h*z - 737280*a^5*b^8*c^6*f*g*h*z + 9
2160*a^4*b^10*c^5*f*g*h*z - 4608*a^3*b^12*c^4*f*g*h*z + 8847360*a^5*b^7*c^7
*d*f*j*z - 58982400*a^5*b^6*c^8*d*f*g*z - 3809280*a^4*b^9*c^6*d*f*j*z + 276
4800*a^4*b^9*c^6*d*e*k*z + 2359296*a^6*b^5*c^8*d*f*j*z + 681984*a^3*b^11*c^
5*d*f*j*z - 138240*a^3*b^11*c^5*d*e*k*z - 55296*a^2*b^13*c^4*d*f*j*z + 1179
6480*a^7*b^3*c^9*e*f*h*z - 6635520*a^5*b^7*c^7*d*g*h*z - 5898240*a^6*b^5*c^
8*e*f*h*z + 1474560*a^5*b^7*c^7*e*f*h*z - 276480*a^4*b^9*c^6*d*g*h*z - 1843
20*a^4*b^9*c^6*e*f*h*z + 179712*a^3*b^11*c^5*d*g*h*z - 13824*a^2*b^13*c^4*d
*g*h*z + 9216*a^3*b^11*c^5*e*f*h*z + 16220160*a^4*b^8*c^7*d*f*g*z + 1327104
0*a^5*b^6*c^8*d*e*h*z - 2396160*a^3*b^10*c^6*d*f*g*z + 552960*a^4*b^8*c^7*d
*e*h*z - 359424*a^3*b^10*c^6*d*e*h*z + 175104*a^2*b^12*c^5*d*f*g*z + 27648*
a^2*b^12*c^5*d*e*h*z - 32440320*a^4*b^7*c^8*d*e*f*z + 4792320*a^3*b^9*c^7*d
*e*f*z - 350208*a^2*b^11*c^6*d*e*f*z + 165150720*a^10*b*c^8*d*l*m*z + 4608*
a^6*b^12*c*k*l*m*z + 23592960*a^11*b*c^7*h*l*m*z + 3145728*a^11*b*c^7*j*k*m
*z - 1536*a^5*b^13*c*j*k*m*z + 165150720*a^9*b*c^9*d*g*m*z + 346816512*a^7*
b*c^11*d^2*g*z + 19660800*a^12*b*c^6*l*m^2*z - 34560*a^7*b^11*c*l*m^2*z - 7
077888*a^11*b*c^7*k^2*l*z + 11008*a^6*b^12*c*j*m^2*z + 19660800*a^11*b*c^7*
g*m^2*z + 7077888*a^10*b*c^8*h^2*l*z + 768*a^5*b^13*c*g*m^2*z - 19660800*a^
9*b*c^9*f^2*l*z - 7077888*a^10*b*c^8*g*k^2*z - 6912*a*b^15*c^3*d^2*l*z + 70
77888*a^9*b*c^9*g*h^2*z - 19660800*a^8*b*c^10*f^2*g*z - 66816*a*b^14*c^4*d^
2*j*z + 214272*a*b^13*c^5*d^2*g*z - 428544*a*b^12*c^6*d^2*e*z - 330301440*a

^9*c^10*d*e*m*z - 110100480*a^10*c^9*d*j*m*z - 15728640*a^11*c^8*h*j*m*z -
47185920*a^10*c^9*e*h*m*z - 198180864*a^8*c^11*d*e*h*z + 15728640*a^10*c^9*
f*j*k*z - 66060288*a^9*c^10*d*h*j*z + 47185920*a^9*c^10*e*f*k*z + 102275481
6*a^6*b^2*c^11*d^2*e*z - 642318336*a^5*b^4*c^10*d^2*e*z - 511377408*a^7*b^3
*c^9*d^2*l*z - 511377408*a^6*b^3*c^10*d^2*g*z + 321159168*a^6*b^5*c^8*d^2*l
*z + 321159168*a^5*b^5*c^9*d^2*g*z + 225312768*a^7*b^2*c^10*d^2*j*z - 25362
432*a^11*b^3*c^5*l*m^2*z + 13271040*a^10*b^5*c^4*l*m^2*z - 3563520*a^9*b^7*
c^3*l*m^2*z + 506880*a^8*b^9*c^2*l*m^2*z + 10354688*a^11*b^2*c^6*j*m^2*z +
8847360*a^10*b^3*c^6*k^2*l*z - 4423680*a^9*b^5*c^5*k^2*l*z - 2048000*a^9*b^
6*c^4*j*m^2*z + 1105920*a^8*b^7*c^4*k^2*l*z + 849920*a^8*b^8*c^3*j*m^2*z -
393216*a^10*b^4*c^5*j*m^2*z - 145920*a^7*b^10*c^2*j*m^2*z - 138240*a^7*b^9*
c^3*k^2*l*z + 6912*a^6*b^11*c^2*k^2*l*z - 111697920*a^5*b^7*c^7*d^2*l*z + 2
23395840*a^4*b^6*c^9*d^2*e*z - 25362432*a^10*b^3*c^6*g*m^2*z - 3538944*a^10
*b^2*c^7*j*k^2*z + 737280*a^8*b^6*c^5*j*k^2*z + 50724864*a^10*b^2*c^7*e*m^2
*z - 276480*a^7*b^8*c^4*j*k^2*z + 41472*a^6*b^10*c^3*j*k^2*z - 2304*a^5*b^1
2*c^2*j*k^2*z + 13271040*a^9*b^5*c^5*g*m^2*z - 8847360*a^9*b^3*c^7*h^2*l*z
+ 4423680*a^8*b^5*c^6*h^2*l*z - 3563520*a^8*b^7*c^4*g*m^2*z - 1105920*a^7*b
^7*c^5*h^2*l*z + 506880*a^7*b^9*c^3*g*m^2*z + 138240*a^6*b^9*c^4*h^2*l*z -
34560*a^6*b^11*c^2*g*m^2*z - 6912*a^5*b^11*c^3*h^2*l*z - 26542080*a^9*b^4*c
^6*e*m^2*z + 25362432*a^8*b^3*c^8*f^2*l*z - 13271040*a^7*b^5*c^7*f^2*l*z +
8847360*a^9*b^3*c^7*g*k^2*z + 7127040*a^8*b^6*c^5*e*m^2*z - 4423680*a^8*b^5
*c^6*g*k^2*z + 3563520*a^6*b^7*c^6*f^2*l*z + 3538944*a^9*b^2*c^8*h^2*j*z +
1105920*a^7*b^7*c^5*g*k^2*z - 1013760*a^7*b^8*c^4*e*m^2*z - 737280*a^7*b^6*
c^6*h^2*j*z - 506880*a^5*b^9*c^5*f^2*l*z + 276480*a^6*b^8*c^5*h^2*j*z - 138
240*a^6*b^9*c^4*g*k^2*z + 69120*a^6*b^10*c^3*e*m^2*z - 41472*a^5*b^10*c^4*h
^2*j*z + 34560*a^4*b^11*c^4*f^2*l*z + 6912*a^5*b^11*c^3*g*k^2*z + 2304*a^4*
b^12*c^3*h^2*j*z - 1536*a^5*b^12*c^2*e*m^2*z - 768*a^3*b^13*c^3*f^2*l*z - 1
11697920*a^4*b^7*c^8*d^2*g*z + 23362560*a^4*b^9*c^6*d^2*l*z - 17694720*a^9*
b^2*c^8*e*k^2*z - 10354688*a^8*b^2*c^9*f^2*j*z - 43646976*a^6*b^4*c^9*d^2*j
*z + 8847360*a^8*b^4*c^7*e*k^2*z - 2965248*a^3*b^11*c^5*d^2*l*z - 2211840*a
^7*b^6*c^6*e*k^2*z + 2048000*a^6*b^6*c^7*f^2*j*z - 849920*a^5*b^8*c^6*f^2*j
*z + 393216*a^7*b^4*c^8*f^2*j*z + 276480*a^6*b^8*c^5*e*k^2*z + 214272*a^2*b
^13*c^4*d^2*l*z + 145920*a^4*b^10*c^5*f^2*j*z - 13824*a^5*b^10*c^4*e*k^2*z
- 11008*a^3*b^12*c^4*f^2*j*z + 256*a^2*b^14*c^3*f^2*j*z - 32587776*a^5*b^6*
c^8*d^2*j*z - 8847360*a^8*b^3*c^8*g*h^2*z + 21657600*a^4*b^8*c^7*d^2*j*z +
4423680*a^7*b^5*c^7*g*h^2*z - 1105920*a^6*b^7*c^6*g*h^2*z + 138240*a^5*b^9*
c^5*g*h^2*z - 6912*a^4*b^11*c^4*g*h^2*z + 25362432*a^7*b^3*c^9*f^2*g*z - 58
10688*a^3*b^10*c^6*d^2*j*z + 17694720*a^8*b^2*c^9*e*h^2*z + 845568*a^2*b^12
*c^5*d^2*j*z - 50724864*a^7*b^2*c^10*e*f^2*z - 13271040*a^6*b^5*c^8*f^2*g*z
 - 8847360*a^7*b^4*c^8*e*h^2*z + 3563520*a^5*b^7*c^7*f^2*g*z + 2211840*a^6*
b^6*c^7*e*h^2*z - 506880*a^4*b^9*c^6*f^2*g*z - 276480*a^5*b^8*c^6*e*h^2*z +
 34560*a^3*b^11*c^5*f^2*g*z + 13824*a^4*b^10*c^5*e*h^2*z - 768*a^2*b^13*c^4
*f^2*g*z + 26542080*a^6*b^4*c^9*e*f^2*z + 23362560*a^3*b^9*c^7*d^2*g*z - 46
725120*a^3*b^8*c^8*d^2*e*z - 7127040*a^5*b^6*c^8*e*f^2*z - 2965248*a^2*b^11
*c^6*d^2*g*z + 1013760*a^4*b^8*c^7*e*f^2*z - 69120*a^3*b^10*c^6*e*f^2*z + 1
536*a^2*b^12*c^5*e*f^2*z + 5930496*a^2*b^10*c^7*d^2*e*z + 346816512*a^8*b*c
^10*d^2*l*z - 693633024*a^7*c^12*d^2*e*z - 231211008*a^8*c^11*d^2*j*z + 768
*a^6*b^13*l*m^2*z - 13107200*a^12*c^7*j*m^2*z - 256*a^5*b^14*j*m^2*z + 4718
592*a^11*c^8*j*k^2*z - 39321600*a^11*c^8*e*m^2*z - 4718592*a^10*c^9*h^2*j*z
 + 14155776*a^10*c^9*e*k^2*z + 13107200*a^9*c^10*f^2*j*z + 2304*b^16*c^3*d^
2*j*z - 14155776*a^9*c^10*e*h^2*z + 39321600*a^8*c^11*e*f^2*z - 6912*b^15*c
^4*d^2*g*z + 13824*b^14*c^5*d^2*e*z + 737280*a^10*b*c^5*j*k*l*m - 2304*a^6*
b^9*c*j*k*l*m + 2211840*a^9*b*c^6*e*k*l*m + 1228800*a^9*b*c^6*f*j*l*m + 737
280*a^9*b*c^6*g*j*k*m + 442368*a^9*b*c^6*h*j*k*l + 36*a^3*b^12*c*f*h*k*m +
3096576*a^8*b*c^7*d*j*k*l - 12745728*a^8*b*c^7*d*h*k*m + 3686400*a^8*b*c^7*
e*f*l*m + 3391488*a^8*b*c^7*e*h*j*m + 2211840*a^8*b*c^7*e*g*k*m + 1327104*a
^8*b*c^7*e*h*k*l + 1228800*a^8*b*c^7*f*g*j*m + 737280*a^8*b*c^7*f*h*j*l + 4
42368*a^8*b*c^7*g*h*j*k + 108*a^2*b^13*c*d*h*k*m + 16367616*a^7*b*c^8*d*e*j
*m + 9289728*a^7*b*c^8*d*e*k*l + 5160960*a^7*b*c^8*d*f*j*l + 3391488*a^7*b*

c^8*e*f*j*k + 3096576*a^7*b*c^8*d*g*j*k - 19307520*a^7*b*c^8*d*f*h*m + 3686
400*a^7*b*c^8*e*f*g*m + 2211840*a^7*b*c^8*e*f*h*l + 1327104*a^7*b*c^8*e*g*h
*k + 737280*a^7*b*c^8*f*g*h*j - 180*a*b^13*c^2*d*f*h*m - 540*a*b^12*c^3*d*f
*h*k + 15482880*a^6*b*c^9*d*e*f*l + 11059200*a^6*b*c^9*d*e*h*j + 9289728*a^
6*b*c^9*d*e*g*k + 5160960*a^6*b*c^9*d*f*g*j - 2304*a*b^11*c^4*d*f*g*j + 221
1840*a^6*b*c^9*e*f*g*h + 4608*a*b^10*c^5*d*e*f*j + 15482880*a^5*b*c^10*d*e*
f*g - 13824*a*b^9*c^6*d*e*f*g + 36*a*b^14*c*d*f*k*m + 1843200*a^9*b^3*c^4*j
*k*l*m + 783360*a^8*b^5*c^3*j*k*l*m + 18432*a^7*b^7*c^2*j*k*l*m - 2211840*a
^8*b^4*c^4*g*k*l*m - 1695744*a^9*b^2*c^5*h*j*l*m - 1400832*a^8*b^4*c^4*h*j*
l*m - 1105920*a^9*b^2*c^5*g*k*l*m - 253440*a^7*b^6*c^3*h*j*l*m - 69120*a^7*
b^6*c^3*g*k*l*m + 11520*a^6*b^8*c^2*h*j*l*m + 6912*a^6*b^8*c^2*g*k*l*m + 44
23680*a^8*b^3*c^5*e*k*l*m + 2506752*a^8*b^3*c^5*f*j*l*m + 1843200*a^8*b^3*c
^5*g*j*k*m + 1327104*a^8*b^3*c^5*h*j*k*l + 838656*a^7*b^5*c^4*f*j*l*m + 783
360*a^7*b^5*c^4*g*j*k*m + 691200*a^7*b^5*c^4*h*j*k*l + 138240*a^7*b^5*c^4*e
*k*l*m + 69120*a^6*b^7*c^3*h*j*k*l - 53760*a^6*b^7*c^3*f*j*l*m + 18432*a^6*
b^7*c^3*g*j*k*m - 13824*a^6*b^7*c^3*e*k*l*m - 2304*a^5*b^9*c^2*g*j*k*m + 25
43616*a^8*b^3*c^5*g*h*l*m + 829440*a^7*b^5*c^4*g*h*l*m - 34560*a^6*b^7*c^3*
g*h*l*m - 8183808*a^8*b^2*c^6*d*j*l*m - 3686400*a^8*b^2*c^6*e*j*k*m - 22855
68*a^7*b^4*c^5*d*j*l*m - 1695744*a^8*b^2*c^6*f*j*k*l - 1566720*a^7*b^4*c^5*
e*j*k*m - 1400832*a^7*b^4*c^5*f*j*k*l + 741888*a^6*b^6*c^4*d*j*l*m - 253440
*a^6*b^6*c^4*f*j*k*l - 80640*a^5*b^8*c^3*d*j*l*m - 36864*a^6*b^6*c^4*e*j*k*
m + 11520*a^5*b^8*c^3*f*j*k*l + 4608*a^5*b^8*c^3*e*j*k*m + 6700032*a^8*b^2*
c^6*f*h*k*m + 5103360*a^7*b^4*c^5*f*h*k*m - 5087232*a^8*b^2*c^6*e*h*l*m - 2
838528*a^7*b^4*c^5*f*g*l*m - 1843200*a^8*b^2*c^6*f*g*l*m - 1695744*a^8*b^2*
c^6*g*h*j*m - 1658880*a^7*b^4*c^5*g*h*k*l - 1658880*a^7*b^4*c^5*e*h*l*m - 1
400832*a^7*b^4*c^5*g*h*j*m - 663552*a^8*b^2*c^6*g*h*k*l + 483840*a^6*b^6*c^
4*f*h*k*m - 253440*a^6*b^6*c^4*g*h*j*m - 207360*a^6*b^6*c^4*g*h*k*l + 16128
0*a^6*b^6*c^4*f*g*l*m + 69120*a^6*b^6*c^4*e*h*l*m - 50040*a^5*b^8*c^3*f*h*k
*m + 11520*a^5*b^8*c^3*g*h*j*m + 180*a^4*b^10*c^2*f*h*k*m + 4202496*a^7*b^3
*c^6*d*j*k*l + 635904*a^6*b^5*c^5*d*j*k*l - 276480*a^5*b^7*c^4*d*j*k*l + 34
560*a^4*b^9*c^3*d*j*k*l - 16671744*a^7*b^3*c^6*d*h*k*m + 12275712*a^7*b^3*c
^6*d*g*l*m + 5677056*a^7*b^3*c^6*e*f*l*m + 4423680*a^7*b^3*c^6*e*g*k*m + 33
17760*a^7*b^3*c^6*e*h*k*l + 2801664*a^7*b^3*c^6*e*h*j*m - 2709504*a^6*b^5*c
^5*d*g*l*m + 2543616*a^7*b^3*c^6*f*g*k*l + 2506752*a^7*b^3*c^6*f*g*j*m + 18
43200*a^7*b^3*c^6*f*h*j*l + 1327104*a^7*b^3*c^6*g*h*j*k + 838656*a^6*b^5*c^
5*f*g*j*m + 829440*a^6*b^5*c^5*f*g*k*l + 783360*a^6*b^5*c^5*f*h*j*l + 69120
0*a^6*b^5*c^5*g*h*j*k + 665280*a^5*b^7*c^4*d*h*k*m + 506880*a^6*b^5*c^5*e*h
*j*m + 414720*a^6*b^5*c^5*e*h*k*l - 322560*a^6*b^5*c^5*e*f*l*m + 241920*a^5
*b^7*c^4*d*g*l*m + 138240*a^6*b^5*c^5*e*g*k*m - 108540*a^4*b^9*c^3*d*h*k*m
+ 69120*a^5*b^7*c^4*g*h*j*k - 53760*a^5*b^7*c^4*f*g*j*m - 51840*a^6*b^5*c^5
*d*h*k*m - 34560*a^5*b^7*c^4*f*g*k*l - 23040*a^5*b^7*c^4*e*h*j*m + 18432*a^
5*b^7*c^4*f*h*j*l - 13824*a^5*b^7*c^4*e*g*k*m - 2304*a^4*b^9*c^3*f*h*j*l +
1296*a^3*b^11*c^2*d*h*k*m + 31924224*a^7*b^2*c^7*d*f*k*m - 24551424*a^7*b^2
*c^7*d*e*l*m + 10616832*a^7*b^2*c^7*e*g*j*l - 8183808*a^7*b^2*c^7*d*g*j*m -
5529600*a^7*b^2*c^7*d*h*j*l + 5419008*a^6*b^4*c^6*d*e*l*m + 5308416*a^6*b^
4*c^6*e*g*j*l - 5087232*a^7*b^2*c^7*e*f*k*l - 5013504*a^7*b^2*c^7*e*f*j*m +
4868352*a^6*b^4*c^6*d*f*k*m - 4644864*a^7*b^2*c^7*d*g*k*l - 3981312*a^6*b^
4*c^6*d*g*k*l - 2654208*a^7*b^2*c^7*e*h*j*k - 2367360*a^5*b^6*c^5*d*f*k*m -
2285568*a^6*b^4*c^6*d*g*j*m - 2211840*a^6*b^4*c^6*d*h*j*l - 1695744*a^7*b^
2*c^7*f*g*j*k - 1677312*a^6*b^4*c^6*e*f*j*m - 1658880*a^6*b^4*c^6*e*f*k*l -
1400832*a^6*b^4*c^6*f*g*j*k - 1382400*a^6*b^4*c^6*e*h*j*k + 1036800*a^5*b^
6*c^5*d*g*k*l + 741888*a^5*b^6*c^5*d*g*j*m - 483840*a^5*b^6*c^5*d*e*l*m + 3
17952*a^5*b^6*c^5*d*h*j*l + 268920*a^4*b^8*c^4*d*f*k*m - 253440*a^5*b^6*c^5
*f*g*j*k - 138240*a^5*b^6*c^5*e*h*j*k + 107520*a^5*b^6*c^5*e*f*j*m - 103680
*a^4*b^8*c^4*d*g*k*l - 80640*a^4*b^8*c^4*d*g*j*m + 69120*a^5*b^6*c^5*e*f*k*
l + 11520*a^4*b^8*c^4*f*g*j*k + 6912*a^4*b^8*c^4*d*h*j*l - 6912*a^3*b^10*c^
3*d*h*j*l + 6120*a^3*b^10*c^3*d*f*k*m - 1368*a^2*b^12*c^2*d*f*k*m - 5087232
*a^7*b^2*c^7*e*g*h*m - 2211840*a^6*b^4*c^6*f*g*h*l - 1658880*a^6*b^4*c^6*e*
g*h*m - 1105920*a^7*b^2*c^7*f*g*h*l - 69120*a^5*b^6*c^5*f*g*h*l + 69120*a^5

*b^6*c^5*e*g*h*m + 6912*a^4*b^8*c^4*f*g*h*l + 7962624*a^6*b^3*c^7*d*e*k*l -
22164480*a^6*b^3*c^7*d*f*h*m + 5160960*a^6*b^3*c^7*d*f*j*l + 4571136*a^6*b
^3*c^7*d*e*j*m + 4202496*a^6*b^3*c^7*d*g*j*k + 2801664*a^6*b^3*c^7*e*f*j*k
- 2073600*a^5*b^5*c^6*d*e*k*l - 1483776*a^5*b^5*c^6*d*e*j*m + 635904*a^5*b^
5*c^6*d*g*j*k + 506880*a^5*b^5*c^6*e*f*j*k - 354816*a^4*b^7*c^5*d*f*j*l + 3
22560*a^5*b^5*c^6*d*f*j*l - 276480*a^4*b^7*c^5*d*g*j*k + 207360*a^4*b^7*c^5
*d*e*k*l + 161280*a^4*b^7*c^5*d*e*j*m + 59904*a^3*b^9*c^4*d*f*j*l + 34560*a
^3*b^9*c^4*d*g*j*k - 23040*a^4*b^7*c^5*e*f*j*k - 2304*a^2*b^11*c^3*d*f*j*l
+ 8294400*a^6*b^3*c^7*d*g*h*l + 5677056*a^6*b^3*c^7*e*f*g*m + 4423680*a^6*b
^3*c^7*e*f*h*l + 3317760*a^6*b^3*c^7*e*g*h*k + 2805120*a^5*b^5*c^6*d*f*h*m
+ 1843200*a^6*b^3*c^7*f*g*h*j - 829440*a^5*b^5*c^6*d*g*h*l + 783360*a^5*b^5
*c^6*f*g*h*j + 437184*a^4*b^7*c^5*d*f*h*m + 414720*a^5*b^5*c^6*e*g*h*k - 32
2560*a^5*b^5*c^6*e*f*g*m - 146268*a^3*b^9*c^4*d*f*h*m + 138240*a^5*b^5*c^6*
e*f*h*l - 62208*a^4*b^7*c^5*d*g*h*l + 20736*a^3*b^9*c^4*d*g*h*l + 18432*a^4
*b^7*c^5*f*g*h*j - 13824*a^4*b^7*c^5*e*f*h*l + 9360*a^2*b^11*c^3*d*f*h*m -
2304*a^3*b^9*c^4*f*g*h*j - 8404992*a^6*b^2*c^8*d*e*j*k - 24551424*a^6*b^2*c
^8*d*e*g*m + 21150720*a^6*b^2*c^8*d*f*h*k - 1271808*a^5*b^4*c^7*d*e*j*k + 5
52960*a^4*b^6*c^6*d*e*j*k - 69120*a^3*b^8*c^5*d*e*j*k - 16588800*a^6*b^2*c^
8*d*e*h*l - 7741440*a^6*b^2*c^8*d*f*g*l + 6946560*a^5*b^4*c^7*d*f*h*k - 552
9600*a^6*b^2*c^8*d*g*h*j + 5419008*a^5*b^4*c^7*d*e*g*m - 5087232*a^6*b^2*c^
8*e*f*g*k - 3870720*a^5*b^4*c^7*d*f*g*l - 3686400*a^6*b^2*c^8*e*f*h*j - 221
1840*a^5*b^4*c^7*d*g*h*j - 1755648*a^4*b^6*c^6*d*f*h*k - 1658880*a^5*b^4*c^
7*e*f*g*k + 1658880*a^5*b^4*c^7*d*e*h*l - 1566720*a^5*b^4*c^7*e*f*h*j + 145
1520*a^4*b^6*c^6*d*f*g*l - 483840*a^4*b^6*c^6*d*e*g*m + 317952*a^4*b^6*c^6*
d*g*h*j - 193536*a^3*b^8*c^5*d*f*g*l + 124416*a^4*b^6*c^6*d*e*h*l + 114696*
a^3*b^8*c^5*d*f*h*k + 69120*a^4*b^6*c^6*e*f*g*k - 41472*a^3*b^8*c^5*d*e*h*l
- 36864*a^4*b^6*c^6*e*f*h*j + 14580*a^2*b^10*c^4*d*f*h*k + 6912*a^3*b^8*c^
5*d*g*h*j - 6912*a^2*b^10*c^4*d*g*h*j + 6912*a^2*b^10*c^4*d*f*g*l + 4608*a^
3*b^8*c^5*e*f*h*j + 7962624*a^5*b^3*c^8*d*e*g*k + 7741440*a^5*b^3*c^8*d*e*f
*l + 5160960*a^5*b^3*c^8*d*f*g*j + 4423680*a^5*b^3*c^8*d*e*h*j - 2903040*a^
4*b^5*c^7*d*e*f*l - 2073600*a^4*b^5*c^7*d*e*g*k - 635904*a^4*b^5*c^7*d*e*h*
j + 387072*a^3*b^7*c^6*d*e*f*l - 354816*a^3*b^7*c^6*d*f*g*j + 322560*a^4*b^
5*c^7*d*f*g*j + 207360*a^3*b^7*c^6*d*e*g*k + 59904*a^2*b^9*c^5*d*f*g*j - 13
824*a^3*b^7*c^6*d*e*h*j + 13824*a^2*b^9*c^5*d*e*h*j - 13824*a^2*b^9*c^5*d*e
*f*l + 4423680*a^5*b^3*c^8*e*f*g*h + 138240*a^4*b^5*c^7*e*f*g*h - 13824*a^3
*b^7*c^6*e*f*g*h - 10321920*a^5*b^2*c^9*d*e*f*j + 709632*a^3*b^6*c^7*d*e*f*
j - 645120*a^4*b^4*c^8*d*e*f*j - 119808*a^2*b^8*c^6*d*e*f*j - 16588800*a^5*
b^2*c^9*d*e*g*h + 1658880*a^4*b^4*c^8*d*e*g*h + 124416*a^3*b^6*c^7*d*e*g*h
- 41472*a^2*b^8*c^6*d*e*g*h + 7741440*a^4*b^3*c^9*d*e*f*g - 2903040*a^3*b^5
*c^8*d*e*f*g + 387072*a^2*b^7*c^7*d*e*f*g + 3456*a^7*b^8*c*k*l^2*m + 12672*
a^7*b^8*c*j*l*m^2 + 384*a^5*b^10*c*j^2*k*m - 1635840*a^10*b*c^5*h*k*m^2 - 1
009152*a^9*b*c^6*h^2*k*m + 3690*a^6*b^9*c*h*k*m^2 + 1152*a^6*b^9*c*g*l*m^2
- 540*a^5*b^10*c*h*k^2*m + 54*a^4*b^11*c*h^2*k*m + 565248*a^9*b*c^6*h*j^2*m
- 39771648*a^7*b*c^8*d^2*k*m - 2496000*a^8*b*c^7*f^2*k*m - 1543680*a^9*b*c
^6*f*k^2*m + 1980*a^5*b^10*c*f*k*m^2 - 384*a^5*b^10*c*g*j*m^2 - 180*a^4*b^1
1*c*f*k^2*m + 6*a^2*b^13*c*f^2*k*m - 10298880*a^9*b*c^6*d*k*m^2 + 2580480*a
^9*b*c^6*e*j*m^2 + 5310*a^4*b^11*c*d*k*m^2 - 1674*a*b^13*c^2*d^2*k*m - 540*
a^3*b^12*c*d*k^2*m - 10616832*a^7*b*c^8*e^2*j*l - 3538944*a^8*b*c^7*e*j^2*l
+ 2727936*a^8*b*c^7*d*j^2*m - 2496000*a^9*b*c^6*f*h*m^2 - 1543680*a^8*b*c^
7*f*h^2*m + 565248*a^8*b*c^7*f*j^2*k - 270*a^4*b^11*c*f*h*m^2 - 59512320*a^
6*b*c^9*d^2*f*m + 5087232*a^7*b*c^8*e^2*h*m + 1105920*a^8*b*c^7*e*j*k^2 - 3
456*a*b^12*c^3*d^2*j*l - 1635840*a^7*b*c^8*f^2*h*k - 1009152*a^8*b*c^7*f*h*
k^2 + 10260*a*b^12*c^3*d^2*h*m - 684*a^3*b^12*c*d*h*m^2 - 24675840*a^6*b*c^
9*d^2*h*k - 15552000*a^8*b*c^7*d*f*m^2 + 24551424*a^6*b*c^9*d*e^2*m - 39398
40*a^7*b*c^8*d*h^2*k + 1105920*a^7*b*c^8*e*h^2*j - 25074*a*b^11*c^4*d^2*f*m
+ 10530*a*b^11*c^4*d^2*h*k + 10368*a*b^11*c^4*d^2*g*l + 420*a*b^12*c^3*d*f
^2*m - 378*a^2*b^13*c*d*f*m^2 - 10616832*a^6*b*c^9*e^2*g*j + 5087232*a^6*b*
c^9*e^2*f*k - 3538944*a^7*b*c^8*e*g*j^2 + 1843200*a^7*b*c^8*d*h*j^2 - 79948
80*a^6*b*c^9*d*f^2*k - 4990464*a^7*b*c^8*d*f*k^2 + 2580480*a^6*b*c^9*e*f^2*

j + 65664*a*b^10*c^5*d^2*g*j - 27972*a*b^10*c^5*d^2*f*k - 20736*a*b^10*c^5*
d^2*e*l + 1260*a*b^11*c^4*d*f^2*k + 54*a*b^13*c^2*d*f*k^2 + 23224320*a^5*b*
c^10*d^2*e*j - 37062144*a^5*b*c^10*d^2*f*h + 384*a*b^12*c^3*d*f*j^2 - 13132
8*a*b^9*c^6*d^2*e*j - 5985792*a^6*b*c^9*d*f*h^2 + 206010*a*b^9*c^6*d^2*f*h
- 6300*a*b^10*c^5*d*f^2*h + 1350*a*b^11*c^4*d*f*h^2 + 16588800*a^5*b*c^10*d
*e^2*h + 3456*a*b^10*c^5*d*f*g^2 + 435456*a*b^8*c^7*d^2*e*g + 13824*a*b^8*c
^7*d*e^2*f - 1474560*a^9*c^7*e*j*k*m + 460800*a^9*c^7*f*h*k*m + 3225600*a^8
*c^8*d*f*k*m - 2457600*a^8*c^8*e*f*j*m - 884736*a^8*c^8*e*h*j*k - 6193152*a
^7*c^9*d*e*j*k + 1935360*a^7*c^9*d*f*h*k - 1474560*a^7*c^9*e*f*h*j - 103219
20*a^6*c^10*d*e*f*j - 1105920*a^9*b^4*c^3*k*l^2*m - 552960*a^10*b^2*c^4*k*l
^2*m - 34560*a^8*b^6*c^2*k*l^2*m - 1290240*a^10*b^2*c^4*j*l*m^2 - 860160*a^
9*b^4*c^3*j*l*m^2 - 80640*a^8*b^6*c^2*j*l*m^2 - 737280*a^9*b^2*c^5*j^2*k*m
- 568320*a^8*b^4*c^4*j^2*k*m - 136704*a^7*b^6*c^3*j^2*k*m - 2304*a^6*b^8*c^
2*j^2*k*m + 1271808*a^9*b^3*c^4*h*l^2*m - 552960*a^9*b^2*c^5*j*k^2*l - 5529
60*a^8*b^4*c^4*j*k^2*l + 414720*a^8*b^5*c^3*h*l^2*m - 145152*a^7*b^6*c^3*j*
k^2*l - 17280*a^7*b^7*c^2*h*l^2*m - 3456*a^6*b^8*c^2*j*k^2*l - 3640320*a^9*
b^3*c^4*h*k*m^2 - 2626560*a^8*b^3*c^5*h^2*k*m + 2211840*a^9*b^2*c^5*h*k^2*m
 + 2056320*a^8*b^4*c^4*h*k^2*m + 1935360*a^9*b^3*c^4*g*l*m^2 - 1143360*a^8*
b^5*c^3*h*k*m^2 - 1097280*a^7*b^5*c^4*h^2*k*m + 364608*a^7*b^6*c^3*h*k^2*m
+ 322560*a^8*b^5*c^3*g*l*m^2 - 56160*a^6*b^7*c^3*h^2*k*m - 40320*a^7*b^7*c^
2*g*l*m^2 + 27936*a^7*b^7*c^2*h*k*m^2 - 3780*a^6*b^8*c^2*h*k^2*m + 2970*a^5
*b^9*c^2*h^2*k*m - 1419264*a^8*b^4*c^4*f*l^2*m - 1105920*a^7*b^4*c^5*g^2*k*
m - 921600*a^9*b^2*c^5*f*l^2*m - 829440*a^8*b^4*c^4*h*k*l^2 + 749568*a^8*b^
3*c^5*h*j^2*m - 552960*a^8*b^2*c^6*g^2*k*m - 331776*a^9*b^2*c^5*h*k*l^2 + 3
17952*a^7*b^5*c^4*h*j^2*m - 103680*a^7*b^6*c^3*h*k*l^2 + 80640*a^7*b^6*c^3*
f*l^2*m + 38400*a^6*b^7*c^3*h*j^2*m - 34560*a^6*b^6*c^4*g^2*k*m + 3456*a^5*
b^8*c^3*g^2*k*m - 1920*a^5*b^9*c^2*h*j^2*m - 5142528*a^7*b^3*c^6*f^2*k*m +
5068800*a^9*b^2*c^5*f*k*m^2 - 3870720*a^9*b^2*c^5*e*l*m^2 - 3755520*a^8*b^3
*c^5*f*k^2*m + 3000960*a^8*b^4*c^4*f*k*m^2 - 1290240*a^9*b^2*c^5*g*j*m^2 -
1085760*a^7*b^5*c^4*f*k^2*m - 959040*a^6*b^5*c^5*f^2*k*m - 860160*a^8*b^4*c
^4*g*j*m^2 + 829440*a^8*b^3*c^5*g*k^2*l - 645120*a^8*b^4*c^4*e*l*m^2 - 5529
60*a^8*b^2*c^6*h^2*j*l - 552960*a^7*b^4*c^5*h^2*j*l + 414720*a^7*b^5*c^4*g*
k^2*l - 145152*a^6*b^6*c^4*h^2*j*l + 103200*a^5*b^7*c^4*f^2*k*m - 80640*a^7
*b^6*c^3*g*j*m^2 + 80640*a^7*b^6*c^3*e*l*m^2 + 41280*a^7*b^6*c^3*f*k*m^2 -
37188*a^6*b^8*c^2*f*k*m^2 + 13536*a^6*b^7*c^3*f*k^2*m + 12672*a^6*b^8*c^2*g
*j*m^2 + 10368*a^6*b^7*c^3*g*k^2*l + 5490*a^5*b^9*c^2*f*k^2*m - 3456*a^5*b^
8*c^3*h^2*j*l - 2304*a^6*b^8*c^2*e*l*m^2 + 810*a^4*b^9*c^3*f^2*k*m - 270*a^
3*b^11*c^2*f^2*k*m + 6137856*a^8*b^3*c^5*d*l^2*m - 4423680*a^7*b^2*c^7*e^2*
k*m - 2654208*a^8*b^3*c^5*g*j*l^2 - 2654208*a^7*b^3*c^6*g^2*j*l + 1769472*a
^8*b^2*c^6*g*j^2*l + 1769472*a^7*b^4*c^5*g*j^2*l - 1354752*a^7*b^5*c^4*d*l^
2*m - 1327104*a^7*b^5*c^4*g*j*l^2 - 1327104*a^6*b^5*c^5*g^2*j*l + 1271808*a
^8*b^3*c^5*f*k*l^2 - 1040384*a^8*b^2*c^6*f*j^2*m - 697344*a^7*b^4*c^5*f*j^2
*m - 516096*a^8*b^2*c^6*h*j^2*k - 451584*a^7*b^4*c^5*h*j^2*k + 442368*a^6*b
^6*c^4*g*j^2*l + 414720*a^7*b^5*c^4*f*k*l^2 - 138240*a^6*b^6*c^4*h*j^2*k -
138240*a^6*b^4*c^6*e^2*k*m - 121856*a^6*b^6*c^4*f*j^2*m + 120960*a^6*b^7*c^
3*d*l^2*m - 17280*a^6*b^7*c^3*f*k*l^2 + 13824*a^5*b^6*c^5*e^2*k*m - 11520*a
^5*b^8*c^3*h*j^2*k + 8960*a^5*b^8*c^3*f*j^2*m + 10851840*a^8*b^2*c^6*d*k^2*
m - 10464768*a^6*b^3*c^7*d^2*k*m - 10275840*a^8*b^3*c^5*d*k*m^2 + 7121088*a
^5*b^5*c^6*d^2*k*m + 3127680*a^7*b^4*c^5*d*k^2*m + 1720320*a^8*b^3*c^5*e*j*
m^2 - 1658880*a^8*b^2*c^6*e*k^2*l - 1290240*a^7*b^2*c^7*f^2*j*l + 1271808*a
^7*b^3*c^6*g^2*h*m - 1222560*a^4*b^7*c^5*d^2*k*m + 999360*a^7*b^5*c^4*d*k*m
^2 - 860160*a^6*b^4*c^6*f^2*j*l - 829440*a^7*b^4*c^5*e*k^2*l - 705024*a^6*b
^6*c^4*d*k^2*m - 552960*a^8*b^2*c^6*g*j*k^2 - 552960*a^7*b^4*c^5*g*j*k^2 +
414720*a^6*b^5*c^5*g^2*h*m + 319392*a^6*b^7*c^3*d*k*m^2 + 161280*a^7*b^5*c^
4*e*j*m^2 - 145152*a^6*b^6*c^4*g*j*k^2 - 85734*a^5*b^9*c^2*d*k*m^2 - 80640*
a^5*b^6*c^5*f^2*j*l - 25344*a^6*b^7*c^3*e*j*m^2 + 23490*a^3*b^9*c^4*d^2*k*m
 - 20736*a^6*b^6*c^4*e*k^2*l - 17280*a^5*b^7*c^4*g^2*h*m + 14148*a^5*b^8*c^
3*d*k^2*m + 13716*a^2*b^11*c^3*d^2*k*m + 12690*a^4*b^10*c^2*d*k^2*m + 12672
*a^4*b^8*c^4*f^2*j*l - 3456*a^5*b^8*c^3*g*j*k^2 + 768*a^5*b^9*c^2*e*j*m^2 -

384*a^3*b^10*c^3*f^2*j*l + 5308416*a^8*b^2*c^6*e*j*l^2 - 5308416*a^6*b^3*c
^7*e^2*j*l - 5142528*a^8*b^3*c^5*f*h*m^2 + 5068800*a^7*b^2*c^7*f^2*h*m - 37
55520*a^7*b^3*c^6*f*h^2*m - 3538944*a^7*b^3*c^6*e*j^2*l + 3000960*a^6*b^4*c
^6*f^2*h*m + 2654208*a^7*b^4*c^5*e*j*l^2 - 2322432*a^8*b^2*c^6*d*k*l^2 + 21
25824*a^7*b^3*c^6*d*j^2*m - 1990656*a^7*b^4*c^5*d*k*l^2 - 1085760*a^6*b^5*c
^5*f*h^2*m - 959040*a^7*b^5*c^4*f*h*m^2 - 884736*a^6*b^5*c^5*e*j^2*l + 8294
40*a^7*b^3*c^6*g*h^2*l + 749568*a^7*b^3*c^6*f*j^2*k + 518400*a^6*b^6*c^4*d*
k*l^2 + 414720*a^6*b^5*c^5*g*h^2*l + 317952*a^6*b^5*c^5*f*j^2*k + 133632*a^
6*b^5*c^5*d*j^2*m + 103200*a^6*b^7*c^3*f*h*m^2 - 96768*a^5*b^7*c^4*d*j^2*m
- 51840*a^5*b^8*c^3*d*k*l^2 + 41280*a^5*b^6*c^5*f^2*h*m + 38400*a^5*b^7*c^4
*f*j^2*k - 37188*a^4*b^8*c^4*f^2*h*m + 13536*a^5*b^7*c^4*f*h^2*m + 13440*a^
4*b^9*c^3*d*j^2*m + 10368*a^5*b^7*c^4*g*h^2*l + 5490*a^4*b^9*c^3*f*h^2*m +
1980*a^3*b^10*c^3*f^2*h*m - 1920*a^4*b^9*c^3*f*j^2*k + 810*a^5*b^9*c^2*f*h*
m^2 - 180*a^3*b^11*c^2*f*h^2*m - 30*a^2*b^12*c^2*f^2*h*m + 30067200*a^6*b^2
*c^8*d^2*h*m - 11612160*a^6*b^2*c^8*d^2*j*l + 1658880*a^6*b^3*c^7*e^2*h*m +
1596672*a^4*b^6*c^6*d^2*j*l - 1419264*a^6*b^4*c^6*f*g^2*m - 1105920*a^7*b^
4*c^5*f*h*l^2 + 1105920*a^7*b^3*c^6*e*j*k^2 - 921600*a^7*b^2*c^7*f*g^2*m -
829440*a^6*b^4*c^6*g^2*h*k - 552960*a^8*b^2*c^6*f*h*l^2 - 508032*a^3*b^8*c^
5*d^2*j*l - 331776*a^7*b^2*c^7*g^2*h*k + 290304*a^6*b^5*c^5*e*j*k^2 - 10368
0*a^5*b^6*c^5*g^2*h*k + 80640*a^5*b^6*c^5*f*g^2*m - 69120*a^5*b^5*c^6*e^2*h
*m + 65664*a^2*b^10*c^4*d^2*j*l - 34560*a^6*b^6*c^4*f*h*l^2 + 6912*a^5*b^7*
c^4*e*j*k^2 + 3456*a^5*b^8*c^3*f*h*l^2 + 11930112*a^8*b^2*c^6*d*h*m^2 + 843
2640*a^7*b^2*c^7*d*h^2*m + 4450176*a^7*b^4*c^5*d*h*m^2 + 4337280*a^6*b^4*c^
6*d*h^2*m - 3870720*a^8*b^2*c^6*e*g*m^2 - 3640320*a^6*b^3*c^7*f^2*h*k - 288
5760*a^5*b^4*c^7*d^2*h*m - 2844288*a^4*b^6*c^6*d^2*h*m - 2626560*a^7*b^3*c^
6*f*h*k^2 + 2211840*a^7*b^2*c^7*f*h^2*k + 2056320*a^6*b^4*c^6*f*h^2*k + 193
5360*a^6*b^3*c^7*f^2*g*l - 1916928*a^7*b^2*c^7*d*j^2*k - 1687680*a^6*b^6*c^
4*d*h*m^2 - 1658880*a^7*b^2*c^7*e*h^2*l - 1143360*a^5*b^5*c^6*f^2*h*k - 109
7280*a^6*b^5*c^5*f*h*k^2 + 1019412*a^3*b^8*c^5*d^2*h*m - 1007424*a^5*b^6*c^
5*d*h^2*m - 912384*a^6*b^4*c^6*d*j^2*k - 829440*a^6*b^4*c^6*e*h^2*l - 64512
0*a^7*b^4*c^5*e*g*m^2 - 552960*a^7*b^2*c^7*g*h^2*j - 552960*a^6*b^4*c^6*g*h
^2*j + 364608*a^5*b^6*c^5*f*h^2*k + 322560*a^5*b^5*c^6*f^2*g*l + 197460*a^5
*b^8*c^3*d*h*m^2 - 145152*a^5*b^6*c^5*g*h^2*j - 143802*a^2*b^10*c^4*d^2*h*m
+ 80640*a^6*b^6*c^4*e*g*m^2 - 56160*a^5*b^7*c^4*f*h*k^2 + 51948*a^4*b^8*c^
4*d*h^2*m - 40320*a^4*b^7*c^5*f^2*g*l + 34560*a^4*b^8*c^4*d*j^2*k + 27936*a
^4*b^7*c^5*f^2*h*k - 20736*a^5*b^6*c^5*e*h^2*l - 13824*a^5*b^6*c^5*d*j^2*k
+ 10800*a^3*b^10*c^3*d*h^2*m - 5760*a^3*b^10*c^3*d*j^2*k - 3780*a^4*b^8*c^4
*f*h^2*k + 3690*a^3*b^9*c^4*f^2*h*k - 3456*a^4*b^8*c^4*g*h^2*j + 2970*a^4*b
^9*c^3*f*h*k^2 - 2304*a^5*b^8*c^3*e*g*m^2 + 1152*a^3*b^9*c^4*f^2*g*l - 540*
a^3*b^10*c^3*f*h^2*k - 540*a^2*b^12*c^2*d*h^2*m - 90*a^4*b^10*c^2*d*h*m^2 -
90*a^2*b^11*c^3*f^2*h*k + 54*a^3*b^11*c^2*f*h*k^2 + 15925248*a^6*b^2*c^8*e
^2*g*l - 7962624*a^7*b^3*c^6*e*g*l^2 - 7962624*a^6*b^3*c^7*e*g^2*l + 233856
00*a^6*b^2*c^8*d*f^2*m + 6137856*a^6*b^3*c^7*d*g^2*m - 5677056*a^6*b^2*c^8*
e^2*f*m + 4147200*a^7*b^3*c^6*d*h*l^2 - 3317760*a^6*b^2*c^8*e^2*h*k - 13547
52*a^5*b^5*c^6*d*g^2*m + 1271808*a^6*b^3*c^7*f*g^2*k - 737280*a^7*b^2*c^7*f
*h*j^2 + 17418240*a^5*b^3*c^8*d^2*g*l - 568320*a^6*b^4*c^6*f*h*j^2 - 414720
*a^6*b^5*c^5*d*h*l^2 + 414720*a^5*b^5*c^6*f*g^2*k - 414720*a^5*b^4*c^7*e^2*
h*k + 322560*a^5*b^4*c^7*e^2*f*m - 136704*a^5*b^6*c^5*f*h*j^2 + 120960*a^4*
b^7*c^5*d*g^2*m - 31104*a^5*b^7*c^4*d*h*l^2 - 17280*a^4*b^7*c^5*f*g^2*k + 1
0368*a^4*b^9*c^3*d*h*l^2 - 2304*a^4*b^8*c^4*f*h*j^2 + 384*a^3*b^10*c^3*f*h*
j^2 + 50042880*a^5*b^2*c^9*d^2*f*k - 13271040*a^5*b^3*c^8*d^2*h*k - 1314969
6*a^7*b^3*c^6*d*f*m^2 + 10906560*a^4*b^5*c^7*d^2*f*m - 8709120*a^4*b^5*c^7*
d^2*g*l - 7418880*a^5*b^3*c^8*d^2*f*m + 7133184*a^7*b^2*c^7*d*h*k^2 - 64281
60*a^6*b^3*c^7*d*h^2*k + 5593536*a^4*b^5*c^7*d^2*h*k - 3870720*a^6*b^2*c^8*
e*f^2*l + 3369600*a^6*b^4*c^6*d*h*k^2 + 3148992*a^6*b^5*c^5*d*f*m^2 - 29856
96*a^3*b^7*c^6*d^2*f*m + 1959552*a^3*b^7*c^6*d^2*g*l - 1658880*a^7*b^2*c^7*
e*g*k^2 - 1505280*a^4*b^6*c^6*d*f^2*m - 1290240*a^6*b^2*c^8*f^2*g*j - 34836
480*a^5*b^2*c^9*d^2*e*l + 1105920*a^6*b^3*c^7*e*h^2*j - 860160*a^5*b^4*c^7*
f^2*g*j - 829440*a^6*b^4*c^6*e*g*k^2 - 692064*a^3*b^7*c^6*d^2*h*k - 689472*

a^5*b^5*c^6*d*h^2*k - 645120*a^5*b^4*c^7*e*f^2*l - 388800*a^5*b^6*c^5*d*h*k
^2 + 378954*a^2*b^9*c^5*d^2*f*m + 362880*a^5*b^4*c^7*d*f^2*m + 296964*a^3*b
^8*c^5*d*f^2*m + 290304*a^5*b^5*c^6*e*h^2*j + 277344*a^4*b^7*c^5*d*h^2*k -
217728*a^2*b^9*c^5*d^2*g*l - 80640*a^4*b^6*c^6*f^2*g*j + 80640*a^4*b^6*c^6*
e*f^2*l - 77070*a^4*b^9*c^3*d*f*m^2 - 30240*a^5*b^7*c^4*d*f*m^2 - 28350*a^3
*b^9*c^4*d*h^2*k - 26406*a^2*b^9*c^5*d^2*h*k - 21060*a^4*b^8*c^4*d*h*k^2 -
20736*a^5*b^6*c^5*e*g*k^2 - 19278*a^2*b^10*c^4*d*f^2*m + 12672*a^3*b^8*c^5*
f^2*g*j + 10044*a^3*b^10*c^3*d*h*k^2 + 8820*a^3*b^11*c^2*d*f*m^2 + 6912*a^4
*b^7*c^5*e*h^2*j - 2304*a^3*b^8*c^5*e*f^2*l - 1620*a^2*b^11*c^3*d*h^2*k - 3
84*a^2*b^10*c^4*f^2*g*j + 162*a^2*b^12*c^2*d*h*k^2 - 5419008*a^5*b^3*c^8*d*
e^2*m + 5308416*a^6*b^2*c^8*e*g^2*j - 5308416*a^5*b^3*c^8*e^2*g*j - 3870720
*a^7*b^2*c^7*d*f*l^2 - 3538944*a^6*b^3*c^7*e*g*j^2 + 2654208*a^5*b^4*c^7*e*
g^2*j - 2322432*a^6*b^2*c^8*d*g^2*k - 1990656*a^5*b^4*c^7*d*g^2*k - 1935360
*a^6*b^4*c^6*d*f*l^2 + 1658880*a^6*b^3*c^7*d*h*j^2 + 1658880*a^5*b^3*c^8*e^
2*f*k - 884736*a^5*b^5*c^6*e*g*j^2 + 725760*a^5*b^6*c^5*d*f*l^2 + 17418240*
a^4*b^4*c^8*d^2*e*l + 518400*a^4*b^6*c^6*d*g^2*k + 483840*a^4*b^5*c^7*d*e^2
*m + 262656*a^5*b^5*c^6*d*h*j^2 - 96768*a^4*b^8*c^4*d*f*l^2 - 69120*a^4*b^5
*c^7*e^2*f*k - 55296*a^4*b^7*c^5*d*h*j^2 - 51840*a^3*b^8*c^5*d*g^2*k + 3456
*a^3*b^10*c^3*d*f*l^2 + 1152*a^3*b^9*c^4*d*h*j^2 + 1152*a^2*b^11*c^3*d*h*j^
2 - 15431040*a^4*b^4*c^8*d^2*f*k - 13248000*a^5*b^3*c^8*d*f^2*k - 11612160*
a^5*b^2*c^9*d^2*g*j - 10063872*a^6*b^3*c^7*d*f*k^2 - 3919104*a^3*b^6*c^7*d^
2*e*l + 2554560*a^4*b^5*c^7*d*f^2*k + 1720320*a^5*b^3*c^8*e*f^2*j + 1596672
*a^3*b^6*c^7*d^2*g*j + 1518912*a^3*b^6*c^7*d^2*f*k - 1105920*a^5*b^4*c^7*f*
g^2*h + 838080*a^5*b^5*c^6*d*f*k^2 - 552960*a^6*b^2*c^8*f*g^2*h - 508032*a^
2*b^8*c^6*d^2*g*j + 435456*a^2*b^8*c^6*d^2*e*l + 161280*a^4*b^5*c^7*e*f^2*j
 + 116640*a^4*b^7*c^5*d*f*k^2 + 106812*a^2*b^8*c^6*d^2*f*k - 98208*a^3*b^7*
c^6*d*f^2*k - 34560*a^4*b^6*c^6*f*g^2*h - 27270*a^3*b^9*c^4*d*f*k^2 - 26334
*a^2*b^9*c^5*d*f^2*k - 25344*a^3*b^7*c^6*e*f^2*j + 3456*a^3*b^8*c^5*f*g^2*h
 + 768*a^2*b^9*c^5*e*f^2*j - 702*a^2*b^11*c^3*d*f*k^2 - 7962624*a^5*b^2*c^9
*d*e^2*k - 2580480*a^6*b^2*c^8*d*f*j^2 + 2073600*a^4*b^4*c^8*d*e^2*k - 1658
880*a^6*b^2*c^8*e*g*h^2 - 967680*a^5*b^4*c^7*d*f*j^2 - 829440*a^5*b^4*c^7*e
*g*h^2 - 207360*a^3*b^6*c^7*d*e^2*k + 64512*a^4*b^6*c^6*d*f*j^2 + 39168*a^3
*b^8*c^5*d*f*j^2 - 20736*a^4*b^6*c^6*e*g*h^2 - 9216*a^2*b^10*c^4*d*f*j^2 -
4423680*a^5*b^2*c^9*e^2*f*h + 4147200*a^5*b^3*c^8*d*g^2*h - 3193344*a^3*b^5
*c^8*d^2*e*j + 1016064*a^2*b^7*c^7*d^2*e*j - 414720*a^4*b^5*c^7*d*g^2*h - 1
38240*a^4*b^4*c^8*e^2*f*h - 31104*a^3*b^7*c^6*d*g^2*h + 13824*a^3*b^6*c^7*e
^2*f*h + 10368*a^2*b^9*c^5*d*g^2*h + 15630336*a^5*b^2*c^9*d*f^2*h - 1445990
4*a^4*b^3*c^9*d^2*f*h + 9630144*a^3*b^5*c^8*d^2*f*h - 8764416*a^5*b^3*c^8*d
*f*h^2 - 3870720*a^5*b^2*c^9*e*f^2*g + 2867328*a^4*b^4*c^8*d*f^2*h - 209520
0*a^2*b^7*c^7*d^2*f*h - 1414080*a^3*b^6*c^7*d*f^2*h - 34836480*a^4*b^2*c^10
*d^2*e*g - 645120*a^4*b^4*c^8*e*f^2*g + 306720*a^3*b^7*c^6*d*f*h^2 + 197820
*a^2*b^8*c^6*d*f^2*h + 146880*a^4*b^5*c^7*d*f*h^2 + 80640*a^3*b^6*c^7*e*f^2
*g - 55350*a^2*b^9*c^5*d*f*h^2 - 2304*a^2*b^8*c^6*e*f^2*g - 3870720*a^5*b^2
*c^9*d*f*g^2 - 1935360*a^4*b^4*c^8*d*f*g^2 - 1658880*a^4*b^3*c^9*d*e^2*h +
725760*a^3*b^6*c^7*d*f*g^2 + 17418240*a^3*b^4*c^9*d^2*e*g - 124416*a^3*b^5*
c^8*d*e^2*h - 96768*a^2*b^8*c^6*d*f*g^2 + 41472*a^2*b^7*c^7*d*e^2*h - 39191
04*a^2*b^6*c^8*d^2*e*g - 7741440*a^4*b^2*c^10*d*e^2*f + 2903040*a^3*b^4*c^9
*d*e^2*f - 387072*a^2*b^6*c^8*d*e^2*f - 20160*a^8*b^7*c*l^2*m^2 - 1648128*a
^10*b^3*c^3*k*m^3 - 898560*a^9*b^3*c^4*k^3*m - 354240*a^9*b^5*c^2*k*m^3 - 3
54240*a^8*b^5*c^3*k^3*m - 21600*a^7*b^7*c^2*k^3*m - 13950*a^7*b^8*c*k^2*m^2
 + 430080*a^10*b*c^5*j^2*m^2 - 1984*a^6*b^9*c*j^2*m^2 - 884736*a^9*b^3*c^4*
j*l^3 - 589824*a^8*b^3*c^5*j^3*l - 442368*a^8*b^5*c^3*j*l^3 - 294912*a^7*b^
5*c^4*j^3*l - 49152*a^6*b^7*c^3*j^3*l + 1359360*a^10*b^2*c^4*h*m^3 + 117312
0*a^9*b^4*c^3*h*m^3 + 743040*a^7*b^4*c^5*h^3*m + 622080*a^8*b^2*c^6*h^3*m +
 184320*a^9*b*c^6*j^2*k^2 + 107136*a^6*b^6*c^4*h^3*m - 32640*a^8*b^6*c^2*h*
m^3 + 540*a^5*b^8*c^3*h^3*m - 270*a^4*b^10*c^2*h^3*m - 180*a^5*b^10*c*h^2*m
^2 - 2293760*a^9*b^3*c^4*f*m^3 - 2293760*a^6*b^3*c^7*f^3*m + 1327104*a^8*b^
4*c^4*g*l^3 + 1327104*a^6*b^4*c^6*g^3*l - 622080*a^8*b^3*c^5*h*k^3 - 622080
*a^7*b^3*c^6*h^3*k - 326592*a^7*b^5*c^4*h*k^3 - 326592*a^6*b^5*c^5*h^3*k -

199360*a^8*b^5*c^3*f*m^3 - 199360*a^5*b^5*c^6*f^3*m + 61920*a^7*b^7*c^2*f*m
^3 + 61920*a^4*b^7*c^5*f^3*m - 38880*a^6*b^7*c^3*h*k^3 - 38880*a^5*b^7*c^4*
h^3*k - 3682*a^3*b^9*c^4*f^3*m - 810*a^5*b^9*c^2*h*k^3 - 810*a^4*b^9*c^3*h^
3*k - 70*a^3*b^12*c*f^2*m^2 + 70*a^2*b^11*c^3*f^3*m + 3870720*a^8*b*c^7*e^2
*m^2 + 184320*a^8*b*c^7*h^2*j^2 - 14152320*a^4*b^4*c^8*d^3*m + 10644480*a^5
*b^2*c^9*d^3*m + 5483520*a^9*b^2*c^5*d*m^3 + 4269888*a^3*b^6*c^7*d^3*m - 26
54208*a^8*b^3*c^5*e*l^3 + 1359360*a^6*b^2*c^8*f^3*k + 1330560*a^8*b^4*c^4*d
*m^3 + 1173120*a^5*b^4*c^7*f^3*k - 884736*a^6*b^3*c^7*g^3*j - 826560*a^7*b^
6*c^3*d*m^3 + 743040*a^7*b^4*c^5*f*k^3 + 622080*a^8*b^2*c^6*f*k^3 - 607068*
a^2*b^8*c^6*d^3*m - 589824*a^7*b^3*c^6*g*j^3 - 442368*a^5*b^5*c^6*g^3*j - 2
94912*a^6*b^5*c^5*g*j^3 + 145188*a^6*b^8*c^2*d*m^3 + 107136*a^6*b^6*c^4*f*k
^3 - 49152*a^5*b^7*c^4*g*j^3 - 32640*a^4*b^6*c^6*f^3*k - 5796*a^3*b^8*c^5*f
^3*k + 540*a^5*b^8*c^3*f*k^3 - 270*a^4*b^10*c^2*f*k^3 + 210*a^2*b^10*c^4*f^
3*k + 19077120*a^4*b^3*c^9*d^3*k + 1658880*a^7*b*c^8*e^2*k^2 + 430080*a^7*b
*c^8*f^2*j^2 + 3538944*a^5*b^2*c^9*e^3*j - 2488320*a^7*b^3*c^6*d*k^3 - 2379
456*a^3*b^5*c^8*d^3*k + 1179648*a^7*b^2*c^7*e*j^3 + 589824*a^6*b^4*c^6*e*j^
3 + 98304*a^5*b^6*c^5*e*j^3 - 95904*a^2*b^7*c^7*d^3*k - 57024*a^6*b^5*c^5*d
*k^3 + 49248*a^5*b^7*c^4*d*k^3 - 4050*a^4*b^9*c^3*d*k^3 - 810*a^3*b^11*c^2*
d*k^3 - 486*a*b^12*c^3*d^2*k^2 + 3870720*a^6*b*c^9*d^2*j^2 - 1648128*a^5*b^
3*c^8*f^3*h - 898560*a^6*b^3*c^7*f*h^3 - 354240*a^5*b^5*c^6*f*h^3 - 354240*
a^4*b^5*c^7*f^3*h + 43680*a^3*b^7*c^6*f^3*h - 21600*a^4*b^7*c^5*f*h^3 - 979
2*a*b^11*c^4*d^2*j^2 + 1350*a^3*b^9*c^4*f*h^3 - 1050*a^2*b^9*c^5*f^3*h + 16
58880*a^6*b*c^9*e^2*h^2 + 16547328*a^4*b^2*c^10*d^3*h - 12306816*a^3*b^4*c^
9*d^3*h + 37310976*a^3*b^3*c^10*d^3*f + 3037824*a^2*b^6*c^8*d^3*h - 2654208
*a^5*b^3*c^8*e*g^3 + 1949184*a^6*b^2*c^8*d*h^3 + 1296000*a^5*b^4*c^7*d*h^3
- 155520*a^4*b^6*c^6*d*h^3 - 40500*a*b^10*c^5*d^2*h^2 - 8100*a^3*b^8*c^5*d*
h^3 + 4050*a^2*b^10*c^4*d*h^3 + 3870720*a^5*b*c^10*e^2*f^2 + 34836480*a^4*b
*c^11*d^2*e^2 - 108864*a*b^9*c^6*d^2*g^2 - 8068032*a^2*b^5*c^9*d^3*f - 5623
296*a^4*b^3*c^9*d*f^3 + 1737792*a^3*b^5*c^8*d*f^3 - 260190*a*b^8*c^7*d^2*f^
2 - 211680*a^2*b^7*c^7*d*f^3 - 435456*a*b^7*c^8*d^2*e^2 - 245760*a^10*c^6*j
^2*k*m - 384*a^6*b^10*j*l*m^2 + 138240*a^10*c^6*h*k^2*m - 90*a^5*b^11*h*k*m
^2 + 384000*a^10*c^6*f*k*m^2 - 2211840*a^8*c^8*e^2*k*m - 409600*a^9*c^7*f*j
^2*m - 147456*a^9*c^7*h*j^2*k - 30*a^4*b^12*f*k*m^2 + 967680*a^9*c^7*d*k^2*
m + 384000*a^8*c^8*f^2*h*m - 90*a^3*b^13*d*k*m^2 + 20321280*a^7*c^9*d^2*h*m
- 883200*a^11*b*c^4*k*m^3 - 317952*a^10*b*c^5*k^3*m + 43680*a^8*b^7*c*k*m^
3 + 1350*a^6*b^9*c*k^3*m - 270*b^14*c^2*d^2*h*m + 6*a^3*b^13*f*h*m^2 + 4838
400*a^9*c^7*d*h*m^2 + 2903040*a^8*c^8*d*h^2*m - 1032192*a^8*c^8*d*j^2*k + 1
38240*a^8*c^8*f*h^2*k - 3686400*a^7*c^9*e^2*f*m - 1327104*a^7*c^9*e^2*h*k -
393216*a^9*b*c^6*j^3*l - 245760*a^8*c^8*f*h*j^2 - 810*b^13*c^3*d^2*h*k + 6
30*b^13*c^3*d^2*f*m + 18*a^2*b^14*d*h*m^2 + 2688000*a^7*c^9*d*f^2*m + 58060
8*a^8*c^8*d*h*k^2 - 5796*a^7*b^8*c*h*m^3 - 3456*b^12*c^4*d^2*g*j + 1890*b^1
2*c^4*d^2*f*k + 6773760*a^6*c^10*d^2*f*k - 1344000*a^10*b*c^5*f*m^3 - 13440
00*a^7*b*c^8*f^3*m - 207360*a^9*b*c^6*h*k^3 - 207360*a^8*b*c^7*h^3*k - 3682
*a^6*b^9*c*f*m^3 - 9289728*a^6*c^10*d*e^2*k - 1720320*a^7*c^9*d*f*j^2 - 508
03200*a^5*b*c^10*d^3*k + 6912*b^11*c^5*d^2*e*j - 10616832*a^6*b*c^9*e^3*l -
2211840*a^6*c^10*e^2*f*h - 393216*a^8*b*c^7*g*j^3 + 43416*a*b^10*c^5*d^3*m
- 9576*a^5*b^10*c*d*m^3 - 9450*b^11*c^5*d^2*f*h - 504*a*b^14*c*d^2*m^2 + 1
612800*a^6*c^10*d*f^2*h - 1036800*a^8*b*c^7*d*k^3 + 45198*a*b^9*c^6*d^3*k -
20736*b^10*c^6*d^2*e*g - 75188736*a^4*b*c^11*d^3*f - 883200*a^6*b*c^9*f^3*
h - 317952*a^7*b*c^8*f*h^3 - 15482880*a^5*c^11*d*e^2*f - 10616832*a^5*b*c^1
0*e^3*g - 345060*a*b^8*c^7*d^3*h - 4262400*a^5*b*c^10*d*f^3 + 852768*a*b^7*
c^8*d^3*f + 7350*a*b^9*c^6*d*f^3 + 967680*a^10*b^3*c^3*l^2*m^2 + 161280*a^9
*b^5*c^2*l^2*m^2 + 1684224*a^10*b^2*c^4*k^2*m^2 + 1264320*a^9*b^4*c^3*k^2*m
^2 + 126720*a^8*b^6*c^2*k^2*m^2 + 501760*a^9*b^3*c^4*j^2*m^2 + 414720*a^9*b
^3*c^4*k^2*l^2 + 207360*a^8*b^5*c^3*k^2*l^2 + 170240*a^8*b^5*c^3*j^2*m^2 +
9216*a^7*b^7*c^2*j^2*m^2 + 5184*a^7*b^7*c^2*k^2*l^2 + 884736*a^9*b^2*c^5*j^
2*l^2 + 884736*a^8*b^4*c^4*j^2*l^2 + 221184*a^7*b^6*c^3*j^2*l^2 + 1419840*a
^8*b^4*c^4*h^2*m^2 + 1387008*a^9*b^2*c^5*h^2*m^2 + 276480*a^8*b^3*c^5*j^2*k
^2 + 140544*a^7*b^5*c^4*j^2*k^2 + 84960*a^7*b^6*c^3*h^2*m^2 + 25344*a^6*b^7

```
*c^3*j^2*k^2 - 8010*a^6*b^8*c^2*h^2*m^2 + 576*a^5*b^9*c^2*j^2*k^2 + 967680*
a^8*b^3*c^5*g^2*m^2 + 414720*a^8*b^3*c^5*h^2*l^2 + 207360*a^7*b^5*c^4*h^2*l
^2 + 161280*a^7*b^5*c^4*g^2*m^2 - 20160*a^6*b^7*c^3*g^2*m^2 + 5184*a^6*b^7*
c^3*h^2*l^2 + 576*a^5*b^9*c^2*g^2*m^2 + 3808000*a^8*b^2*c^6*f^2*m^2 + 19906
56*a^7*b^4*c^5*g^2*l^2 + 1643712*a^7*b^4*c^5*f^2*m^2 + 803520*a^7*b^4*c^5*h
^2*k^2 + 725760*a^8*b^2*c^6*h^2*k^2 + 207360*a^6*b^6*c^4*h^2*k^2 - 125440*a
^6*b^6*c^4*f^2*m^2 - 13790*a^5*b^8*c^3*f^2*m^2 + 10530*a^5*b^8*c^3*h^2*k^2
+ 1785*a^4*b^10*c^2*f^2*m^2 + 81*a^4*b^10*c^2*h^2*k^2 + 18427392*a^7*b^2*c^
7*d^2*m^2 + 967680*a^7*b^3*c^6*f^2*l^2 + 645120*a^7*b^3*c^6*e^2*m^2 + 41472
0*a^7*b^3*c^6*g^2*k^2 + 276480*a^7*b^3*c^6*h^2*j^2 + 207360*a^6*b^5*c^5*g^2
*k^2 + 161280*a^6*b^5*c^5*f^2*l^2 + 140544*a^6*b^5*c^5*h^2*j^2 - 80640*a^6*
b^5*c^5*e^2*m^2 + 25344*a^5*b^7*c^4*h^2*j^2 - 20160*a^5*b^7*c^4*f^2*l^2 + 5
184*a^5*b^7*c^4*g^2*k^2 + 2304*a^5*b^7*c^4*e^2*m^2 + 576*a^4*b^9*c^3*h^2*j^
2 + 576*a^4*b^9*c^3*f^2*l^2 + 7962624*a^7*b^2*c^7*e^2*l^2 - 4148928*a^6*b^4
*c^6*d^2*m^2 + 1419840*a^6*b^4*c^6*f^2*k^2 + 1387008*a^7*b^2*c^7*f^2*k^2 -
1183392*a^5*b^6*c^5*d^2*m^2 + 884736*a^7*b^2*c^7*g^2*j^2 + 884736*a^6*b^4*c
^6*g^2*j^2 + 645750*a^4*b^8*c^4*d^2*m^2 + 221184*a^5*b^6*c^5*g^2*j^2 - 1159
20*a^3*b^10*c^3*d^2*m^2 + 84960*a^5*b^6*c^5*f^2*k^2 + 10836*a^2*b^12*c^2*d^
2*m^2 - 8010*a^4*b^8*c^4*f^2*k^2 - 180*a^3*b^10*c^3*f^2*k^2 + 9*a^2*b^12*c^
2*f^2*k^2 + 8709120*a^6*b^3*c^7*d^2*l^2 - 4354560*a^5*b^5*c^6*d^2*l^2 + 979
776*a^4*b^7*c^5*d^2*l^2 + 829440*a^6*b^3*c^7*e^2*k^2 + 17480448*a^6*b^2*c^8
*d^2*k^2 + 501760*a^6*b^3*c^7*f^2*j^2 + 170240*a^5*b^5*c^6*f^2*j^2 - 108864
*a^3*b^9*c^4*d^2*l^2 + 20736*a^5*b^5*c^6*e^2*k^2 + 9216*a^4*b^7*c^5*f^2*j^2
 + 5184*a^2*b^11*c^3*d^2*l^2 - 1984*a^3*b^9*c^4*f^2*j^2 + 64*a^2*b^11*c^3*f
^2*j^2 + 3538944*a^6*b^2*c^8*e^2*j^2 - 3302208*a^5*b^4*c^7*d^2*k^2 + 884736
*a^5*b^4*c^7*e^2*j^2 + 414720*a^6*b^3*c^7*g^2*h^2 + 207360*a^5*b^5*c^6*g^2*
h^2 - 103680*a^4*b^6*c^6*d^2*k^2 + 101250*a^3*b^8*c^5*d^2*k^2 - 5751*a^2*b^
10*c^4*d^2*k^2 + 5184*a^4*b^7*c^5*g^2*h^2 + 1935360*a^5*b^3*c^8*d^2*j^2 + 1
684224*a^6*b^2*c^8*f^2*h^2 + 1264320*a^5*b^4*c^7*f^2*h^2 - 532224*a^4*b^5*c
^7*d^2*j^2 + 126720*a^4*b^6*c^6*f^2*h^2 - 96768*a^3*b^7*c^6*d^2*j^2 + 62784
*a^2*b^9*c^5*d^2*j^2 - 13950*a^3*b^8*c^5*f^2*h^2 + 225*a^2*b^10*c^4*f^2*h^2
 + 967680*a^5*b^3*c^8*f^2*g^2 + 829440*a^5*b^3*c^8*e^2*h^2 + 161280*a^4*b^5
*c^7*f^2*g^2 + 20736*a^4*b^5*c^7*e^2*h^2 - 20160*a^3*b^7*c^6*f^2*g^2 + 576*
a^2*b^9*c^5*f^2*g^2 + 11487744*a^5*b^2*c^9*d^2*h^2 + 7962624*a^5*b^2*c^9*e^
2*g^2 + 35525376*a^4*b^2*c^10*d^2*f^2 - 1412640*a^3*b^6*c^7*d^2*h^2 + 46137
6*a^4*b^4*c^8*d^2*h^2 + 375030*a^2*b^8*c^6*d^2*h^2 + 8709120*a^4*b^3*c^9*d^
2*g^2 - 4354560*a^3*b^5*c^8*d^2*g^2 + 979776*a^2*b^7*c^7*d^2*g^2 + 645120*a
^4*b^3*c^9*e^2*f^2 - 80640*a^3*b^5*c^8*e^2*f^2 + 2304*a^2*b^7*c^7*e^2*f^2 -
 15269184*a^3*b^4*c^9*d^2*f^2 + 2870784*a^2*b^6*c^8*d^2*f^2 - 17418240*a^3*
b^3*c^10*d^2*e^2 + 3919104*a^2*b^5*c^9*d^2*e^2 + 54*b^15*c*d^2*k*m + 6*a*b^
15*d*f*m^2 + 115200*a^11*c^5*k^2*m^2 + 576*a^7*b^9*l^2*m^2 + 225*a^6*b^10*k
^2*m^2 + 64*a^5*b^11*j^2*m^2 + 345600*a^10*c^6*h^2*m^2 + 9*a^4*b^12*h^2*m^2
 + 320000*a^9*c^7*f^2*m^2 + 41472*a^9*c^7*h^2*k^2 + 16934400*a^8*c^8*d^2*m^
2 + 345600*a^8*c^8*f^2*k^2 + 81*b^14*c^2*d^2*k^2 + 3538944*a^7*c^9*e^2*j^2
+ 2032128*a^7*c^9*d^2*k^2 + 492800*a^11*b^2*c^3*m^4 + 351456*a^10*b^4*c^2*m
^4 + 576*b^13*c^3*d^2*j^2 + 331776*a^9*b^4*c^3*l^4 + 115200*a^7*c^9*f^2*h^2
 + 142560*a^8*b^4*c^4*k^4 + 103680*a^9*b^2*c^5*k^4 + 32400*a^7*b^6*c^3*k^4
+ 2025*b^12*c^4*d^2*h^2 + 2025*a^6*b^8*c^2*k^4 + 6096384*a^6*c^10*d^2*h^2 +
 131072*a^8*b^2*c^6*j^4 + 98304*a^7*b^4*c^5*j^4 + 32768*a^6*b^6*c^4*j^4 + 5
184*b^11*c^5*d^2*g^2 + 4096*a^5*b^8*c^3*j^4 + 11025*b^10*c^6*d^2*f^2 + 5644
800*a^5*c^11*d^2*f^2 + 142560*a^6*b^4*c^6*h^4 + 103680*a^7*b^2*c^7*h^4 + 32
400*a^5*b^6*c^5*h^4 + 20736*b^9*c^7*d^2*e^2 + 2025*a^4*b^8*c^4*h^4 + 331776
*a^5*b^4*c^7*g^4 + 492800*a^5*b^2*c^9*f^4 + 351456*a^4*b^4*c^8*f^4 - 43120*
a^3*b^6*c^7*f^4 + 1225*a^2*b^8*c^6*f^4 - 27433728*a^3*b^2*c^11*d^4 + 644630
4*a^2*b^4*c^10*d^4 - 1050*a^7*b^9*k*m^3 + 384000*a^11*c^5*h*m^3 + 138240*a^
9*c^7*h^3*m + 210*a^6*b^10*h*m^3 + 47416320*a^6*c^10*d^3*m - 1134*b^12*c^4*
d^3*m + 70*a^5*b^11*f*m^3 + 2688000*a^10*c^6*d*m^3 + 384000*a^7*c^9*f^3*k +
 138240*a^9*c^7*f*k^3 - 3402*b^11*c^5*d^3*k + 210*a^4*b^12*d*m^3 + 7077888*
a^6*c^10*e^3*j + 786432*a^8*c^8*e*j^3 - 43120*a^9*b^6*c*m^4 + 28449792*a^5*
```

```
c^11*d^3*h + 17010*b^10*c^6*d^3*h + 580608*a^7*c^9*d*h^3 - 39690*b^9*c^7*d^
3*f - 734832*a*b^6*c^9*d^4 + 9*b^16*d^2*m^2 + 160000*a^12*c^4*m^4 + 1225*a^
8*b^8*m^4 + 20736*a^10*c^6*k^4 + 65536*a^9*c^7*j^4 + 20736*a^8*c^8*h^4 + 49
787136*a^4*c^12*d^4 + 160000*a^6*c^10*f^4 + 5308416*a^5*c^11*e^4 + 35721*b^
8*c^8*d^4 + a^2*b^14*f^2*m^2, z, k1), k1, 1, 4) - ((8*a^2*c^2*g + a^2*b^2*l
 + b^3*c*e + 8*a^3*c*l - 10*a*b*c^2*e + a*b^2*c*g - 6*a^2*b*c*j)/(4*c*(b^4
+ 16*a^2*c^2 - 8*a*b^2*c)) + (x^4*(b^4*l + 9*b^2*c^2*g + 16*a^2*c^2*l - 18*
b*c^3*e - 3*b^3*c*j - 6*a*b*c^2*j + a*b^2*c*l))/(4*c*(b^4 + 16*a^2*c^2 - 8*
a*b^2*c)) - (x^7*(3*b^3*c^2*d + 20*a^2*c^3*f + 12*a^3*c^2*k + a^2*b^3*m - 2
4*a*b*c^3*d - 16*a^3*b*c*m + a*b^2*c^2*f - 12*a^2*b*c^2*h + 3*a^2*b^2*c*k))
/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^2*(2*a^2*c^2*j - 2*b^2*c^2*e -
 10*a*c^3*e + b^3*c*g + a*b^3*l + 5*a*b*c^2*g - 5*a*b^2*c*j + 5*a^2*b*c*l))
/(2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (c*x^6*(6*c^2*e + b^2*j - 3*b*c*g +
 2*a*c*j - 3*a*b*l))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^3*(4*a^4*c^2*k
 - 36*a^3*c^3*f + 2*a^3*b^3*m - 3*b^5*c*d - 5*a^2*b^2*c^2*f - a*b^4*c*f + 2
8*a^4*b*c*m + 20*a*b^3*c^2*d + 4*a^2*b*c^3*d + 5*a^2*b^3*c*h + 16*a^3*b*c^2
*h - 19*a^3*b^2*c*k))/(8*a^2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x*(12*a^3
*c^2*h - 44*a^2*c^3*d + a^3*b^2*m - 5*b^4*c*d + 20*a^4*c*m + a*b^3*c*f - 12
*a^3*b*c*k + 37*a*b^2*c^2*d - 16*a^2*b*c^2*f + 3*a^2*b^2*c*h))/(8*a*c*(b^4
+ 16*a^2*c^2 - 8*a*b^2*c)) - (x^5*(28*a^2*c^4*d + 6*b^4*c^2*d + 4*a^3*c^3*h
 - a^2*b^4*m - 36*a^4*c^2*m - 19*a^2*b^2*c^2*h - 49*a*b^2*c^3*d + 2*a*b^3*c
^2*f + 28*a^2*b*c^3*f + 5*a^2*b^3*c*k + 16*a^3*b*c^2*k - 5*a^3*b^2*c*m))/(8
*a^2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8
+ 2*a*b*x^2 + 2*b*c*x^6)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x**8+l*x**7+k*x**6+j*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+
b*x**2+a)**3,x)
```

```
[Out] Timed out
```

3.58 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5+jx^6+kx^7}{\left(a+bx^2+cx^4\right)^2}\,dx$

Optimal. Leaf size=645

$$\frac{x\left(x^2\left(-ab^2j+bc(ah+cd)-2ac(cf-aj)\right)+c\left(-\frac{ab(aj+cf)}{c}-2a(cd-ah)+b^2d\right)\right)}{2ac\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{ab^2j}{c}+\cdots\right.}{2\cdots}$$

```
[Out] 1/2*x*(c*(b^2*d-2*a*(-a*h+c*d)-a*b*(a*j+c*f)/c)+(b*c*(a*h+c*d)-a*b^2*j-2*a*
c*(-a*j+c*f))*x^2)/a/c/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*(-b*c*(a*i+c*e)+a*b
^2*k+2*a*c*(-a*k+c*g)-(2*c^3*e-c^2*(2*a*i+b*g)-b^3*k+b*c*(3*a*k+b*i))*x^2)/
c^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*(4*c^3*e-c^2*(-4*a*i+2*b*g)+b^3*k-6*a*
b*c*k)*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/c^2/(-4*a*c+b^2)^(3/2)+1/4*k
*ln(c*x^4+b*x^2+a)/c^2+1/4*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^
(1/2))*(b*(a*h+c*d)+a*b^2*j/c-2*a*(3*a*j+c*f)+(b^2*c*(-a*h+c*d)-4*a*c^2*(a*
h+3*c*d)-a*b^3*j+4*a*b*c*(2*a*j+c*f))/c/(-4*a*c+b^2)^(1/2))/a/(-4*a*c+b^2)*
2^(1/2)/c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/4*arctan(x*2^(1/2)*c^(1/2)/(
b+(-4*a*c+b^2)^(1/2))^(1/2))*(b*(a*h+c*d)+a*b^2*j/c-2*a*(3*a*j+c*f)+(-b^2*c
*(-a*h+c*d)+4*a*c^2*(a*h+3*c*d)+a*b^3*j-4*a*b*c*(2*a*j+c*f))/c/(-4*a*c+b^2)
^(1/2))/a/(-4*a*c+b^2)*2^(1/2)/c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 3.37, antiderivative size = 645, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, integrand size = 50, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {1673, 1678, 1166, 205, 1663, 1660, 634, 618, 206, 628}

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{b^2c(cd-ah)-ab^3j+4abc(2aj+cf)-4ac^2(ah+3cd)}{c\sqrt{b^2-4ac}}+\frac{ab^2j}{c}+b(ah+cd)-2a(3aj+cf)\right)}{2\sqrt{2}a\sqrt{c}\left(b^2-4ac\right)\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}\cdots}}\right)\cdots}{\cdots}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^6 + k*x^7)/(a + b*x^2 +
c*x^4)^2,x]
```

```
[Out] (x*(c*(b^2*d - 2*a*(c*d - a*h) - (a*b*(c*f + a*j))/c) + (b*c*(c*d + a*h) -
a*b^2*j - 2*a*c*(c*f - a*j))*x^2))/(2*a*c*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)
) - (b*c*(c*e + a*i) - a*b^2*k - 2*a*c*(c*g - a*k) + (2*c^3*e - c^2*(b*g +
2*a*i) - b^3*k + b*c*(b*i + 3*a*k))*x^2)/(2*c^2*(b^2 - 4*a*c)*(a + b*x^2 +
c*x^4)) + ((b*(c*d + a*h) + (a*b^2*j)/c - 2*a*(c*f + 3*a*j) + (b^2*c*(c*d -
 a*h) - 4*a*c^2*(3*c*d + a*h) - a*b^3*j + 4*a*b*c*(c*f + 2*a*j))/(c*Sqrt[b^
2 - 4*a*c]))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(2*Sq
rt[2]*a*Sqrt[c]*(b^2 - 4*a*c)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((b*(c*d + a*h
) + (a*b^2*j)/c - 2*a*(c*f + 3*a*j) - (b^2*c*(c*d - a*h) - 4*a*c^2*(3*c*d +
 a*h) - a*b^3*j + 4*a*b*c*(c*f + 2*a*j))/(c*Sqrt[b^2 - 4*a*c]))*ArcTan[(Sqr
t[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(2*Sqrt[2]*a*Sqrt[c]*(b^2 - 4
*a*c)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((4*c^3*e - c^2*(2*b*g - 4*a*i) + b^3*
k - 6*a*b*c*k)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(2*c^2*(b^2 - 4*a*
c)^(3/2)) + (k*Log[a + b*x^2 + c*x^4])/(4*c^2)
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^
(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
 - 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+58x^5+jx^6+kx^7}{\left(a+bx^2+cx^4\right)^2}\,dx = \int \frac{d+fx^2+hx^4+jx^6}{\left(a+bx^2+cx^4\right)^2}\,dx + \int \frac{x\left(e+gx^2+58x^4+kx^6\right.}{\left(a+bx^2+cx^4\right)^2}$$

$$= \frac{x\left(c\left(b^2d-2a(cd-ah)-\frac{ab(cf+aj)}{c}\right)+\left(bc(cd+ah)-ab^2\right.\right.}{2ac\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}$$

$$= \frac{x\left(c\left(b^2d-2a(cd-ah)-\frac{ab(cf+aj)}{c}\right)+\left(bc(cd+ah)-ab^2\right.\right.}{2ac\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}$$

$$= \frac{x\left(c\left(b^2d-2a(cd-ah)-\frac{ab(cf+aj)}{c}\right)+\left(bc(cd+ah)-ab^2\right.\right.}{2ac\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}$$

$$= \frac{x\left(c\left(b^2d-2a(cd-ah)-\frac{ab(cf+aj)}{c}\right)+\left(bc(cd+ah)-ab^2\right.\right.}{2ac\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}$$

$$= \frac{x\left(c\left(b^2d-2a(cd-ah)-\frac{ab(cf+aj)}{c}\right)+\left(bc(cd+ah)-ab^2\right.\right.}{2ac\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}$$

Mathematica [A] time = 4.40, size = 775, normalized size = 1.20

$$-\frac{\sqrt{2}\sqrt{c}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(-bc\left(8a^2j+cd\sqrt{b^2-4ac}+ah\sqrt{b^2-4ac}+4acf\right)+ab^3j+2ac\left(cf\sqrt{b^2-4ac}+3aj\sqrt{b^2-4ac}+2ach+6c^2d\right)-b^2\left(aj\sqrt{b^2-4ac}-ach\right.\right.}{a\left(b^2-4ac\right)^{3/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^6 + k*x^7)/(a + b*
x^2 + c*x^4)^2,x]
```

```
[Out] ((2*(2*a^3*c*k - b*c^2*d*x*(b + c*x^2) + a*(-(b^3*k*x^2) + b^2*c*x^2*(i + j
*x) + 2*c^3*x*(d + x*(e + f*x)) + b*c^2*(e + x*(f - x*(g + h*x)))) + a^2*(-
(b^2*k) + b*c*(i + x*(j + 3*k*x)) - 2*c^2*(g + x*(h + x*(i + j*x))))))/(a*(
-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)) - (Sqrt[2]*Sqrt[c]*(a*b^3*j - b*c*(c*Sqr
t[b^2 - 4*a*c]*d + 4*a*c*f + a*Sqrt[b^2 - 4*a*c]*h + 8*a^2*j) - b^2*(c^2*d
```

```
- a*c*h + a*Sqrt[b^2 - 4*a*c]*j) + 2*a*c*(6*c^2*d + c*Sqrt[b^2 - 4*a*c]*f +
 2*a*c*h + 3*a*Sqrt[b^2 - 4*a*c]*j))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sq
rt[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^(3/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (S
qrt[2]*Sqrt[c]*(a*b^3*j + b*c*(c*Sqrt[b^2 - 4*a*c]*d - 4*a*c*f + a*Sqrt[b^2
 - 4*a*c]*h - 8*a^2*j) + 2*a*c*(6*c^2*d - c*Sqrt[b^2 - 4*a*c]*f + 2*a*c*h -
 3*a*Sqrt[b^2 - 4*a*c]*j) + b^2*(-(c^2*d) + a*c*h + a*Sqrt[b^2 - 4*a*c]*j))
*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^
(3/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((-4*c^3*e + 2*c^2*(b*g - 2*a*i) + b^2
*(-b + Sqrt[b^2 - 4*a*c])*k + a*c*(6*b*k - 4*Sqrt[b^2 - 4*a*c]*k))*Log[-b +
 Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(3/2) + ((4*c^3*e + c^2*(-2*b*
g + 4*a*i) + b^2*(b + Sqrt[b^2 - 4*a*c])*k - 2*a*c*(3*b + 2*Sqrt[b^2 - 4*a*
c])*k)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(3/2))/(4*c^2)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((k*x^7+j*x^6+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x,
algorithm="fricas")
```

```
[Out] Timed out
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((k*x^7+j*x^6+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x,
algorithm="giac")
```

```
[Out] Timed out
```

maple [B] time = 0.09, size = 3107, normalized size = 4.82

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((k*x^7+j*x^6+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x)
```

```
[Out] 1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/
2)*b^2*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+1/4/(4*a*c-b^
2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*h+(-1/2/a*(2*a^2*c*j-a*b^
2*j+a*b*c*h-2*a*c^2*f+b*c^2*d)/(4*a*c-b^2)/c*x^3+1/2*(3*a*b*c*k-2*a*c^2*i-b
^3*k+b^2*c*i-b*c^2*g+2*c^3*e)/(4*a*c-b^2)/c^2*x^2+1/2*(a^2*b*j-2*a^2*c*h+a*
b*c*f+2*a*c^2*d-b^2*c*d)/a/c/(4*a*c-b^2)*x+1/2*(2*a^2*c*k-a*b^2*k+a*b*c*i-2
*a*c^2*g+b*c^2*e)/(4*a*c-b^2)/c^2)/(c*x^4+b*x^2+a)-1/4/(4*a*c-b^2)^2*2^(1/2
)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)/a*b^2*c*d*arctan(2^(1
/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/4*c/(4*a*c-b^2)^2/a*2^(1/2)/((-
b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^
(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*d+4*a^2/(4*a*c-b^2)^2*ln(-2*c*x^2-b+(-4*a
*c+b^2)^(1/2))*k+4*a^2/(4*a*c-b^2)^2*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*k-c/(
4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b
+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b*f-1/(4*a*c-b^2)^2*2
^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)*b*c*f*arctan(2^(
1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-2*c^2/(4*a*c-b^2)^2*a*2^(1/2)/((
-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)
^(1/2)*c*x)*f+1/2*c/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)
```

```
*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^2*f+2/(4*a*c-b^2)
^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*a*c^2*f*arctan(2^(1/2)/((b+(-4*
a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/2/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*b^2*c*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-
1/4*c/(4*a*c-b^2)^2/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(
1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*d+a/(4*a*c-b^2)^2*c*2^(1/2)
/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))
*c)^(1/2)*c*x)*b*h+1/2/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*b*g*ln(-2*c*x^2-b+(
-4*a*c+b^2)^(1/2))+1/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*c*e*ln(2*c*x^2+b+(-4*
a*c+b^2)^(1/2))-1/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*c*e*ln(-2*c*x^2-b+(-4*a*
c+b^2)^(1/2))-1/4/(4*a*c-b^2)^2/c*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)
*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^4*j-3/2*a/(4*a*c-
b^2)^2/c*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b*k+6*a^2/(4*a
*c-b^2)^2*c*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4
*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*j+1/4/(4*a*c-b^2)^2/c*2^(1/2)/((b+(-4*a*c+b^
2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^4
*j+5/2*a/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^
(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^2*j-6*a^2/(4*a*c-b^2)^2*c*2^
(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*c*x)*j-5/2*a/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c
)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^2*j+3/2*a/(4
*a*c-b^2)^2/c*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b*k-2*a/
(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b*j+1/4/(4*a*c-b^2)^2/c
*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^3*j+1/4/(4*a*c-b^2)^2/c*2^(1/2)/((
-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)
^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^3*j-2*a/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x
)*(-4*a*c+b^2)^(1/2)*b*j+3/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)
^(1/2)*(-4*a*c+b^2)^(1/2)*c^2*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(
1/2)*c*x)-1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b*c^2*d*
arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+3*c^2/(4*a*c-b^2)^2*2^
(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d+c^2/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4
*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)
*c*x)*b*d+1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)/a*b^3*
c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+1/4/(4*a*c-b^2)^2/
c^2*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*b^4*k+1/4/(4*a*c-b^2)^2/c^2*ln(2*c*x^
2+b+(-4*a*c+b^2)^(1/2))*b^4*k-1/4/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*h
-1/2/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*b*g*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+
1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)
*a*c*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/(4*a*c-b^2)^2
*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*a*b*c*h*arctan(2^(1/2)/((b+(-4*a*
c+b^2)^(1/2))*c)^(1/2)*c*x)+a/(4*a*c-b^2)^2*c*2^(1/2)/((-b+(-4*a*c+b^2)^(1/
2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c
+b^2)^(1/2)*h+1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b^
3*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/(4*a*c-b^2)^2*(-
4*a*c+b^2)^(1/2)*a*i*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))+1/(4*a*c-b^2)^2*(-4*
a*c+b^2)^(1/2)*a*i*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+1/4/(4*a*c-b^2)^2/c^2*l
n(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b^3*k-2*a/(4*a*c-b^2)^2/
c*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*b^2*k-2*a/(4*a*c-b^2)^2/c*ln(2*c*x^2+b+
(-4*a*c+b^2)^(1/2))*b^2*k-1/4/(4*a*c-b^2)^2/c^2*ln(-2*c*x^2-b+(-4*a*c+b^2)^
(1/2))*(-4*a*c+b^2)^(1/2)*b^3*k
```

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

$$-\frac{abc^2e - 2\,a^2c^2g + a^2bci - \left(bc^3d - 2\,ac^3f + abc^2h - \left(ab^2c - 2\,a^2c^2\right)j\right)x^3 + \left(2\,ac^3e - abc^2g + \left(ab^2c - 2\,a^2c^2\right)i - \right.}{2\left(a^2b^2c^2 - 4\,a^3c^3 + \left(ab^2c^3 - 4\,a^2c^4\right)x^4 + \left(a\right.\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((k*x^7+j*x^6+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x,
algorithm="maxima")
```

```
[Out] -1/2*(a*b*c^2*e - 2*a^2*c^2*g + a^2*b*c*i - (b*c^3*d - 2*a*c^3*f + a*b*c^2*
h - (a*b^2*c - 2*a^2*c^2)*j)*x^3 + (2*a*c^3*e - a*b*c^2*g + (a*b^2*c - 2*a^
2*c^2)*i - (a*b^3 - 3*a^2*b*c)*k)*x^2 - (a^2*b^2 - 2*a^3*c)*k + (a*b*c^2*f
- 2*a^2*c^2*h + a^2*b*c*j - (b^2*c^2 - 2*a*c^3)*d)*x)/(a^2*b^2*c^2 - 4*a^3*
c^3 + (a*b^2*c^3 - 4*a^2*c^4)*x^4 + (a*b^3*c^2 - 4*a^2*b*c^3)*x^2) - 1/2*in
tegrate(-(2*(a*b^2 - 4*a^2*c)*k*x^3 + a*b*c*f - 2*a^2*c*h + a^2*b*j + (b*c^
2*d - 2*a*c^2*f + a*b*c*h + (a*b^2 - 6*a^2*c)*j)*x^2 + (b^2*c - 6*a*c^2)*d
- 2*(2*a*c^2*e - a*b*c*g + 2*a^2*c*i - a^2*b*k)*x)/(c*x^4 + b*x^2 + a), x)/
(a*b^2*c - 4*a^2*c^2)
```

mupad [B] time = 8.85, size = 53538, normalized size = 83.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^6 + k*x^7)/(a + b*x^2 +
c*x^4)^2,x)
```

```
[Out] ((b*c^2*e - 2*a*c^2*g - a*b^2*k + 2*a^2*c*k + a*b*c*i)/(2*c^2*(4*a*c - b^2)
) + (x^2*(2*c^3*e - b^3*k - b*c^2*g - 2*a*c^2*i + b^2*c*i + 3*a*b*c*k))/(2*
c^2*(4*a*c - b^2)) + (x*(2*a*c^2*d - b^2*c*d - 2*a^2*c*h + a^2*b*j + a*b*c*
f))/(2*a*c*(4*a*c - b^2)) - (x^3*(b*c^2*d - 2*a*c^2*f - a*b^2*j + 2*a^2*c*j
 + a*b*c*h))/(2*a*c*(4*a*c - b^2)))/(a + b*x^2 + c*x^4) + symsum(log(root(1
572864*a^8*b^2*c^9*z^4 - 983040*a^7*b^4*c^8*z^4 + 327680*a^6*b^6*c^7*z^4 -
61440*a^5*b^8*c^6*z^4 + 6144*a^4*b^10*c^5*z^4 - 256*a^3*b^12*c^4*z^4 - 1048
576*a^9*c^10*z^4 - 1572864*a^8*b^2*c^7*k*z^3 + 983040*a^7*b^4*c^6*k*z^3 - 3
27680*a^6*b^6*c^5*k*z^3 + 61440*a^5*b^8*c^4*k*z^3 - 6144*a^4*b^10*c^3*k*z^3
 + 256*a^3*b^12*c^2*k*z^3 + 1048576*a^9*c^8*k*z^3 + 98304*a^8*b*c^6*i*k*z^2
 + 98304*a^7*b*c^7*e*k*z^2 + 57344*a^7*b*c^7*f*j*z^2 + 32768*a^7*b*c^7*g*i*
z^2 + 57344*a^6*b*c^8*d*h*z^2 + 32768*a^6*b*c^8*e*g*z^2 - 32*a*b^10*c^4*d*f
*z^2 - 90112*a^7*b^3*c^5*i*k*z^2 + 30720*a^6*b^5*c^4*i*k*z^2 - 4608*a^5*b^7
*c^3*i*k*z^2 + 256*a^4*b^9*c^2*i*k*z^2 - 49152*a^7*b^2*c^6*g*k*z^2 + 45056*
a^6*b^4*c^5*g*k*z^2 + 24576*a^7*b^2*c^6*h*j*z^2 - 15360*a^5*b^6*c^4*g*k*z^2
 - 3072*a^5*b^6*c^4*h*j*z^2 + 2304*a^4*b^8*c^3*g*k*z^2 + 2048*a^6*b^4*c^5*h
*j*z^2 + 576*a^4*b^8*c^3*h*j*z^2 - 128*a^3*b^10*c^2*g*k*z^2 - 32*a^3*b^10*c
^2*h*j*z^2 - 90112*a^6*b^3*c^6*e*k*z^2 - 49152*a^6*b^3*c^6*f*j*z^2 + 30720*
a^5*b^5*c^5*e*k*z^2 - 24576*a^6*b^3*c^6*g*i*z^2 + 15360*a^5*b^5*c^5*f*j*z^2
 + 6144*a^5*b^5*c^5*g*i*z^2 - 4608*a^4*b^7*c^4*e*k*z^2 - 2048*a^4*b^7*c^4*f
*j*z^2 - 512*a^4*b^7*c^4*g*i*z^2 + 256*a^3*b^9*c^3*e*k*z^2 + 96*a^3*b^9*c^3
*f*j*z^2 + 131072*a^6*b^2*c^7*d*j*z^2 + 49152*a^6*b^2*c^7*e*i*z^2 - 43008*a
^5*b^4*c^6*d*j*z^2 - 12288*a^5*b^4*c^6*e*i*z^2 + 6144*a^5*b^4*c^6*f*h*z^2 +
 6144*a^4*b^6*c^5*d*j*z^2 - 2048*a^4*b^6*c^5*f*h*z^2 + 1024*a^4*b^6*c^5*e*i
*z^2 - 320*a^3*b^8*c^4*d*j*z^2 + 192*a^3*b^8*c^4*f*h*z^2 - 49152*a^5*b^3*c^
7*d*h*z^2 - 24576*a^5*b^3*c^7*e*g*z^2 + 15360*a^4*b^5*c^6*d*h*z^2 + 6144*a^
4*b^5*c^6*e*g*z^2 - 2048*a^3*b^7*c^5*d*h*z^2 - 512*a^3*b^7*c^5*e*g*z^2 + 96
*a^2*b^9*c^4*d*h*z^2 + 24576*a^5*b^2*c^8*d*f*z^2 - 3072*a^3*b^6*c^6*d*f*z^2
 + 2048*a^4*b^4*c^7*d*f*z^2 + 576*a^2*b^8*c^5*d*f*z^2 + 1536*a^4*b^10*c*k^2
*z^2 + 61440*a^8*b*c^6*j^2*z^2 - 16*a^3*b^11*c*j^2*z^2 + 12288*a^7*b*c^7*h^
2*z^2 + 12288*a^6*b*c^8*f^2*z^2 + 61440*a^5*b*c^9*d^2*z^2 + 432*a*b^9*c^5*d
^2*z^2 - 49152*a^8*c^7*h*j*z^2 - 147456*a^7*c^8*d*j*z^2 - 65536*a^7*c^8*e*i
*z^2 - 16384*a^7*c^8*f*h*z^2 - 49152*a^6*c^9*d*f*z^2 + 516096*a^8*b^2*c^5*k
^2*z^2 - 288768*a^7*b^4*c^4*k^2*z^2 + 88576*a^6*b^6*c^3*k^2*z^2 - 15744*a^5
*b^8*c^2*k^2*z^2 - 61440*a^7*b^3*c^5*j^2*z^2 + 24064*a^6*b^5*c^4*j^2*z^2 -
4608*a^5*b^7*c^3*j^2*z^2 + 432*a^4*b^9*c^2*j^2*z^2 + 24576*a^7*b^2*c^6*i^2*
z^2 - 6144*a^6*b^4*c^5*i^2*z^2 + 512*a^5*b^6*c^4*i^2*z^2 - 8192*a^6*b^3*c^6
```

*h^2*z^2 + 1536*a^5*b^5*c^5*h^2*z^2 - 16*a^3*b^9*c^3*h^2*z^2 - 8192*a^6*b^2
*c^7*g^2*z^2 + 6144*a^5*b^4*c^6*g^2*z^2 - 1536*a^4*b^6*c^5*g^2*z^2 + 128*a^
3*b^8*c^4*g^2*z^2 - 8192*a^5*b^3*c^7*f^2*z^2 + 1536*a^4*b^5*c^6*f^2*z^2 - 1
6*a^2*b^9*c^4*f^2*z^2 + 24576*a^5*b^2*c^8*e^2*z^2 - 6144*a^4*b^4*c^7*e^2*z^
2 + 512*a^3*b^6*c^6*e^2*z^2 - 61440*a^4*b^3*c^8*d^2*z^2 + 24064*a^3*b^5*c^7
*d^2*z^2 - 4608*a^2*b^7*c^6*d^2*z^2 - 393216*a^9*c^6*k^2*z^2 - 64*a^3*b^12*
k^2*z^2 - 32768*a^8*c^7*i^2*z^2 - 32768*a^6*c^9*e^2*z^2 - 16*b^11*c^4*d^2*z
^2 - 16384*a^7*b*c^5*g*i*k*z - 10240*a^7*b*c^5*f*j*k*z + 4096*a^7*b*c^5*h*i
*j*z - 47104*a^6*b*c^6*d*h*k*z - 16384*a^6*b*c^6*e*g*k*z + 6144*a^6*b*c^6*f
*g*j*z + 4096*a^6*b*c^6*e*h*j*z + 32*a*b^10*c^2*d*f*k*z - 6144*a^5*b*c^7*d*
g*h*z - 4096*a^5*b*c^7*d*f*i*z - 32*a*b^8*c^4*d*f*g*z - 4096*a^4*b*c^8*d*e*
f*z + 64*a*b^7*c^5*d*e*f*z - 18432*a^7*b^2*c^4*h*j*k*z + 4608*a^6*b^4*c^3*h
*j*k*z - 384*a^5*b^6*c^2*h*j*k*z + 12288*a^6*b^3*c^4*g*i*k*z + 7680*a^6*b^3
*c^4*f*j*k*z - 3072*a^6*b^3*c^4*h*i*j*z - 3072*a^5*b^5*c^3*g*i*k*z - 1920*a
^5*b^5*c^3*f*j*k*z + 768*a^5*b^5*c^3*h*i*j*z + 256*a^4*b^7*c^2*g*i*k*z + 16
0*a^4*b^7*c^2*f*j*k*z - 64*a^4*b^7*c^2*h*i*j*z - 65536*a^6*b^2*c^5*d*j*k*z
- 24576*a^6*b^2*c^5*e*i*k*z + 21504*a^5*b^4*c^4*d*j*k*z + 9216*a^6*b^2*c^5*
f*i*j*z + 6144*a^5*b^4*c^4*e*i*k*z - 3072*a^5*b^4*c^4*f*h*k*z - 3072*a^4*b^
6*c^3*d*j*k*z - 2304*a^5*b^4*c^4*f*i*j*z - 2048*a^6*b^2*c^5*g*h*j*z + 1536*
a^5*b^4*c^4*g*h*j*z + 1024*a^4*b^6*c^3*f*h*k*z - 512*a^4*b^6*c^3*e*i*k*z -
384*a^4*b^6*c^3*g*h*j*z + 192*a^4*b^6*c^3*f*i*j*z + 160*a^3*b^8*c^2*d*j*k*z
- 96*a^3*b^8*c^2*f*h*k*z + 32*a^3*b^8*c^2*g*h*j*z + 41472*a^5*b^3*c^5*d*h*
k*z - 13440*a^4*b^5*c^4*d*h*k*z + 12288*a^5*b^3*c^5*e*g*k*z - 4608*a^5*b^3*
c^5*f*g*j*z - 3072*a^5*b^3*c^5*e*h*j*z - 3072*a^4*b^5*c^4*e*g*k*z + 1888*a^
3*b^7*c^3*d*h*k*z + 1152*a^4*b^5*c^4*f*g*j*z + 768*a^4*b^5*c^4*e*h*j*z + 25
6*a^3*b^7*c^3*e*g*k*z - 96*a^3*b^7*c^3*f*g*j*z - 96*a^2*b^9*c^2*d*h*k*z - 6
4*a^3*b^7*c^3*e*h*j*z + 9216*a^5*b^2*c^6*e*f*j*z - 9216*a^5*b^2*c^6*d*h*i*z
- 6656*a^4*b^4*c^5*d*f*k*z - 6144*a^5*b^2*c^6*d*f*k*z + 3456*a^3*b^6*c^4*d
*f*k*z - 2304*a^4*b^4*c^5*e*f*j*z + 2304*a^4*b^4*c^5*d*h*i*z - 576*a^2*b^8*
c^3*d*f*k*z + 192*a^3*b^6*c^4*e*f*j*z - 192*a^3*b^6*c^4*d*h*i*z + 4608*a^4*
b^3*c^6*d*g*h*z + 3072*a^4*b^3*c^6*d*f*i*z - 1152*a^3*b^5*c^5*d*g*h*z - 768
*a^3*b^5*c^5*d*f*i*z + 96*a^2*b^7*c^4*d*g*h*z + 64*a^2*b^7*c^4*d*f*i*z - 92
16*a^4*b^2*c^7*d*e*h*z + 2304*a^3*b^4*c^6*d*e*h*z + 2048*a^4*b^2*c^7*d*f*g*
z - 1536*a^3*b^4*c^6*d*f*g*z + 384*a^2*b^6*c^5*d*f*g*z - 192*a^2*b^6*c^5*d*
e*h*z + 3072*a^3*b^3*c^7*d*e*f*z - 768*a^2*b^5*c^6*d*e*f*z - 3072*a^8*b*c^4
*j^2*k*z + 48*a^5*b^7*c*j^2*k*z - 49152*a^8*b*c^4*i*k^2*z + 2304*a^5*b^7*c*
i*k^2*z - 9216*a^7*b*c^5*h^2*k*z - 32*a^4*b^8*c*i*j^2*z - 1152*a^4*b^8*c*g*
k^2*z + 9216*a^7*b*c^5*g*j^2*z - 3072*a^6*b*c^6*f^2*k*z + 16*a^3*b^9*c*g*j^
2*z - 49152*a^7*b*c^5*e*k^2*z - 128*a^3*b^9*c*e*k^2*z - 58368*a^5*b*c^7*d^2
*k*z - 1024*a^6*b*c^6*g*h^2*z - 432*a*b^9*c^3*d^2*k*z + 1024*a^5*b*c^7*f^2*
g*z + 32*a*b^8*c^4*d^2*i*z - 9216*a^4*b*c^8*d^2*g*z + 336*a*b^7*c^5*d^2*g*z
- 672*a*b^6*c^6*d^2*e*z + 24576*a^8*c^5*h*j*k*z + 73728*a^7*c^6*d*j*k*z +
32768*a^7*c^6*e*i*k*z - 12288*a^7*c^6*f*i*j*z + 8192*a^7*c^6*f*h*k*z + 2457
6*a^6*c^7*d*f*k*z - 12288*a^6*c^7*e*f*j*z + 12288*a^6*c^7*d*h*i*z + 12288*a
^5*c^8*d*e*h*z + 2304*a^7*b^3*c^3*j^2*k*z - 576*a^6*b^5*c^2*j^2*k*z + 45056
*a^7*b^3*c^3*i*k^2*z - 15360*a^6*b^5*c^2*i*k^2*z - 12288*a^7*b^2*c^4*i^2*k*
z + 3072*a^6*b^4*c^3*i^2*k*z - 256*a^5*b^6*c^2*i^2*k*z + 15872*a^7*b^2*c^4*
i*j^2*z + 6912*a^6*b^3*c^4*h^2*k*z - 4992*a^6*b^4*c^3*i*j^2*z - 1728*a^5*b^
5*c^3*h^2*k*z + 672*a^5*b^6*c^2*i*j^2*z + 144*a^4*b^7*c^2*h^2*k*z + 24576*a
^7*b^2*c^4*g*k^2*z - 22528*a^6*b^4*c^3*g*k^2*z + 7680*a^5*b^6*c^2*g*k^2*z +
4096*a^6*b^2*c^5*g^2*k*z - 3072*a^5*b^4*c^4*g^2*k*z + 768*a^4*b^6*c^3*g^2*
k*z - 64*a^3*b^8*c^2*g^2*k*z - 7936*a^6*b^3*c^4*g*j^2*z + 2496*a^5*b^5*c^3*
g*j^2*z - 1536*a^6*b^2*c^5*h^2*i*z + 1280*a^5*b^3*c^5*f^2*k*z + 384*a^5*b^4
*c^4*h^2*i*z - 336*a^4*b^7*c^2*g*j^2*z + 192*a^4*b^5*c^4*f^2*k*z - 144*a^3*
b^7*c^3*f^2*k*z - 32*a^4*b^6*c^3*h^2*i*z + 16*a^2*b^9*c^2*f^2*k*z + 45056*a
^6*b^3*c^4*e*k^2*z - 15360*a^5*b^5*c^3*e*k^2*z - 12288*a^5*b^2*c^6*e^2*k*z
+ 3072*a^4*b^4*c^5*e^2*k*z + 2304*a^4*b^7*c^2*e*k^2*z - 256*a^3*b^6*c^4*e^2
*k*z + 59136*a^4*b^3*c^6*d^2*k*z - 23488*a^3*b^5*c^5*d^2*k*z + 15872*a^6*b^
2*c^5*e*j^2*z - 4992*a^5*b^4*c^4*e*j^2*z + 4560*a^2*b^7*c^4*d^2*k*z + 1536*

a^5*b^2*c^6*f^2*i*z + 768*a^5*b^3*c^5*g*h^2*z + 672*a^4*b^6*c^3*e*j^2*z - 3
84*a^4*b^4*c^5*f^2*i*z - 192*a^4*b^5*c^4*g*h^2*z - 32*a^3*b^8*c^2*e*j^2*z +
32*a^3*b^6*c^4*f^2*i*z + 16*a^3*b^7*c^3*g*h^2*z - 15872*a^4*b^2*c^7*d^2*i*
z + 4992*a^3*b^4*c^6*d^2*i*z - 1536*a^5*b^2*c^6*e*h^2*z - 768*a^4*b^3*c^6*f
^2*g*z - 672*a^2*b^6*c^5*d^2*i*z + 384*a^4*b^4*c^5*e*h^2*z + 192*a^3*b^5*c^
5*f^2*g*z - 32*a^3*b^6*c^4*e*h^2*z - 16*a^2*b^7*c^4*f^2*g*z + 7936*a^3*b^3*
c^7*d^2*g*z - 2496*a^2*b^5*c^6*d^2*g*z + 1536*a^4*b^2*c^7*e*f^2*z - 384*a^3
*b^4*c^6*e*f^2*z + 32*a^2*b^6*c^5*e*f^2*z - 15872*a^3*b^2*c^8*d^2*e*z + 499
2*a^2*b^4*c^7*d^2*e*z - 61440*a^8*b^2*c^3*k^3*z + 21504*a^7*b^4*c^2*k^3*z +
16384*a^8*c^5*i^2*k*z - 18432*a^8*c^5*i*j^2*z - 128*a^4*b^9*i*k^2*z + 2048
*a^7*c^6*h^2*i*z + 64*a^3*b^10*g*k^2*z + 16384*a^6*c^7*e^2*k*z + 16*b^11*c^
2*d^2*k*z - 18432*a^7*c^6*e*j^2*z - 2048*a^6*c^7*f^2*i*z + 18432*a^5*c^8*d^
2*i*z - 3328*a^6*b^6*c*k^3*z + 2048*a^6*c^7*e*h^2*z - 16*b^9*c^4*d^2*g*z -
2048*a^5*c^8*e*f^2*z + 32*b^8*c^5*d^2*e*z + 18432*a^4*c^9*d^2*e*z + 65536*a
^9*c^4*k^3*z + 192*a^5*b^8*k^3*z - 3328*a^7*b*c^3*h*i*j*k - 6912*a^6*b*c^4*
d*i*j*k - 3328*a^6*b*c^4*e*h*j*k - 1536*a^6*b*c^4*f*g*j*k - 768*a^6*b*c^4*g
*h*i*j - 768*a^6*b*c^4*f*h*i*k - 6912*a^5*b*c^5*d*e*j*k - 2304*a^5*b*c^5*d*
g*i*j - 1792*a^5*b*c^5*e*f*i*j + 1536*a^5*b*c^5*d*g*h*k - 1280*a^5*b*c^5*d*
f*i*k - 768*a^5*b*c^5*e*g*h*j - 768*a^5*b*c^5*e*f*h*k - 256*a^5*b*c^5*f*g*h
*i + 16*a*b^8*c^2*d*f*g*k - 4*a*b^8*c^2*d*f*h*j - 2304*a^4*b*c^6*d*e*g*j -
1792*a^4*b*c^6*d*e*h*i - 1280*a^4*b*c^6*d*e*f*k - 768*a^4*b*c^6*d*f*g*i - 2
56*a^4*b*c^6*e*f*g*h - 32*a*b^7*c^3*d*e*f*k - 768*a^3*b*c^7*d*e*f*g + 32*a*
b^5*c^5*d*e*f*g + 576*a^6*b^3*c^2*h*i*j*k + 1664*a^6*b^2*c^3*g*h*j*k + 384*
a^6*b^2*c^3*f*i*j*k - 288*a^5*b^4*c^2*g*h*j*k - 160*a^5*b^4*c^2*f*i*j*k + 2
112*a^5*b^3*c^3*d*i*j*k + 576*a^5*b^3*c^3*e*h*j*k - 448*a^5*b^3*c^3*f*h*i*k
 - 192*a^5*b^3*c^3*g*h*i*j - 192*a^5*b^3*c^3*f*g*j*k - 160*a^4*b^5*c^2*d*i*
j*k + 96*a^4*b^5*c^2*f*h*i*k + 80*a^4*b^5*c^2*f*g*j*k + 32*a^4*b^5*c^2*g*h*
i*j + 4992*a^5*b^2*c^4*d*h*i*k - 4608*a^5*b^2*c^4*e*g*i*k + 3456*a^5*b^2*c^
4*d*g*j*k - 1312*a^4*b^4*c^3*d*h*i*k - 1056*a^4*b^4*c^3*d*g*j*k + 896*a^5*b
^2*c^4*f*g*i*j + 768*a^4*b^4*c^3*e*g*i*k + 384*a^5*b^2*c^4*f*g*h*k + 384*a^
5*b^2*c^4*e*h*i*j + 384*a^5*b^2*c^4*e*f*j*k + 224*a^4*b^4*c^3*f*g*h*k - 160
*a^4*b^4*c^3*e*f*j*k - 96*a^4*b^4*c^3*f*g*i*j + 96*a^3*b^6*c^2*d*h*i*k + 80
*a^3*b^6*c^2*d*g*j*k - 64*a^4*b^4*c^3*e*h*i*j - 48*a^3*b^6*c^2*f*g*h*k - 24
96*a^4*b^3*c^4*d*g*h*k + 2112*a^4*b^3*c^4*d*e*j*k - 960*a^4*b^3*c^4*d*f*i*k
 + 656*a^3*b^5*c^3*d*g*h*k - 448*a^4*b^3*c^4*e*f*h*k + 384*a^3*b^5*c^3*d*f*
i*k + 320*a^4*b^3*c^4*d*g*i*j - 192*a^4*b^3*c^4*f*g*h*i - 192*a^4*b^3*c^4*e
*g*h*j + 192*a^4*b^3*c^4*e*f*i*j - 160*a^3*b^5*c^3*d*e*j*k + 96*a^3*b^5*c^3
*e*f*h*k - 48*a^2*b^7*c^2*d*g*h*k + 32*a^3*b^5*c^3*e*g*h*j - 32*a^2*b^7*c^2
*d*f*i*k + 4992*a^4*b^2*c^5*d*e*h*k - 3584*a^4*b^2*c^5*d*f*h*j - 1312*a^3*b
^4*c^4*d*e*h*k + 896*a^4*b^2*c^5*e*f*g*j + 896*a^4*b^2*c^5*d*g*h*i + 640*a^
4*b^2*c^5*d*f*g*k - 640*a^4*b^2*c^5*d*e*i*j + 600*a^3*b^4*c^4*d*f*h*j + 480
*a^3*b^4*c^4*d*f*g*k + 384*a^4*b^2*c^5*e*f*h*i - 192*a^2*b^6*c^3*d*f*g*k -
96*a^3*b^4*c^4*e*f*g*j - 96*a^3*b^4*c^4*d*g*h*i + 96*a^2*b^6*c^3*d*e*h*k +
12*a^2*b^6*c^3*d*f*h*j - 960*a^3*b^3*c^5*d*e*f*k + 384*a^2*b^5*c^4*d*e*f*k
+ 320*a^3*b^3*c^5*d*e*g*j - 192*a^3*b^3*c^5*e*f*g*h - 192*a^3*b^3*c^5*d*f*g
*i + 192*a^3*b^3*c^5*d*e*h*i + 32*a^2*b^5*c^4*d*f*g*i + 896*a^3*b^2*c^6*d*e
*g*h + 384*a^3*b^2*c^6*d*e*f*i - 96*a^2*b^4*c^5*d*e*g*h - 64*a^2*b^4*c^5*d*
e*f*i - 192*a^2*b^3*c^6*d*e*f*g + 48*a^6*b^4*c*i*j^2*k - 1424*a^6*b^4*c*h*j
*k^2 - 2304*a^7*b*c^3*g*j^2*k - 24*a^5*b^5*c*g*j^2*k + 2048*a^7*b*c^3*g*i*k
^2 - 1024*a^7*b*c^3*f*j*k^2 - 768*a^5*b^5*c*g*i*k^2 + 408*a^5*b^5*c*f*j*k^2
 + 256*a^6*b*c^4*g*h^2*k + 16*a^4*b^6*c*g*i*j^2 + 4608*a^6*b*c^4*e*i^2*k +
4608*a^5*b*c^5*e^2*i*k - 896*a^6*b*c^4*f*i^2*j + 768*a^4*b^6*c*d*j*k^2 - 25
6*a^4*b^6*c*f*h*k^2 - 128*a^4*b^6*c*e*i*k^2 + 2208*a^6*b*c^4*f*h*j^2 - 1920
*a^6*b*c^4*e*i*j^2 + 800*a^5*b*c^5*f^2*h*j - 256*a^5*b*c^5*f^2*g*k - 16*a*b
^8*c^2*d^2*i*k + 6*a^3*b^7*c*f*h*j^2 + 8192*a^6*b*c^4*d*h*k^2 + 2048*a^6*b*
c^4*e*g*k^2 - 472*a^3*b^7*c*d*h*k^2 + 64*a^3*b^7*c*e*g*k^2 + 4896*a^4*b*c^6
*d^2*h*j + 2304*a^4*b*c^6*d^2*g*k + 1824*a^5*b*c^5*d*h^2*j - 384*a^5*b*c^5*
e*h^2*i - 168*a*b^7*c^3*d^2*g*k + 42*a*b^7*c^3*d^2*h*j + 6*a^2*b^8*c*d*h*j^
2 + 1536*a^5*b*c^5*e*g*i^2 + 1536*a^4*b*c^6*e^2*g*i - 896*a^5*b*c^5*d*h*i^2

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 - 896*a^4*b*c^6*e^2*f*j + 144*a^2*b^8*c*d*f*k^2 + 4896*a^5*b*c^5*d*f*j^2 +
 1824*a^4*b*c^6*d*f^2*j - 384*a^4*b*c^6*e*f^2*i + 336*a*b^6*c^4*d^2*e*k - 1
56*a*b^6*c^4*d^2*f*j + 16*a*b^6*c^4*d^2*g*i + 12*a*b^7*c^3*d*f^2*j + 2208*a
^3*b*c^7*d^2*f*h - 1920*a^3*b*c^7*d^2*e*i + 800*a^4*b*c^6*d*f*h^2 - 102*a*b
^5*c^5*d^2*f*h - 32*a*b^5*c^5*d^2*e*i + 12*a*b^6*c^4*d*f^2*h - 2*a*b^7*c^3*
d*f*h^2 - 896*a^3*b*c^7*d*e^2*h - 8*a*b^6*c^4*d*f*g^2 - 240*a*b^4*c^6*d^2*e
*g - 32*a*b^4*c^6*d*e^2*f + 3072*a^7*c^4*f*i*j*k + 3072*a^6*c^5*e*f*j*k - 3
072*a^6*c^5*d*h*i*k + 1536*a^6*c^5*e*h*i*j + 4608*a^5*c^6*d*e*i*j - 3072*a^
5*c^6*d*e*h*k - 1152*a^5*c^6*d*f*h*j + 512*a^5*c^6*e*f*h*i + 1536*a^4*c^7*d
*e*f*i - 2*a*b^9*c*d*f*j^2 - 1088*a^7*b^2*c^2*i*j^2*k + 4800*a^7*b^2*c^2*h*
j*k^2 + 960*a^6*b^2*c^3*h^2*i*k + 544*a^6*b^3*c^2*g*j^2*k - 144*a^5*b^4*c^2
*h^2*i*k - 2304*a^6*b^2*c^3*g*i^2*k + 1920*a^6*b^3*c^2*g*i*k^2 + 1152*a^5*b
^3*c^3*g^2*i*k - 864*a^6*b^3*c^2*f*j*k^2 + 384*a^5*b^4*c^2*g*i^2*k + 192*a^
6*b^2*c^3*h*i^2*j - 192*a^4*b^5*c^2*g^2*i*k - 32*a^5*b^4*c^2*h*i^2*j - 1088
*a^6*b^2*c^3*e*j^2*k + 960*a^6*b^2*c^3*g*i*j^2 - 480*a^5*b^3*c^3*g*h^2*k -
240*a^5*b^4*c^2*g*i*j^2 + 192*a^5*b^2*c^4*f^2*i*k + 72*a^4*b^5*c^2*g*h^2*k
+ 48*a^5*b^4*c^2*e*j^2*k + 48*a^4*b^4*c^3*f^2*i*k - 16*a^3*b^6*c^2*f^2*i*k
+ 13376*a^6*b^2*c^3*d*j*k^2 - 5136*a^5*b^4*c^2*d*j*k^2 - 3840*a^6*b^2*c^3*e
*i*k^2 + 1536*a^5*b^4*c^2*e*i*k^2 - 768*a^5*b^3*c^3*e*i^2*k - 768*a^4*b^3*c
^4*e^2*i*k + 624*a^5*b^4*c^2*f*h*k^2 + 576*a^6*b^2*c^3*f*h*k^2 + 192*a^5*b^
2*c^4*g^2*h*j + 96*a^5*b^3*c^3*f*i^2*j + 48*a^4*b^4*c^3*g^2*h*j - 8*a^3*b^6
*c^2*g^2*h*j + 6848*a^4*b^2*c^5*d^2*i*k - 2448*a^3*b^4*c^4*d^2*i*k + 960*a^
5*b^2*c^4*e*h^2*k - 864*a^5*b^2*c^4*f*h^2*j + 480*a^5*b^3*c^3*e*i*j^2 + 336
*a^4*b^3*c^4*f^2*h*j + 336*a^2*b^6*c^3*d^2*i*k + 192*a^5*b^2*c^4*g*h^2*i +
144*a^5*b^3*c^3*f*h*j^2 - 144*a^4*b^4*c^3*e*h^2*k - 102*a^4*b^5*c^2*f*h*j^2
 - 96*a^4*b^3*c^4*f^2*g*k - 32*a^4*b^5*c^2*e*i*j^2 - 30*a^3*b^5*c^3*f^2*h*j
 - 24*a^3*b^5*c^3*f^2*g*k + 16*a^4*b^4*c^3*g*h^2*i - 12*a^4*b^4*c^3*f*h^2*j
 + 12*a^3*b^6*c^2*f*h^2*j + 8*a^2*b^7*c^2*f^2*g*k - 2*a^2*b^7*c^2*f^2*h*j -
 9312*a^5*b^3*c^3*d*h*k^2 + 3288*a^4*b^5*c^2*d*h*k^2 - 2304*a^4*b^2*c^5*e^2
*g*k + 1920*a^5*b^3*c^3*e*g*k^2 + 1152*a^4*b^3*c^4*e*g^2*k - 768*a^4*b^5*c^
2*e*g*k^2 + 384*a^3*b^4*c^4*e^2*g*k - 320*a^5*b^2*c^4*d*i^2*j - 224*a^4*b^3
*c^4*f*g^2*j + 192*a^5*b^2*c^4*f*h*i^2 + 192*a^4*b^2*c^5*e^2*h*j - 192*a^3*
b^5*c^3*e*g^2*k - 32*a^3*b^4*c^4*e^2*h*j + 24*a^3*b^5*c^3*f*g^2*j - 3552*a^
5*b^2*c^4*d*h*j^2 - 3424*a^3*b^3*c^5*d^2*g*k + 1332*a^4*b^4*c^3*d*h*j^2 + 1
224*a^2*b^5*c^4*d^2*g*k + 960*a^5*b^2*c^4*e*g*j^2 - 496*a^3*b^3*c^5*d^2*h*j
 + 432*a^4*b^3*c^4*d*h^2*j - 240*a^4*b^4*c^3*e*g*j^2 - 222*a^2*b^5*c^4*d^2*
h*j + 192*a^4*b^2*c^5*f^2*g*i + 192*a^4*b^2*c^5*e*f^2*k - 174*a^3*b^5*c^3*d
*h^2*j - 156*a^3*b^6*c^2*d*h*j^2 + 48*a^3*b^4*c^4*e*f^2*k - 32*a^4*b^3*c^4*
e*h^2*i + 16*a^3*b^6*c^2*e*g*j^2 + 16*a^3*b^4*c^4*f^2*g*i - 16*a^2*b^6*c^3*
e*f^2*k + 12*a^2*b^7*c^2*d*h^2*j + 1728*a^5*b^2*c^4*d*f*k^2 + 1392*a^4*b^4*
c^3*d*f*k^2 - 840*a^3*b^6*c^2*d*f*k^2 - 768*a^4*b^2*c^5*e*g^2*i + 576*a^4*b
^2*c^5*d*g^2*j + 96*a^4*b^3*c^4*d*h*i^2 + 96*a^3*b^3*c^5*e^2*f*j - 80*a^3*b
^4*c^4*d*g^2*j + 64*a^4*b^2*c^5*f*g^2*h + 48*a^3*b^4*c^4*f*g^2*h + 6848*a^3
*b^2*c^6*d^2*e*k - 3552*a^3*b^2*c^6*d^2*f*j - 2448*a^2*b^4*c^5*d^2*e*k + 13
32*a^2*b^4*c^5*d^2*f*j + 960*a^3*b^2*c^6*d^2*g*i - 496*a^4*b^3*c^4*d*f*j^2
+ 432*a^3*b^3*c^5*d*f^2*j - 240*a^2*b^4*c^5*d^2*g*i - 222*a^3*b^5*c^3*d*f*j
^2 + 192*a^4*b^2*c^5*e*g*h^2 - 174*a^2*b^5*c^4*d*f^2*j + 42*a^2*b^7*c^2*d*f
*j^2 - 32*a^3*b^3*c^5*e*f^2*i + 16*a^3*b^4*c^4*e*g*h^2 - 320*a^3*b^2*c^6*d*
e^2*j - 224*a^3*b^3*c^5*d*g^2*h + 192*a^4*b^2*c^5*d*f*i^2 + 192*a^3*b^2*c^6
*e^2*f*h - 32*a^3*b^4*c^4*d*f*i^2 + 24*a^2*b^5*c^4*d*g^2*h - 864*a^3*b^2*c^
6*d*f^2*h + 480*a^2*b^3*c^6*d^2*e*i + 336*a^3*b^3*c^5*d*f*h^2 + 192*a^3*b^2
*c^6*e*f^2*g + 144*a^2*b^3*c^6*d^2*f*h - 30*a^2*b^5*c^4*d*f*h^2 + 16*a^2*b^
4*c^5*e*f^2*g - 12*a^2*b^4*c^5*d*f^2*h + 192*a^3*b^2*c^6*d*f*g^2 + 96*a^2*b
^3*c^6*d*e^2*h + 48*a^2*b^4*c^5*d*f*g^2 + 960*a^2*b^2*c^7*d^2*e*g + 192*a^2
*b^2*c^7*d*e^2*f - 3072*a^8*b*c^2*j^2*k^2 + 1104*a^7*b^3*c*j^2*k^2 + 768*a^
6*b^4*c*i^2*k^2 - 256*a^6*b^3*c^2*i^3*k + 1536*a^7*b*c^3*h^2*k^2 - 960*a^7*
b*c^3*i^2*j^2 + 444*a^5*b^5*c*h^2*k^2 - 16*a^5*b^5*c*i^2*j^2 - 3072*a^7*b^2
*c^2*g*k^3 - 496*a^6*b^3*c^2*h*j^3 + 192*a^4*b^6*c*g^2*k^2 - 192*a^4*b^4*c^
3*g^3*k + 144*a^5*b^3*c^3*h^3*j + 32*a^3*b^6*c^2*g^3*k - 18*a^4*b^5*c^2*h^3
```

*j - 9*a^4*b^6*c*h^2*j^2 - 192*a^6*b*c^4*h^2*i^2 + 36*a^3*b^7*c*f^2*k^2 - 4
*a^3*b^7*c*g^2*j^2 - 2176*a^6*b^3*c^2*e*k^3 - 256*a^3*b^3*c^5*e^3*k - 192*a
^6*b^2*c^3*f*j^3 - 192*a^4*b^2*c^5*f^3*j + 132*a^5*b^4*c^2*f*j^3 + 128*a^4*
b^3*c^4*g^3*i - 28*a^3*b^4*c^4*f^3*j + 6*a^2*b^6*c^3*f^3*j + 10752*a^5*b*c^
5*d^2*k^2 - 960*a^5*b*c^5*e^2*j^2 - 192*a^5*b*c^5*f^2*i^2 - 1680*a^5*b^3*c^
3*d*j^3 - 1680*a^2*b^3*c^6*d^3*j + 222*a^4*b^5*c^2*d*j^3 + 80*a^4*b^3*c^4*f
*h^3 + 80*a^3*b^3*c^5*f^3*h + 30*a*b^8*c^2*d^2*j^2 + 6*a^3*b^5*c^3*f*h^3 +
6*a^2*b^5*c^4*f^3*h - 960*a^4*b*c^6*d^2*i^2 - 192*a^4*b*c^6*e^2*h^2 - 192*a
^4*b^2*c^5*d*h^3 - 192*a^2*b^2*c^7*d^3*h + 128*a^3*b^3*c^5*e*g^3 - 28*a^3*b
^4*c^4*d*h^3 + 12*a*b^6*c^4*d^2*h^2 + 6*a^2*b^6*c^3*d*h^3 - 192*a^3*b*c^7*e
^2*f^2 + 60*a*b^5*c^5*d^2*g^2 + 198*a*b^4*c^6*d^2*f^2 + 144*a^2*b^3*c^6*d*f
^3 - 960*a^2*b*c^8*d^2*e^2 + 240*a*b^3*c^7*d^2*e^2 + 4608*a^8*c^3*i*j^2*k -
3072*a^8*c^3*h*j*k^2 - 512*a^7*c^4*h^2*i*k + 120*a^5*b^6*h*j*k^2 + 768*a^7
*c^4*h*i^2*j + 4608*a^7*c^4*e*j^2*k + 512*a^6*c^5*f^2*i*k + 64*a^4*b^7*g*i*
k^2 - 40*a^4*b^7*f*j*k^2 - 9216*a^7*c^4*d*j*k^2 - 4096*a^7*c^4*e*i*k^2 - 10
24*a^7*c^4*f*h*k^2 - 4608*a^5*c^6*d^2*i*k - 512*a^6*c^5*e*h^2*k - 192*a^6*c
^5*f*h^2*j - 40*a^3*b^8*d*j*k^2 + 24*a^3*b^8*f*h*k^2 + 2304*a^6*c^5*d*i^2*j
+ 768*a^5*c^6*e^2*h*j + 256*a^6*c^5*f*h*i^2 + 8*b^9*c^2*d^2*g*k - 2*b^9*c^
2*d^2*h*j + 6144*a^8*b*c^2*i*k^3 - 2176*a^7*b^3*c*i*k^3 - 1728*a^6*c^5*d*h*
j^2 + 1536*a^7*b*c^3*i^3*k + 512*a^5*c^6*e*f^2*k + 24*a^2*b^9*d*h*k^2 - 307
2*a^6*c^5*d*f*k^2 - 16*b^8*c^3*d^2*e*k + 6*b^8*c^3*d^2*f*j - 4608*a^4*c^7*d
^2*e*k + 2016*a^7*b*c^3*h*j^3 - 1728*a^4*c^7*d^2*f*j + 1088*a^6*b^4*c*g*k^3
+ 224*a^6*b*c^4*h^3*j + 30*a^5*b^5*c*h*j^3 + 2304*a^4*c^7*d*e^2*j + 768*a^
5*c^6*d*f*i^2 + 256*a^4*c^7*e^2*f*h + 6*b^7*c^4*d^2*f*h + 6144*a^7*b*c^3*e*
k^3 + 1536*a^4*b*c^6*e^3*k + 512*a^6*b*c^4*g*i^3 + 192*a^5*b^5*c*e*k^3 - 19
2*a^4*c^7*d*f^2*h - 10*a^4*b^6*c*f*j^3 + 108*a*b^9*c*d^2*k^2 + 16*b^6*c^5*d
^2*e*g + 4320*a^6*b*c^4*d*j^3 + 4320*a^3*b*c^7*d^3*j + 222*a*b^5*c^5*d^3*j
+ 96*a^5*b*c^5*f*h^3 + 96*a^4*b*c^6*f^3*h - 10*a^3*b^7*c*d*j^3 + 768*a^3*c^
8*d*e^2*f + 512*a^3*b*c^7*e^3*g + 132*a*b^4*c^6*d^3*h + 2016*a^2*b*c^8*d^3*
f - 496*a*b^3*c^7*d^3*f + 224*a^3*b*c^7*d*f^3 - 18*a*b^5*c^5*d*f^3 - 1920*a
^7*b^2*c^2*i^2*k^2 - 1648*a^6*b^3*c^2*h^2*k^2 + 240*a^6*b^3*c^2*i^2*j^2 - 9
60*a^6*b^2*c^3*h^2*j^2 - 512*a^6*b^2*c^3*g^2*k^2 - 480*a^5*b^4*c^2*g^2*k^2
+ 198*a^5*b^4*c^2*h^2*j^2 - 240*a^5*b^3*c^3*g^2*j^2 - 240*a^5*b^3*c^3*f^2*k
^2 + 60*a^4*b^5*c^2*g^2*j^2 - 36*a^4*b^5*c^2*f^2*k^2 - 16*a^5*b^3*c^3*h^2*i
^2 - 1920*a^5*b^2*c^4*e^2*k^2 + 768*a^4*b^4*c^3*e^2*k^2 - 464*a^5*b^2*c^4*f
^2*j^2 - 384*a^5*b^2*c^4*g^2*i^2 - 64*a^3*b^6*c^2*e^2*k^2 + 42*a^4*b^4*c^3*
f^2*j^2 + 12*a^3*b^6*c^2*f^2*j^2 - 13104*a^4*b^3*c^4*d^2*k^2 + 5628*a^3*b^5
*c^3*d^2*k^2 - 1128*a^2*b^7*c^2*d^2*k^2 + 240*a^4*b^3*c^4*e^2*j^2 - 48*a^4*
b^3*c^4*g^2*h^2 - 16*a^4*b^3*c^4*f^2*i^2 - 16*a^3*b^5*c^3*e^2*j^2 - 4*a^3*b
^5*c^3*g^2*h^2 - 2880*a^4*b^2*c^5*d^2*j^2 + 1750*a^3*b^4*c^4*d^2*j^2 - 345*
a^2*b^6*c^3*d^2*j^2 - 192*a^4*b^2*c^5*f^2*h^2 - 42*a^3*b^4*c^4*f^2*h^2 + 24
0*a^3*b^3*c^5*d^2*i^2 - 48*a^3*b^3*c^5*f^2*g^2 - 16*a^3*b^3*c^5*e^2*h^2 - 1
6*a^2*b^5*c^4*d^2*i^2 - 4*a^2*b^5*c^4*f^2*g^2 - 464*a^3*b^2*c^6*d^2*h^2 - 3
84*a^3*b^2*c^6*e^2*g^2 + 42*a^2*b^4*c^5*d^2*h^2 - 240*a^2*b^3*c^6*d^2*g^2 -
16*a^2*b^3*c^6*e^2*f^2 - 960*a^2*b^2*c^7*d^2*f^2 - 8*a*b^10*d*f*k^2 - a^2*
b^8*c*f^2*j^2 - 2048*a^8*c^3*i^2*k^2 - 100*a^6*b^5*j^2*k^2 - 64*a^5*b^6*i^2
*k^2 - 288*a^7*c^4*h^2*j^2 - 36*a^4*b^7*h^2*k^2 - 16*a^3*b^8*g^2*k^2 - 2048
*a^6*c^5*e^2*k^2 - 864*a^6*c^5*f^2*j^2 - 4*a^2*b^9*f^2*k^2 - 2592*a^5*c^6*d
^2*j^2 - 1536*a^5*c^6*e^2*i^2 - 32*a^5*c^6*f^2*h^2 - 864*a^4*c^7*d^2*h^2 +
360*a^7*b^2*c^2*j^4 - 4*b^7*c^4*d^2*g^2 - 9*b^6*c^5*d^2*f^2 - 288*a^3*c^8*d
^2*f^2 - 24*a^5*b^2*c^4*h^4 - 16*b^5*c^6*d^2*e^2 - 9*a^4*b^4*c^3*h^4 - 16*a
^3*b^4*c^4*g^4 - 24*a^3*b^2*c^6*f^4 - 9*a^2*b^4*c^5*f^4 - a^2*b^6*c^3*f^2*h
^2 + 192*a^6*b^5*i*k^3 - 96*a^5*b^6*g*k^3 - 1728*a^7*c^4*f*j^3 - 192*a^5*c^
6*f^3*j - 10*b^7*c^4*d^3*j - 1024*a^6*c^5*e*i^3 - 1024*a^4*c^7*e^3*i + 1536
*a^8*b^2*c*k^4 - 10*b^6*c^5*d^3*h - 1728*a^3*c^8*d^3*h - 192*a^5*c^6*d*h^3
- 25*a^6*b^4*c*j^4 + 30*b^5*c^6*d^3*f + 360*a*b^2*c^8*d^4 - 4*b^11*d^2*k^2
- 4096*a^9*c^2*k^4 - 1296*a^8*c^3*j^4 - 144*a^7*b^4*k^4 - 256*a^7*c^4*i^4 -
16*a^6*c^5*h^4 - 16*a^4*c^7*f^4 - 256*a^3*c^8*e^4 - 25*b^4*c^7*d^4 - 1296*
a^2*c^9*d^4 - b^8*c^3*d^2*h^2 - b^10*c*d^2*j^2, z, n)*((3072*a^5*c^6*d*k -

512*a^4*c^7*e*f - 1536*a^5*c^6*e*j - 512*a^5*c^6*f*i + 1024*a^6*c^5*h*k - 1
536*a^6*c^5*i*j + 32*a*b^5*c^5*d*e + 1024*a^3*b*c^7*d*e - 16*a*b^6*c^4*d*g
+ 1024*a^4*b*c^6*d*i + 512*a^4*b*c^6*e*h + 256*a^4*b*c^6*f*g + 16*a*b^8*c^2
*d*k + 256*a^5*b*c^5*f*k + 768*a^5*b*c^5*g*j + 512*a^5*b*c^5*h*i + 1792*a^6
*b*c^4*j*k - 384*a^2*b^3*c^6*d*e + 192*a^2*b^4*c^5*d*g + 32*a^2*b^4*c^5*e*f
 - 512*a^3*b^2*c^6*d*g + 32*a^2*b^5*c^4*d*i - 16*a^2*b^5*c^4*f*g - 384*a^3*
b^3*c^5*d*i - 128*a^3*b^3*c^5*e*h - 288*a^2*b^6*c^3*d*k + 1792*a^3*b^4*c^4*
d*k - 32*a^3*b^4*c^4*e*j + 32*a^3*b^4*c^4*f*i + 64*a^3*b^4*c^4*g*h - 4352*a
^4*b^2*c^5*d*k + 512*a^4*b^2*c^5*e*j - 256*a^4*b^2*c^5*g*h + 16*a^2*b^7*c^2
*f*k - 144*a^3*b^5*c^3*f*k + 16*a^3*b^5*c^3*g*j + 256*a^4*b^3*c^4*f*k - 256
*a^4*b^3*c^4*g*j - 128*a^4*b^3*c^4*h*i - 48*a^3*b^6*c^2*h*k + 512*a^4*b^4*c
^3*h*k - 32*a^4*b^4*c^3*i*j - 1536*a^5*b^2*c^4*h*k + 512*a^5*b^2*c^4*i*j +
80*a^4*b^5*c^2*j*k - 768*a^5*b^3*c^3*j*k)/(8*(64*a^5*c^5 - a^2*b^6*c^2 + 12
*a^3*b^4*c^3 - 48*a^4*b^2*c^4)) - root(1572864*a^8*b^2*c^9*z^4 - 983040*a^7
*b^4*c^8*z^4 + 327680*a^6*b^6*c^7*z^4 - 61440*a^5*b^8*c^6*z^4 + 6144*a^4*b^
10*c^5*z^4 - 256*a^3*b^12*c^4*z^4 - 1048576*a^9*c^10*z^4 - 1572864*a^8*b^2*
c^7*k*z^3 + 983040*a^7*b^4*c^6*k*z^3 - 327680*a^6*b^6*c^5*k*z^3 + 61440*a^5
*b^8*c^4*k*z^3 - 6144*a^4*b^10*c^3*k*z^3 + 256*a^3*b^12*c^2*k*z^3 + 1048576
*a^9*c^8*k*z^3 + 98304*a^8*b*c^6*i*k*z^2 + 98304*a^7*b*c^7*e*k*z^2 + 57344*
a^7*b*c^7*f*j*z^2 + 32768*a^7*b*c^7*g*i*z^2 + 57344*a^6*b*c^8*d*h*z^2 + 327
68*a^6*b*c^8*e*g*z^2 - 32*a*b^10*c^4*d*f*z^2 - 90112*a^7*b^3*c^5*i*k*z^2 +
30720*a^6*b^5*c^4*i*k*z^2 - 4608*a^5*b^7*c^3*i*k*z^2 + 256*a^4*b^9*c^2*i*k*
z^2 - 49152*a^7*b^2*c^6*g*k*z^2 + 45056*a^6*b^4*c^5*g*k*z^2 + 24576*a^7*b^2
*c^6*h*j*z^2 - 15360*a^5*b^6*c^4*g*k*z^2 - 3072*a^5*b^6*c^4*h*j*z^2 + 2304*
a^4*b^8*c^3*g*k*z^2 + 2048*a^6*b^4*c^5*h*j*z^2 + 576*a^4*b^8*c^3*h*j*z^2 -
128*a^3*b^10*c^2*g*k*z^2 - 32*a^3*b^10*c^2*h*j*z^2 - 90112*a^6*b^3*c^6*e*k*
z^2 - 49152*a^6*b^3*c^6*f*j*z^2 + 30720*a^5*b^5*c^5*e*k*z^2 - 24576*a^6*b^3
*c^6*g*i*z^2 + 15360*a^5*b^5*c^5*f*j*z^2 + 6144*a^5*b^5*c^5*g*i*z^2 - 4608*
a^4*b^7*c^4*e*k*z^2 - 2048*a^4*b^7*c^4*f*j*z^2 - 512*a^4*b^7*c^4*g*i*z^2 +
256*a^3*b^9*c^3*e*k*z^2 + 96*a^3*b^9*c^3*f*j*z^2 + 131072*a^6*b^2*c^7*d*j*z
^2 + 49152*a^6*b^2*c^7*e*i*z^2 - 43008*a^5*b^4*c^6*d*j*z^2 - 12288*a^5*b^4*
c^6*e*i*z^2 + 6144*a^5*b^4*c^6*f*h*z^2 + 6144*a^4*b^6*c^5*d*j*z^2 - 2048*a^
4*b^6*c^5*f*h*z^2 + 1024*a^4*b^6*c^5*e*i*z^2 - 320*a^3*b^8*c^4*d*j*z^2 + 19
2*a^3*b^8*c^4*f*h*z^2 - 49152*a^5*b^3*c^7*d*h*z^2 - 24576*a^5*b^3*c^7*e*g*z
^2 + 15360*a^4*b^5*c^6*d*h*z^2 + 6144*a^4*b^5*c^6*e*g*z^2 - 2048*a^3*b^7*c^
5*d*h*z^2 - 512*a^3*b^7*c^5*e*g*z^2 + 96*a^2*b^9*c^4*d*h*z^2 + 24576*a^5*b^
2*c^8*d*f*z^2 - 3072*a^3*b^6*c^6*d*f*z^2 + 2048*a^4*b^4*c^7*d*f*z^2 + 576*a
^2*b^8*c^5*d*f*z^2 + 1536*a^4*b^10*c*k^2*z^2 + 61440*a^8*b*c^6*j^2*z^2 - 16
*a^3*b^11*c*j^2*z^2 + 12288*a^7*b*c^7*h^2*z^2 + 12288*a^6*b*c^8*f^2*z^2 + 6
1440*a^5*b*c^9*d^2*z^2 + 432*a*b^9*c^5*d^2*z^2 - 49152*a^8*c^7*h*j*z^2 - 14
7456*a^7*c^8*d*j*z^2 - 65536*a^7*c^8*e*i*z^2 - 16384*a^7*c^8*f*h*z^2 - 4915
2*a^6*c^9*d*f*z^2 + 516096*a^8*b^2*c^5*k^2*z^2 - 288768*a^7*b^4*c^4*k^2*z^2
 + 88576*a^6*b^6*c^3*k^2*z^2 - 15744*a^5*b^8*c^2*k^2*z^2 - 61440*a^7*b^3*c^
5*j^2*z^2 + 24064*a^6*b^5*c^4*j^2*z^2 - 4608*a^5*b^7*c^3*j^2*z^2 + 432*a^4*
b^9*c^2*j^2*z^2 + 24576*a^7*b^2*c^6*i^2*z^2 - 6144*a^6*b^4*c^5*i^2*z^2 + 51
2*a^5*b^6*c^4*i^2*z^2 - 8192*a^6*b^3*c^6*h^2*z^2 + 1536*a^5*b^5*c^5*h^2*z^2
 - 16*a^3*b^9*c^3*h^2*z^2 - 8192*a^6*b^2*c^7*g^2*z^2 + 6144*a^5*b^4*c^6*g^2
*z^2 - 1536*a^4*b^6*c^5*g^2*z^2 + 128*a^3*b^8*c^4*g^2*z^2 - 8192*a^5*b^3*c^
7*f^2*z^2 + 1536*a^4*b^5*c^6*f^2*z^2 - 16*a^2*b^9*c^4*f^2*z^2 + 24576*a^5*b
^2*c^8*e^2*z^2 - 6144*a^4*b^4*c^7*e^2*z^2 + 512*a^3*b^6*c^6*e^2*z^2 - 61440
*a^4*b^3*c^8*d^2*z^2 + 24064*a^3*b^5*c^7*d^2*z^2 - 4608*a^2*b^7*c^6*d^2*z^2
 - 393216*a^9*c^6*k^2*z^2 - 64*a^3*b^12*k^2*z^2 - 32768*a^8*c^7*i^2*z^2 - 3
2768*a^6*c^9*e^2*z^2 - 16*b^11*c^4*d^2*z^2 - 16384*a^7*b*c^5*g*i*k*z - 1024
0*a^7*b*c^5*f*j*k*z + 4096*a^7*b*c^5*h*i*j*z - 47104*a^6*b*c^6*d*h*k*z - 16
384*a^6*b*c^6*e*g*k*z + 6144*a^6*b*c^6*f*g*j*z + 4096*a^6*b*c^6*e*h*j*z + 3
2*a*b^10*c^2*d*f*k*z - 6144*a^5*b*c^7*d*g*h*z - 4096*a^5*b*c^7*d*f*i*z - 32
*a*b^8*c^4*d*f*g*z - 4096*a^4*b*c^8*d*e*f*z + 64*a*b^7*c^5*d*e*f*z - 18432*
a^7*b^2*c^4*h*j*k*z + 4608*a^6*b^4*c^3*h*j*k*z - 384*a^5*b^6*c^2*h*j*k*z +
12288*a^6*b^3*c^4*g*i*k*z + 7680*a^6*b^3*c^4*f*j*k*z - 3072*a^6*b^3*c^4*h*i

*j*z - 3072*a^5*b^5*c^3*g*i*k*z - 1920*a^5*b^5*c^3*f*j*k*z + 768*a^5*b^5*c^
3*h*i*j*z + 256*a^4*b^7*c^2*g*i*k*z + 160*a^4*b^7*c^2*f*j*k*z - 64*a^4*b^7*
c^2*h*i*j*z - 65536*a^6*b^2*c^5*d*j*k*z - 24576*a^6*b^2*c^5*e*i*k*z + 21504
*a^5*b^4*c^4*d*j*k*z + 9216*a^6*b^2*c^5*f*i*j*z + 6144*a^5*b^4*c^4*e*i*k*z
- 3072*a^5*b^4*c^4*f*h*k*z - 3072*a^4*b^6*c^3*d*j*k*z - 2304*a^5*b^4*c^4*f*
i*j*z - 2048*a^6*b^2*c^5*g*h*j*z + 1536*a^5*b^4*c^4*g*h*j*z + 1024*a^4*b^6*
c^3*f*h*k*z - 512*a^4*b^6*c^3*e*i*k*z - 384*a^4*b^6*c^3*g*h*j*z + 192*a^4*b
^6*c^3*f*i*j*z + 160*a^3*b^8*c^2*d*j*k*z - 96*a^3*b^8*c^2*f*h*k*z + 32*a^3*
b^8*c^2*g*h*j*z + 41472*a^5*b^3*c^5*d*h*k*z - 13440*a^4*b^5*c^4*d*h*k*z + 1
2288*a^5*b^3*c^5*e*g*k*z - 4608*a^5*b^3*c^5*f*g*j*z - 3072*a^5*b^3*c^5*e*h*
j*z - 3072*a^4*b^5*c^4*e*g*k*z + 1888*a^3*b^7*c^3*d*h*k*z + 1152*a^4*b^5*c^
4*f*g*j*z + 768*a^4*b^5*c^4*e*h*j*z + 256*a^3*b^7*c^3*e*g*k*z - 96*a^3*b^7*
c^3*f*g*j*z - 96*a^2*b^9*c^2*d*h*k*z - 64*a^3*b^7*c^3*e*h*j*z + 9216*a^5*b^
2*c^6*e*f*j*z - 9216*a^5*b^2*c^6*d*h*i*z - 6656*a^4*b^4*c^5*d*f*k*z - 6144*
a^5*b^2*c^6*d*f*k*z + 3456*a^3*b^6*c^4*d*f*k*z - 2304*a^4*b^4*c^5*e*f*j*z +
 2304*a^4*b^4*c^5*d*h*i*z - 576*a^2*b^8*c^3*d*f*k*z + 192*a^3*b^6*c^4*e*f*j
*z - 192*a^3*b^6*c^4*d*h*i*z + 4608*a^4*b^3*c^6*d*g*h*z + 3072*a^4*b^3*c^6*
d*f*i*z - 1152*a^3*b^5*c^5*d*g*h*z - 768*a^3*b^5*c^5*d*f*i*z + 96*a^2*b^7*c
^4*d*g*h*z + 64*a^2*b^7*c^4*d*f*i*z - 9216*a^4*b^2*c^7*d*e*h*z + 2304*a^3*b
^4*c^6*d*e*h*z + 2048*a^4*b^2*c^7*d*f*g*z - 1536*a^3*b^4*c^6*d*f*g*z + 384*
a^2*b^6*c^5*d*f*g*z - 192*a^2*b^6*c^5*d*e*h*z + 3072*a^3*b^3*c^7*d*e*f*z -
768*a^2*b^5*c^6*d*e*f*z - 3072*a^8*b*c^4*j^2*k*z + 48*a^5*b^7*c*j^2*k*z - 4
9152*a^8*b*c^4*i*k^2*z + 2304*a^5*b^7*c*i*k^2*z - 9216*a^7*b*c^5*h^2*k*z -
32*a^4*b^8*c*i*j^2*z - 1152*a^4*b^8*c*g*k^2*z + 9216*a^7*b*c^5*g*j^2*z - 30
72*a^6*b*c^6*f^2*k*z + 16*a^3*b^9*c*g*j^2*z - 49152*a^7*b*c^5*e*k^2*z - 128
*a^3*b^9*c*e*k^2*z - 58368*a^5*b*c^7*d^2*k*z - 1024*a^6*b*c^6*g*h^2*z - 432
*a*b^9*c^3*d^2*k*z + 1024*a^5*b*c^7*f^2*g*z + 32*a*b^8*c^4*d^2*i*z - 9216*a
^4*b*c^8*d^2*g*z + 336*a*b^7*c^5*d^2*g*z - 672*a*b^6*c^6*d^2*e*z + 24576*a^
8*c^5*h*j*k*z + 73728*a^7*c^6*d*j*k*z + 32768*a^7*c^6*e*i*k*z - 12288*a^7*c
^6*f*i*j*z + 8192*a^7*c^6*f*h*k*z + 24576*a^6*c^7*d*f*k*z - 12288*a^6*c^7*e
*f*j*z + 12288*a^6*c^7*d*h*i*z + 12288*a^5*c^8*d*e*h*z + 2304*a^7*b^3*c^3*j
^2*k*z - 576*a^6*b^5*c^2*j^2*k*z + 45056*a^7*b^3*c^3*i*k^2*z - 15360*a^6*b^
5*c^2*i*k^2*z - 12288*a^7*b^2*c^4*i^2*k*z + 3072*a^6*b^4*c^3*i^2*k*z - 256*
a^5*b^6*c^2*i^2*k*z + 15872*a^7*b^2*c^4*i*j^2*z + 6912*a^6*b^3*c^4*h^2*k*z
- 4992*a^6*b^4*c^3*i*j^2*z - 1728*a^5*b^5*c^3*h^2*k*z + 672*a^5*b^6*c^2*i*j
^2*z + 144*a^4*b^7*c^2*h^2*k*z + 24576*a^7*b^2*c^4*g*k^2*z - 22528*a^6*b^4*
c^3*g*k^2*z + 7680*a^5*b^6*c^2*g*k^2*z + 4096*a^6*b^2*c^5*g^2*k*z - 3072*a^
5*b^4*c^4*g^2*k*z + 768*a^4*b^6*c^3*g^2*k*z - 64*a^3*b^8*c^2*g^2*k*z - 7936
*a^6*b^3*c^4*g*j^2*z + 2496*a^5*b^5*c^3*g*j^2*z - 1536*a^6*b^2*c^5*h^2*i*z
+ 1280*a^5*b^3*c^5*f^2*k*z + 384*a^5*b^4*c^4*h^2*i*z - 336*a^4*b^7*c^2*g*j^
2*z + 192*a^4*b^5*c^4*f^2*k*z - 144*a^3*b^7*c^3*f^2*k*z - 32*a^4*b^6*c^3*h^
2*i*z + 16*a^2*b^9*c^2*f^2*k*z + 45056*a^6*b^3*c^4*e*k^2*z - 15360*a^5*b^5*
c^3*e*k^2*z - 12288*a^5*b^2*c^6*e^2*k*z + 3072*a^4*b^4*c^5*e^2*k*z + 2304*a
^4*b^7*c^2*e*k^2*z - 256*a^3*b^6*c^4*e^2*k*z + 59136*a^4*b^3*c^6*d^2*k*z -
23488*a^3*b^5*c^5*d^2*k*z + 15872*a^6*b^2*c^5*e*j^2*z - 4992*a^5*b^4*c^4*e*
j^2*z + 4560*a^2*b^7*c^4*d^2*k*z + 1536*a^5*b^2*c^6*f^2*i*z + 768*a^5*b^3*c
^5*g*h^2*z + 672*a^4*b^6*c^3*e*j^2*z - 384*a^4*b^4*c^5*f^2*i*z - 192*a^4*b^
5*c^4*g*h^2*z - 32*a^3*b^8*c^2*e*j^2*z + 32*a^3*b^6*c^4*f^2*i*z + 16*a^3*b^
7*c^3*g*h^2*z - 15872*a^4*b^2*c^7*d^2*i*z + 4992*a^3*b^4*c^6*d^2*i*z - 1536
*a^5*b^2*c^6*e*h^2*z - 768*a^4*b^3*c^6*f^2*g*z - 672*a^2*b^6*c^5*d^2*i*z +
384*a^4*b^4*c^5*e*h^2*z + 192*a^3*b^5*c^5*f^2*g*z - 32*a^3*b^6*c^4*e*h^2*z
- 16*a^2*b^7*c^4*f^2*g*z + 7936*a^3*b^3*c^7*d^2*g*z - 2496*a^2*b^5*c^6*d^2*
g*z + 1536*a^4*b^2*c^7*e*f^2*z - 384*a^3*b^4*c^6*e*f^2*z + 32*a^2*b^6*c^5*e
*f^2*z - 15872*a^3*b^2*c^8*d^2*e*z + 4992*a^2*b^4*c^7*d^2*e*z - 61440*a^8*b
^2*c^3*k^3*z + 21504*a^7*b^4*c^2*k^3*z + 16384*a^8*c^5*i^2*k*z - 18432*a^8*
c^5*i*j^2*z - 128*a^4*b^9*i*k^2*z + 2048*a^7*c^6*h^2*i*z + 64*a^3*b^10*g*k^
2*z + 16384*a^6*c^7*e^2*k*z + 16*b^11*c^2*d^2*k*z - 18432*a^7*c^6*e*j^2*z -
 2048*a^6*c^7*f^2*i*z + 18432*a^5*c^8*d^2*i*z - 3328*a^6*b^6*c*k^3*z + 2048
*a^6*c^7*e*h^2*z - 16*b^9*c^4*d^2*g*z - 2048*a^5*c^8*e*f^2*z + 32*b^8*c^5*d

```
^2*e*z + 18432*a^4*c^9*d^2*e*z + 65536*a^9*c^4*k^3*z + 192*a^5*b^8*k^3*z -
3328*a^7*b*c^3*h*i*j*k - 6912*a^6*b*c^4*d*i*j*k - 3328*a^6*b*c^4*e*h*j*k -
1536*a^6*b*c^4*f*g*j*k - 768*a^6*b*c^4*g*h*i*j - 768*a^6*b*c^4*f*h*i*k - 69
12*a^5*b*c^5*d*e*j*k - 2304*a^5*b*c^5*d*g*i*j - 1792*a^5*b*c^5*e*f*i*j + 15
36*a^5*b*c^5*d*g*h*k - 1280*a^5*b*c^5*d*f*i*k - 768*a^5*b*c^5*e*g*h*j - 768
*a^5*b*c^5*e*f*h*k - 256*a^5*b*c^5*f*g*h*i + 16*a*b^8*c^2*d*f*g*k - 4*a*b^8
*c^2*d*f*h*j - 2304*a^4*b*c^6*d*e*g*j - 1792*a^4*b*c^6*d*e*h*i - 1280*a^4*b
*c^6*d*e*f*k - 768*a^4*b*c^6*d*f*g*i - 256*a^4*b*c^6*e*f*g*h - 32*a*b^7*c^3
*d*e*f*k - 768*a^3*b*c^7*d*e*f*g + 32*a*b^5*c^5*d*e*f*g + 576*a^6*b^3*c^2*h
*i*j*k + 1664*a^6*b^2*c^3*g*h*j*k + 384*a^6*b^2*c^3*f*i*j*k - 288*a^5*b^4*c
^2*g*h*j*k - 160*a^5*b^4*c^2*f*i*j*k + 2112*a^5*b^3*c^3*d*i*j*k + 576*a^5*b
^3*c^3*e*h*j*k - 448*a^5*b^3*c^3*f*h*i*k - 192*a^5*b^3*c^3*g*h*i*j - 192*a^
5*b^3*c^3*f*g*j*k - 160*a^4*b^5*c^2*d*i*j*k + 96*a^4*b^5*c^2*f*h*i*k + 80*a
^4*b^5*c^2*f*g*j*k + 32*a^4*b^5*c^2*g*h*i*j + 4992*a^5*b^2*c^4*d*h*i*k - 46
08*a^5*b^2*c^4*e*g*i*k + 3456*a^5*b^2*c^4*d*g*j*k - 1312*a^4*b^4*c^3*d*h*i*
k - 1056*a^4*b^4*c^3*d*g*j*k + 896*a^5*b^2*c^4*f*g*i*j + 768*a^4*b^4*c^3*e*
g*i*k + 384*a^5*b^2*c^4*f*g*h*k + 384*a^5*b^2*c^4*e*h*i*j + 384*a^5*b^2*c^4
*e*f*j*k + 224*a^4*b^4*c^3*f*g*h*k - 160*a^4*b^4*c^3*e*f*j*k - 96*a^4*b^4*c
^3*f*g*i*j + 96*a^3*b^6*c^2*d*h*i*k + 80*a^3*b^6*c^2*d*g*j*k - 64*a^4*b^4*c
^3*e*h*i*j - 48*a^3*b^6*c^2*f*g*h*k - 2496*a^4*b^3*c^4*d*g*h*k + 2112*a^4*b
^3*c^4*d*e*j*k - 960*a^4*b^3*c^4*d*f*i*k + 656*a^3*b^5*c^3*d*g*h*k - 448*a^
4*b^3*c^4*e*f*h*k + 384*a^3*b^5*c^3*d*f*i*k + 320*a^4*b^3*c^4*d*g*i*j - 192
*a^4*b^3*c^4*f*g*h*i - 192*a^4*b^3*c^4*e*g*h*j + 192*a^4*b^3*c^4*e*f*i*j -
160*a^3*b^5*c^3*d*e*j*k + 96*a^3*b^5*c^3*e*f*h*k - 48*a^2*b^7*c^2*d*g*h*k +
 32*a^3*b^5*c^3*e*g*h*j - 32*a^2*b^7*c^2*d*f*i*k + 4992*a^4*b^2*c^5*d*e*h*k
 - 3584*a^4*b^2*c^5*d*f*h*j - 1312*a^3*b^4*c^4*d*e*h*k + 896*a^4*b^2*c^5*e*
f*g*j + 896*a^4*b^2*c^5*d*g*h*i + 640*a^4*b^2*c^5*d*f*g*k - 640*a^4*b^2*c^5
*d*e*i*j + 600*a^3*b^4*c^4*d*f*h*j + 480*a^3*b^4*c^4*d*f*g*k + 384*a^4*b^2*
c^5*e*f*h*i - 192*a^2*b^6*c^3*d*f*g*k - 96*a^3*b^4*c^4*e*f*g*j - 96*a^3*b^4
*c^4*d*g*h*i + 96*a^2*b^6*c^3*d*e*h*k + 12*a^2*b^6*c^3*d*f*h*j - 960*a^3*b^
3*c^5*d*e*f*k + 384*a^2*b^5*c^4*d*e*f*k + 320*a^3*b^3*c^5*d*e*g*j - 192*a^3
*b^3*c^5*e*f*g*h - 192*a^3*b^3*c^5*d*f*g*i + 192*a^3*b^3*c^5*d*e*h*i + 32*a
^2*b^5*c^4*d*f*g*i + 896*a^3*b^2*c^6*d*e*g*h + 384*a^3*b^2*c^6*d*e*f*i - 96
*a^2*b^4*c^5*d*e*g*h - 64*a^2*b^4*c^5*d*e*f*i - 192*a^2*b^3*c^6*d*e*f*g + 4
8*a^6*b^4*c*i*j^2*k - 1424*a^6*b^4*c*h*j*k^2 - 2304*a^7*b*c^3*g*j^2*k - 24*
a^5*b^5*c*g*j^2*k + 2048*a^7*b*c^3*g*i*k^2 - 1024*a^7*b*c^3*f*j*k^2 - 768*a
^5*b^5*c*g*i*k^2 + 408*a^5*b^5*c*f*j*k^2 + 256*a^6*b*c^4*g*h^2*k + 16*a^4*b
^6*c*g*i*j^2 + 4608*a^6*b*c^4*e*i^2*k + 4608*a^5*b*c^5*e^2*i*k - 896*a^6*b*
c^4*f*i^2*j + 768*a^4*b^6*c*d*j*k^2 - 256*a^4*b^6*c*f*h*k^2 - 128*a^4*b^6*c
*e*i*k^2 + 2208*a^6*b*c^4*f*h*j^2 - 1920*a^6*b*c^4*e*i*j^2 + 800*a^5*b*c^5*
f^2*h*j - 256*a^5*b*c^5*f^2*g*k - 16*a*b^8*c^2*d^2*i*k + 6*a^3*b^7*c*f*h*j^
2 + 8192*a^6*b*c^4*d*h*k^2 + 2048*a^6*b*c^4*e*g*k^2 - 472*a^3*b^7*c*d*h*k^2
 + 64*a^3*b^7*c*e*g*k^2 + 4896*a^4*b*c^6*d^2*h*j + 2304*a^4*b*c^6*d^2*g*k +
 1824*a^5*b*c^5*d*h^2*j - 384*a^5*b*c^5*e*h^2*i - 168*a*b^7*c^3*d^2*g*k + 4
2*a*b^7*c^3*d^2*h*j + 6*a^2*b^8*c*d*h*j^2 + 1536*a^5*b*c^5*e*g*i^2 + 1536*a
^4*b*c^6*e^2*g*i - 896*a^5*b*c^5*d*h*i^2 - 896*a^4*b*c^6*e^2*f*j + 144*a^2*
b^8*c*d*f*k^2 + 4896*a^5*b*c^5*d*f*j^2 + 1824*a^4*b*c^6*d*f^2*j - 384*a^4*b
*c^6*e*f^2*i + 336*a*b^6*c^4*d^2*e*k - 156*a*b^6*c^4*d^2*f*j + 16*a*b^6*c^4
*d^2*g*i + 12*a*b^7*c^3*d*f^2*j + 2208*a^3*b*c^7*d^2*f*h - 1920*a^3*b*c^7*d
^2*e*i + 800*a^4*b*c^6*d*f*h^2 - 102*a*b^5*c^5*d^2*f*h - 32*a*b^5*c^5*d^2*e
*i + 12*a*b^6*c^4*d*f^2*h - 2*a*b^7*c^3*d*f*h^2 - 896*a^3*b*c^7*d*e^2*h - 8
*a*b^6*c^4*d*f*g^2 - 240*a*b^4*c^6*d^2*e*g - 32*a*b^4*c^6*d*e^2*f + 3072*a^
7*c^4*f*i*j*k + 3072*a^6*c^5*e*f*j*k - 3072*a^6*c^5*d*h*i*k + 1536*a^6*c^5*
e*h*i*j + 4608*a^5*c^6*d*e*i*j - 3072*a^5*c^6*d*e*h*k - 1152*a^5*c^6*d*f*h*
j + 512*a^5*c^6*e*f*h*i + 1536*a^4*c^7*d*e*f*i - 2*a*b^9*c*d*f*j^2 - 1088*a
^7*b^2*c^2*i*j^2*k + 4800*a^7*b^2*c^2*h*j*k^2 + 960*a^6*b^2*c^3*h^2*i*k + 5
44*a^6*b^3*c^2*g*j^2*k - 144*a^5*b^4*c^2*h^2*i*k - 2304*a^6*b^2*c^3*g*i^2*k
 + 1920*a^6*b^3*c^2*g*i*k^2 + 1152*a^5*b^3*c^3*g^2*i*k - 864*a^6*b^3*c^2*f*
j*k^2 + 384*a^5*b^4*c^2*g*i^2*k + 192*a^6*b^2*c^3*h*i^2*j - 192*a^4*b^5*c^2
```

*g^2*i*k - 32*a^5*b^4*c^2*h*i^2*j - 1088*a^6*b^2*c^3*e*j^2*k + 960*a^6*b^2*
c^3*g*i*j^2 - 480*a^5*b^3*c^3*g*h^2*k - 240*a^5*b^4*c^2*g*i*j^2 + 192*a^5*b
^2*c^4*f^2*i*k + 72*a^4*b^5*c^2*g*h^2*k + 48*a^5*b^4*c^2*e*j^2*k + 48*a^4*b
^4*c^3*f^2*i*k - 16*a^3*b^6*c^2*f^2*i*k + 13376*a^6*b^2*c^3*d*j*k^2 - 5136*
a^5*b^4*c^2*d*j*k^2 - 3840*a^6*b^2*c^3*e*i*k^2 + 1536*a^5*b^4*c^2*e*i*k^2 -
768*a^5*b^3*c^3*e*i^2*k - 768*a^4*b^3*c^4*e^2*i*k + 624*a^5*b^4*c^2*f*h*k^
2 + 576*a^6*b^2*c^3*f*h*k^2 + 192*a^5*b^2*c^4*g^2*h*j + 96*a^5*b^3*c^3*f*i^
2*j + 48*a^4*b^4*c^3*g^2*h*j - 8*a^3*b^6*c^2*g^2*h*j + 6848*a^4*b^2*c^5*d^2
*i*k - 2448*a^3*b^4*c^4*d^2*i*k + 960*a^5*b^2*c^4*e*h^2*k - 864*a^5*b^2*c^4
*f*h^2*j + 480*a^5*b^3*c^3*e*i*j^2 + 336*a^4*b^3*c^4*f^2*h*j + 336*a^2*b^6*
c^3*d^2*i*k + 192*a^5*b^2*c^4*g*h^2*i + 144*a^5*b^3*c^3*f*h*j^2 - 144*a^4*b
^4*c^3*e*h^2*k - 102*a^4*b^5*c^2*f*h*j^2 - 96*a^4*b^3*c^4*f^2*g*k - 32*a^4*
b^5*c^2*e*i*j^2 - 30*a^3*b^5*c^3*f^2*h*j - 24*a^3*b^5*c^3*f^2*g*k + 16*a^4*
b^4*c^3*g*h^2*i - 12*a^4*b^4*c^3*f*h^2*j + 12*a^3*b^6*c^2*f*h^2*j + 8*a^2*b
^7*c^2*f^2*g*k - 2*a^2*b^7*c^2*f^2*h*j - 9312*a^5*b^3*c^3*d*h*k^2 + 3288*a^
4*b^5*c^2*d*h*k^2 - 2304*a^4*b^2*c^5*e^2*g*k + 1920*a^5*b^3*c^3*e*g*k^2 + 1
152*a^4*b^3*c^4*e*g^2*k - 768*a^4*b^5*c^2*e*g*k^2 + 384*a^3*b^4*c^4*e^2*g*k
- 320*a^5*b^2*c^4*d*i^2*j - 224*a^4*b^3*c^4*f*g^2*j + 192*a^5*b^2*c^4*f*h*
i^2 + 192*a^4*b^2*c^5*e^2*h*j - 192*a^3*b^5*c^3*e*g^2*k - 32*a^3*b^4*c^4*e^
2*h*j + 24*a^3*b^5*c^3*f*g^2*j - 3552*a^5*b^2*c^4*d*h*j^2 - 3424*a^3*b^3*c^
5*d^2*g*k + 1332*a^4*b^4*c^3*d*h*j^2 + 1224*a^2*b^5*c^4*d^2*g*k + 960*a^5*b
^2*c^4*e*g*j^2 - 496*a^3*b^3*c^5*d^2*h*j + 432*a^4*b^3*c^4*d*h^2*j - 240*a^
4*b^4*c^3*e*g*j^2 - 222*a^2*b^5*c^4*d^2*h*j + 192*a^4*b^2*c^5*f^2*g*i + 192
*a^4*b^2*c^5*e*f^2*k - 174*a^3*b^5*c^3*d*h^2*j - 156*a^3*b^6*c^2*d*h*j^2 +
48*a^3*b^4*c^4*e*f^2*k - 32*a^4*b^3*c^4*e*h^2*i + 16*a^3*b^6*c^2*e*g*j^2 +
16*a^3*b^4*c^4*f^2*g*i - 16*a^2*b^6*c^3*e*f^2*k + 12*a^2*b^7*c^2*d*h^2*j +
1728*a^5*b^2*c^4*d*f*k^2 + 1392*a^4*b^4*c^3*d*f*k^2 - 840*a^3*b^6*c^2*d*f*k
^2 - 768*a^4*b^2*c^5*e*g^2*i + 576*a^4*b^2*c^5*d*g^2*j + 96*a^4*b^3*c^4*d*h
*i^2 + 96*a^3*b^3*c^5*e^2*f*j - 80*a^3*b^4*c^4*d*g^2*j + 64*a^4*b^2*c^5*f*g
^2*h + 48*a^3*b^4*c^4*f*g^2*h + 6848*a^3*b^2*c^6*d^2*e*k - 3552*a^3*b^2*c^6
*d^2*f*j - 2448*a^2*b^4*c^5*d^2*e*k + 1332*a^2*b^4*c^5*d^2*f*j + 960*a^3*b^
2*c^6*d^2*g*i - 496*a^4*b^3*c^4*d*f*j^2 + 432*a^3*b^3*c^5*d*f^2*j - 240*a^2
*b^4*c^5*d^2*g*i - 222*a^3*b^5*c^3*d*f*j^2 + 192*a^4*b^2*c^5*e*g*h^2 - 174*
a^2*b^5*c^4*d*f^2*j + 42*a^2*b^7*c^2*d*f*j^2 - 32*a^3*b^3*c^5*e*f^2*i + 16*
a^3*b^4*c^4*e*g*h^2 - 320*a^3*b^2*c^6*d*e^2*j - 224*a^3*b^3*c^5*d*g^2*h + 1
92*a^4*b^2*c^5*d*f*i^2 + 192*a^3*b^2*c^6*e^2*f*h - 32*a^3*b^4*c^4*d*f*i^2 +
24*a^2*b^5*c^4*d*g^2*h - 864*a^3*b^2*c^6*d*f^2*h + 480*a^2*b^3*c^6*d^2*e*i
+ 336*a^3*b^3*c^5*d*f*h^2 + 192*a^3*b^2*c^6*e*f^2*g + 144*a^2*b^3*c^6*d^2*
f*h - 30*a^2*b^5*c^4*d*f*h^2 + 16*a^2*b^4*c^5*e*f^2*g - 12*a^2*b^4*c^5*d*f^
2*h + 192*a^3*b^2*c^6*d*f*g^2 + 96*a^2*b^3*c^6*d*e^2*h + 48*a^2*b^4*c^5*d*f
*g^2 + 960*a^2*b^2*c^7*d^2*e*g + 192*a^2*b^2*c^7*d*e^2*f - 3072*a^8*b*c^2*j
^2*k^2 + 1104*a^7*b^3*c*j^2*k^2 + 768*a^6*b^4*c*i^2*k^2 - 256*a^6*b^3*c^2*i
^3*k + 1536*a^7*b*c^3*h^2*k^2 - 960*a^7*b*c^3*i^2*j^2 + 444*a^5*b^5*c*h^2*k
^2 - 16*a^5*b^5*c*i^2*j^2 - 3072*a^7*b^2*c^2*g*k^3 - 496*a^6*b^3*c^2*h*j^3
+ 192*a^4*b^6*c*g^2*k^2 - 192*a^4*b^4*c^3*g^3*k + 144*a^5*b^3*c^3*h^3*j + 3
2*a^3*b^6*c^2*g^3*k - 18*a^4*b^5*c^2*h^3*j - 9*a^4*b^6*c*h^2*j^2 - 192*a^6*
b*c^4*h^2*i^2 + 36*a^3*b^7*c*f^2*k^2 - 4*a^3*b^7*c*g^2*j^2 - 2176*a^6*b^3*c
^2*e*k^3 - 256*a^3*b^3*c^5*e^3*k - 192*a^6*b^2*c^3*f*j^3 - 192*a^4*b^2*c^5*
f^3*j + 132*a^5*b^4*c^2*f*j^3 + 128*a^4*b^3*c^4*g^3*i - 28*a^3*b^4*c^4*f^3*
j + 6*a^2*b^6*c^3*f^3*j + 10752*a^5*b*c^5*d^2*k^2 - 960*a^5*b*c^5*e^2*j^2 -
192*a^5*b*c^5*f^2*i^2 - 1680*a^5*b^3*c^3*d*j^3 - 1680*a^2*b^3*c^6*d^3*j +
222*a^4*b^5*c^2*d*j^3 + 80*a^4*b^3*c^4*f*h^3 + 80*a^3*b^3*c^5*f^3*h + 30*a*
b^8*c^2*d^2*j^2 + 6*a^3*b^5*c^3*f*h^3 + 6*a^2*b^5*c^4*f^3*h - 960*a^4*b*c^6
*d^2*i^2 - 192*a^4*b*c^6*e^2*h^2 - 192*a^4*b^2*c^5*d*h^3 - 192*a^2*b^2*c^7*
d^3*h + 128*a^3*b^3*c^5*e*g^3 - 28*a^3*b^4*c^4*d*h^3 + 12*a*b^6*c^4*d^2*h^2
+ 6*a^2*b^6*c^3*d*h^3 - 192*a^3*b*c^7*e^2*f^2 + 60*a*b^5*c^5*d^2*g^2 + 198
*a*b^4*c^6*d^2*f^2 + 144*a^2*b^3*c^6*d*f^3 - 960*a^2*b*c^8*d^2*e^2 + 240*a*
b^3*c^7*d^2*e^2 + 4608*a^8*c^3*i*j^2*k - 3072*a^8*c^3*h*j*k^2 - 512*a^7*c^4
*h^2*i*k + 120*a^5*b^6*h*j*k^2 + 768*a^7*c^4*h*i^2*j + 4608*a^7*c^4*e*j^2*k

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 + 512*a^6*c^5*f^2*i*k + 64*a^4*b^7*g*i*k^2 - 40*a^4*b^7*f*j*k^2 - 9216*a^7
*c^4*d*j*k^2 - 4096*a^7*c^4*e*i*k^2 - 1024*a^7*c^4*f*h*k^2 - 4608*a^5*c^6*d
^2*i*k - 512*a^6*c^5*e*h^2*k - 192*a^6*c^5*f*h^2*j - 40*a^3*b^8*d*j*k^2 + 2
4*a^3*b^8*f*h*k^2 + 2304*a^6*c^5*d*i^2*j + 768*a^5*c^6*e^2*h*j + 256*a^6*c^
5*f*h*i^2 + 8*b^9*c^2*d^2*g*k - 2*b^9*c^2*d^2*h*j + 6144*a^8*b*c^2*i*k^3 -
2176*a^7*b^3*c*i*k^3 - 1728*a^6*c^5*d*h*j^2 + 1536*a^7*b*c^3*i^3*k + 512*a^
5*c^6*e*f^2*k + 24*a^2*b^9*d*h*k^2 - 3072*a^6*c^5*d*f*k^2 - 16*b^8*c^3*d^2*
e*k + 6*b^8*c^3*d^2*f*j - 4608*a^4*c^7*d^2*e*k + 2016*a^7*b*c^3*h*j^3 - 172
8*a^4*c^7*d^2*f*j + 1088*a^6*b^4*c*g*k^3 + 224*a^6*b*c^4*h^3*j + 30*a^5*b^5
*c*h*j^3 + 2304*a^4*c^7*d*e^2*j + 768*a^5*c^6*d*f*i^2 + 256*a^4*c^7*e^2*f*h
 + 6*b^7*c^4*d^2*f*h + 6144*a^7*b*c^3*e*k^3 + 1536*a^4*b*c^6*e^3*k + 512*a^
6*b*c^4*g*i^3 + 192*a^5*b^5*c*e*k^3 - 192*a^4*c^7*d*f^2*h - 10*a^4*b^6*c*f*
j^3 + 108*a*b^9*c*d^2*k^2 + 16*b^6*c^5*d^2*e*g + 4320*a^6*b*c^4*d*j^3 + 432
0*a^3*b*c^7*d^3*j + 222*a*b^5*c^5*d^3*j + 96*a^5*b*c^5*f*h^3 + 96*a^4*b*c^6
*f^3*h - 10*a^3*b^7*c*d*j^3 + 768*a^3*c^8*d*e^2*f + 512*a^3*b*c^7*e^3*g + 1
32*a*b^4*c^6*d^3*h + 2016*a^2*b*c^8*d^3*f - 496*a*b^3*c^7*d^3*f + 224*a^3*b
*c^7*d*f^3 - 18*a*b^5*c^5*d*f^3 - 1920*a^7*b^2*c^2*i^2*k^2 - 1648*a^6*b^3*c
^2*h^2*k^2 + 240*a^6*b^3*c^2*i^2*j^2 - 960*a^6*b^2*c^3*h^2*j^2 - 512*a^6*b^
2*c^3*g^2*k^2 - 480*a^5*b^4*c^2*g^2*k^2 + 198*a^5*b^4*c^2*h^2*j^2 - 240*a^5
*b^3*c^3*g^2*j^2 - 240*a^5*b^3*c^3*f^2*k^2 + 60*a^4*b^5*c^2*g^2*j^2 - 36*a^
4*b^5*c^2*f^2*k^2 - 16*a^5*b^3*c^3*h^2*i^2 - 1920*a^5*b^2*c^4*e^2*k^2 + 768
*a^4*b^4*c^3*e^2*k^2 - 464*a^5*b^2*c^4*f^2*j^2 - 384*a^5*b^2*c^4*g^2*i^2 -
64*a^3*b^6*c^2*e^2*k^2 + 42*a^4*b^4*c^3*f^2*j^2 + 12*a^3*b^6*c^2*f^2*j^2 -
13104*a^4*b^3*c^4*d^2*k^2 + 5628*a^3*b^5*c^3*d^2*k^2 - 1128*a^2*b^7*c^2*d^2
*k^2 + 240*a^4*b^3*c^4*e^2*j^2 - 48*a^4*b^3*c^4*g^2*h^2 - 16*a^4*b^3*c^4*f^
2*i^2 - 16*a^3*b^5*c^3*e^2*j^2 - 4*a^3*b^5*c^3*g^2*h^2 - 2880*a^4*b^2*c^5*d
^2*j^2 + 1750*a^3*b^4*c^4*d^2*j^2 - 345*a^2*b^6*c^3*d^2*j^2 - 192*a^4*b^2*c
^5*f^2*h^2 - 42*a^3*b^4*c^4*f^2*h^2 + 240*a^3*b^3*c^5*d^2*i^2 - 48*a^3*b^3*
c^5*f^2*g^2 - 16*a^3*b^3*c^5*e^2*h^2 - 16*a^2*b^5*c^4*d^2*i^2 - 4*a^2*b^5*c
^4*f^2*g^2 - 464*a^3*b^2*c^6*d^2*h^2 - 384*a^3*b^2*c^6*e^2*g^2 + 42*a^2*b^4
*c^5*d^2*h^2 - 240*a^2*b^3*c^6*d^2*g^2 - 16*a^2*b^3*c^6*e^2*f^2 - 960*a^2*b
^2*c^7*d^2*f^2 - 8*a*b^10*d*f*k^2 - a^2*b^8*c*f^2*j^2 - 2048*a^8*c^3*i^2*k^
2 - 100*a^6*b^5*j^2*k^2 - 64*a^5*b^6*i^2*k^2 - 288*a^7*c^4*h^2*j^2 - 36*a^4
*b^7*h^2*k^2 - 16*a^3*b^8*g^2*k^2 - 2048*a^6*c^5*e^2*k^2 - 864*a^6*c^5*f^2*
j^2 - 4*a^2*b^9*f^2*k^2 - 2592*a^5*c^6*d^2*j^2 - 1536*a^5*c^6*e^2*i^2 - 32*
a^5*c^6*f^2*h^2 - 864*a^4*c^7*d^2*h^2 + 360*a^7*b^2*c^2*j^4 - 4*b^7*c^4*d^2
*g^2 - 9*b^6*c^5*d^2*f^2 - 288*a^3*c^8*d^2*f^2 - 24*a^5*b^2*c^4*h^4 - 16*b^
5*c^6*d^2*e^2 - 9*a^4*b^4*c^3*h^4 - 16*a^3*b^4*c^4*g^4 - 24*a^3*b^2*c^6*f^4
 - 9*a^2*b^4*c^5*f^4 - a^2*b^6*c^3*f^2*h^2 + 192*a^6*b^5*i*k^3 - 96*a^5*b^6
*g*k^3 - 1728*a^7*c^4*f*j^3 - 192*a^5*c^6*f^3*j - 10*b^7*c^4*d^3*j - 1024*a
^6*c^5*e*i^3 - 1024*a^4*c^7*e^3*i + 1536*a^8*b^2*c*k^4 - 10*b^6*c^5*d^3*h -
 1728*a^3*c^8*d^3*h - 192*a^5*c^6*d*h^3 - 25*a^6*b^4*c*j^4 + 30*b^5*c^6*d^3
*f + 360*a*b^2*c^8*d^4 - 4*b^11*d^2*k^2 - 4096*a^9*c^2*k^4 - 1296*a^8*c^3*j
^4 - 144*a^7*b^4*k^4 - 256*a^7*c^4*i^4 - 16*a^6*c^5*h^4 - 16*a^4*c^7*f^4 -
256*a^3*c^8*e^4 - 25*b^4*c^7*d^4 - 1296*a^2*c^9*d^4 - b^8*c^3*d^2*h^2 - b^1
0*c*d^2*j^2, z, n)*((6144*a^5*c^8*d + 2048*a^6*c^7*h - 288*a^2*b^6*c^5*d +
1920*a^3*b^4*c^6*d - 5632*a^4*b^2*c^7*d + 16*a^2*b^7*c^4*f - 192*a^3*b^5*c^
5*f + 768*a^4*b^3*c^6*f - 32*a^3*b^6*c^4*h + 384*a^4*b^4*c^5*h - 1536*a^5*b
^2*c^6*h + 16*a^3*b^7*c^3*j - 192*a^4*b^5*c^4*j + 768*a^5*b^3*c^5*j + 16*a*
b^8*c^4*d - 1024*a^5*b*c^7*f - 1024*a^6*b*c^6*j)/(8*(64*a^5*c^5 - a^2*b^6*c
^2 + 12*a^3*b^4*c^3 - 48*a^4*b^2*c^4)) + (x*(32*a^2*b^6*c^5*e - 2048*a^6*c^
7*i - 2048*a^5*c^8*e - 384*a^3*b^4*c^6*e + 1536*a^4*b^2*c^7*e - 16*a^2*b^7*
c^4*g + 192*a^3*b^5*c^5*g - 768*a^4*b^3*c^6*g + 32*a^3*b^6*c^4*i - 384*a^4*
b^4*c^5*i + 1536*a^5*b^2*c^6*i + 32*a^2*b^9*c^2*k - 528*a^3*b^7*c^3*k + 326
4*a^4*b^5*c^4*k - 8960*a^5*b^3*c^5*k + 1024*a^5*b*c^7*g + 9216*a^6*b*c^6*k)
)/(4*(64*a^5*c^5 - a^2*b^6*c^2 + 12*a^3*b^4*c^3 - 48*a^4*b^2*c^4)) - (root(
1572864*a^8*b^2*c^9*z^4 - 983040*a^7*b^4*c^8*z^4 + 327680*a^6*b^6*c^7*z^4 -
 61440*a^5*b^8*c^6*z^4 + 6144*a^4*b^10*c^5*z^4 - 256*a^3*b^12*c^4*z^4 - 104
8576*a^9*c^10*z^4 - 1572864*a^8*b^2*c^7*k*z^3 + 983040*a^7*b^4*c^6*k*z^3 -
```

327680*a^6*b^6*c^5*k*z^3 + 61440*a^5*b^8*c^4*k*z^3 - 6144*a^4*b^10*c^3*k*z^
3 + 256*a^3*b^12*c^2*k*z^3 + 1048576*a^9*c^8*k*z^3 + 98304*a^8*b*c^6*i*k*z^
2 + 98304*a^7*b*c^7*e*k*z^2 + 57344*a^7*b*c^7*f*j*z^2 + 32768*a^7*b*c^7*g*i
*z^2 + 57344*a^6*b*c^8*d*h*z^2 + 32768*a^6*b*c^8*e*g*z^2 - 32*a*b^10*c^4*d*
f*z^2 - 90112*a^7*b^3*c^5*i*k*z^2 + 30720*a^6*b^5*c^4*i*k*z^2 - 4608*a^5*b^
7*c^3*i*k*z^2 + 256*a^4*b^9*c^2*i*k*z^2 - 49152*a^7*b^2*c^6*g*k*z^2 + 45056
*a^6*b^4*c^5*g*k*z^2 + 24576*a^7*b^2*c^6*h*j*z^2 - 15360*a^5*b^6*c^4*g*k*z^
2 - 3072*a^5*b^6*c^4*h*j*z^2 + 2304*a^4*b^8*c^3*g*k*z^2 + 2048*a^6*b^4*c^5*
h*j*z^2 + 576*a^4*b^8*c^3*h*j*z^2 - 128*a^3*b^10*c^2*g*k*z^2 - 32*a^3*b^10*
c^2*h*j*z^2 - 90112*a^6*b^3*c^6*e*k*z^2 - 49152*a^6*b^3*c^6*f*j*z^2 + 30720
*a^5*b^5*c^5*e*k*z^2 - 24576*a^6*b^3*c^6*g*i*z^2 + 15360*a^5*b^5*c^5*f*j*z^
2 + 6144*a^5*b^5*c^5*g*i*z^2 - 4608*a^4*b^7*c^4*e*k*z^2 - 2048*a^4*b^7*c^4*
f*j*z^2 - 512*a^4*b^7*c^4*g*i*z^2 + 256*a^3*b^9*c^3*e*k*z^2 + 96*a^3*b^9*c^
3*f*j*z^2 + 131072*a^6*b^2*c^7*d*j*z^2 + 49152*a^6*b^2*c^7*e*i*z^2 - 43008*
a^5*b^4*c^6*d*j*z^2 - 12288*a^5*b^4*c^6*e*i*z^2 + 6144*a^5*b^4*c^6*f*h*z^2
+ 6144*a^4*b^6*c^5*d*j*z^2 - 2048*a^4*b^6*c^5*f*h*z^2 + 1024*a^4*b^6*c^5*e*
i*z^2 - 320*a^3*b^8*c^4*d*j*z^2 + 192*a^3*b^8*c^4*f*h*z^2 - 49152*a^5*b^3*c
^7*d*h*z^2 - 24576*a^5*b^3*c^7*e*g*z^2 + 15360*a^4*b^5*c^6*d*h*z^2 + 6144*a
^4*b^5*c^6*e*g*z^2 - 2048*a^3*b^7*c^5*d*h*z^2 - 512*a^3*b^7*c^5*e*g*z^2 + 9
6*a^2*b^9*c^4*d*h*z^2 + 24576*a^5*b^2*c^8*d*f*z^2 - 3072*a^3*b^6*c^6*d*f*z^
2 + 2048*a^4*b^4*c^7*d*f*z^2 + 576*a^2*b^8*c^5*d*f*z^2 + 1536*a^4*b^10*c*k^
2*z^2 + 61440*a^8*b*c^6*j^2*z^2 - 16*a^3*b^11*c*j^2*z^2 + 12288*a^7*b*c^7*h
^2*z^2 + 12288*a^6*b*c^8*f^2*z^2 + 61440*a^5*b*c^9*d^2*z^2 + 432*a*b^9*c^5*
d^2*z^2 - 49152*a^8*c^7*h*j*z^2 - 147456*a^7*c^8*d*j*z^2 - 65536*a^7*c^8*e*
i*z^2 - 16384*a^7*c^8*f*h*z^2 - 49152*a^6*c^9*d*f*z^2 + 516096*a^8*b^2*c^5*
k^2*z^2 - 288768*a^7*b^4*c^4*k^2*z^2 + 88576*a^6*b^6*c^3*k^2*z^2 - 15744*a^
5*b^8*c^2*k^2*z^2 - 61440*a^7*b^3*c^5*j^2*z^2 + 24064*a^6*b^5*c^4*j^2*z^2 -
 4608*a^5*b^7*c^3*j^2*z^2 + 432*a^4*b^9*c^2*j^2*z^2 + 24576*a^7*b^2*c^6*i^2
*z^2 - 6144*a^6*b^4*c^5*i^2*z^2 + 512*a^5*b^6*c^4*i^2*z^2 - 8192*a^6*b^3*c^
6*h^2*z^2 + 1536*a^5*b^5*c^5*h^2*z^2 - 16*a^3*b^9*c^3*h^2*z^2 - 8192*a^6*b^
2*c^7*g^2*z^2 + 6144*a^5*b^4*c^6*g^2*z^2 - 1536*a^4*b^6*c^5*g^2*z^2 + 128*a
^3*b^8*c^4*g^2*z^2 - 8192*a^5*b^3*c^7*f^2*z^2 + 1536*a^4*b^5*c^6*f^2*z^2 -
16*a^2*b^9*c^4*f^2*z^2 + 24576*a^5*b^2*c^8*e^2*z^2 - 6144*a^4*b^4*c^7*e^2*z
^2 + 512*a^3*b^6*c^6*e^2*z^2 - 61440*a^4*b^3*c^8*d^2*z^2 + 24064*a^3*b^5*c^
7*d^2*z^2 - 4608*a^2*b^7*c^6*d^2*z^2 - 393216*a^9*c^6*k^2*z^2 - 64*a^3*b^12
*k^2*z^2 - 32768*a^8*c^7*i^2*z^2 - 32768*a^6*c^9*e^2*z^2 - 16*b^11*c^4*d^2*
z^2 - 16384*a^7*b*c^5*g*i*k*z - 10240*a^7*b*c^5*f*j*k*z + 4096*a^7*b*c^5*h*
i*j*z - 47104*a^6*b*c^6*d*h*k*z - 16384*a^6*b*c^6*e*g*k*z + 6144*a^6*b*c^6*
f*g*j*z + 4096*a^6*b*c^6*e*h*j*z + 32*a*b^10*c^2*d*f*k*z - 6144*a^5*b*c^7*d
*g*h*z - 4096*a^5*b*c^7*d*f*i*z - 32*a*b^8*c^4*d*f*g*z - 4096*a^4*b*c^8*d*e
*f*z + 64*a*b^7*c^5*d*e*f*z - 18432*a^7*b^2*c^4*h*j*k*z + 4608*a^6*b^4*c^3*
h*j*k*z - 384*a^5*b^6*c^2*h*j*k*z + 12288*a^6*b^3*c^4*g*i*k*z + 7680*a^6*b^
3*c^4*f*j*k*z - 3072*a^6*b^3*c^4*h*i*j*z - 3072*a^5*b^5*c^3*g*i*k*z - 1920*
a^5*b^5*c^3*f*j*k*z + 768*a^5*b^5*c^3*h*i*j*z + 256*a^4*b^7*c^2*g*i*k*z + 1
60*a^4*b^7*c^2*f*j*k*z - 64*a^4*b^7*c^2*h*i*j*z - 65536*a^6*b^2*c^5*d*j*k*z
 - 24576*a^6*b^2*c^5*e*i*k*z + 21504*a^5*b^4*c^4*d*j*k*z + 9216*a^6*b^2*c^5
*f*i*j*z + 6144*a^5*b^4*c^4*e*i*k*z - 3072*a^5*b^4*c^4*f*h*k*z - 3072*a^4*b
^6*c^3*d*j*k*z - 2304*a^5*b^4*c^4*f*i*j*z - 2048*a^6*b^2*c^5*g*h*j*z + 1536
*a^5*b^4*c^4*g*h*j*z + 1024*a^4*b^6*c^3*f*h*k*z - 512*a^4*b^6*c^3*e*i*k*z -
 384*a^4*b^6*c^3*g*h*j*z + 192*a^4*b^6*c^3*f*i*j*z + 160*a^3*b^8*c^2*d*j*k*
z - 96*a^3*b^8*c^2*f*h*k*z + 32*a^3*b^8*c^2*g*h*j*z + 41472*a^5*b^3*c^5*d*h
*k*z - 13440*a^4*b^5*c^4*d*h*k*z + 12288*a^5*b^3*c^5*e*g*k*z - 4608*a^5*b^3
*c^5*f*g*j*z - 3072*a^5*b^3*c^5*e*h*j*z - 3072*a^4*b^5*c^4*e*g*k*z + 1888*a
^3*b^7*c^3*d*h*k*z + 1152*a^4*b^5*c^4*f*g*j*z + 768*a^4*b^5*c^4*e*h*j*z + 2
56*a^3*b^7*c^3*e*g*k*z - 96*a^3*b^7*c^3*f*g*j*z - 96*a^2*b^9*c^2*d*h*k*z -
64*a^3*b^7*c^3*e*h*j*z + 9216*a^5*b^2*c^6*e*f*j*z - 9216*a^5*b^2*c^6*d*h*i*
z - 6656*a^4*b^4*c^5*d*f*k*z - 6144*a^5*b^2*c^6*d*f*k*z + 3456*a^3*b^6*c^4*
d*f*k*z - 2304*a^4*b^4*c^5*e*f*j*z + 2304*a^4*b^4*c^5*d*h*i*z - 576*a^2*b^8
*c^3*d*f*k*z + 192*a^3*b^6*c^4*e*f*j*z - 192*a^3*b^6*c^4*d*h*i*z + 4608*a^4

*b^3*c^6*d*g*h*z + 3072*a^4*b^3*c^6*d*f*i*z - 1152*a^3*b^5*c^5*d*g*h*z - 76
8*a^3*b^5*c^5*d*f*i*z + 96*a^2*b^7*c^4*d*g*h*z + 64*a^2*b^7*c^4*d*f*i*z - 9
216*a^4*b^2*c^7*d*e*h*z + 2304*a^3*b^4*c^6*d*e*h*z + 2048*a^4*b^2*c^7*d*f*g
*z - 1536*a^3*b^4*c^6*d*f*g*z + 384*a^2*b^6*c^5*d*f*g*z - 192*a^2*b^6*c^5*d
*e*h*z + 3072*a^3*b^3*c^7*d*e*f*z - 768*a^2*b^5*c^6*d*e*f*z - 3072*a^8*b*c^
4*j^2*k*z + 48*a^5*b^7*c*j^2*k*z - 49152*a^8*b*c^4*i*k^2*z + 2304*a^5*b^7*c
*i*k^2*z - 9216*a^7*b*c^5*h^2*k*z - 32*a^4*b^8*c*i*j^2*z - 1152*a^4*b^8*c*g
*k^2*z + 9216*a^7*b*c^5*g*j^2*z - 3072*a^6*b*c^6*f^2*k*z + 16*a^3*b^9*c*g*j
^2*z - 49152*a^7*b*c^5*e*k^2*z - 128*a^3*b^9*c*e*k^2*z - 58368*a^5*b*c^7*d^
2*k*z - 1024*a^6*b*c^6*g*h^2*z - 432*a*b^9*c^3*d^2*k*z + 1024*a^5*b*c^7*f^2
*g*z + 32*a*b^8*c^4*d^2*i*z - 9216*a^4*b*c^8*d^2*g*z + 336*a*b^7*c^5*d^2*g*
z - 672*a*b^6*c^6*d^2*e*z + 24576*a^8*c^5*h*j*k*z + 73728*a^7*c^6*d*j*k*z +
 32768*a^7*c^6*e*i*k*z - 12288*a^7*c^6*f*i*j*z + 8192*a^7*c^6*f*h*k*z + 245
76*a^6*c^7*d*f*k*z - 12288*a^6*c^7*e*f*j*z + 12288*a^6*c^7*d*h*i*z + 12288*
a^5*c^8*d*e*h*z + 2304*a^7*b^3*c^3*j^2*k*z - 576*a^6*b^5*c^2*j^2*k*z + 4505
6*a^7*b^3*c^3*i*k^2*z - 15360*a^6*b^5*c^2*i*k^2*z - 12288*a^7*b^2*c^4*i^2*k
*z + 3072*a^6*b^4*c^3*i^2*k*z - 256*a^5*b^6*c^2*i^2*k*z + 15872*a^7*b^2*c^4
*i*j^2*z + 6912*a^6*b^3*c^4*h^2*k*z - 4992*a^6*b^4*c^3*i*j^2*z - 1728*a^5*b
^5*c^3*h^2*k*z + 672*a^5*b^6*c^2*i*j^2*z + 144*a^4*b^7*c^2*h^2*k*z + 24576*
a^7*b^2*c^4*g*k^2*z - 22528*a^6*b^4*c^3*g*k^2*z + 7680*a^5*b^6*c^2*g*k^2*z
+ 4096*a^6*b^2*c^5*g^2*k*z - 3072*a^5*b^4*c^4*g^2*k*z + 768*a^4*b^6*c^3*g^2
*k*z - 64*a^3*b^8*c^2*g^2*k*z - 7936*a^6*b^3*c^4*g*j^2*z + 2496*a^5*b^5*c^3
*g*j^2*z - 1536*a^6*b^2*c^5*h^2*i*z + 1280*a^5*b^3*c^5*f^2*k*z + 384*a^5*b^
4*c^4*h^2*i*z - 336*a^4*b^7*c^2*g*j^2*z + 192*a^4*b^5*c^4*f^2*k*z - 144*a^3
*b^7*c^3*f^2*k*z - 32*a^4*b^6*c^3*h^2*i*z + 16*a^2*b^9*c^2*f^2*k*z + 45056*
a^6*b^3*c^4*e*k^2*z - 15360*a^5*b^5*c^3*e*k^2*z - 12288*a^5*b^2*c^6*e^2*k*z
 + 3072*a^4*b^4*c^5*e^2*k*z + 2304*a^4*b^7*c^2*e*k^2*z - 256*a^3*b^6*c^4*e^
2*k*z + 59136*a^4*b^3*c^6*d^2*k*z - 23488*a^3*b^5*c^5*d^2*k*z + 15872*a^6*b
^2*c^5*e*j^2*z - 4992*a^5*b^4*c^4*e*j^2*z + 4560*a^2*b^7*c^4*d^2*k*z + 1536
*a^5*b^2*c^6*f^2*i*z + 768*a^5*b^3*c^5*g*h^2*z + 672*a^4*b^6*c^3*e*j^2*z -
384*a^4*b^4*c^5*f^2*i*z - 192*a^4*b^5*c^4*g*h^2*z - 32*a^3*b^8*c^2*e*j^2*z
+ 32*a^3*b^6*c^4*f^2*i*z + 16*a^3*b^7*c^3*g*h^2*z - 15872*a^4*b^2*c^7*d^2*i
*z + 4992*a^3*b^4*c^6*d^2*i*z - 1536*a^5*b^2*c^6*e*h^2*z - 768*a^4*b^3*c^6*
f^2*g*z - 672*a^2*b^6*c^5*d^2*i*z + 384*a^4*b^4*c^5*e*h^2*z + 192*a^3*b^5*c
^5*f^2*g*z - 32*a^3*b^6*c^4*e*h^2*z - 16*a^2*b^7*c^4*f^2*g*z + 7936*a^3*b^3
*c^7*d^2*g*z - 2496*a^2*b^5*c^6*d^2*g*z + 1536*a^4*b^2*c^7*e*f^2*z - 384*a^
3*b^4*c^6*e*f^2*z + 32*a^2*b^6*c^5*e*f^2*z - 15872*a^3*b^2*c^8*d^2*e*z + 49
92*a^2*b^4*c^7*d^2*e*z - 61440*a^8*b^2*c^3*k^3*z + 21504*a^7*b^4*c^2*k^3*z
+ 16384*a^8*c^5*i^2*k*z - 18432*a^8*c^5*i*j^2*z - 128*a^4*b^9*i*k^2*z + 204
8*a^7*c^6*h^2*i*z + 64*a^3*b^10*g*k^2*z + 16384*a^6*c^7*e^2*k*z + 16*b^11*c
^2*d^2*k*z - 18432*a^7*c^6*e*j^2*z - 2048*a^6*c^7*f^2*i*z + 18432*a^5*c^8*d
^2*i*z - 3328*a^6*b^6*c*k^3*z + 2048*a^6*c^7*e*h^2*z - 16*b^9*c^4*d^2*g*z -
 2048*a^5*c^8*e*f^2*z + 32*b^8*c^5*d^2*e*z + 18432*a^4*c^9*d^2*e*z + 65536*
a^9*c^4*k^3*z + 192*a^5*b^8*k^3*z - 3328*a^7*b*c^3*h*i*j*k - 6912*a^6*b*c^4
*d*i*j*k - 3328*a^6*b*c^4*e*h*j*k - 1536*a^6*b*c^4*f*g*j*k - 768*a^6*b*c^4*
g*h*i*j - 768*a^6*b*c^4*f*h*i*k - 6912*a^5*b*c^5*d*e*j*k - 2304*a^5*b*c^5*d
*g*i*j - 1792*a^5*b*c^5*e*f*i*j + 1536*a^5*b*c^5*d*g*h*k - 1280*a^5*b*c^5*d
*f*i*k - 768*a^5*b*c^5*e*g*h*j - 768*a^5*b*c^5*e*f*h*k - 256*a^5*b*c^5*f*g*
h*i + 16*a*b^8*c^2*d*f*g*k - 4*a*b^8*c^2*d*f*h*j - 2304*a^4*b*c^6*d*e*g*j -
 1792*a^4*b*c^6*d*e*h*i - 1280*a^4*b*c^6*d*e*f*k - 768*a^4*b*c^6*d*f*g*i -
256*a^4*b*c^6*e*f*g*h - 32*a*b^7*c^3*d*e*f*k - 768*a^3*b*c^7*d*e*f*g + 32*a
*b^5*c^5*d*e*f*g + 576*a^6*b^3*c^2*h*i*j*k + 1664*a^6*b^2*c^3*g*h*j*k + 384
*a^6*b^2*c^3*f*i*j*k - 288*a^5*b^4*c^2*g*h*j*k - 160*a^5*b^4*c^2*f*i*j*k +
2112*a^5*b^3*c^3*d*i*j*k + 576*a^5*b^3*c^3*e*h*j*k - 448*a^5*b^3*c^3*f*h*i*
k - 192*a^5*b^3*c^3*g*h*i*j - 192*a^5*b^3*c^3*f*g*j*k - 160*a^4*b^5*c^2*d*i
*j*k + 96*a^4*b^5*c^2*f*h*i*k + 80*a^4*b^5*c^2*f*g*j*k + 32*a^4*b^5*c^2*g*h
*i*j + 4992*a^5*b^2*c^4*d*h*i*k - 4608*a^5*b^2*c^4*e*g*i*k + 3456*a^5*b^2*c
^4*d*g*j*k - 1312*a^4*b^4*c^3*d*h*i*k - 1056*a^4*b^4*c^3*d*g*j*k + 896*a^5*
b^2*c^4*f*g*i*j + 768*a^4*b^4*c^3*e*g*i*k + 384*a^5*b^2*c^4*f*g*h*k + 384*a

^5*b^2*c^4*e*h*i*j + 384*a^5*b^2*c^4*e*f*j*k + 224*a^4*b^4*c^3*f*g*h*k - 16
0*a^4*b^4*c^3*e*f*j*k - 96*a^4*b^4*c^3*f*g*i*j + 96*a^3*b^6*c^2*d*h*i*k + 8
0*a^3*b^6*c^2*d*g*j*k - 64*a^4*b^4*c^3*e*h*i*j - 48*a^3*b^6*c^2*f*g*h*k - 2
496*a^4*b^3*c^4*d*g*h*k + 2112*a^4*b^3*c^4*d*e*j*k - 960*a^4*b^3*c^4*d*f*i*
k + 656*a^3*b^5*c^3*d*g*h*k - 448*a^4*b^3*c^4*e*f*h*k + 384*a^3*b^5*c^3*d*f
*i*k + 320*a^4*b^3*c^4*d*g*i*j - 192*a^4*b^3*c^4*f*g*h*i - 192*a^4*b^3*c^4*
e*g*h*j + 192*a^4*b^3*c^4*e*f*i*j - 160*a^3*b^5*c^3*d*e*j*k + 96*a^3*b^5*c^
3*e*f*h*k - 48*a^2*b^7*c^2*d*g*h*k + 32*a^3*b^5*c^3*e*g*h*j - 32*a^2*b^7*c^
2*d*f*i*k + 4992*a^4*b^2*c^5*d*e*h*k - 3584*a^4*b^2*c^5*d*f*h*j - 1312*a^3*
b^4*c^4*d*e*h*k + 896*a^4*b^2*c^5*e*f*g*j + 896*a^4*b^2*c^5*d*g*h*i + 640*a
^4*b^2*c^5*d*f*g*k - 640*a^4*b^2*c^5*d*e*i*j + 600*a^3*b^4*c^4*d*f*h*j + 48
0*a^3*b^4*c^4*d*f*g*k + 384*a^4*b^2*c^5*e*f*h*i - 192*a^2*b^6*c^3*d*f*g*k -
 96*a^3*b^4*c^4*e*f*g*j - 96*a^3*b^4*c^4*d*g*h*i + 96*a^2*b^6*c^3*d*e*h*k +
 12*a^2*b^6*c^3*d*f*h*j - 960*a^3*b^3*c^5*d*e*f*k + 384*a^2*b^5*c^4*d*e*f*k
 + 320*a^3*b^3*c^5*d*e*g*j - 192*a^3*b^3*c^5*e*f*g*h - 192*a^3*b^3*c^5*d*f*
g*i + 192*a^3*b^3*c^5*d*e*h*i + 32*a^2*b^5*c^4*d*f*g*i + 896*a^3*b^2*c^6*d*
e*g*h + 384*a^3*b^2*c^6*d*e*f*i - 96*a^2*b^4*c^5*d*e*g*h - 64*a^2*b^4*c^5*d
*e*f*i - 192*a^2*b^3*c^6*d*e*f*g + 48*a^6*b^4*c*i*j^2*k - 1424*a^6*b^4*c*h*
j*k^2 - 2304*a^7*b*c^3*g*j^2*k - 24*a^5*b^5*c*g*j^2*k + 2048*a^7*b*c^3*g*i*
k^2 - 1024*a^7*b*c^3*f*j*k^2 - 768*a^5*b^5*c*g*i*k^2 + 408*a^5*b^5*c*f*j*k^
2 + 256*a^6*b*c^4*g*h^2*k + 16*a^4*b^6*c*g*i*j^2 + 4608*a^6*b*c^4*e*i^2*k +
 4608*a^5*b*c^5*e^2*i*k - 896*a^6*b*c^4*f*i^2*j + 768*a^4*b^6*c*d*j*k^2 - 2
56*a^4*b^6*c*f*h*k^2 - 128*a^4*b^6*c*e*i*k^2 + 2208*a^6*b*c^4*f*h*j^2 - 192
0*a^6*b*c^4*e*i*j^2 + 800*a^5*b*c^5*f^2*h*j - 256*a^5*b*c^5*f^2*g*k - 16*a*
b^8*c^2*d^2*i*k + 6*a^3*b^7*c*f*h*j^2 + 8192*a^6*b*c^4*d*h*k^2 + 2048*a^6*b
*c^4*e*g*k^2 - 472*a^3*b^7*c*d*h*k^2 + 64*a^3*b^7*c*e*g*k^2 + 4896*a^4*b*c^
6*d^2*h*j + 2304*a^4*b*c^6*d^2*g*k + 1824*a^5*b*c^5*d*h^2*j - 384*a^5*b*c^5
*e*h^2*i - 168*a*b^7*c^3*d^2*g*k + 42*a*b^7*c^3*d^2*h*j + 6*a^2*b^8*c*d*h*j
^2 + 1536*a^5*b*c^5*e*g*i^2 + 1536*a^4*b*c^6*e^2*g*i - 896*a^5*b*c^5*d*h*i^
2 - 896*a^4*b*c^6*e^2*f*j + 144*a^2*b^8*c*d*f*k^2 + 4896*a^5*b*c^5*d*f*j^2
+ 1824*a^4*b*c^6*d*f^2*j - 384*a^4*b*c^6*e*f^2*i + 336*a*b^6*c^4*d^2*e*k -
156*a*b^6*c^4*d^2*f*j + 16*a*b^6*c^4*d^2*g*i + 12*a*b^7*c^3*d*f^2*j + 2208*
a^3*b*c^7*d^2*f*h - 1920*a^3*b*c^7*d^2*e*i + 800*a^4*b*c^6*d*f*h^2 - 102*a*
b^5*c^5*d^2*f*h - 32*a*b^5*c^5*d^2*e*i + 12*a*b^6*c^4*d*f^2*h - 2*a*b^7*c^3
*d*f*h^2 - 896*a^3*b*c^7*d*e^2*h - 8*a*b^6*c^4*d*f*g^2 - 240*a*b^4*c^6*d^2*
e*g - 32*a*b^4*c^6*d*e^2*f + 3072*a^7*c^4*f*i*j*k + 3072*a^6*c^5*e*f*j*k -
3072*a^6*c^5*d*h*i*k + 1536*a^6*c^5*e*h*i*j + 4608*a^5*c^6*d*e*i*j - 3072*a
^5*c^6*d*e*h*k - 1152*a^5*c^6*d*f*h*j + 512*a^5*c^6*e*f*h*i + 1536*a^4*c^7*
d*e*f*i - 2*a*b^9*c*d*f*j^2 - 1088*a^7*b^2*c^2*i*j^2*k + 4800*a^7*b^2*c^2*h
*j*k^2 + 960*a^6*b^2*c^3*h^2*i*k + 544*a^6*b^3*c^2*g*j^2*k - 144*a^5*b^4*c^
2*h^2*i*k - 2304*a^6*b^2*c^3*g*i^2*k + 1920*a^6*b^3*c^2*g*i*k^2 + 1152*a^5*
b^3*c^3*g^2*i*k - 864*a^6*b^3*c^2*f*j*k^2 + 384*a^5*b^4*c^2*g*i^2*k + 192*a
^6*b^2*c^3*h*i^2*j - 192*a^4*b^5*c^2*g^2*i*k - 32*a^5*b^4*c^2*h*i^2*j - 108
8*a^6*b^2*c^3*e*j^2*k + 960*a^6*b^2*c^3*g*i*j^2 - 480*a^5*b^3*c^3*g*h^2*k -
 240*a^5*b^4*c^2*g*i*j^2 + 192*a^5*b^2*c^4*f^2*i*k + 72*a^4*b^5*c^2*g*h^2*k
 + 48*a^5*b^4*c^2*e*j^2*k + 48*a^4*b^4*c^3*f^2*i*k - 16*a^3*b^6*c^2*f^2*i*k
 + 13376*a^6*b^2*c^3*d*j*k^2 - 5136*a^5*b^4*c^2*d*j*k^2 - 3840*a^6*b^2*c^3*
e*i*k^2 + 1536*a^5*b^4*c^2*e*i*k^2 - 768*a^5*b^3*c^3*e*i^2*k - 768*a^4*b^3*
c^4*e^2*i*k + 624*a^5*b^4*c^2*f*h*k^2 + 576*a^6*b^2*c^3*f*h*k^2 + 192*a^5*b
^2*c^4*g^2*h*j + 96*a^5*b^3*c^3*f*i^2*j + 48*a^4*b^4*c^3*g^2*h*j - 8*a^3*b^
6*c^2*g^2*h*j + 6848*a^4*b^2*c^5*d^2*i*k - 2448*a^3*b^4*c^4*d^2*i*k + 960*a
^5*b^2*c^4*e*h^2*k - 864*a^5*b^2*c^4*f*h^2*j + 480*a^5*b^3*c^3*e*i*j^2 + 33
6*a^4*b^3*c^4*f^2*h*j + 336*a^2*b^6*c^3*d^2*i*k + 192*a^5*b^2*c^4*g*h^2*i +
 144*a^5*b^3*c^3*f*h*j^2 - 144*a^4*b^4*c^3*e*h^2*k - 102*a^4*b^5*c^2*f*h*j^
2 - 96*a^4*b^3*c^4*f^2*g*k - 32*a^4*b^5*c^2*e*i*j^2 - 30*a^3*b^5*c^3*f^2*h*
j - 24*a^3*b^5*c^3*f^2*g*k + 16*a^4*b^4*c^3*g*h^2*i - 12*a^4*b^4*c^3*f*h^2*
j + 12*a^3*b^6*c^2*f*h^2*j + 8*a^2*b^7*c^2*f^2*g*k - 2*a^2*b^7*c^2*f^2*h*j
- 9312*a^5*b^3*c^3*d*h*k^2 + 3288*a^4*b^5*c^2*d*h*k^2 - 2304*a^4*b^2*c^5*e^
2*g*k + 1920*a^5*b^3*c^3*e*g*k^2 + 1152*a^4*b^3*c^4*e*g^2*k - 768*a^4*b^5*c

^2*e*g*k^2 + 384*a^3*b^4*c^4*e^2*g*k - 320*a^5*b^2*c^4*d*i^2*j - 224*a^4*b^3*c^4*f*g^2*j + 192*a^5*b^2*c^4*f*h*i^2 + 192*a^4*b^2*c^5*e^2*h*j - 192*a^3*b^5*c^3*e*g^2*k - 32*a^3*b^4*c^4*e^2*h*j + 24*a^3*b^5*c^3*f*g^2*j - 3552*a^5*b^2*c^4*d*h*j^2 - 3424*a^3*b^3*c^5*d^2*g*k + 1332*a^4*b^4*c^3*d*h*j^2 + 1224*a^2*b^5*c^4*d^2*g*k + 960*a^5*b^2*c^4*e*g*j^2 - 496*a^3*b^3*c^5*d^2*h*j + 432*a^4*b^3*c^4*d*h^2*j - 240*a^4*b^4*c^3*e*g*j^2 - 222*a^2*b^5*c^4*d^2*h*j + 192*a^4*b^2*c^5*f^2*g*i + 192*a^4*b^2*c^5*e*f^2*k - 174*a^3*b^5*c^3*d*h^2*j - 156*a^3*b^6*c^2*d*h*j^2 + 48*a^3*b^4*c^4*e*f^2*k - 32*a^4*b^3*c^4*e*h^2*i + 16*a^3*b^6*c^2*e*g*j^2 + 16*a^3*b^4*c^4*f^2*g*i - 16*a^2*b^6*c^3*e*f^2*k + 12*a^2*b^7*c^2*d*h^2*j + 1728*a^5*b^2*c^4*d*f*k^2 + 1392*a^4*b^4*c^3*d*f*k^2 - 840*a^3*b^6*c^2*d*f*k^2 - 768*a^4*b^2*c^5*e*g^2*i + 576*a^4*b^2*c^5*d*g^2*j + 96*a^4*b^3*c^4*d*h*i^2 + 96*a^3*b^3*c^5*e^2*f*j - 80*a^3*b^4*c^4*d*g^2*j + 64*a^4*b^2*c^5*f*g^2*h + 48*a^3*b^4*c^4*f*g^2*h + 6848*a^3*b^2*c^6*d^2*e*k - 3552*a^3*b^2*c^6*d^2*f*j - 2448*a^2*b^4*c^5*d^2*e*k + 1332*a^2*b^4*c^5*d^2*f*j + 960*a^3*b^2*c^6*d^2*g*i - 496*a^4*b^3*c^4*d*f*j^2 + 432*a^3*b^3*c^5*d*f^2*j - 240*a^2*b^4*c^5*d^2*g*i - 222*a^3*b^5*c^3*d*f*j^2 + 192*a^4*b^2*c^5*e*g*h^2 - 174*a^2*b^5*c^4*d*f^2*j + 42*a^2*b^7*c^2*d*f*j^2 - 32*a^3*b^3*c^5*e*f^2*i + 16*a^3*b^4*c^4*e*g*h^2 - 320*a^3*b^2*c^6*d*e^2*j - 224*a^3*b^3*c^5*d*g^2*h + 192*a^4*b^2*c^5*d*f*i^2 + 192*a^3*b^2*c^6*e^2*f*h - 32*a^3*b^4*c^4*d*f*i^2 + 24*a^2*b^5*c^4*d*g^2*h - 864*a^3*b^2*c^6*d*f^2*h + 480*a^2*b^3*c^6*d^2*e*i + 336*a^3*b^3*c^5*d*f*h^2 + 192*a^3*b^2*c^6*e*f^2*g + 144*a^2*b^3*c^6*d^2*f*h - 30*a^2*b^5*c^4*d*f*h^2 + 16*a^2*b^4*c^5*e*f^2*g - 12*a^2*b^4*c^5*d*f^2*h + 192*a^3*b^2*c^6*d*f*g^2 + 96*a^2*b^3*c^6*d*e^2*h + 48*a^2*b^4*c^5*d*f*g^2 + 960*a^2*b^2*c^7*d^2*e*g + 192*a^2*b^2*c^7*d*e^2*f - 3072*a^8*b*c^2*j^2*k^2 + 1104*a^7*b^3*c*j^2*k^2 + 768*a^6*b^4*c*i^2*k^2 - 256*a^6*b^3*c^2*i^3*k + 1536*a^7*b*c^3*h^2*k^2 - 960*a^7*b*c^3*i^2*j^2 + 444*a^5*b^5*c*h^2*k^2 - 16*a^5*b^5*c*i^2*j^2 - 3072*a^7*b^2*c^2*g*k^3 - 496*a^6*b^3*c^2*h*j^3 + 192*a^4*b^6*c*g^2*k^2 - 192*a^4*b^4*c^3*g^3*k + 144*a^5*b^3*c^3*h^3*j + 32*a^3*b^6*c^2*g^3*k - 18*a^4*b^5*c^2*h^3*j - 9*a^4*b^6*c*h^2*j^2 - 192*a^6*b*c^4*h^2*i^2 + 36*a^3*b^7*c*f^2*k^2 - 4*a^3*b^7*c*g^2*j^2 - 2176*a^6*b^3*c^2*e*k^3 - 256*a^3*b^3*c^5*e^3*k - 192*a^6*b^2*c^3*f*j^3 - 192*a^4*b^2*c^5*f^3*j + 132*a^5*b^4*c^2*f*j^3 + 128*a^4*b^3*c^4*g^3*i - 28*a^3*b^4*c^4*f^3*j + 6*a^2*b^6*c^3*f^3*j + 10752*a^5*b*c^5*d^2*k^2 - 960*a^5*b*c^5*e^2*j^2 - 192*a^5*b*c^5*f^2*i^2 - 1680*a^5*b^3*c^3*d*j^3 - 1680*a^2*b^3*c^6*d^3*j + 222*a^4*b^5*c^2*d*j^3 + 80*a^4*b^3*c^4*f*h^3 + 80*a^3*b^3*c^5*f^3*h + 30*a*b^8*c^2*d^2*j^2 + 6*a^3*b^5*c^3*f*h^3 + 6*a^2*b^5*c^4*f^3*h - 960*a^4*b*c^6*d^2*i^2 - 192*a^4*b*c^6*e^2*h^2 - 192*a^4*b^2*c^5*d*h^3 - 192*a^2*b^2*c^7*d^3*h + 128*a^3*b^3*c^5*e*g^3 - 28*a^3*b^4*c^4*d*h^3 + 12*a*b^6*c^4*d^2*h^2 + 6*a^2*b^6*c^3*d*h^3 - 192*a^3*b*c^7*e^2*f^2 + 60*a*b^5*c^5*d^2*g^2 + 198*a*b^4*c^6*d^2*f^2 + 144*a^2*b^3*c^6*d*f^3 - 960*a^2*b*c^8*d^2*e^2 + 240*a*b^3*c^7*d^2*e^2 + 4608*a^8*c^3*i*j^2*k - 3072*a^8*c^3*h*j*k^2 - 512*a^7*c^4*h^2*i*k + 120*a^5*b^6*h*j*k^2 + 768*a^7*c^4*h*i^2*j + 4608*a^7*c^4*e*j^2*k + 512*a^6*c^5*f^2*i*k + 64*a^4*b^7*g*i*k^2 - 40*a^4*b^7*f*j*k^2 - 9216*a^7*c^4*d*j*k^2 - 4096*a^7*c^4*e*i*k^2 - 1024*a^7*c^4*f*h*k^2 - 4608*a^5*c^6*d^2*i*k - 512*a^6*c^5*e*h^2*k - 192*a^6*c^5*f*h^2*j - 40*a^3*b^8*d*j*k^2 + 24*a^3*b^8*f*h*k^2 + 2304*a^6*c^5*d*i^2*j + 768*a^5*c^6*e^2*h*j + 256*a^6*c^5*f*h*i^2 + 8*b^9*c^2*d^2*g*k - 2*b^9*c^2*d^2*h*j + 6144*a^8*b*c^2*i*k^3 - 2176*a^7*b^3*c*i*k^3 - 1728*a^6*c^5*d*h*j^2 + 1536*a^7*b*c^3*i^3*k + 512*a^5*c^6*e*f^2*k + 24*a^2*b^9*d*h*k^2 - 3072*a^6*c^5*d*f*k^2 - 16*b^8*c^3*d^2*e*k + 6*b^8*c^3*d^2*f*j - 4608*a^4*c^7*d^2*e*k + 2016*a^7*b*c^3*h*j^3 - 1728*a^4*c^7*d^2*f*j + 1088*a^6*b^4*c*g*k^3 + 224*a^6*b*c^4*h^3*j + 30*a^5*b^5*c*h*j^3 + 2304*a^4*c^7*d*e^2*j + 768*a^5*c^6*d*f*i^2 + 256*a^4*c^7*e^2*f*h + 6*b^7*c^4*d^2*f*h + 6144*a^7*b*c^3*e*k^3 + 1536*a^4*b*c^6*e^3*k + 512*a^6*b*c^4*g*i^3 + 192*a^5*b^5*c*e*k^3 - 192*a^4*c^7*d*f^2*h - 10*a^4*b^6*c*f*j^3 + 108*a*b^9*c*d^2*k^2 + 16*b^6*c^5*d^2*e*g + 4320*a^6*b*c^4*d*j^3 + 4320*a^3*b*c^7*d^3*j + 222*a*b^5*c^5*d^3*j + 96*a^5*b*c^5*f*h^3 + 96*a^4*b*c^6*f^3*h - 10*a^3*b^7*c*d*j^3 + 768*a^3*c^8*d*e^2*f + 512*a^3*b*c^7*e^3*g + 132*a*b^4*c^6*d^3*h + 2016*a^2*b*c^8*d^3*f - 496*a*b^3*c^7*d^3*f + 224*a^3*b*c^7*d*f^3 - 18*a*b^5*c^5*d*f^3 - 1920*

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a^7*b^2*c^2*i^2*k^2 - 1648*a^6*b^3*c^2*h^2*k^2 + 240*a^6*b^3*c^2*i^2*j^2 -
960*a^6*b^2*c^3*h^2*j^2 - 512*a^6*b^2*c^3*g^2*k^2 - 480*a^5*b^4*c^2*g^2*k^2
 + 198*a^5*b^4*c^2*h^2*j^2 - 240*a^5*b^3*c^3*g^2*j^2 - 240*a^5*b^3*c^3*f^2*
k^2 + 60*a^4*b^5*c^2*g^2*j^2 - 36*a^4*b^5*c^2*f^2*k^2 - 16*a^5*b^3*c^3*h^2*
i^2 - 1920*a^5*b^2*c^4*e^2*k^2 + 768*a^4*b^4*c^3*e^2*k^2 - 464*a^5*b^2*c^4*
f^2*j^2 - 384*a^5*b^2*c^4*g^2*i^2 - 64*a^3*b^6*c^2*e^2*k^2 + 42*a^4*b^4*c^3
*f^2*j^2 + 12*a^3*b^6*c^2*f^2*j^2 - 13104*a^4*b^3*c^4*d^2*k^2 + 5628*a^3*b^
5*c^3*d^2*k^2 - 1128*a^2*b^7*c^2*d^2*k^2 + 240*a^4*b^3*c^4*e^2*j^2 - 48*a^4
*b^3*c^4*g^2*h^2 - 16*a^4*b^3*c^4*f^2*i^2 - 16*a^3*b^5*c^3*e^2*j^2 - 4*a^3*
b^5*c^3*g^2*h^2 - 2880*a^4*b^2*c^5*d^2*j^2 + 1750*a^3*b^4*c^4*d^2*j^2 - 345
*a^2*b^6*c^3*d^2*j^2 - 192*a^4*b^2*c^5*f^2*h^2 - 42*a^3*b^4*c^4*f^2*h^2 + 2
40*a^3*b^3*c^5*d^2*i^2 - 48*a^3*b^3*c^5*f^2*g^2 - 16*a^3*b^3*c^5*e^2*h^2 -
16*a^2*b^5*c^4*d^2*i^2 - 4*a^2*b^5*c^4*f^2*g^2 - 464*a^3*b^2*c^6*d^2*h^2 -
384*a^3*b^2*c^6*e^2*g^2 + 42*a^2*b^4*c^5*d^2*h^2 - 240*a^2*b^3*c^6*d^2*g^2
- 16*a^2*b^3*c^6*e^2*f^2 - 960*a^2*b^2*c^7*d^2*f^2 - 8*a*b^10*d*f*k^2 - a^2
*b^8*c*f^2*j^2 - 2048*a^8*c^3*i^2*k^2 - 100*a^6*b^5*j^2*k^2 - 64*a^5*b^6*i^
2*k^2 - 288*a^7*c^4*h^2*j^2 - 36*a^4*b^7*h^2*k^2 - 16*a^3*b^8*g^2*k^2 - 204
8*a^6*c^5*e^2*k^2 - 864*a^6*c^5*f^2*j^2 - 4*a^2*b^9*f^2*k^2 - 2592*a^5*c^6*
d^2*j^2 - 1536*a^5*c^6*e^2*i^2 - 32*a^5*c^6*f^2*h^2 - 864*a^4*c^7*d^2*h^2 +
 360*a^7*b^2*c^2*j^4 - 4*b^7*c^4*d^2*g^2 - 9*b^6*c^5*d^2*f^2 - 288*a^3*c^8*
d^2*f^2 - 24*a^5*b^2*c^4*h^4 - 16*b^5*c^6*d^2*e^2 - 9*a^4*b^4*c^3*h^4 - 16*
a^3*b^4*c^4*g^4 - 24*a^3*b^2*c^6*f^4 - 9*a^2*b^4*c^5*f^4 - a^2*b^6*c^3*f^2*
h^2 + 192*a^6*b^5*i*k^3 - 96*a^5*b^6*g*k^3 - 1728*a^7*c^4*f*j^3 - 192*a^5*c
^6*f^3*j - 10*b^7*c^4*d^3*j - 1024*a^6*c^5*e*i^3 - 1024*a^4*c^7*e^3*i + 153
6*a^8*b^2*c*k^4 - 10*b^6*c^5*d^3*h - 1728*a^3*c^8*d^3*h - 192*a^5*c^6*d*h^3
 - 25*a^6*b^4*c*j^4 + 30*b^5*c^6*d^3*f + 360*a*b^2*c^8*d^4 - 4*b^11*d^2*k^2
 - 4096*a^9*c^2*k^4 - 1296*a^8*c^3*j^4 - 144*a^7*b^4*k^4 - 256*a^7*c^4*i^4
- 16*a^6*c^5*h^4 - 16*a^4*c^7*f^4 - 256*a^3*c^8*e^4 - 25*b^4*c^7*d^4 - 1296
*a^2*c^9*d^4 - b^8*c^3*d^2*h^2 - b^10*c*d^2*j^2, z, n)*x*(8192*a^6*b*c^8 +
32*a^2*b^9*c^4 - 512*a^3*b^7*c^5 + 3072*a^4*b^5*c^6 - 8192*a^5*b^3*c^7))/(4
*(64*a^5*c^5 - a^2*b^6*c^2 + 12*a^3*b^4*c^3 - 48*a^4*b^2*c^4))) + (x*(2*b^6
*c^5*d^2 - 576*a^3*c^8*d^2 + 64*a^4*c^7*f^2 - 64*a^5*c^6*h^2 + 8*a^2*b^9*k^
2 + 576*a^6*c^5*j^2 - 36*a*b^4*c^6*d^2 + 128*a^3*b*c^7*e^2 + 128*a^5*b*c^5*
i^2 + 2*a^2*b^8*c*j^2 - 136*a^3*b^7*c*k^2 + 3072*a^6*b*c^4*k^2 + 256*a^2*b^
2*c^7*d^2 - 32*a^2*b^3*c^6*e^2 + 20*a^2*b^4*c^5*f^2 - 96*a^3*b^2*c^6*f^2 -
8*a^2*b^5*c^4*g^2 + 32*a^3*b^3*c^5*g^2 + 2*a^2*b^6*c^3*h^2 - 4*a^3*b^4*c^4*
h^2 - 32*a^4*b^3*c^4*i^2 - 40*a^3*b^6*c^2*j^2 + 276*a^4*b^4*c^3*j^2 - 736*a
^5*b^2*c^4*j^2 + 888*a^4*b^5*c^2*k^2 - 2656*a^5*b^3*c^3*k^2 - 384*a^4*c^7*d
*h - 1024*a^5*c^6*e*k + 384*a^5*c^6*f*j - 1024*a^6*c^5*i*k + 4*a*b^5*c^5*d*
f + 320*a^3*b*c^7*d*f + 576*a^4*b*c^6*d*j + 256*a^4*b*c^6*e*i + 64*a^4*b*c^
6*f*h + 512*a^5*b*c^5*g*k + 64*a^5*b*c^5*h*j - 96*a^2*b^3*c^6*d*f + 8*a^2*b
^4*c^5*d*h + 32*a^2*b^4*c^5*e*g + 64*a^3*b^2*c^6*d*h - 128*a^3*b^2*c^6*e*g
+ 20*a^2*b^5*c^4*d*j - 12*a^2*b^5*c^4*f*h - 224*a^3*b^3*c^5*d*j - 64*a^3*b^
3*c^5*e*i + 32*a^3*b^3*c^5*f*h - 12*a^2*b^6*c^3*f*j - 32*a^3*b^4*c^4*e*k +
152*a^3*b^4*c^4*f*j + 32*a^3*b^4*c^4*g*i + 384*a^4*b^2*c^5*e*k - 512*a^4*b^
2*c^5*f*j - 128*a^4*b^2*c^5*g*i + 4*a^2*b^7*c^2*h*j + 16*a^3*b^5*c^3*g*k -
44*a^3*b^5*c^3*h*j - 192*a^4*b^3*c^4*g*k + 96*a^4*b^3*c^4*h*j - 32*a^4*b^4*
c^3*i*k + 384*a^5*b^2*c^4*i*k))/(4*(64*a^5*c^5 - a^2*b^6*c^2 + 12*a^3*b^4*c
^3 - 48*a^4*b^2*c^4))) - (5*b^3*c^6*d^3 + 8*a^3*c^6*f^3 + 216*a^6*c^3*j^3 -
 96*a^2*c^7*d*e^2 + 72*a^2*c^7*d^2*f - 4*a^4*b*c^4*h^3 - 3*b^4*c^5*d^2*f +
5*a^4*b^4*c*j^3 - 32*a^3*c^6*e^2*h - 96*a^4*c^5*d*i^2 + b^5*c^4*d^2*h + 216
*a^3*c^6*d^2*j + 8*a^4*c^5*f*h^2 + 384*a^5*c^4*d*k^2 + b^6*c^3*d^2*j + 4*a^
2*b^7*f*k^2 + 72*a^4*c^5*f^2*j + 216*a^5*c^4*f*j^2 - 32*a^5*c^4*h*i^2 - 12*
a^3*b^6*h*k^2 + 24*a^5*c^4*h^2*j + 128*a^6*c^3*h*k^2 + 20*a^4*b^5*j*k^2 + 6
*a^2*b^2*c^5*f^3 - 3*a^3*b^3*c^3*h^3 - 66*a^5*b^2*c^2*j^3 - 36*a*b*c^7*d^3
+ 4*a*b^8*d*k^2 + a*b^7*c*d*j^2 - 192*a^3*c^6*d*e*i + 48*a^3*c^6*d*f*h + 14
4*a^4*c^5*d*h*j - 128*a^4*c^5*e*f*k - 64*a^4*c^5*e*h*i - 384*a^5*c^4*e*j*k
- 128*a^5*c^4*f*i*k - 384*a^6*c^3*i*j*k + 16*a*b^2*c^6*d*e^2 + 18*a*b^2*c^6
*d^2*f + 3*a*b^3*c^5*d*f^2 - 60*a^2*b*c^6*d*f^2 + 4*a*b^4*c^4*d*g^2 + 16*a^
```

2*b*c^6*e^2*f - a*b^3*c^5*d^2*h + a*b^5*c^3*d*h^2 - 60*a^2*b*c^6*d^2*h - 28
*a^3*b*c^5*d*h^2 - 10*a*b^4*c^4*d^2*j - 28*a^3*b*c^5*f^2*h - 396*a^4*b*c^4*
d*j^2 - 72*a^2*b^6*c*d*k^2 + 16*a^3*b*c^5*e^2*j + 16*a^4*b*c^4*f*i^2 + a^2*
b^6*c*f*j^2 - 36*a^3*b^5*c*f*k^2 + 128*a^5*b*c^3*f*k^2 - 3*a^3*b^5*c*h*j^2
- 204*a^5*b*c^3*h*j^2 + 128*a^4*b^4*c*h*k^2 + 16*a^5*b*c^3*i^2*j - 204*a^5*
b^3*c*j*k^2 + 512*a^6*b*c^2*j*k^2 - 24*a^2*b^2*c^5*d*g^2 - 9*a^2*b^3*c^4*d*
h^2 + 4*a^2*b^3*c^4*f*g^2 + 16*a^3*b^2*c^4*d*i^2 - 6*a^2*b^2*c^5*d^2*j - 5*
a^2*b^3*c^4*f^2*h + a^2*b^4*c^3*f*h^2 - 21*a^2*b^5*c^2*d*j^2 + 18*a^3*b^2*c
^4*f*h^2 + 155*a^3*b^3*c^3*d*j^2 - 8*a^3*b^2*c^4*g^2*h + 436*a^3*b^4*c^2*d*
k^2 - 952*a^4*b^2*c^3*d*k^2 - 5*a^2*b^4*c^3*f^2*j + 26*a^3*b^2*c^4*f^2*j -
12*a^3*b^4*c^2*f*j^2 + 2*a^4*b^2*c^3*f*j^2 + 4*a^3*b^3*c^3*g^2*j + 52*a^4*b
^3*c^2*f*k^2 - 6*a^3*b^4*c^2*h^2*j + 42*a^4*b^2*c^3*h^2*j + 51*a^4*b^3*c^2*
h*j^2 - 360*a^5*b^2*c^2*h*k^2 - 16*a*b^3*c^5*d*e*g + 96*a^2*b*c^6*d*e*g - 4
*a*b^4*c^4*d*f*h + 16*a*b^5*c^3*d*e*k - 4*a*b^5*c^3*d*f*j + 544*a^3*b*c^5*d
*e*k - 312*a^3*b*c^5*d*f*j + 96*a^3*b*c^5*d*g*i + 32*a^3*b*c^5*e*f*i + 32*a
^3*b*c^5*e*g*h - 8*a*b^6*c^2*d*g*k + 2*a*b^6*c^2*d*h*j + 544*a^4*b*c^4*d*i*
k + 224*a^4*b*c^4*e*h*k + 32*a^4*b*c^4*e*i*j + 64*a^4*b*c^4*f*g*k - 152*a^4
*b*c^4*f*h*j + 32*a^4*b*c^4*g*h*i + 192*a^5*b*c^3*g*j*k + 224*a^5*b*c^3*h*i
*k + 32*a^2*b^2*c^5*d*e*i + 52*a^2*b^2*c^5*d*f*h - 16*a^2*b^2*c^5*e*f*g - 1
92*a^2*b^3*c^4*d*e*k + 70*a^2*b^3*c^4*d*f*j - 16*a^2*b^3*c^4*d*g*i + 96*a^2
*b^4*c^3*d*g*k - 30*a^2*b^4*c^3*d*h*j + 16*a^2*b^4*c^3*e*f*k - 272*a^3*b^2*
c^4*d*g*k + 100*a^3*b^2*c^4*d*h*j - 48*a^3*b^2*c^4*e*f*k - 16*a^3*b^2*c^4*e
*g*j - 16*a^3*b^2*c^4*f*g*i + 16*a^2*b^5*c^2*d*i*k - 8*a^2*b^5*c^2*f*g*k +
2*a^2*b^5*c^2*f*h*j - 192*a^3*b^3*c^3*d*i*k - 48*a^3*b^3*c^3*e*h*k + 24*a^3
*b^3*c^3*f*g*k + 6*a^3*b^3*c^3*f*h*j + 16*a^3*b^4*c^2*f*i*k + 24*a^3*b^4*c^
2*g*h*k + 80*a^4*b^2*c^3*e*j*k - 48*a^4*b^2*c^3*f*i*k - 112*a^4*b^2*c^3*g*h
*k - 16*a^4*b^2*c^3*g*i*j - 40*a^4*b^3*c^2*g*j*k - 48*a^4*b^3*c^2*h*i*k + 8
0*a^5*b^2*c^2*i*j*k)/(8*(64*a^5*c^5 - a^2*b^6*c^2 + 12*a^3*b^4*c^3 - 48*a^4
*b^2*c^4)) + (x*(32*a^2*c^7*e^3 + 32*a^5*c^4*i^3 - 12*a^4*b^5*k^3 - 2*b^3*c
^6*d^2*e + b^4*c^5*d^2*g + 124*a^5*b^3*c*k^3 - 320*a^6*b*c^2*k^3 + 96*a^3*c
^6*e^2*i + 96*a^4*c^5*e*i^2 + 144*a^3*c^6*d^2*k + 128*a^5*c^4*e*k^2 - b^6*c
^3*d^2*k - 4*a^2*b^7*g*k^2 - 16*a^4*c^5*f^2*k + 8*a^3*b^6*i*k^2 + 16*a^5*c^
4*h^2*k + 128*a^6*c^3*i*k^2 - 144*a^6*c^3*j^2*k - 4*a^2*b^3*c^4*g^3 + 24*a*
b*c^7*d^2*e - 48*a^2*c^7*d*e*f - 144*a^3*c^6*d*e*j - 48*a^3*c^6*d*f*i - 16*
a^3*c^6*e*f*h + 96*a^4*c^5*d*h*k - 144*a^4*c^5*d*i*j - 48*a^4*c^5*e*h*j - 1
6*a^4*c^5*f*h*i - 96*a^5*c^4*f*j*k - 48*a^5*c^4*h*i*j - 12*a*b^2*c^6*d^2*g
+ 16*a^2*b*c^6*e*f^2 - 48*a^2*b*c^6*e^2*g - 2*a*b^3*c^5*d^2*i + 24*a^2*b*c^
6*d^2*i + 8*a^3*b*c^5*e*h^2 + 18*a*b^4*c^4*d^2*k + 16*a^3*b*c^5*f^2*i + 96*
a^4*b*c^4*e*j^2 + 8*a^2*b^6*c*e*k^2 - 176*a^3*b*c^5*e^2*k - 48*a^4*b*c^4*g*
i^2 - a^2*b^6*c*g*j^2 + 8*a^4*b*c^4*h^2*i + 44*a^3*b^5*c*g*k^2 - 64*a^5*b*c
^3*g*k^2 + 2*a^3*b^5*c*i*j^2 + 96*a^5*b*c^3*i*j^2 - 88*a^4*b^4*c*i*k^2 - 17
6*a^5*b*c^3*i^2*k - 3*a^4*b^4*c*j^2*k + 24*a^2*b^2*c^5*e*g^2 - 8*a^2*b^2*c^
5*f^2*g + 2*a^2*b^3*c^4*e*h^2 - 100*a^2*b^2*c^5*d^2*k - a^2*b^4*c^3*g*h^2 +
2*a^2*b^5*c^2*e*j^2 - 4*a^3*b^2*c^4*g*h^2 - 28*a^3*b^3*c^3*e*j^2 + 32*a^2*
b^3*c^4*e^2*k + 24*a^3*b^2*c^4*g^2*i - 88*a^3*b^4*c^2*e*k^2 + 216*a^4*b^2*c
^3*e*k^2 - a^2*b^4*c^3*f^2*k + 2*a^3*b^3*c^3*h^2*i + 14*a^3*b^4*c^2*g*j^2 -
48*a^4*b^2*c^3*g*j^2 + 8*a^2*b^5*c^2*g^2*k - 44*a^3*b^3*c^3*g^2*k - 108*a^
4*b^3*c^2*g*k^2 - 12*a^4*b^2*c^3*h^2*k - 28*a^4*b^3*c^2*i*j^2 + 32*a^4*b^3*
c^2*i^2*k + 216*a^5*b^2*c^2*i*k^2 + 40*a^5*b^2*c^2*j^2*k - 4*a*b^2*c^6*d*e*
f + 2*a*b^3*c^5*d*f*g + 32*a^2*b*c^6*d*e*h + 24*a^2*b*c^6*d*f*g - 2*a*b^5*c
^3*d*f*k - 8*a^3*b*c^5*d*f*k + 72*a^3*b*c^5*d*g*j + 32*a^3*b*c^5*d*h*i + 80
*a^3*b*c^5*e*f*j - 96*a^3*b*c^5*e*g*i + 8*a^3*b*c^5*f*g*h + 72*a^4*b*c^4*d*
j*k - 352*a^4*b*c^4*e*i*k + 8*a^4*b*c^4*f*h*k + 80*a^4*b*c^4*f*i*j + 24*a^4
*b*c^4*g*h*j + 56*a^5*b*c^3*h*j*k + 20*a^2*b^2*c^5*d*e*j - 4*a^2*b^2*c^5*d*
f*i - 16*a^2*b^2*c^5*d*g*h - 12*a^2*b^2*c^5*e*f*h + 18*a^2*b^3*c^4*d*f*k -
10*a^2*b^3*c^4*d*g*j - 12*a^2*b^3*c^4*e*f*j + 6*a^2*b^3*c^4*f*g*h + 6*a^2*b
^4*c^3*d*h*k - 32*a^2*b^4*c^3*e*g*k + 4*a^2*b^4*c^3*e*h*j + 6*a^2*b^4*c^3*f
*g*j - 64*a^3*b^2*c^4*d*h*k + 20*a^3*b^2*c^4*d*i*j + 176*a^3*b^2*c^4*e*g*k
- 20*a^3*b^2*c^4*e*h*j - 40*a^3*b^2*c^4*f*g*j - 12*a^3*b^2*c^4*f*h*i - 2*a^

```
2*b^5*c^2*g*h*j - 10*a^3*b^3*c^3*d*j*k + 64*a^3*b^3*c^3*e*i*k + 6*a^3*b^3*c
^3*f*h*k - 12*a^3*b^3*c^3*f*i*j + 10*a^3*b^3*c^3*g*h*j - 32*a^3*b^4*c^2*g*i
*k + 4*a^3*b^4*c^2*h*i*j + 8*a^4*b^2*c^3*f*j*k + 176*a^4*b^2*c^3*g*i*k - 20
*a^4*b^2*c^3*h*i*j - 6*a^4*b^3*c^2*h*j*k))/(4*(64*a^5*c^5 - a^2*b^6*c^2 + 1
2*a^3*b^4*c^3 - 48*a^4*b^2*c^4)))*root(1572864*a^8*b^2*c^9*z^4 - 983040*a^7
*b^4*c^8*z^4 + 327680*a^6*b^6*c^7*z^4 - 61440*a^5*b^8*c^6*z^4 + 6144*a^4*b^
10*c^5*z^4 - 256*a^3*b^12*c^4*z^4 - 1048576*a^9*c^10*z^4 - 1572864*a^8*b^2*
c^7*k*z^3 + 983040*a^7*b^4*c^6*k*z^3 - 327680*a^6*b^6*c^5*k*z^3 + 61440*a^5
*b^8*c^4*k*z^3 - 6144*a^4*b^10*c^3*k*z^3 + 256*a^3*b^12*c^2*k*z^3 + 1048576
*a^9*c^8*k*z^3 + 98304*a^8*b*c^6*i*k*z^2 + 98304*a^7*b*c^7*e*k*z^2 + 57344*
a^7*b*c^7*f*j*z^2 + 32768*a^7*b*c^7*g*i*z^2 + 57344*a^6*b*c^8*d*h*z^2 + 327
68*a^6*b*c^8*e*g*z^2 - 32*a*b^10*c^4*d*f*z^2 - 90112*a^7*b^3*c^5*i*k*z^2 +
30720*a^6*b^5*c^4*i*k*z^2 - 4608*a^5*b^7*c^3*i*k*z^2 + 256*a^4*b^9*c^2*i*k*
z^2 - 49152*a^7*b^2*c^6*g*k*z^2 + 45056*a^6*b^4*c^5*g*k*z^2 + 24576*a^7*b^2
*c^6*h*j*z^2 - 15360*a^5*b^6*c^4*g*k*z^2 - 3072*a^5*b^6*c^4*h*j*z^2 + 2304*
a^4*b^8*c^3*g*k*z^2 + 2048*a^6*b^4*c^5*h*j*z^2 + 576*a^4*b^8*c^3*h*j*z^2 -
128*a^3*b^10*c^2*g*k*z^2 - 32*a^3*b^10*c^2*h*j*z^2 - 90112*a^6*b^3*c^6*e*k*
z^2 - 49152*a^6*b^3*c^6*f*j*z^2 + 30720*a^5*b^5*c^5*e*k*z^2 - 24576*a^6*b^3
*c^6*g*i*z^2 + 15360*a^5*b^5*c^5*f*j*z^2 + 6144*a^5*b^5*c^5*g*i*z^2 - 4608*
a^4*b^7*c^4*e*k*z^2 - 2048*a^4*b^7*c^4*f*j*z^2 - 512*a^4*b^7*c^4*g*i*z^2 +
256*a^3*b^9*c^3*e*k*z^2 + 96*a^3*b^9*c^3*f*j*z^2 + 131072*a^6*b^2*c^7*d*j*z
^2 + 49152*a^6*b^2*c^7*e*i*z^2 - 43008*a^5*b^4*c^6*d*j*z^2 - 12288*a^5*b^4*
c^6*e*i*z^2 + 6144*a^5*b^4*c^6*f*h*z^2 + 6144*a^4*b^6*c^5*d*j*z^2 - 2048*a^
4*b^6*c^5*f*h*z^2 + 1024*a^4*b^6*c^5*e*i*z^2 - 320*a^3*b^8*c^4*d*j*z^2 + 19
2*a^3*b^8*c^4*f*h*z^2 - 49152*a^5*b^3*c^7*d*h*z^2 - 24576*a^5*b^3*c^7*e*g*z
^2 + 15360*a^4*b^5*c^6*d*h*z^2 + 6144*a^4*b^5*c^6*e*g*z^2 - 2048*a^3*b^7*c^
5*d*h*z^2 - 512*a^3*b^7*c^5*e*g*z^2 + 96*a^2*b^9*c^4*d*h*z^2 + 24576*a^5*b^
2*c^8*d*f*z^2 - 3072*a^3*b^6*c^6*d*f*z^2 + 2048*a^4*b^4*c^7*d*f*z^2 + 576*a
^2*b^8*c^5*d*f*z^2 + 1536*a^4*b^10*c*k^2*z^2 + 61440*a^8*b*c^6*j^2*z^2 - 16
*a^3*b^11*c*j^2*z^2 + 12288*a^7*b*c^7*h^2*z^2 + 12288*a^6*b*c^8*f^2*z^2 + 6
1440*a^5*b*c^9*d^2*z^2 + 432*a*b^9*c^5*d^2*z^2 - 49152*a^8*c^7*h*j*z^2 - 14
7456*a^7*c^8*d*j*z^2 - 65536*a^7*c^8*e*i*z^2 - 16384*a^7*c^8*f*h*z^2 - 4915
2*a^6*c^9*d*f*z^2 + 516096*a^8*b^2*c^5*k^2*z^2 - 288768*a^7*b^4*c^4*k^2*z^2
 + 88576*a^6*b^6*c^3*k^2*z^2 - 15744*a^5*b^8*c^2*k^2*z^2 - 61440*a^7*b^3*c^
5*j^2*z^2 + 24064*a^6*b^5*c^4*j^2*z^2 - 4608*a^5*b^7*c^3*j^2*z^2 + 432*a^4*
b^9*c^2*j^2*z^2 + 24576*a^7*b^2*c^6*i^2*z^2 - 6144*a^6*b^4*c^5*i^2*z^2 + 51
2*a^5*b^6*c^4*i^2*z^2 - 8192*a^6*b^3*c^6*h^2*z^2 + 1536*a^5*b^5*c^5*h^2*z^2
 - 16*a^3*b^9*c^3*h^2*z^2 - 8192*a^6*b^2*c^7*g^2*z^2 + 6144*a^5*b^4*c^6*g^2
*z^2 - 1536*a^4*b^6*c^5*g^2*z^2 + 128*a^3*b^8*c^4*g^2*z^2 - 8192*a^5*b^3*c^
7*f^2*z^2 + 1536*a^4*b^5*c^6*f^2*z^2 - 16*a^2*b^9*c^4*f^2*z^2 + 24576*a^5*b
^2*c^8*e^2*z^2 - 6144*a^4*b^4*c^7*e^2*z^2 + 512*a^3*b^6*c^6*e^2*z^2 - 61440
*a^4*b^3*c^8*d^2*z^2 + 24064*a^3*b^5*c^7*d^2*z^2 - 4608*a^2*b^7*c^6*d^2*z^2
 - 393216*a^9*c^6*k^2*z^2 - 64*a^3*b^12*k^2*z^2 - 32768*a^8*c^7*i^2*z^2 - 3
2768*a^6*c^9*e^2*z^2 - 16*b^11*c^4*d^2*z^2 - 16384*a^7*b*c^5*g*i*k*z - 1024
0*a^7*b*c^5*f*j*k*z + 4096*a^7*b*c^5*h*i*j*z - 47104*a^6*b*c^6*d*h*k*z - 16
384*a^6*b*c^6*e*g*k*z + 6144*a^6*b*c^6*f*g*j*z + 4096*a^6*b*c^6*e*h*j*z + 3
2*a*b^10*c^2*d*f*k*z - 6144*a^5*b*c^7*d*g*h*z - 4096*a^5*b*c^7*d*f*i*z - 32
*a*b^8*c^4*d*f*g*z - 4096*a^4*b*c^8*d*e*f*z + 64*a*b^7*c^5*d*e*f*z - 18432*
a^7*b^2*c^4*h*j*k*z + 4608*a^6*b^4*c^3*h*j*k*z - 384*a^5*b^6*c^2*h*j*k*z +
12288*a^6*b^3*c^4*g*i*k*z + 7680*a^6*b^3*c^4*f*j*k*z - 3072*a^6*b^3*c^4*h*i
*j*z - 3072*a^5*b^5*c^3*g*i*k*z - 1920*a^5*b^5*c^3*f*j*k*z + 768*a^5*b^5*c^
3*h*i*j*z + 256*a^4*b^7*c^2*g*i*k*z + 160*a^4*b^7*c^2*f*j*k*z - 64*a^4*b^7*
c^2*h*i*j*z - 65536*a^6*b^2*c^5*d*j*k*z - 24576*a^6*b^2*c^5*e*i*k*z + 21504
*a^5*b^4*c^4*d*j*k*z + 9216*a^6*b^2*c^5*f*i*j*z + 6144*a^5*b^4*c^4*e*i*k*z
- 3072*a^5*b^4*c^4*f*h*k*z - 3072*a^4*b^6*c^3*d*j*k*z - 2304*a^5*b^4*c^4*f*
i*j*z - 2048*a^6*b^2*c^5*g*h*j*z + 1536*a^5*b^4*c^4*g*h*j*z + 1024*a^4*b^6*
c^3*f*h*k*z - 512*a^4*b^6*c^3*e*i*k*z - 384*a^4*b^6*c^3*g*h*j*z + 192*a^4*b
^6*c^3*f*i*j*z + 160*a^3*b^8*c^2*d*j*k*z - 96*a^3*b^8*c^2*f*h*k*z + 32*a^3*
b^8*c^2*g*h*j*z + 41472*a^5*b^3*c^5*d*h*k*z - 13440*a^4*b^5*c^4*d*h*k*z + 1
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2288*a^5*b^3*c^5*e*g*k*z - 4608*a^5*b^3*c^5*f*g*j*z - 3072*a^5*b^3*c^5*e*h*
j*z - 3072*a^4*b^5*c^4*e*g*k*z + 1888*a^3*b^7*c^3*d*h*k*z + 1152*a^4*b^5*c^
4*f*g*j*z + 768*a^4*b^5*c^4*e*h*j*z + 256*a^3*b^7*c^3*e*g*k*z - 96*a^3*b^7*
c^3*f*g*j*z - 96*a^2*b^9*c^2*d*h*k*z - 64*a^3*b^7*c^3*e*h*j*z + 9216*a^5*b^
2*c^6*e*f*j*z - 9216*a^5*b^2*c^6*d*h*i*z - 6656*a^4*b^4*c^5*d*f*k*z - 6144*
a^5*b^2*c^6*d*f*k*z + 3456*a^3*b^6*c^4*d*f*k*z - 2304*a^4*b^4*c^5*e*f*j*z +
2304*a^4*b^4*c^5*d*h*i*z - 576*a^2*b^8*c^3*d*f*k*z + 192*a^3*b^6*c^4*e*f*j
*z - 192*a^3*b^6*c^4*d*h*i*z + 4608*a^4*b^3*c^6*d*g*h*z + 3072*a^4*b^3*c^6*
d*f*i*z - 1152*a^3*b^5*c^5*d*g*h*z - 768*a^3*b^5*c^5*d*f*i*z + 96*a^2*b^7*c
^4*d*g*h*z + 64*a^2*b^7*c^4*d*f*i*z - 9216*a^4*b^2*c^7*d*e*h*z + 2304*a^3*b
^4*c^6*d*e*h*z + 2048*a^4*b^2*c^7*d*f*g*z - 1536*a^3*b^4*c^6*d*f*g*z + 384*
a^2*b^6*c^5*d*f*g*z - 192*a^2*b^6*c^5*d*e*h*z + 3072*a^3*b^3*c^7*d*e*f*z -
768*a^2*b^5*c^6*d*e*f*z - 3072*a^8*b*c^4*j^2*k*z + 48*a^5*b^7*c*j^2*k*z - 4
9152*a^8*b*c^4*i*k^2*z + 2304*a^5*b^7*c*i*k^2*z - 9216*a^7*b*c^5*h^2*k*z -
32*a^4*b^8*c*i*j^2*z - 1152*a^4*b^8*c*g*k^2*z + 9216*a^7*b*c^5*g*j^2*z - 30
72*a^6*b*c^6*f^2*k*z + 16*a^3*b^9*c*g*j^2*z - 49152*a^7*b*c^5*e*k^2*z - 128
*a^3*b^9*c*e*k^2*z - 58368*a^5*b*c^7*d^2*k*z - 1024*a^6*b*c^6*g*h^2*z - 432
*a*b^9*c^3*d^2*k*z + 1024*a^5*b*c^7*f^2*g*z + 32*a*b^8*c^4*d^2*i*z - 9216*a
^4*b*c^8*d^2*g*z + 336*a*b^7*c^5*d^2*g*z - 672*a*b^6*c^6*d^2*e*z + 24576*a^
8*c^5*h*j*k*z + 73728*a^7*c^6*d*j*k*z + 32768*a^7*c^6*e*i*k*z - 12288*a^7*c
^6*f*i*j*z + 8192*a^7*c^6*f*h*k*z + 24576*a^6*c^7*d*f*k*z - 12288*a^6*c^7*e
*f*j*z + 12288*a^6*c^7*d*h*i*z + 12288*a^5*c^8*d*e*h*z + 2304*a^7*b^3*c^3*j
^2*k*z - 576*a^6*b^5*c^2*j^2*k*z + 45056*a^7*b^3*c^3*i*k^2*z - 15360*a^6*b^
5*c^2*i*k^2*z - 12288*a^7*b^2*c^4*i^2*k*z + 3072*a^6*b^4*c^3*i^2*k*z - 256*
a^5*b^6*c^2*i^2*k*z + 15872*a^7*b^2*c^4*i*j^2*z + 6912*a^6*b^3*c^4*h^2*k*z
- 4992*a^6*b^4*c^3*i*j^2*z - 1728*a^5*b^5*c^3*h^2*k*z + 672*a^5*b^6*c^2*i*j
^2*z + 144*a^4*b^7*c^2*h^2*k*z + 24576*a^7*b^2*c^4*g*k^2*z - 22528*a^6*b^4*
c^3*g*k^2*z + 7680*a^5*b^6*c^2*g*k^2*z + 4096*a^6*b^2*c^5*g^2*k*z - 3072*a^
5*b^4*c^4*g^2*k*z + 768*a^4*b^6*c^3*g^2*k*z - 64*a^3*b^8*c^2*g^2*k*z - 7936
*a^6*b^3*c^4*g*j^2*z + 2496*a^5*b^5*c^3*g*j^2*z - 1536*a^6*b^2*c^5*h^2*i*z
+ 1280*a^5*b^3*c^5*f^2*k*z + 384*a^5*b^4*c^4*h^2*i*z - 336*a^4*b^7*c^2*g*j^
2*z + 192*a^4*b^5*c^4*f^2*k*z - 144*a^3*b^7*c^3*f^2*k*z - 32*a^4*b^6*c^3*h^
2*i*z + 16*a^2*b^9*c^2*f^2*k*z + 45056*a^6*b^3*c^4*e*k^2*z - 15360*a^5*b^5*
c^3*e*k^2*z - 12288*a^5*b^2*c^6*e^2*k*z + 3072*a^4*b^4*c^5*e^2*k*z + 2304*a
^4*b^7*c^2*e*k^2*z - 256*a^3*b^6*c^4*e^2*k*z + 59136*a^4*b^3*c^6*d^2*k*z -
23488*a^3*b^5*c^5*d^2*k*z + 15872*a^6*b^2*c^5*e*j^2*z - 4992*a^5*b^4*c^4*e*
j^2*z + 4560*a^2*b^7*c^4*d^2*k*z + 1536*a^5*b^2*c^6*f^2*i*z + 768*a^5*b^3*c
^5*g*h^2*z + 672*a^4*b^6*c^3*e*j^2*z - 384*a^4*b^4*c^5*f^2*i*z - 192*a^4*b^
5*c^4*g*h^2*z - 32*a^3*b^8*c^2*e*j^2*z + 32*a^3*b^6*c^4*f^2*i*z + 16*a^3*b^
7*c^3*g*h^2*z - 15872*a^4*b^2*c^7*d^2*i*z + 4992*a^3*b^4*c^6*d^2*i*z - 1536
*a^5*b^2*c^6*e*h^2*z - 768*a^4*b^3*c^6*f^2*g*z - 672*a^2*b^6*c^5*d^2*i*z +
384*a^4*b^4*c^5*e*h^2*z + 192*a^3*b^5*c^5*f^2*g*z - 32*a^3*b^6*c^4*e*h^2*z
- 16*a^2*b^7*c^4*f^2*g*z + 7936*a^3*b^3*c^7*d^2*g*z - 2496*a^2*b^5*c^6*d^2*
g*z + 1536*a^4*b^2*c^7*e*f^2*z - 384*a^3*b^4*c^6*e*f^2*z + 32*a^2*b^6*c^5*e
*f^2*z - 15872*a^3*b^2*c^8*d^2*e*z + 4992*a^2*b^4*c^7*d^2*e*z - 61440*a^8*b
^2*c^3*k^3*z + 21504*a^7*b^4*c^2*k^3*z + 16384*a^8*c^5*i^2*k*z - 18432*a^8*
c^5*i*j^2*z - 128*a^4*b^9*i*k^2*z + 2048*a^7*c^6*h^2*i*z + 64*a^3*b^10*g*k^
2*z + 16384*a^6*c^7*e^2*k*z + 16*b^11*c^2*d^2*k*z - 18432*a^7*c^6*e*j^2*z -
2048*a^6*c^7*f^2*i*z + 18432*a^5*c^8*d^2*i*z - 3328*a^6*b^6*c*k^3*z + 2048
*a^6*c^7*e*h^2*z - 16*b^9*c^4*d^2*g*z - 2048*a^5*c^8*e*f^2*z + 32*b^8*c^5*d
^2*e*z + 18432*a^4*c^9*d^2*e*z + 65536*a^9*c^4*k^3*z + 192*a^5*b^8*k^3*z -
3328*a^7*b*c^3*h*i*j*k - 6912*a^6*b*c^4*d*i*j*k - 3328*a^6*b*c^4*e*h*j*k -
1536*a^6*b*c^4*f*g*j*k - 768*a^6*b*c^4*g*h*i*j - 768*a^6*b*c^4*f*h*i*k - 69
12*a^5*b*c^5*d*e*j*k - 2304*a^5*b*c^5*d*g*i*j - 1792*a^5*b*c^5*e*f*i*j + 15
36*a^5*b*c^5*d*g*h*k - 1280*a^5*b*c^5*d*f*i*k - 768*a^5*b*c^5*e*g*h*j - 768
*a^5*b*c^5*e*f*h*k - 256*a^5*b*c^5*f*g*h*i + 16*a*b^8*c^2*d*f*g*k - 4*a*b^8
*c^2*d*f*h*j - 2304*a^4*b*c^6*d*e*g*j - 1792*a^4*b*c^6*d*e*h*i - 1280*a^4*b
*c^6*d*e*f*k - 768*a^4*b*c^6*d*f*g*i - 256*a^4*b*c^6*e*f*g*h - 32*a*b^7*c^3
*d*e*f*k - 768*a^3*b*c^7*d*e*f*g + 32*a*b^5*c^5*d*e*f*g + 576*a^6*b^3*c^2*h

*i*j*k + 1664*a^6*b^2*c^3*g*h*j*k + 384*a^6*b^2*c^3*f*i*j*k - 288*a^5*b^4*c
^2*g*h*j*k - 160*a^5*b^4*c^2*f*i*j*k + 2112*a^5*b^3*c^3*d*i*j*k + 576*a^5*b
^3*c^3*e*h*j*k - 448*a^5*b^3*c^3*f*h*i*k - 192*a^5*b^3*c^3*g*h*i*j - 192*a^
5*b^3*c^3*f*g*j*k - 160*a^4*b^5*c^2*d*i*j*k + 96*a^4*b^5*c^2*f*h*i*k + 80*a
^4*b^5*c^2*f*g*j*k + 32*a^4*b^5*c^2*g*h*i*j + 4992*a^5*b^2*c^4*d*h*i*k - 46
08*a^5*b^2*c^4*e*g*i*k + 3456*a^5*b^2*c^4*d*g*j*k - 1312*a^4*b^4*c^3*d*h*i*
k - 1056*a^4*b^4*c^3*d*g*j*k + 896*a^5*b^2*c^4*f*g*i*j + 768*a^4*b^4*c^3*e*
g*i*k + 384*a^5*b^2*c^4*f*g*h*k + 384*a^5*b^2*c^4*e*h*i*j + 384*a^5*b^2*c^4
*e*f*j*k + 224*a^4*b^4*c^3*f*g*h*k - 160*a^4*b^4*c^3*e*f*j*k - 96*a^4*b^4*c
^3*f*g*i*j + 96*a^3*b^6*c^2*d*h*i*k + 80*a^3*b^6*c^2*d*g*j*k - 64*a^4*b^4*c
^3*e*h*i*j - 48*a^3*b^6*c^2*f*g*h*k - 2496*a^4*b^3*c^4*d*g*h*k + 2112*a^4*b
^3*c^4*d*e*j*k - 960*a^4*b^3*c^4*d*f*i*k + 656*a^3*b^5*c^3*d*g*h*k - 448*a^
4*b^3*c^4*e*f*h*k + 384*a^3*b^5*c^3*d*f*i*k + 320*a^4*b^3*c^4*d*g*i*j - 192
*a^4*b^3*c^4*f*g*h*i - 192*a^4*b^3*c^4*e*g*h*j + 192*a^4*b^3*c^4*e*f*i*j -
160*a^3*b^5*c^3*d*e*j*k + 96*a^3*b^5*c^3*e*f*h*k - 48*a^2*b^7*c^2*d*g*h*k +
 32*a^3*b^5*c^3*e*g*h*j - 32*a^2*b^7*c^2*d*f*i*k + 4992*a^4*b^2*c^5*d*e*h*k
 - 3584*a^4*b^2*c^5*d*f*h*j - 1312*a^3*b^4*c^4*d*e*h*k + 896*a^4*b^2*c^5*e*
f*g*j + 896*a^4*b^2*c^5*d*g*h*i + 640*a^4*b^2*c^5*d*f*g*k - 640*a^4*b^2*c^5
*d*e*i*j + 600*a^3*b^4*c^4*d*f*h*j + 480*a^3*b^4*c^4*d*f*g*k + 384*a^4*b^2*
c^5*e*f*h*i - 192*a^2*b^6*c^3*d*f*g*k - 96*a^3*b^4*c^4*e*f*g*j - 96*a^3*b^4
*c^4*d*g*h*i + 96*a^2*b^6*c^3*d*e*h*k + 12*a^2*b^6*c^3*d*f*h*j - 960*a^3*b^
3*c^5*d*e*f*k + 384*a^2*b^5*c^4*d*e*f*k + 320*a^3*b^3*c^5*d*e*g*j - 192*a^3
*b^3*c^5*e*f*g*h - 192*a^3*b^3*c^5*d*f*g*i + 192*a^3*b^3*c^5*d*e*h*i + 32*a
^2*b^5*c^4*d*f*g*i + 896*a^3*b^2*c^6*d*e*g*h + 384*a^3*b^2*c^6*d*e*f*i - 96
*a^2*b^4*c^5*d*e*g*h - 64*a^2*b^4*c^5*d*e*f*i - 192*a^2*b^3*c^6*d*e*f*g + 4
8*a^6*b^4*c*i*j^2*k - 1424*a^6*b^4*c*h*j*k^2 - 2304*a^7*b*c^3*g*j^2*k - 24*
a^5*b^5*c*g*j^2*k + 2048*a^7*b*c^3*g*i*k^2 - 1024*a^7*b*c^3*f*j*k^2 - 768*a
^5*b^5*c*g*i*k^2 + 408*a^5*b^5*c*f*j*k^2 + 256*a^6*b*c^4*g*h^2*k + 16*a^4*b
^6*c*g*i*j^2 + 4608*a^6*b*c^4*e*i^2*k + 4608*a^5*b*c^5*e^2*i*k - 896*a^6*b*
c^4*f*i^2*j + 768*a^4*b^6*c*d*j*k^2 - 256*a^4*b^6*c*f*h*k^2 - 128*a^4*b^6*c
*e*i*k^2 + 2208*a^6*b*c^4*f*h*j^2 - 1920*a^6*b*c^4*e*i*j^2 + 800*a^5*b*c^5*
f^2*h*j - 256*a^5*b*c^5*f^2*g*k - 16*a*b^8*c^2*d^2*i*k + 6*a^3*b^7*c*f*h*j^
2 + 8192*a^6*b*c^4*d*h*k^2 + 2048*a^6*b*c^4*e*g*k^2 - 472*a^3*b^7*c*d*h*k^2
 + 64*a^3*b^7*c*e*g*k^2 + 4896*a^4*b*c^6*d^2*h*j + 2304*a^4*b*c^6*d^2*g*k +
 1824*a^5*b*c^5*d*h^2*j - 384*a^5*b*c^5*e*h^2*i - 168*a*b^7*c^3*d^2*g*k + 4
2*a*b^7*c^3*d^2*h*j + 6*a^2*b^8*c*d*h*j^2 + 1536*a^5*b*c^5*e*g*i^2 + 1536*a
^4*b*c^6*e^2*g*i - 896*a^5*b*c^5*d*h*i^2 - 896*a^4*b*c^6*e^2*f*j + 144*a^2*
b^8*c*d*f*k^2 + 4896*a^5*b*c^5*d*f*j^2 + 1824*a^4*b*c^6*d*f^2*j - 384*a^4*b
*c^6*e*f^2*i + 336*a*b^6*c^4*d^2*e*k - 156*a*b^6*c^4*d^2*f*j + 16*a*b^6*c^4
*d^2*g*i + 12*a*b^7*c^3*d*f^2*j + 2208*a^3*b*c^7*d^2*f*h - 1920*a^3*b*c^7*d
^2*e*i + 800*a^4*b*c^6*d*f*h^2 - 102*a*b^5*c^5*d^2*f*h - 32*a*b^5*c^5*d^2*e
*i + 12*a*b^6*c^4*d*f^2*h - 2*a*b^7*c^3*d*f*h^2 - 896*a^3*b*c^7*d*e^2*h - 8
*a*b^6*c^4*d*f*g^2 - 240*a*b^4*c^6*d^2*e*g - 32*a*b^4*c^6*d*e^2*f + 3072*a^
7*c^4*f*i*j*k + 3072*a^6*c^5*e*f*j*k - 3072*a^6*c^5*d*h*i*k + 1536*a^6*c^5*
e*h*i*j + 4608*a^5*c^6*d*e*i*j - 3072*a^5*c^6*d*e*h*k - 1152*a^5*c^6*d*f*h*
j + 512*a^5*c^6*e*f*h*i + 1536*a^4*c^7*d*e*f*i - 2*a*b^9*c*d*f*j^2 - 1088*a
^7*b^2*c^2*i*j^2*k + 4800*a^7*b^2*c^2*h*j*k^2 + 960*a^6*b^2*c^3*h^2*i*k + 5
44*a^6*b^3*c^2*g*j^2*k - 144*a^5*b^4*c^2*h^2*i*k - 2304*a^6*b^2*c^3*g*i^2*k
 + 1920*a^6*b^3*c^2*g*i*k^2 + 1152*a^5*b^3*c^3*g^2*i*k - 864*a^6*b^3*c^2*f*
j*k^2 + 384*a^5*b^4*c^2*g*i^2*k + 192*a^6*b^2*c^3*h*i^2*j - 192*a^4*b^5*c^2
*g^2*i*k - 32*a^5*b^4*c^2*h*i^2*j - 1088*a^6*b^2*c^3*e*j^2*k + 960*a^6*b^2*
c^3*g*i*j^2 - 480*a^5*b^3*c^3*g*h^2*k - 240*a^5*b^4*c^2*g*i*j^2 + 192*a^5*b
^2*c^4*f^2*i*k + 72*a^4*b^5*c^2*g*h^2*k + 48*a^5*b^4*c^2*e*j^2*k + 48*a^4*b
^4*c^3*f^2*i*k - 16*a^3*b^6*c^2*f^2*i*k + 13376*a^6*b^2*c^3*d*j*k^2 - 5136*
a^5*b^4*c^2*d*j*k^2 - 3840*a^6*b^2*c^3*e*i*k^2 + 1536*a^5*b^4*c^2*e*i*k^2 -
 768*a^5*b^3*c^3*e*i^2*k - 768*a^4*b^3*c^4*e^2*i*k + 624*a^5*b^4*c^2*f*h*k^
2 + 576*a^6*b^2*c^3*f*h*k^2 + 192*a^5*b^2*c^4*g^2*h*j + 96*a^5*b^3*c^3*f*i^
2*j + 48*a^4*b^4*c^3*g^2*h*j - 8*a^3*b^6*c^2*g^2*h*j + 6848*a^4*b^2*c^5*d^2
*i*k - 2448*a^3*b^4*c^4*d^2*i*k + 960*a^5*b^2*c^4*e*h^2*k - 864*a^5*b^2*c^4

*f*h^2*j + 480*a^5*b^3*c^3*e*i*j^2 + 336*a^4*b^3*c^4*f^2*h*j + 336*a^2*b^6*c^3*d^2*i*k + 192*a^5*b^2*c^4*g*h^2*i + 144*a^5*b^3*c^3*f*h*j^2 - 144*a^4*b^4*c^3*e*h^2*k - 102*a^4*b^5*c^2*f*h*j^2 - 96*a^4*b^3*c^4*f^2*g*k - 32*a^4*b^5*c^2*e*i*j^2 - 30*a^3*b^5*c^3*f^2*h*j - 24*a^3*b^5*c^3*f^2*g*k + 16*a^4*b^4*c^3*g*h^2*i - 12*a^4*b^4*c^3*f*h^2*j + 12*a^3*b^6*c^2*f*h^2*j + 8*a^2*b^7*c^2*f^2*g*k - 2*a^2*b^7*c^2*f^2*h*j - 9312*a^5*b^3*c^3*d*h*k^2 + 3288*a^4*b^5*c^2*d*h*k^2 - 2304*a^4*b^2*c^5*e^2*g*k + 1920*a^5*b^3*c^3*e*g*k^2 + 1152*a^4*b^3*c^4*e*g^2*k - 768*a^4*b^5*c^2*e*g*k^2 + 384*a^3*b^4*c^4*e^2*g*k - 320*a^5*b^2*c^4*d*i^2*j - 224*a^4*b^3*c^4*f*g^2*j + 192*a^5*b^2*c^4*f*h*i^2 + 192*a^4*b^2*c^5*e^2*h*j - 192*a^3*b^5*c^3*e*g^2*k - 32*a^3*b^4*c^4*e^2*h*j + 24*a^3*b^5*c^3*f*g^2*j - 3552*a^5*b^2*c^4*d*h*j^2 - 3424*a^3*b^3*c^5*d^2*g*k + 1332*a^4*b^4*c^3*d*h*j^2 + 1224*a^2*b^5*c^4*d^2*g*k + 960*a^5*b^2*c^4*e*g*j^2 - 496*a^3*b^3*c^5*d^2*h*j + 432*a^4*b^3*c^4*d*h^2*j - 240*a^4*b^4*c^3*e*g*j^2 - 222*a^2*b^5*c^4*d^2*h*j + 192*a^4*b^2*c^5*f^2*g*i + 192*a^4*b^2*c^5*e*f^2*k - 174*a^3*b^5*c^3*d*h^2*j - 156*a^3*b^6*c^2*d*h*j^2 + 48*a^3*b^4*c^4*e*f^2*k - 32*a^4*b^3*c^4*e*h^2*i + 16*a^3*b^6*c^2*e*g*j^2 + 16*a^3*b^4*c^4*f^2*g*i - 16*a^2*b^6*c^3*e*f^2*k + 12*a^2*b^7*c^2*d*h^2*j + 1728*a^5*b^2*c^4*d*f*k^2 + 1392*a^4*b^4*c^3*d*f*k^2 - 840*a^3*b^6*c^2*d*f*k^2 - 768*a^4*b^2*c^5*e*g^2*i + 576*a^4*b^2*c^5*d*g^2*j + 96*a^4*b^3*c^4*d*h*i^2 + 96*a^3*b^3*c^5*e^2*f*j - 80*a^3*b^4*c^4*d*g^2*j + 64*a^4*b^2*c^5*f*g^2*h + 48*a^3*b^4*c^4*f*g^2*h + 6848*a^3*b^2*c^6*d^2*e*k - 3552*a^3*b^2*c^6*d^2*f*j - 2448*a^2*b^4*c^5*d^2*e*k + 1332*a^2*b^4*c^5*d^2*f*j + 960*a^3*b^2*c^6*d^2*g*i - 496*a^4*b^3*c^4*d*f*j^2 + 432*a^3*b^3*c^5*d*f^2*j - 240*a^2*b^4*c^5*d^2*g*i - 222*a^3*b^5*c^3*d*f*j^2 + 192*a^4*b^2*c^5*e*g*h^2 - 174*a^2*b^5*c^4*d*f^2*j + 42*a^2*b^7*c^2*d*f*j^2 - 32*a^3*b^3*c^5*e*f^2*i + 16*a^3*b^4*c^4*e*g*h^2 - 320*a^3*b^2*c^6*d*e^2*j - 224*a^3*b^3*c^5*d*g^2*h + 192*a^4*b^2*c^5*d*f*i^2 + 192*a^3*b^2*c^6*e^2*f*h - 32*a^3*b^4*c^4*d*f*i^2 + 24*a^2*b^5*c^4*d*g^2*h - 864*a^3*b^2*c^6*d*f^2*h + 480*a^2*b^3*c^6*d^2*e*i + 336*a^3*b^3*c^5*d*f*h^2 + 192*a^3*b^2*c^6*e*f^2*g + 144*a^2*b^3*c^6*d^2*f*h - 30*a^2*b^5*c^4*d*f*h^2 + 16*a^2*b^4*c^5*e*f^2*g - 12*a^2*b^4*c^5*d*f^2*h + 192*a^3*b^2*c^6*d*f*g^2 + 96*a^2*b^3*c^6*d*e^2*h + 48*a^2*b^4*c^5*d*f*g^2 + 960*a^2*b^2*c^7*d^2*e*g + 192*a^2*b^2*c^7*d*e^2*f - 3072*a^8*b*c^2*j^2*k^2 + 1104*a^7*b^3*c*j^2*k^2 + 768*a^6*b^4*c*i^2*k^2 - 256*a^6*b^3*c^2*i^3*k + 1536*a^7*b*c^3*h^2*k^2 - 960*a^7*b*c^3*i^2*j^2 + 444*a^5*b^5*c*h^2*k^2 - 16*a^5*b^5*c*i^2*j^2 - 3072*a^7*b^2*c^2*g*k^3 - 496*a^6*b^3*c^2*h*j^3 + 192*a^4*b^6*c*g^2*k^2 - 192*a^4*b^4*c^3*g^3*k + 144*a^5*b^3*c^3*h^3*j + 32*a^3*b^6*c^2*g^3*k - 18*a^4*b^5*c^2*h^3*j - 9*a^4*b^6*c*h^2*j^2 - 192*a^6*b*c^4*h^2*i^2 + 36*a^3*b^7*c*f^2*k^2 - 4*a^3*b^7*c*g^2*j^2 - 2176*a^6*b^3*c^2*e*k^3 - 256*a^3*b^3*c^5*e^3*k - 192*a^6*b^2*c^3*f*j^3 - 192*a^4*b^2*c^5*f^3*j + 132*a^5*b^4*c^2*f*j^3 + 128*a^4*b^3*c^4*g^3*i - 28*a^3*b^4*c^4*f^3*j + 6*a^2*b^6*c^3*f^3*j + 10752*a^5*b*c^5*d^2*k^2 - 960*a^5*b*c^5*e^2*j^2 - 192*a^5*b*c^5*f^2*i^2 - 1680*a^5*b^3*c^3*d*j^3 - 1680*a^2*b^3*c^6*d^3*j + 222*a^4*b^5*c^2*d*j^3 + 80*a^4*b^3*c^4*f*h^3 + 80*a^3*b^3*c^5*f^3*h + 30*a*b^8*c^2*d^2*j^2 + 6*a^3*b^5*c^3*f*h^3 + 6*a^2*b^5*c^4*f^3*h - 960*a^4*b*c^6*d^2*i^2 - 192*a^4*b*c^6*e^2*h^2 - 192*a^4*b^2*c^5*d*h^3 - 192*a^2*b^2*c^7*d^3*h + 128*a^3*b^3*c^5*e*g^3 - 28*a^3*b^4*c^4*d*h^3 + 12*a*b^6*c^4*d^2*h^2 + 6*a^2*b^6*c^3*d*h^3 - 192*a^3*b*c^7*e^2*f^2 + 60*a*b^5*c^5*d^2*g^2 + 198*a*b^4*c^6*d^2*f^2 + 144*a^2*b^3*c^6*d*f^3 - 960*a^2*b*c^8*d^2*e^2 + 240*a*b^3*c^7*d^2*e^2 + 4608*a^8*c^3*i*j^2*k - 3072*a^8*c^3*h*j*k^2 - 512*a^7*c^4*h^2*i*k + 120*a^5*b^6*h*j*k^2 + 768*a^7*c^4*h*i^2*j + 4608*a^7*c^4*e*j^2*k + 512*a^6*c^5*f^2*i*k + 64*a^4*b^7*g*i*k^2 - 40*a^4*b^7*f*j*k^2 - 9216*a^7*c^4*d*j*k^2 - 4096*a^7*c^4*e*i*k^2 - 1024*a^7*c^4*f*h*k^2 - 4608*a^5*c^6*d^2*i*k - 512*a^6*c^5*e*h^2*k - 192*a^6*c^5*f*h^2*j - 40*a^3*b^8*d*j*k^2 + 24*a^3*b^8*f*h*k^2 + 2304*a^6*c^5*d*i^2*j + 768*a^5*c^6*e^2*h*j + 256*a^6*c^5*f*h*i^2 + 8*b^9*c^2*d^2*g*k - 2*b^9*c^2*d^2*h*j + 6144*a^8*b*c^2*i*k^3 - 2176*a^7*b^3*c*i*k^3 - 1728*a^6*c^5*d*h*j^2 + 1536*a^7*b*c^3*i^3*k + 512*a^5*c^6*e*f^2*k + 24*a^2*b^9*d*h*k^2 - 3072*a^6*c^5*d*f*k^2 - 16*b^8*c^3*d^2*e*k + 6*b^8*c^3*d^2*f*j - 4608*a^4*c^7*d^2*e*k + 2016*a^7*b*c^3*h*j^3 - 1728*a^4*c^7*d^2*f*j + 1088*a^6*b^4*c*g*k^3 + 224*a^6*b*c^4*h^3*j + 30*a^5*b^5

```
*c*h*j^3 + 2304*a^4*c^7*d*e^2*j + 768*a^5*c^6*d*f*i^2 + 256*a^4*c^7*e^2*f*h
 + 6*b^7*c^4*d^2*f*h + 6144*a^7*b*c^3*e*k^3 + 1536*a^4*b*c^6*e^3*k + 512*a^
6*b*c^4*g*i^3 + 192*a^5*b^5*c*e*k^3 - 192*a^4*c^7*d*f^2*h - 10*a^4*b^6*c*f*
j^3 + 108*a*b^9*c*d^2*k^2 + 16*b^6*c^5*d^2*e*g + 4320*a^6*b*c^4*d*j^3 + 432
0*a^3*b*c^7*d^3*j + 222*a*b^5*c^5*d^3*j + 96*a^5*b*c^5*f*h^3 + 96*a^4*b*c^6
*f^3*h - 10*a^3*b^7*c*d*j^3 + 768*a^3*c^8*d*e^2*f + 512*a^3*b*c^7*e^3*g + 1
32*a*b^4*c^6*d^3*h + 2016*a^2*b*c^8*d^3*f - 496*a*b^3*c^7*d^3*f + 224*a^3*b
*c^7*d*f^3 - 18*a*b^5*c^5*d*f^3 - 1920*a^7*b^2*c^2*i^2*k^2 - 1648*a^6*b^3*c
^2*h^2*k^2 + 240*a^6*b^3*c^2*i^2*j^2 - 960*a^6*b^2*c^3*h^2*j^2 - 512*a^6*b^
2*c^3*g^2*k^2 - 480*a^5*b^4*c^2*g^2*k^2 + 198*a^5*b^4*c^2*h^2*j^2 - 240*a^5
*b^3*c^3*g^2*j^2 - 240*a^5*b^3*c^3*f^2*k^2 + 60*a^4*b^5*c^2*g^2*j^2 - 36*a^
4*b^5*c^2*f^2*k^2 - 16*a^5*b^3*c^3*h^2*i^2 - 1920*a^5*b^2*c^4*e^2*k^2 + 768
*a^4*b^4*c^3*e^2*k^2 - 464*a^5*b^2*c^4*f^2*j^2 - 384*a^5*b^2*c^4*g^2*i^2 -
64*a^3*b^6*c^2*e^2*k^2 + 42*a^4*b^4*c^3*f^2*j^2 + 12*a^3*b^6*c^2*f^2*j^2 -
13104*a^4*b^3*c^4*d^2*k^2 + 5628*a^3*b^5*c^3*d^2*k^2 - 1128*a^2*b^7*c^2*d^2
*k^2 + 240*a^4*b^3*c^4*e^2*j^2 - 48*a^4*b^3*c^4*g^2*h^2 - 16*a^4*b^3*c^4*f^
2*i^2 - 16*a^3*b^5*c^3*e^2*j^2 - 4*a^3*b^5*c^3*g^2*h^2 - 2880*a^4*b^2*c^5*d
^2*j^2 + 1750*a^3*b^4*c^4*d^2*j^2 - 345*a^2*b^6*c^3*d^2*j^2 - 192*a^4*b^2*c
^5*f^2*h^2 - 42*a^3*b^4*c^4*f^2*h^2 + 240*a^3*b^3*c^5*d^2*i^2 - 48*a^3*b^3*
c^5*f^2*g^2 - 16*a^3*b^3*c^5*e^2*h^2 - 16*a^2*b^5*c^4*d^2*i^2 - 4*a^2*b^5*c
^4*f^2*g^2 - 464*a^3*b^2*c^6*d^2*h^2 - 384*a^3*b^2*c^6*e^2*g^2 + 42*a^2*b^4
*c^5*d^2*h^2 - 240*a^2*b^3*c^6*d^2*g^2 - 16*a^2*b^3*c^6*e^2*f^2 - 960*a^2*b
^2*c^7*d^2*f^2 - 8*a*b^10*d*f*k^2 - a^2*b^8*c*f^2*j^2 - 2048*a^8*c^3*i^2*k^
2 - 100*a^6*b^5*j^2*k^2 - 64*a^5*b^6*i^2*k^2 - 288*a^7*c^4*h^2*j^2 - 36*a^4
*b^7*h^2*k^2 - 16*a^3*b^8*g^2*k^2 - 2048*a^6*c^5*e^2*k^2 - 864*a^6*c^5*f^2*
j^2 - 4*a^2*b^9*f^2*k^2 - 2592*a^5*c^6*d^2*j^2 - 1536*a^5*c^6*e^2*i^2 - 32*
a^5*c^6*f^2*h^2 - 864*a^4*c^7*d^2*h^2 + 360*a^7*b^2*c^2*j^4 - 4*b^7*c^4*d^2
*g^2 - 9*b^6*c^5*d^2*f^2 - 288*a^3*c^8*d^2*f^2 - 24*a^5*b^2*c^4*h^4 - 16*b^
5*c^6*d^2*e^2 - 9*a^4*b^4*c^3*h^4 - 16*a^3*b^4*c^4*g^4 - 24*a^3*b^2*c^6*f^4
 - 9*a^2*b^4*c^5*f^4 - a^2*b^6*c^3*f^2*h^2 + 192*a^6*b^5*i*k^3 - 96*a^5*b^6
*g*k^3 - 1728*a^7*c^4*f*j^3 - 192*a^5*c^6*f^3*j - 10*b^7*c^4*d^3*j - 1024*a
^6*c^5*e*i^3 - 1024*a^4*c^7*e^3*i + 1536*a^8*b^2*c*k^4 - 10*b^6*c^5*d^3*h -
 1728*a^3*c^8*d^3*h - 192*a^5*c^6*d*h^3 - 25*a^6*b^4*c*j^4 + 30*b^5*c^6*d^3
*f + 360*a*b^2*c^8*d^4 - 4*b^11*d^2*k^2 - 4096*a^9*c^2*k^4 - 1296*a^8*c^3*j
^4 - 144*a^7*b^4*k^4 - 256*a^7*c^4*i^4 - 16*a^6*c^5*h^4 - 16*a^4*c^7*f^4 -
256*a^3*c^8*e^4 - 25*b^4*c^7*d^4 - 1296*a^2*c^9*d^4 - b^8*c^3*d^2*h^2 - b^1
0*c*d^2*j^2, z, n), n, 1, 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((k*x**7+j*x**6+i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+
a)**2,x)
```

```
[Out] Timed out
```

3.59 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5+jx^8+kx^{11}}{\left(a+bx^2+cx^4\right)^3}\,dx$

Optimal. Leaf size=1177

$$-\frac{x\left(\left(-\left(\left(\frac{ja^2}{c^2}+d\right)b^2\right)+afb+2a\left(\frac{ja^2}{c}-ha+cd\right)\right)c^2+\left(-ajb^3-c\left(-3ja^2+cha+c^2d\right)b+2ac^3f\right)x^2\right)}{4ac^2\left(b^2-4ac\right)\left(cx^4+bx^2+a\right)^2}+\frac{\left(\left(ja^2+\right.\right.}{}$$

```
[Out] -1/4*x*(c^2*(a*b*f-b^2*(d+a^2*j/c^2)+2*a*(c*d-a*h+a^2*j/c))+(2*a*c^3*f-a*b^
3*j-b*c*(-3*a^2*j+a*c*h+c^2*d))*x^2)/a/c^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1
/4*(-b*c^3*(a*i+c*e)+a*b^4*k-4*a^2*b^2*c*k+2*a*c^2*(a^2*k+c^2*g)-(2*c^5*e+b
^2*c^3*i-c^4*(2*a*i+b*g)-b^5*k+5*a*b^3*c*k-5*a^2*b*c^2*k)*x^2)/c^4/(-4*a*c+
b^2)/(c*x^4+b*x^2+a)^2+1/8*x*(c*(a*b^3*f+8*a^2*b*c*f+4*a^2*(-9*a^2*j+a*c*h+
7*c^2*d)+b^4*(3*d-2*a^2*j/c^2)-a*b^2*(25*c*d+7*a*h-11*a^2*j/c))+(a*b^2*c^2*
f+20*a^2*c^3*f+b^3*(a^2*j+3*c^2*d)-4*a*b*c*(4*a^2*j+3*a*c*h+6*c^2*d))*x^2)/
a^2/c/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/4*(b^3*c^2*i+2*b*c^3*(a*i+3*c*e)+11*
a*b^4*k-b^6*k/c+32*a^3*c^2*k-3*b^2*(13*a^2*c*k+c^3*g)+2*(6*c^5*e+b^2*c^3*i-
c^4*(-2*a*i+3*b*g)+2*b^5*k-15*a*b^3*c*k+25*a^2*b*c^2*k)*x^2)/c^3/(-4*a*c+b^
2)^2/(c*x^4+b*x^2+a)-1/2*(12*c^5*e+2*b^2*c^3*i-c^4*(-4*a*i+6*b*g)-b^5*k+10*
a*b^3*c*k-30*a^2*b*c^2*k)*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/c^3/(-4*a
*c+b^2)^(5/2)+1/4*k*ln(c*x^4+b*x^2+a)/c^3+1/16*arctan(x*2^(1/2)*c^(1/2)/(b-
(-4*a*c+b^2)^(1/2))^(1/2))*(a*b^2*c^2*f+20*a^2*c^3*f+b^3*(a^2*j+3*c^2*d)-4*
a*b*c*(4*a^2*j+3*a*c*h+6*c^2*d)+(a*b^3*c^2*f-52*a^2*b*c^3*f-6*a*b^2*c*(-3*a
^2*j-3*a*c*h+5*c^2*d)+b^4*(-a^2*j+3*c^2*d)+8*a^2*c^2*(5*a^2*j+3*a*c*h+21*c^
2*d))/(-4*a*c+b^2)^(1/2))/a^2/c^(3/2)/(-4*a*c+b^2)^2*2^(1/2)/(b-(-4*a*c+b^2
)^(1/2))^(1/2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*
(a*b^2*c^2*f+20*a^2*c^3*f+b^3*(a^2*j+3*c^2*d)-4*a*b*c*(4*a^2*j+3*a*c*h+6*c^
2*d)+(-a*b^3*c^2*f+52*a^2*b*c^3*f+6*a*b^2*c*(-3*a^2*j-3*a*c*h+5*c^2*d)-b^4*
(-a^2*j+3*c^2*d)-8*a^2*c^2*(5*a^2*j+3*a*c*h+21*c^2*d))/(-4*a*c+b^2)^(1/2))/
a^2/c^(3/2)/(-4*a*c+b^2)^2*2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 7.93, antiderivative size = 1179, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 10, integrand size = 50, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.200, Rules used = {1673, 1678, 1166, 205, 1663, 1660, 634, 618, 206, 628}

$$-\frac{x\left(\left(-\left(\frac{ja^2}{c^2}+d\right)b^2+afb+2a\left(\frac{ja^2}{c}-ha+cd\right)\right)c^2+\left(-ajb^3-c\left(-3ja^2+cha+c^2d\right)b+2ac^3f\right)x^2\right)}{4ac^2\left(b^2-4ac\right)\left(cx^4+bx^2+a\right)^2}+\frac{\left(\left(\frac{ja^2}{c}+3c\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^8 + k*x^11)/(a + b*x^2 +
 c*x^4)^3,x]
```

```
[Out] -(x*(c^2*(a*b*f - b^2*(d + (a^2*j)/c^2) + 2*a*(c*d - a*h + (a^2*j)/c)) + (2
*a*c^3*f - a*b^3*j - b*c*(c^2*d + a*c*h - 3*a^2*j))*x^2))/(4*a*c^2*(b^2 - 4
*a*c)*(a + b*x^2 + c*x^4)^2) - (b*c^3*(c*e + a*i) - a*b^4*k + 4*a^2*b^2*c*k
 - 2*a*c^2*(c^2*g + a^2*k) + (2*c^5*e + b^2*c^3*i - c^4*(b*g + 2*a*i) - b^5
*k + 5*a*b^3*c*k - 5*a^2*b*c^2*k)*x^2)/(4*c^4*(b^2 - 4*a*c)*(a + b*x^2 + c*
x^4)^2) + (x*(c*(a*b^3*f + 8*a^2*b*c*f + 4*a^2*(7*c^2*d + a*c*h - 9*a^2*j)
+ b^4*(3*d - (2*a^2*j)/c^2) - a*b^2*(25*c*d + 7*a*h - (11*a^2*j)/c)) + (a*b
^2*c^2*f + 20*a^2*c^3*f + b^3*(3*c^2*d + a^2*j) - 4*a*b*c*(6*c^2*d + 3*a*c*
h + 4*a^2*j))*x^2))/(8*a^2*c*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (b^3*c^
2*i + 2*b*c^3*(3*c*e + a*i) + 11*a*b^4*k - (b^6*k)/c + 32*a^3*c^2*k - 3*b^2
*(c^3*g + 13*a^2*c*k) + 2*(6*c^5*e + b^2*c^3*i - c^4*(3*b*g - 2*a*i) + 2*b^
```

```
5*k - 15*a*b^3*c*k + 25*a^2*b*c^2*k)*x^2)/(4*c^3*(b^2 - 4*a*c)^2*(a + b*x^2
 + c*x^4)) + ((a*b^2*c*f + 20*a^2*c^2*f - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*
j) + b^3*(3*c*d + (a^2*j)/c) + (a*b^3*c^2*f - 52*a^2*b*c^3*f - 6*a*b^2*c*(5
*c^2*d - 3*a*c*h - 3*a^2*j) + b^4*(3*c^2*d - a^2*j) + 8*a^2*c^2*(21*c^2*d +
 3*a*c*h + 5*a^2*j))/(c*Sqrt[b^2 - 4*a*c]))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt
[b - Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*Sqrt[c]*(b^2 - 4*a*c)^2*Sqrt[b - S
qrt[b^2 - 4*a*c]]) + ((a*b^2*c*f + 20*a^2*c^2*f - 4*a*b*(6*c^2*d + 3*a*c*h
+ 4*a^2*j) + b^3*(3*c*d + (a^2*j)/c) - (a*b^3*c^2*f - 52*a^2*b*c^3*f - 6*a*
b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*j) + b^4*(3*c^2*d - a^2*j) + 8*a^2*c^2*(21
*c^2*d + 3*a*c*h + 5*a^2*j))/(c*Sqrt[b^2 - 4*a*c]))*ArcTan[(Sqrt[2]*Sqrt[c]
*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*Sqrt[c]*(b^2 - 4*a*c)^2*Sq
rt[b + Sqrt[b^2 - 4*a*c]]) - ((12*c^5*e + 2*b^2*c^3*i - c^4*(6*b*g - 4*a*i)
 - b^5*k + 10*a*b^3*c*k - 30*a^2*b*c^2*k)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 -
4*a*c]])/(2*c^3*(b^2 - 4*a*c)^(5/2)) + (k*Log[a + b*x^2 + c*x^4])/(4*c^3)
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] &&  !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^
(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
```

```
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
 - 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
 Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
 + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
 + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3+hx^4+59x^5+jx^8+kx^{11}}{\left(a+bx^2+cx^4\right)^3}dx = \int \frac{d+fx^2+hx^4+jx^8}{\left(a+bx^2+cx^4\right)^3}dx + \int \frac{x\left(e+gx^2+59x^4+kx^{10}\right)}{\left(a+bx^2+cx^4\right)^3}$$

$$= -\frac{x\left(c^2\left(abf-b^2\left(d+\frac{a^2j}{c^2}\right)+2a\left(cd-ah+\frac{a^2j}{c}\right)\right)+\left(2ac^3f\right.\right.}{4ac^2\left(b^2-4ac\right)\left(a+bx^2+\right.}$$

$$= -\frac{x\left(c^2\left(abf-b^2\left(d+\frac{a^2j}{c^2}\right)+2a\left(cd-ah+\frac{a^2j}{c}\right)\right)+\left(2ac^3f\right.\right.}{4ac^2\left(b^2-4ac\right)\left(a+bx^2+\right.}$$

$$= -\frac{x\left(c^2\left(abf-b^2\left(d+\frac{a^2j}{c^2}\right)+2a\left(cd-ah+\frac{a^2j}{c}\right)\right)+\left(2ac^3f\right.\right.}{4ac^2\left(b^2-4ac\right)\left(a+bx^2+\right.}$$

$$= -\frac{x\left(c^2\left(abf-b^2\left(d+\frac{a^2j}{c^2}\right)+2a\left(cd-ah+\frac{a^2j}{c}\right)\right)+\left(2ac^3f\right.\right.}{4ac^2\left(b^2-4ac\right)\left(a+bx^2+\right.}$$

$$= -\frac{x\left(c^2\left(abf-b^2\left(d+\frac{a^2j}{c^2}\right)+2a\left(cd-ah+\frac{a^2j}{c}\right)\right)+\left(2ac^3f\right.\right.}{4ac^2\left(b^2-4ac\right)\left(a+bx^2+\right.}$$

$$= -\frac{x\left(c^2\left(abf-b^2\left(d+\frac{a^2j}{c^2}\right)+2a\left(cd-ah+\frac{a^2j}{c}\right)\right)+\left(2ac^3f\right.\right.}{4ac^2\left(b^2-4ac\right)\left(a+bx^2+\right.}$$

Mathematica [A] time = 7.35, size = 1649, normalized size = 1.40

$$\frac{-akx^2b^5-a^2kb^4-ac^2jx^3b^3+5a^2ckx^2b^3+ac^3ix^2b^2+4a^3ckb^2-c^4dxb^2-a^2c^2jxb^2-c^5dx^3b-ac^4hx^3b+3a^2c^3jx^3}{4ac^4\left(\right.}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^8 + k*x^11)/(a + b
*x^2 + c*x^4)^3,x]
```

```
[Out] (a*b*c^4*e - 2*a^2*c^4*g + a^2*b*c^3*i - a^2*b^4*k + 4*a^3*b^2*c*k - 2*a^4*
c^2*k - b^2*c^4*d*x + 2*a*c^5*d*x + a*b*c^4*f*x - 2*a^2*c^4*h*x - a^2*b^2*c
^2*j*x + 2*a^3*c^3*j*x + 2*a*c^5*e*x^2 - a*b*c^4*g*x^2 + a*b^2*c^3*i*x^2 -
2*a^2*c^4*i*x^2 - a*b^5*k*x^2 + 5*a^2*b^3*c*k*x^2 - 5*a^3*b*c^2*k*x^2 - b*c
^5*d*x^3 + 2*a*c^5*f*x^3 - a*b*c^4*h*x^3 - a*b^3*c^2*j*x^3 + 3*a^2*b*c^3*j*
x^3)/(4*a*c^4*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (12*a^2*b*c^5*e - 6*a
^2*b^2*c^4*g + 2*a^2*b^3*c^3*i + 4*a^3*b*c^4*i - 2*a^2*b^6*k + 22*a^3*b^4*c
*k - 78*a^4*b^2*c^2*k + 64*a^5*c^3*k + 3*b^4*c^4*d*x - 25*a*b^2*c^5*d*x + 2
8*a^2*c^6*d*x + a*b^3*c^4*f*x + 8*a^2*b*c^5*f*x - 7*a^2*b^2*c^4*h*x + 4*a^3
*c^5*h*x - 2*a^2*b^4*c^2*j*x + 11*a^3*b^2*c^3*j*x - 36*a^4*c^4*j*x + 24*a^2
```

```
*c^6*e*x^2 - 12*a^2*b*c^5*g*x^2 + 4*a^2*b^2*c^4*i*x^2 + 8*a^3*c^5*i*x^2 + 8
*a^2*b^5*c*k*x^2 - 60*a^3*b^3*c^2*k*x^2 + 100*a^4*b*c^3*k*x^2 + 3*b^3*c^5*d
*x^3 - 24*a*b*c^6*d*x^3 + a*b^2*c^5*f*x^3 + 20*a^2*c^6*f*x^3 - 12*a^2*b*c^5
*h*x^3 + a^2*b^3*c^3*j*x^3 - 16*a^3*b*c^4*j*x^3)/(8*a^2*c^4*(-b^2 + 4*a*c)^
2*(a + b*x^2 + c*x^4)) + ((3*b^4*c^2*d - 30*a*b^2*c^3*d + 168*a^2*c^4*d + 3
*b^3*c^2*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c^3*Sqrt[b^2 - 4*a*c]*d + a*b^3*c^2*f
 - 52*a^2*b*c^3*f + a*b^2*c^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c^3*Sqrt[b^2 - 4
*a*c]*f + 18*a^2*b^2*c^2*h + 24*a^3*c^3*h - 12*a^2*b*c^2*Sqrt[b^2 - 4*a*c]*
h - a^2*b^4*j + 18*a^3*b^2*c*j + 40*a^4*c^2*j + a^2*b^3*Sqrt[b^2 - 4*a*c]*j
 - 16*a^3*b*c*Sqrt[b^2 - 4*a*c]*j)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt
[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*c^(3/2)*(b^2 - 4*a*c)^(5/2)*Sqrt[b - Sqrt[b
^2 - 4*a*c]]) + ((-3*b^4*c^2*d + 30*a*b^2*c^3*d - 168*a^2*c^4*d + 3*b^3*c^2
*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c^3*Sqrt[b^2 - 4*a*c]*d - a*b^3*c^2*f + 52*a^
2*b*c^3*f + a*b^2*c^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c^3*Sqrt[b^2 - 4*a*c]*f
- 18*a^2*b^2*c^2*h - 24*a^3*c^3*h - 12*a^2*b*c^2*Sqrt[b^2 - 4*a*c]*h + a^2*
b^4*j - 18*a^3*b^2*c*j - 40*a^4*c^2*j + a^2*b^3*Sqrt[b^2 - 4*a*c]*j - 16*a^
3*b*c*Sqrt[b^2 - 4*a*c]*j)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4
*a*c]]])/(8*Sqrt[2]*a^2*c^(3/2)*(b^2 - 4*a*c)^(5/2)*Sqrt[b + Sqrt[b^2 - 4*a
*c]]) + ((12*c^5*e - 6*b*c^4*g + 2*b^2*c^3*i + 4*a*c^4*i - b^5*k + 10*a*b^3
*c*k - 30*a^2*b*c^2*k + b^4*Sqrt[b^2 - 4*a*c]*k - 8*a*b^2*c*Sqrt[b^2 - 4*a*
c]*k + 16*a^2*c^2*Sqrt[b^2 - 4*a*c]*k)*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2
])/(4*c^3*(b^2 - 4*a*c)^(5/2)) + ((-12*c^5*e + 6*b*c^4*g - 2*b^2*c^3*i - 4*
a*c^4*i + b^5*k - 10*a*b^3*c*k + 30*a^2*b*c^2*k + b^4*Sqrt[b^2 - 4*a*c]*k -
 8*a*b^2*c*Sqrt[b^2 - 4*a*c]*k + 16*a^2*c^2*Sqrt[b^2 - 4*a*c]*k)*Log[b + Sq
rt[b^2 - 4*a*c] + 2*c*x^2])/(4*c^3*(b^2 - 4*a*c)^(5/2))
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((k*x^11+j*x^8+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x,
 algorithm="fricas")
```

```
[Out] Timed out
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((k*x^11+j*x^8+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x,
 algorithm="giac")
```

```
[Out] Timed out
```

maple [B] time = 0.13, size = 6130, normalized size = 5.21

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((k*x^11+j*x^8+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x)
```

```
[Out] result too large to display
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((k*x^11+j*x^8+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x,
 algorithm="maxima")
```

```
[Out] 1/8*(12*a^4*b*c^3*i - (12*a^2*b*c^5*h - 3*(b^3*c^5 - 8*a*b*c^6)*d - (a*b^2*
c^5 + 20*a^2*c^6)*f - (a^2*b^3*c^3 - 16*a^3*b*c^4)*j)*x^7 + 4*(6*a^2*c^6*e
- 3*a^2*b*c^5*g + (a^2*b^2*c^4 + 2*a^3*c^5)*i + (2*a^2*b^5*c - 15*a^3*b^3*c
^2 + 25*a^4*b*c^3)*k)*x^6 + ((6*b^4*c^4 - 49*a*b^2*c^5 + 28*a^2*c^6)*d + 2*
(a*b^3*c^4 + 14*a^2*b*c^5)*f - (19*a^2*b^2*c^4 - 4*a^3*c^5)*h - (a^2*b^4*c^
2 + 5*a^3*b^2*c^3 + 36*a^4*c^4)*j)*x^5 + 2*(18*a^2*b*c^5*e - 9*a^2*b^2*c^4*
g + 3*(a^2*b^3*c^3 + 2*a^3*b*c^4)*i + (3*a^2*b^6 - 19*a^3*b^4*c + 11*a^4*b^
2*c^2 + 32*a^5*c^3)*k)*x^4 + ((3*b^5*c^3 - 20*a*b^3*c^4 - 4*a^2*b*c^5)*d +
(a*b^4*c^3 + 5*a^2*b^2*c^4 + 36*a^3*c^5)*f - (5*a^2*b^3*c^3 + 16*a^3*b*c^4)
*h - 2*(a^3*b^3*c^2 + 14*a^4*b*c^3)*j)*x^3 + 4*(2*(a^2*b^2*c^4 + 5*a^3*c^5)
*e - (a^2*b^3*c^3 + 5*a^3*b*c^4)*g + (5*a^3*b^2*c^3 - 2*a^4*c^4)*i + (3*a^3
*b^5 - 22*a^4*b^3*c + 31*a^5*b*c^2)*k)*x^2 - 2*(a^2*b^3*c^3 - 10*a^3*b*c^4)
*e - 2*(a^3*b^2*c^3 + 8*a^4*c^4)*g + 6*(a^4*b^4 - 7*a^5*b^2*c + 8*a^6*c^2)*
k + ((5*a*b^4*c^3 - 37*a^2*b^2*c^4 + 44*a^3*c^5)*d - (a^2*b^3*c^3 - 16*a^3*
b*c^4)*f - 3*(a^3*b^2*c^3 + 4*a^4*c^4)*h - (a^4*b^2*c^2 + 20*a^5*c^3)*j)*x)
/(a^4*b^4*c^3 - 8*a^5*b^2*c^4 + 16*a^6*c^5 + (a^2*b^4*c^5 - 8*a^3*b^2*c^6 +
 16*a^4*c^7)*x^8 + 2*(a^2*b^5*c^4 - 8*a^3*b^3*c^5 + 16*a^4*b*c^6)*x^6 + (a^
2*b^6*c^3 - 6*a^3*b^4*c^4 + 32*a^5*c^6)*x^4 + 2*(a^3*b^5*c^3 - 8*a^4*b^3*c^
4 + 16*a^5*b*c^5)*x^2) + 1/8*integrate((8*(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c
^2)*k*x^3 - (12*a^2*b*c^3*h - 3*(b^3*c^3 - 8*a*b*c^4)*d - (a*b^2*c^3 + 20*a
^2*c^4)*f - (a^2*b^3*c - 16*a^3*b*c^2)*j)*x^2 + 3*(b^4*c^2 - 9*a*b^2*c^3 +
28*a^2*c^4)*d + (a*b^3*c^2 - 16*a^2*b*c^3)*f + 3*(a^2*b^2*c^2 + 4*a^3*c^3)*
h + (a^3*b^2*c + 20*a^4*c^2)*j + 8*(6*a^2*c^4*e - 3*a^2*b*c^3*g + (a^2*b^2*
c^2 + 2*a^3*c^3)*i + (a^3*b^3 - 7*a^4*b*c)*k)*x)/(c*x^4 + b*x^2 + a), x)/(a
^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4)
```

mupad [B] time = 17.18, size = 97905, normalized size = 83.18

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^8 + k*x^11)/(a + b*x^2 +
 c*x^4)^3,x)
```

```
[Out] ((x^7*(3*b^3*c^2*d + 20*a^2*c^3*f + a^2*b^3*j - 24*a*b*c^3*d - 16*a^3*b*c*j
 + a*b^2*c^2*f - 12*a^2*b*c^2*h))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) -
(b^3*c^3*e + 8*a^2*c^4*g - 3*a^2*b^4*k - 24*a^4*c^2*k - 10*a*b*c^4*e + a*b^
2*c^3*g - 6*a^2*b*c^3*i + 21*a^3*b^2*c*k)/(4*c^3*(b^4 + 16*a^2*c^2 - 8*a*b^
2*c)) + (x^4*(3*b^6*k - 9*b^2*c^4*g + 3*b^3*c^3*i + 32*a^3*c^3*k + 18*b*c^5
*e + 11*a^2*b^2*c^2*k + 6*a*b*c^4*i - 19*a*b^4*c*k))/(4*c^3*(b^4 + 16*a^2*c
^2 - 8*a*b^2*c)) + (x^2*(2*b^2*c^4*e - b^3*c^3*g - 2*a^2*c^4*i + 10*a*c^5*e
 + 3*a*b^5*k - 5*a*b*c^4*g + 5*a*b^2*c^3*i - 22*a^2*b^3*c*k + 31*a^3*b*c^2*
k))/(2*c^3*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^6*(6*c^5*e + 2*b^5*k + b^2*
c^3*i - 3*b*c^4*g + 2*a*c^4*i - 15*a*b^3*c*k + 25*a^2*b*c^2*k))/(2*c^2*(b^4
 + 16*a^2*c^2 - 8*a*b^2*c)) - (x^3*(2*a^3*b^3*j - 36*a^3*c^3*f - 3*b^5*c*d
- 5*a^2*b^2*c^2*f - a*b^4*c*f + 28*a^4*b*c*j + 20*a*b^3*c^2*d + 4*a^2*b*c^3
*d + 5*a^2*b^3*c*h + 16*a^3*b*c^2*h))/(8*a^2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*
c)) + (x^5*(28*a^2*c^4*d + 6*b^4*c^2*d + 4*a^3*c^3*h - a^2*b^4*j - 36*a^4*c
^2*j - 19*a^2*b^2*c^2*h - 49*a*b^2*c^3*d + 2*a*b^3*c^2*f + 28*a^2*b*c^3*f -
 5*a^3*b^2*c*j))/(8*a^2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (x*(12*a^3*c^2*
h - 44*a^2*c^3*d + a^3*b^2*j - 5*b^4*c*d + 20*a^4*c*j + a*b^3*c*f + 37*a*b^
2*c^2*d - 16*a^2*b*c^2*f + 3*a^2*b^2*c*h))/(8*a*c*(b^4 + 16*a^2*c^2 - 8*a*b
^2*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6) + symsu
m(log((10368*a*b^5*c^10*d^3 - 8000*a^5*c^11*f^3 - 567*b^7*c^9*d^3 + 169344*
a^3*b*c^12*d^3 + 193536*a^4*c^12*d*e^2 - 141120*a^4*c^12*d^2*f + 1728*a^6*b
*c^9*h^3 + 315*b^8*c^8*d^2*f + 6400*a^9*b*c^6*j^3 + 27648*a^5*c^11*e^2*h +
21504*a^6*c^10*d*i^2 - 135*b^9*c^7*d^2*h + 192*a^2*b^14*d*k^2 - 2880*a^6*c^
```

10*f*h^2 + 46080*a^6*c^10*e^2*j - 1376256*a^9*c^7*d*k^2 + 9*b^11*c^5*d^2*j
+ 64*a^3*b^13*f*k^2 - 8000*a^8*c^8*f*j^2 + 3072*a^7*c^9*h*i^2 + 192*a^4*b^1
2*h*k^2 + 5120*a^8*c^8*i^2*j - 196608*a^10*c^6*h*k^2 + 2240*a^6*b^10*j*k^2
- 327680*a^11*c^5*j*k^2 - 67824*a^2*b^3*c^11*d^3 + 35*a^2*b^6*c^8*f^3 + 84*
a^3*b^4*c^9*f^3 - 12720*a^4*b^2*c^10*f^3 + 540*a^4*b^5*c^7*h^3 + 4320*a^5*b
^3*c^8*h^3 + 35*a^6*b^7*c^3*j^3 - 1176*a^7*b^5*c^4*j^3 + 9456*a^8*b^3*c^5*j
^3 + 129024*a^5*c^11*d*e*i - 40320*a^5*c^11*d*f*h - 67200*a^6*c^10*d*f*j +
18432*a^6*c^10*e*h*i + 245760*a^7*c^9*e*f*k + 30720*a^7*c^9*e*i*j - 9600*a^
7*c^9*f*h*j + 81920*a^8*c^8*f*i*k - 6237*a*b^6*c^9*d^2*f + 210*a*b^7*c^8*d*
f^2 + 116160*a^4*b*c^11*d*f^2 - 36864*a^4*b*c^11*e^2*f + 2430*a*b^7*c^8*d^2
*h + 133056*a^4*b*c^11*d^2*h + 27648*a^5*b*c^10*d*h^2 - 324*a*b^9*c^6*d^2*j
+ 193536*a^5*b*c^10*d^2*j + 26880*a^5*b*c^10*f^2*h + 63360*a^7*b*c^8*d*j^2
- 5568*a^3*b^12*c*d*k^2 - 4096*a^6*b*c^9*f*i^2 + 40000*a^6*b*c^9*f^2*j - 2
304*a^4*b^11*c*f*k^2 - 352256*a^9*b*c^6*f*k^2 + 8064*a^7*b*c^8*h^2*j + 1248
0*a^8*b*c^7*h*j^2 - 2112*a^5*b^10*c*h*k^2 - 41664*a^7*b^8*c*j*k^2 + 6912*a^
2*b^4*c^10*d*e^2 - 62208*a^3*b^2*c^11*d*e^2 + 42372*a^2*b^4*c^10*d^2*f - 17
64*a^2*b^5*c^9*d*f^2 - 96048*a^3*b^2*c^11*d^2*f - 4608*a^3*b^3*c^10*d*f^2 +
1728*a^2*b^6*c^8*d*g^2 + 2304*a^3*b^3*c^10*e^2*f - 15552*a^3*b^4*c^9*d*g^2
+ 48384*a^4*b^2*c^10*d*g^2 - 13716*a^2*b^5*c^9*d^2*h + 405*a^2*b^7*c^7*d*h
^2 + 12096*a^3*b^3*c^10*d^2*h - 5400*a^3*b^5*c^8*d*h^2 + 28944*a^4*b^3*c^9*
d*h^2 + 192*a^2*b^8*c^6*d*i^2 + 576*a^3*b^5*c^8*f*g^2 - 960*a^3*b^6*c^7*d*i
^2 + 6912*a^4*b^2*c^10*e^2*h - 9216*a^4*b^3*c^9*f*g^2 - 768*a^4*b^4*c^8*d*i
^2 + 14592*a^5*b^2*c^9*d*i^2 + 3717*a^2*b^7*c^7*d^2*j - 15*a^2*b^7*c^7*f^2*
h + 3*a^2*b^11*c^3*d*j^2 - 15192*a^3*b^5*c^8*d^2*j - 360*a^3*b^5*c^8*f^2*h
+ 135*a^3*b^6*c^7*f*h^2 - 132*a^3*b^9*c^4*d*j^2 - 7920*a^4*b^3*c^9*d^2*j +
15696*a^4*b^3*c^9*f^2*h - 5580*a^4*b^4*c^8*f*h^2 + 2079*a^4*b^7*c^5*d*j^2 -
20592*a^5*b^2*c^9*f*h^2 - 14448*a^5*b^5*c^6*d*j^2 + 37104*a^6*b^3*c^7*d*j^
2 + 64*a^3*b^7*c^6*f*i^2 + 1728*a^4*b^4*c^8*g^2*h - 768*a^4*b^5*c^7*f*i^2 +
70656*a^4*b^10*c^2*d*k^2 + 2304*a^5*b^2*c^9*e^2*j + 6912*a^5*b^2*c^9*g^2*h
- 3840*a^5*b^3*c^8*f*i^2 - 499008*a^5*b^8*c^3*d*k^2 + 2071104*a^6*b^6*c^4*
d*k^2 - 4853952*a^7*b^4*c^5*d*k^2 + 5399808*a^8*b^2*c^6*d*k^2 + a^2*b^9*c^5
*f^2*j + 20*a^3*b^7*c^6*f^2*j + a^3*b^10*c^3*f*j^2 - 1596*a^4*b^5*c^7*f^2*j
- 51*a^4*b^8*c^4*f*j^2 + 16736*a^5*b^3*c^8*f^2*j + 875*a^5*b^6*c^5*f*j^2 -
2716*a^6*b^4*c^6*f*j^2 - 39600*a^7*b^2*c^7*f*j^2 + 192*a^4*b^6*c^6*h*i^2 +
1536*a^5*b^4*c^7*h*i^2 + 576*a^5*b^4*c^7*g^2*j + 28480*a^5*b^9*c^2*f*k^2 +
3840*a^6*b^2*c^8*h*i^2 + 11520*a^6*b^2*c^8*g^2*j - 164096*a^6*b^7*c^3*f*k^
2 + 436800*a^7*b^5*c^4*f*k^2 - 338944*a^8*b^3*c^5*f*k^2 - 81*a^4*b^7*c^5*h^
2*j + 3*a^4*b^9*c^3*h*j^2 + 720*a^5*b^5*c^6*h^2*j - 78*a^5*b^7*c^4*h*j^2 +
17136*a^6*b^3*c^7*h^2*j - 900*a^6*b^5*c^5*h*j^2 + 22272*a^7*b^3*c^6*h*j^2 +
64*a^5*b^6*c^5*i^2*j + 1536*a^6*b^4*c^6*i^2*j - 960*a^6*b^8*c^2*h*k^2 + 53
76*a^7*b^2*c^7*i^2*j + 108672*a^7*b^6*c^3*h*k^2 - 548160*a^8*b^4*c^4*h*k^2
+ 922368*a^9*b^2*c^5*h*k^2 + 305024*a^8*b^6*c^2*j*k^2 - 1042880*a^9*b^4*c^3
*j*k^2 + 1479936*a^10*b^2*c^4*j*k^2 - 193536*a^4*b*c^11*d*e*g - 90*a*b^8*c^
7*d*f*h + 6*a*b^10*c^5*d*f*j - 64512*a^5*b*c^10*d*g*i - 24576*a^5*b*c^10*e*
f*i - 27648*a^5*b*c^10*e*g*h - 1778688*a^6*b*c^9*d*e*k + 84096*a^6*b*c^9*d*
h*j - 46080*a^6*b*c^9*e*g*j - 9216*a^6*b*c^9*g*h*i - 592896*a^7*b*c^8*d*i*k
- 359424*a^7*b*c^8*e*h*k - 122880*a^7*b*c^8*f*g*k - 15360*a^7*b*c^8*g*i*j
- 549888*a^8*b*c^7*e*j*k - 119808*a^8*b*c^7*h*i*k - 183296*a^9*b*c^6*i*j*k
- 6912*a^2*b^5*c^9*d*e*g + 62208*a^3*b^3*c^10*d*e*g + 2304*a^2*b^6*c^8*d*e*
i - 270*a^2*b^6*c^8*d*f*h - 16128*a^3*b^4*c^9*d*e*i + 16056*a^3*b^4*c^9*d*f
*h - 2304*a^3*b^4*c^9*e*f*g + 23040*a^4*b^2*c^10*d*e*i - 127008*a^4*b^2*c^1
0*d*f*h + 36864*a^4*b^2*c^10*e*f*g - 1152*a^2*b^7*c^7*d*g*i - 48*a^2*b^8*c^
6*d*f*j - 2304*a^2*b^9*c^5*d*e*k + 8064*a^3*b^5*c^8*d*g*i + 768*a^3*b^5*c^8
*e*f*i - 2226*a^3*b^6*c^7*d*f*j + 43776*a^3*b^7*c^6*d*e*k - 11520*a^4*b^3*c
^9*d*g*i - 10752*a^4*b^3*c^9*e*f*i - 6912*a^4*b^3*c^9*e*g*h + 33384*a^4*b^4
*c^8*d*f*j - 340992*a^4*b^5*c^7*d*e*k - 162528*a^5*b^2*c^9*d*f*j + 1241856*
a^5*b^3*c^8*d*e*k - 72*a^2*b^9*c^5*d*h*j + 1152*a^2*b^10*c^4*d*g*k - 384*a^
3*b^6*c^7*f*g*i + 2016*a^3*b^7*c^6*d*h*j - 21888*a^3*b^8*c^5*d*g*k - 768*a^
3*b^8*c^5*e*f*k + 2304*a^4*b^4*c^8*e*h*i + 5376*a^4*b^4*c^8*f*g*i - 18648*a

^4*b^5*c^7*d*h*j + 170496*a^4*b^6*c^6*d*g*k + 19968*a^4*b^6*c^6*e*f*k + 138
24*a^5*b^2*c^9*e*h*i + 12288*a^5*b^2*c^9*f*g*i + 67392*a^5*b^3*c^8*d*h*j -
2304*a^5*b^3*c^8*e*g*j - 620928*a^5*b^4*c^7*d*g*k - 119040*a^5*b^4*c^7*e*f*
k + 889344*a^6*b^2*c^8*d*g*k + 172032*a^6*b^2*c^8*e*f*k - 384*a^2*b^11*c^3*
d*i*k - 24*a^3*b^8*c^5*f*h*j + 6528*a^3*b^9*c^4*d*i*k + 384*a^3*b^9*c^4*f*g
*k - 1152*a^4*b^5*c^7*g*h*i + 1050*a^4*b^6*c^6*f*h*j - 42240*a^4*b^7*c^5*d*
i*k - 2304*a^4*b^7*c^5*e*h*k - 9984*a^4*b^7*c^5*f*g*k - 6912*a^5*b^3*c^8*g*
h*i + 768*a^5*b^4*c^7*e*i*j - 9576*a^5*b^4*c^7*f*h*j + 93312*a^5*b^5*c^6*d*
i*k + 2304*a^5*b^5*c^6*e*h*k + 59520*a^5*b^5*c^6*f*g*k + 16896*a^6*b^2*c^8*
e*i*j - 57504*a^6*b^2*c^8*f*h*j + 117504*a^6*b^3*c^7*d*i*k + 103680*a^6*b^3
*c^7*e*h*k - 86016*a^6*b^3*c^7*f*g*k - 128*a^3*b^10*c^3*f*i*k + 3072*a^4*b^
8*c^4*f*i*k + 1152*a^4*b^8*c^4*g*h*k - 384*a^5*b^5*c^6*g*i*j - 13184*a^5*b^
6*c^5*f*i*k - 1152*a^5*b^6*c^5*g*h*k - 8448*a^6*b^3*c^7*g*i*j - 11008*a^6*b
^4*c^6*f*i*k - 51840*a^6*b^4*c^6*g*h*k - 26880*a^6*b^5*c^5*e*j*k + 98304*a^
7*b^2*c^7*f*i*k + 179712*a^7*b^2*c^7*g*h*k + 231168*a^7*b^3*c^6*e*j*k - 384
*a^4*b^9*c^3*h*i*k - 384*a^5*b^7*c^4*h*i*k + 18048*a^6*b^5*c^5*h*i*k + 1344
0*a^6*b^6*c^4*g*j*k - 25344*a^7*b^3*c^6*h*i*k - 115584*a^7*b^4*c^5*g*j*k +
274944*a^8*b^2*c^6*g*j*k - 4480*a^6*b^7*c^3*i*j*k + 29568*a^7*b^5*c^4*i*j*k
 - 14592*a^8*b^3*c^5*i*j*k)/(512*(4096*a^10*c^10 + a^4*b^12*c^4 - 24*a^5*b^
10*c^5 + 240*a^6*b^8*c^6 - 1280*a^7*b^6*c^7 + 3840*a^8*b^4*c^8 - 6144*a^9*b
^2*c^9)) + root(56371445760*a^11*b^8*c^12*z^4 - 503316480*a^8*b^14*c^9*z^4
+ 47185920*a^7*b^16*c^8*z^4 - 2621440*a^6*b^18*c^7*z^4 + 65536*a^5*b^20*c^6
*z^4 - 171798691840*a^14*b^2*c^15*z^4 + 193273528320*a^13*b^4*c^14*z^4 - 12
8849018880*a^12*b^6*c^13*z^4 - 16911433728*a^10*b^10*c^11*z^4 + 3523215360*
a^9*b^12*c^10*z^4 + 68719476736*a^15*c^16*z^4 - 47185920*a^7*b^16*c^5*k*z^3
 + 2621440*a^6*b^18*c^4*k*z^3 - 65536*a^5*b^20*c^3*k*z^3 + 171798691840*a^1
4*b^2*c^12*k*z^3 - 193273528320*a^13*b^4*c^11*k*z^3 + 128849018880*a^12*b^6
*c^10*k*z^3 + 16911433728*a^10*b^10*c^8*k*z^3 - 3523215360*a^9*b^12*c^7*k*z
^3 - 56371445760*a^11*b^8*c^9*k*z^3 + 503316480*a^8*b^14*c^6*k*z^3 - 687194
76736*a^15*c^13*k*z^3 + 1536*a*b^18*c^6*d*f*z^2 - 2571632640*a^9*b^5*c^11*d
*j*z^2 + 2548039680*a^9*b^3*c^13*d*h*z^2 + 2453667840*a^9*b^7*c^9*e*k*z^2 +
 2181038080*a^12*b^3*c^10*i*k*z^2 - 6492782592*a^10*b^5*c^10*e*k*z^2 + 1509
949440*a^9*b^3*c^13*e*g*z^2 - 1401421824*a^8*b^5*c^12*d*h*z^2 - 1226833920*
a^9*b^8*c^8*g*k*z^2 - 1321205760*a^9*b^2*c^14*d*f*z^2 - 2793406464*a^11*b*c
^13*d*j*z^2 + 9563013120*a^11*b^3*c^11*e*k*z^2 + 890634240*a^8*b^7*c^10*d*j
*z^2 - 754974720*a^8*b^5*c^12*e*g*z^2 - 570425344*a^11*b^5*c^9*i*k*z^2 + 73
2168192*a^7*b^6*c^12*d*f*z^2 - 581959680*a^10*b^4*c^11*f*j*z^2 - 603979776*
a^10*b^2*c^13*e*i*z^2 + 534773760*a^11*b^3*c^11*h*j*z^2 - 558366720*a^8*b^9
*c^8*e*k*z^2 - 4781506560*a^11*b^4*c^10*g*k*z^2 - 2013265920*a^13*b*c^11*i*
k*z^2 - 456130560*a^9*b^4*c^12*f*h*z^2 + 384040960*a^9*b^6*c^10*f*j*z^2 - 2
64241152*a^10*b^7*c^8*i*k*z^2 + 390463488*a^7*b^7*c^11*d*h*z^2 + 279183360*
a^8*b^10*c^7*g*k*z^2 + 301989888*a^10*b^3*c^12*g*i*z^2 + 222822400*a^9*b^9*
c^7*i*k*z^2 - 366280704*a^6*b^8*c^11*d*f*z^2 - 330301440*a^8*b^4*c^13*d*f*z
^2 + 254017536*a^8*b^6*c^11*f*h*z^2 - 1887436800*a^10*b*c^14*d*h*z^2 + 1887
43680*a^10*b^2*c^13*f*h*z^2 - 185303040*a^7*b^9*c^9*d*j*z^2 - 117964800*a^1
0*b^5*c^10*h*j*z^2 - 6039797760*a^12*b*c^12*e*k*z^2 - 67502080*a^8*b^11*c^6
*i*k*z^2 + 121634816*a^11*b^2*c^12*f*j*z^2 + 188743680*a^7*b^7*c^11*e*g*z^2
 - 115671040*a^8*b^8*c^9*f*j*z^2 + 125829120*a^8*b^6*c^11*e*i*z^2 + 1081344
0*a^7*b^13*c^5*i*k*z^2 + 76677120*a^7*b^11*c^7*e*k*z^2 - 38338560*a^7*b^12*
c^6*g*k*z^2 - 37355520*a^9*b^7*c^9*h*j*z^2 - 917504*a^6*b^15*c^4*i*k*z^2 +
32768*a^5*b^17*c^3*i*k*z^2 - 62914560*a^8*b^7*c^10*g*i*z^2 + 23101440*a^8*b
^9*c^8*h*j*z^2 - 4349952*a^7*b^11*c^7*h*j*z^2 + 2949120*a^6*b^14*c^5*g*k*z^
2 + 337920*a^6*b^13*c^6*h*j*z^2 - 98304*a^5*b^16*c^4*g*k*z^2 - 7680*a^5*b^1
5*c^5*h*j*z^2 - 61931520*a^7*b^8*c^10*f*h*z^2 + 23592960*a^7*b^9*c^9*g*i*z^
2 + 17940480*a^7*b^10*c^8*f*j*z^2 - 47185920*a^7*b^8*c^10*e*i*z^2 - 5898240
*a^6*b^13*c^6*e*k*z^2 - 3538944*a^6*b^11*c^8*g*i*z^2 - 1347584*a^6*b^12*c^7
*f*j*z^2 + 196608*a^5*b^15*c^5*e*k*z^2 + 196608*a^5*b^13*c^7*g*i*z^2 + 3584
0*a^5*b^14*c^6*f*j*z^2 + 96583680*a^5*b^10*c^10*d*f*z^2 + 23371776*a^6*b^11
*c^8*d*j*z^2 - 51609600*a^6*b^9*c^10*d*h*z^2 + 7077888*a^6*b^10*c^9*e*i*z^2

+ 6144000*a^6*b^10*c^9*f*h*z^2 - 1677312*a^5*b^13*c^7*d*j*z^2 - 393216*a^5
*b^12*c^8*e*i*z^2 + 61440*a^5*b^12*c^8*f*h*z^2 + 53760*a^4*b^15*c^6*d*j*z^2
- 46080*a^4*b^14*c^7*f*h*z^2 + 1536*a^3*b^16*c^6*f*h*z^2 - 23592960*a^6*b^
9*c^10*e*g*z^2 + 1179648*a^5*b^11*c^9*e*g*z^2 + 829440*a^4*b^13*c^8*d*h*z^2
+ 368640*a^5*b^11*c^9*d*h*z^2 - 105984*a^3*b^15*c^7*d*h*z^2 + 4608*a^2*b^1
7*c^6*d*h*z^2 - 15175680*a^4*b^12*c^9*d*f*z^2 + 1428480*a^3*b^14*c^8*d*f*z^
2 - 73728*a^2*b^16*c^7*d*f*z^2 + 4108320768*a^10*b^3*c^12*d*j*z^2 - 1207959
552*a^10*b*c^14*e*g*z^2 - 578813952*a^12*b*c^12*h*j*z^2 + 3246391296*a^10*b
^6*c^9*g*k*z^2 - 402653184*a^11*b*c^13*g*i*z^2 + 3019898880*a^12*b^2*c^11*g
*k*z^2 - 440401920*a^10*b*c^14*f^2*z^2 - 188743680*a^11*b*c^13*h^2*z^2 + 17
61607680*a^10*c^15*d*f*z^2 - 655360*a^6*b^18*c*k^2*z^2 - 94464*a*b^17*c^7*d
^2*z^2 + 6936330240*a^8*b^3*c^14*d^2*z^2 + 2464874496*a^6*b^7*c^12*d^2*z^2
- 3963617280*a^9*b*c^15*d^2*z^2 + 58007224320*a^13*b^4*c^8*k^2*z^2 + 149684
22400*a^11*b^8*c^6*k^2*z^2 + 805306368*a^11*c^14*e*i*z^2 - 35966156800*a^12
*b^6*c^7*k^2*z^2 + 419430400*a^12*c^13*f*j*z^2 - 1509949440*a^9*b^2*c^14*e^
2*z^2 + 251658240*a^11*c^14*f*h*z^2 - 56874762240*a^14*b^2*c^9*k^2*z^2 - 54
00428544*a^7*b^5*c^13*d^2*z^2 + 890470400*a^9*b^12*c^4*k^2*z^2 + 754974720*
a^8*b^4*c^13*e^2*z^2 - 730054656*a^5*b^9*c^11*d^2*z^2 + 477102080*a^12*b^3*
c^10*j^2*z^2 + 477102080*a^9*b^3*c^13*f^2*z^2 - 377487360*a^9*b^4*c^12*g^2*
z^2 + 301989888*a^10*b^2*c^13*g^2*z^2 - 174325760*a^11*b^5*c^9*j^2*z^2 - 12
6156800*a^8*b^14*c^3*k^2*z^2 + 188743680*a^8*b^6*c^11*g^2*z^2 + 141557760*a
^10*b^3*c^12*h^2*z^2 - 174325760*a^8*b^5*c^12*f^2*z^2 - 188743680*a^7*b^6*c
^12*e^2*z^2 - 4350935040*a^10*b^10*c^5*k^2*z^2 + 146165760*a^4*b^11*c^10*d^
2*z^2 - 50331648*a^10*b^4*c^11*i^2*z^2 + 11796480*a^7*b^16*c^2*k^2*z^2 - 33
554432*a^11*b^2*c^12*i^2*z^2 + 11206656*a^10*b^7*c^8*j^2*z^2 + 8929280*a^9*
b^9*c^7*j^2*z^2 + 20971520*a^9*b^6*c^10*i^2*z^2 - 2600960*a^8*b^11*c^6*j^2*
z^2 + 291840*a^7*b^13*c^5*j^2*z^2 - 14080*a^6*b^15*c^4*j^2*z^2 + 256*a^5*b^
17*c^3*j^2*z^2 - 47185920*a^7*b^8*c^10*g^2*z^2 - 26542080*a^8*b^7*c^10*h^2*
z^2 - 2752512*a^7*b^10*c^8*i^2*z^2 + 2621440*a^8*b^8*c^9*i^2*z^2 + 524288*a
^6*b^12*c^7*i^2*z^2 - 32768*a^5*b^14*c^6*i^2*z^2 + 9584640*a^7*b^9*c^9*h^2*
z^2 - 2359296*a^9*b^5*c^11*h^2*z^2 - 1290240*a^6*b^11*c^8*h^2*z^2 + 46080*a
^5*b^13*c^7*h^2*z^2 + 2304*a^4*b^15*c^6*h^2*z^2 + 5898240*a^6*b^10*c^9*g^2*
z^2 - 294912*a^5*b^12*c^8*g^2*z^2 + 11206656*a^7*b^7*c^11*f^2*z^2 + 8929280
*a^6*b^9*c^10*f^2*z^2 + 23592960*a^6*b^8*c^11*e^2*z^2 - 2600960*a^5*b^11*c^
9*f^2*z^2 + 291840*a^4*b^13*c^8*f^2*z^2 - 14080*a^3*b^15*c^7*f^2*z^2 + 256*
a^2*b^17*c^6*f^2*z^2 - 19860480*a^3*b^13*c^9*d^2*z^2 - 1179648*a^5*b^10*c^1
0*e^2*z^2 + 1771776*a^2*b^15*c^8*d^2*z^2 - 440401920*a^13*b*c^11*j^2*z^2 +
1207959552*a^10*c^15*e^2*z^2 + 134217728*a^12*c^13*i^2*z^2 + 25769803776*a^
15*c^10*k^2*z^2 + 16384*a^5*b^20*k^2*z^2 + 2304*b^19*c^6*d^2*z^2 + 16515072
0*a^9*b*c^12*d*g*j*z + 23592960*a^10*b*c^11*g*h*j*z + 169869312*a^7*b*c^14*
d*e*f*z + 99090432*a^8*b*c^13*d*g*h*z - 3145728*a^9*b*c^12*f*h*i*z + 566231
04*a^8*b*c^13*d*f*i*z - 1536*a*b^18*c^3*d*f*k*z - 9437184*a^8*b*c^13*e*f*h*
z + 1536*a*b^15*c^6*d*f*i*z - 4608*a*b^14*c^7*d*f*g*z + 9216*a*b^13*c^8*d*e
*f*z + 2173501440*a^9*b^5*c^8*d*j*k*z - 1987706880*a^9*b^3*c^10*d*h*k*z + 1
121255424*a^8*b^5*c^9*d*h*k*z + 861143040*a^8*b^4*c^10*d*f*k*z - 859963392*
a^7*b^6*c^9*d*f*k*z - 780779520*a^8*b^7*c^7*d*j*k*z - 754974720*a^9*b^3*c^1
0*e*g*k*z + 2222456832*a^11*b*c^10*d*j*k*z - 454164480*a^11*b^3*c^8*h*j*k*z
+ 377487360*a^8*b^5*c^9*e*g*k*z + 290979840*a^10*b^4*c^8*f*j*k*z + 3810263
04*a^6*b^8*c^8*d*f*k*z + 412876800*a^8*b^2*c^12*d*e*j*z + 301989888*a^10*b^
2*c^10*e*i*k*z - 320421888*a^7*b^7*c^8*d*h*k*z + 185794560*a^10*b^5*c^7*h*j
*k*z - 192020480*a^9*b^6*c^7*f*j*k*z + 190709760*a^9*b^4*c^9*f*h*k*z - 1509
94944*a^10*b^3*c^9*g*i*k*z + 168990720*a^7*b^9*c^6*d*j*k*z + 235929600*a^9*
b^2*c^11*d*f*k*z - 206438400*a^8*b^3*c^11*d*g*j*z - 206438400*a^7*b^4*c^11*
d*e*j*z - 101646336*a^8*b^6*c^8*f*h*k*z - 29245440*a^9*b^7*c^6*h*j*k*z - 60
817408*a^11*b^2*c^9*f*j*k*z + 57835520*a^8*b^8*c^6*f*j*k*z + 219414528*a^7*
b^2*c^13*d*e*h*z - 70778880*a^10*b^2*c^10*f*h*k*z + 677376*a^7*b^11*c^4*h*j
*k*z - 645120*a^8*b^9*c^5*h*j*k*z - 53760*a^6*b^13*c^3*h*j*k*z + 31457280*a
^8*b^7*c^7*g*i*k*z - 62914560*a^8*b^6*c^8*e*i*k*z - 94371840*a^7*b^7*c^8*e*
g*k*z - 221773824*a^6*b^3*c^13*d*e*f*z + 82575360*a^9*b^2*c^11*d*i*j*z + 11

796480*a^10*b^2*c^10*h*i*j*z - 11796480*a^7*b^9*c^6*g*i*k*z - 8970240*a^7*b
^10*c^5*f*j*k*z + 103219200*a^7*b^5*c^10*d*g*j*z - 2457600*a^8*b^6*c^8*h*i*
j*z + 1769472*a^6*b^11*c^5*g*i*k*z + 921600*a^7*b^8*c^7*h*i*j*z + 673792*a^
6*b^12*c^4*f*j*k*z - 138240*a^6*b^10*c^6*h*i*j*z - 98304*a^5*b^13*c^4*g*i*k
*z - 17920*a^5*b^14*c^3*f*j*k*z + 7680*a^5*b^12*c^5*h*i*j*z - 97136640*a^5*
b^10*c^7*d*f*k*z - 29491200*a^9*b^3*c^10*g*h*j*z + 58982400*a^9*b^2*c^11*e*
h*j*z + 23592960*a^7*b^8*c^7*e*i*k*z - 22169088*a^6*b^11*c^5*d*j*k*z + 2138
1120*a^7*b^8*c^7*f*h*k*z + 14745600*a^8*b^5*c^9*g*h*j*z + 42854400*a^6*b^9*
c^7*d*h*k*z - 109707264*a^7*b^3*c^12*d*g*h*z - 3686400*a^7*b^7*c^8*g*h*j*z
- 3538944*a^6*b^10*c^6*e*i*k*z + 1645056*a^5*b^13*c^4*d*j*k*z - 890880*a^6*
b^10*c^6*f*h*k*z + 460800*a^6*b^9*c^7*g*h*j*z - 330240*a^5*b^12*c^5*f*h*k*z
+ 196608*a^5*b^12*c^5*e*i*k*z - 53760*a^4*b^15*c^3*d*j*k*z + 46080*a^4*b^1
4*c^4*f*h*k*z - 23040*a^5*b^11*c^6*g*h*j*z - 1536*a^3*b^16*c^3*f*h*k*z - 29
491200*a^8*b^4*c^10*e*h*j*z - 17203200*a^7*b^6*c^9*d*i*j*z + 11796480*a^6*b
^9*c^7*e*g*k*z + 110886912*a^6*b^4*c^12*d*f*g*z + 7372800*a^7*b^6*c^9*e*h*j
*z + 40108032*a^8*b^2*c^12*d*h*i*z + 6451200*a^6*b^8*c^8*d*i*j*z + 2359296*
a^8*b^3*c^11*f*h*i*z - 967680*a^5*b^10*c^7*d*i*j*z - 921600*a^6*b^8*c^8*e*h
*j*z - 829440*a^4*b^13*c^5*d*h*k*z - 589824*a^5*b^11*c^6*e*g*k*z - 491520*a
^6*b^7*c^9*f*h*i*z + 184320*a^5*b^9*c^8*f*h*i*z + 105984*a^3*b^15*c^4*d*h*k
*z + 69120*a^5*b^11*c^6*d*h*k*z + 53760*a^4*b^12*c^6*d*i*j*z + 46080*a^5*b^
10*c^7*e*h*j*z - 27648*a^4*b^11*c^7*f*h*i*z - 4608*a^2*b^17*c^3*d*h*k*z + 1
536*a^3*b^13*c^6*f*h*i*z - 25804800*a^6*b^7*c^9*d*g*j*z - 88473600*a^6*b^4*
c^12*d*e*h*z + 51609600*a^6*b^6*c^10*d*e*j*z - 84934656*a^7*b^2*c^13*d*f*g*
z + 117964800*a^5*b^5*c^12*d*e*f*z + 15160320*a^4*b^12*c^6*d*f*k*z - 456130
56*a^7*b^3*c^12*d*f*i*z + 44236800*a^6*b^5*c^11*d*g*h*z - 10321920*a^6*b^6*
c^10*d*h*i*z + 7077888*a^7*b^4*c^11*d*h*i*z - 5898240*a^7*b^4*c^11*f*g*h*z
+ 4718592*a^8*b^2*c^12*f*g*h*z + 3225600*a^5*b^9*c^8*d*g*j*z + 2949120*a^6*
b^6*c^10*f*g*h*z + 2396160*a^5*b^8*c^9*d*h*i*z - 1428480*a^3*b^14*c^5*d*f*k
*z - 737280*a^5*b^8*c^9*f*g*h*z - 161280*a^4*b^11*c^7*d*g*j*z + 92160*a^4*b
^10*c^8*f*g*h*z + 73728*a^2*b^16*c^4*d*f*k*z - 50688*a^3*b^12*c^7*d*h*i*z -
27648*a^4*b^10*c^8*d*h*i*z - 4608*a^3*b^12*c^7*f*g*h*z + 4608*a^2*b^14*c^6
*d*h*i*z - 58982400*a^5*b^6*c^11*d*f*g*z + 11796480*a^7*b^3*c^12*e*f*h*z +
8847360*a^5*b^7*c^10*d*f*i*z - 6635520*a^5*b^7*c^10*d*g*h*z - 6451200*a^5*b
^8*c^9*d*e*j*z - 5898240*a^6*b^5*c^11*e*f*h*z - 3809280*a^4*b^9*c^9*d*f*i*z
+ 2359296*a^6*b^5*c^11*d*f*i*z + 1474560*a^5*b^7*c^10*e*f*h*z + 681984*a^3
*b^11*c^8*d*f*i*z + 322560*a^4*b^10*c^8*d*e*j*z - 276480*a^4*b^9*c^9*d*g*h*
z - 184320*a^4*b^9*c^9*e*f*h*z + 179712*a^3*b^11*c^8*d*g*h*z - 55296*a^2*b^
13*c^7*d*f*i*z - 13824*a^2*b^13*c^7*d*g*h*z + 9216*a^3*b^11*c^8*e*f*h*z + 1
6220160*a^4*b^8*c^10*d*f*g*z + 13271040*a^5*b^6*c^11*d*e*h*z - 2396160*a^3*
b^10*c^9*d*f*g*z + 552960*a^4*b^8*c^10*d*e*h*z - 359424*a^3*b^10*c^9*d*e*h*
z + 175104*a^2*b^12*c^8*d*f*g*z + 27648*a^2*b^12*c^8*d*e*h*z - 32440320*a^4
*b^7*c^11*d*e*f*z + 4792320*a^3*b^9*c^10*d*e*f*z - 350208*a^2*b^11*c^9*d*e*
f*z + 1439170560*a^10*b*c^11*d*h*k*z - 3361603584*a^10*b^3*c^9*d*j*k*z + 60
3979776*a^10*b*c^11*e*g*k*z + 407371776*a^12*b*c^9*h*j*k*z + 201326592*a^11
*b*c^10*g*i*k*z + 346816512*a^7*b*c^14*d^2*g*z + 129761280*a^11*b*c^10*h^2*
k*z + 121896960*a^10*b*c^11*f^2*k*z + 458752*a^6*b^15*c*i*k^2*z + 19660800*
a^11*b*c^10*g*j^2*z + 49152*a^5*b^16*c*g*k^2*z + 7077888*a^9*b*c^12*g*h^2*z
+ 94464*a*b^17*c^4*d^2*k*z - 19660800*a^8*b*c^13*f^2*g*z - 66816*a*b^14*c^
7*d^2*i*z + 214272*a*b^13*c^8*d^2*g*z - 428544*a*b^12*c^9*d^2*e*z + 2390753
280*a^11*b^4*c^7*g*k^2*z - 2411421696*a^6*b^7*c^9*d^2*k*z - 6603079680*a^8*
b^3*c^11*d^2*k*z + 3715891200*a^9*b*c^12*d^2*k*z - 880803840*a^10*c^12*d*f*
k*z - 1623195648*a^10*b^6*c^6*g*k^2*z - 402653184*a^11*c^11*e*i*k*z - 15099
49440*a^12*b^2*c^8*g*k^2*z - 209715200*a^12*c^10*f*j*k*z - 330301440*a^9*c^
13*d*e*j*z + 3019898880*a^12*b*c^9*e*k^2*z - 125829120*a^11*c^11*f*h*k*z -
110100480*a^10*c^12*d*i*j*z - 198180864*a^8*c^14*d*e*h*z - 15728640*a^11*c^
11*h*i*j*z - 1226833920*a^9*b^7*c^6*e*k^2*z - 47185920*a^10*c^12*e*h*j*z -
66060288*a^9*c^13*d*h*i*z - 1090519040*a^12*b^3*c^7*i*k^2*z + 1022754816*a^
6*b^2*c^14*d^2*e*z + 5216108544*a^7*b^5*c^10*d^2*k*z + 754974720*a^9*b^2*c^
11*e^2*k*z + 721529856*a^5*b^9*c^8*d^2*k*z + 613416960*a^9*b^8*c^5*g*k^2*z

- 642318336*a^5*b^4*c^13*d^2*e*z - 4781506560*a^11*b^3*c^8*e*k^2*z - 398131
200*a^12*b^3*c^7*j^2*k*z - 511377408*a^6*b^3*c^13*d^2*g*z - 377487360*a^8*b
^4*c^10*e^2*k*z + 285212672*a^11*b^5*c^6*i*k^2*z + 199065600*a^11*b^5*c^6*j
^2*k*z + 279183360*a^8*b^9*c^5*e*k^2*z + 321159168*a^5*b^5*c^12*d^2*g*z + 1
88743680*a^9*b^4*c^9*g^2*k*z + 132120576*a^10*b^7*c^5*i*k^2*z - 150994944*a
^10*b^2*c^10*g^2*k*z - 111411200*a^9*b^9*c^4*i*k^2*z - 126812160*a^10*b^3*c
^9*h^2*k*z + 225312768*a^7*b^2*c^13*d^2*i*z - 139591680*a^8*b^10*c^4*g*k^2*
z - 49766400*a^10*b^7*c^5*j^2*k*z - 145463040*a^4*b^11*c^7*d^2*k*z - 943718
40*a^8*b^6*c^8*g^2*k*z + 223395840*a^4*b^6*c^12*d^2*e*z + 33751040*a^8*b^11
*c^3*i*k^2*z - 78970880*a^9*b^3*c^10*f^2*k*z + 94371840*a^7*b^6*c^9*e^2*k*z
 + 25165824*a^10*b^4*c^8*i^2*k*z + 6220800*a^9*b^9*c^4*j^2*k*z + 39223296*a
^9*b^5*c^8*h^2*k*z - 311040*a^8*b^11*c^3*j^2*k*z + 16777216*a^11*b^2*c^9*i^
2*k*z - 10485760*a^9*b^6*c^7*i^2*k*z - 5406720*a^7*b^13*c^2*i*k^2*z + 13762
56*a^7*b^10*c^5*i^2*k*z - 1310720*a^8*b^8*c^6*i^2*k*z - 262144*a^6*b^12*c^4
*i^2*k*z + 16384*a^5*b^14*c^3*i^2*k*z + 10354688*a^11*b^2*c^9*i*j^2*z + 235
92960*a^7*b^8*c^7*g^2*k*z + 38559744*a^7*b^7*c^8*f^2*k*z + 19169280*a^7*b^1
2*c^3*g*k^2*z - 2048000*a^9*b^6*c^7*i*j^2*z - 1520640*a^7*b^9*c^6*h^2*k*z -
 1105920*a^8*b^7*c^7*h^2*k*z + 849920*a^8*b^8*c^6*i*j^2*z - 393216*a^10*b^4
*c^8*i*j^2*z + 195840*a^6*b^11*c^5*h^2*k*z - 145920*a^7*b^10*c^5*i*j^2*z +
11520*a^5*b^13*c^4*h^2*k*z + 11008*a^6*b^12*c^4*i*j^2*z - 2304*a^4*b^15*c^3
*h^2*k*z - 256*a^5*b^14*c^3*i*j^2*z - 25362432*a^10*b^3*c^9*g*j^2*z - 24739
840*a^8*b^5*c^9*f^2*k*z - 38338560*a^7*b^11*c^4*e*k^2*z - 2949120*a^6*b^10*
c^6*g^2*k*z - 1474560*a^6*b^14*c^2*g*k^2*z + 50724864*a^10*b^2*c^10*e*j^2*z
 + 147456*a^5*b^12*c^5*g^2*k*z - 15150080*a^6*b^9*c^7*f^2*k*z + 13271040*a^
9*b^5*c^8*g*j^2*z - 111697920*a^4*b^7*c^11*d^2*g*z - 3563520*a^8*b^7*c^7*g*
j^2*z + 3538944*a^9*b^2*c^11*h^2*i*z + 2912000*a^5*b^11*c^6*f^2*k*z - 73728
0*a^7*b^6*c^9*h^2*i*z + 506880*a^7*b^9*c^6*g*j^2*z - 291840*a^4*b^13*c^5*f^
2*k*z + 276480*a^6*b^8*c^8*h^2*i*z - 41472*a^5*b^10*c^7*h^2*i*z - 34560*a^6
*b^11*c^5*g*j^2*z + 14080*a^3*b^15*c^4*f^2*k*z + 2304*a^4*b^12*c^6*h^2*i*z
+ 768*a^5*b^13*c^4*g*j^2*z - 256*a^2*b^17*c^3*f^2*k*z - 11796480*a^6*b^8*c^
8*e^2*k*z - 26542080*a^9*b^4*c^9*e*j^2*z + 19837440*a^3*b^13*c^6*d^2*k*z +
2949120*a^6*b^13*c^3*e*k^2*z + 589824*a^5*b^10*c^7*e^2*k*z - 98304*a^5*b^15
*c^2*e*k^2*z - 10354688*a^8*b^2*c^12*f^2*i*z - 43646976*a^6*b^4*c^12*d^2*i*
z - 8847360*a^8*b^3*c^11*g*h^2*z + 7127040*a^8*b^6*c^8*e*j^2*z + 4423680*a^
7*b^5*c^10*g*h^2*z + 2048000*a^6*b^6*c^10*f^2*i*z - 1771776*a^2*b^15*c^5*d^
2*k*z - 1105920*a^6*b^7*c^9*g*h^2*z - 1013760*a^7*b^8*c^7*e*j^2*z - 849920*
a^5*b^8*c^9*f^2*i*z + 393216*a^7*b^4*c^11*f^2*i*z + 145920*a^4*b^10*c^8*f^2
*i*z + 138240*a^5*b^9*c^8*g*h^2*z + 69120*a^6*b^10*c^6*e*j^2*z - 11008*a^3*
b^12*c^7*f^2*i*z - 6912*a^4*b^11*c^7*g*h^2*z - 1536*a^5*b^12*c^5*e*j^2*z +
256*a^2*b^14*c^6*f^2*i*z - 32587776*a^5*b^6*c^11*d^2*i*z + 25362432*a^7*b^3
*c^12*f^2*g*z + 21657600*a^4*b^8*c^10*d^2*i*z + 17694720*a^8*b^2*c^12*e*h^2
*z - 50724864*a^7*b^2*c^13*e*f^2*z - 13271040*a^6*b^5*c^11*f^2*g*z - 884736
0*a^7*b^4*c^11*e*h^2*z - 5810688*a^3*b^10*c^9*d^2*i*z + 3563520*a^5*b^7*c^1
0*f^2*g*z + 2211840*a^6*b^6*c^10*e*h^2*z + 845568*a^2*b^12*c^8*d^2*i*z - 50
6880*a^4*b^9*c^9*f^2*g*z - 276480*a^5*b^8*c^9*e*h^2*z + 34560*a^3*b^11*c^8*
f^2*g*z + 13824*a^4*b^10*c^8*e*h^2*z - 768*a^2*b^13*c^7*f^2*g*z + 26542080*
a^6*b^4*c^12*e*f^2*z + 23362560*a^3*b^9*c^10*d^2*g*z - 46725120*a^3*b^8*c^1
1*d^2*e*z - 7127040*a^5*b^6*c^11*e*f^2*z - 2965248*a^2*b^11*c^9*d^2*g*z + 1
013760*a^4*b^8*c^10*e*f^2*z - 69120*a^3*b^10*c^9*e*f^2*z + 1536*a^2*b^12*c^
8*e*f^2*z + 5930496*a^2*b^10*c^10*d^2*e*z + 1006632960*a^13*b*c^8*i*k^2*z +
 3246391296*a^10*b^5*c^7*e*k^2*z + 318504960*a^13*b*c^8*j^2*k*z + 61538304*
a^10*b^10*c^2*k^3*z - 603979776*a^10*c^12*e^2*k*z - 693633024*a^7*c^15*d^2*
e*z - 231211008*a^8*c^14*d^2*i*z - 67108864*a^12*c^10*i^2*k*z - 13107200*a^
12*c^10*i*j^2*z - 16384*a^5*b^17*i*k^2*z - 39321600*a^11*c^11*e*j^2*z - 471
8592*a^10*c^12*h^2*i*z - 2304*b^19*c^3*d^2*k*z + 13107200*a^9*c^13*f^2*i*z
+ 2304*b^16*c^6*d^2*i*z - 14155776*a^9*c^13*e*h^2*z + 39321600*a^8*c^14*e*f
^2*z - 4833280*a^9*b^12*c*k^3*z - 6912*b^15*c^7*d^2*g*z + 6962544640*a^14*b
^2*c^6*k^3*z + 13824*b^14*c^8*d^2*e*z + 1876951040*a^12*b^6*c^4*k^3*z - 484
4421120*a^13*b^4*c^5*k^3*z - 437780480*a^11*b^8*c^3*k^3*z - 4294967296*a^15

*c^7*k^3*z + 163840*a^8*b^14*k^3*z + 6144000*a^10*b*c^8*f*i*j*k - 5898240*a
^10*b*c^8*g*h*j*k - 41287680*a^9*b*c^9*d*g*j*k + 4472832*a^9*b*c^9*f*h*i*k
+ 18432000*a^9*b*c^9*e*f*j*k + 3391488*a^8*b*c^10*e*h*i*j + 1228800*a^8*b*c
^10*f*g*i*j - 24772608*a^8*b*c^10*d*g*h*k + 13418496*a^8*b*c^10*e*f*h*k + 1
1649024*a^8*b*c^10*d*f*i*k + 737280*a^7*b*c^11*f*g*h*i - 768*a*b^15*c^3*d*f
*i*k - 19307520*a^7*b*c^11*d*f*h*j + 16367616*a^7*b*c^11*d*e*i*j + 3686400*
a^7*b*c^11*e*f*g*j + 34947072*a^7*b*c^11*d*e*f*k + 2304*a*b^14*c^4*d*f*g*k
- 180*a*b^13*c^5*d*f*h*j + 11059200*a^6*b*c^12*d*e*h*i + 5160960*a^6*b*c^12
*d*f*g*i + 2211840*a^6*b*c^12*e*f*g*h - 4608*a*b^13*c^5*d*e*f*k - 2304*a*b^
11*c^7*d*f*g*i + 4608*a*b^10*c^8*d*e*f*i + 15482880*a^5*b*c^13*d*e*f*g - 13
824*a*b^9*c^9*d*e*f*g - 225976320*a^8*b^2*c^9*d*e*j*k + 112988160*a^8*b^3*c
^8*d*g*j*k - 11427840*a^10*b^2*c^7*h*i*j*k - 4177920*a^9*b^4*c^6*h*i*j*k +
1399296*a^8*b^6*c^5*h*i*j*k - 26880*a^6*b^10*c^3*h*i*j*k + 16128*a^7*b^8*c^
4*h*i*j*k - 61562880*a^9*b^2*c^8*d*i*j*k + 20090880*a^9*b^3*c^7*g*h*j*k + 1
19623680*a^7*b^4*c^8*d*e*j*k + 10485760*a^9*b^3*c^7*f*i*j*k - 40181760*a^9*
b^2*c^8*e*h*j*k - 3778560*a^8*b^5*c^6*g*h*j*k - 137797632*a^7*b^2*c^10*d*e*
h*k - 1248768*a^7*b^7*c^5*f*i*j*k + 229376*a^6*b^9*c^4*f*i*j*k + 220160*a^8
*b^5*c^6*f*i*j*k - 209664*a^7*b^7*c^5*g*h*j*k + 80640*a^6*b^9*c^4*g*h*j*k -
8960*a^5*b^11*c^3*f*i*j*k - 59811840*a^7*b^5*c^7*d*g*j*k + 53084160*a^8*b^
2*c^9*e*g*i*k - 11120640*a^8*b^4*c^7*f*g*j*k + 10455552*a^7*b^6*c^6*d*i*j*k
- 9216000*a^9*b^2*c^8*f*g*j*k + 7557120*a^8*b^4*c^7*e*h*j*k + 7397376*a^8*
b^3*c^8*f*h*i*k + 5230080*a^7*b^6*c^6*f*g*j*k - 37675008*a^8*b^2*c^9*d*h*i*
k - 3633408*a^6*b^8*c^5*d*i*j*k + 2211840*a^8*b^4*c^7*d*i*j*k + 68898816*a^
7*b^3*c^9*d*g*h*k - 1695744*a^8*b^2*c^9*g*h*i*j - 1400832*a^7*b^4*c^8*g*h*i
*j + 967680*a^7*b^5*c^7*f*h*i*k - 783360*a^6*b^7*c^6*f*h*i*k - 741888*a^6*b
^8*c^5*f*g*j*k + 499968*a^5*b^10*c^4*d*i*j*k + 419328*a^7*b^6*c^6*e*h*j*k -
253440*a^6*b^6*c^7*g*h*i*j - 161280*a^6*b^8*c^5*e*h*j*k + 42240*a^5*b^9*c^
5*f*h*i*k + 26880*a^5*b^10*c^4*f*g*j*k - 26880*a^4*b^12*c^3*d*i*j*k + 13824
*a^4*b^11*c^4*f*h*i*k + 11520*a^5*b^8*c^6*g*h*i*j - 768*a^3*b^13*c^3*f*h*i*
k + 22241280*a^8*b^3*c^8*e*f*j*k + 14222592*a^6*b^7*c^6*d*g*j*k - 10460160*
a^7*b^5*c^7*e*f*j*k + 8847360*a^7*b^4*c^8*e*g*i*k - 7741440*a^7*b^4*c^8*f*g
*h*k - 7077888*a^6*b^6*c^7*e*g*i*k + 6935040*a^6*b^6*c^7*d*h*i*k - 6709248*
a^8*b^2*c^9*f*g*h*k - 3612672*a^7*b^4*c^8*d*h*i*k + 2801664*a^7*b^3*c^9*e*h
*i*j + 2506752*a^7*b^3*c^9*f*g*i*j + 2419200*a^6*b^6*c^7*f*g*h*k - 1661184*
a^5*b^9*c^5*d*g*j*k + 1483776*a^6*b^7*c^6*e*f*j*k - 1463040*a^5*b^8*c^6*d*h
*i*k + 884736*a^5*b^8*c^6*e*g*i*k + 838656*a^6*b^5*c^8*f*g*i*j + 506880*a^6
*b^5*c^8*e*h*i*j + 80640*a^4*b^11*c^4*d*g*j*k - 53760*a^5*b^9*c^5*e*f*j*k -
53760*a^5*b^7*c^7*f*g*i*j - 46080*a^4*b^10*c^5*f*g*h*k - 34560*a^5*b^8*c^6
*f*g*h*k + 25344*a^3*b^12*c^4*d*h*i*k - 23040*a^5*b^7*c^7*e*h*i*j + 13824*a
^4*b^10*c^5*d*h*i*k + 2304*a^3*b^12*c^4*f*g*h*k - 2304*a^2*b^14*c^3*d*h*i*k
- 29030400*a^6*b^5*c^8*d*g*h*k + 28606464*a^7*b^3*c^9*d*f*i*k - 28445184*a
^6*b^6*c^7*d*e*j*k + 58060800*a^6*b^4*c^9*d*e*h*k + 15482880*a^7*b^3*c^9*e*
f*h*k - 8183808*a^7*b^2*c^10*d*g*i*j - 6718464*a^6*b^5*c^8*d*f*i*k - 508723
2*a^7*b^2*c^10*e*g*h*j - 5013504*a^7*b^2*c^10*e*f*i*j - 4838400*a^6*b^5*c^8
*e*f*h*k + 4112640*a^5*b^7*c^7*d*g*h*k - 3663360*a^5*b^7*c^7*d*f*i*k + 3322
368*a^5*b^8*c^6*d*e*j*k - 2285568*a^6*b^4*c^9*d*g*i*j + 1896960*a^4*b^9*c^6
*d*f*i*k + 1843200*a^6*b^3*c^10*f*g*h*i - 1677312*a^6*b^4*c^9*e*f*i*j - 165
8880*a^6*b^4*c^9*e*g*h*j + 68345856*a^6*b^3*c^10*d*e*f*k + 783360*a^5*b^5*c
^9*f*g*h*i + 741888*a^5*b^6*c^8*d*g*i*j - 34172928*a^6*b^4*c^9*d*f*g*k - 34
0992*a^3*b^11*c^5*d*f*i*k - 161280*a^4*b^10*c^5*d*e*j*k + 138240*a^4*b^9*c^
6*d*g*h*k + 107520*a^5*b^6*c^8*e*f*i*j + 92160*a^4*b^9*c^6*e*f*h*k - 89856*
a^3*b^11*c^5*d*g*h*k - 80640*a^4*b^8*c^7*d*g*i*j + 69120*a^5*b^7*c^7*e*f*h*
k + 69120*a^5*b^6*c^8*e*g*h*j + 27648*a^2*b^13*c^4*d*f*i*k + 18432*a^4*b^7*
c^8*f*g*h*i + 6912*a^2*b^13*c^4*d*g*h*k - 4608*a^3*b^11*c^5*e*f*h*k - 2304*
a^3*b^9*c^7*f*g*h*i + 27164160*a^5*b^6*c^8*d*f*g*k - 22164480*a^6*b^3*c^10*
d*f*h*j - 54328320*a^5*b^5*c^9*d*e*f*k - 17473536*a^7*b^2*c^10*d*f*g*k - 82
25280*a^5*b^6*c^8*d*e*h*k - 8087040*a^4*b^8*c^7*d*f*g*k + 5677056*a^6*b^3*c
^10*e*f*g*j - 5529600*a^6*b^2*c^11*d*g*h*i + 4571136*a^6*b^3*c^10*d*e*i*j -
3686400*a^6*b^2*c^11*e*f*h*i + 2805120*a^5*b^5*c^9*d*f*h*j - 2211840*a^5*b

```
^4*c^10*d*g*h*i - 1566720*a^5*b^4*c^10*e*f*h*i - 1483776*a^5*b^5*c^9*d*e*i*
j + 1198080*a^3*b^10*c^6*d*f*g*k + 437184*a^4*b^7*c^8*d*f*h*j - 322560*a^5*
b^5*c^9*e*f*g*j + 317952*a^4*b^6*c^9*d*g*h*i - 276480*a^4*b^8*c^7*d*e*h*k +
 179712*a^3*b^10*c^6*d*e*h*k + 161280*a^4*b^7*c^8*d*e*i*j - 146268*a^3*b^9*
c^7*d*f*h*j - 87552*a^2*b^12*c^5*d*f*g*k - 36864*a^4*b^6*c^9*e*f*h*i - 1382
4*a^2*b^12*c^5*d*e*h*k + 9360*a^2*b^11*c^6*d*f*h*j + 6912*a^3*b^8*c^8*d*g*h
*i - 6912*a^2*b^10*c^7*d*g*h*i + 4608*a^3*b^8*c^8*e*f*h*i - 24551424*a^6*b^
2*c^11*d*e*g*j + 16174080*a^4*b^7*c^8*d*e*f*k + 5419008*a^5*b^4*c^10*d*e*g*
j + 5160960*a^5*b^3*c^11*d*f*g*i + 4423680*a^5*b^3*c^11*e*f*g*h + 4423680*a
^5*b^3*c^11*d*e*h*i - 2396160*a^3*b^9*c^7*d*e*f*k - 635904*a^4*b^5*c^10*d*e
*h*i - 483840*a^4*b^6*c^9*d*e*g*j - 354816*a^3*b^7*c^9*d*f*g*i + 322560*a^4
*b^5*c^10*d*f*g*i + 175104*a^2*b^11*c^6*d*e*f*k + 138240*a^4*b^5*c^10*e*f*g
*h + 59904*a^2*b^9*c^8*d*f*g*i - 13824*a^3*b^7*c^9*e*f*g*h - 13824*a^3*b^7*
c^9*d*e*h*i + 13824*a^2*b^9*c^8*d*e*h*i - 16588800*a^5*b^2*c^12*d*e*g*h - 1
0321920*a^5*b^2*c^12*d*e*f*i + 1658880*a^4*b^4*c^11*d*e*g*h + 709632*a^3*b^
6*c^10*d*e*f*i - 645120*a^4*b^4*c^11*d*e*f*i + 124416*a^3*b^6*c^10*d*e*g*h
 - 119808*a^2*b^8*c^9*d*e*f*i - 41472*a^2*b^8*c^9*d*e*g*h + 7741440*a^4*b^3*
c^12*d*e*f*g - 2903040*a^3*b^5*c^11*d*e*f*g + 387072*a^2*b^7*c^10*d*e*f*g -
 381026304*a^11*b*c^7*d*j*k^2 - 241827840*a^10*b*c^8*d*h*k^2 - 65667072*a^1
2*b*c^6*h*j*k^2 - 169344*a^7*b^11*c*h*j*k^2 - 25165824*a^11*b*c^7*g*i*k^2 -
 4915200*a^11*b*c^7*g*j^2*k - 53084160*a^8*b*c^10*e^2*i*k - 75497472*a^10*b
*c^8*e*g*k^2 - 86704128*a^7*b*c^11*d^2*g*k + 565248*a^9*b*c^9*h*i^2*j - 168
448*a^6*b^12*c*f*j*k^2 - 24576*a^5*b^13*c*g*i*k^2 - 1769472*a^9*b*c^9*g*h^2
*k - 17694720*a^9*b*c^9*e*i^2*k - 411264*a^5*b^13*c*d*j*k^2 - 11520*a^4*b^1
4*c*f*h*k^2 + 4915200*a^8*b*c^10*f^2*g*k + 2580480*a^9*b*c^9*e*i*j^2 - 2496
000*a^9*b*c^9*f*h*j^2 - 1543680*a^8*b*c^10*f*h^2*j + 33408*a*b^14*c^4*d^2*i
*k - 59512320*a^6*b*c^12*d^2*f*j + 5087232*a^7*b*c^11*e^2*h*j + 2727936*a^8
*b*c^10*d*i^2*j - 26496*a^3*b^15*c*d*h*k^2 + 1105920*a^7*b*c^11*e*h^2*i - 1
07136*a*b^13*c^5*d^2*g*k + 10260*a*b^12*c^6*d^2*h*j - 10616832*a^6*b*c^12*e
^2*g*i - 3538944*a^7*b*c^11*e*g*i^2 + 1843200*a^7*b*c^11*d*h*i^2 - 18432*a^
2*b^16*c*d*f*k^2 - 15552000*a^8*b*c^10*d*f*j^2 + 24551424*a^6*b*c^12*d*e^2*
j - 37062144*a^5*b*c^13*d^2*f*h + 2580480*a^6*b*c^12*e*f^2*i + 214272*a*b^1
2*c^6*d^2*e*k + 65664*a*b^10*c^8*d^2*g*i - 25074*a*b^11*c^7*d^2*f*j + 420*a
*b^12*c^6*d*f^2*j + 6*a*b^15*c^3*d*f*j^2 + 23224320*a^5*b*c^13*d^2*e*i + 38
4*a*b^12*c^6*d*f*i^2 - 5985792*a^6*b*c^12*d*f*h^2 + 206010*a*b^9*c^9*d^2*f*
h - 131328*a*b^9*c^9*d^2*e*i - 6300*a*b^10*c^8*d*f^2*h + 1350*a*b^11*c^7*d*
f*h^2 + 16588800*a^5*b*c^13*d*e^2*h + 3456*a*b^10*c^8*d*f*g^2 + 435456*a*b^
8*c^10*d^2*e*g + 13824*a*b^8*c^10*d*e^2*f + 3932160*a^11*c^8*h*i*j*k + 2752
5120*a^10*c^9*d*i*j*k + 82575360*a^9*c^10*d*e*j*k + 11796480*a^10*c^9*e*h*j
*k + 16515072*a^9*c^10*d*h*i*k + 49545216*a^8*c^11*d*e*h*k - 2457600*a^8*c^
11*e*f*i*j - 1474560*a^7*c^12*e*f*h*i - 10321920*a^6*c^13*d*e*f*i + 7370772
48*a^10*b^3*c^6*d*j*k^2 - 518814720*a^9*b^5*c^5*d*j*k^2 + 441354240*a^9*b^3
*c^7*d*h*k^2 - 429871104*a^6*b^2*c^11*d^2*e*k - 272212992*a^8*b^5*c^6*d*h*k
^2 + 305731584*a^5*b^4*c^10*d^2*e*k + 192412800*a^8*b^7*c^4*d*j*k^2 + 11191
2960*a^11*b^3*c^5*h*j*k^2 + 214935552*a^6*b^3*c^10*d^2*g*k + 202427136*a^7*
b^6*c^6*d*f*k^2 - 49904640*a^10*b^5*c^4*h*j*k^2 - 178513920*a^8*b^4*c^7*d*f
*k^2 - 152865792*a^5*b^5*c^9*d^2*g*k - 114388992*a^7*b^2*c^10*d^2*i*k + 949
61664*a^10*b^2*c^7*e*i*k^2 - 9039872*a^11*b^2*c^6*i*j^2*k - 56494080*a^10*b
^4*c^5*f*j*k^2 - 2052096*a^10*b^4*c^5*i*j^2*k + 1327360*a^9*b^6*c^4*i*j^2*k
 - 158080*a^8*b^8*c^3*i*j^2*k - 47480832*a^10*b^3*c^6*g*i*k^2 + 45576960*a^
9*b^6*c^4*f*j*k^2 + 7954560*a^9*b^7*c^3*h*j*k^2 - 104693760*a^9*b^3*c^7*e*g
*k^2 + 142080*a^8*b^9*c^2*h*j*k^2 + 16017408*a^10*b^3*c^6*g*j^2*k - 4930560
*a^9*b^5*c^5*g*j^2*k - 3649536*a^9*b^2*c^8*h^2*i*k - 1843200*a^8*b^4*c^7*h^
2*i*k + 85524480*a^8*b^5*c^6*e*g*k^2 + 474240*a^8*b^7*c^4*g*j^2*k + 288000*
a^7*b^6*c^6*h^2*i*k + 63360*a^6*b^8*c^5*h^2*i*k - 8064*a^5*b^10*c^4*h^2*i*k
 - 1152*a^4*b^12*c^3*h^2*i*k - 15437824*a^11*b^2*c^6*f*j*k^2 - 32034816*a^1
0*b^2*c^7*e*j^2*k - 14369280*a^8*b^8*c^3*f*j*k^2 - 13271040*a^8*b^3*c^8*g^2
*i*k + 80267904*a^7*b^7*c^5*d*h*k^2 + 79626240*a^7*b^2*c^10*e^2*g*k + 11059
200*a^9*b^5*c^5*g*i*k^2 + 8847360*a^9*b^2*c^8*g*i^2*k - 42113280*a^7*b^9*c^
```

3*d*j*k^2 + 6389760*a^8*b^7*c^4*g*i*k^2 + 5898240*a^8*b^4*c^7*g*i^2*k - 376
01280*a^9*b^4*c^6*f*h*k^2 - 2949120*a^7*b^9*c^3*g*i*k^2 + 2242560*a^7*b^10*
c^2*f*j*k^2 - 2211840*a^7*b^5*c^7*g^2*i*k + 1769472*a^6*b^7*c^6*g^2*i*k + 7
49568*a^8*b^3*c^8*h*i^2*j - 442368*a^7*b^6*c^6*g*i^2*k + 442368*a^6*b^11*c^
2*g*i*k^2 - 442368*a^6*b^8*c^5*g*i^2*k + 317952*a^7*b^5*c^7*h*i^2*j - 22118
4*a^5*b^9*c^5*g^2*i*k + 73728*a^5*b^10*c^4*g*i^2*k + 38400*a^6*b^7*c^6*h*i^
2*j - 1920*a^5*b^9*c^5*h*i^2*j + 9861120*a^9*b^4*c^6*e*j^2*k - 110280960*a^
4*b^6*c^9*d^2*e*k - 93330432*a^6*b^8*c^5*d*f*k^2 + 24645888*a^8*b^6*c^5*f*h
*k^2 + 6359040*a^8*b^3*c^8*g*h^2*k - 22118400*a^9*b^4*c^6*e*i*k^2 - 3862528
*a^8*b^2*c^9*f^2*i*k - 2248704*a^7*b^4*c^8*f^2*i*k - 1290240*a^9*b^2*c^8*g*
i*j^2 - 948480*a^8*b^6*c^5*e*j^2*k - 860160*a^8*b^4*c^7*g*i*j^2 - 414720*a^
7*b^5*c^7*g*h^2*k + 303360*a^6*b^6*c^7*f^2*i*k + 266880*a^5*b^8*c^6*f^2*i*k
 - 224640*a^6*b^7*c^6*g*h^2*k - 80640*a^7*b^6*c^6*g*i*j^2 - 72960*a^4*b^10*
c^5*f^2*i*k + 17280*a^5*b^9*c^5*g*h^2*k + 12672*a^6*b^8*c^5*g*i*j^2 + 5504*
a^3*b^12*c^4*f^2*i*k + 3456*a^4*b^11*c^4*g*h^2*k - 384*a^5*b^10*c^4*g*i*j^2
 - 128*a^2*b^14*c^3*f^2*i*k + 30265344*a^6*b^4*c^9*d^2*i*k - 12779520*a^8*b
^6*c^5*e*i*k^2 - 11796480*a^8*b^3*c^8*e*i^2*k - 8847360*a^7*b^3*c^9*e^2*i*k
 - 7925760*a^10*b^2*c^7*f*h*k^2 + 7077888*a^6*b^5*c^8*e^2*i*k - 39813120*a^
7*b^3*c^9*e*g^2*k - 73175040*a^9*b^2*c^8*d*f*k^2 + 5898240*a^7*b^8*c^4*e*i*
k^2 + 5542272*a^6*b^11*c^2*d*j*k^2 - 5420160*a^7*b^8*c^4*f*h*k^2 + 55140480
*a^4*b^7*c^8*d^2*g*k + 1271808*a^7*b^3*c^9*g^2*h*j - 1040384*a^8*b^2*c^9*f*
i^2*j + 884736*a^7*b^5*c^7*e*i^2*k - 884736*a^6*b^10*c^3*e*i*k^2 + 884736*a
^6*b^7*c^6*e*i^2*k - 884736*a^5*b^7*c^7*e^2*i*k - 697344*a^7*b^4*c^8*f*i^2*
j + 414720*a^6*b^5*c^8*g^2*h*j + 226560*a^6*b^10*c^3*f*h*k^2 - 147456*a^5*b
^9*c^5*e*i^2*k - 121856*a^6*b^6*c^7*f*i^2*j + 82560*a^5*b^12*c^2*f*h*k^2 +
49152*a^5*b^12*c^2*e*i*k^2 - 17280*a^5*b^7*c^7*g^2*h*j + 8960*a^5*b^8*c^6*f
*i^2*j + 14194944*a^5*b^6*c^8*d^2*i*k - 12718080*a^8*b^2*c^9*e*h^2*k - 1061
5680*a^4*b^8*c^7*d^2*i*k - 26542080*a^6*b^4*c^9*e^2*g*k - 23592960*a^7*b^7*
c^5*e*g*k^2 - 5142528*a^8*b^3*c^8*f*h*j^2 + 5068800*a^7*b^2*c^10*f^2*h*j -
3755520*a^7*b^3*c^9*f*h^2*j + 3336192*a^7*b^3*c^9*f^2*g*k + 3000960*a^6*b^4
*c^9*f^2*h*j + 2893824*a^3*b^10*c^6*d^2*i*k + 1720320*a^8*b^3*c^8*e*i*j^2 +
 1704960*a^6*b^5*c^8*f^2*g*k - 1307520*a^5*b^7*c^7*f^2*g*k - 1085760*a^6*b^
5*c^8*f*h^2*j - 959040*a^7*b^5*c^7*f*h*j^2 + 829440*a^7*b^4*c^8*e*h^2*k - 5
52960*a^7*b^2*c^10*g*h^2*i - 552960*a^6*b^4*c^9*g*h^2*i + 449280*a^6*b^6*c^
7*e*h^2*k - 422784*a^2*b^12*c^5*d^2*i*k + 253440*a^4*b^9*c^6*f^2*g*k + 1612
80*a^7*b^5*c^7*e*i*j^2 - 145152*a^5*b^6*c^8*g*h^2*i + 103200*a^6*b^7*c^6*f*
h*j^2 + 41280*a^5*b^6*c^8*f^2*h*j - 37188*a^4*b^8*c^7*f^2*h*j - 34560*a^5*b
^8*c^6*e*h^2*k - 25344*a^6*b^7*c^6*e*i*j^2 - 17280*a^3*b^11*c^5*f^2*g*k + 1
3536*a^5*b^7*c^7*f*h^2*j - 6912*a^4*b^10*c^5*e*h^2*k + 5490*a^4*b^9*c^6*f*h
^2*j - 3456*a^4*b^8*c^7*g*h^2*i + 1980*a^3*b^10*c^6*f^2*h*j + 810*a^5*b^9*c
^5*f*h*j^2 + 768*a^5*b^9*c^5*e*i*j^2 + 384*a^2*b^13*c^4*f^2*g*k - 270*a^4*b
^11*c^4*f*h*j^2 - 180*a^3*b^11*c^5*f*h^2*j - 30*a^2*b^12*c^5*f^2*h*j + 6*a^
3*b^13*c^3*f*h*j^2 + 30067200*a^6*b^2*c^11*d^2*h*j + 13271040*a^6*b^5*c^8*e
*g^2*k - 10857600*a^6*b^9*c^4*d*h*k^2 + 2949120*a^6*b^9*c^4*e*g*k^2 + 26542
08*a^5*b^6*c^8*e^2*g*k + 2125824*a^7*b^3*c^9*d*i^2*j + 1658880*a^6*b^3*c^10
*e^2*h*j - 1419264*a^6*b^4*c^9*f*g^2*j - 1327104*a^5*b^7*c^7*e*g^2*k - 9216
00*a^7*b^2*c^10*f*g^2*j - 737280*a^7*b^2*c^10*f*h*i^2 - 568320*a^6*b^4*c^9*
f*h*i^2 + 207360*a^4*b^13*c^2*d*h*k^2 - 147456*a^5*b^11*c^3*e*g*k^2 - 13670
4*a^5*b^6*c^8*f*h*i^2 + 133632*a^6*b^5*c^8*d*i^2*j - 96768*a^5*b^7*c^7*d*i^
2*j + 80640*a^5*b^6*c^8*f*g^2*j - 69120*a^5*b^5*c^9*e^2*h*j + 13440*a^4*b^9
*c^6*d*i^2*j - 5760*a^5*b^11*c^3*d*h*k^2 - 2304*a^4*b^8*c^7*f*h*i^2 + 384*a
^3*b^10*c^6*f*h*i^2 + 11930112*a^8*b^2*c^9*d*h*j^2 - 11646720*a^3*b^9*c^7*d
^2*g*k + 8432640*a^7*b^2*c^10*d*h^2*j + 24140160*a^5*b^10*c^4*d*f*k^2 - 667
2384*a^7*b^2*c^10*e*f^2*k + 4450176*a^7*b^4*c^8*d*h*j^2 + 4337280*a^6*b^4*c
^9*d*h^2*j - 3870720*a^8*b^2*c^9*e*g*j^2 - 3409920*a^6*b^4*c^9*e*f^2*k - 28
85760*a^5*b^4*c^10*d^2*h*j - 2844288*a^4*b^6*c^9*d^2*h*j + 2615040*a^5*b^6*
c^8*e*f^2*k - 1687680*a^6*b^6*c^7*d*h*j^2 + 1482624*a^2*b^11*c^6*d^2*g*k -
1290240*a^6*b^2*c^11*f^2*g*i + 1105920*a^6*b^3*c^10*e*h^2*i + 1019412*a^3*b
^8*c^8*d^2*h*j - 1007424*a^5*b^6*c^8*d*h^2*j - 860160*a^5*b^4*c^10*f^2*g*i

- 645120*a^7*b^4*c^8*e*g*j^2 - 506880*a^4*b^8*c^7*e*f^2*k + 290304*a^5*b^5*
c^9*e*h^2*i + 197460*a^5*b^8*c^6*d*h*j^2 - 143802*a^2*b^10*c^7*d^2*h*j + 80
640*a^6*b^6*c^7*e*g*j^2 - 80640*a^4*b^6*c^9*f^2*g*i + 51948*a^4*b^8*c^7*d*h
^2*j + 34560*a^3*b^10*c^6*e*f^2*k + 12672*a^3*b^8*c^8*f^2*g*i + 10800*a^3*b
^10*c^6*d*h^2*j + 6912*a^4*b^7*c^8*e*h^2*i - 2304*a^5*b^8*c^6*e*g*j^2 - 768
*a^2*b^12*c^5*e*f^2*k - 684*a^3*b^12*c^4*d*h*j^2 - 540*a^2*b^12*c^5*d*h^2*j
 - 384*a^2*b^10*c^7*f^2*g*i - 90*a^4*b^10*c^5*d*h*j^2 + 18*a^2*b^14*c^3*d*h
*j^2 + 23385600*a^6*b^2*c^11*d*f^2*j + 23293440*a^3*b^8*c^8*d^2*e*k + 61378
56*a^6*b^3*c^10*d*g^2*j - 5677056*a^6*b^2*c^11*e^2*f*j + 5308416*a^6*b^2*c^
11*e*g^2*i - 5308416*a^5*b^3*c^11*e^2*g*i - 3786240*a^4*b^12*c^3*d*f*k^2 -
3538944*a^6*b^3*c^10*e*g*i^2 + 2654208*a^5*b^4*c^10*e*g^2*i + 1658880*a^6*b
^3*c^10*d*h*i^2 - 1354752*a^5*b^5*c^9*d*g^2*j - 1105920*a^5*b^4*c^10*f*g^2*
h - 884736*a^5*b^5*c^9*e*g*i^2 - 552960*a^6*b^2*c^11*f*g^2*h + 357120*a^3*b
^14*c^2*d*f*k^2 + 322560*a^5*b^4*c^10*e^2*f*j + 262656*a^5*b^5*c^9*d*h*i^2
+ 120960*a^4*b^7*c^8*d*g^2*j - 55296*a^4*b^7*c^8*d*h*i^2 - 34560*a^4*b^6*c^
9*f*g^2*h + 3456*a^3*b^8*c^8*f*g^2*h + 1152*a^3*b^9*c^7*d*h*i^2 + 1152*a^2*
b^11*c^6*d*h*i^2 - 13149696*a^7*b^3*c^9*d*f*j^2 - 11612160*a^5*b^2*c^12*d^2
*g*i + 10906560*a^4*b^5*c^10*d^2*f*j - 7418880*a^5*b^3*c^11*d^2*f*j + 31489
92*a^6*b^5*c^8*d*f*j^2 - 2985696*a^3*b^7*c^9*d^2*f*j - 2965248*a^2*b^10*c^7
*d^2*e*k + 1720320*a^5*b^3*c^11*e*f^2*i - 1658880*a^6*b^2*c^11*e*g*h^2 + 15
96672*a^3*b^6*c^10*d^2*g*i - 1505280*a^4*b^6*c^9*d*f^2*j - 829440*a^5*b^4*c
^10*e*g*h^2 - 508032*a^2*b^8*c^9*d^2*g*i + 378954*a^2*b^9*c^8*d^2*f*j + 362
880*a^5*b^4*c^10*d*f^2*j + 296964*a^3*b^8*c^8*d*f^2*j + 161280*a^4*b^5*c^10
*e*f^2*i - 77070*a^4*b^9*c^6*d*f*j^2 - 30240*a^5*b^7*c^7*d*f*j^2 - 25344*a^
3*b^7*c^9*e*f^2*i - 20736*a^4*b^6*c^9*e*g*h^2 - 19278*a^2*b^10*c^7*d*f^2*j
+ 8820*a^3*b^11*c^5*d*f*j^2 + 768*a^2*b^9*c^8*e*f^2*i - 378*a^2*b^13*c^4*d*
f*j^2 - 5419008*a^5*b^3*c^11*d*e^2*j - 4423680*a^5*b^2*c^12*e^2*f*h + 41472
00*a^5*b^3*c^11*d*g^2*h - 2580480*a^6*b^2*c^11*d*f*i^2 - 967680*a^5*b^4*c^1
0*d*f*i^2 + 483840*a^4*b^5*c^10*d*e^2*j - 414720*a^4*b^5*c^10*d*g^2*h - 138
240*a^4*b^4*c^11*e^2*f*h + 64512*a^4*b^6*c^9*d*f*i^2 + 39168*a^3*b^8*c^8*d*
f*i^2 - 31104*a^3*b^7*c^9*d*g^2*h + 13824*a^3*b^6*c^10*e^2*f*h + 10368*a^2*
b^9*c^8*d*g^2*h - 9216*a^2*b^10*c^7*d*f*i^2 + 15630336*a^5*b^2*c^12*d*f^2*h
 - 14459904*a^4*b^3*c^12*d^2*f*h + 9630144*a^3*b^5*c^11*d^2*f*h - 8764416*a
^5*b^3*c^11*d*f*h^2 - 3870720*a^5*b^2*c^12*e*f^2*g - 3193344*a^3*b^5*c^11*d
^2*e*i + 2867328*a^4*b^4*c^11*d*f^2*h - 2095200*a^2*b^7*c^10*d^2*f*h - 1414
080*a^3*b^6*c^10*d*f^2*h - 34836480*a^4*b^2*c^13*d^2*e*g + 1016064*a^2*b^7*
c^10*d^2*e*i - 645120*a^4*b^4*c^11*e*f^2*g + 306720*a^3*b^7*c^9*d*f*h^2 + 1
97820*a^2*b^8*c^9*d*f^2*h + 146880*a^4*b^5*c^10*d*f*h^2 + 80640*a^3*b^6*c^1
0*e*f^2*g - 55350*a^2*b^9*c^8*d*f*h^2 - 2304*a^2*b^8*c^9*e*f^2*g - 3870720*
a^5*b^2*c^12*d*f*g^2 - 1935360*a^4*b^4*c^11*d*f*g^2 - 1658880*a^4*b^3*c^12*
d*e^2*h + 725760*a^3*b^6*c^10*d*f*g^2 + 17418240*a^3*b^4*c^12*d^2*e*g - 124
416*a^3*b^5*c^11*d*e^2*h - 96768*a^2*b^8*c^9*d*f*g^2 + 41472*a^2*b^7*c^10*d
*e^2*h - 3919104*a^2*b^6*c^11*d^2*e*g - 7741440*a^4*b^2*c^13*d*e^2*f + 2903
040*a^3*b^4*c^12*d*e^2*f - 387072*a^2*b^6*c^11*d*e^2*f - 681246720*a^9*b*c^
9*d^2*k^2 + 265912320*a^11*b^3*c^5*e*k^3 + 188743680*a^12*b^2*c^5*g*k^3 - 1
32956160*a^11*b^4*c^4*g*k^3 - 52101120*a^13*b*c^5*j^2*k^2 + 25722880*a^12*b
^3*c^4*i*k^3 + 19644416*a^11*b^5*c^3*i*k^3 - 1583680*a^9*b^9*c*j^2*k^2 - 91
42272*a^10*b^7*c^2*i*k^3 - 74022912*a^10*b^5*c^4*e*k^3 - 20643840*a^11*b*c^
7*h^2*k^2 + 37011456*a^10*b^6*c^3*g*k^3 - 2293760*a^9*b^3*c^7*i^3*k - 55705
6*a^8*b^5*c^6*i^3*k + 147456*a^7*b^7*c^5*i^3*k - 65536*a^6*b^12*c*i^2*k^2 +
 32768*a^6*b^9*c^4*i^3*k - 8192*a^5*b^11*c^3*i^3*k + 430080*a^10*b*c^8*i^2*
j^2 - 2880*a^5*b^13*c*h^2*k^2 + 6635520*a^7*b^4*c^8*g^3*k - 4792320*a^9*b^8
*c^2*g*k^3 - 2211840*a^6*b^6*c^7*g^3*k + 1359360*a^10*b^2*c^7*h*j^3 + 11731
20*a^9*b^4*c^6*h*j^3 + 743040*a^7*b^4*c^8*h^3*j + 622080*a^8*b^2*c^9*h^3*j
+ 221184*a^5*b^8*c^6*g^3*k + 107136*a^6*b^6*c^7*h^3*j - 32640*a^8*b^6*c^5*h
*j^3 - 5796*a^7*b^8*c^4*h*j^3 + 540*a^5*b^8*c^6*h^3*j - 270*a^4*b^10*c^5*h^
3*j + 210*a^6*b^10*c^3*h*j^3 - 2949120*a^10*b*c^8*f^2*k^2 + 17694720*a^6*b^
3*c^10*e^3*k + 184320*a^8*b*c^10*h^2*i^2 - 3520*a^3*b^15*c*f^2*k^2 + 958464
0*a^9*b^7*c^3*e*k^3 - 2293760*a^9*b^3*c^7*f*j^3 - 2293760*a^6*b^3*c^10*f^3*

j - 1769472*a^5*b^5*c^9*e^3*k - 884736*a^6*b^3*c^10*g^3*i - 589824*a^7*b^3*
c^9*g*i^3 - 491520*a^8*b^9*c^2*e*k^3 - 442368*a^5*b^5*c^9*g^3*i - 294912*a^
6*b^5*c^8*g*i^3 - 199360*a^8*b^5*c^6*f*j^3 - 199360*a^5*b^5*c^9*f^3*j + 619
20*a^7*b^7*c^5*f*j^3 + 61920*a^4*b^7*c^8*f^3*j - 49152*a^5*b^7*c^7*g*i^3 -
3682*a^6*b^9*c^4*f*j^3 - 3682*a^3*b^9*c^7*f^3*j + 70*a^5*b^11*c^3*f*j^3 + 7
0*a^2*b^11*c^6*f^3*j + 3870720*a^8*b*c^10*e^2*j^2 + 430080*a^7*b*c^11*f^2*i
^2 - 14152320*a^4*b^4*c^11*d^3*j + 10644480*a^5*b^2*c^12*d^3*j + 5483520*a^
9*b^2*c^8*d*j^3 + 4269888*a^3*b^6*c^10*d^3*j + 3538944*a^5*b^2*c^12*e^3*i -
1648128*a^5*b^3*c^11*f^3*h + 1330560*a^8*b^4*c^7*d*j^3 + 1179648*a^7*b^2*c
^10*e*i^3 - 898560*a^6*b^3*c^10*f*h^3 - 826560*a^7*b^6*c^6*d*j^3 - 607068*a
^2*b^8*c^9*d^3*j + 589824*a^6*b^4*c^9*e*i^3 - 354240*a^5*b^5*c^9*f*h^3 - 35
4240*a^4*b^5*c^10*f^3*h + 145188*a^6*b^8*c^5*d*j^3 + 98304*a^5*b^6*c^8*e*i^
3 + 43680*a^3*b^7*c^9*f^3*h - 21600*a^4*b^7*c^8*f*h^3 - 9576*a^5*b^10*c^4*d
*j^3 + 1350*a^3*b^9*c^7*f*h^3 - 1050*a^2*b^9*c^8*f^3*h - 504*a*b^14*c^4*d^2
*j^2 + 210*a^4*b^12*c^3*d*j^3 + 3870720*a^6*b*c^12*d^2*i^2 + 1658880*a^6*b*
c^12*e^2*h^2 - 9792*a*b^11*c^7*d^2*i^2 + 16547328*a^4*b^2*c^13*d^3*h - 1230
6816*a^3*b^4*c^12*d^3*h + 37310976*a^3*b^3*c^13*d^3*f + 3037824*a^2*b^6*c^1
1*d^3*h - 2654208*a^5*b^3*c^11*e*g^3 + 1949184*a^6*b^2*c^11*d*h^3 + 1296000
*a^5*b^4*c^10*d*h^3 - 155520*a^4*b^6*c^9*d*h^3 - 40500*a*b^10*c^8*d^2*h^2 -
8100*a^3*b^8*c^8*d*h^3 + 4050*a^2*b^10*c^7*d*h^3 + 3870720*a^5*b*c^13*e^2*
f^2 + 34836480*a^4*b*c^14*d^2*e^2 - 108864*a*b^9*c^9*d^2*g^2 - 8068032*a^2*
b^5*c^12*d^3*f - 5623296*a^4*b^3*c^12*d*f^3 + 1737792*a^3*b^5*c^11*d*f^3 -
260190*a*b^8*c^10*d^2*f^2 - 211680*a^2*b^7*c^10*d*f^3 - 435456*a*b^7*c^11*d
^2*e^2 - 377487360*a^12*b*c^6*e*k^3 + 1434977280*a^8*b^3*c^8*d^2*k^2 + 1734
08256*a^7*c^12*d^2*e*k + 3276800*a^12*c^7*i*j^2*k - 125829120*a^13*b*c^5*i*
k^3 + 26214400*a^12*c^7*f*j*k^2 + 1179648*a^10*c^9*h^2*i*k + 13440*a^6*b^13
*h*j*k^2 + 50331648*a^11*c^8*e*i*k^2 + 110100480*a^10*c^9*d*f*k^2 + 5780275
2*a^8*c^11*d^2*i*k + 9830400*a^11*c^8*e*j^2*k - 3276800*a^9*c^10*f^2*i*k +
4480*a^5*b^14*f*j*k^2 + 15728640*a^11*c^8*f*h*k^2 - 409600*a^9*c^10*f*i^2*j
- 1152*b^16*c^3*d^2*i*k - 1220516352*a^7*b^5*c^7*d^2*k^2 + 3538944*a^9*c^1
0*e*h^2*k + 384000*a^8*c^11*f^2*h*j + 13440*a^4*b^15*d*j*k^2 + 384*a^3*b^16
*f*h*k^2 + 20321280*a^7*c^12*d^2*h*j - 245760*a^8*c^11*f*h*i^2 + 3456*b^15*
c^4*d^2*g*k - 270*b^14*c^5*d^2*h*j - 9830400*a^8*c^11*e*f^2*k + 4838400*a^9
*c^10*d*h*j^2 + 2903040*a^8*c^11*d*h^2*j - 1966080*a^10*b*c^8*i^3*k + 14336
00*a^9*b^9*c*i*k^3 + 1152*a^2*b^17*d*h*k^2 - 3686400*a^7*c^12*e^2*f*j - 530
84160*a^7*b*c^11*e^3*k - 6912*b^14*c^5*d^2*e*k - 3456*b^12*c^7*d^2*g*i + 63
0*b^13*c^6*d^2*f*j + 2688000*a^7*c^12*d*f^2*j + 245760*a^8*b^10*c*g*k^3 - 2
211840*a^6*c^13*e^2*f*h - 1720320*a^7*c^12*d*f*i^2 - 9450*b^11*c^8*d^2*f*h
+ 6912*b^11*c^8*d^2*e*i + 1612800*a^6*c^13*d*f^2*h - 1344000*a^10*b*c^8*f*j
^3 - 1344000*a^7*b*c^11*f^3*j - 393216*a^8*b*c^10*g*i^3 - 23616*a*b^17*c*d^
2*k^2 - 20736*b^10*c^9*d^2*e*g - 75188736*a^4*b*c^14*d^3*f - 883200*a^6*b*c
^12*f^3*h - 317952*a^7*b*c^11*f*h^3 + 43416*a*b^10*c^8*d^3*j - 15482880*a^5
*c^14*d*e^2*f - 10616832*a^5*b*c^13*e^3*g - 345060*a*b^8*c^10*d^3*h - 42624
00*a^5*b*c^13*d*f^3 + 852768*a*b^7*c^11*d^3*f + 7350*a*b^9*c^9*d*f^3 + 5845
78368*a^6*b^7*c^6*d^2*k^2 + 93905920*a^12*b^3*c^4*j^2*k^2 - 177997248*a^5*b
^9*c^5*d^2*k^2 - 50967040*a^11*b^5*c^3*j^2*k^2 + 104693760*a^9*b^2*c^8*e^2*
k^2 + 12849984*a^10*b^7*c^2*j^2*k^2 + 20021248*a^11*b^2*c^6*i^2*k^2 - 85524
480*a^8*b^4*c^7*e^2*k^2 + 33223680*a^10*b^3*c^6*h^2*k^2 + 4227072*a^10*b^4*
c^5*i^2*k^2 - 3973120*a^9*b^6*c^4*i^2*k^2 + 344064*a^7*b^10*c^2*i^2*k^2 - 8
1920*a^8*b^8*c^3*i^2*k^2 - 11386368*a^9*b^5*c^5*h^2*k^2 + 26173440*a^9*b^4*
c^6*g^2*k^2 - 21381120*a^8*b^6*c^5*g^2*k^2 + 18874368*a^10*b^2*c^7*g^2*k^2
+ 501760*a^9*b^3*c^7*i^2*j^2 + 452160*a^8*b^7*c^4*h^2*k^2 + 385920*a^7*b^9*
c^3*h^2*k^2 + 170240*a^8*b^5*c^6*i^2*j^2 - 48960*a^6*b^11*c^2*h^2*k^2 + 921
6*a^7*b^7*c^5*i^2*j^2 - 1984*a^6*b^9*c^4*i^2*j^2 + 64*a^5*b^11*c^3*i^2*j^2
+ 5898240*a^7*b^8*c^4*g^2*k^2 + 1419840*a^8*b^4*c^7*h^2*j^2 + 1387008*a^9*b
^2*c^8*h^2*j^2 - 737280*a^6*b^10*c^3*g^2*k^2 + 84960*a^7*b^6*c^6*h^2*j^2 +
36864*a^5*b^12*c^2*g^2*k^2 - 8010*a^6*b^8*c^5*h^2*j^2 - 180*a^5*b^10*c^4*h^
2*j^2 + 9*a^4*b^12*c^3*h^2*j^2 + 14115840*a^9*b^3*c^7*f^2*k^2 - 9231552*a^7
*b^7*c^5*f^2*k^2 + 23592960*a^7*b^6*c^6*e^2*k^2 + 4984320*a^8*b^5*c^6*f^2*k

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^2 + 3759040*a^6*b^9*c^4*f^2*k^2 + 36190080*a^4*b^11*c^4*d^2*k^2 + 967680*a
^8*b^3*c^8*g^2*j^2 - 727360*a^5*b^11*c^3*f^2*k^2 + 276480*a^7*b^3*c^9*h^2*i
^2 + 161280*a^7*b^5*c^7*g^2*j^2 + 140544*a^6*b^5*c^8*h^2*i^2 + 72960*a^4*b^
13*c^2*f^2*k^2 + 25344*a^5*b^7*c^7*h^2*i^2 - 20160*a^6*b^7*c^6*g^2*j^2 + 57
6*a^5*b^9*c^5*g^2*j^2 + 576*a^4*b^9*c^6*h^2*i^2 + 3808000*a^8*b^2*c^9*f^2*j
^2 - 2949120*a^6*b^8*c^5*e^2*k^2 + 1643712*a^7*b^4*c^8*f^2*j^2 + 884736*a^7
*b^2*c^10*g^2*i^2 + 884736*a^6*b^4*c^9*g^2*i^2 + 221184*a^5*b^6*c^8*g^2*i^2
 + 147456*a^5*b^10*c^4*e^2*k^2 - 125440*a^6*b^6*c^7*f^2*j^2 - 13790*a^5*b^8
*c^6*f^2*j^2 + 1785*a^4*b^10*c^5*f^2*j^2 - 70*a^3*b^12*c^4*f^2*j^2 - 495360
0*a^3*b^13*c^3*d^2*k^2 + 18427392*a^7*b^2*c^10*d^2*j^2 + 645120*a^7*b^3*c^9
*e^2*j^2 + 501760*a^6*b^3*c^10*f^2*i^2 + 442944*a^2*b^15*c^2*d^2*k^2 + 4147
20*a^6*b^3*c^10*g^2*h^2 + 207360*a^5*b^5*c^9*g^2*h^2 + 170240*a^5*b^5*c^9*f
^2*i^2 - 80640*a^6*b^5*c^8*e^2*j^2 + 9216*a^4*b^7*c^8*f^2*i^2 + 5184*a^4*b^
7*c^8*g^2*h^2 + 2304*a^5*b^7*c^7*e^2*j^2 - 1984*a^3*b^9*c^7*f^2*i^2 + 64*a^
2*b^11*c^6*f^2*i^2 - 4148928*a^6*b^4*c^9*d^2*j^2 + 3538944*a^6*b^2*c^11*e^2
*i^2 + 1684224*a^6*b^2*c^11*f^2*h^2 + 1264320*a^5*b^4*c^10*f^2*h^2 - 118339
2*a^5*b^6*c^8*d^2*j^2 + 884736*a^5*b^4*c^10*e^2*i^2 + 645750*a^4*b^8*c^7*d^
2*j^2 + 126720*a^4*b^6*c^9*f^2*h^2 - 115920*a^3*b^10*c^6*d^2*j^2 - 13950*a^
3*b^8*c^8*f^2*h^2 + 10836*a^2*b^12*c^5*d^2*j^2 + 225*a^2*b^10*c^7*f^2*h^2 +
 1935360*a^5*b^3*c^11*d^2*i^2 + 967680*a^5*b^3*c^11*f^2*g^2 + 829440*a^5*b^
3*c^11*e^2*h^2 - 532224*a^4*b^5*c^10*d^2*i^2 + 161280*a^4*b^5*c^10*f^2*g^2
- 96768*a^3*b^7*c^9*d^2*i^2 + 62784*a^2*b^9*c^8*d^2*i^2 + 20736*a^4*b^5*c^1
0*e^2*h^2 - 20160*a^3*b^7*c^9*f^2*g^2 + 576*a^2*b^9*c^8*f^2*g^2 + 11487744*
a^5*b^2*c^12*d^2*h^2 + 7962624*a^5*b^2*c^12*e^2*g^2 + 35525376*a^4*b^2*c^13
*d^2*f^2 - 1412640*a^3*b^6*c^10*d^2*h^2 + 461376*a^4*b^4*c^11*d^2*h^2 + 375
030*a^2*b^8*c^9*d^2*h^2 + 8709120*a^4*b^3*c^12*d^2*g^2 - 4354560*a^3*b^5*c^
11*d^2*g^2 + 979776*a^2*b^7*c^10*d^2*g^2 + 645120*a^4*b^3*c^12*e^2*f^2 - 80
640*a^3*b^5*c^11*e^2*f^2 + 2304*a^2*b^7*c^10*e^2*f^2 - 15269184*a^3*b^4*c^1
2*d^2*f^2 + 2870784*a^2*b^6*c^11*d^2*f^2 - 17418240*a^3*b^3*c^13*d^2*e^2 +
3919104*a^2*b^5*c^12*d^2*e^2 + 384*a*b^18*d*f*k^2 - 199229440*a^14*b^2*c^3*
k^4 + 8388608*a^12*c^7*i^2*k^2 + 75497472*a^10*c^9*e^2*k^2 + 78400*a^8*b^11
*j^2*k^2 + 4096*a^5*b^14*i^2*k^2 + 345600*a^10*c^9*h^2*j^2 + 576*a^4*b^15*h
^2*k^2 + 57937920*a^13*b^4*c^2*k^4 + 320000*a^9*c^10*f^2*j^2 + 64*a^2*b^17*
f^2*k^2 + 16934400*a^8*c^11*d^2*j^2 + 9*b^16*c^3*d^2*j^2 + 3538944*a^7*c^12
*e^2*i^2 + 115200*a^7*c^12*f^2*h^2 + 576*b^13*c^6*d^2*i^2 + 2025*b^12*c^7*d
^2*h^2 + 6096384*a^6*c^13*d^2*h^2 + 492800*a^11*b^2*c^6*j^4 + 351456*a^10*b
^4*c^5*j^4 - 43120*a^9*b^6*c^4*j^4 + 5184*b^11*c^8*d^2*g^2 + 1225*a^8*b^8*c
^3*j^4 + 131072*a^8*b^2*c^9*i^4 + 98304*a^7*b^4*c^8*i^4 + 32768*a^6*b^6*c^7
*i^4 + 11025*b^10*c^9*d^2*f^2 + 4096*a^5*b^8*c^6*i^4 + 5644800*a^5*c^14*d^2
*f^2 + 142560*a^6*b^4*c^9*h^4 + 103680*a^7*b^2*c^10*h^4 + 32400*a^5*b^6*c^8
*h^4 + 20736*b^9*c^10*d^2*e^2 + 2025*a^4*b^8*c^7*h^4 + 331776*a^5*b^4*c^10*
g^4 + 492800*a^5*b^2*c^12*f^4 + 351456*a^4*b^4*c^11*f^4 - 43120*a^3*b^6*c^1
0*f^4 + 1225*a^2*b^8*c^9*f^4 - 27433728*a^3*b^2*c^14*d^4 + 6446304*a^2*b^4*
c^13*d^4 + a^2*b^14*c^3*f^2*j^2 - 81920*a^8*b^11*i*k^3 + 384000*a^11*c^8*h*
j^3 + 138240*a^9*c^10*h^3*j + 47416320*a^6*c^13*d^3*j - 1134*b^12*c^7*d^3*j
 + 7077888*a^6*c^13*e^3*i + 2688000*a^10*c^9*d*j^3 + 786432*a^8*c^11*e*i^3
+ 28449792*a^5*c^14*d^3*h - 7782400*a^12*b^6*c*k^4 + 17010*b^10*c^9*d^3*h +
 580608*a^7*c^12*d*h^3 - 39690*b^9*c^10*d^3*f - 734832*a*b^6*c^12*d^4 + 268
435456*a^15*c^4*k^4 + 576*b^19*d^2*k^2 + 409600*a^11*b^8*k^4 + 160000*a^12*
c^7*j^4 + 65536*a^9*c^10*i^4 + 20736*a^8*c^11*h^4 + 49787136*a^4*c^15*d^4 +
 160000*a^6*c^13*f^4 + 5308416*a^5*c^14*e^4 + 35721*b^8*c^11*d^4, z, n)*((1
1010048*a^9*c^10*d*k - 327680*a^8*c^11*f*i - 983040*a^7*c^12*e*f + 1572864*
a^10*c^9*h*k + 2621440*a^11*c^8*j*k + 3244032*a^6*b*c^12*d*e + 1081344*a^7*
b*c^11*d*i + 884736*a^7*b*c^11*e*h + 491520*a^7*b*c^11*f*g + 1277952*a^8*b*
c^10*e*j + 294912*a^8*b*c^10*h*i + 360448*a^9*b*c^9*f*k + 425984*a^9*b*c^9*
i*j + 4608*a^2*b^9*c^8*d*e - 87552*a^3*b^7*c^9*d*e + 681984*a^4*b^5*c^10*d*
e - 2433024*a^5*b^3*c^11*d*e - 2304*a^2*b^10*c^7*d*g + 43776*a^3*b^8*c^8*d*
g + 1536*a^3*b^8*c^8*e*f - 340992*a^4*b^6*c^9*d*g - 39936*a^4*b^6*c^9*e*f +
 1216512*a^5*b^4*c^10*d*g + 184320*a^5*b^4*c^10*e*f - 1622016*a^6*b^2*c^11*
```

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d*g + 49152*a^6*b^2*c^11*e*f + 768*a^2*b^11*c^6*d*i - 13056*a^3*b^9*c^7*d*i
 - 768*a^3*b^9*c^7*f*g + 84480*a^4*b^7*c^8*d*i + 4608*a^4*b^7*c^8*e*h + 199
68*a^4*b^7*c^8*f*g - 178176*a^5*b^5*c^9*d*i + 18432*a^5*b^5*c^9*e*h - 92160
*a^5*b^5*c^9*f*g - 270336*a^6*b^3*c^10*d*i - 368640*a^6*b^3*c^10*e*h - 2457
6*a^6*b^3*c^10*f*g - 768*a^2*b^14*c^3*d*k + 256*a^3*b^10*c^6*f*i + 22272*a^
3*b^12*c^4*d*k - 6144*a^4*b^8*c^7*f*i - 2304*a^4*b^8*c^7*g*h - 282624*a^4*b
^10*c^5*d*k + 17408*a^5*b^6*c^8*f*i - 9216*a^5*b^6*c^8*g*h - 1536*a^5*b^7*c
^7*e*j + 2003712*a^5*b^8*c^6*d*k + 69632*a^6*b^4*c^9*f*i + 184320*a^6*b^4*c
^9*g*h + 92160*a^6*b^5*c^8*e*j - 8426496*a^6*b^6*c^7*d*k - 147456*a^7*b^2*c
^10*f*i - 442368*a^7*b^2*c^10*g*h - 663552*a^7*b^3*c^9*e*j + 20484096*a^7*b
^4*c^8*d*k - 25411584*a^8*b^2*c^9*d*k - 256*a^3*b^13*c^3*f*k + 768*a^4*b^9*
c^6*h*i + 9216*a^4*b^11*c^4*f*k + 4608*a^5*b^7*c^7*h*i + 768*a^5*b^8*c^6*g*
j - 113920*a^5*b^9*c^5*f*k - 55296*a^6*b^5*c^8*h*i - 46080*a^6*b^6*c^7*g*j
 + 658944*a^6*b^7*c^6*f*k + 24576*a^7*b^3*c^9*h*i + 331776*a^7*b^4*c^8*g*j -
 1812480*a^7*b^5*c^7*f*k - 638976*a^8*b^2*c^9*g*j + 1810432*a^8*b^3*c^8*f*k
 - 768*a^4*b^12*c^3*h*k - 256*a^5*b^9*c^5*i*j + 8448*a^5*b^10*c^4*h*k + 148
48*a^6*b^7*c^6*i*j + 3840*a^6*b^8*c^5*h*k - 79872*a^7*b^5*c^7*i*j - 427008*
a^7*b^6*c^6*h*k - 8192*a^8*b^3*c^8*i*j + 2150400*a^8*b^4*c^7*h*k - 3784704*
a^9*b^2*c^8*h*k - 8960*a^6*b^10*c^3*j*k + 166656*a^7*b^8*c^4*j*k - 1217536*
a^8*b^6*c^5*j*k + 4198400*a^9*b^4*c^6*j*k - 6340608*a^10*b^2*c^7*j*k)/(512*
(4096*a^10*c^10 + a^4*b^12*c^4 - 24*a^5*b^10*c^5 + 240*a^6*b^8*c^6 - 1280*a
^7*b^6*c^7 + 3840*a^8*b^4*c^8 - 6144*a^9*b^2*c^9)) + root(56371445760*a^11*
b^8*c^12*z^4 - 503316480*a^8*b^14*c^9*z^4 + 47185920*a^7*b^16*c^8*z^4 - 262
1440*a^6*b^18*c^7*z^4 + 65536*a^5*b^20*c^6*z^4 - 171798691840*a^14*b^2*c^15
*z^4 + 193273528320*a^13*b^4*c^14*z^4 - 128849018880*a^12*b^6*c^13*z^4 - 16
911433728*a^10*b^10*c^11*z^4 + 3523215360*a^9*b^12*c^10*z^4 + 68719476736*a
^15*c^16*z^4 - 47185920*a^7*b^16*c^5*k*z^3 + 2621440*a^6*b^18*c^4*k*z^3 - 6
5536*a^5*b^20*c^3*k*z^3 + 171798691840*a^14*b^2*c^12*k*z^3 - 193273528320*a
^13*b^4*c^11*k*z^3 + 128849018880*a^12*b^6*c^10*k*z^3 + 16911433728*a^10*b^
10*c^8*k*z^3 - 3523215360*a^9*b^12*c^7*k*z^3 - 56371445760*a^11*b^8*c^9*k*z
^3 + 503316480*a^8*b^14*c^6*k*z^3 - 68719476736*a^15*c^13*k*z^3 + 1536*a*b^
18*c^6*d*f*z^2 - 2571632640*a^9*b^5*c^11*d*j*z^2 + 2548039680*a^9*b^3*c^13*
d*h*z^2 + 2453667840*a^9*b^7*c^9*e*k*z^2 + 2181038080*a^12*b^3*c^10*i*k*z^2
 - 6492782592*a^10*b^5*c^10*e*k*z^2 + 1509949440*a^9*b^3*c^13*e*g*z^2 - 140
1421824*a^8*b^5*c^12*d*h*z^2 - 1226833920*a^9*b^8*c^8*g*k*z^2 - 1321205760*
a^9*b^2*c^14*d*f*z^2 - 2793406464*a^11*b*c^13*d*j*z^2 + 9563013120*a^11*b^3
*c^11*e*k*z^2 + 890634240*a^8*b^7*c^10*d*j*z^2 - 754974720*a^8*b^5*c^12*e*g
*z^2 - 570425344*a^11*b^5*c^9*i*k*z^2 + 732168192*a^7*b^6*c^12*d*f*z^2 - 58
1959680*a^10*b^4*c^11*f*j*z^2 - 603979776*a^10*b^2*c^13*e*i*z^2 + 534773760
*a^11*b^3*c^11*h*j*z^2 - 558366720*a^8*b^9*c^8*e*k*z^2 - 4781506560*a^11*b^
4*c^10*g*k*z^2 - 2013265920*a^13*b*c^11*i*k*z^2 - 456130560*a^9*b^4*c^12*f*
h*z^2 + 384040960*a^9*b^6*c^10*f*j*z^2 - 264241152*a^10*b^7*c^8*i*k*z^2 + 3
90463488*a^7*b^7*c^11*d*h*z^2 + 279183360*a^8*b^10*c^7*g*k*z^2 + 301989888*
a^10*b^3*c^12*g*i*z^2 + 222822400*a^9*b^9*c^7*i*k*z^2 - 366280704*a^6*b^8*c
^11*d*f*z^2 - 330301440*a^8*b^4*c^13*d*f*z^2 + 254017536*a^8*b^6*c^11*f*h*z
^2 - 1887436800*a^10*b*c^14*d*h*z^2 + 188743680*a^10*b^2*c^13*f*h*z^2 - 185
303040*a^7*b^9*c^9*d*j*z^2 - 117964800*a^10*b^5*c^10*h*j*z^2 - 6039797760*a
^12*b*c^12*e*k*z^2 - 67502080*a^8*b^11*c^6*i*k*z^2 + 121634816*a^11*b^2*c^1
2*f*j*z^2 + 188743680*a^7*b^7*c^11*e*g*z^2 - 115671040*a^8*b^8*c^9*f*j*z^2
 + 125829120*a^8*b^6*c^11*e*i*z^2 + 10813440*a^7*b^13*c^5*i*k*z^2 + 76677120
*a^7*b^11*c^7*e*k*z^2 - 38338560*a^7*b^12*c^6*g*k*z^2 - 37355520*a^9*b^7*c^
9*h*j*z^2 - 917504*a^6*b^15*c^4*i*k*z^2 + 32768*a^5*b^17*c^3*i*k*z^2 - 6291
4560*a^8*b^7*c^10*g*i*z^2 + 23101440*a^8*b^9*c^8*h*j*z^2 - 4349952*a^7*b^11
*c^7*h*j*z^2 + 2949120*a^6*b^14*c^5*g*k*z^2 + 337920*a^6*b^13*c^6*h*j*z^2 -
 98304*a^5*b^16*c^4*g*k*z^2 - 7680*a^5*b^15*c^5*h*j*z^2 - 61931520*a^7*b^8*
c^10*f*h*z^2 + 23592960*a^7*b^9*c^9*g*i*z^2 + 17940480*a^7*b^10*c^8*f*j*z^2
 - 47185920*a^7*b^8*c^10*e*i*z^2 - 5898240*a^6*b^13*c^6*e*k*z^2 - 3538944*a
^6*b^11*c^8*g*i*z^2 - 1347584*a^6*b^12*c^7*f*j*z^2 + 196608*a^5*b^15*c^5*e*
k*z^2 + 196608*a^5*b^13*c^7*g*i*z^2 + 35840*a^5*b^14*c^6*f*j*z^2 + 96583680
```

*a^5*b^10*c^10*d*f*z^2 + 23371776*a^6*b^11*c^8*d*j*z^2 - 51609600*a^6*b^9*c
^10*d*h*z^2 + 7077888*a^6*b^10*c^9*e*i*z^2 + 6144000*a^6*b^10*c^9*f*h*z^2 -
1677312*a^5*b^13*c^7*d*j*z^2 - 393216*a^5*b^12*c^8*e*i*z^2 + 61440*a^5*b^1
2*c^8*f*h*z^2 + 53760*a^4*b^15*c^6*d*j*z^2 - 46080*a^4*b^14*c^7*f*h*z^2 + 1
536*a^3*b^16*c^6*f*h*z^2 - 23592960*a^6*b^9*c^10*e*g*z^2 + 1179648*a^5*b^11
*c^9*e*g*z^2 + 829440*a^4*b^13*c^8*d*h*z^2 + 368640*a^5*b^11*c^9*d*h*z^2 -
105984*a^3*b^15*c^7*d*h*z^2 + 4608*a^2*b^17*c^6*d*h*z^2 - 15175680*a^4*b^12
*c^9*d*f*z^2 + 1428480*a^3*b^14*c^8*d*f*z^2 - 73728*a^2*b^16*c^7*d*f*z^2 +
4108320768*a^10*b^3*c^12*d*j*z^2 - 1207959552*a^10*b*c^14*e*g*z^2 - 5788139
52*a^12*b*c^12*h*j*z^2 + 3246391296*a^10*b^6*c^9*g*k*z^2 - 402653184*a^11*b
*c^13*g*i*z^2 + 3019898880*a^12*b^2*c^11*g*k*z^2 - 440401920*a^10*b*c^14*f^
2*z^2 - 188743680*a^11*b*c^13*h^2*z^2 + 1761607680*a^10*c^15*d*f*z^2 - 6553
60*a^6*b^18*c*k^2*z^2 - 94464*a*b^17*c^7*d^2*z^2 + 6936330240*a^8*b^3*c^14*
d^2*z^2 + 2464874496*a^6*b^7*c^12*d^2*z^2 - 3963617280*a^9*b*c^15*d^2*z^2 +
58007224320*a^13*b^4*c^8*k^2*z^2 + 14968422400*a^11*b^8*c^6*k^2*z^2 + 8053
06368*a^11*c^14*e*i*z^2 - 35966156800*a^12*b^6*c^7*k^2*z^2 + 419430400*a^12
*c^13*f*j*z^2 - 1509949440*a^9*b^2*c^14*e^2*z^2 + 251658240*a^11*c^14*f*h*z
^2 - 56874762240*a^14*b^2*c^9*k^2*z^2 - 5400428544*a^7*b^5*c^13*d^2*z^2 + 8
90470400*a^9*b^12*c^4*k^2*z^2 + 754974720*a^8*b^4*c^13*e^2*z^2 - 730054656*
a^5*b^9*c^11*d^2*z^2 + 477102080*a^12*b^3*c^10*j^2*z^2 + 477102080*a^9*b^3*
c^13*f^2*z^2 - 377487360*a^9*b^4*c^12*g^2*z^2 + 301989888*a^10*b^2*c^13*g^2
*z^2 - 174325760*a^11*b^5*c^9*j^2*z^2 - 126156800*a^8*b^14*c^3*k^2*z^2 + 18
8743680*a^8*b^6*c^11*g^2*z^2 + 141557760*a^10*b^3*c^12*h^2*z^2 - 174325760*
a^8*b^5*c^12*f^2*z^2 - 188743680*a^7*b^6*c^12*e^2*z^2 - 4350935040*a^10*b^1
0*c^5*k^2*z^2 + 146165760*a^4*b^11*c^10*d^2*z^2 - 50331648*a^10*b^4*c^11*i^
2*z^2 + 11796480*a^7*b^16*c^2*k^2*z^2 - 33554432*a^11*b^2*c^12*i^2*z^2 + 11
206656*a^10*b^7*c^8*j^2*z^2 + 8929280*a^9*b^9*c^7*j^2*z^2 + 20971520*a^9*b^
6*c^10*i^2*z^2 - 2600960*a^8*b^11*c^6*j^2*z^2 + 291840*a^7*b^13*c^5*j^2*z^2
- 14080*a^6*b^15*c^4*j^2*z^2 + 256*a^5*b^17*c^3*j^2*z^2 - 47185920*a^7*b^8
*c^10*g^2*z^2 - 26542080*a^8*b^7*c^10*h^2*z^2 - 2752512*a^7*b^10*c^8*i^2*z^
2 + 2621440*a^8*b^8*c^9*i^2*z^2 + 524288*a^6*b^12*c^7*i^2*z^2 - 32768*a^5*b
^14*c^6*i^2*z^2 + 9584640*a^7*b^9*c^9*h^2*z^2 - 2359296*a^9*b^5*c^11*h^2*z^
2 - 1290240*a^6*b^11*c^8*h^2*z^2 + 46080*a^5*b^13*c^7*h^2*z^2 + 2304*a^4*b^
15*c^6*h^2*z^2 + 5898240*a^6*b^10*c^9*g^2*z^2 - 294912*a^5*b^12*c^8*g^2*z^2
+ 11206656*a^7*b^7*c^11*f^2*z^2 + 8929280*a^6*b^9*c^10*f^2*z^2 + 23592960*
a^6*b^8*c^11*e^2*z^2 - 2600960*a^5*b^11*c^9*f^2*z^2 + 291840*a^4*b^13*c^8*f
^2*z^2 - 14080*a^3*b^15*c^7*f^2*z^2 + 256*a^2*b^17*c^6*f^2*z^2 - 19860480*a
^3*b^13*c^9*d^2*z^2 - 1179648*a^5*b^10*c^10*e^2*z^2 + 1771776*a^2*b^15*c^8*
d^2*z^2 - 440401920*a^13*b*c^11*j^2*z^2 + 1207959552*a^10*c^15*e^2*z^2 + 13
4217728*a^12*c^13*i^2*z^2 + 25769803776*a^15*c^10*k^2*z^2 + 16384*a^5*b^20*
k^2*z^2 + 2304*b^19*c^6*d^2*z^2 + 165150720*a^9*b*c^12*d*g*j*z + 23592960*a
^10*b*c^11*g*h*j*z + 169869312*a^7*b*c^14*d*e*f*z + 99090432*a^8*b*c^13*d*g
*h*z - 3145728*a^9*b*c^12*f*h*i*z + 56623104*a^8*b*c^13*d*f*i*z - 1536*a*b^
18*c^3*d*f*k*z - 9437184*a^8*b*c^13*e*f*h*z + 1536*a*b^15*c^6*d*f*i*z - 460
8*a*b^14*c^7*d*f*g*z + 9216*a*b^13*c^8*d*e*f*z + 2173501440*a^9*b^5*c^8*d*j
*k*z - 1987706880*a^9*b^3*c^10*d*h*k*z + 1121255424*a^8*b^5*c^9*d*h*k*z + 8
61143040*a^8*b^4*c^10*d*f*k*z - 859963392*a^7*b^6*c^9*d*f*k*z - 780779520*a
^8*b^7*c^7*d*j*k*z - 754974720*a^9*b^3*c^10*e*g*k*z + 2222456832*a^11*b*c^1
0*d*j*k*z - 454164480*a^11*b^3*c^8*h*j*k*z + 377487360*a^8*b^5*c^9*e*g*k*z
+ 290979840*a^10*b^4*c^8*f*j*k*z + 381026304*a^6*b^8*c^8*d*f*k*z + 41287680
0*a^8*b^2*c^12*d*e*j*z + 301989888*a^10*b^2*c^10*e*i*k*z - 320421888*a^7*b^
7*c^8*d*h*k*z + 185794560*a^10*b^5*c^7*h*j*k*z - 192020480*a^9*b^6*c^7*f*j*
k*z + 190709760*a^9*b^4*c^9*f*h*k*z - 150994944*a^10*b^3*c^9*g*i*k*z + 1689
90720*a^7*b^9*c^6*d*j*k*z + 235929600*a^9*b^2*c^11*d*f*k*z - 206438400*a^8*
b^3*c^11*d*g*j*z - 206438400*a^7*b^4*c^11*d*e*j*z - 101646336*a^8*b^6*c^8*f
*h*k*z - 29245440*a^9*b^7*c^6*h*j*k*z - 60817408*a^11*b^2*c^9*f*j*k*z + 578
35520*a^8*b^8*c^6*f*j*k*z + 219414528*a^7*b^2*c^13*d*e*h*z - 70778880*a^10*
b^2*c^10*f*h*k*z + 677376*a^7*b^11*c^4*h*j*k*z - 645120*a^8*b^9*c^5*h*j*k*z
- 53760*a^6*b^13*c^3*h*j*k*z + 31457280*a^8*b^7*c^7*g*i*k*z - 62914560*a^8

*b^6*c^8*e*i*k*z - 94371840*a^7*b^7*c^8*e*g*k*z - 221773824*a^6*b^3*c^13*d*
e*f*z + 82575360*a^9*b^2*c^11*d*i*j*z + 11796480*a^10*b^2*c^10*h*i*j*z - 11
796480*a^7*b^9*c^6*g*i*k*z - 8970240*a^7*b^10*c^5*f*j*k*z + 103219200*a^7*b
^5*c^10*d*g*j*z - 2457600*a^8*b^6*c^8*h*i*j*z + 1769472*a^6*b^11*c^5*g*i*k*
z + 921600*a^7*b^8*c^7*h*i*j*z + 673792*a^6*b^12*c^4*f*j*k*z - 138240*a^6*b
^10*c^6*h*i*j*z - 98304*a^5*b^13*c^4*g*i*k*z - 17920*a^5*b^14*c^3*f*j*k*z +
 7680*a^5*b^12*c^5*h*i*j*z - 97136640*a^5*b^10*c^7*d*f*k*z - 29491200*a^9*b
^3*c^10*g*h*j*z + 58982400*a^9*b^2*c^11*e*h*j*z + 23592960*a^7*b^8*c^7*e*i*
k*z - 22169088*a^6*b^11*c^5*d*j*k*z + 21381120*a^7*b^8*c^7*f*h*k*z + 147456
00*a^8*b^5*c^9*g*h*j*z + 42854400*a^6*b^9*c^7*d*h*k*z - 109707264*a^7*b^3*c
^12*d*g*h*z - 3686400*a^7*b^7*c^8*g*h*j*z - 3538944*a^6*b^10*c^6*e*i*k*z +
1645056*a^5*b^13*c^4*d*j*k*z - 890880*a^6*b^10*c^6*f*h*k*z + 460800*a^6*b^9
*c^7*g*h*j*z - 330240*a^5*b^12*c^5*f*h*k*z + 196608*a^5*b^12*c^5*e*i*k*z -
53760*a^4*b^15*c^3*d*j*k*z + 46080*a^4*b^14*c^4*f*h*k*z - 23040*a^5*b^11*c^
6*g*h*j*z - 1536*a^3*b^16*c^3*f*h*k*z - 29491200*a^8*b^4*c^10*e*h*j*z - 172
03200*a^7*b^6*c^9*d*i*j*z + 11796480*a^6*b^9*c^7*e*g*k*z + 110886912*a^6*b^
4*c^12*d*f*g*z + 7372800*a^7*b^6*c^9*e*h*j*z + 40108032*a^8*b^2*c^12*d*h*i*
z + 6451200*a^6*b^8*c^8*d*i*j*z + 2359296*a^8*b^3*c^11*f*h*i*z - 967680*a^5
*b^10*c^7*d*i*j*z - 921600*a^6*b^8*c^8*e*h*j*z - 829440*a^4*b^13*c^5*d*h*k*
z - 589824*a^5*b^11*c^6*e*g*k*z - 491520*a^6*b^7*c^9*f*h*i*z + 184320*a^5*b
^9*c^8*f*h*i*z + 105984*a^3*b^15*c^4*d*h*k*z + 69120*a^5*b^11*c^6*d*h*k*z +
 53760*a^4*b^12*c^6*d*i*j*z + 46080*a^5*b^10*c^7*e*h*j*z - 27648*a^4*b^11*c
^7*f*h*i*z - 4608*a^2*b^17*c^3*d*h*k*z + 1536*a^3*b^13*c^6*f*h*i*z - 258048
00*a^6*b^7*c^9*d*g*j*z - 88473600*a^6*b^4*c^12*d*e*h*z + 51609600*a^6*b^6*c
^10*d*e*j*z - 84934656*a^7*b^2*c^13*d*f*g*z + 117964800*a^5*b^5*c^12*d*e*f*
z + 15160320*a^4*b^12*c^6*d*f*k*z - 45613056*a^7*b^3*c^12*d*f*i*z + 4423680
0*a^6*b^5*c^11*d*g*h*z - 10321920*a^6*b^6*c^10*d*h*i*z + 7077888*a^7*b^4*c^
11*d*h*i*z - 5898240*a^7*b^4*c^11*f*g*h*z + 4718592*a^8*b^2*c^12*f*g*h*z +
3225600*a^5*b^9*c^8*d*g*j*z + 2949120*a^6*b^6*c^10*f*g*h*z + 2396160*a^5*b^
8*c^9*d*h*i*z - 1428480*a^3*b^14*c^5*d*f*k*z - 737280*a^5*b^8*c^9*f*g*h*z -
 161280*a^4*b^11*c^7*d*g*j*z + 92160*a^4*b^10*c^8*f*g*h*z + 73728*a^2*b^16*
c^4*d*f*k*z - 50688*a^3*b^12*c^7*d*h*i*z - 27648*a^4*b^10*c^8*d*h*i*z - 460
8*a^3*b^12*c^7*f*g*h*z + 4608*a^2*b^14*c^6*d*h*i*z - 58982400*a^5*b^6*c^11*
d*f*g*z + 11796480*a^7*b^3*c^12*e*f*h*z + 8847360*a^5*b^7*c^10*d*f*i*z - 66
35520*a^5*b^7*c^10*d*g*h*z - 6451200*a^5*b^8*c^9*d*e*j*z - 5898240*a^6*b^5*
c^11*e*f*h*z - 3809280*a^4*b^9*c^9*d*f*i*z + 2359296*a^6*b^5*c^11*d*f*i*z +
 1474560*a^5*b^7*c^10*e*f*h*z + 681984*a^3*b^11*c^8*d*f*i*z + 322560*a^4*b^
10*c^8*d*e*j*z - 276480*a^4*b^9*c^9*d*g*h*z - 184320*a^4*b^9*c^9*e*f*h*z +
179712*a^3*b^11*c^8*d*g*h*z - 55296*a^2*b^13*c^7*d*f*i*z - 13824*a^2*b^13*c
^7*d*g*h*z + 9216*a^3*b^11*c^8*e*f*h*z + 16220160*a^4*b^8*c^10*d*f*g*z + 13
271040*a^5*b^6*c^11*d*e*h*z - 2396160*a^3*b^10*c^9*d*f*g*z + 552960*a^4*b^8
*c^10*d*e*h*z - 359424*a^3*b^10*c^9*d*e*h*z + 175104*a^2*b^12*c^8*d*f*g*z +
 27648*a^2*b^12*c^8*d*e*h*z - 32440320*a^4*b^7*c^11*d*e*f*z + 4792320*a^3*b
^9*c^10*d*e*f*z - 350208*a^2*b^11*c^9*d*e*f*z + 1439170560*a^10*b*c^11*d*h*
k*z - 3361603584*a^10*b^3*c^9*d*j*k*z + 603979776*a^10*b*c^11*e*g*k*z + 407
371776*a^12*b*c^9*h*j*k*z + 201326592*a^11*b*c^10*g*i*k*z + 346816512*a^7*b
*c^14*d^2*g*z + 129761280*a^11*b*c^10*h^2*k*z + 121896960*a^10*b*c^11*f^2*k
*z + 458752*a^6*b^15*c*i*k^2*z + 19660800*a^11*b*c^10*g*j^2*z + 49152*a^5*b
^16*c*g*k^2*z + 7077888*a^9*b*c^12*g*h^2*z + 94464*a*b^17*c^4*d^2*k*z - 196
60800*a^8*b*c^13*f^2*g*z - 66816*a*b^14*c^7*d^2*i*z + 214272*a*b^13*c^8*d^2
*g*z - 428544*a*b^12*c^9*d^2*e*z + 2390753280*a^11*b^4*c^7*g*k^2*z - 241142
1696*a^6*b^7*c^9*d^2*k*z - 6603079680*a^8*b^3*c^11*d^2*k*z + 3715891200*a^9
*b*c^12*d^2*k*z - 880803840*a^10*c^12*d*f*k*z - 1623195648*a^10*b^6*c^6*g*k
^2*z - 402653184*a^11*c^11*e*i*k*z - 1509949440*a^12*b^2*c^8*g*k^2*z - 2097
15200*a^12*c^10*f*j*k*z - 330301440*a^9*c^13*d*e*j*z + 3019898880*a^12*b*c^
9*e*k^2*z - 125829120*a^11*c^11*f*h*k*z - 110100480*a^10*c^12*d*i*j*z - 198
180864*a^8*c^14*d*e*h*z - 15728640*a^11*c^11*h*i*j*z - 1226833920*a^9*b^7*c
^6*e*k^2*z - 47185920*a^10*c^12*e*h*j*z - 66060288*a^9*c^13*d*h*i*z - 10905
19040*a^12*b^3*c^7*i*k^2*z + 1022754816*a^6*b^2*c^14*d^2*e*z + 5216108544*a

^7*b^5*c^10*d^2*k*z + 754974720*a^9*b^2*c^11*e^2*k*z + 721529856*a^5*b^9*c^
8*d^2*k*z + 613416960*a^9*b^8*c^5*g*k^2*z - 642318336*a^5*b^4*c^13*d^2*e*z
- 4781506560*a^11*b^3*c^8*e*k^2*z - 398131200*a^12*b^3*c^7*j^2*k*z - 511377
408*a^6*b^3*c^13*d^2*g*z - 377487360*a^8*b^4*c^10*e^2*k*z + 285212672*a^11*
b^5*c^6*i*k^2*z + 199065600*a^11*b^5*c^6*j^2*k*z + 279183360*a^8*b^9*c^5*e*
k^2*z + 321159168*a^5*b^5*c^12*d^2*g*z + 188743680*a^9*b^4*c^9*g^2*k*z + 13
2120576*a^10*b^7*c^5*i*k^2*z - 150994944*a^10*b^2*c^10*g^2*k*z - 111411200*
a^9*b^9*c^4*i*k^2*z - 126812160*a^10*b^3*c^9*h^2*k*z + 225312768*a^7*b^2*c^
13*d^2*i*z - 139591680*a^8*b^10*c^4*g*k^2*z - 49766400*a^10*b^7*c^5*j^2*k*z
- 145463040*a^4*b^11*c^7*d^2*k*z - 94371840*a^8*b^6*c^8*g^2*k*z + 22339584
0*a^4*b^6*c^12*d^2*e*z + 33751040*a^8*b^11*c^3*i*k^2*z - 78970880*a^9*b^3*c
^10*f^2*k*z + 94371840*a^7*b^6*c^9*e^2*k*z + 25165824*a^10*b^4*c^8*i^2*k*z
+ 6220800*a^9*b^9*c^4*j^2*k*z + 39223296*a^9*b^5*c^8*h^2*k*z - 311040*a^8*b
^11*c^3*j^2*k*z + 16777216*a^11*b^2*c^9*i^2*k*z - 10485760*a^9*b^6*c^7*i^2*
k*z - 5406720*a^7*b^13*c^2*i*k^2*z + 1376256*a^7*b^10*c^5*i^2*k*z - 1310720
*a^8*b^8*c^6*i^2*k*z - 262144*a^6*b^12*c^4*i^2*k*z + 16384*a^5*b^14*c^3*i^2
*k*z + 10354688*a^11*b^2*c^9*i*j^2*z + 23592960*a^7*b^8*c^7*g^2*k*z + 38559
744*a^7*b^7*c^8*f^2*k*z + 19169280*a^7*b^12*c^3*g*k^2*z - 2048000*a^9*b^6*c
^7*i*j^2*z - 1520640*a^7*b^9*c^6*h^2*k*z - 1105920*a^8*b^7*c^7*h^2*k*z + 84
9920*a^8*b^8*c^6*i*j^2*z - 393216*a^10*b^4*c^8*i*j^2*z + 195840*a^6*b^11*c^
5*h^2*k*z - 145920*a^7*b^10*c^5*i*j^2*z + 11520*a^5*b^13*c^4*h^2*k*z + 1100
8*a^6*b^12*c^4*i*j^2*z - 2304*a^4*b^15*c^3*h^2*k*z - 256*a^5*b^14*c^3*i*j^2
*z - 25362432*a^10*b^3*c^9*g*j^2*z - 24739840*a^8*b^5*c^9*f^2*k*z - 3833856
0*a^7*b^11*c^4*e*k^2*z - 2949120*a^6*b^10*c^6*g^2*k*z - 1474560*a^6*b^14*c^
2*g*k^2*z + 50724864*a^10*b^2*c^10*e*j^2*z + 147456*a^5*b^12*c^5*g^2*k*z -
15150080*a^6*b^9*c^7*f^2*k*z + 13271040*a^9*b^5*c^8*g*j^2*z - 111697920*a^4
*b^7*c^11*d^2*g*z - 3563520*a^8*b^7*c^7*g*j^2*z + 3538944*a^9*b^2*c^11*h^2*
i*z + 2912000*a^5*b^11*c^6*f^2*k*z - 737280*a^7*b^6*c^9*h^2*i*z + 506880*a^
7*b^9*c^6*g*j^2*z - 291840*a^4*b^13*c^5*f^2*k*z + 276480*a^6*b^8*c^8*h^2*i*
z - 41472*a^5*b^10*c^7*h^2*i*z - 34560*a^6*b^11*c^5*g*j^2*z + 14080*a^3*b^1
5*c^4*f^2*k*z + 2304*a^4*b^12*c^6*h^2*i*z + 768*a^5*b^13*c^4*g*j^2*z - 256*
a^2*b^17*c^3*f^2*k*z - 11796480*a^6*b^8*c^8*e^2*k*z - 26542080*a^9*b^4*c^9*
e*j^2*z + 19837440*a^3*b^13*c^6*d^2*k*z + 2949120*a^6*b^13*c^3*e*k^2*z + 58
9824*a^5*b^10*c^7*e^2*k*z - 98304*a^5*b^15*c^2*e*k^2*z - 10354688*a^8*b^2*c
^12*f^2*i*z - 43646976*a^6*b^4*c^12*d^2*i*z - 8847360*a^8*b^3*c^11*g*h^2*z
+ 7127040*a^8*b^6*c^8*e*j^2*z + 4423680*a^7*b^5*c^10*g*h^2*z + 2048000*a^6*
b^6*c^10*f^2*i*z - 1771776*a^2*b^15*c^5*d^2*k*z - 1105920*a^6*b^7*c^9*g*h^2
*z - 1013760*a^7*b^8*c^7*e*j^2*z - 849920*a^5*b^8*c^9*f^2*i*z + 393216*a^7*
b^4*c^11*f^2*i*z + 145920*a^4*b^10*c^8*f^2*i*z + 138240*a^5*b^9*c^8*g*h^2*z
+ 69120*a^6*b^10*c^6*e*j^2*z - 11008*a^3*b^12*c^7*f^2*i*z - 6912*a^4*b^11*
c^7*g*h^2*z - 1536*a^5*b^12*c^5*e*j^2*z + 256*a^2*b^14*c^6*f^2*i*z - 325877
76*a^5*b^6*c^11*d^2*i*z + 25362432*a^7*b^3*c^12*f^2*g*z + 21657600*a^4*b^8*
c^10*d^2*i*z + 17694720*a^8*b^2*c^12*e*h^2*z - 50724864*a^7*b^2*c^13*e*f^2*
z - 13271040*a^6*b^5*c^11*f^2*g*z - 8847360*a^7*b^4*c^11*e*h^2*z - 5810688*
a^3*b^10*c^9*d^2*i*z + 3563520*a^5*b^7*c^10*f^2*g*z + 2211840*a^6*b^6*c^10*
e*h^2*z + 845568*a^2*b^12*c^8*d^2*i*z - 506880*a^4*b^9*c^9*f^2*g*z - 276480
*a^5*b^8*c^9*e*h^2*z + 34560*a^3*b^11*c^8*f^2*g*z + 13824*a^4*b^10*c^8*e*h^
2*z - 768*a^2*b^13*c^7*f^2*g*z + 26542080*a^6*b^4*c^12*e*f^2*z + 23362560*a
^3*b^9*c^10*d^2*g*z - 46725120*a^3*b^8*c^11*d^2*e*z - 7127040*a^5*b^6*c^11*
e*f^2*z - 2965248*a^2*b^11*c^9*d^2*g*z + 1013760*a^4*b^8*c^10*e*f^2*z - 691
20*a^3*b^10*c^9*e*f^2*z + 1536*a^2*b^12*c^8*e*f^2*z + 5930496*a^2*b^10*c^10
*d^2*e*z + 1006632960*a^13*b*c^8*i*k^2*z + 3246391296*a^10*b^5*c^7*e*k^2*z
+ 318504960*a^13*b*c^8*j^2*k*z + 61538304*a^10*b^10*c^2*k^3*z - 603979776*a
^10*c^12*e^2*k*z - 693633024*a^7*c^15*d^2*e*z - 231211008*a^8*c^14*d^2*i*z
- 67108864*a^12*c^10*i^2*k*z - 13107200*a^12*c^10*i*j^2*z - 16384*a^5*b^17*
i*k^2*z - 39321600*a^11*c^11*e*j^2*z - 4718592*a^10*c^12*h^2*i*z - 2304*b^1
9*c^3*d^2*k*z + 13107200*a^9*c^13*f^2*i*z + 2304*b^16*c^6*d^2*i*z - 1415577
6*a^9*c^13*e*h^2*z + 39321600*a^8*c^14*e*f^2*z - 4833280*a^9*b^12*c*k^3*z -
6912*b^15*c^7*d^2*g*z + 6962544640*a^14*b^2*c^6*k^3*z + 13824*b^14*c^8*d^2

*e*z + 1876951040*a^12*b^6*c^4*k^3*z - 4844421120*a^13*b^4*c^5*k^3*z - 4377
80480*a^11*b^8*c^3*k^3*z - 4294967296*a^15*c^7*k^3*z + 163840*a^8*b^14*k^3*
z + 6144000*a^10*b*c^8*f*i*j*k - 5898240*a^10*b*c^8*g*h*j*k - 41287680*a^9*
b*c^9*d*g*j*k + 4472832*a^9*b*c^9*f*h*i*k + 18432000*a^9*b*c^9*e*f*j*k + 33
91488*a^8*b*c^10*e*h*i*j + 1228800*a^8*b*c^10*f*g*i*j - 24772608*a^8*b*c^10
*d*g*h*k + 13418496*a^8*b*c^10*e*f*h*k + 11649024*a^8*b*c^10*d*f*i*k + 7372
80*a^7*b*c^11*f*g*h*i - 768*a*b^15*c^3*d*f*i*k - 19307520*a^7*b*c^11*d*f*h*
j + 16367616*a^7*b*c^11*d*e*i*j + 3686400*a^7*b*c^11*e*f*g*j + 34947072*a^7
*b*c^11*d*e*f*k + 2304*a*b^14*c^4*d*f*g*k - 180*a*b^13*c^5*d*f*h*j + 110592
00*a^6*b*c^12*d*e*h*i + 5160960*a^6*b*c^12*d*f*g*i + 2211840*a^6*b*c^12*e*f
*g*h - 4608*a*b^13*c^5*d*e*f*k - 2304*a*b^11*c^7*d*f*g*i + 4608*a*b^10*c^8*
d*e*f*i + 15482880*a^5*b*c^13*d*e*f*g - 13824*a*b^9*c^9*d*e*f*g - 225976320
*a^8*b^2*c^9*d*e*j*k + 112988160*a^8*b^3*c^8*d*g*j*k - 11427840*a^10*b^2*c^
7*h*i*j*k - 4177920*a^9*b^4*c^6*h*i*j*k + 1399296*a^8*b^6*c^5*h*i*j*k - 268
80*a^6*b^10*c^3*h*i*j*k + 16128*a^7*b^8*c^4*h*i*j*k - 61562880*a^9*b^2*c^8*
d*i*j*k + 20090880*a^9*b^3*c^7*g*h*j*k + 119623680*a^7*b^4*c^8*d*e*j*k + 10
485760*a^9*b^3*c^7*f*i*j*k - 40181760*a^9*b^2*c^8*e*h*j*k - 3778560*a^8*b^5
*c^6*g*h*j*k - 137797632*a^7*b^2*c^10*d*e*h*k - 1248768*a^7*b^7*c^5*f*i*j*k
 + 229376*a^6*b^9*c^4*f*i*j*k + 220160*a^8*b^5*c^6*f*i*j*k - 209664*a^7*b^7
*c^5*g*h*j*k + 80640*a^6*b^9*c^4*g*h*j*k - 8960*a^5*b^11*c^3*f*i*j*k - 5981
1840*a^7*b^5*c^7*d*g*j*k + 53084160*a^8*b^2*c^9*e*g*i*k - 11120640*a^8*b^4*
c^7*f*g*j*k + 10455552*a^7*b^6*c^6*d*i*j*k - 9216000*a^9*b^2*c^8*f*g*j*k +
7557120*a^8*b^4*c^7*e*h*j*k + 7397376*a^8*b^3*c^8*f*h*i*k + 5230080*a^7*b^6
*c^6*f*g*j*k - 37675008*a^8*b^2*c^9*d*h*i*k - 3633408*a^6*b^8*c^5*d*i*j*k +
 2211840*a^8*b^4*c^7*d*i*j*k + 68898816*a^7*b^3*c^9*d*g*h*k - 1695744*a^8*b
^2*c^9*g*h*i*j - 1400832*a^7*b^4*c^8*g*h*i*j + 967680*a^7*b^5*c^7*f*h*i*k -
 783360*a^6*b^7*c^6*f*h*i*k - 741888*a^6*b^8*c^5*f*g*j*k + 499968*a^5*b^10*
c^4*d*i*j*k + 419328*a^7*b^6*c^6*e*h*j*k - 253440*a^6*b^6*c^7*g*h*i*j - 161
280*a^6*b^8*c^5*e*h*j*k + 42240*a^5*b^9*c^5*f*h*i*k + 26880*a^5*b^10*c^4*f*
g*j*k - 26880*a^4*b^12*c^3*d*i*j*k + 13824*a^4*b^11*c^4*f*h*i*k + 11520*a^5
*b^8*c^6*g*h*i*j - 768*a^3*b^13*c^3*f*h*i*k + 22241280*a^8*b^3*c^8*e*f*j*k
+ 14222592*a^6*b^7*c^6*d*g*j*k - 10460160*a^7*b^5*c^7*e*f*j*k + 8847360*a^7
*b^4*c^8*e*g*i*k - 7741440*a^7*b^4*c^8*f*g*h*k - 7077888*a^6*b^6*c^7*e*g*i*
k + 6935040*a^6*b^6*c^7*d*h*i*k - 6709248*a^8*b^2*c^9*f*g*h*k - 3612672*a^7
*b^4*c^8*d*h*i*k + 2801664*a^7*b^3*c^9*e*h*i*j + 2506752*a^7*b^3*c^9*f*g*i*
j + 2419200*a^6*b^6*c^7*f*g*h*k - 1661184*a^5*b^9*c^5*d*g*j*k + 1483776*a^6
*b^7*c^6*e*f*j*k - 1463040*a^5*b^8*c^6*d*h*i*k + 884736*a^5*b^8*c^6*e*g*i*k
 + 838656*a^6*b^5*c^8*f*g*i*j + 506880*a^6*b^5*c^8*e*h*i*j + 80640*a^4*b^11
*c^4*d*g*j*k - 53760*a^5*b^9*c^5*e*f*j*k - 53760*a^5*b^7*c^7*f*g*i*j - 4608
0*a^4*b^10*c^5*f*g*h*k - 34560*a^5*b^8*c^6*f*g*h*k + 25344*a^3*b^12*c^4*d*h
*i*k - 23040*a^5*b^7*c^7*e*h*i*j + 13824*a^4*b^10*c^5*d*h*i*k + 2304*a^3*b^
12*c^4*f*g*h*k - 2304*a^2*b^14*c^3*d*h*i*k - 29030400*a^6*b^5*c^8*d*g*h*k +
 28606464*a^7*b^3*c^9*d*f*i*k - 28445184*a^6*b^6*c^7*d*e*j*k + 58060800*a^6
*b^4*c^9*d*e*h*k + 15482880*a^7*b^3*c^9*e*f*h*k - 8183808*a^7*b^2*c^10*d*g*
i*j - 6718464*a^6*b^5*c^8*d*f*i*k - 5087232*a^7*b^2*c^10*e*g*h*j - 5013504*
a^7*b^2*c^10*e*f*i*j - 4838400*a^6*b^5*c^8*e*f*h*k + 4112640*a^5*b^7*c^7*d*
g*h*k - 3663360*a^5*b^7*c^7*d*f*i*k + 3322368*a^5*b^8*c^6*d*e*j*k - 2285568
*a^6*b^4*c^9*d*g*i*j + 1896960*a^4*b^9*c^6*d*f*i*k + 1843200*a^6*b^3*c^10*f
*g*h*i - 1677312*a^6*b^4*c^9*e*f*i*j - 1658880*a^6*b^4*c^9*e*g*h*j + 683458
56*a^6*b^3*c^10*d*e*f*k + 783360*a^5*b^5*c^9*f*g*h*i + 741888*a^5*b^6*c^8*d
*g*i*j - 34172928*a^6*b^4*c^9*d*f*g*k - 340992*a^3*b^11*c^5*d*f*i*k - 16128
0*a^4*b^10*c^5*d*e*j*k + 138240*a^4*b^9*c^6*d*g*h*k + 107520*a^5*b^6*c^8*e*
f*i*j + 92160*a^4*b^9*c^6*e*f*h*k - 89856*a^3*b^11*c^5*d*g*h*k - 80640*a^4*
b^8*c^7*d*g*i*j + 69120*a^5*b^7*c^7*e*f*h*k + 69120*a^5*b^6*c^8*e*g*h*j + 2
7648*a^2*b^13*c^4*d*f*i*k + 18432*a^4*b^7*c^8*f*g*h*i + 6912*a^2*b^13*c^4*d
*g*h*k - 4608*a^3*b^11*c^5*e*f*h*k - 2304*a^3*b^9*c^7*f*g*h*i + 27164160*a^
5*b^6*c^8*d*f*g*k - 22164480*a^6*b^3*c^10*d*f*h*j - 54328320*a^5*b^5*c^9*d*
e*f*k - 17473536*a^7*b^2*c^10*d*f*g*k - 8225280*a^5*b^6*c^8*d*e*h*k - 80870
40*a^4*b^8*c^7*d*f*g*k + 5677056*a^6*b^3*c^10*e*f*g*j - 5529600*a^6*b^2*c^1

1*d*g*h*i + 4571136*a^6*b^3*c^10*d*e*i*j - 3686400*a^6*b^2*c^11*e*f*h*i + 2
805120*a^5*b^5*c^9*d*f*h*j - 2211840*a^5*b^4*c^10*d*g*h*i - 1566720*a^5*b^4
*c^10*e*f*h*i - 1483776*a^5*b^5*c^9*d*e*i*j + 1198080*a^3*b^10*c^6*d*f*g*k
+ 437184*a^4*b^7*c^8*d*f*h*j - 322560*a^5*b^5*c^9*e*f*g*j + 317952*a^4*b^6*
c^9*d*g*h*i - 276480*a^4*b^8*c^7*d*e*h*k + 179712*a^3*b^10*c^6*d*e*h*k + 16
1280*a^4*b^7*c^8*d*e*i*j - 146268*a^3*b^9*c^7*d*f*h*j - 87552*a^2*b^12*c^5*
d*f*g*k - 36864*a^4*b^6*c^9*e*f*h*i - 13824*a^2*b^12*c^5*d*e*h*k + 9360*a^2
*b^11*c^6*d*f*h*j + 6912*a^3*b^8*c^8*d*g*h*i - 6912*a^2*b^10*c^7*d*g*h*i +
4608*a^3*b^8*c^8*e*f*h*i - 24551424*a^6*b^2*c^11*d*e*g*j + 16174080*a^4*b^7
*c^8*d*e*f*k + 5419008*a^5*b^4*c^10*d*e*g*j + 5160960*a^5*b^3*c^11*d*f*g*i
+ 4423680*a^5*b^3*c^11*e*f*g*h + 4423680*a^5*b^3*c^11*d*e*h*i - 2396160*a^3
*b^9*c^7*d*e*f*k - 635904*a^4*b^5*c^10*d*e*h*i - 483840*a^4*b^6*c^9*d*e*g*j
 - 354816*a^3*b^7*c^9*d*f*g*i + 322560*a^4*b^5*c^10*d*f*g*i + 175104*a^2*b^
11*c^6*d*e*f*k + 138240*a^4*b^5*c^10*e*f*g*h + 59904*a^2*b^9*c^8*d*f*g*i -
13824*a^3*b^7*c^9*e*f*g*h - 13824*a^3*b^7*c^9*d*e*h*i + 13824*a^2*b^9*c^8*d
*e*h*i - 16588800*a^5*b^2*c^12*d*e*g*h - 10321920*a^5*b^2*c^12*d*e*f*i + 16
58880*a^4*b^4*c^11*d*e*g*h + 709632*a^3*b^6*c^10*d*e*f*i - 645120*a^4*b^4*c
^11*d*e*f*i + 124416*a^3*b^6*c^10*d*e*g*h - 119808*a^2*b^8*c^9*d*e*f*i - 41
472*a^2*b^8*c^9*d*e*g*h + 7741440*a^4*b^3*c^12*d*e*f*g - 2903040*a^3*b^5*c^
11*d*e*f*g + 387072*a^2*b^7*c^10*d*e*f*g - 381026304*a^11*b*c^7*d*j*k^2 - 2
41827840*a^10*b*c^8*d*h*k^2 - 65667072*a^12*b*c^6*h*j*k^2 - 169344*a^7*b^11
*c*h*j*k^2 - 25165824*a^11*b*c^7*g*i*k^2 - 4915200*a^11*b*c^7*g*j^2*k - 530
84160*a^8*b*c^10*e^2*i*k - 75497472*a^10*b*c^8*e*g*k^2 - 86704128*a^7*b*c^1
1*d^2*g*k + 565248*a^9*b*c^9*h*i^2*j - 168448*a^6*b^12*c*f*j*k^2 - 24576*a^
5*b^13*c*g*i*k^2 - 1769472*a^9*b*c^9*g*h^2*k - 17694720*a^9*b*c^9*e*i^2*k -
 411264*a^5*b^13*c*d*j*k^2 - 11520*a^4*b^14*c*f*h*k^2 + 4915200*a^8*b*c^10*
f^2*g*k + 2580480*a^9*b*c^9*e*i*j^2 - 2496000*a^9*b*c^9*f*h*j^2 - 1543680*a
^8*b*c^10*f*h^2*j + 33408*a*b^14*c^4*d^2*i*k - 59512320*a^6*b*c^12*d^2*f*j
+ 5087232*a^7*b*c^11*e^2*h*j + 2727936*a^8*b*c^10*d*i^2*j - 26496*a^3*b^15*
c*d*h*k^2 + 1105920*a^7*b*c^11*e*h^2*i - 107136*a*b^13*c^5*d^2*g*k + 10260*
a*b^12*c^6*d^2*h*j - 10616832*a^6*b*c^12*e^2*g*i - 3538944*a^7*b*c^11*e*g*i
^2 + 1843200*a^7*b*c^11*d*h*i^2 - 18432*a^2*b^16*c*d*f*k^2 - 15552000*a^8*b
*c^10*d*f*j^2 + 24551424*a^6*b*c^12*d*e^2*j - 37062144*a^5*b*c^13*d^2*f*h +
 2580480*a^6*b*c^12*e*f^2*i + 214272*a*b^12*c^6*d^2*e*k + 65664*a*b^10*c^8*
d^2*g*i - 25074*a*b^11*c^7*d^2*f*j + 420*a*b^12*c^6*d*f^2*j + 6*a*b^15*c^3*
d*f*j^2 + 23224320*a^5*b*c^13*d^2*e*i + 384*a*b^12*c^6*d*f*i^2 - 5985792*a^
6*b*c^12*d*f*h^2 + 206010*a*b^9*c^9*d^2*f*h - 131328*a*b^9*c^9*d^2*e*i - 63
00*a*b^10*c^8*d*f^2*h + 1350*a*b^11*c^7*d*f*h^2 + 16588800*a^5*b*c^13*d*e^2
*h + 3456*a*b^10*c^8*d*f*g^2 + 435456*a*b^8*c^10*d^2*e*g + 13824*a*b^8*c^10
*d*e^2*f + 3932160*a^11*c^8*h*i*j*k + 27525120*a^10*c^9*d*i*j*k + 82575360*
a^9*c^10*d*e*j*k + 11796480*a^10*c^9*e*h*j*k + 16515072*a^9*c^10*d*h*i*k +
49545216*a^8*c^11*d*e*h*k - 2457600*a^8*c^11*e*f*i*j - 1474560*a^7*c^12*e*f
*h*i - 10321920*a^6*c^13*d*e*f*i + 737077248*a^10*b^3*c^6*d*j*k^2 - 5188147
20*a^9*b^5*c^5*d*j*k^2 + 441354240*a^9*b^3*c^7*d*h*k^2 - 429871104*a^6*b^2*
c^11*d^2*e*k - 272212992*a^8*b^5*c^6*d*h*k^2 + 305731584*a^5*b^4*c^10*d^2*e
*k + 192412800*a^8*b^7*c^4*d*j*k^2 + 111912960*a^11*b^3*c^5*h*j*k^2 + 21493
5552*a^6*b^3*c^10*d^2*g*k + 202427136*a^7*b^6*c^6*d*f*k^2 - 49904640*a^10*b
^5*c^4*h*j*k^2 - 178513920*a^8*b^4*c^7*d*f*k^2 - 152865792*a^5*b^5*c^9*d^2*
g*k - 114388992*a^7*b^2*c^10*d^2*i*k + 94961664*a^10*b^2*c^7*e*i*k^2 - 9039
872*a^11*b^2*c^6*i*j^2*k - 56494080*a^10*b^4*c^5*f*j*k^2 - 2052096*a^10*b^4
*c^5*i*j^2*k + 1327360*a^9*b^6*c^4*i*j^2*k - 158080*a^8*b^8*c^3*i*j^2*k - 4
7480832*a^10*b^3*c^6*g*i*k^2 + 45576960*a^9*b^6*c^4*f*j*k^2 + 7954560*a^9*b
^7*c^3*h*j*k^2 - 104693760*a^9*b^3*c^7*e*g*k^2 + 142080*a^8*b^9*c^2*h*j*k^2
 + 16017408*a^10*b^3*c^6*g*j^2*k - 4930560*a^9*b^5*c^5*g*j^2*k - 3649536*a^
9*b^2*c^8*h^2*i*k - 1843200*a^8*b^4*c^7*h^2*i*k + 85524480*a^8*b^5*c^6*e*g*
k^2 + 474240*a^8*b^7*c^4*g*j^2*k + 288000*a^7*b^6*c^6*h^2*i*k + 63360*a^6*b
^8*c^5*h^2*i*k - 8064*a^5*b^10*c^4*h^2*i*k - 1152*a^4*b^12*c^3*h^2*i*k - 15
437824*a^11*b^2*c^6*f*j*k^2 - 32034816*a^10*b^2*c^7*e*j^2*k - 14369280*a^8*
b^8*c^3*f*j*k^2 - 13271040*a^8*b^3*c^8*g^2*i*k + 80267904*a^7*b^7*c^5*d*h*k

^2 + 79626240*a^7*b^2*c^10*e^2*g*k + 11059200*a^9*b^5*c^5*g*i*k^2 + 8847360
*a^9*b^2*c^8*g*i^2*k - 42113280*a^7*b^9*c^3*d*j*k^2 + 6389760*a^8*b^7*c^4*g
*i*k^2 + 5898240*a^8*b^4*c^7*g*i^2*k - 37601280*a^9*b^4*c^6*f*h*k^2 - 29491
20*a^7*b^9*c^3*g*i*k^2 + 2242560*a^7*b^10*c^2*f*j*k^2 - 2211840*a^7*b^5*c^7
*g^2*i*k + 1769472*a^6*b^7*c^6*g^2*i*k + 749568*a^8*b^3*c^8*h*i^2*j - 44236
8*a^7*b^6*c^6*g*i^2*k + 442368*a^6*b^11*c^2*g*i*k^2 - 442368*a^6*b^8*c^5*g*
i^2*k + 317952*a^7*b^5*c^7*h*i^2*j - 221184*a^5*b^9*c^5*g^2*i*k + 73728*a^5
*b^10*c^4*g*i^2*k + 38400*a^6*b^7*c^6*h*i^2*j - 1920*a^5*b^9*c^5*h*i^2*j +
9861120*a^9*b^4*c^6*e*j^2*k - 110280960*a^4*b^6*c^9*d^2*e*k - 93330432*a^6*
b^8*c^5*d*f*k^2 + 24645888*a^8*b^6*c^5*f*h*k^2 + 6359040*a^8*b^3*c^8*g*h^2*
k - 22118400*a^9*b^4*c^6*e*i*k^2 - 3862528*a^8*b^2*c^9*f^2*i*k - 2248704*a^
7*b^4*c^8*f^2*i*k - 1290240*a^9*b^2*c^8*g*i*j^2 - 948480*a^8*b^6*c^5*e*j^2*
k - 860160*a^8*b^4*c^7*g*i*j^2 - 414720*a^7*b^5*c^7*g*h^2*k + 303360*a^6*b^
6*c^7*f^2*i*k + 266880*a^5*b^8*c^6*f^2*i*k - 224640*a^6*b^7*c^6*g*h^2*k - 8
0640*a^7*b^6*c^6*g*i*j^2 - 72960*a^4*b^10*c^5*f^2*i*k + 17280*a^5*b^9*c^5*g
*h^2*k + 12672*a^6*b^8*c^5*g*i*j^2 + 5504*a^3*b^12*c^4*f^2*i*k + 3456*a^4*b
^11*c^4*g*h^2*k - 384*a^5*b^10*c^4*g*i*j^2 - 128*a^2*b^14*c^3*f^2*i*k + 302
65344*a^6*b^4*c^9*d^2*i*k - 12779520*a^8*b^6*c^5*e*i*k^2 - 11796480*a^8*b^3
*c^8*e*i^2*k - 8847360*a^7*b^3*c^9*e^2*i*k - 7925760*a^10*b^2*c^7*f*h*k^2 +
7077888*a^6*b^5*c^8*e^2*i*k - 39813120*a^7*b^3*c^9*e*g^2*k - 73175040*a^9*
b^2*c^8*d*f*k^2 + 5898240*a^7*b^8*c^4*e*i*k^2 + 5542272*a^6*b^11*c^2*d*j*k^
2 - 5420160*a^7*b^8*c^4*f*h*k^2 + 55140480*a^4*b^7*c^8*d^2*g*k + 1271808*a^
7*b^3*c^9*g^2*h*j - 1040384*a^8*b^2*c^9*f*i^2*j + 884736*a^7*b^5*c^7*e*i^2*
k - 884736*a^6*b^10*c^3*e*i*k^2 + 884736*a^6*b^7*c^6*e*i^2*k - 884736*a^5*b
^7*c^7*e^2*i*k - 697344*a^7*b^4*c^8*f*i^2*j + 414720*a^6*b^5*c^8*g^2*h*j +
226560*a^6*b^10*c^3*f*h*k^2 - 147456*a^5*b^9*c^5*e*i^2*k - 121856*a^6*b^6*c
^7*f*i^2*j + 82560*a^5*b^12*c^2*f*h*k^2 + 49152*a^5*b^12*c^2*e*i*k^2 - 1728
0*a^5*b^7*c^7*g^2*h*j + 8960*a^5*b^8*c^6*f*i^2*j + 14194944*a^5*b^6*c^8*d^2
*i*k - 12718080*a^8*b^2*c^9*e*h^2*k - 10615680*a^4*b^8*c^7*d^2*i*k - 265420
80*a^6*b^4*c^9*e^2*g*k - 23592960*a^7*b^7*c^5*e*g*k^2 - 5142528*a^8*b^3*c^8
*f*h*j^2 + 5068800*a^7*b^2*c^10*f^2*h*j - 3755520*a^7*b^3*c^9*f*h^2*j + 333
6192*a^7*b^3*c^9*f^2*g*k + 3000960*a^6*b^4*c^9*f^2*h*j + 2893824*a^3*b^10*c
^6*d^2*i*k + 1720320*a^8*b^3*c^8*e*i*j^2 + 1704960*a^6*b^5*c^8*f^2*g*k - 13
07520*a^5*b^7*c^7*f^2*g*k - 1085760*a^6*b^5*c^8*f*h^2*j - 959040*a^7*b^5*c^
7*f*h*j^2 + 829440*a^7*b^4*c^8*e*h^2*k - 552960*a^7*b^2*c^10*g*h^2*i - 5529
60*a^6*b^4*c^9*g*h^2*i + 449280*a^6*b^6*c^7*e*h^2*k - 422784*a^2*b^12*c^5*d
^2*i*k + 253440*a^4*b^9*c^6*f^2*g*k + 161280*a^7*b^5*c^7*e*i*j^2 - 145152*a
^5*b^6*c^8*g*h^2*i + 103200*a^6*b^7*c^6*f*h*j^2 + 41280*a^5*b^6*c^8*f^2*h*j
 - 37188*a^4*b^8*c^7*f^2*h*j - 34560*a^5*b^8*c^6*e*h^2*k - 25344*a^6*b^7*c^
6*e*i*j^2 - 17280*a^3*b^11*c^5*f^2*g*k + 13536*a^5*b^7*c^7*f*h^2*j - 6912*a
^4*b^10*c^5*e*h^2*k + 5490*a^4*b^9*c^6*f*h^2*j - 3456*a^4*b^8*c^7*g*h^2*i +
 1980*a^3*b^10*c^6*f^2*h*j + 810*a^5*b^9*c^5*f*h*j^2 + 768*a^5*b^9*c^5*e*i*
j^2 + 384*a^2*b^13*c^4*f^2*g*k - 270*a^4*b^11*c^4*f*h*j^2 - 180*a^3*b^11*c^
5*f*h^2*j - 30*a^2*b^12*c^5*f^2*h*j + 6*a^3*b^13*c^3*f*h*j^2 + 30067200*a^6
*b^2*c^11*d^2*h*j + 13271040*a^6*b^5*c^8*e*g^2*k - 10857600*a^6*b^9*c^4*d*h
*k^2 + 2949120*a^6*b^9*c^4*e*g*k^2 + 2654208*a^5*b^6*c^8*e^2*g*k + 2125824*
a^7*b^3*c^9*d*i^2*j + 1658880*a^6*b^3*c^10*e^2*h*j - 1419264*a^6*b^4*c^9*f*
g^2*j - 1327104*a^5*b^7*c^7*e*g^2*k - 921600*a^7*b^2*c^10*f*g^2*j - 737280*
a^7*b^2*c^10*f*h*i^2 - 568320*a^6*b^4*c^9*f*h*i^2 + 207360*a^4*b^13*c^2*d*h
*k^2 - 147456*a^5*b^11*c^3*e*g*k^2 - 136704*a^5*b^6*c^8*f*h*i^2 + 133632*a^
6*b^5*c^8*d*i^2*j - 96768*a^5*b^7*c^7*d*i^2*j + 80640*a^5*b^6*c^8*f*g^2*j -
 69120*a^5*b^5*c^9*e^2*h*j + 13440*a^4*b^9*c^6*d*i^2*j - 5760*a^5*b^11*c^3*
d*h*k^2 - 2304*a^4*b^8*c^7*f*h*i^2 + 384*a^3*b^10*c^6*f*h*i^2 + 11930112*a^
8*b^2*c^9*d*h*j^2 - 11646720*a^3*b^9*c^7*d^2*g*k + 8432640*a^7*b^2*c^10*d*h
^2*j + 24140160*a^5*b^10*c^4*d*f*k^2 - 6672384*a^7*b^2*c^10*e*f^2*k + 44501
76*a^7*b^4*c^8*d*h*j^2 + 4337280*a^6*b^4*c^9*d*h^2*j - 3870720*a^8*b^2*c^9*
e*g*j^2 - 3409920*a^6*b^4*c^9*e*f^2*k - 2885760*a^5*b^4*c^10*d^2*h*j - 2844
288*a^4*b^6*c^9*d^2*h*j + 2615040*a^5*b^6*c^8*e*f^2*k - 1687680*a^6*b^6*c^7
*d*h*j^2 + 1482624*a^2*b^11*c^6*d^2*g*k - 1290240*a^6*b^2*c^11*f^2*g*i + 11

05920*a^6*b^3*c^10*e*h^2*i + 1019412*a^3*b^8*c^8*d^2*h*j - 1007424*a^5*b^6*
c^8*d*h^2*j - 860160*a^5*b^4*c^10*f^2*g*i - 645120*a^7*b^4*c^8*e*g*j^2 - 50
6880*a^4*b^8*c^7*e*f^2*k + 290304*a^5*b^5*c^9*e*h^2*i + 197460*a^5*b^8*c^6*
d*h*j^2 - 143802*a^2*b^10*c^7*d^2*h*j + 80640*a^6*b^6*c^7*e*g*j^2 - 80640*a
^4*b^6*c^9*f^2*g*i + 51948*a^4*b^8*c^7*d*h^2*j + 34560*a^3*b^10*c^6*e*f^2*k
 + 12672*a^3*b^8*c^8*f^2*g*i + 10800*a^3*b^10*c^6*d*h^2*j + 6912*a^4*b^7*c^
8*e*h^2*i - 2304*a^5*b^8*c^6*e*g*j^2 - 768*a^2*b^12*c^5*e*f^2*k - 684*a^3*b
^12*c^4*d*h*j^2 - 540*a^2*b^12*c^5*d*h^2*j - 384*a^2*b^10*c^7*f^2*g*i - 90*
a^4*b^10*c^5*d*h*j^2 + 18*a^2*b^14*c^3*d*h*j^2 + 23385600*a^6*b^2*c^11*d*f^
2*j + 23293440*a^3*b^8*c^8*d^2*e*k + 6137856*a^6*b^3*c^10*d*g^2*j - 5677056
*a^6*b^2*c^11*e^2*f*j + 5308416*a^6*b^2*c^11*e*g^2*i - 5308416*a^5*b^3*c^11
*e^2*g*i - 3786240*a^4*b^12*c^3*d*f*k^2 - 3538944*a^6*b^3*c^10*e*g*i^2 + 26
54208*a^5*b^4*c^10*e*g^2*i + 1658880*a^6*b^3*c^10*d*h*i^2 - 1354752*a^5*b^5
*c^9*d*g^2*j - 1105920*a^5*b^4*c^10*f*g^2*h - 884736*a^5*b^5*c^9*e*g*i^2 -
552960*a^6*b^2*c^11*f*g^2*h + 357120*a^3*b^14*c^2*d*f*k^2 + 322560*a^5*b^4*
c^10*e^2*f*j + 262656*a^5*b^5*c^9*d*h*i^2 + 120960*a^4*b^7*c^8*d*g^2*j - 55
296*a^4*b^7*c^8*d*h*i^2 - 34560*a^4*b^6*c^9*f*g^2*h + 3456*a^3*b^8*c^8*f*g^
2*h + 1152*a^3*b^9*c^7*d*h*i^2 + 1152*a^2*b^11*c^6*d*h*i^2 - 13149696*a^7*b
^3*c^9*d*f*j^2 - 11612160*a^5*b^2*c^12*d^2*g*i + 10906560*a^4*b^5*c^10*d^2*
f*j - 7418880*a^5*b^3*c^11*d^2*f*j + 3148992*a^6*b^5*c^8*d*f*j^2 - 2985696*
a^3*b^7*c^9*d^2*f*j - 2965248*a^2*b^10*c^7*d^2*e*k + 1720320*a^5*b^3*c^11*e
*f^2*i - 1658880*a^6*b^2*c^11*e*g*h^2 + 1596672*a^3*b^6*c^10*d^2*g*i - 1505
280*a^4*b^6*c^9*d*f^2*j - 829440*a^5*b^4*c^10*e*g*h^2 - 508032*a^2*b^8*c^9*
d^2*g*i + 378954*a^2*b^9*c^8*d^2*f*j + 362880*a^5*b^4*c^10*d*f^2*j + 296964
*a^3*b^8*c^8*d*f^2*j + 161280*a^4*b^5*c^10*e*f^2*i - 77070*a^4*b^9*c^6*d*f*
j^2 - 30240*a^5*b^7*c^7*d*f*j^2 - 25344*a^3*b^7*c^9*e*f^2*i - 20736*a^4*b^6
*c^9*e*g*h^2 - 19278*a^2*b^10*c^7*d*f^2*j + 8820*a^3*b^11*c^5*d*f*j^2 + 768
*a^2*b^9*c^8*e*f^2*i - 378*a^2*b^13*c^4*d*f*j^2 - 5419008*a^5*b^3*c^11*d*e^
2*j - 4423680*a^5*b^2*c^12*e^2*f*h + 4147200*a^5*b^3*c^11*d*g^2*h - 2580480
*a^6*b^2*c^11*d*f*i^2 - 967680*a^5*b^4*c^10*d*f*i^2 + 483840*a^4*b^5*c^10*d
*e^2*j - 414720*a^4*b^5*c^10*d*g^2*h - 138240*a^4*b^4*c^11*e^2*f*h + 64512*
a^4*b^6*c^9*d*f*i^2 + 39168*a^3*b^8*c^8*d*f*i^2 - 31104*a^3*b^7*c^9*d*g^2*h
 + 13824*a^3*b^6*c^10*e^2*f*h + 10368*a^2*b^9*c^8*d*g^2*h - 9216*a^2*b^10*c
^7*d*f*i^2 + 15630336*a^5*b^2*c^12*d*f^2*h - 14459904*a^4*b^3*c^12*d^2*f*h
+ 9630144*a^3*b^5*c^11*d^2*f*h - 8764416*a^5*b^3*c^11*d*f*h^2 - 3870720*a^5
*b^2*c^12*e*f^2*g - 3193344*a^3*b^5*c^11*d^2*e*i + 2867328*a^4*b^4*c^11*d*f
^2*h - 2095200*a^2*b^7*c^10*d^2*f*h - 1414080*a^3*b^6*c^10*d*f^2*h - 348364
80*a^4*b^2*c^13*d^2*e*g + 1016064*a^2*b^7*c^10*d^2*e*i - 645120*a^4*b^4*c^1
1*e*f^2*g + 306720*a^3*b^7*c^9*d*f*h^2 + 197820*a^2*b^8*c^9*d*f^2*h + 14688
0*a^4*b^5*c^10*d*f*h^2 + 80640*a^3*b^6*c^10*e*f^2*g - 55350*a^2*b^9*c^8*d*f
*h^2 - 2304*a^2*b^8*c^9*e*f^2*g - 3870720*a^5*b^2*c^12*d*f*g^2 - 1935360*a^
4*b^4*c^11*d*f*g^2 - 1658880*a^4*b^3*c^12*d*e^2*h + 725760*a^3*b^6*c^10*d*f
*g^2 + 17418240*a^3*b^4*c^12*d^2*e*g - 124416*a^3*b^5*c^11*d*e^2*h - 96768*
a^2*b^8*c^9*d*f*g^2 + 41472*a^2*b^7*c^10*d*e^2*h - 3919104*a^2*b^6*c^11*d^2
*e*g - 7741440*a^4*b^2*c^13*d*e^2*f + 2903040*a^3*b^4*c^12*d*e^2*f - 387072
*a^2*b^6*c^11*d*e^2*f - 681246720*a^9*b*c^9*d^2*k^2 + 265912320*a^11*b^3*c^
5*e*k^3 + 188743680*a^12*b^2*c^5*g*k^3 - 132956160*a^11*b^4*c^4*g*k^3 - 521
01120*a^13*b*c^5*j^2*k^2 + 25722880*a^12*b^3*c^4*i*k^3 + 19644416*a^11*b^5*
c^3*i*k^3 - 1583680*a^9*b^9*c*j^2*k^2 - 9142272*a^10*b^7*c^2*i*k^3 - 740229
12*a^10*b^5*c^4*e*k^3 - 20643840*a^11*b*c^7*h^2*k^2 + 37011456*a^10*b^6*c^3
*g*k^3 - 2293760*a^9*b^3*c^7*i^3*k - 557056*a^8*b^5*c^6*i^3*k + 147456*a^7*
b^7*c^5*i^3*k - 65536*a^6*b^12*c*i^2*k^2 + 32768*a^6*b^9*c^4*i^3*k - 8192*a
^5*b^11*c^3*i^3*k + 430080*a^10*b*c^8*i^2*j^2 - 2880*a^5*b^13*c*h^2*k^2 + 6
635520*a^7*b^4*c^8*g^3*k - 4792320*a^9*b^8*c^2*g*k^3 - 2211840*a^6*b^6*c^7*
g^3*k + 1359360*a^10*b^2*c^7*h*j^3 + 1173120*a^9*b^4*c^6*h*j^3 + 743040*a^7
*b^4*c^8*h^3*j + 622080*a^8*b^2*c^9*h^3*j + 221184*a^5*b^8*c^6*g^3*k + 1071
36*a^6*b^6*c^7*h^3*j - 32640*a^8*b^6*c^5*h*j^3 - 5796*a^7*b^8*c^4*h*j^3 + 5
40*a^5*b^8*c^6*h^3*j - 270*a^4*b^10*c^5*h^3*j + 210*a^6*b^10*c^3*h*j^3 - 29
49120*a^10*b*c^8*f^2*k^2 + 17694720*a^6*b^3*c^10*e^3*k + 184320*a^8*b*c^10*

h^2*i^2 - 3520*a^3*b^15*c*f^2*k^2 + 9584640*a^9*b^7*c^3*e*k^3 - 2293760*a^9
*b^3*c^7*f*j^3 - 2293760*a^6*b^3*c^10*f^3*j - 1769472*a^5*b^5*c^9*e^3*k - 8
84736*a^6*b^3*c^10*g^3*i - 589824*a^7*b^3*c^9*g*i^3 - 491520*a^8*b^9*c^2*e*
k^3 - 442368*a^5*b^5*c^9*g^3*i - 294912*a^6*b^5*c^8*g*i^3 - 199360*a^8*b^5*
c^6*f*j^3 - 199360*a^5*b^5*c^9*f^3*j + 61920*a^7*b^7*c^5*f*j^3 + 61920*a^4*
b^7*c^8*f^3*j - 49152*a^5*b^7*c^7*g*i^3 - 3682*a^6*b^9*c^4*f*j^3 - 3682*a^3
*b^9*c^7*f^3*j + 70*a^5*b^11*c^3*f*j^3 + 70*a^2*b^11*c^6*f^3*j + 3870720*a^
8*b*c^10*e^2*j^2 + 430080*a^7*b*c^11*f^2*i^2 - 14152320*a^4*b^4*c^11*d^3*j
+ 10644480*a^5*b^2*c^12*d^3*j + 5483520*a^9*b^2*c^8*d*j^3 + 4269888*a^3*b^6
*c^10*d^3*j + 3538944*a^5*b^2*c^12*e^3*i - 1648128*a^5*b^3*c^11*f^3*h + 133
0560*a^8*b^4*c^7*d*j^3 + 1179648*a^7*b^2*c^10*e*i^3 - 898560*a^6*b^3*c^10*f
*h^3 - 826560*a^7*b^6*c^6*d*j^3 - 607068*a^2*b^8*c^9*d^3*j + 589824*a^6*b^4
*c^9*e*i^3 - 354240*a^5*b^5*c^9*f*h^3 - 354240*a^4*b^5*c^10*f^3*h + 145188*
a^6*b^8*c^5*d*j^3 + 98304*a^5*b^6*c^8*e*i^3 + 43680*a^3*b^7*c^9*f^3*h - 216
00*a^4*b^7*c^8*f*h^3 - 9576*a^5*b^10*c^4*d*j^3 + 1350*a^3*b^9*c^7*f*h^3 - 1
050*a^2*b^9*c^8*f^3*h - 504*a*b^14*c^4*d^2*j^2 + 210*a^4*b^12*c^3*d*j^3 + 3
870720*a^6*b*c^12*d^2*i^2 + 1658880*a^6*b*c^12*e^2*h^2 - 9792*a*b^11*c^7*d^
2*i^2 + 16547328*a^4*b^2*c^13*d^3*h - 12306816*a^3*b^4*c^12*d^3*h + 3731097
6*a^3*b^3*c^13*d^3*f + 3037824*a^2*b^6*c^11*d^3*h - 2654208*a^5*b^3*c^11*e*
g^3 + 1949184*a^6*b^2*c^11*d*h^3 + 1296000*a^5*b^4*c^10*d*h^3 - 155520*a^4*
b^6*c^9*d*h^3 - 40500*a*b^10*c^8*d^2*h^2 - 8100*a^3*b^8*c^8*d*h^3 + 4050*a^
2*b^10*c^7*d*h^3 + 3870720*a^5*b*c^13*e^2*f^2 + 34836480*a^4*b*c^14*d^2*e^2
 - 108864*a*b^9*c^9*d^2*g^2 - 8068032*a^2*b^5*c^12*d^3*f - 5623296*a^4*b^3*
c^12*d*f^3 + 1737792*a^3*b^5*c^11*d*f^3 - 260190*a*b^8*c^10*d^2*f^2 - 21168
0*a^2*b^7*c^10*d*f^3 - 435456*a*b^7*c^11*d^2*e^2 - 377487360*a^12*b*c^6*e*k
^3 + 1434977280*a^8*b^3*c^8*d^2*k^2 + 173408256*a^7*c^12*d^2*e*k + 3276800*
a^12*c^7*i*j^2*k - 125829120*a^13*b*c^5*i*k^3 + 26214400*a^12*c^7*f*j*k^2 +
 1179648*a^10*c^9*h^2*i*k + 13440*a^6*b^13*h*j*k^2 + 50331648*a^11*c^8*e*i*
k^2 + 110100480*a^10*c^9*d*f*k^2 + 57802752*a^8*c^11*d^2*i*k + 9830400*a^11
*c^8*e*j^2*k - 3276800*a^9*c^10*f^2*i*k + 4480*a^5*b^14*f*j*k^2 + 15728640*
a^11*c^8*f*h*k^2 - 409600*a^9*c^10*f*i^2*j - 1152*b^16*c^3*d^2*i*k - 122051
6352*a^7*b^5*c^7*d^2*k^2 + 3538944*a^9*c^10*e*h^2*k + 384000*a^8*c^11*f^2*h
*j + 13440*a^4*b^15*d*j*k^2 + 384*a^3*b^16*f*h*k^2 + 20321280*a^7*c^12*d^2*
h*j - 245760*a^8*c^11*f*h*i^2 + 3456*b^15*c^4*d^2*g*k - 270*b^14*c^5*d^2*h*
j - 9830400*a^8*c^11*e*f^2*k + 4838400*a^9*c^10*d*h*j^2 + 2903040*a^8*c^11*
d*h^2*j - 1966080*a^10*b*c^8*i^3*k + 1433600*a^9*b^9*c*i*k^3 + 1152*a^2*b^1
7*d*h*k^2 - 3686400*a^7*c^12*e^2*f*j - 53084160*a^7*b*c^11*e^3*k - 6912*b^1
4*c^5*d^2*e*k - 3456*b^12*c^7*d^2*g*i + 630*b^13*c^6*d^2*f*j + 2688000*a^7*
c^12*d*f^2*j + 245760*a^8*b^10*c*g*k^3 - 2211840*a^6*c^13*e^2*f*h - 1720320
*a^7*c^12*d*f*i^2 - 9450*b^11*c^8*d^2*f*h + 6912*b^11*c^8*d^2*e*i + 1612800
*a^6*c^13*d*f^2*h - 1344000*a^10*b*c^8*f*j^3 - 1344000*a^7*b*c^11*f^3*j - 3
93216*a^8*b*c^10*g*i^3 - 23616*a*b^17*c*d^2*k^2 - 20736*b^10*c^9*d^2*e*g -
75188736*a^4*b*c^14*d^3*f - 883200*a^6*b*c^12*f^3*h - 317952*a^7*b*c^11*f*h
^3 + 43416*a*b^10*c^8*d^3*j - 15482880*a^5*c^14*d*e^2*f - 10616832*a^5*b*c^
13*e^3*g - 345060*a*b^8*c^10*d^3*h - 4262400*a^5*b*c^13*d*f^3 + 852768*a*b^
7*c^11*d^3*f + 7350*a*b^9*c^9*d*f^3 + 584578368*a^6*b^7*c^6*d^2*k^2 + 93905
920*a^12*b^3*c^4*j^2*k^2 - 177997248*a^5*b^9*c^5*d^2*k^2 - 50967040*a^11*b^
5*c^3*j^2*k^2 + 104693760*a^9*b^2*c^8*e^2*k^2 + 12849984*a^10*b^7*c^2*j^2*k
^2 + 20021248*a^11*b^2*c^6*i^2*k^2 - 85524480*a^8*b^4*c^7*e^2*k^2 + 3322368
0*a^10*b^3*c^6*h^2*k^2 + 4227072*a^10*b^4*c^5*i^2*k^2 - 3973120*a^9*b^6*c^4
*i^2*k^2 + 344064*a^7*b^10*c^2*i^2*k^2 - 81920*a^8*b^8*c^3*i^2*k^2 - 113863
68*a^9*b^5*c^5*h^2*k^2 + 26173440*a^9*b^4*c^6*g^2*k^2 - 21381120*a^8*b^6*c^
5*g^2*k^2 + 18874368*a^10*b^2*c^7*g^2*k^2 + 501760*a^9*b^3*c^7*i^2*j^2 + 45
2160*a^8*b^7*c^4*h^2*k^2 + 385920*a^7*b^9*c^3*h^2*k^2 + 170240*a^8*b^5*c^6*
i^2*j^2 - 48960*a^6*b^11*c^2*h^2*k^2 + 9216*a^7*b^7*c^5*i^2*j^2 - 1984*a^6*
b^9*c^4*i^2*j^2 + 64*a^5*b^11*c^3*i^2*j^2 + 5898240*a^7*b^8*c^4*g^2*k^2 + 1
419840*a^8*b^4*c^7*h^2*j^2 + 1387008*a^9*b^2*c^8*h^2*j^2 - 737280*a^6*b^10*
c^3*g^2*k^2 + 84960*a^7*b^6*c^6*h^2*j^2 + 36864*a^5*b^12*c^2*g^2*k^2 - 8010
*a^6*b^8*c^5*h^2*j^2 - 180*a^5*b^10*c^4*h^2*j^2 + 9*a^4*b^12*c^3*h^2*j^2 +

14115840*a^9*b^3*c^7*f^2*k^2 - 9231552*a^7*b^7*c^5*f^2*k^2 + 23592960*a^7*b
^6*c^6*e^2*k^2 + 4984320*a^8*b^5*c^6*f^2*k^2 + 3759040*a^6*b^9*c^4*f^2*k^2
+ 36190080*a^4*b^11*c^4*d^2*k^2 + 967680*a^8*b^3*c^8*g^2*j^2 - 727360*a^5*b
^11*c^3*f^2*k^2 + 276480*a^7*b^3*c^9*h^2*i^2 + 161280*a^7*b^5*c^7*g^2*j^2 +
140544*a^6*b^5*c^8*h^2*i^2 + 72960*a^4*b^13*c^2*f^2*k^2 + 25344*a^5*b^7*c^
7*h^2*i^2 - 20160*a^6*b^7*c^6*g^2*j^2 + 576*a^5*b^9*c^5*g^2*j^2 + 576*a^4*b
^9*c^6*h^2*i^2 + 3808000*a^8*b^2*c^9*f^2*j^2 - 2949120*a^6*b^8*c^5*e^2*k^2
+ 1643712*a^7*b^4*c^8*f^2*j^2 + 884736*a^7*b^2*c^10*g^2*i^2 + 884736*a^6*b^
4*c^9*g^2*i^2 + 221184*a^5*b^6*c^8*g^2*i^2 + 147456*a^5*b^10*c^4*e^2*k^2 -
125440*a^6*b^6*c^7*f^2*j^2 - 13790*a^5*b^8*c^6*f^2*j^2 + 1785*a^4*b^10*c^5*
f^2*j^2 - 70*a^3*b^12*c^4*f^2*j^2 - 4953600*a^3*b^13*c^3*d^2*k^2 + 18427392
*a^7*b^2*c^10*d^2*j^2 + 645120*a^7*b^3*c^9*e^2*j^2 + 501760*a^6*b^3*c^10*f^
2*i^2 + 442944*a^2*b^15*c^2*d^2*k^2 + 414720*a^6*b^3*c^10*g^2*h^2 + 207360*
a^5*b^5*c^9*g^2*h^2 + 170240*a^5*b^5*c^9*f^2*i^2 - 80640*a^6*b^5*c^8*e^2*j^
2 + 9216*a^4*b^7*c^8*f^2*i^2 + 5184*a^4*b^7*c^8*g^2*h^2 + 2304*a^5*b^7*c^7*
e^2*j^2 - 1984*a^3*b^9*c^7*f^2*i^2 + 64*a^2*b^11*c^6*f^2*i^2 - 4148928*a^6*
b^4*c^9*d^2*j^2 + 3538944*a^6*b^2*c^11*e^2*i^2 + 1684224*a^6*b^2*c^11*f^2*h
^2 + 1264320*a^5*b^4*c^10*f^2*h^2 - 1183392*a^5*b^6*c^8*d^2*j^2 + 884736*a^
5*b^4*c^10*e^2*i^2 + 645750*a^4*b^8*c^7*d^2*j^2 + 126720*a^4*b^6*c^9*f^2*h^
2 - 115920*a^3*b^10*c^6*d^2*j^2 - 13950*a^3*b^8*c^8*f^2*h^2 + 10836*a^2*b^1
2*c^5*d^2*j^2 + 225*a^2*b^10*c^7*f^2*h^2 + 1935360*a^5*b^3*c^11*d^2*i^2 + 9
67680*a^5*b^3*c^11*f^2*g^2 + 829440*a^5*b^3*c^11*e^2*h^2 - 532224*a^4*b^5*c
^10*d^2*i^2 + 161280*a^4*b^5*c^10*f^2*g^2 - 96768*a^3*b^7*c^9*d^2*i^2 + 627
84*a^2*b^9*c^8*d^2*i^2 + 20736*a^4*b^5*c^10*e^2*h^2 - 20160*a^3*b^7*c^9*f^2
*g^2 + 576*a^2*b^9*c^8*f^2*g^2 + 11487744*a^5*b^2*c^12*d^2*h^2 + 7962624*a^
5*b^2*c^12*e^2*g^2 + 35525376*a^4*b^2*c^13*d^2*f^2 - 1412640*a^3*b^6*c^10*d
^2*h^2 + 461376*a^4*b^4*c^11*d^2*h^2 + 375030*a^2*b^8*c^9*d^2*h^2 + 8709120
*a^4*b^3*c^12*d^2*g^2 - 4354560*a^3*b^5*c^11*d^2*g^2 + 979776*a^2*b^7*c^10*
d^2*g^2 + 645120*a^4*b^3*c^12*e^2*f^2 - 80640*a^3*b^5*c^11*e^2*f^2 + 2304*a
^2*b^7*c^10*e^2*f^2 - 15269184*a^3*b^4*c^12*d^2*f^2 + 2870784*a^2*b^6*c^11*
d^2*f^2 - 17418240*a^3*b^3*c^13*d^2*e^2 + 3919104*a^2*b^5*c^12*d^2*e^2 + 38
4*a*b^18*d*f*k^2 - 199229440*a^14*b^2*c^3*k^4 + 8388608*a^12*c^7*i^2*k^2 +
75497472*a^10*c^9*e^2*k^2 + 78400*a^8*b^11*j^2*k^2 + 4096*a^5*b^14*i^2*k^2
+ 345600*a^10*c^9*h^2*j^2 + 576*a^4*b^15*h^2*k^2 + 57937920*a^13*b^4*c^2*k^
4 + 320000*a^9*c^10*f^2*j^2 + 64*a^2*b^17*f^2*k^2 + 16934400*a^8*c^11*d^2*j
^2 + 9*b^16*c^3*d^2*j^2 + 3538944*a^7*c^12*e^2*i^2 + 115200*a^7*c^12*f^2*h^
2 + 576*b^13*c^6*d^2*i^2 + 2025*b^12*c^7*d^2*h^2 + 6096384*a^6*c^13*d^2*h^2
+ 492800*a^11*b^2*c^6*j^4 + 351456*a^10*b^4*c^5*j^4 - 43120*a^9*b^6*c^4*j^
4 + 5184*b^11*c^8*d^2*g^2 + 1225*a^8*b^8*c^3*j^4 + 131072*a^8*b^2*c^9*i^4 +
98304*a^7*b^4*c^8*i^4 + 32768*a^6*b^6*c^7*i^4 + 11025*b^10*c^9*d^2*f^2 + 4
096*a^5*b^8*c^6*i^4 + 5644800*a^5*c^14*d^2*f^2 + 142560*a^6*b^4*c^9*h^4 + 1
03680*a^7*b^2*c^10*h^4 + 32400*a^5*b^6*c^8*h^4 + 20736*b^9*c^10*d^2*e^2 + 2
025*a^4*b^8*c^7*h^4 + 331776*a^5*b^4*c^10*g^4 + 492800*a^5*b^2*c^12*f^4 + 3
51456*a^4*b^4*c^11*f^4 - 43120*a^3*b^6*c^10*f^4 + 1225*a^2*b^8*c^9*f^4 - 27
433728*a^3*b^2*c^14*d^4 + 6446304*a^2*b^4*c^13*d^4 + a^2*b^14*c^3*f^2*j^2 -
81920*a^8*b^11*i*k^3 + 384000*a^11*c^8*h*j^3 + 138240*a^9*c^10*h^3*j + 474
16320*a^6*c^13*d^3*j - 1134*b^12*c^7*d^3*j + 7077888*a^6*c^13*e^3*i + 26880
00*a^10*c^9*d*j^3 + 786432*a^8*c^11*e*i^3 + 28449792*a^5*c^14*d^3*h - 77824
00*a^12*b^6*c*k^4 + 17010*b^10*c^9*d^3*h + 580608*a^7*c^12*d*h^3 - 39690*b^
9*c^10*d^3*f - 734832*a*b^6*c^12*d^4 + 268435456*a^15*c^4*k^4 + 576*b^19*d^
2*k^2 + 409600*a^11*b^8*k^4 + 160000*a^12*c^7*j^4 + 65536*a^9*c^10*i^4 + 20
736*a^8*c^11*h^4 + 49787136*a^4*c^15*d^4 + 160000*a^6*c^13*f^4 + 5308416*a^
5*c^14*e^4 + 35721*b^8*c^11*d^4, z, n)*((768*a^2*b^14*c^6*d - 3145728*a^10*
c^12*h - 5242880*a^11*c^11*j - 22020096*a^9*c^13*d - 22272*a^3*b^12*c^7*d +
282624*a^4*b^10*c^8*d - 2027520*a^5*b^8*c^9*d + 8847360*a^6*b^6*c^10*d - 2
3396352*a^7*b^4*c^11*d + 34603008*a^8*b^2*c^12*d + 256*a^3*b^13*c^6*f - 921
6*a^4*b^11*c^7*f + 122880*a^5*b^9*c^8*f - 819200*a^6*b^7*c^9*f + 2949120*a^
7*b^5*c^10*f - 5505024*a^8*b^3*c^11*f + 768*a^4*b^12*c^6*h - 12288*a^5*b^10
*c^7*h + 61440*a^6*b^8*c^8*h - 983040*a^8*b^4*c^10*h + 3145728*a^9*b^2*c^11

*h + 256*a^5*b^12*c^5*j - 61440*a^7*b^8*c^7*j + 655360*a^8*b^6*c^8*j - 2949
120*a^9*b^4*c^9*j + 6291456*a^10*b^2*c^10*j + 4194304*a^9*b*c^12*f)/(512*(4
096*a^10*c^10 + a^4*b^12*c^4 - 24*a^5*b^10*c^5 + 240*a^6*b^8*c^6 - 1280*a^7
*b^6*c^7 + 3840*a^8*b^4*c^8 - 6144*a^9*b^2*c^9)) + (x*(1572864*a^9*c^13*e +
524288*a^10*c^12*i - 1536*a^4*b^10*c^8*e + 30720*a^5*b^8*c^9*e - 245760*a^
6*b^6*c^10*e + 983040*a^7*b^4*c^11*e - 1966080*a^8*b^2*c^12*e + 768*a^4*b^1
1*c^7*g - 15360*a^5*b^9*c^8*g + 122880*a^6*b^7*c^9*g - 491520*a^7*b^5*c^10*
g + 983040*a^8*b^3*c^11*g - 256*a^4*b^12*c^6*i + 4608*a^5*b^10*c^7*i - 3072
0*a^6*b^8*c^8*i + 81920*a^7*b^6*c^9*i - 393216*a^9*b^2*c^11*i + 512*a^4*b^1
5*c^3*k - 14592*a^5*b^13*c^4*k + 178944*a^6*b^11*c^5*k - 1223680*a^7*b^9*c^
6*k + 5038080*a^8*b^7*c^7*k - 12484608*a^9*b^5*c^8*k + 17235968*a^10*b^3*c^
9*k - 786432*a^9*b*c^12*g - 10223616*a^11*b*c^10*k))/(64*(4096*a^10*c^10 +
a^4*b^12*c^4 - 24*a^5*b^10*c^5 + 240*a^6*b^8*c^6 - 1280*a^7*b^6*c^7 + 3840*
a^8*b^4*c^8 - 6144*a^9*b^2*c^9)) + (root(56371445760*a^11*b^8*c^12*z^4 - 50
3316480*a^8*b^14*c^9*z^4 + 47185920*a^7*b^16*c^8*z^4 - 2621440*a^6*b^18*c^7
*z^4 + 65536*a^5*b^20*c^6*z^4 - 171798691840*a^14*b^2*c^15*z^4 + 1932735283
20*a^13*b^4*c^14*z^4 - 128849018880*a^12*b^6*c^13*z^4 - 16911433728*a^10*b^
10*c^11*z^4 + 3523215360*a^9*b^12*c^10*z^4 + 68719476736*a^15*c^16*z^4 - 47
185920*a^7*b^16*c^5*k*z^3 + 2621440*a^6*b^18*c^4*k*z^3 - 65536*a^5*b^20*c^3
*k*z^3 + 171798691840*a^14*b^2*c^12*k*z^3 - 193273528320*a^13*b^4*c^11*k*z^
3 + 128849018880*a^12*b^6*c^10*k*z^3 + 16911433728*a^10*b^10*c^8*k*z^3 - 35
23215360*a^9*b^12*c^7*k*z^3 - 56371445760*a^11*b^8*c^9*k*z^3 + 503316480*a^
8*b^14*c^6*k*z^3 - 68719476736*a^15*c^13*k*z^3 + 1536*a*b^18*c^6*d*f*z^2 -
2571632640*a^9*b^5*c^11*d*j*z^2 + 2548039680*a^9*b^3*c^13*d*h*z^2 + 2453667
840*a^9*b^7*c^9*e*k*z^2 + 2181038080*a^12*b^3*c^10*i*k*z^2 - 6492782592*a^1
0*b^5*c^10*e*k*z^2 + 1509949440*a^9*b^3*c^13*e*g*z^2 - 1401421824*a^8*b^5*c
^12*d*h*z^2 - 1226833920*a^9*b^8*c^8*g*k*z^2 - 1321205760*a^9*b^2*c^14*d*f*
z^2 - 2793406464*a^11*b*c^13*d*j*z^2 + 9563013120*a^11*b^3*c^11*e*k*z^2 + 8
90634240*a^8*b^7*c^10*d*j*z^2 - 754974720*a^8*b^5*c^12*e*g*z^2 - 570425344*
a^11*b^5*c^9*i*k*z^2 + 732168192*a^7*b^6*c^12*d*f*z^2 - 581959680*a^10*b^4*
c^11*f*j*z^2 - 603979776*a^10*b^2*c^13*e*i*z^2 + 534773760*a^11*b^3*c^11*h*
j*z^2 - 558366720*a^8*b^9*c^8*e*k*z^2 - 4781506560*a^11*b^4*c^10*g*k*z^2 -
2013265920*a^13*b*c^11*i*k*z^2 - 456130560*a^9*b^4*c^12*f*h*z^2 + 384040960
*a^9*b^6*c^10*f*j*z^2 - 264241152*a^10*b^7*c^8*i*k*z^2 + 390463488*a^7*b^7*
c^11*d*h*z^2 + 279183360*a^8*b^10*c^7*g*k*z^2 + 301989888*a^10*b^3*c^12*g*i
*z^2 + 222822400*a^9*b^9*c^7*i*k*z^2 - 366280704*a^6*b^8*c^11*d*f*z^2 - 330
301440*a^8*b^4*c^13*d*f*z^2 + 254017536*a^8*b^6*c^11*f*h*z^2 - 1887436800*a
^10*b*c^14*d*h*z^2 + 188743680*a^10*b^2*c^13*f*h*z^2 - 185303040*a^7*b^9*c^
9*d*j*z^2 - 117964800*a^10*b^5*c^10*h*j*z^2 - 6039797760*a^12*b*c^12*e*k*z^
2 - 67502080*a^8*b^11*c^6*i*k*z^2 + 121634816*a^11*b^2*c^12*f*j*z^2 + 18874
3680*a^7*b^7*c^11*e*g*z^2 - 115671040*a^8*b^8*c^9*f*j*z^2 + 125829120*a^8*b
^6*c^11*e*i*z^2 + 10813440*a^7*b^13*c^5*i*k*z^2 + 76677120*a^7*b^11*c^7*e*k
*z^2 - 38338560*a^7*b^12*c^6*g*k*z^2 - 37355520*a^9*b^7*c^9*h*j*z^2 - 91750
4*a^6*b^15*c^4*i*k*z^2 + 32768*a^5*b^17*c^3*i*k*z^2 - 62914560*a^8*b^7*c^10
*g*i*z^2 + 23101440*a^8*b^9*c^8*h*j*z^2 - 4349952*a^7*b^11*c^7*h*j*z^2 + 29
49120*a^6*b^14*c^5*g*k*z^2 + 337920*a^6*b^13*c^6*h*j*z^2 - 98304*a^5*b^16*c
^4*g*k*z^2 - 7680*a^5*b^15*c^5*h*j*z^2 - 61931520*a^7*b^8*c^10*f*h*z^2 + 23
592960*a^7*b^9*c^9*g*i*z^2 + 17940480*a^7*b^10*c^8*f*j*z^2 - 47185920*a^7*b
^8*c^10*e*i*z^2 - 5898240*a^6*b^13*c^6*e*k*z^2 - 3538944*a^6*b^11*c^8*g*i*z
^2 - 1347584*a^6*b^12*c^7*f*j*z^2 + 196608*a^5*b^15*c^5*e*k*z^2 + 196608*a^
5*b^13*c^7*g*i*z^2 + 35840*a^5*b^14*c^6*f*j*z^2 + 96583680*a^5*b^10*c^10*d*
f*z^2 + 23371776*a^6*b^11*c^8*d*j*z^2 - 51609600*a^6*b^9*c^10*d*h*z^2 + 707
7888*a^6*b^10*c^9*e*i*z^2 + 6144000*a^6*b^10*c^9*f*h*z^2 - 1677312*a^5*b^13
*c^7*d*j*z^2 - 393216*a^5*b^12*c^8*e*i*z^2 + 61440*a^5*b^12*c^8*f*h*z^2 + 5
3760*a^4*b^15*c^6*d*j*z^2 - 46080*a^4*b^14*c^7*f*h*z^2 + 1536*a^3*b^16*c^6*
f*h*z^2 - 23592960*a^6*b^9*c^10*e*g*z^2 + 1179648*a^5*b^11*c^9*e*g*z^2 + 82
9440*a^4*b^13*c^8*d*h*z^2 + 368640*a^5*b^11*c^9*d*h*z^2 - 105984*a^3*b^15*c
^7*d*h*z^2 + 4608*a^2*b^17*c^6*d*h*z^2 - 15175680*a^4*b^12*c^9*d*f*z^2 + 14
28480*a^3*b^14*c^8*d*f*z^2 - 73728*a^2*b^16*c^7*d*f*z^2 + 4108320768*a^10*b

^3*c^12*d*j*z^2 - 1207959552*a^10*b*c^14*e*g*z^2 - 578813952*a^12*b*c^12*h*
j*z^2 + 3246391296*a^10*b^6*c^9*g*k*z^2 - 402653184*a^11*b*c^13*g*i*z^2 + 3
019898880*a^12*b^2*c^11*g*k*z^2 - 440401920*a^10*b*c^14*f^2*z^2 - 188743680
*a^11*b*c^13*h^2*z^2 + 1761607680*a^10*c^15*d*f*z^2 - 655360*a^6*b^18*c*k^2
*z^2 - 94464*a*b^17*c^7*d^2*z^2 + 6936330240*a^8*b^3*c^14*d^2*z^2 + 2464874
496*a^6*b^7*c^12*d^2*z^2 - 3963617280*a^9*b*c^15*d^2*z^2 + 58007224320*a^13
*b^4*c^8*k^2*z^2 + 14968422400*a^11*b^8*c^6*k^2*z^2 + 805306368*a^11*c^14*e
*i*z^2 - 35966156800*a^12*b^6*c^7*k^2*z^2 + 419430400*a^12*c^13*f*j*z^2 - 1
509949440*a^9*b^2*c^14*e^2*z^2 + 251658240*a^11*c^14*f*h*z^2 - 56874762240*
a^14*b^2*c^9*k^2*z^2 - 5400428544*a^7*b^5*c^13*d^2*z^2 + 890470400*a^9*b^12
*c^4*k^2*z^2 + 754974720*a^8*b^4*c^13*e^2*z^2 - 730054656*a^5*b^9*c^11*d^2*
z^2 + 477102080*a^12*b^3*c^10*j^2*z^2 + 477102080*a^9*b^3*c^13*f^2*z^2 - 37
7487360*a^9*b^4*c^12*g^2*z^2 + 301989888*a^10*b^2*c^13*g^2*z^2 - 174325760*
a^11*b^5*c^9*j^2*z^2 - 126156800*a^8*b^14*c^3*k^2*z^2 + 188743680*a^8*b^6*c
^11*g^2*z^2 + 141557760*a^10*b^3*c^12*h^2*z^2 - 174325760*a^8*b^5*c^12*f^2*
z^2 - 188743680*a^7*b^6*c^12*e^2*z^2 - 4350935040*a^10*b^10*c^5*k^2*z^2 + 1
46165760*a^4*b^11*c^10*d^2*z^2 - 50331648*a^10*b^4*c^11*i^2*z^2 + 11796480*
a^7*b^16*c^2*k^2*z^2 - 33554432*a^11*b^2*c^12*i^2*z^2 + 11206656*a^10*b^7*c
^8*j^2*z^2 + 8929280*a^9*b^9*c^7*j^2*z^2 + 20971520*a^9*b^6*c^10*i^2*z^2 -
2600960*a^8*b^11*c^6*j^2*z^2 + 291840*a^7*b^13*c^5*j^2*z^2 - 14080*a^6*b^15
*c^4*j^2*z^2 + 256*a^5*b^17*c^3*j^2*z^2 - 47185920*a^7*b^8*c^10*g^2*z^2 - 2
6542080*a^8*b^7*c^10*h^2*z^2 - 2752512*a^7*b^10*c^8*i^2*z^2 + 2621440*a^8*b
^8*c^9*i^2*z^2 + 524288*a^6*b^12*c^7*i^2*z^2 - 32768*a^5*b^14*c^6*i^2*z^2 +
9584640*a^7*b^9*c^9*h^2*z^2 - 2359296*a^9*b^5*c^11*h^2*z^2 - 1290240*a^6*b
^11*c^8*h^2*z^2 + 46080*a^5*b^13*c^7*h^2*z^2 + 2304*a^4*b^15*c^6*h^2*z^2 +
5898240*a^6*b^10*c^9*g^2*z^2 - 294912*a^5*b^12*c^8*g^2*z^2 + 11206656*a^7*b
^7*c^11*f^2*z^2 + 8929280*a^6*b^9*c^10*f^2*z^2 + 23592960*a^6*b^8*c^11*e^2*
z^2 - 2600960*a^5*b^11*c^9*f^2*z^2 + 291840*a^4*b^13*c^8*f^2*z^2 - 14080*a^
3*b^15*c^7*f^2*z^2 + 256*a^2*b^17*c^6*f^2*z^2 - 19860480*a^3*b^13*c^9*d^2*z
^2 - 1179648*a^5*b^10*c^10*e^2*z^2 + 1771776*a^2*b^15*c^8*d^2*z^2 - 4404019
20*a^13*b*c^11*j^2*z^2 + 1207959552*a^10*c^15*e^2*z^2 + 134217728*a^12*c^13
*i^2*z^2 + 25769803776*a^15*c^10*k^2*z^2 + 16384*a^5*b^20*k^2*z^2 + 2304*b^
19*c^6*d^2*z^2 + 165150720*a^9*b*c^12*d*g*j*z + 23592960*a^10*b*c^11*g*h*j*
z + 169869312*a^7*b*c^14*d*e*f*z + 99090432*a^8*b*c^13*d*g*h*z - 3145728*a^
9*b*c^12*f*h*i*z + 56623104*a^8*b*c^13*d*f*i*z - 1536*a*b^18*c^3*d*f*k*z -
9437184*a^8*b*c^13*e*f*h*z + 1536*a*b^15*c^6*d*f*i*z - 4608*a*b^14*c^7*d*f*
g*z + 9216*a*b^13*c^8*d*e*f*z + 2173501440*a^9*b^5*c^8*d*j*k*z - 1987706880
*a^9*b^3*c^10*d*h*k*z + 1121255424*a^8*b^5*c^9*d*h*k*z + 861143040*a^8*b^4*
c^10*d*f*k*z - 859963392*a^7*b^6*c^9*d*f*k*z - 780779520*a^8*b^7*c^7*d*j*k*
z - 754974720*a^9*b^3*c^10*e*g*k*z + 2222456832*a^11*b*c^10*d*j*k*z - 45416
4480*a^11*b^3*c^8*h*j*k*z + 377487360*a^8*b^5*c^9*e*g*k*z + 290979840*a^10*
b^4*c^8*f*j*k*z + 381026304*a^6*b^8*c^8*d*f*k*z + 412876800*a^8*b^2*c^12*d*
e*j*z + 301989888*a^10*b^2*c^10*e*i*k*z - 320421888*a^7*b^7*c^8*d*h*k*z + 1
85794560*a^10*b^5*c^7*h*j*k*z - 192020480*a^9*b^6*c^7*f*j*k*z + 190709760*a
^9*b^4*c^9*f*h*k*z - 150994944*a^10*b^3*c^9*g*i*k*z + 168990720*a^7*b^9*c^6
*d*j*k*z + 235929600*a^9*b^2*c^11*d*f*k*z - 206438400*a^8*b^3*c^11*d*g*j*z
- 206438400*a^7*b^4*c^11*d*e*j*z - 101646336*a^8*b^6*c^8*f*h*k*z - 29245440
*a^9*b^7*c^6*h*j*k*z - 60817408*a^11*b^2*c^9*f*j*k*z + 57835520*a^8*b^8*c^6
*f*j*k*z + 219414528*a^7*b^2*c^13*d*e*h*z - 70778880*a^10*b^2*c^10*f*h*k*z
+ 677376*a^7*b^11*c^4*h*j*k*z - 645120*a^8*b^9*c^5*h*j*k*z - 53760*a^6*b^13
*c^3*h*j*k*z + 31457280*a^8*b^7*c^7*g*i*k*z - 62914560*a^8*b^6*c^8*e*i*k*z
- 94371840*a^7*b^7*c^8*e*g*k*z - 221773824*a^6*b^3*c^13*d*e*f*z + 82575360*
a^9*b^2*c^11*d*i*j*z + 11796480*a^10*b^2*c^10*h*i*j*z - 11796480*a^7*b^9*c^
6*g*i*k*z - 8970240*a^7*b^10*c^5*f*j*k*z + 103219200*a^7*b^5*c^10*d*g*j*z -
2457600*a^8*b^6*c^8*h*i*j*z + 1769472*a^6*b^11*c^5*g*i*k*z + 921600*a^7*b^
8*c^7*h*i*j*z + 673792*a^6*b^12*c^4*f*j*k*z - 138240*a^6*b^10*c^6*h*i*j*z -
98304*a^5*b^13*c^4*g*i*k*z - 17920*a^5*b^14*c^3*f*j*k*z + 7680*a^5*b^12*c^
5*h*i*j*z - 97136640*a^5*b^10*c^7*d*f*k*z - 29491200*a^9*b^3*c^10*g*h*j*z +
58982400*a^9*b^2*c^11*e*h*j*z + 23592960*a^7*b^8*c^7*e*i*k*z - 22169088*a^

6*b^11*c^5*d*j*k*z + 21381120*a^7*b^8*c^7*f*h*k*z + 14745600*a^8*b^5*c^9*g*
h*j*z + 42854400*a^6*b^9*c^7*d*h*k*z - 109707264*a^7*b^3*c^12*d*g*h*z - 368
6400*a^7*b^7*c^8*g*h*j*z - 3538944*a^6*b^10*c^6*e*i*k*z + 1645056*a^5*b^13*
c^4*d*j*k*z - 890880*a^6*b^10*c^6*f*h*k*z + 460800*a^6*b^9*c^7*g*h*j*z - 33
0240*a^5*b^12*c^5*f*h*k*z + 196608*a^5*b^12*c^5*e*i*k*z - 53760*a^4*b^15*c^
3*d*j*k*z + 46080*a^4*b^14*c^4*f*h*k*z - 23040*a^5*b^11*c^6*g*h*j*z - 1536*
a^3*b^16*c^3*f*h*k*z - 29491200*a^8*b^4*c^10*e*h*j*z - 17203200*a^7*b^6*c^9
*d*i*j*z + 11796480*a^6*b^9*c^7*e*g*k*z + 110886912*a^6*b^4*c^12*d*f*g*z +
7372800*a^7*b^6*c^9*e*h*j*z + 40108032*a^8*b^2*c^12*d*h*i*z + 6451200*a^6*b
^8*c^8*d*i*j*z + 2359296*a^8*b^3*c^11*f*h*i*z - 967680*a^5*b^10*c^7*d*i*j*z
 - 921600*a^6*b^8*c^8*e*h*j*z - 829440*a^4*b^13*c^5*d*h*k*z - 589824*a^5*b^
11*c^6*e*g*k*z - 491520*a^6*b^7*c^9*f*h*i*z + 184320*a^5*b^9*c^8*f*h*i*z +
105984*a^3*b^15*c^4*d*h*k*z + 69120*a^5*b^11*c^6*d*h*k*z + 53760*a^4*b^12*c
^6*d*i*j*z + 46080*a^5*b^10*c^7*e*h*j*z - 27648*a^4*b^11*c^7*f*h*i*z - 4608
*a^2*b^17*c^3*d*h*k*z + 1536*a^3*b^13*c^6*f*h*i*z - 25804800*a^6*b^7*c^9*d*
g*j*z - 88473600*a^6*b^4*c^12*d*e*h*z + 51609600*a^6*b^6*c^10*d*e*j*z - 849
34656*a^7*b^2*c^13*d*f*g*z + 117964800*a^5*b^5*c^12*d*e*f*z + 15160320*a^4*
b^12*c^6*d*f*k*z - 45613056*a^7*b^3*c^12*d*f*i*z + 44236800*a^6*b^5*c^11*d*
g*h*z - 10321920*a^6*b^6*c^10*d*h*i*z + 7077888*a^7*b^4*c^11*d*h*i*z - 5898
240*a^7*b^4*c^11*f*g*h*z + 4718592*a^8*b^2*c^12*f*g*h*z + 3225600*a^5*b^9*c
^8*d*g*j*z + 2949120*a^6*b^6*c^10*f*g*h*z + 2396160*a^5*b^8*c^9*d*h*i*z - 1
428480*a^3*b^14*c^5*d*f*k*z - 737280*a^5*b^8*c^9*f*g*h*z - 161280*a^4*b^11*
c^7*d*g*j*z + 92160*a^4*b^10*c^8*f*g*h*z + 73728*a^2*b^16*c^4*d*f*k*z - 506
88*a^3*b^12*c^7*d*h*i*z - 27648*a^4*b^10*c^8*d*h*i*z - 4608*a^3*b^12*c^7*f*
g*h*z + 4608*a^2*b^14*c^6*d*h*i*z - 58982400*a^5*b^6*c^11*d*f*g*z + 1179648
0*a^7*b^3*c^12*e*f*h*z + 8847360*a^5*b^7*c^10*d*f*i*z - 6635520*a^5*b^7*c^1
0*d*g*h*z - 6451200*a^5*b^8*c^9*d*e*j*z - 5898240*a^6*b^5*c^11*e*f*h*z - 38
09280*a^4*b^9*c^9*d*f*i*z + 2359296*a^6*b^5*c^11*d*f*i*z + 1474560*a^5*b^7*
c^10*e*f*h*z + 681984*a^3*b^11*c^8*d*f*i*z + 322560*a^4*b^10*c^8*d*e*j*z -
276480*a^4*b^9*c^9*d*g*h*z - 184320*a^4*b^9*c^9*e*f*h*z + 179712*a^3*b^11*c
^8*d*g*h*z - 55296*a^2*b^13*c^7*d*f*i*z - 13824*a^2*b^13*c^7*d*g*h*z + 9216
*a^3*b^11*c^8*e*f*h*z + 16220160*a^4*b^8*c^10*d*f*g*z + 13271040*a^5*b^6*c^
11*d*e*h*z - 2396160*a^3*b^10*c^9*d*f*g*z + 552960*a^4*b^8*c^10*d*e*h*z - 3
59424*a^3*b^10*c^9*d*e*h*z + 175104*a^2*b^12*c^8*d*f*g*z + 27648*a^2*b^12*c
^8*d*e*h*z - 32440320*a^4*b^7*c^11*d*e*f*z + 4792320*a^3*b^9*c^10*d*e*f*z -
 350208*a^2*b^11*c^9*d*e*f*z + 1439170560*a^10*b*c^11*d*h*k*z - 3361603584*
a^10*b^3*c^9*d*j*k*z + 603979776*a^10*b*c^11*e*g*k*z + 407371776*a^12*b*c^9
*h*j*k*z + 201326592*a^11*b*c^10*g*i*k*z + 346816512*a^7*b*c^14*d^2*g*z + 1
29761280*a^11*b*c^10*h^2*k*z + 121896960*a^10*b*c^11*f^2*k*z + 458752*a^6*b
^15*c*i*k^2*z + 19660800*a^11*b*c^10*g*j^2*z + 49152*a^5*b^16*c*g*k^2*z + 7
077888*a^9*b*c^12*g*h^2*z + 94464*a*b^17*c^4*d^2*k*z - 19660800*a^8*b*c^13*
f^2*g*z - 66816*a*b^14*c^7*d^2*i*z + 214272*a*b^13*c^8*d^2*g*z - 428544*a*b
^12*c^9*d^2*e*z + 2390753280*a^11*b^4*c^7*g*k^2*z - 2411421696*a^6*b^7*c^9*
d^2*k*z - 6603079680*a^8*b^3*c^11*d^2*k*z + 3715891200*a^9*b*c^12*d^2*k*z -
 880803840*a^10*c^12*d*f*k*z - 1623195648*a^10*b^6*c^6*g*k^2*z - 402653184*
a^11*c^11*e*i*k*z - 1509949440*a^12*b^2*c^8*g*k^2*z - 209715200*a^12*c^10*f
*j*k*z - 330301440*a^9*c^13*d*e*j*z + 3019898880*a^12*b*c^9*e*k^2*z - 12582
9120*a^11*c^11*f*h*k*z - 110100480*a^10*c^12*d*i*j*z - 198180864*a^8*c^14*d
*e*h*z - 15728640*a^11*c^11*h*i*j*z - 1226833920*a^9*b^7*c^6*e*k^2*z - 4718
5920*a^10*c^12*e*h*j*z - 66060288*a^9*c^13*d*h*i*z - 1090519040*a^12*b^3*c^
7*i*k^2*z + 1022754816*a^6*b^2*c^14*d^2*e*z + 5216108544*a^7*b^5*c^10*d^2*k
*z + 754974720*a^9*b^2*c^11*e^2*k*z + 721529856*a^5*b^9*c^8*d^2*k*z + 61341
6960*a^9*b^8*c^5*g*k^2*z - 642318336*a^5*b^4*c^13*d^2*e*z - 4781506560*a^11
*b^3*c^8*e*k^2*z - 398131200*a^12*b^3*c^7*j^2*k*z - 511377408*a^6*b^3*c^13*
d^2*g*z - 377487360*a^8*b^4*c^10*e^2*k*z + 285212672*a^11*b^5*c^6*i*k^2*z +
 199065600*a^11*b^5*c^6*j^2*k*z + 279183360*a^8*b^9*c^5*e*k^2*z + 321159168
*a^5*b^5*c^12*d^2*g*z + 188743680*a^9*b^4*c^9*g^2*k*z + 132120576*a^10*b^7*
c^5*i*k^2*z - 150994944*a^10*b^2*c^10*g^2*k*z - 111411200*a^9*b^9*c^4*i*k^2
*z - 126812160*a^10*b^3*c^9*h^2*k*z + 225312768*a^7*b^2*c^13*d^2*i*z - 1395

```
91680*a^8*b^10*c^4*g*k^2*z - 49766400*a^10*b^7*c^5*j^2*k*z - 145463040*a^4*
b^11*c^7*d^2*k*z - 94371840*a^8*b^6*c^8*g^2*k*z + 223395840*a^4*b^6*c^12*d^
2*e*z + 33751040*a^8*b^11*c^3*i*k^2*z - 78970880*a^9*b^3*c^10*f^2*k*z + 943
71840*a^7*b^6*c^9*e^2*k*z + 25165824*a^10*b^4*c^8*i^2*k*z + 6220800*a^9*b^9
*c^4*j^2*k*z + 39223296*a^9*b^5*c^8*h^2*k*z - 311040*a^8*b^11*c^3*j^2*k*z +
 16777216*a^11*b^2*c^9*i^2*k*z - 10485760*a^9*b^6*c^7*i^2*k*z - 5406720*a^7
*b^13*c^2*i*k^2*z + 1376256*a^7*b^10*c^5*i^2*k*z - 1310720*a^8*b^8*c^6*i^2*
k*z - 262144*a^6*b^12*c^4*i^2*k*z + 16384*a^5*b^14*c^3*i^2*k*z + 10354688*a
^11*b^2*c^9*i*j^2*z + 23592960*a^7*b^8*c^7*g^2*k*z + 38559744*a^7*b^7*c^8*f
^2*k*z + 19169280*a^7*b^12*c^3*g*k^2*z - 2048000*a^9*b^6*c^7*i*j^2*z - 1520
640*a^7*b^9*c^6*h^2*k*z - 1105920*a^8*b^7*c^7*h^2*k*z + 849920*a^8*b^8*c^6*
i*j^2*z - 393216*a^10*b^4*c^8*i*j^2*z + 195840*a^6*b^11*c^5*h^2*k*z - 14592
0*a^7*b^10*c^5*i*j^2*z + 11520*a^5*b^13*c^4*h^2*k*z + 11008*a^6*b^12*c^4*i*
j^2*z - 2304*a^4*b^15*c^3*h^2*k*z - 256*a^5*b^14*c^3*i*j^2*z - 25362432*a^1
0*b^3*c^9*g*j^2*z - 24739840*a^8*b^5*c^9*f^2*k*z - 38338560*a^7*b^11*c^4*e*
k^2*z - 2949120*a^6*b^10*c^6*g^2*k*z - 1474560*a^6*b^14*c^2*g*k^2*z + 50724
864*a^10*b^2*c^10*e*j^2*z + 147456*a^5*b^12*c^5*g^2*k*z - 15150080*a^6*b^9*
c^7*f^2*k*z + 13271040*a^9*b^5*c^8*g*j^2*z - 111697920*a^4*b^7*c^11*d^2*g*z
 - 3563520*a^8*b^7*c^7*g*j^2*z + 3538944*a^9*b^2*c^11*h^2*i*z + 2912000*a^5
*b^11*c^6*f^2*k*z - 737280*a^7*b^6*c^9*h^2*i*z + 506880*a^7*b^9*c^6*g*j^2*z
 - 291840*a^4*b^13*c^5*f^2*k*z + 276480*a^6*b^8*c^8*h^2*i*z - 41472*a^5*b^1
0*c^7*h^2*i*z - 34560*a^6*b^11*c^5*g*j^2*z + 14080*a^3*b^15*c^4*f^2*k*z + 2
304*a^4*b^12*c^6*h^2*i*z + 768*a^5*b^13*c^4*g*j^2*z - 256*a^2*b^17*c^3*f^2*
k*z - 11796480*a^6*b^8*c^8*e^2*k*z - 26542080*a^9*b^4*c^9*e*j^2*z + 1983744
0*a^3*b^13*c^6*d^2*k*z + 2949120*a^6*b^13*c^3*e*k^2*z + 589824*a^5*b^10*c^7
*e^2*k*z - 98304*a^5*b^15*c^2*e*k^2*z - 10354688*a^8*b^2*c^12*f^2*i*z - 436
46976*a^6*b^4*c^12*d^2*i*z - 8847360*a^8*b^3*c^11*g*h^2*z + 7127040*a^8*b^6
*c^8*e*j^2*z + 4423680*a^7*b^5*c^10*g*h^2*z + 2048000*a^6*b^6*c^10*f^2*i*z
- 1771776*a^2*b^15*c^5*d^2*k*z - 1105920*a^6*b^7*c^9*g*h^2*z - 1013760*a^7*
b^8*c^7*e*j^2*z - 849920*a^5*b^8*c^9*f^2*i*z + 393216*a^7*b^4*c^11*f^2*i*z
+ 145920*a^4*b^10*c^8*f^2*i*z + 138240*a^5*b^9*c^8*g*h^2*z + 69120*a^6*b^10
*c^6*e*j^2*z - 11008*a^3*b^12*c^7*f^2*i*z - 6912*a^4*b^11*c^7*g*h^2*z - 153
6*a^5*b^12*c^5*e*j^2*z + 256*a^2*b^14*c^6*f^2*i*z - 32587776*a^5*b^6*c^11*d
^2*i*z + 25362432*a^7*b^3*c^12*f^2*g*z + 21657600*a^4*b^8*c^10*d^2*i*z + 17
694720*a^8*b^2*c^12*e*h^2*z - 50724864*a^7*b^2*c^13*e*f^2*z - 13271040*a^6*
b^5*c^11*f^2*g*z - 8847360*a^7*b^4*c^11*e*h^2*z - 5810688*a^3*b^10*c^9*d^2*
i*z + 3563520*a^5*b^7*c^10*f^2*g*z + 2211840*a^6*b^6*c^10*e*h^2*z + 845568*
a^2*b^12*c^8*d^2*i*z - 506880*a^4*b^9*c^9*f^2*g*z - 276480*a^5*b^8*c^9*e*h^
2*z + 34560*a^3*b^11*c^8*f^2*g*z + 13824*a^4*b^10*c^8*e*h^2*z - 768*a^2*b^1
3*c^7*f^2*g*z + 26542080*a^6*b^4*c^12*e*f^2*z + 23362560*a^3*b^9*c^10*d^2*g
*z - 46725120*a^3*b^8*c^11*d^2*e*z - 7127040*a^5*b^6*c^11*e*f^2*z - 2965248
*a^2*b^11*c^9*d^2*g*z + 1013760*a^4*b^8*c^10*e*f^2*z - 69120*a^3*b^10*c^9*e
*f^2*z + 1536*a^2*b^12*c^8*e*f^2*z + 5930496*a^2*b^10*c^10*d^2*e*z + 100663
2960*a^13*b*c^8*i*k^2*z + 3246391296*a^10*b^5*c^7*e*k^2*z + 318504960*a^13*
b*c^8*j^2*k*z + 61538304*a^10*b^10*c^2*k^3*z - 603979776*a^10*c^12*e^2*k*z
- 693633024*a^7*c^15*d^2*e*z - 231211008*a^8*c^14*d^2*i*z - 67108864*a^12*c
^10*i^2*k*z - 13107200*a^12*c^10*i*j^2*z - 16384*a^5*b^17*i*k^2*z - 3932160
0*a^11*c^11*e*j^2*z - 4718592*a^10*c^12*h^2*i*z - 2304*b^19*c^3*d^2*k*z + 1
3107200*a^9*c^13*f^2*i*z + 2304*b^16*c^6*d^2*i*z - 14155776*a^9*c^13*e*h^2*
z + 39321600*a^8*c^14*e*f^2*z - 4833280*a^9*b^12*c*k^3*z - 6912*b^15*c^7*d^
2*g*z + 6962544640*a^14*b^2*c^6*k^3*z + 13824*b^14*c^8*d^2*e*z + 1876951040
*a^12*b^6*c^4*k^3*z - 4844421120*a^13*b^4*c^5*k^3*z - 437780480*a^11*b^8*c^
3*k^3*z - 4294967296*a^15*c^7*k^3*z + 163840*a^8*b^14*k^3*z + 6144000*a^10*
b*c^8*f*i*j*k - 5898240*a^10*b*c^8*g*h*j*k - 41287680*a^9*b*c^9*d*g*j*k + 4
472832*a^9*b*c^9*f*h*i*k + 18432000*a^9*b*c^9*e*f*j*k + 3391488*a^8*b*c^10*
e*h*i*j + 1228800*a^8*b*c^10*f*g*i*j - 24772608*a^8*b*c^10*d*g*h*k + 134184
96*a^8*b*c^10*e*f*h*k + 11649024*a^8*b*c^10*d*f*i*k + 737280*a^7*b*c^11*f*g
*h*i - 768*a*b^15*c^3*d*f*i*k - 19307520*a^7*b*c^11*d*f*h*j + 16367616*a^7*
b*c^11*d*e*i*j + 3686400*a^7*b*c^11*e*f*g*j + 34947072*a^7*b*c^11*d*e*f*k +
```

2304*a*b^14*c^4*d*f*g*k - 180*a*b^13*c^5*d*f*h*j + 11059200*a^6*b*c^12*d*e
*h*i + 5160960*a^6*b*c^12*d*f*g*i + 2211840*a^6*b*c^12*e*f*g*h - 4608*a*b^1
3*c^5*d*e*f*k - 2304*a*b^11*c^7*d*f*g*i + 4608*a*b^10*c^8*d*e*f*i + 1548288
0*a^5*b*c^13*d*e*f*g - 13824*a*b^9*c^9*d*e*f*g - 225976320*a^8*b^2*c^9*d*e*
j*k + 112988160*a^8*b^3*c^8*d*g*j*k - 11427840*a^10*b^2*c^7*h*i*j*k - 41779
20*a^9*b^4*c^6*h*i*j*k + 1399296*a^8*b^6*c^5*h*i*j*k - 26880*a^6*b^10*c^3*h
*i*j*k + 16128*a^7*b^8*c^4*h*i*j*k - 61562880*a^9*b^2*c^8*d*i*j*k + 2009088
0*a^9*b^3*c^7*g*h*j*k + 119623680*a^7*b^4*c^8*d*e*j*k + 10485760*a^9*b^3*c^
7*f*i*j*k - 40181760*a^9*b^2*c^8*e*h*j*k - 3778560*a^8*b^5*c^6*g*h*j*k - 13
7797632*a^7*b^2*c^10*d*e*h*k - 1248768*a^7*b^7*c^5*f*i*j*k + 229376*a^6*b^9
*c^4*f*i*j*k + 220160*a^8*b^5*c^6*f*i*j*k - 209664*a^7*b^7*c^5*g*h*j*k + 80
640*a^6*b^9*c^4*g*h*j*k - 8960*a^5*b^11*c^3*f*i*j*k - 59811840*a^7*b^5*c^7*
d*g*j*k + 53084160*a^8*b^2*c^9*e*g*i*k - 11120640*a^8*b^4*c^7*f*g*j*k + 104
55552*a^7*b^6*c^6*d*i*j*k - 9216000*a^9*b^2*c^8*f*g*j*k + 7557120*a^8*b^4*c
^7*e*h*j*k + 7397376*a^8*b^3*c^8*f*h*i*k + 5230080*a^7*b^6*c^6*f*g*j*k - 37
675008*a^8*b^2*c^9*d*h*i*k - 3633408*a^6*b^8*c^5*d*i*j*k + 2211840*a^8*b^4*
c^7*d*i*j*k + 68898816*a^7*b^3*c^9*d*g*h*k - 1695744*a^8*b^2*c^9*g*h*i*j -
1400832*a^7*b^4*c^8*g*h*i*j + 967680*a^7*b^5*c^7*f*h*i*k - 783360*a^6*b^7*c
^6*f*h*i*k - 741888*a^6*b^8*c^5*f*g*j*k + 499968*a^5*b^10*c^4*d*i*j*k + 419
328*a^7*b^6*c^6*e*h*j*k - 253440*a^6*b^6*c^7*g*h*i*j - 161280*a^6*b^8*c^5*e
*h*j*k + 42240*a^5*b^9*c^5*f*h*i*k + 26880*a^5*b^10*c^4*f*g*j*k - 26880*a^4
*b^12*c^3*d*i*j*k + 13824*a^4*b^11*c^4*f*h*i*k + 11520*a^5*b^8*c^6*g*h*i*j
- 768*a^3*b^13*c^3*f*h*i*k + 22241280*a^8*b^3*c^8*e*f*j*k + 14222592*a^6*b^
7*c^6*d*g*j*k - 10460160*a^7*b^5*c^7*e*f*j*k + 8847360*a^7*b^4*c^8*e*g*i*k
- 7741440*a^7*b^4*c^8*f*g*h*k - 7077888*a^6*b^6*c^7*e*g*i*k + 6935040*a^6*b
^6*c^7*d*h*i*k - 6709248*a^8*b^2*c^9*f*g*h*k - 3612672*a^7*b^4*c^8*d*h*i*k
+ 2801664*a^7*b^3*c^9*e*h*i*j + 2506752*a^7*b^3*c^9*f*g*i*j + 2419200*a^6*b
^6*c^7*f*g*h*k - 1661184*a^5*b^9*c^5*d*g*j*k + 1483776*a^6*b^7*c^6*e*f*j*k
- 1463040*a^5*b^8*c^6*d*h*i*k + 884736*a^5*b^8*c^6*e*g*i*k + 838656*a^6*b^5
*c^8*f*g*i*j + 506880*a^6*b^5*c^8*e*h*i*j + 80640*a^4*b^11*c^4*d*g*j*k - 53
760*a^5*b^9*c^5*e*f*j*k - 53760*a^5*b^7*c^7*f*g*i*j - 46080*a^4*b^10*c^5*f*
g*h*k - 34560*a^5*b^8*c^6*f*g*h*k + 25344*a^3*b^12*c^4*d*h*i*k - 23040*a^5*
b^7*c^7*e*h*i*j + 13824*a^4*b^10*c^5*d*h*i*k + 2304*a^3*b^12*c^4*f*g*h*k -
2304*a^2*b^14*c^3*d*h*i*k - 29030400*a^6*b^5*c^8*d*g*h*k + 28606464*a^7*b^3
*c^9*d*f*i*k - 28445184*a^6*b^6*c^7*d*e*j*k + 58060800*a^6*b^4*c^9*d*e*h*k
+ 15482880*a^7*b^3*c^9*e*f*h*k - 8183808*a^7*b^2*c^10*d*g*i*j - 6718464*a^6
*b^5*c^8*d*f*i*k - 5087232*a^7*b^2*c^10*e*g*h*j - 5013504*a^7*b^2*c^10*e*f*
i*j - 4838400*a^6*b^5*c^8*e*f*h*k + 4112640*a^5*b^7*c^7*d*g*h*k - 3663360*a
^5*b^7*c^7*d*f*i*k + 3322368*a^5*b^8*c^6*d*e*j*k - 2285568*a^6*b^4*c^9*d*g*
i*j + 1896960*a^4*b^9*c^6*d*f*i*k + 1843200*a^6*b^3*c^10*f*g*h*i - 1677312*
a^6*b^4*c^9*e*f*i*j - 1658880*a^6*b^4*c^9*e*g*h*j + 68345856*a^6*b^3*c^10*d
*e*f*k + 783360*a^5*b^5*c^9*f*g*h*i + 741888*a^5*b^6*c^8*d*g*i*j - 34172928
*a^6*b^4*c^9*d*f*g*k - 340992*a^3*b^11*c^5*d*f*i*k - 161280*a^4*b^10*c^5*d*
e*j*k + 138240*a^4*b^9*c^6*d*g*h*k + 107520*a^5*b^6*c^8*e*f*i*j + 92160*a^4
*b^9*c^6*e*f*h*k - 89856*a^3*b^11*c^5*d*g*h*k - 80640*a^4*b^8*c^7*d*g*i*j +
69120*a^5*b^7*c^7*e*f*h*k + 69120*a^5*b^6*c^8*e*g*h*j + 27648*a^2*b^13*c^4
*d*f*i*k + 18432*a^4*b^7*c^8*f*g*h*i + 6912*a^2*b^13*c^4*d*g*h*k - 4608*a^3
*b^11*c^5*e*f*h*k - 2304*a^3*b^9*c^7*f*g*h*i + 27164160*a^5*b^6*c^8*d*f*g*k
- 22164480*a^6*b^3*c^10*d*f*h*j - 54328320*a^5*b^5*c^9*d*e*f*k - 17473536*
a^7*b^2*c^10*d*f*g*k - 8225280*a^5*b^6*c^8*d*e*h*k - 8087040*a^4*b^8*c^7*d*
f*g*k + 5677056*a^6*b^3*c^10*e*f*g*j - 5529600*a^6*b^2*c^11*d*g*h*i + 45711
36*a^6*b^3*c^10*d*e*i*j - 3686400*a^6*b^2*c^11*e*f*h*i + 2805120*a^5*b^5*c^
9*d*f*h*j - 2211840*a^5*b^4*c^10*d*g*h*i - 1566720*a^5*b^4*c^10*e*f*h*i - 1
483776*a^5*b^5*c^9*d*e*i*j + 1198080*a^3*b^10*c^6*d*f*g*k + 437184*a^4*b^7*
c^8*d*f*h*j - 322560*a^5*b^5*c^9*e*f*g*j + 317952*a^4*b^6*c^9*d*g*h*i - 276
480*a^4*b^8*c^7*d*e*h*k + 179712*a^3*b^10*c^6*d*e*h*k + 161280*a^4*b^7*c^8*
d*e*i*j - 146268*a^3*b^9*c^7*d*f*h*j - 87552*a^2*b^12*c^5*d*f*g*k - 36864*a
^4*b^6*c^9*e*f*h*i - 13824*a^2*b^12*c^5*d*e*h*k + 9360*a^2*b^11*c^6*d*f*h*j
+ 6912*a^3*b^8*c^8*d*g*h*i - 6912*a^2*b^10*c^7*d*g*h*i + 4608*a^3*b^8*c^8*

e*f*h*i - 24551424*a^6*b^2*c^11*d*e*g*j + 16174080*a^4*b^7*c^8*d*e*f*k + 54
19008*a^5*b^4*c^10*d*e*g*j + 5160960*a^5*b^3*c^11*d*f*g*i + 4423680*a^5*b^3
*c^11*e*f*g*h + 4423680*a^5*b^3*c^11*d*e*h*i - 2396160*a^3*b^9*c^7*d*e*f*k
- 635904*a^4*b^5*c^10*d*e*h*i - 483840*a^4*b^6*c^9*d*e*g*j - 354816*a^3*b^7
*c^9*d*f*g*i + 322560*a^4*b^5*c^10*d*f*g*i + 175104*a^2*b^11*c^6*d*e*f*k +
138240*a^4*b^5*c^10*e*f*g*h + 59904*a^2*b^9*c^8*d*f*g*i - 13824*a^3*b^7*c^9
*e*f*g*h - 13824*a^3*b^7*c^9*d*e*h*i + 13824*a^2*b^9*c^8*d*e*h*i - 16588800
*a^5*b^2*c^12*d*e*g*h - 10321920*a^5*b^2*c^12*d*e*f*i + 1658880*a^4*b^4*c^1
1*d*e*g*h + 709632*a^3*b^6*c^10*d*e*f*i - 645120*a^4*b^4*c^11*d*e*f*i + 124
416*a^3*b^6*c^10*d*e*g*h - 119808*a^2*b^8*c^9*d*e*f*i - 41472*a^2*b^8*c^9*d
*e*g*h + 7741440*a^4*b^3*c^12*d*e*f*g - 2903040*a^3*b^5*c^11*d*e*f*g + 3870
72*a^2*b^7*c^10*d*e*f*g - 381026304*a^11*b*c^7*d*j*k^2 - 241827840*a^10*b*c
^8*d*h*k^2 - 65667072*a^12*b*c^6*h*j*k^2 - 169344*a^7*b^11*c*h*j*k^2 - 2516
5824*a^11*b*c^7*g*i*k^2 - 4915200*a^11*b*c^7*g*j^2*k - 53084160*a^8*b*c^10*
e^2*i*k - 75497472*a^10*b*c^8*e*g*k^2 - 86704128*a^7*b*c^11*d^2*g*k + 56524
8*a^9*b*c^9*h*i^2*j - 168448*a^6*b^12*c*f*j*k^2 - 24576*a^5*b^13*c*g*i*k^2
- 1769472*a^9*b*c^9*g*h^2*k - 17694720*a^9*b*c^9*e*i^2*k - 411264*a^5*b^13*
c*d*j*k^2 - 11520*a^4*b^14*c*f*h*k^2 + 4915200*a^8*b*c^10*f^2*g*k + 2580480
*a^9*b*c^9*e*i*j^2 - 2496000*a^9*b*c^9*f*h*j^2 - 1543680*a^8*b*c^10*f*h^2*j
+ 33408*a*b^14*c^4*d^2*i*k - 59512320*a^6*b*c^12*d^2*f*j + 5087232*a^7*b*c
^11*e^2*h*j + 2727936*a^8*b*c^10*d*i^2*j - 26496*a^3*b^15*c*d*h*k^2 + 11059
20*a^7*b*c^11*e*h^2*i - 107136*a*b^13*c^5*d^2*g*k + 10260*a*b^12*c^6*d^2*h*
j - 10616832*a^6*b*c^12*e^2*g*i - 3538944*a^7*b*c^11*e*g*i^2 + 1843200*a^7*
b*c^11*d*h*i^2 - 18432*a^2*b^16*c*d*f*k^2 - 15552000*a^8*b*c^10*d*f*j^2 + 2
4551424*a^6*b*c^12*d*e^2*j - 37062144*a^5*b*c^13*d^2*f*h + 2580480*a^6*b*c^
12*e*f^2*i + 214272*a*b^12*c^6*d^2*e*k + 65664*a*b^10*c^8*d^2*g*i - 25074*a
*b^11*c^7*d^2*f*j + 420*a*b^12*c^6*d*f^2*j + 6*a*b^15*c^3*d*f*j^2 + 2322432
0*a^5*b*c^13*d^2*e*i + 384*a*b^12*c^6*d*f*i^2 - 5985792*a^6*b*c^12*d*f*h^2
+ 206010*a*b^9*c^9*d^2*f*h - 131328*a*b^9*c^9*d^2*e*i - 6300*a*b^10*c^8*d*f
^2*h + 1350*a*b^11*c^7*d*f*h^2 + 16588800*a^5*b*c^13*d*e^2*h + 3456*a*b^10*
c^8*d*f*g^2 + 435456*a*b^8*c^10*d^2*e*g + 13824*a*b^8*c^10*d*e^2*f + 393216
0*a^11*c^8*h*i*j*k + 27525120*a^10*c^9*d*i*j*k + 82575360*a^9*c^10*d*e*j*k
+ 11796480*a^10*c^9*e*h*j*k + 16515072*a^9*c^10*d*h*i*k + 49545216*a^8*c^11
*d*e*h*k - 2457600*a^8*c^11*e*f*i*j - 1474560*a^7*c^12*e*f*h*i - 10321920*a
^6*c^13*d*e*f*i + 737077248*a^10*b^3*c^6*d*j*k^2 - 518814720*a^9*b^5*c^5*d*
j*k^2 + 441354240*a^9*b^3*c^7*d*h*k^2 - 429871104*a^6*b^2*c^11*d^2*e*k - 27
2212992*a^8*b^5*c^6*d*h*k^2 + 305731584*a^5*b^4*c^10*d^2*e*k + 192412800*a^
8*b^7*c^4*d*j*k^2 + 111912960*a^11*b^3*c^5*h*j*k^2 + 214935552*a^6*b^3*c^10
*d^2*g*k + 202427136*a^7*b^6*c^6*d*f*k^2 - 49904640*a^10*b^5*c^4*h*j*k^2 -
178513920*a^8*b^4*c^7*d*f*k^2 - 152865792*a^5*b^5*c^9*d^2*g*k - 114388992*a
^7*b^2*c^10*d^2*i*k + 94961664*a^10*b^2*c^7*e*i*k^2 - 9039872*a^11*b^2*c^6*
i*j^2*k - 56494080*a^10*b^4*c^5*f*j*k^2 - 2052096*a^10*b^4*c^5*i*j^2*k + 13
27360*a^9*b^6*c^4*i*j^2*k - 158080*a^8*b^8*c^3*i*j^2*k - 47480832*a^10*b^3*
c^6*g*i*k^2 + 45576960*a^9*b^6*c^4*f*j*k^2 + 7954560*a^9*b^7*c^3*h*j*k^2 -
104693760*a^9*b^3*c^7*e*g*k^2 + 142080*a^8*b^9*c^2*h*j*k^2 + 16017408*a^10*
b^3*c^6*g*j^2*k - 4930560*a^9*b^5*c^5*g*j^2*k - 3649536*a^9*b^2*c^8*h^2*i*k
- 1843200*a^8*b^4*c^7*h^2*i*k + 85524480*a^8*b^5*c^6*e*g*k^2 + 474240*a^8*
b^7*c^4*g*j^2*k + 288000*a^7*b^6*c^6*h^2*i*k + 63360*a^6*b^8*c^5*h^2*i*k -
8064*a^5*b^10*c^4*h^2*i*k - 1152*a^4*b^12*c^3*h^2*i*k - 15437824*a^11*b^2*c
^6*f*j*k^2 - 32034816*a^10*b^2*c^7*e*j^2*k - 14369280*a^8*b^8*c^3*f*j*k^2 -
13271040*a^8*b^3*c^8*g^2*i*k + 80267904*a^7*b^7*c^5*d*h*k^2 + 79626240*a^7
*b^2*c^10*e^2*g*k + 11059200*a^9*b^5*c^5*g*i*k^2 + 8847360*a^9*b^2*c^8*g*i^
2*k - 42113280*a^7*b^9*c^3*d*j*k^2 + 6389760*a^8*b^7*c^4*g*i*k^2 + 5898240*
a^8*b^4*c^7*g*i^2*k - 37601280*a^9*b^4*c^6*f*h*k^2 - 2949120*a^7*b^9*c^3*g*
i*k^2 + 2242560*a^7*b^10*c^2*f*j*k^2 - 2211840*a^7*b^5*c^7*g^2*i*k + 176947
2*a^6*b^7*c^6*g^2*i*k + 749568*a^8*b^3*c^8*h*i^2*j - 442368*a^7*b^6*c^6*g*i
^2*k + 442368*a^6*b^11*c^2*g*i*k^2 - 442368*a^6*b^8*c^5*g*i^2*k + 317952*a^
7*b^5*c^7*h*i^2*j - 221184*a^5*b^9*c^5*g^2*i*k + 73728*a^5*b^10*c^4*g*i^2*k
+ 38400*a^6*b^7*c^6*h*i^2*j - 1920*a^5*b^9*c^5*h*i^2*j + 9861120*a^9*b^4*c

^6*e*j^2*k - 110280960*a^4*b^6*c^9*d^2*e*k - 93330432*a^6*b^8*c^5*d*f*k^2 +
 24645888*a^8*b^6*c^5*f*h*k^2 + 6359040*a^8*b^3*c^8*g*h^2*k - 22118400*a^9*
b^4*c^6*e*i*k^2 - 3862528*a^8*b^2*c^9*f^2*i*k - 2248704*a^7*b^4*c^8*f^2*i*k
 - 1290240*a^9*b^2*c^8*g*i*j^2 - 948480*a^8*b^6*c^5*e*j^2*k - 860160*a^8*b^
4*c^7*g*i*j^2 - 414720*a^7*b^5*c^7*g*h^2*k + 303360*a^6*b^6*c^7*f^2*i*k + 2
66880*a^5*b^8*c^6*f^2*i*k - 224640*a^6*b^7*c^6*g*h^2*k - 80640*a^7*b^6*c^6*
g*i*j^2 - 72960*a^4*b^10*c^5*f^2*i*k + 17280*a^5*b^9*c^5*g*h^2*k + 12672*a^
6*b^8*c^5*g*i*j^2 + 5504*a^3*b^12*c^4*f^2*i*k + 3456*a^4*b^11*c^4*g*h^2*k -
 384*a^5*b^10*c^4*g*i*j^2 - 128*a^2*b^14*c^3*f^2*i*k + 30265344*a^6*b^4*c^9
*d^2*i*k - 12779520*a^8*b^6*c^5*e*i*k^2 - 11796480*a^8*b^3*c^8*e*i^2*k - 88
47360*a^7*b^3*c^9*e^2*i*k - 7925760*a^10*b^2*c^7*f*h*k^2 + 7077888*a^6*b^5*
c^8*e^2*i*k - 39813120*a^7*b^3*c^9*e*g^2*k - 73175040*a^9*b^2*c^8*d*f*k^2 +
 5898240*a^7*b^8*c^4*e*i*k^2 + 5542272*a^6*b^11*c^2*d*j*k^2 - 5420160*a^7*b
^8*c^4*f*h*k^2 + 55140480*a^4*b^7*c^8*d^2*g*k + 1271808*a^7*b^3*c^9*g^2*h*j
 - 1040384*a^8*b^2*c^9*f*i^2*j + 884736*a^7*b^5*c^7*e*i^2*k - 884736*a^6*b^
10*c^3*e*i*k^2 + 884736*a^6*b^7*c^6*e*i^2*k - 884736*a^5*b^7*c^7*e^2*i*k -
697344*a^7*b^4*c^8*f*i^2*j + 414720*a^6*b^5*c^8*g^2*h*j + 226560*a^6*b^10*c
^3*f*h*k^2 - 147456*a^5*b^9*c^5*e*i^2*k - 121856*a^6*b^6*c^7*f*i^2*j + 8256
0*a^5*b^12*c^2*f*h*k^2 + 49152*a^5*b^12*c^2*e*i*k^2 - 17280*a^5*b^7*c^7*g^2
*h*j + 8960*a^5*b^8*c^6*f*i^2*j + 14194944*a^5*b^6*c^8*d^2*i*k - 12718080*a
^8*b^2*c^9*e*h^2*k - 10615680*a^4*b^8*c^7*d^2*i*k - 26542080*a^6*b^4*c^9*e^
2*g*k - 23592960*a^7*b^7*c^5*e*g*k^2 - 5142528*a^8*b^3*c^8*f*h*j^2 + 506880
0*a^7*b^2*c^10*f^2*h*j - 3755520*a^7*b^3*c^9*f*h^2*j + 3336192*a^7*b^3*c^9*
f^2*g*k + 3000960*a^6*b^4*c^9*f^2*h*j + 2893824*a^3*b^10*c^6*d^2*i*k + 1720
320*a^8*b^3*c^8*e*i*j^2 + 1704960*a^6*b^5*c^8*f^2*g*k - 1307520*a^5*b^7*c^7
*f^2*g*k - 1085760*a^6*b^5*c^8*f*h^2*j - 959040*a^7*b^5*c^7*f*h*j^2 + 82944
0*a^7*b^4*c^8*e*h^2*k - 552960*a^7*b^2*c^10*g*h^2*i - 552960*a^6*b^4*c^9*g*
h^2*i + 449280*a^6*b^6*c^7*e*h^2*k - 422784*a^2*b^12*c^5*d^2*i*k + 253440*a
^4*b^9*c^6*f^2*g*k + 161280*a^7*b^5*c^7*e*i*j^2 - 145152*a^5*b^6*c^8*g*h^2*
i + 103200*a^6*b^7*c^6*f*h*j^2 + 41280*a^5*b^6*c^8*f^2*h*j - 37188*a^4*b^8*
c^7*f^2*h*j - 34560*a^5*b^8*c^6*e*h^2*k - 25344*a^6*b^7*c^6*e*i*j^2 - 17280
*a^3*b^11*c^5*f^2*g*k + 13536*a^5*b^7*c^7*f*h^2*j - 6912*a^4*b^10*c^5*e*h^2
*k + 5490*a^4*b^9*c^6*f*h^2*j - 3456*a^4*b^8*c^7*g*h^2*i + 1980*a^3*b^10*c^
6*f^2*h*j + 810*a^5*b^9*c^5*f*h*j^2 + 768*a^5*b^9*c^5*e*i*j^2 + 384*a^2*b^1
3*c^4*f^2*g*k - 270*a^4*b^11*c^4*f*h*j^2 - 180*a^3*b^11*c^5*f*h^2*j - 30*a^
2*b^12*c^5*f^2*h*j + 6*a^3*b^13*c^3*f*h*j^2 + 30067200*a^6*b^2*c^11*d^2*h*j
 + 13271040*a^6*b^5*c^8*e*g^2*k - 10857600*a^6*b^9*c^4*d*h*k^2 + 2949120*a^
6*b^9*c^4*e*g*k^2 + 2654208*a^5*b^6*c^8*e^2*g*k + 2125824*a^7*b^3*c^9*d*i^2
*j + 1658880*a^6*b^3*c^10*e^2*h*j - 1419264*a^6*b^4*c^9*f*g^2*j - 1327104*a
^5*b^7*c^7*e*g^2*k - 921600*a^7*b^2*c^10*f*g^2*j - 737280*a^7*b^2*c^10*f*h*
i^2 - 568320*a^6*b^4*c^9*f*h*i^2 + 207360*a^4*b^13*c^2*d*h*k^2 - 147456*a^5
*b^11*c^3*e*g*k^2 - 136704*a^5*b^6*c^8*f*h*i^2 + 133632*a^6*b^5*c^8*d*i^2*j
 - 96768*a^5*b^7*c^7*d*i^2*j + 80640*a^5*b^6*c^8*f*g^2*j - 69120*a^5*b^5*c^
9*e^2*h*j + 13440*a^4*b^9*c^6*d*i^2*j - 5760*a^5*b^11*c^3*d*h*k^2 - 2304*a^
4*b^8*c^7*f*h*i^2 + 384*a^3*b^10*c^6*f*h*i^2 + 11930112*a^8*b^2*c^9*d*h*j^2
 - 11646720*a^3*b^9*c^7*d^2*g*k + 8432640*a^7*b^2*c^10*d*h^2*j + 24140160*a
^5*b^10*c^4*d*f*k^2 - 6672384*a^7*b^2*c^10*e*f^2*k + 4450176*a^7*b^4*c^8*d*
h*j^2 + 4337280*a^6*b^4*c^9*d*h^2*j - 3870720*a^8*b^2*c^9*e*g*j^2 - 3409920
*a^6*b^4*c^9*e*f^2*k - 2885760*a^5*b^4*c^10*d^2*h*j - 2844288*a^4*b^6*c^9*d
^2*h*j + 2615040*a^5*b^6*c^8*e*f^2*k - 1687680*a^6*b^6*c^7*d*h*j^2 + 148262
4*a^2*b^11*c^6*d^2*g*k - 1290240*a^6*b^2*c^11*f^2*g*i + 1105920*a^6*b^3*c^1
0*e*h^2*i + 1019412*a^3*b^8*c^8*d^2*h*j - 1007424*a^5*b^6*c^8*d*h^2*j - 860
160*a^5*b^4*c^10*f^2*g*i - 645120*a^7*b^4*c^8*e*g*j^2 - 506880*a^4*b^8*c^7*
e*f^2*k + 290304*a^5*b^5*c^9*e*h^2*i + 197460*a^5*b^8*c^6*d*h*j^2 - 143802*
a^2*b^10*c^7*d^2*h*j + 80640*a^6*b^6*c^7*e*g*j^2 - 80640*a^4*b^6*c^9*f^2*g*
i + 51948*a^4*b^8*c^7*d*h^2*j + 34560*a^3*b^10*c^6*e*f^2*k + 12672*a^3*b^8*
c^8*f^2*g*i + 10800*a^3*b^10*c^6*d*h^2*j + 6912*a^4*b^7*c^8*e*h^2*i - 2304*
a^5*b^8*c^6*e*g*j^2 - 768*a^2*b^12*c^5*e*f^2*k - 684*a^3*b^12*c^4*d*h*j^2 -
 540*a^2*b^12*c^5*d*h^2*j - 384*a^2*b^10*c^7*f^2*g*i - 90*a^4*b^10*c^5*d*h*

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j^2 + 18*a^2*b^14*c^3*d*h*j^2 + 23385600*a^6*b^2*c^11*d*f^2*j + 23293440*a^
3*b^8*c^8*d^2*e*k + 6137856*a^6*b^3*c^10*d*g^2*j - 5677056*a^6*b^2*c^11*e^2
*f*j + 5308416*a^6*b^2*c^11*e*g^2*i - 5308416*a^5*b^3*c^11*e^2*g*i - 378624
0*a^4*b^12*c^3*d*f*k^2 - 3538944*a^6*b^3*c^10*e*g*i^2 + 2654208*a^5*b^4*c^1
0*e*g^2*i + 1658880*a^6*b^3*c^10*d*h*i^2 - 1354752*a^5*b^5*c^9*d*g^2*j - 11
05920*a^5*b^4*c^10*f*g^2*h - 884736*a^5*b^5*c^9*e*g*i^2 - 552960*a^6*b^2*c^
11*f*g^2*h + 357120*a^3*b^14*c^2*d*f*k^2 + 322560*a^5*b^4*c^10*e^2*f*j + 26
2656*a^5*b^5*c^9*d*h*i^2 + 120960*a^4*b^7*c^8*d*g^2*j - 55296*a^4*b^7*c^8*d
*h*i^2 - 34560*a^4*b^6*c^9*f*g^2*h + 3456*a^3*b^8*c^8*f*g^2*h + 1152*a^3*b^
9*c^7*d*h*i^2 + 1152*a^2*b^11*c^6*d*h*i^2 - 13149696*a^7*b^3*c^9*d*f*j^2 -
11612160*a^5*b^2*c^12*d^2*g*i + 10906560*a^4*b^5*c^10*d^2*f*j - 7418880*a^5
*b^3*c^11*d^2*f*j + 3148992*a^6*b^5*c^8*d*f*j^2 - 2985696*a^3*b^7*c^9*d^2*f
*j - 2965248*a^2*b^10*c^7*d^2*e*k + 1720320*a^5*b^3*c^11*e*f^2*i - 1658880*
a^6*b^2*c^11*e*g*h^2 + 1596672*a^3*b^6*c^10*d^2*g*i - 1505280*a^4*b^6*c^9*d
*f^2*j - 829440*a^5*b^4*c^10*e*g*h^2 - 508032*a^2*b^8*c^9*d^2*g*i + 378954*
a^2*b^9*c^8*d^2*f*j + 362880*a^5*b^4*c^10*d*f^2*j + 296964*a^3*b^8*c^8*d*f^
2*j + 161280*a^4*b^5*c^10*e*f^2*i - 77070*a^4*b^9*c^6*d*f*j^2 - 30240*a^5*b
^7*c^7*d*f*j^2 - 25344*a^3*b^7*c^9*e*f^2*i - 20736*a^4*b^6*c^9*e*g*h^2 - 19
278*a^2*b^10*c^7*d*f^2*j + 8820*a^3*b^11*c^5*d*f*j^2 + 768*a^2*b^9*c^8*e*f^
2*i - 378*a^2*b^13*c^4*d*f*j^2 - 5419008*a^5*b^3*c^11*d*e^2*j - 4423680*a^5
*b^2*c^12*e^2*f*h + 4147200*a^5*b^3*c^11*d*g^2*h - 2580480*a^6*b^2*c^11*d*f
*i^2 - 967680*a^5*b^4*c^10*d*f*i^2 + 483840*a^4*b^5*c^10*d*e^2*j - 414720*a
^4*b^5*c^10*d*g^2*h - 138240*a^4*b^4*c^11*e^2*f*h + 64512*a^4*b^6*c^9*d*f*i
^2 + 39168*a^3*b^8*c^8*d*f*i^2 - 31104*a^3*b^7*c^9*d*g^2*h + 13824*a^3*b^6*
c^10*e^2*f*h + 10368*a^2*b^9*c^8*d*g^2*h - 9216*a^2*b^10*c^7*d*f*i^2 + 1563
0336*a^5*b^2*c^12*d*f^2*h - 14459904*a^4*b^3*c^12*d^2*f*h + 9630144*a^3*b^5
*c^11*d^2*f*h - 8764416*a^5*b^3*c^11*d*f*h^2 - 3870720*a^5*b^2*c^12*e*f^2*g
 - 3193344*a^3*b^5*c^11*d^2*e*i + 2867328*a^4*b^4*c^11*d*f^2*h - 2095200*a^
2*b^7*c^10*d^2*f*h - 1414080*a^3*b^6*c^10*d*f^2*h - 34836480*a^4*b^2*c^13*d
^2*e*g + 1016064*a^2*b^7*c^10*d^2*e*i - 645120*a^4*b^4*c^11*e*f^2*g + 30672
0*a^3*b^7*c^9*d*f*h^2 + 197820*a^2*b^8*c^9*d*f^2*h + 146880*a^4*b^5*c^10*d*
f*h^2 + 80640*a^3*b^6*c^10*e*f^2*g - 55350*a^2*b^9*c^8*d*f*h^2 - 2304*a^2*b
^8*c^9*e*f^2*g - 3870720*a^5*b^2*c^12*d*f*g^2 - 1935360*a^4*b^4*c^11*d*f*g^
2 - 1658880*a^4*b^3*c^12*d*e^2*h + 725760*a^3*b^6*c^10*d*f*g^2 + 17418240*a
^3*b^4*c^12*d^2*e*g - 124416*a^3*b^5*c^11*d*e^2*h - 96768*a^2*b^8*c^9*d*f*g
^2 + 41472*a^2*b^7*c^10*d*e^2*h - 3919104*a^2*b^6*c^11*d^2*e*g - 7741440*a^
4*b^2*c^13*d*e^2*f + 2903040*a^3*b^4*c^12*d*e^2*f - 387072*a^2*b^6*c^11*d*e
^2*f - 681246720*a^9*b*c^9*d^2*k^2 + 265912320*a^11*b^3*c^5*e*k^3 + 1887436
80*a^12*b^2*c^5*g*k^3 - 132956160*a^11*b^4*c^4*g*k^3 - 52101120*a^13*b*c^5*
j^2*k^2 + 25722880*a^12*b^3*c^4*i*k^3 + 19644416*a^11*b^5*c^3*i*k^3 - 15836
80*a^9*b^9*c*j^2*k^2 - 9142272*a^10*b^7*c^2*i*k^3 - 74022912*a^10*b^5*c^4*e
*k^3 - 20643840*a^11*b*c^7*h^2*k^2 + 37011456*a^10*b^6*c^3*g*k^3 - 2293760*
a^9*b^3*c^7*i^3*k - 557056*a^8*b^5*c^6*i^3*k + 147456*a^7*b^7*c^5*i^3*k - 6
5536*a^6*b^12*c*i^2*k^2 + 32768*a^6*b^9*c^4*i^3*k - 8192*a^5*b^11*c^3*i^3*k
 + 430080*a^10*b*c^8*i^2*j^2 - 2880*a^5*b^13*c*h^2*k^2 + 6635520*a^7*b^4*c^
8*g^3*k - 4792320*a^9*b^8*c^2*g*k^3 - 2211840*a^6*b^6*c^7*g^3*k + 1359360*a
^10*b^2*c^7*h*j^3 + 1173120*a^9*b^4*c^6*h*j^3 + 743040*a^7*b^4*c^8*h^3*j +
622080*a^8*b^2*c^9*h^3*j + 221184*a^5*b^8*c^6*g^3*k + 107136*a^6*b^6*c^7*h^
3*j - 32640*a^8*b^6*c^5*h*j^3 - 5796*a^7*b^8*c^4*h*j^3 + 540*a^5*b^8*c^6*h^
3*j - 270*a^4*b^10*c^5*h^3*j + 210*a^6*b^10*c^3*h*j^3 - 2949120*a^10*b*c^8*
f^2*k^2 + 17694720*a^6*b^3*c^10*e^3*k + 184320*a^8*b*c^10*h^2*i^2 - 3520*a^
3*b^15*c*f^2*k^2 + 9584640*a^9*b^7*c^3*e*k^3 - 2293760*a^9*b^3*c^7*f*j^3 -
2293760*a^6*b^3*c^10*f^3*j - 1769472*a^5*b^5*c^9*e^3*k - 884736*a^6*b^3*c^1
0*g^3*i - 589824*a^7*b^3*c^9*g*i^3 - 491520*a^8*b^9*c^2*e*k^3 - 442368*a^5*
b^5*c^9*g^3*i - 294912*a^6*b^5*c^8*g*i^3 - 199360*a^8*b^5*c^6*f*j^3 - 19936
0*a^5*b^5*c^9*f^3*j + 61920*a^7*b^7*c^5*f*j^3 + 61920*a^4*b^7*c^8*f^3*j - 4
9152*a^5*b^7*c^7*g*i^3 - 3682*a^6*b^9*c^4*f*j^3 - 3682*a^3*b^9*c^7*f^3*j +
70*a^5*b^11*c^3*f*j^3 + 70*a^2*b^11*c^6*f^3*j + 3870720*a^8*b*c^10*e^2*j^2
+ 430080*a^7*b*c^11*f^2*i^2 - 14152320*a^4*b^4*c^11*d^3*j + 10644480*a^5*b^
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2*c^12*d^3*j + 5483520*a^9*b^2*c^8*d*j^3 + 4269888*a^3*b^6*c^10*d^3*j + 353
8944*a^5*b^2*c^12*e^3*i - 1648128*a^5*b^3*c^11*f^3*h + 1330560*a^8*b^4*c^7*
d*j^3 + 1179648*a^7*b^2*c^10*e*i^3 - 898560*a^6*b^3*c^10*f*h^3 - 826560*a^7
*b^6*c^6*d*j^3 - 607068*a^2*b^8*c^9*d^3*j + 589824*a^6*b^4*c^9*e*i^3 - 3542
40*a^5*b^5*c^9*f*h^3 - 354240*a^4*b^5*c^10*f^3*h + 145188*a^6*b^8*c^5*d*j^3
 + 98304*a^5*b^6*c^8*e*i^3 + 43680*a^3*b^7*c^9*f^3*h - 21600*a^4*b^7*c^8*f*
h^3 - 9576*a^5*b^10*c^4*d*j^3 + 1350*a^3*b^9*c^7*f*h^3 - 1050*a^2*b^9*c^8*f
^3*h - 504*a*b^14*c^4*d^2*j^2 + 210*a^4*b^12*c^3*d*j^3 + 3870720*a^6*b*c^12
*d^2*i^2 + 1658880*a^6*b*c^12*e^2*h^2 - 9792*a*b^11*c^7*d^2*i^2 + 16547328*
a^4*b^2*c^13*d^3*h - 12306816*a^3*b^4*c^12*d^3*h + 37310976*a^3*b^3*c^13*d^
3*f + 3037824*a^2*b^6*c^11*d^3*h - 2654208*a^5*b^3*c^11*e*g^3 + 1949184*a^6
*b^2*c^11*d*h^3 + 1296000*a^5*b^4*c^10*d*h^3 - 155520*a^4*b^6*c^9*d*h^3 - 4
0500*a*b^10*c^8*d^2*h^2 - 8100*a^3*b^8*c^8*d*h^3 + 4050*a^2*b^10*c^7*d*h^3
+ 3870720*a^5*b*c^13*e^2*f^2 + 34836480*a^4*b*c^14*d^2*e^2 - 108864*a*b^9*c
^9*d^2*g^2 - 8068032*a^2*b^5*c^12*d^3*f - 5623296*a^4*b^3*c^12*d*f^3 + 1737
792*a^3*b^5*c^11*d*f^3 - 260190*a*b^8*c^10*d^2*f^2 - 211680*a^2*b^7*c^10*d*
f^3 - 435456*a*b^7*c^11*d^2*e^2 - 377487360*a^12*b*c^6*e*k^3 + 1434977280*a
^8*b^3*c^8*d^2*k^2 + 173408256*a^7*c^12*d^2*e*k + 3276800*a^12*c^7*i*j^2*k
- 125829120*a^13*b*c^5*i*k^3 + 26214400*a^12*c^7*f*j*k^2 + 1179648*a^10*c^9
*h^2*i*k + 13440*a^6*b^13*h*j*k^2 + 50331648*a^11*c^8*e*i*k^2 + 110100480*a
^10*c^9*d*f*k^2 + 57802752*a^8*c^11*d^2*i*k + 9830400*a^11*c^8*e*j^2*k - 32
76800*a^9*c^10*f^2*i*k + 4480*a^5*b^14*f*j*k^2 + 15728640*a^11*c^8*f*h*k^2
- 409600*a^9*c^10*f*i^2*j - 1152*b^16*c^3*d^2*i*k - 1220516352*a^7*b^5*c^7*
d^2*k^2 + 3538944*a^9*c^10*e*h^2*k + 384000*a^8*c^11*f^2*h*j + 13440*a^4*b^
15*d*j*k^2 + 384*a^3*b^16*f*h*k^2 + 20321280*a^7*c^12*d^2*h*j - 245760*a^8*
c^11*f*h*i^2 + 3456*b^15*c^4*d^2*g*k - 270*b^14*c^5*d^2*h*j - 9830400*a^8*c
^11*e*f^2*k + 4838400*a^9*c^10*d*h*j^2 + 2903040*a^8*c^11*d*h^2*j - 1966080
*a^10*b*c^8*i^3*k + 1433600*a^9*b^9*c*i*k^3 + 1152*a^2*b^17*d*h*k^2 - 36864
00*a^7*c^12*e^2*f*j - 53084160*a^7*b*c^11*e^3*k - 6912*b^14*c^5*d^2*e*k - 3
456*b^12*c^7*d^2*g*i + 630*b^13*c^6*d^2*f*j + 2688000*a^7*c^12*d*f^2*j + 24
5760*a^8*b^10*c*g*k^3 - 2211840*a^6*c^13*e^2*f*h - 1720320*a^7*c^12*d*f*i^2
 - 9450*b^11*c^8*d^2*f*h + 6912*b^11*c^8*d^2*e*i + 1612800*a^6*c^13*d*f^2*h
 - 1344000*a^10*b*c^8*f*j^3 - 1344000*a^7*b*c^11*f^3*j - 393216*a^8*b*c^10*
g*i^3 - 23616*a*b^17*c*d^2*k^2 - 20736*b^10*c^9*d^2*e*g - 75188736*a^4*b*c^
14*d^3*f - 883200*a^6*b*c^12*f^3*h - 317952*a^7*b*c^11*f*h^3 + 43416*a*b^10
*c^8*d^3*j - 15482880*a^5*c^14*d*e^2*f - 10616832*a^5*b*c^13*e^3*g - 345060
*a*b^8*c^10*d^3*h - 4262400*a^5*b*c^13*d*f^3 + 852768*a*b^7*c^11*d^3*f + 73
50*a*b^9*c^9*d*f^3 + 584578368*a^6*b^7*c^6*d^2*k^2 + 93905920*a^12*b^3*c^4*
j^2*k^2 - 177997248*a^5*b^9*c^5*d^2*k^2 - 50967040*a^11*b^5*c^3*j^2*k^2 + 1
04693760*a^9*b^2*c^8*e^2*k^2 + 12849984*a^10*b^7*c^2*j^2*k^2 + 20021248*a^1
1*b^2*c^6*i^2*k^2 - 85524480*a^8*b^4*c^7*e^2*k^2 + 33223680*a^10*b^3*c^6*h^
2*k^2 + 4227072*a^10*b^4*c^5*i^2*k^2 - 3973120*a^9*b^6*c^4*i^2*k^2 + 344064
*a^7*b^10*c^2*i^2*k^2 - 81920*a^8*b^8*c^3*i^2*k^2 - 11386368*a^9*b^5*c^5*h^
2*k^2 + 26173440*a^9*b^4*c^6*g^2*k^2 - 21381120*a^8*b^6*c^5*g^2*k^2 + 18874
368*a^10*b^2*c^7*g^2*k^2 + 501760*a^9*b^3*c^7*i^2*j^2 + 452160*a^8*b^7*c^4*
h^2*k^2 + 385920*a^7*b^9*c^3*h^2*k^2 + 170240*a^8*b^5*c^6*i^2*j^2 - 48960*a
^6*b^11*c^2*h^2*k^2 + 9216*a^7*b^7*c^5*i^2*j^2 - 1984*a^6*b^9*c^4*i^2*j^2 +
 64*a^5*b^11*c^3*i^2*j^2 + 5898240*a^7*b^8*c^4*g^2*k^2 + 1419840*a^8*b^4*c^
7*h^2*j^2 + 1387008*a^9*b^2*c^8*h^2*j^2 - 737280*a^6*b^10*c^3*g^2*k^2 + 849
60*a^7*b^6*c^6*h^2*j^2 + 36864*a^5*b^12*c^2*g^2*k^2 - 8010*a^6*b^8*c^5*h^2*
j^2 - 180*a^5*b^10*c^4*h^2*j^2 + 9*a^4*b^12*c^3*h^2*j^2 + 14115840*a^9*b^3*
c^7*f^2*k^2 - 9231552*a^7*b^7*c^5*f^2*k^2 + 23592960*a^7*b^6*c^6*e^2*k^2 +
4984320*a^8*b^5*c^6*f^2*k^2 + 3759040*a^6*b^9*c^4*f^2*k^2 + 36190080*a^4*b^
11*c^4*d^2*k^2 + 967680*a^8*b^3*c^8*g^2*j^2 - 727360*a^5*b^11*c^3*f^2*k^2 +
 276480*a^7*b^3*c^9*h^2*i^2 + 161280*a^7*b^5*c^7*g^2*j^2 + 140544*a^6*b^5*c
^8*h^2*i^2 + 72960*a^4*b^13*c^2*f^2*k^2 + 25344*a^5*b^7*c^7*h^2*i^2 - 20160
*a^6*b^7*c^6*g^2*j^2 + 576*a^5*b^9*c^5*g^2*j^2 + 576*a^4*b^9*c^6*h^2*i^2 +
3808000*a^8*b^2*c^9*f^2*j^2 - 2949120*a^6*b^8*c^5*e^2*k^2 + 1643712*a^7*b^4
*c^8*f^2*j^2 + 884736*a^7*b^2*c^10*g^2*i^2 + 884736*a^6*b^4*c^9*g^2*i^2 + 2

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21184*a^5*b^6*c^8*g^2*i^2 + 147456*a^5*b^10*c^4*e^2*k^2 - 125440*a^6*b^6*c^
7*f^2*j^2 - 13790*a^5*b^8*c^6*f^2*j^2 + 1785*a^4*b^10*c^5*f^2*j^2 - 70*a^3*
b^12*c^4*f^2*j^2 - 4953600*a^3*b^13*c^3*d^2*k^2 + 18427392*a^7*b^2*c^10*d^2
*j^2 + 645120*a^7*b^3*c^9*e^2*j^2 + 501760*a^6*b^3*c^10*f^2*i^2 + 442944*a^
2*b^15*c^2*d^2*k^2 + 414720*a^6*b^3*c^10*g^2*h^2 + 207360*a^5*b^5*c^9*g^2*h
^2 + 170240*a^5*b^5*c^9*f^2*i^2 - 80640*a^6*b^5*c^8*e^2*j^2 + 9216*a^4*b^7*
c^8*f^2*i^2 + 5184*a^4*b^7*c^8*g^2*h^2 + 2304*a^5*b^7*c^7*e^2*j^2 - 1984*a^
3*b^9*c^7*f^2*i^2 + 64*a^2*b^11*c^6*f^2*i^2 - 4148928*a^6*b^4*c^9*d^2*j^2 +
 3538944*a^6*b^2*c^11*e^2*i^2 + 1684224*a^6*b^2*c^11*f^2*h^2 + 1264320*a^5*
b^4*c^10*f^2*h^2 - 1183392*a^5*b^6*c^8*d^2*j^2 + 884736*a^5*b^4*c^10*e^2*i^
2 + 645750*a^4*b^8*c^7*d^2*j^2 + 126720*a^4*b^6*c^9*f^2*h^2 - 115920*a^3*b^
10*c^6*d^2*j^2 - 13950*a^3*b^8*c^8*f^2*h^2 + 10836*a^2*b^12*c^5*d^2*j^2 + 2
25*a^2*b^10*c^7*f^2*h^2 + 1935360*a^5*b^3*c^11*d^2*i^2 + 967680*a^5*b^3*c^1
1*f^2*g^2 + 829440*a^5*b^3*c^11*e^2*h^2 - 532224*a^4*b^5*c^10*d^2*i^2 + 161
280*a^4*b^5*c^10*f^2*g^2 - 96768*a^3*b^7*c^9*d^2*i^2 + 62784*a^2*b^9*c^8*d^
2*i^2 + 20736*a^4*b^5*c^10*e^2*h^2 - 20160*a^3*b^7*c^9*f^2*g^2 + 576*a^2*b^
9*c^8*f^2*g^2 + 11487744*a^5*b^2*c^12*d^2*h^2 + 7962624*a^5*b^2*c^12*e^2*g^
2 + 35525376*a^4*b^2*c^13*d^2*f^2 - 1412640*a^3*b^6*c^10*d^2*h^2 + 461376*a
^4*b^4*c^11*d^2*h^2 + 375030*a^2*b^8*c^9*d^2*h^2 + 8709120*a^4*b^3*c^12*d^2
*g^2 - 4354560*a^3*b^5*c^11*d^2*g^2 + 979776*a^2*b^7*c^10*d^2*g^2 + 645120*
a^4*b^3*c^12*e^2*f^2 - 80640*a^3*b^5*c^11*e^2*f^2 + 2304*a^2*b^7*c^10*e^2*f
^2 - 15269184*a^3*b^4*c^12*d^2*f^2 + 2870784*a^2*b^6*c^11*d^2*f^2 - 1741824
0*a^3*b^3*c^13*d^2*e^2 + 3919104*a^2*b^5*c^12*d^2*e^2 + 384*a*b^18*d*f*k^2
- 199229440*a^14*b^2*c^3*k^4 + 8388608*a^12*c^7*i^2*k^2 + 75497472*a^10*c^9
*e^2*k^2 + 78400*a^8*b^11*j^2*k^2 + 4096*a^5*b^14*i^2*k^2 + 345600*a^10*c^9
*h^2*j^2 + 576*a^4*b^15*h^2*k^2 + 57937920*a^13*b^4*c^2*k^4 + 320000*a^9*c^
10*f^2*j^2 + 64*a^2*b^17*f^2*k^2 + 16934400*a^8*c^11*d^2*j^2 + 9*b^16*c^3*d
^2*j^2 + 3538944*a^7*c^12*e^2*i^2 + 115200*a^7*c^12*f^2*h^2 + 576*b^13*c^6*
d^2*i^2 + 2025*b^12*c^7*d^2*h^2 + 6096384*a^6*c^13*d^2*h^2 + 492800*a^11*b^
2*c^6*j^4 + 351456*a^10*b^4*c^5*j^4 - 43120*a^9*b^6*c^4*j^4 + 5184*b^11*c^8
*d^2*g^2 + 1225*a^8*b^8*c^3*j^4 + 131072*a^8*b^2*c^9*i^4 + 98304*a^7*b^4*c^
8*i^4 + 32768*a^6*b^6*c^7*i^4 + 11025*b^10*c^9*d^2*f^2 + 4096*a^5*b^8*c^6*i
^4 + 5644800*a^5*c^14*d^2*f^2 + 142560*a^6*b^4*c^9*h^4 + 103680*a^7*b^2*c^1
0*h^4 + 32400*a^5*b^6*c^8*h^4 + 20736*b^9*c^10*d^2*e^2 + 2025*a^4*b^8*c^7*h
^4 + 331776*a^5*b^4*c^10*g^4 + 492800*a^5*b^2*c^12*f^4 + 351456*a^4*b^4*c^1
1*f^4 - 43120*a^3*b^6*c^10*f^4 + 1225*a^2*b^8*c^9*f^4 - 27433728*a^3*b^2*c^
14*d^4 + 6446304*a^2*b^4*c^13*d^4 + a^2*b^14*c^3*f^2*j^2 - 81920*a^8*b^11*i
*k^3 + 384000*a^11*c^8*h*j^3 + 138240*a^9*c^10*h^3*j + 47416320*a^6*c^13*d^
3*j - 1134*b^12*c^7*d^3*j + 7077888*a^6*c^13*e^3*i + 2688000*a^10*c^9*d*j^3
 + 786432*a^8*c^11*e*i^3 + 28449792*a^5*c^14*d^3*h - 7782400*a^12*b^6*c*k^4
 + 17010*b^10*c^9*d^3*h + 580608*a^7*c^12*d*h^3 - 39690*b^9*c^10*d^3*f - 73
4832*a*b^6*c^12*d^4 + 268435456*a^15*c^4*k^4 + 576*b^19*d^2*k^2 + 409600*a^
11*b^8*k^4 + 160000*a^12*c^7*j^4 + 65536*a^9*c^10*i^4 + 20736*a^8*c^11*h^4
+ 49787136*a^4*c^15*d^4 + 160000*a^6*c^13*f^4 + 5308416*a^5*c^14*e^4 + 3572
1*b^8*c^11*d^4, z, n)*x*(8388608*a^11*b*c^13 - 512*a^4*b^15*c^6 + 14336*a^5
*b^13*c^7 - 172032*a^6*b^11*c^8 + 1146880*a^7*b^9*c^9 - 4587520*a^8*b^7*c^1
0 + 11010048*a^9*b^5*c^11 - 14680064*a^10*b^3*c^12))/(64*(4096*a^10*c^10 +
a^4*b^12*c^4 - 24*a^5*b^10*c^5 + 240*a^6*b^8*c^6 - 1280*a^7*b^6*c^7 + 3840*
a^8*b^4*c^8 - 6144*a^9*b^2*c^9))) - (x*(451584*a^6*c^13*d^2 + 18*b^12*c^7*d
^2 - 25600*a^7*c^12*f^2 + 9216*a^8*c^11*h^2 + 128*a^4*b^15*k^2 + 25600*a^10
*c^9*j^2 - 504*a*b^10*c^8*d^2 - 73728*a^6*b*c^12*e^2 - 8192*a^8*b*c^10*i^2
- 3712*a^5*b^13*c*k^2 - 3538944*a^11*b*c^7*k^2 + 6228*a^2*b^8*c^9*d^2 - 426
24*a^3*b^6*c^10*d^2 + 176256*a^4*b^4*c^11*d^2 - 423936*a^5*b^2*c^12*d^2 - 4
608*a^4*b^5*c^10*e^2 + 36864*a^5*b^3*c^11*e^2 + 2*a^2*b^10*c^7*f^2 - 84*a^3
*b^8*c^8*f^2 + 3520*a^4*b^6*c^9*f^2 - 26240*a^5*b^4*c^10*f^2 + 59904*a^6*b^
2*c^11*f^2 - 1152*a^4*b^7*c^8*g^2 + 9216*a^5*b^5*c^9*g^2 - 18432*a^6*b^3*c^
10*g^2 + 468*a^4*b^8*c^7*h^2 - 3456*a^5*b^6*c^8*h^2 + 5760*a^6*b^4*c^9*h^2
- 128*a^4*b^9*c^6*i^2 + 512*a^5*b^7*c^7*i^2 + 1536*a^6*b^5*c^8*i^2 - 4096*a
^7*b^3*c^9*i^2 + 2*a^4*b^12*c^3*j^2 - 88*a^5*b^10*c^4*j^2 + 1236*a^6*b^8*c^
```

5*j^2 - 5760*a^7*b^6*c^6*j^2 + 8320*a^8*b^4*c^7*j^2 - 6144*a^9*b^2*c^8*j^2 + 46464*a^6*b^11*c^2*k^2 - 326400*a^7*b^9*c^3*k^2 + 1394560*a^8*b^7*c^4*k^2 - 3640320*a^9*b^5*c^5*k^2 + 5404672*a^10*b^3*c^6*k^2 + 129024*a^7*c^12*d*h + 215040*a^8*c^11*d*j + 786432*a^9*c^10*e*k + 30720*a^9*c^10*h*j + 262144*a^10*c^9*i*k + 12*a*b^11*c^7*d*f - 218112*a^6*b*c^12*d*f - 49152*a^7*b*c^11*e*i - 9216*a^7*b*c^11*f*h - 25600*a^8*b*c^10*f*j - 393216*a^9*b*c^9*g*k - 420*a^2*b^9*c^8*d*f + 4992*a^3*b^7*c^9*d*f - 36480*a^4*b^5*c^10*d*f + 144384*a^5*b^3*c^11*d*f + 36*a^2*b^10*c^7*d*h - 360*a^3*b^8*c^8*d*h + 3456*a^4*b^6*c^9*d*h + 4608*a^4*b^6*c^9*e*g - 11520*a^5*b^4*c^10*d*h - 36864*a^5*b^4*c^10*e*g - 27648*a^6*b^2*c^11*d*h + 73728*a^6*b^2*c^11*e*g + 12*a^3*b^9*c^7*f*h - 1536*a^4*b^7*c^8*e*i - 2304*a^4*b^7*c^8*f*h + 168*a^4*b^8*c^7*d*j + 9216*a^5*b^5*c^9*e*i + 17280*a^5*b^5*c^9*f*h - 768*a^5*b^6*c^8*d*j - 30720*a^6*b^3*c^10*f*h + 11520*a^6*b^4*c^9*d*j - 98304*a^7*b^2*c^10*d*j + 768*a^4*b^8*c^7*g*i + 140*a^4*b^9*c^6*f*j - 4608*a^5*b^6*c^8*g*i - 3584*a^5*b^7*c^7*f*j + 1536*a^5*b^8*c^6*e*k + 20352*a^6*b^5*c^8*f*j - 26112*a^6*b^6*c^7*e*k + 24576*a^7*b^2*c^10*g*i - 26624*a^7*b^3*c^9*f*j + 184320*a^7*b^4*c^8*e*k - 614400*a^8*b^2*c^9*e*k - 60*a^4*b^10*c^5*h*j + 1560*a^5*b^8*c^6*h*j - 768*a^5*b^9*c^5*g*k - 8832*a^6*b^6*c^7*h*j + 13056*a^6*b^7*c^6*g*k + 13056*a^7*b^4*c^8*h*j - 92160*a^7*b^5*c^7*g*k - 3072*a^8*b^2*c^9*h*j + 307200*a^8*b^3*c^8*g*k + 256*a^5*b^10*c^4*i*k - 3840*a^6*b^8*c^5*i*k + 22016*a^7*b^6*c^6*i*k - 40960*a^8*b^4*c^7*i*k - 73728*a^9*b^2*c^8*i*k))/(64*(4096*a^10*c^10 + a^4*b^12*c^4 - 24*a^5*b^10*c^5 + 240*a^6*b^8*c^6 - 1280*a^7*b^6*c^7 + 3840*a^8*b^4*c^8 - 6144*a^9*b^2*c^9))) + (x*(13824*a^4*c^12*e^3 + 512*a^7*c^9*i^3 - 640*a^7*b^9*k^3 - 54*b^7*c^9*d^2*e + 27*b^8*c^8*d^2*g + 11840*a^8*b^7*c*k^3 - 376832*a^11*b*c^4*k^3 + 13824*a^5*c^11*e^2*i + 4608*a^6*c^10*e*i^2 - 9*b^9*c^7*d^2*i + 112896*a^6*c^10*d^2*k + 98304*a^9*c^7*e*k^2 + 9*b^12*c^4*d^2*k - 6400*a^7*c^9*f^2*k + 64*a^4*b^12*i*k^2 + 2304*a^8*c^8*h^2*k + 32768*a^10*c^6*i*k^2 + 6400*a^10*c^6*j^2*k - 1728*a^4*b^3*c^9*g^3 + 64*a^4*b^6*c^6*i^3 + 384*a^5*b^4*c^7*i^3 + 768*a^6*b^2*c^8*i^3 - 85824*a^9*b^5*c^2*k^3 + 287296*a^10*b^3*c^3*k^3 - 20160*a^4*c^12*d*e*f - 6720*a^5*c^11*d*f*i - 2880*a^5*c^11*e*f*h - 4800*a^6*c^10*e*f*j - 960*a^6*c^10*f*h*i + 32256*a^7*c^9*d*h*k - 1600*a^7*c^9*f*i*j + 53760*a^8*c^8*d*j*k + 7680*a^9*c^7*h*j*k + 972*a*b^5*c^10*d^2*e + 24192*a^3*b*c^12*d^2*e - 486*a*b^6*c^9*d^2*g + 6240*a^4*b*c^11*e*f^2 - 20736*a^4*b*c^11*e^2*g + 144*a*b^7*c^8*d^2*i + 8064*a^4*b*c^11*d^2*i + 1728*a^5*b*c^10*e*h^2 - 252*a*b^10*c^5*d^2*k + 2080*a^5*b*c^10*f^2*i + 3840*a^7*b*c^8*e*j^2 - 2304*a^6*b*c^9*g*i^2 - 122112*a^6*b*c^9*e^2*k + 576*a^6*b*c^9*h^2*i - 192*a^4*b^11*c*g*k^2 - 49152*a^9*b*c^6*g*k^2 + 1280*a^8*b*c^7*i*j^2 - 1088*a^5*b^10*c*i*k^2 - 13568*a^8*b*c^7*i^2*k - 7344*a^2*b^3*c^11*d^2*e + 3672*a^2*b^4*c^10*d^2*g - 6*a^2*b^5*c^9*e*f^2 - 12096*a^3*b^2*c^11*d^2*g + 192*a^3*b^3*c^10*e*f^2 + 10368*a^4*b^2*c^10*e*g^2 - 900*a^2*b^5*c^9*d^2*i + 3*a^2*b^6*c^8*f^2*g + 1584*a^3*b^3*c^10*d^2*i - 96*a^3*b^4*c^9*f^2*g - 3120*a^4*b^2*c^10*f^2*g + 1296*a^4*b^3*c^9*e*h^2 + 6912*a^4*b^2*c^10*e^2*i + 1152*a^4*b^4*c^8*e*i^2 + 4608*a^5*b^2*c^9*e*i^2 - a^2*b^7*c^7*f^2*i + 3114*a^2*b^8*c^6*d^2*k + 30*a^3*b^5*c^8*f^2*i - 21222*a^3*b^6*c^7*d^2*k + 1104*a^4*b^3*c^9*f^2*i - 648*a^4*b^4*c^8*g*h^2 + 82584*a^4*b^4*c^8*d^2*k + 6*a^4*b^7*c^5*e*j^2 - 864*a^5*b^2*c^9*g*h^2 - 166464*a^5*b^2*c^9*d^2*k - 204*a^5*b^5*c^6*e*j^2 + 1488*a^6*b^3*c^7*e*j^2 + 1728*a^4*b^4*c^8*g^2*i - 576*a^4*b^5*c^7*g*i^2 - 4608*a^4*b^5*c^7*e^2*k + 384*a^4*b^10*c^2*e*k^2 + 3456*a^5*b^2*c^9*g^2*i - 2304*a^5*b^3*c^8*g*i^2 + 43776*a^5*b^3*c^8*e^2*k - 7296*a^5*b^8*c^3*e*k^2 + 54912*a^6*b^6*c^4*e*k^2 - 188160*a^7*b^4*c^5*e*k^2 + 228480*a^8*b^2*c^6*e*k^2 + a^2*b^10*c^4*f^2*k - 42*a^3*b^8*c^5*f^2*k + 216*a^4*b^5*c^7*h^2*i + 535*a^4*b^6*c^6*f^2*k - 3*a^4*b^8*c^4*g*j^2 + 720*a^5*b^3*c^8*h^2*i - 1840*a^5*b^4*c^7*f^2*k + 102*a^5*b^6*c^5*g*j^2 - 624*a^6*b^2*c^8*f^2*k - 744*a^6*b^4*c^6*g*j^2 - 1920*a^7*b^2*c^7*g*j^2 - 1152*a^4*b^7*c^5*g^2*k + 10944*a^5*b^5*c^6*g^2*k + 3648*a^5*b^9*c^2*g*k^2 - 30528*a^6*b^3*c^7*g^2*k - 27456*a^6*b^7*c^3*g*k^2 + 94080*a^7*b^5*c^4*g*k^2 - 114240*a^8*b^3*c^5*g*k^2 + 9*a^4*b^8*c^4*h^2*k + a^4*b^9*c^3*i*j^2 + 72*a^5*b^6*c^5*h^2*k - 32*a^5*b^7*c^4*i*j^2 - 360*a^6*b^4*c^6*h^2*k + 180*a^6*b^5*c^5*i*j^2 - 4320*a^7*b^2*c^7*h^2*k + 1136*a^7*b^3*c^6*i*j^2 - 12

8*a^4*b^9*c^3*i^2*k + 704*a^5*b^7*c^4*i^2*k + 960*a^6*b^5*c^5*i^2*k + 6720*
a^6*b^8*c^2*i*k^2 - 8704*a^7*b^3*c^6*i^2*k - 13056*a^7*b^6*c^3*i*k^2 - 2464
0*a^8*b^4*c^4*i*k^2 + 92544*a^9*b^2*c^5*i*k^2 - 10*a^7*b^6*c^3*j^2*k + 1560
*a^8*b^4*c^4*j^2*k - 11136*a^9*b^2*c^5*j^2*k - 36*a*b^6*c^9*d*e*f + 18*a*b^
7*c^8*d*f*g + 15552*a^4*b*c^11*d*e*h + 10080*a^4*b*c^11*d*f*g - 6*a*b^8*c^7
*d*f*i + 21888*a^5*b*c^10*d*e*j + 6*a*b^11*c^4*d*f*k + 5184*a^5*b*c^10*d*h*
i - 13824*a^5*b*c^10*e*g*i + 1440*a^5*b*c^10*f*g*h - 4128*a^6*b*c^9*d*f*k +
 7296*a^6*b*c^9*d*i*j + 5184*a^6*b*c^9*e*h*j + 2400*a^6*b*c^9*f*g*j - 81408
*a^7*b*c^8*e*i*k + 4896*a^7*b*c^8*f*h*k + 1728*a^7*b*c^8*h*i*j + 5600*a^8*b
*c^7*f*j*k + 900*a^2*b^4*c^10*d*e*f - 4896*a^3*b^2*c^11*d*e*f - 108*a^2*b^5
*c^9*d*e*h - 450*a^2*b^5*c^9*d*f*g + 2448*a^3*b^3*c^10*d*f*g + 138*a^2*b^6*
c^8*d*f*i + 54*a^2*b^6*c^8*d*g*h - 516*a^3*b^4*c^9*d*f*i - 36*a^3*b^4*c^9*e
*f*h - 4992*a^4*b^2*c^10*d*f*i - 7776*a^4*b^2*c^10*d*g*h - 6048*a^4*b^2*c^1
0*e*f*h - 2016*a^4*b^3*c^9*d*e*j - 18*a^2*b^7*c^7*d*h*i - 210*a^2*b^9*c^5*d
*f*k - 36*a^3*b^5*c^8*d*h*i + 18*a^3*b^5*c^8*f*g*h + 2496*a^3*b^7*c^6*d*f*k
 + 2592*a^4*b^3*c^9*d*h*i - 6912*a^4*b^3*c^9*e*g*i + 3024*a^4*b^3*c^9*f*g*h
 + 1008*a^4*b^4*c^8*d*g*j + 420*a^4*b^4*c^8*e*f*j - 13770*a^4*b^5*c^7*d*f*k
 - 10944*a^5*b^2*c^9*d*g*j - 7392*a^5*b^2*c^9*e*f*j + 31536*a^5*b^3*c^8*d*f
*k + 18*a^2*b^10*c^4*d*h*k - 6*a^3*b^6*c^7*f*h*i - 180*a^3*b^8*c^5*d*h*k -
1020*a^4*b^4*c^8*f*h*i - 336*a^4*b^5*c^7*d*i*j - 180*a^4*b^5*c^7*e*h*j - 21
0*a^4*b^5*c^7*f*g*j - 162*a^4*b^6*c^6*d*h*k + 4608*a^4*b^6*c^6*e*g*k - 2496
*a^5*b^2*c^9*f*h*i + 2976*a^5*b^3*c^8*d*i*j + 2880*a^5*b^3*c^8*e*h*j + 3696
*a^5*b^3*c^8*f*g*j + 10080*a^5*b^4*c^7*d*h*k - 43776*a^5*b^4*c^7*e*g*k - 45
792*a^6*b^2*c^8*d*h*k + 122112*a^6*b^2*c^8*e*g*k + 6*a^3*b^9*c^4*f*h*k + 70
*a^4*b^6*c^6*f*i*j + 90*a^4*b^6*c^6*g*h*j - 1536*a^4*b^7*c^5*e*i*k - 102*a^
4*b^7*c^5*f*h*k + 210*a^4*b^8*c^4*d*j*k - 1092*a^5*b^4*c^7*f*i*j - 1440*a^5
*b^4*c^7*g*h*j + 11520*a^5*b^5*c^6*e*i*k - 390*a^5*b^5*c^6*f*h*k - 3696*a^5
*b^6*c^5*d*j*k - 3264*a^6*b^2*c^8*f*i*j - 2592*a^6*b^2*c^8*g*h*j - 11520*a^
6*b^3*c^7*e*i*k + 5040*a^6*b^3*c^7*f*h*k + 26160*a^6*b^4*c^6*d*j*k - 79296*
a^7*b^2*c^7*d*j*k - 30*a^4*b^7*c^5*h*i*j + 768*a^4*b^8*c^4*g*i*k + 420*a^5*
b^5*c^6*h*i*j - 5760*a^5*b^6*c^5*g*i*k + 70*a^5*b^7*c^4*f*j*k + 1824*a^6*b^
3*c^7*h*i*j + 5760*a^6*b^4*c^6*g*i*k - 1722*a^6*b^5*c^5*f*j*k + 40704*a^7*b
^2*c^7*g*i*k + 7824*a^7*b^3*c^6*f*j*k + 210*a^6*b^6*c^4*h*j*k + 384*a^7*b^4
*c^5*h*j*k - 13728*a^8*b^2*c^6*h*j*k))/(64*(4096*a^10*c^10 + a^4*b^12*c^4 -
 24*a^5*b^10*c^5 + 240*a^6*b^8*c^6 - 1280*a^7*b^6*c^7 + 3840*a^8*b^4*c^8 -
6144*a^9*b^2*c^9)))*root(56371445760*a^11*b^8*c^12*z^4 - 503316480*a^8*b^14
*c^9*z^4 + 47185920*a^7*b^16*c^8*z^4 - 2621440*a^6*b^18*c^7*z^4 + 65536*a^5
*b^20*c^6*z^4 - 171798691840*a^14*b^2*c^15*z^4 + 193273528320*a^13*b^4*c^14
*z^4 - 128849018880*a^12*b^6*c^13*z^4 - 16911433728*a^10*b^10*c^11*z^4 + 35
23215360*a^9*b^12*c^10*z^4 + 68719476736*a^15*c^16*z^4 - 47185920*a^7*b^16*
c^5*k*z^3 + 2621440*a^6*b^18*c^4*k*z^3 - 65536*a^5*b^20*c^3*k*z^3 + 1717986
91840*a^14*b^2*c^12*k*z^3 - 193273528320*a^13*b^4*c^11*k*z^3 + 128849018880
*a^12*b^6*c^10*k*z^3 + 16911433728*a^10*b^10*c^8*k*z^3 - 3523215360*a^9*b^1
2*c^7*k*z^3 - 56371445760*a^11*b^8*c^9*k*z^3 + 503316480*a^8*b^14*c^6*k*z^3
 - 68719476736*a^15*c^13*k*z^3 + 1536*a*b^18*c^6*d*f*z^2 - 2571632640*a^9*b
^5*c^11*d*j*z^2 + 2548039680*a^9*b^3*c^13*d*h*z^2 + 2453667840*a^9*b^7*c^9*
e*k*z^2 + 2181038080*a^12*b^3*c^10*i*k*z^2 - 6492782592*a^10*b^5*c^10*e*k*z
^2 + 1509949440*a^9*b^3*c^13*e*g*z^2 - 1401421824*a^8*b^5*c^12*d*h*z^2 - 12
26833920*a^9*b^8*c^8*g*k*z^2 - 1321205760*a^9*b^2*c^14*d*f*z^2 - 2793406464
*a^11*b*c^13*d*j*z^2 + 9563013120*a^11*b^3*c^11*e*k*z^2 + 890634240*a^8*b^7
*c^10*d*j*z^2 - 754974720*a^8*b^5*c^12*e*g*z^2 - 570425344*a^11*b^5*c^9*i*k
*z^2 + 732168192*a^7*b^6*c^12*d*f*z^2 - 581959680*a^10*b^4*c^11*f*j*z^2 - 6
03979776*a^10*b^2*c^13*e*i*z^2 + 534773760*a^11*b^3*c^11*h*j*z^2 - 55836672
0*a^8*b^9*c^8*e*k*z^2 - 4781506560*a^11*b^4*c^10*g*k*z^2 - 2013265920*a^13*
b*c^11*i*k*z^2 - 456130560*a^9*b^4*c^12*f*h*z^2 + 384040960*a^9*b^6*c^10*f*
j*z^2 - 264241152*a^10*b^7*c^8*i*k*z^2 + 390463488*a^7*b^7*c^11*d*h*z^2 + 2
79183360*a^8*b^10*c^7*g*k*z^2 + 301989888*a^10*b^3*c^12*g*i*z^2 + 222822400
*a^9*b^9*c^7*i*k*z^2 - 366280704*a^6*b^8*c^11*d*f*z^2 - 330301440*a^8*b^4*c
^13*d*f*z^2 + 254017536*a^8*b^6*c^11*f*h*z^2 - 1887436800*a^10*b*c^14*d*h*z

^2 + 188743680*a^10*b^2*c^13*f*h*z^2 - 185303040*a^7*b^9*c^9*d*j*z^2 - 1179
64800*a^10*b^5*c^10*h*j*z^2 - 6039797760*a^12*b*c^12*e*k*z^2 - 67502080*a^8
*b^11*c^6*i*k*z^2 + 121634816*a^11*b^2*c^12*f*j*z^2 + 188743680*a^7*b^7*c^1
1*e*g*z^2 - 115671040*a^8*b^8*c^9*f*j*z^2 + 125829120*a^8*b^6*c^11*e*i*z^2
+ 10813440*a^7*b^13*c^5*i*k*z^2 + 76677120*a^7*b^11*c^7*e*k*z^2 - 38338560*
a^7*b^12*c^6*g*k*z^2 - 37355520*a^9*b^7*c^9*h*j*z^2 - 917504*a^6*b^15*c^4*i
*k*z^2 + 32768*a^5*b^17*c^3*i*k*z^2 - 62914560*a^8*b^7*c^10*g*i*z^2 + 23101
440*a^8*b^9*c^8*h*j*z^2 - 4349952*a^7*b^11*c^7*h*j*z^2 + 2949120*a^6*b^14*c
^5*g*k*z^2 + 337920*a^6*b^13*c^6*h*j*z^2 - 98304*a^5*b^16*c^4*g*k*z^2 - 768
0*a^5*b^15*c^5*h*j*z^2 - 61931520*a^7*b^8*c^10*f*h*z^2 + 23592960*a^7*b^9*c
^9*g*i*z^2 + 17940480*a^7*b^10*c^8*f*j*z^2 - 47185920*a^7*b^8*c^10*e*i*z^2
- 5898240*a^6*b^13*c^6*e*k*z^2 - 3538944*a^6*b^11*c^8*g*i*z^2 - 1347584*a^6
*b^12*c^7*f*j*z^2 + 196608*a^5*b^15*c^5*e*k*z^2 + 196608*a^5*b^13*c^7*g*i*z
^2 + 35840*a^5*b^14*c^6*f*j*z^2 + 96583680*a^5*b^10*c^10*d*f*z^2 + 23371776
*a^6*b^11*c^8*d*j*z^2 - 51609600*a^6*b^9*c^10*d*h*z^2 + 7077888*a^6*b^10*c^
9*e*i*z^2 + 6144000*a^6*b^10*c^9*f*h*z^2 - 1677312*a^5*b^13*c^7*d*j*z^2 - 3
93216*a^5*b^12*c^8*e*i*z^2 + 61440*a^5*b^12*c^8*f*h*z^2 + 53760*a^4*b^15*c^
6*d*j*z^2 - 46080*a^4*b^14*c^7*f*h*z^2 + 1536*a^3*b^16*c^6*f*h*z^2 - 235929
60*a^6*b^9*c^10*e*g*z^2 + 1179648*a^5*b^11*c^9*e*g*z^2 + 829440*a^4*b^13*c^
8*d*h*z^2 + 368640*a^5*b^11*c^9*d*h*z^2 - 105984*a^3*b^15*c^7*d*h*z^2 + 460
8*a^2*b^17*c^6*d*h*z^2 - 15175680*a^4*b^12*c^9*d*f*z^2 + 1428480*a^3*b^14*c
^8*d*f*z^2 - 73728*a^2*b^16*c^7*d*f*z^2 + 4108320768*a^10*b^3*c^12*d*j*z^2
- 1207959552*a^10*b*c^14*e*g*z^2 - 578813952*a^12*b*c^12*h*j*z^2 + 32463912
96*a^10*b^6*c^9*g*k*z^2 - 402653184*a^11*b*c^13*g*i*z^2 + 3019898880*a^12*b
^2*c^11*g*k*z^2 - 440401920*a^10*b*c^14*f^2*z^2 - 188743680*a^11*b*c^13*h^2
*z^2 + 1761607680*a^10*c^15*d*f*z^2 - 655360*a^6*b^18*c*k^2*z^2 - 94464*a*b
^17*c^7*d^2*z^2 + 6936330240*a^8*b^3*c^14*d^2*z^2 + 2464874496*a^6*b^7*c^12
*d^2*z^2 - 3963617280*a^9*b*c^15*d^2*z^2 + 58007224320*a^13*b^4*c^8*k^2*z^2
+ 14968422400*a^11*b^8*c^6*k^2*z^2 + 805306368*a^11*c^14*e*i*z^2 - 3596615
6800*a^12*b^6*c^7*k^2*z^2 + 419430400*a^12*c^13*f*j*z^2 - 1509949440*a^9*b^
2*c^14*e^2*z^2 + 251658240*a^11*c^14*f*h*z^2 - 56874762240*a^14*b^2*c^9*k^2
*z^2 - 5400428544*a^7*b^5*c^13*d^2*z^2 + 890470400*a^9*b^12*c^4*k^2*z^2 + 7
54974720*a^8*b^4*c^13*e^2*z^2 - 730054656*a^5*b^9*c^11*d^2*z^2 + 477102080*
a^12*b^3*c^10*j^2*z^2 + 477102080*a^9*b^3*c^13*f^2*z^2 - 377487360*a^9*b^4*
c^12*g^2*z^2 + 301989888*a^10*b^2*c^13*g^2*z^2 - 174325760*a^11*b^5*c^9*j^2
*z^2 - 126156800*a^8*b^14*c^3*k^2*z^2 + 188743680*a^8*b^6*c^11*g^2*z^2 + 14
1557760*a^10*b^3*c^12*h^2*z^2 - 174325760*a^8*b^5*c^12*f^2*z^2 - 188743680*
a^7*b^6*c^12*e^2*z^2 - 4350935040*a^10*b^10*c^5*k^2*z^2 + 146165760*a^4*b^1
1*c^10*d^2*z^2 - 50331648*a^10*b^4*c^11*i^2*z^2 + 11796480*a^7*b^16*c^2*k^2
*z^2 - 33554432*a^11*b^2*c^12*i^2*z^2 + 11206656*a^10*b^7*c^8*j^2*z^2 + 892
9280*a^9*b^9*c^7*j^2*z^2 + 20971520*a^9*b^6*c^10*i^2*z^2 - 2600960*a^8*b^11
*c^6*j^2*z^2 + 291840*a^7*b^13*c^5*j^2*z^2 - 14080*a^6*b^15*c^4*j^2*z^2 + 2
56*a^5*b^17*c^3*j^2*z^2 - 47185920*a^7*b^8*c^10*g^2*z^2 - 26542080*a^8*b^7*
c^10*h^2*z^2 - 2752512*a^7*b^10*c^8*i^2*z^2 + 2621440*a^8*b^8*c^9*i^2*z^2 +
524288*a^6*b^12*c^7*i^2*z^2 - 32768*a^5*b^14*c^6*i^2*z^2 + 9584640*a^7*b^9
*c^9*h^2*z^2 - 2359296*a^9*b^5*c^11*h^2*z^2 - 1290240*a^6*b^11*c^8*h^2*z^2
+ 46080*a^5*b^13*c^7*h^2*z^2 + 2304*a^4*b^15*c^6*h^2*z^2 + 5898240*a^6*b^10
*c^9*g^2*z^2 - 294912*a^5*b^12*c^8*g^2*z^2 + 11206656*a^7*b^7*c^11*f^2*z^2
+ 8929280*a^6*b^9*c^10*f^2*z^2 + 23592960*a^6*b^8*c^11*e^2*z^2 - 2600960*a^
5*b^11*c^9*f^2*z^2 + 291840*a^4*b^13*c^8*f^2*z^2 - 14080*a^3*b^15*c^7*f^2*z
^2 + 256*a^2*b^17*c^6*f^2*z^2 - 19860480*a^3*b^13*c^9*d^2*z^2 - 1179648*a^5
*b^10*c^10*e^2*z^2 + 1771776*a^2*b^15*c^8*d^2*z^2 - 440401920*a^13*b*c^11*j
^2*z^2 + 1207959552*a^10*c^15*e^2*z^2 + 134217728*a^12*c^13*i^2*z^2 + 25769
803776*a^15*c^10*k^2*z^2 + 16384*a^5*b^20*k^2*z^2 + 2304*b^19*c^6*d^2*z^2 +
165150720*a^9*b*c^12*d*g*j*z + 23592960*a^10*b*c^11*g*h*j*z + 169869312*a^
7*b*c^14*d*e*f*z + 99090432*a^8*b*c^13*d*g*h*z - 3145728*a^9*b*c^12*f*h*i*z
+ 56623104*a^8*b*c^13*d*f*i*z - 1536*a*b^18*c^3*d*f*k*z - 9437184*a^8*b*c^
13*e*f*h*z + 1536*a*b^15*c^6*d*f*i*z - 4608*a*b^14*c^7*d*f*g*z + 9216*a*b^1
3*c^8*d*e*f*z + 2173501440*a^9*b^5*c^8*d*j*k*z - 1987706880*a^9*b^3*c^10*d*

h*k*z + 1121255424*a^8*b^5*c^9*d*h*k*z + 861143040*a^8*b^4*c^10*d*f*k*z - 8
59963392*a^7*b^6*c^9*d*f*k*z - 780779520*a^8*b^7*c^7*d*j*k*z - 754974720*a^
9*b^3*c^10*e*g*k*z + 2222456832*a^11*b*c^10*d*j*k*z - 454164480*a^11*b^3*c^
8*h*j*k*z + 377487360*a^8*b^5*c^9*e*g*k*z + 290979840*a^10*b^4*c^8*f*j*k*z
+ 381026304*a^6*b^8*c^8*d*f*k*z + 412876800*a^8*b^2*c^12*d*e*j*z + 30198988
8*a^10*b^2*c^10*e*i*k*z - 320421888*a^7*b^7*c^8*d*h*k*z + 185794560*a^10*b^
5*c^7*h*j*k*z - 192020480*a^9*b^6*c^7*f*j*k*z + 190709760*a^9*b^4*c^9*f*h*k
*z - 150994944*a^10*b^3*c^9*g*i*k*z + 168990720*a^7*b^9*c^6*d*j*k*z + 23592
9600*a^9*b^2*c^11*d*f*k*z - 206438400*a^8*b^3*c^11*d*g*j*z - 206438400*a^7*
b^4*c^11*d*e*j*z - 101646336*a^8*b^6*c^8*f*h*k*z - 29245440*a^9*b^7*c^6*h*j
*k*z - 60817408*a^11*b^2*c^9*f*j*k*z + 57835520*a^8*b^8*c^6*f*j*k*z + 21941
4528*a^7*b^2*c^13*d*e*h*z - 70778880*a^10*b^2*c^10*f*h*k*z + 677376*a^7*b^1
1*c^4*h*j*k*z - 645120*a^8*b^9*c^5*h*j*k*z - 53760*a^6*b^13*c^3*h*j*k*z + 3
1457280*a^8*b^7*c^7*g*i*k*z - 62914560*a^8*b^6*c^8*e*i*k*z - 94371840*a^7*b
^7*c^8*e*g*k*z - 221773824*a^6*b^3*c^13*d*e*f*z + 82575360*a^9*b^2*c^11*d*i
*j*z + 11796480*a^10*b^2*c^10*h*i*j*z - 11796480*a^7*b^9*c^6*g*i*k*z - 8970
240*a^7*b^10*c^5*f*j*k*z + 103219200*a^7*b^5*c^10*d*g*j*z - 2457600*a^8*b^6
*c^8*h*i*j*z + 1769472*a^6*b^11*c^5*g*i*k*z + 921600*a^7*b^8*c^7*h*i*j*z +
673792*a^6*b^12*c^4*f*j*k*z - 138240*a^6*b^10*c^6*h*i*j*z - 98304*a^5*b^13*
c^4*g*i*k*z - 17920*a^5*b^14*c^3*f*j*k*z + 7680*a^5*b^12*c^5*h*i*j*z - 9713
6640*a^5*b^10*c^7*d*f*k*z - 29491200*a^9*b^3*c^10*g*h*j*z + 58982400*a^9*b^
2*c^11*e*h*j*z + 23592960*a^7*b^8*c^7*e*i*k*z - 22169088*a^6*b^11*c^5*d*j*k
*z + 21381120*a^7*b^8*c^7*f*h*k*z + 14745600*a^8*b^5*c^9*g*h*j*z + 42854400
*a^6*b^9*c^7*d*h*k*z - 109707264*a^7*b^3*c^12*d*g*h*z - 3686400*a^7*b^7*c^8
*g*h*j*z - 3538944*a^6*b^10*c^6*e*i*k*z + 1645056*a^5*b^13*c^4*d*j*k*z - 89
0880*a^6*b^10*c^6*f*h*k*z + 460800*a^6*b^9*c^7*g*h*j*z - 330240*a^5*b^12*c^
5*f*h*k*z + 196608*a^5*b^12*c^5*e*i*k*z - 53760*a^4*b^15*c^3*d*j*k*z + 4608
0*a^4*b^14*c^4*f*h*k*z - 23040*a^5*b^11*c^6*g*h*j*z - 1536*a^3*b^16*c^3*f*h
*k*z - 29491200*a^8*b^4*c^10*e*h*j*z - 17203200*a^7*b^6*c^9*d*i*j*z + 11796
480*a^6*b^9*c^7*e*g*k*z + 110886912*a^6*b^4*c^12*d*f*g*z + 7372800*a^7*b^6*
c^9*e*h*j*z + 40108032*a^8*b^2*c^12*d*h*i*z + 6451200*a^6*b^8*c^8*d*i*j*z +
2359296*a^8*b^3*c^11*f*h*i*z - 967680*a^5*b^10*c^7*d*i*j*z - 921600*a^6*b^
8*c^8*e*h*j*z - 829440*a^4*b^13*c^5*d*h*k*z - 589824*a^5*b^11*c^6*e*g*k*z -
491520*a^6*b^7*c^9*f*h*i*z + 184320*a^5*b^9*c^8*f*h*i*z + 105984*a^3*b^15*
c^4*d*h*k*z + 69120*a^5*b^11*c^6*d*h*k*z + 53760*a^4*b^12*c^6*d*i*j*z + 460
80*a^5*b^10*c^7*e*h*j*z - 27648*a^4*b^11*c^7*f*h*i*z - 4608*a^2*b^17*c^3*d*
h*k*z + 1536*a^3*b^13*c^6*f*h*i*z - 25804800*a^6*b^7*c^9*d*g*j*z - 88473600
*a^6*b^4*c^12*d*e*h*z + 51609600*a^6*b^6*c^10*d*e*j*z - 84934656*a^7*b^2*c^
13*d*f*g*z + 117964800*a^5*b^5*c^12*d*e*f*z + 15160320*a^4*b^12*c^6*d*f*k*z
- 45613056*a^7*b^3*c^12*d*f*i*z + 44236800*a^6*b^5*c^11*d*g*h*z - 10321920
*a^6*b^6*c^10*d*h*i*z + 7077888*a^7*b^4*c^11*d*h*i*z - 5898240*a^7*b^4*c^11
*f*g*h*z + 4718592*a^8*b^2*c^12*f*g*h*z + 3225600*a^5*b^9*c^8*d*g*j*z + 294
9120*a^6*b^6*c^10*f*g*h*z + 2396160*a^5*b^8*c^9*d*h*i*z - 1428480*a^3*b^14*
c^5*d*f*k*z - 737280*a^5*b^8*c^9*f*g*h*z - 161280*a^4*b^11*c^7*d*g*j*z + 92
160*a^4*b^10*c^8*f*g*h*z + 73728*a^2*b^16*c^4*d*f*k*z - 50688*a^3*b^12*c^7*
d*h*i*z - 27648*a^4*b^10*c^8*d*h*i*z - 4608*a^3*b^12*c^7*f*g*h*z + 4608*a^2
*b^14*c^6*d*h*i*z - 58982400*a^5*b^6*c^11*d*f*g*z + 11796480*a^7*b^3*c^12*e
*f*h*z + 8847360*a^5*b^7*c^10*d*f*i*z - 6635520*a^5*b^7*c^10*d*g*h*z - 6451
200*a^5*b^8*c^9*d*e*j*z - 5898240*a^6*b^5*c^11*e*f*h*z - 3809280*a^4*b^9*c^
9*d*f*i*z + 2359296*a^6*b^5*c^11*d*f*i*z + 1474560*a^5*b^7*c^10*e*f*h*z + 6
81984*a^3*b^11*c^8*d*f*i*z + 322560*a^4*b^10*c^8*d*e*j*z - 276480*a^4*b^9*c
^9*d*g*h*z - 184320*a^4*b^9*c^9*e*f*h*z + 179712*a^3*b^11*c^8*d*g*h*z - 552
96*a^2*b^13*c^7*d*f*i*z - 13824*a^2*b^13*c^7*d*g*h*z + 9216*a^3*b^11*c^8*e*
f*h*z + 16220160*a^4*b^8*c^10*d*f*g*z + 13271040*a^5*b^6*c^11*d*e*h*z - 239
6160*a^3*b^10*c^9*d*f*g*z + 552960*a^4*b^8*c^10*d*e*h*z - 359424*a^3*b^10*c
^9*d*e*h*z + 175104*a^2*b^12*c^8*d*f*g*z + 27648*a^2*b^12*c^8*d*e*h*z - 324
40320*a^4*b^7*c^11*d*e*f*z + 4792320*a^3*b^9*c^10*d*e*f*z - 350208*a^2*b^11
*c^9*d*e*f*z + 1439170560*a^10*b*c^11*d*h*k*z - 3361603584*a^10*b^3*c^9*d*j
*k*z + 603979776*a^10*b*c^11*e*g*k*z + 407371776*a^12*b*c^9*h*j*k*z + 20132

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6592*a^11*b*c^10*g*i*k*z + 346816512*a^7*b*c^14*d^2*g*z + 129761280*a^11*b*
c^10*h^2*k*z + 121896960*a^10*b*c^11*f^2*k*z + 458752*a^6*b^15*c*i*k^2*z +
19660800*a^11*b*c^10*g*j^2*z + 49152*a^5*b^16*c*g*k^2*z + 7077888*a^9*b*c^1
2*g*h^2*z + 94464*a*b^17*c^4*d^2*k*z - 19660800*a^8*b*c^13*f^2*g*z - 66816*
a*b^14*c^7*d^2*i*z + 214272*a*b^13*c^8*d^2*g*z - 428544*a*b^12*c^9*d^2*e*z
+ 2390753280*a^11*b^4*c^7*g*k^2*z - 2411421696*a^6*b^7*c^9*d^2*k*z - 660307
9680*a^8*b^3*c^11*d^2*k*z + 3715891200*a^9*b*c^12*d^2*k*z - 880803840*a^10*
c^12*d*f*k*z - 1623195648*a^10*b^6*c^6*g*k^2*z - 402653184*a^11*c^11*e*i*k*
z - 1509949440*a^12*b^2*c^8*g*k^2*z - 209715200*a^12*c^10*f*j*k*z - 3303014
40*a^9*c^13*d*e*j*z + 3019898880*a^12*b*c^9*e*k^2*z - 125829120*a^11*c^11*f
*h*k*z - 110100480*a^10*c^12*d*i*j*z - 198180864*a^8*c^14*d*e*h*z - 1572864
0*a^11*c^11*h*i*j*z - 1226833920*a^9*b^7*c^6*e*k^2*z - 47185920*a^10*c^12*e
*h*j*z - 66060288*a^9*c^13*d*h*i*z - 1090519040*a^12*b^3*c^7*i*k^2*z + 1022
754816*a^6*b^2*c^14*d^2*e*z + 5216108544*a^7*b^5*c^10*d^2*k*z + 754974720*a
^9*b^2*c^11*e^2*k*z + 721529856*a^5*b^9*c^8*d^2*k*z + 613416960*a^9*b^8*c^5
*g*k^2*z - 642318336*a^5*b^4*c^13*d^2*e*z - 4781506560*a^11*b^3*c^8*e*k^2*z
 - 398131200*a^12*b^3*c^7*j^2*k*z - 511377408*a^6*b^3*c^13*d^2*g*z - 377487
360*a^8*b^4*c^10*e^2*k*z + 285212672*a^11*b^5*c^6*i*k^2*z + 199065600*a^11*
b^5*c^6*j^2*k*z + 279183360*a^8*b^9*c^5*e*k^2*z + 321159168*a^5*b^5*c^12*d^
2*g*z + 188743680*a^9*b^4*c^9*g^2*k*z + 132120576*a^10*b^7*c^5*i*k^2*z - 15
0994944*a^10*b^2*c^10*g^2*k*z - 111411200*a^9*b^9*c^4*i*k^2*z - 126812160*a
^10*b^3*c^9*h^2*k*z + 225312768*a^7*b^2*c^13*d^2*i*z - 139591680*a^8*b^10*c
^4*g*k^2*z - 49766400*a^10*b^7*c^5*j^2*k*z - 145463040*a^4*b^11*c^7*d^2*k*z
 - 94371840*a^8*b^6*c^8*g^2*k*z + 223395840*a^4*b^6*c^12*d^2*e*z + 33751040
*a^8*b^11*c^3*i*k^2*z - 78970880*a^9*b^3*c^10*f^2*k*z + 94371840*a^7*b^6*c^
9*e^2*k*z + 25165824*a^10*b^4*c^8*i^2*k*z + 6220800*a^9*b^9*c^4*j^2*k*z + 3
9223296*a^9*b^5*c^8*h^2*k*z - 311040*a^8*b^11*c^3*j^2*k*z + 16777216*a^11*b
^2*c^9*i^2*k*z - 10485760*a^9*b^6*c^7*i^2*k*z - 5406720*a^7*b^13*c^2*i*k^2*
z + 1376256*a^7*b^10*c^5*i^2*k*z - 1310720*a^8*b^8*c^6*i^2*k*z - 262144*a^6
*b^12*c^4*i^2*k*z + 16384*a^5*b^14*c^3*i^2*k*z + 10354688*a^11*b^2*c^9*i*j^
2*z + 23592960*a^7*b^8*c^7*g^2*k*z + 38559744*a^7*b^7*c^8*f^2*k*z + 1916928
0*a^7*b^12*c^3*g*k^2*z - 2048000*a^9*b^6*c^7*i*j^2*z - 1520640*a^7*b^9*c^6*
h^2*k*z - 1105920*a^8*b^7*c^7*h^2*k*z + 849920*a^8*b^8*c^6*i*j^2*z - 393216
*a^10*b^4*c^8*i*j^2*z + 195840*a^6*b^11*c^5*h^2*k*z - 145920*a^7*b^10*c^5*i
*j^2*z + 11520*a^5*b^13*c^4*h^2*k*z + 11008*a^6*b^12*c^4*i*j^2*z - 2304*a^4
*b^15*c^3*h^2*k*z - 256*a^5*b^14*c^3*i*j^2*z - 25362432*a^10*b^3*c^9*g*j^2*
z - 24739840*a^8*b^5*c^9*f^2*k*z - 38338560*a^7*b^11*c^4*e*k^2*z - 2949120*
a^6*b^10*c^6*g^2*k*z - 1474560*a^6*b^14*c^2*g*k^2*z + 50724864*a^10*b^2*c^1
0*e*j^2*z + 147456*a^5*b^12*c^5*g^2*k*z - 15150080*a^6*b^9*c^7*f^2*k*z + 13
271040*a^9*b^5*c^8*g*j^2*z - 111697920*a^4*b^7*c^11*d^2*g*z - 3563520*a^8*b
^7*c^7*g*j^2*z + 3538944*a^9*b^2*c^11*h^2*i*z + 2912000*a^5*b^11*c^6*f^2*k*
z - 737280*a^7*b^6*c^9*h^2*i*z + 506880*a^7*b^9*c^6*g*j^2*z - 291840*a^4*b^
13*c^5*f^2*k*z + 276480*a^6*b^8*c^8*h^2*i*z - 41472*a^5*b^10*c^7*h^2*i*z -
34560*a^6*b^11*c^5*g*j^2*z + 14080*a^3*b^15*c^4*f^2*k*z + 2304*a^4*b^12*c^6
*h^2*i*z + 768*a^5*b^13*c^4*g*j^2*z - 256*a^2*b^17*c^3*f^2*k*z - 11796480*a
^6*b^8*c^8*e^2*k*z - 26542080*a^9*b^4*c^9*e*j^2*z + 19837440*a^3*b^13*c^6*d
^2*k*z + 2949120*a^6*b^13*c^3*e*k^2*z + 589824*a^5*b^10*c^7*e^2*k*z - 98304
*a^5*b^15*c^2*e*k^2*z - 10354688*a^8*b^2*c^12*f^2*i*z - 43646976*a^6*b^4*c^
12*d^2*i*z - 8847360*a^8*b^3*c^11*g*h^2*z + 7127040*a^8*b^6*c^8*e*j^2*z + 4
423680*a^7*b^5*c^10*g*h^2*z + 2048000*a^6*b^6*c^10*f^2*i*z - 1771776*a^2*b^
15*c^5*d^2*k*z - 1105920*a^6*b^7*c^9*g*h^2*z - 1013760*a^7*b^8*c^7*e*j^2*z
- 849920*a^5*b^8*c^9*f^2*i*z + 393216*a^7*b^4*c^11*f^2*i*z + 145920*a^4*b^1
0*c^8*f^2*i*z + 138240*a^5*b^9*c^8*g*h^2*z + 69120*a^6*b^10*c^6*e*j^2*z - 1
1008*a^3*b^12*c^7*f^2*i*z - 6912*a^4*b^11*c^7*g*h^2*z - 1536*a^5*b^12*c^5*e
*j^2*z + 256*a^2*b^14*c^6*f^2*i*z - 32587776*a^5*b^6*c^11*d^2*i*z + 2536243
2*a^7*b^3*c^12*f^2*g*z + 21657600*a^4*b^8*c^10*d^2*i*z + 17694720*a^8*b^2*c
^12*e*h^2*z - 50724864*a^7*b^2*c^13*e*f^2*z - 13271040*a^6*b^5*c^11*f^2*g*z
 - 8847360*a^7*b^4*c^11*e*h^2*z - 5810688*a^3*b^10*c^9*d^2*i*z + 3563520*a^
5*b^7*c^10*f^2*g*z + 2211840*a^6*b^6*c^10*e*h^2*z + 845568*a^2*b^12*c^8*d^2
```

*i*z - 506880*a^4*b^9*c^9*f^2*g*z - 276480*a^5*b^8*c^9*e*h^2*z + 34560*a^3*
b^11*c^8*f^2*g*z + 13824*a^4*b^10*c^8*e*h^2*z - 768*a^2*b^13*c^7*f^2*g*z +
26542080*a^6*b^4*c^12*e*f^2*z + 23362560*a^3*b^9*c^10*d^2*g*z - 46725120*a^
3*b^8*c^11*d^2*e*z - 7127040*a^5*b^6*c^11*e*f^2*z - 2965248*a^2*b^11*c^9*d^
2*g*z + 1013760*a^4*b^8*c^10*e*f^2*z - 69120*a^3*b^10*c^9*e*f^2*z + 1536*a^
2*b^12*c^8*e*f^2*z + 5930496*a^2*b^10*c^10*d^2*e*z + 1006632960*a^13*b*c^8*
i*k^2*z + 3246391296*a^10*b^5*c^7*e*k^2*z + 318504960*a^13*b*c^8*j^2*k*z +
61538304*a^10*b^10*c^2*k^3*z - 603979776*a^10*c^12*e^2*k*z - 693633024*a^7*
c^15*d^2*e*z - 231211008*a^8*c^14*d^2*i*z - 67108864*a^12*c^10*i^2*k*z - 13
107200*a^12*c^10*i*j^2*z - 16384*a^5*b^17*i*k^2*z - 39321600*a^11*c^11*e*j^
2*z - 4718592*a^10*c^12*h^2*i*z - 2304*b^19*c^3*d^2*k*z + 13107200*a^9*c^13
*f^2*i*z + 2304*b^16*c^6*d^2*i*z - 14155776*a^9*c^13*e*h^2*z + 39321600*a^8
*c^14*e*f^2*z - 4833280*a^9*b^12*c*k^3*z - 6912*b^15*c^7*d^2*g*z + 69625446
40*a^14*b^2*c^6*k^3*z + 13824*b^14*c^8*d^2*e*z + 1876951040*a^12*b^6*c^4*k^
3*z - 4844421120*a^13*b^4*c^5*k^3*z - 437780480*a^11*b^8*c^3*k^3*z - 429496
7296*a^15*c^7*k^3*z + 163840*a^8*b^14*k^3*z + 6144000*a^10*b*c^8*f*i*j*k -
5898240*a^10*b*c^8*g*h*j*k - 41287680*a^9*b*c^9*d*g*j*k + 4472832*a^9*b*c^9
*f*h*i*k + 18432000*a^9*b*c^9*e*f*j*k + 3391488*a^8*b*c^10*e*h*i*j + 122880
0*a^8*b*c^10*f*g*i*j - 24772608*a^8*b*c^10*d*g*h*k + 13418496*a^8*b*c^10*e*
f*h*k + 11649024*a^8*b*c^10*d*f*i*k + 737280*a^7*b*c^11*f*g*h*i - 768*a*b^1
5*c^3*d*f*i*k - 19307520*a^7*b*c^11*d*f*h*j + 16367616*a^7*b*c^11*d*e*i*j +
3686400*a^7*b*c^11*e*f*g*j + 34947072*a^7*b*c^11*d*e*f*k + 2304*a*b^14*c^4
*d*f*g*k - 180*a*b^13*c^5*d*f*h*j + 11059200*a^6*b*c^12*d*e*h*i + 5160960*a
^6*b*c^12*d*f*g*i + 2211840*a^6*b*c^12*e*f*g*h - 4608*a*b^13*c^5*d*e*f*k -
2304*a*b^11*c^7*d*f*g*i + 4608*a*b^10*c^8*d*e*f*i + 15482880*a^5*b*c^13*d*e
*f*g - 13824*a*b^9*c^9*d*e*f*g - 225976320*a^8*b^2*c^9*d*e*j*k + 112988160*
a^8*b^3*c^8*d*g*j*k - 11427840*a^10*b^2*c^7*h*i*j*k - 4177920*a^9*b^4*c^6*h
*i*j*k + 1399296*a^8*b^6*c^5*h*i*j*k - 26880*a^6*b^10*c^3*h*i*j*k + 16128*a
^7*b^8*c^4*h*i*j*k - 61562880*a^9*b^2*c^8*d*i*j*k + 20090880*a^9*b^3*c^7*g*
h*j*k + 119623680*a^7*b^4*c^8*d*e*j*k + 10485760*a^9*b^3*c^7*f*i*j*k - 4018
1760*a^9*b^2*c^8*e*h*j*k - 3778560*a^8*b^5*c^6*g*h*j*k - 137797632*a^7*b^2*
c^10*d*e*h*k - 1248768*a^7*b^7*c^5*f*i*j*k + 229376*a^6*b^9*c^4*f*i*j*k + 2
20160*a^8*b^5*c^6*f*i*j*k - 209664*a^7*b^7*c^5*g*h*j*k + 80640*a^6*b^9*c^4*
g*h*j*k - 8960*a^5*b^11*c^3*f*i*j*k - 59811840*a^7*b^5*c^7*d*g*j*k + 530841
60*a^8*b^2*c^9*e*g*i*k - 11120640*a^8*b^4*c^7*f*g*j*k + 10455552*a^7*b^6*c^
6*d*i*j*k - 9216000*a^9*b^2*c^8*f*g*j*k + 7557120*a^8*b^4*c^7*e*h*j*k + 739
7376*a^8*b^3*c^8*f*h*i*k + 5230080*a^7*b^6*c^6*f*g*j*k - 37675008*a^8*b^2*c
^9*d*h*i*k - 3633408*a^6*b^8*c^5*d*i*j*k + 2211840*a^8*b^4*c^7*d*i*j*k + 68
898816*a^7*b^3*c^9*d*g*h*k - 1695744*a^8*b^2*c^9*g*h*i*j - 1400832*a^7*b^4*
c^8*g*h*i*j + 967680*a^7*b^5*c^7*f*h*i*k - 783360*a^6*b^7*c^6*f*h*i*k - 741
888*a^6*b^8*c^5*f*g*j*k + 499968*a^5*b^10*c^4*d*i*j*k + 419328*a^7*b^6*c^6*
e*h*j*k - 253440*a^6*b^6*c^7*g*h*i*j - 161280*a^6*b^8*c^5*e*h*j*k + 42240*a
^5*b^9*c^5*f*h*i*k + 26880*a^5*b^10*c^4*f*g*j*k - 26880*a^4*b^12*c^3*d*i*j*
k + 13824*a^4*b^11*c^4*f*h*i*k + 11520*a^5*b^8*c^6*g*h*i*j - 768*a^3*b^13*c
^3*f*h*i*k + 22241280*a^8*b^3*c^8*e*f*j*k + 14222592*a^6*b^7*c^6*d*g*j*k -
10460160*a^7*b^5*c^7*e*f*j*k + 8847360*a^7*b^4*c^8*e*g*i*k - 7741440*a^7*b^
4*c^8*f*g*h*k - 7077888*a^6*b^6*c^7*e*g*i*k + 6935040*a^6*b^6*c^7*d*h*i*k -
6709248*a^8*b^2*c^9*f*g*h*k - 3612672*a^7*b^4*c^8*d*h*i*k + 2801664*a^7*b^
3*c^9*e*h*i*j + 2506752*a^7*b^3*c^9*f*g*i*j + 2419200*a^6*b^6*c^7*f*g*h*k -
1661184*a^5*b^9*c^5*d*g*j*k + 1483776*a^6*b^7*c^6*e*f*j*k - 1463040*a^5*b^
8*c^6*d*h*i*k + 884736*a^5*b^8*c^6*e*g*i*k + 838656*a^6*b^5*c^8*f*g*i*j + 5
06880*a^6*b^5*c^8*e*h*i*j + 80640*a^4*b^11*c^4*d*g*j*k - 53760*a^5*b^9*c^5*
e*f*j*k - 53760*a^5*b^7*c^7*f*g*i*j - 46080*a^4*b^10*c^5*f*g*h*k - 34560*a^
5*b^8*c^6*f*g*h*k + 25344*a^3*b^12*c^4*d*h*i*k - 23040*a^5*b^7*c^7*e*h*i*j
+ 13824*a^4*b^10*c^5*d*h*i*k + 2304*a^3*b^12*c^4*f*g*h*k - 2304*a^2*b^14*c^
3*d*h*i*k - 29030400*a^6*b^5*c^8*d*g*h*k + 28606464*a^7*b^3*c^9*d*f*i*k - 2
8445184*a^6*b^6*c^7*d*e*j*k + 58060800*a^6*b^4*c^9*d*e*h*k + 15482880*a^7*b
^3*c^9*e*f*h*k - 8183808*a^7*b^2*c^10*d*g*i*j - 6718464*a^6*b^5*c^8*d*f*i*k
- 5087232*a^7*b^2*c^10*e*g*h*j - 5013504*a^7*b^2*c^10*e*f*i*j - 4838400*a^

6*b^5*c^8*e*f*h*k + 4112640*a^5*b^7*c^7*d*g*h*k - 3663360*a^5*b^7*c^7*d*f*i
*k + 3322368*a^5*b^8*c^6*d*e*j*k - 2285568*a^6*b^4*c^9*d*g*i*j + 1896960*a^
4*b^9*c^6*d*f*i*k + 1843200*a^6*b^3*c^10*f*g*h*i - 1677312*a^6*b^4*c^9*e*f*
i*j - 1658880*a^6*b^4*c^9*e*g*h*j + 68345856*a^6*b^3*c^10*d*e*f*k + 783360*
a^5*b^5*c^9*f*g*h*i + 741888*a^5*b^6*c^8*d*g*i*j - 34172928*a^6*b^4*c^9*d*f
*g*k - 340992*a^3*b^11*c^5*d*f*i*k - 161280*a^4*b^10*c^5*d*e*j*k + 138240*a
^4*b^9*c^6*d*g*h*k + 107520*a^5*b^6*c^8*e*f*i*j + 92160*a^4*b^9*c^6*e*f*h*k
 - 89856*a^3*b^11*c^5*d*g*h*k - 80640*a^4*b^8*c^7*d*g*i*j + 69120*a^5*b^7*c
^7*e*f*h*k + 69120*a^5*b^6*c^8*e*g*h*j + 27648*a^2*b^13*c^4*d*f*i*k + 18432
*a^4*b^7*c^8*f*g*h*i + 6912*a^2*b^13*c^4*d*g*h*k - 4608*a^3*b^11*c^5*e*f*h*
k - 2304*a^3*b^9*c^7*f*g*h*i + 27164160*a^5*b^6*c^8*d*f*g*k - 22164480*a^6*
b^3*c^10*d*f*h*j - 54328320*a^5*b^5*c^9*d*e*f*k - 17473536*a^7*b^2*c^10*d*f
*g*k - 8225280*a^5*b^6*c^8*d*e*h*k - 8087040*a^4*b^8*c^7*d*f*g*k + 5677056*
a^6*b^3*c^10*e*f*g*j - 5529600*a^6*b^2*c^11*d*g*h*i + 4571136*a^6*b^3*c^10*
d*e*i*j - 3686400*a^6*b^2*c^11*e*f*h*i + 2805120*a^5*b^5*c^9*d*f*h*j - 2211
840*a^5*b^4*c^10*d*g*h*i - 1566720*a^5*b^4*c^10*e*f*h*i - 1483776*a^5*b^5*c
^9*d*e*i*j + 1198080*a^3*b^10*c^6*d*f*g*k + 437184*a^4*b^7*c^8*d*f*h*j - 32
2560*a^5*b^5*c^9*e*f*g*j + 317952*a^4*b^6*c^9*d*g*h*i - 276480*a^4*b^8*c^7*
d*e*h*k + 179712*a^3*b^10*c^6*d*e*h*k + 161280*a^4*b^7*c^8*d*e*i*j - 146268
*a^3*b^9*c^7*d*f*h*j - 87552*a^2*b^12*c^5*d*f*g*k - 36864*a^4*b^6*c^9*e*f*h
*i - 13824*a^2*b^12*c^5*d*e*h*k + 9360*a^2*b^11*c^6*d*f*h*j + 6912*a^3*b^8*
c^8*d*g*h*i - 6912*a^2*b^10*c^7*d*g*h*i + 4608*a^3*b^8*c^8*e*f*h*i - 245514
24*a^6*b^2*c^11*d*e*g*j + 16174080*a^4*b^7*c^8*d*e*f*k + 5419008*a^5*b^4*c^
10*d*e*g*j + 5160960*a^5*b^3*c^11*d*f*g*i + 4423680*a^5*b^3*c^11*e*f*g*h +
4423680*a^5*b^3*c^11*d*e*h*i - 2396160*a^3*b^9*c^7*d*e*f*k - 635904*a^4*b^5
*c^10*d*e*h*i - 483840*a^4*b^6*c^9*d*e*g*j - 354816*a^3*b^7*c^9*d*f*g*i + 3
22560*a^4*b^5*c^10*d*f*g*i + 175104*a^2*b^11*c^6*d*e*f*k + 138240*a^4*b^5*c
^10*e*f*g*h + 59904*a^2*b^9*c^8*d*f*g*i - 13824*a^3*b^7*c^9*e*f*g*h - 13824
*a^3*b^7*c^9*d*e*h*i + 13824*a^2*b^9*c^8*d*e*h*i - 16588800*a^5*b^2*c^12*d*
e*g*h - 10321920*a^5*b^2*c^12*d*e*f*i + 1658880*a^4*b^4*c^11*d*e*g*h + 7096
32*a^3*b^6*c^10*d*e*f*i - 645120*a^4*b^4*c^11*d*e*f*i + 124416*a^3*b^6*c^10
*d*e*g*h - 119808*a^2*b^8*c^9*d*e*f*i - 41472*a^2*b^8*c^9*d*e*g*h + 7741440
*a^4*b^3*c^12*d*e*f*g - 2903040*a^3*b^5*c^11*d*e*f*g + 387072*a^2*b^7*c^10*
d*e*f*g - 381026304*a^11*b*c^7*d*j*k^2 - 241827840*a^10*b*c^8*d*h*k^2 - 656
67072*a^12*b*c^6*h*j*k^2 - 169344*a^7*b^11*c*h*j*k^2 - 25165824*a^11*b*c^7*
g*i*k^2 - 4915200*a^11*b*c^7*g*j^2*k - 53084160*a^8*b*c^10*e^2*i*k - 754974
72*a^10*b*c^8*e*g*k^2 - 86704128*a^7*b*c^11*d^2*g*k + 565248*a^9*b*c^9*h*i^
2*j - 168448*a^6*b^12*c*f*j*k^2 - 24576*a^5*b^13*c*g*i*k^2 - 1769472*a^9*b*
c^9*g*h^2*k - 17694720*a^9*b*c^9*e*i^2*k - 411264*a^5*b^13*c*d*j*k^2 - 1152
0*a^4*b^14*c*f*h*k^2 + 4915200*a^8*b*c^10*f^2*g*k + 2580480*a^9*b*c^9*e*i*j
^2 - 2496000*a^9*b*c^9*f*h*j^2 - 1543680*a^8*b*c^10*f*h^2*j + 33408*a*b^14*
c^4*d^2*i*k - 59512320*a^6*b*c^12*d^2*f*j + 5087232*a^7*b*c^11*e^2*h*j + 27
27936*a^8*b*c^10*d*i^2*j - 26496*a^3*b^15*c*d*h*k^2 + 1105920*a^7*b*c^11*e*
h^2*i - 107136*a*b^13*c^5*d^2*g*k + 10260*a*b^12*c^6*d^2*h*j - 10616832*a^6
*b*c^12*e^2*g*i - 3538944*a^7*b*c^11*e*g*i^2 + 1843200*a^7*b*c^11*d*h*i^2 -
 18432*a^2*b^16*c*d*f*k^2 - 15552000*a^8*b*c^10*d*f*j^2 + 24551424*a^6*b*c^
12*d*e^2*j - 37062144*a^5*b*c^13*d^2*f*h + 2580480*a^6*b*c^12*e*f^2*i + 214
272*a*b^12*c^6*d^2*e*k + 65664*a*b^10*c^8*d^2*g*i - 25074*a*b^11*c^7*d^2*f*
j + 420*a*b^12*c^6*d*f^2*j + 6*a*b^15*c^3*d*f*j^2 + 23224320*a^5*b*c^13*d^2
*e*i + 384*a*b^12*c^6*d*f*i^2 - 5985792*a^6*b*c^12*d*f*h^2 + 206010*a*b^9*c
^9*d^2*f*h - 131328*a*b^9*c^9*d^2*e*i - 6300*a*b^10*c^8*d*f^2*h + 1350*a*b^
11*c^7*d*f*h^2 + 16588800*a^5*b*c^13*d*e^2*h + 3456*a*b^10*c^8*d*f*g^2 + 43
5456*a*b^8*c^10*d^2*e*g + 13824*a*b^8*c^10*d*e^2*f + 3932160*a^11*c^8*h*i*j
*k + 27525120*a^10*c^9*d*i*j*k + 82575360*a^9*c^10*d*e*j*k + 11796480*a^10*
c^9*e*h*j*k + 16515072*a^9*c^10*d*h*i*k + 49545216*a^8*c^11*d*e*h*k - 24576
00*a^8*c^11*e*f*i*j - 1474560*a^7*c^12*e*f*h*i - 10321920*a^6*c^13*d*e*f*i
+ 737077248*a^10*b^3*c^6*d*j*k^2 - 518814720*a^9*b^5*c^5*d*j*k^2 + 44135424
0*a^9*b^3*c^7*d*h*k^2 - 429871104*a^6*b^2*c^11*d^2*e*k - 272212992*a^8*b^5*
c^6*d*h*k^2 + 305731584*a^5*b^4*c^10*d^2*e*k + 192412800*a^8*b^7*c^4*d*j*k^

2 + 111912960*a^11*b^3*c^5*h*j*k^2 + 214935552*a^6*b^3*c^10*d^2*g*k + 20242
7136*a^7*b^6*c^6*d*f*k^2 - 49904640*a^10*b^5*c^4*h*j*k^2 - 178513920*a^8*b^
4*c^7*d*f*k^2 - 152865792*a^5*b^5*c^9*d^2*g*k - 114388992*a^7*b^2*c^10*d^2*
i*k + 94961664*a^10*b^2*c^7*e*i*k^2 - 9039872*a^11*b^2*c^6*i*j^2*k - 564940
80*a^10*b^4*c^5*f*j*k^2 - 2052096*a^10*b^4*c^5*i*j^2*k + 1327360*a^9*b^6*c^
4*i*j^2*k - 158080*a^8*b^8*c^3*i*j^2*k - 47480832*a^10*b^3*c^6*g*i*k^2 + 45
576960*a^9*b^6*c^4*f*j*k^2 + 7954560*a^9*b^7*c^3*h*j*k^2 - 104693760*a^9*b^
3*c^7*e*g*k^2 + 142080*a^8*b^9*c^2*h*j*k^2 + 16017408*a^10*b^3*c^6*g*j^2*k
- 4930560*a^9*b^5*c^5*g*j^2*k - 3649536*a^9*b^2*c^8*h^2*i*k - 1843200*a^8*b
^4*c^7*h^2*i*k + 85524480*a^8*b^5*c^6*e*g*k^2 + 474240*a^8*b^7*c^4*g*j^2*k
+ 288000*a^7*b^6*c^6*h^2*i*k + 63360*a^6*b^8*c^5*h^2*i*k - 8064*a^5*b^10*c^
4*h^2*i*k - 1152*a^4*b^12*c^3*h^2*i*k - 15437824*a^11*b^2*c^6*f*j*k^2 - 320
34816*a^10*b^2*c^7*e*j^2*k - 14369280*a^8*b^8*c^3*f*j*k^2 - 13271040*a^8*b^
3*c^8*g^2*i*k + 80267904*a^7*b^7*c^5*d*h*k^2 + 79626240*a^7*b^2*c^10*e^2*g*
k + 11059200*a^9*b^5*c^5*g*i*k^2 + 8847360*a^9*b^2*c^8*g*i^2*k - 42113280*a
^7*b^9*c^3*d*j*k^2 + 6389760*a^8*b^7*c^4*g*i*k^2 + 5898240*a^8*b^4*c^7*g*i^
2*k - 37601280*a^9*b^4*c^6*f*h*k^2 - 2949120*a^7*b^9*c^3*g*i*k^2 + 2242560*
a^7*b^10*c^2*f*j*k^2 - 2211840*a^7*b^5*c^7*g^2*i*k + 1769472*a^6*b^7*c^6*g^
2*i*k + 749568*a^8*b^3*c^8*h*i^2*j - 442368*a^7*b^6*c^6*g*i^2*k + 442368*a^
6*b^11*c^2*g*i*k^2 - 442368*a^6*b^8*c^5*g*i^2*k + 317952*a^7*b^5*c^7*h*i^2*
j - 221184*a^5*b^9*c^5*g^2*i*k + 73728*a^5*b^10*c^4*g*i^2*k + 38400*a^6*b^7
*c^6*h*i^2*j - 1920*a^5*b^9*c^5*h*i^2*j + 9861120*a^9*b^4*c^6*e*j^2*k - 110
280960*a^4*b^6*c^9*d^2*e*k - 93330432*a^6*b^8*c^5*d*f*k^2 + 24645888*a^8*b^
6*c^5*f*h*k^2 + 6359040*a^8*b^3*c^8*g*h^2*k - 22118400*a^9*b^4*c^6*e*i*k^2
- 3862528*a^8*b^2*c^9*f^2*i*k - 2248704*a^7*b^4*c^8*f^2*i*k - 1290240*a^9*b
^2*c^8*g*i*j^2 - 948480*a^8*b^6*c^5*e*j^2*k - 860160*a^8*b^4*c^7*g*i*j^2 -
414720*a^7*b^5*c^7*g*h^2*k + 303360*a^6*b^6*c^7*f^2*i*k + 266880*a^5*b^8*c^
6*f^2*i*k - 224640*a^6*b^7*c^6*g*h^2*k - 80640*a^7*b^6*c^6*g*i*j^2 - 72960*
a^4*b^10*c^5*f^2*i*k + 17280*a^5*b^9*c^5*g*h^2*k + 12672*a^6*b^8*c^5*g*i*j^
2 + 5504*a^3*b^12*c^4*f^2*i*k + 3456*a^4*b^11*c^4*g*h^2*k - 384*a^5*b^10*c^
4*g*i*j^2 - 128*a^2*b^14*c^3*f^2*i*k + 30265344*a^6*b^4*c^9*d^2*i*k - 12779
520*a^8*b^6*c^5*e*i*k^2 - 11796480*a^8*b^3*c^8*e*i^2*k - 8847360*a^7*b^3*c^
9*e^2*i*k - 7925760*a^10*b^2*c^7*f*h*k^2 + 7077888*a^6*b^5*c^8*e^2*i*k - 39
813120*a^7*b^3*c^9*e*g^2*k - 73175040*a^9*b^2*c^8*d*f*k^2 + 5898240*a^7*b^8
*c^4*e*i*k^2 + 5542272*a^6*b^11*c^2*d*j*k^2 - 5420160*a^7*b^8*c^4*f*h*k^2 +
55140480*a^4*b^7*c^8*d^2*g*k + 1271808*a^7*b^3*c^9*g^2*h*j - 1040384*a^8*b
^2*c^9*f*i^2*j + 884736*a^7*b^5*c^7*e*i^2*k - 884736*a^6*b^10*c^3*e*i*k^2 +
884736*a^6*b^7*c^6*e*i^2*k - 884736*a^5*b^7*c^7*e^2*i*k - 697344*a^7*b^4*c
^8*f*i^2*j + 414720*a^6*b^5*c^8*g^2*h*j + 226560*a^6*b^10*c^3*f*h*k^2 - 147
456*a^5*b^9*c^5*e*i^2*k - 121856*a^6*b^6*c^7*f*i^2*j + 82560*a^5*b^12*c^2*f
*h*k^2 + 49152*a^5*b^12*c^2*e*i*k^2 - 17280*a^5*b^7*c^7*g^2*h*j + 8960*a^5*
b^8*c^6*f*i^2*j + 14194944*a^5*b^6*c^8*d^2*i*k - 12718080*a^8*b^2*c^9*e*h^2
*k - 10615680*a^4*b^8*c^7*d^2*i*k - 26542080*a^6*b^4*c^9*e^2*g*k - 23592960
*a^7*b^7*c^5*e*g*k^2 - 5142528*a^8*b^3*c^8*f*h*j^2 + 5068800*a^7*b^2*c^10*f
^2*h*j - 3755520*a^7*b^3*c^9*f*h^2*j + 3336192*a^7*b^3*c^9*f^2*g*k + 300096
0*a^6*b^4*c^9*f^2*h*j + 2893824*a^3*b^10*c^6*d^2*i*k + 1720320*a^8*b^3*c^8*
e*i*j^2 + 1704960*a^6*b^5*c^8*f^2*g*k - 1307520*a^5*b^7*c^7*f^2*g*k - 10857
60*a^6*b^5*c^8*f*h^2*j - 959040*a^7*b^5*c^7*f*h*j^2 + 829440*a^7*b^4*c^8*e*
h^2*k - 552960*a^7*b^2*c^10*g*h^2*i - 552960*a^6*b^4*c^9*g*h^2*i + 449280*a
^6*b^6*c^7*e*h^2*k - 422784*a^2*b^12*c^5*d^2*i*k + 253440*a^4*b^9*c^6*f^2*g
*k + 161280*a^7*b^5*c^7*e*i*j^2 - 145152*a^5*b^6*c^8*g*h^2*i + 103200*a^6*b
^7*c^6*f*h*j^2 + 41280*a^5*b^6*c^8*f^2*h*j - 37188*a^4*b^8*c^7*f^2*h*j - 34
560*a^5*b^8*c^6*e*h^2*k - 25344*a^6*b^7*c^6*e*i*j^2 - 17280*a^3*b^11*c^5*f^
2*g*k + 13536*a^5*b^7*c^7*f*h^2*j - 6912*a^4*b^10*c^5*e*h^2*k + 5490*a^4*b^
9*c^6*f*h^2*j - 3456*a^4*b^8*c^7*g*h^2*i + 1980*a^3*b^10*c^6*f^2*h*j + 810*
a^5*b^9*c^5*f*h*j^2 + 768*a^5*b^9*c^5*e*i*j^2 + 384*a^2*b^13*c^4*f^2*g*k -
270*a^4*b^11*c^4*f*h*j^2 - 180*a^3*b^11*c^5*f*h^2*j - 30*a^2*b^12*c^5*f^2*h
*j + 6*a^3*b^13*c^3*f*h*j^2 + 30067200*a^6*b^2*c^11*d^2*h*j + 13271040*a^6*
b^5*c^8*e*g^2*k - 10857600*a^6*b^9*c^4*d*h*k^2 + 2949120*a^6*b^9*c^4*e*g*k^

```
2 + 2654208*a^5*b^6*c^8*e^2*g*k + 2125824*a^7*b^3*c^9*d*i^2*j + 1658880*a^6
*b^3*c^10*e^2*h*j - 1419264*a^6*b^4*c^9*f*g^2*j - 1327104*a^5*b^7*c^7*e*g^2
*k - 921600*a^7*b^2*c^10*f*g^2*j - 737280*a^7*b^2*c^10*f*h*i^2 - 568320*a^6
*b^4*c^9*f*h*i^2 + 207360*a^4*b^13*c^2*d*h*k^2 - 147456*a^5*b^11*c^3*e*g*k^
2 - 136704*a^5*b^6*c^8*f*h*i^2 + 133632*a^6*b^5*c^8*d*i^2*j - 96768*a^5*b^7
*c^7*d*i^2*j + 80640*a^5*b^6*c^8*f*g^2*j - 69120*a^5*b^5*c^9*e^2*h*j + 1344
0*a^4*b^9*c^6*d*i^2*j - 5760*a^5*b^11*c^3*d*h*k^2 - 2304*a^4*b^8*c^7*f*h*i^
2 + 384*a^3*b^10*c^6*f*h*i^2 + 11930112*a^8*b^2*c^9*d*h*j^2 - 11646720*a^3*
b^9*c^7*d^2*g*k + 8432640*a^7*b^2*c^10*d*h^2*j + 24140160*a^5*b^10*c^4*d*f*
k^2 - 6672384*a^7*b^2*c^10*e*f^2*k + 4450176*a^7*b^4*c^8*d*h*j^2 + 4337280*
a^6*b^4*c^9*d*h^2*j - 3870720*a^8*b^2*c^9*e*g*j^2 - 3409920*a^6*b^4*c^9*e*f
^2*k - 2885760*a^5*b^4*c^10*d^2*h*j - 2844288*a^4*b^6*c^9*d^2*h*j + 2615040
*a^5*b^6*c^8*e*f^2*k - 1687680*a^6*b^6*c^7*d*h*j^2 + 1482624*a^2*b^11*c^6*d
^2*g*k - 1290240*a^6*b^2*c^11*f^2*g*i + 1105920*a^6*b^3*c^10*e*h^2*i + 1019
412*a^3*b^8*c^8*d^2*h*j - 1007424*a^5*b^6*c^8*d*h^2*j - 860160*a^5*b^4*c^10
*f^2*g*i - 645120*a^7*b^4*c^8*e*g*j^2 - 506880*a^4*b^8*c^7*e*f^2*k + 290304
*a^5*b^5*c^9*e*h^2*i + 197460*a^5*b^8*c^6*d*h*j^2 - 143802*a^2*b^10*c^7*d^2
*h*j + 80640*a^6*b^6*c^7*e*g*j^2 - 80640*a^4*b^6*c^9*f^2*g*i + 51948*a^4*b^
8*c^7*d*h^2*j + 34560*a^3*b^10*c^6*e*f^2*k + 12672*a^3*b^8*c^8*f^2*g*i + 10
800*a^3*b^10*c^6*d*h^2*j + 6912*a^4*b^7*c^8*e*h^2*i - 2304*a^5*b^8*c^6*e*g*
j^2 - 768*a^2*b^12*c^5*e*f^2*k - 684*a^3*b^12*c^4*d*h*j^2 - 540*a^2*b^12*c^
5*d*h^2*j - 384*a^2*b^10*c^7*f^2*g*i - 90*a^4*b^10*c^5*d*h*j^2 + 18*a^2*b^1
4*c^3*d*h*j^2 + 23385600*a^6*b^2*c^11*d*f^2*j + 23293440*a^3*b^8*c^8*d^2*e*
k + 6137856*a^6*b^3*c^10*d*g^2*j - 5677056*a^6*b^2*c^11*e^2*f*j + 5308416*a
^6*b^2*c^11*e*g^2*i - 5308416*a^5*b^3*c^11*e^2*g*i - 3786240*a^4*b^12*c^3*d
*f*k^2 - 3538944*a^6*b^3*c^10*e*g*i^2 + 2654208*a^5*b^4*c^10*e*g^2*i + 1658
880*a^6*b^3*c^10*d*h*i^2 - 1354752*a^5*b^5*c^9*d*g^2*j - 1105920*a^5*b^4*c^
10*f*g^2*h - 884736*a^5*b^5*c^9*e*g*i^2 - 552960*a^6*b^2*c^11*f*g^2*h + 357
120*a^3*b^14*c^2*d*f*k^2 + 322560*a^5*b^4*c^10*e^2*f*j + 262656*a^5*b^5*c^9
*d*h*i^2 + 120960*a^4*b^7*c^8*d*g^2*j - 55296*a^4*b^7*c^8*d*h*i^2 - 34560*a
^4*b^6*c^9*f*g^2*h + 3456*a^3*b^8*c^8*f*g^2*h + 1152*a^3*b^9*c^7*d*h*i^2 +
1152*a^2*b^11*c^6*d*h*i^2 - 13149696*a^7*b^3*c^9*d*f*j^2 - 11612160*a^5*b^2
*c^12*d^2*g*i + 10906560*a^4*b^5*c^10*d^2*f*j - 7418880*a^5*b^3*c^11*d^2*f*
j + 3148992*a^6*b^5*c^8*d*f*j^2 - 2985696*a^3*b^7*c^9*d^2*f*j - 2965248*a^2
*b^10*c^7*d^2*e*k + 1720320*a^5*b^3*c^11*e*f^2*i - 1658880*a^6*b^2*c^11*e*g
*h^2 + 1596672*a^3*b^6*c^10*d^2*g*i - 1505280*a^4*b^6*c^9*d*f^2*j - 829440*
a^5*b^4*c^10*e*g*h^2 - 508032*a^2*b^8*c^9*d^2*g*i + 378954*a^2*b^9*c^8*d^2*
f*j + 362880*a^5*b^4*c^10*d*f^2*j + 296964*a^3*b^8*c^8*d*f^2*j + 161280*a^4
*b^5*c^10*e*f^2*i - 77070*a^4*b^9*c^6*d*f*j^2 - 30240*a^5*b^7*c^7*d*f*j^2 -
 25344*a^3*b^7*c^9*e*f^2*i - 20736*a^4*b^6*c^9*e*g*h^2 - 19278*a^2*b^10*c^7
*d*f^2*j + 8820*a^3*b^11*c^5*d*f*j^2 + 768*a^2*b^9*c^8*e*f^2*i - 378*a^2*b^
13*c^4*d*f*j^2 - 5419008*a^5*b^3*c^11*d*e^2*j - 4423680*a^5*b^2*c^12*e^2*f*
h + 4147200*a^5*b^3*c^11*d*g^2*h - 2580480*a^6*b^2*c^11*d*f*i^2 - 967680*a^
5*b^4*c^10*d*f*i^2 + 483840*a^4*b^5*c^10*d*e^2*j - 414720*a^4*b^5*c^10*d*g^
2*h - 138240*a^4*b^4*c^11*e^2*f*h + 64512*a^4*b^6*c^9*d*f*i^2 + 39168*a^3*b
^8*c^8*d*f*i^2 - 31104*a^3*b^7*c^9*d*g^2*h + 13824*a^3*b^6*c^10*e^2*f*h + 1
0368*a^2*b^9*c^8*d*g^2*h - 9216*a^2*b^10*c^7*d*f*i^2 + 15630336*a^5*b^2*c^1
2*d*f^2*h - 14459904*a^4*b^3*c^12*d^2*f*h + 9630144*a^3*b^5*c^11*d^2*f*h -
8764416*a^5*b^3*c^11*d*f*h^2 - 3870720*a^5*b^2*c^12*e*f^2*g - 3193344*a^3*b
^5*c^11*d^2*e*i + 2867328*a^4*b^4*c^11*d*f^2*h - 2095200*a^2*b^7*c^10*d^2*f
*h - 1414080*a^3*b^6*c^10*d*f^2*h - 34836480*a^4*b^2*c^13*d^2*e*g + 1016064
*a^2*b^7*c^10*d^2*e*i - 645120*a^4*b^4*c^11*e*f^2*g + 306720*a^3*b^7*c^9*d*
f*h^2 + 197820*a^2*b^8*c^9*d*f^2*h + 146880*a^4*b^5*c^10*d*f*h^2 + 80640*a^
3*b^6*c^10*e*f^2*g - 55350*a^2*b^9*c^8*d*f*h^2 - 2304*a^2*b^8*c^9*e*f^2*g -
 3870720*a^5*b^2*c^12*d*f*g^2 - 1935360*a^4*b^4*c^11*d*f*g^2 - 1658880*a^4*
b^3*c^12*d*e^2*h + 725760*a^3*b^6*c^10*d*f*g^2 + 17418240*a^3*b^4*c^12*d^2*
e*g - 124416*a^3*b^5*c^11*d*e^2*h - 96768*a^2*b^8*c^9*d*f*g^2 + 41472*a^2*b
^7*c^10*d*e^2*h - 3919104*a^2*b^6*c^11*d^2*e*g - 7741440*a^4*b^2*c^13*d*e^2
*f + 2903040*a^3*b^4*c^12*d*e^2*f - 387072*a^2*b^6*c^11*d*e^2*f - 681246720
```

*a^9*b*c^9*d^2*k^2 + 265912320*a^11*b^3*c^5*e*k^3 + 188743680*a^12*b^2*c^5*
g*k^3 - 132956160*a^11*b^4*c^4*g*k^3 - 52101120*a^13*b*c^5*j^2*k^2 + 257228
80*a^12*b^3*c^4*i*k^3 + 19644416*a^11*b^5*c^3*i*k^3 - 1583680*a^9*b^9*c*j^2
*k^2 - 9142272*a^10*b^7*c^2*i*k^3 - 74022912*a^10*b^5*c^4*e*k^3 - 20643840*
a^11*b*c^7*h^2*k^2 + 37011456*a^10*b^6*c^3*g*k^3 - 2293760*a^9*b^3*c^7*i^3*
k - 557056*a^8*b^5*c^6*i^3*k + 147456*a^7*b^7*c^5*i^3*k - 65536*a^6*b^12*c*
i^2*k^2 + 32768*a^6*b^9*c^4*i^3*k - 8192*a^5*b^11*c^3*i^3*k + 430080*a^10*b
*c^8*i^2*j^2 - 2880*a^5*b^13*c*h^2*k^2 + 6635520*a^7*b^4*c^8*g^3*k - 479232
0*a^9*b^8*c^2*g*k^3 - 2211840*a^6*b^6*c^7*g^3*k + 1359360*a^10*b^2*c^7*h*j^
3 + 1173120*a^9*b^4*c^6*h*j^3 + 743040*a^7*b^4*c^8*h^3*j + 622080*a^8*b^2*c
^9*h^3*j + 221184*a^5*b^8*c^6*g^3*k + 107136*a^6*b^6*c^7*h^3*j - 32640*a^8*
b^6*c^5*h*j^3 - 5796*a^7*b^8*c^4*h*j^3 + 540*a^5*b^8*c^6*h^3*j - 270*a^4*b^
10*c^5*h^3*j + 210*a^6*b^10*c^3*h*j^3 - 2949120*a^10*b*c^8*f^2*k^2 + 176947
20*a^6*b^3*c^10*e^3*k + 184320*a^8*b*c^10*h^2*i^2 - 3520*a^3*b^15*c*f^2*k^2
 + 9584640*a^9*b^7*c^3*e*k^3 - 2293760*a^9*b^3*c^7*f*j^3 - 2293760*a^6*b^3*
c^10*f^3*j - 1769472*a^5*b^5*c^9*e^3*k - 884736*a^6*b^3*c^10*g^3*i - 589824
*a^7*b^3*c^9*g*i^3 - 491520*a^8*b^9*c^2*e*k^3 - 442368*a^5*b^5*c^9*g^3*i -
294912*a^6*b^5*c^8*g*i^3 - 199360*a^8*b^5*c^6*f*j^3 - 199360*a^5*b^5*c^9*f^
3*j + 61920*a^7*b^7*c^5*f*j^3 + 61920*a^4*b^7*c^8*f^3*j - 49152*a^5*b^7*c^7
*g*i^3 - 3682*a^6*b^9*c^4*f*j^3 - 3682*a^3*b^9*c^7*f^3*j + 70*a^5*b^11*c^3*
f*j^3 + 70*a^2*b^11*c^6*f^3*j + 3870720*a^8*b*c^10*e^2*j^2 + 430080*a^7*b*c
^11*f^2*i^2 - 14152320*a^4*b^4*c^11*d^3*j + 10644480*a^5*b^2*c^12*d^3*j + 5
483520*a^9*b^2*c^8*d*j^3 + 4269888*a^3*b^6*c^10*d^3*j + 3538944*a^5*b^2*c^1
2*e^3*i - 1648128*a^5*b^3*c^11*f^3*h + 1330560*a^8*b^4*c^7*d*j^3 + 1179648*
a^7*b^2*c^10*e*i^3 - 898560*a^6*b^3*c^10*f*h^3 - 826560*a^7*b^6*c^6*d*j^3 -
 607068*a^2*b^8*c^9*d^3*j + 589824*a^6*b^4*c^9*e*i^3 - 354240*a^5*b^5*c^9*f
*h^3 - 354240*a^4*b^5*c^10*f^3*h + 145188*a^6*b^8*c^5*d*j^3 + 98304*a^5*b^6
*c^8*e*i^3 + 43680*a^3*b^7*c^9*f^3*h - 21600*a^4*b^7*c^8*f*h^3 - 9576*a^5*b
^10*c^4*d*j^3 + 1350*a^3*b^9*c^7*f*h^3 - 1050*a^2*b^9*c^8*f^3*h - 504*a*b^1
4*c^4*d^2*j^2 + 210*a^4*b^12*c^3*d*j^3 + 3870720*a^6*b*c^12*d^2*i^2 + 16588
80*a^6*b*c^12*e^2*h^2 - 9792*a*b^11*c^7*d^2*i^2 + 16547328*a^4*b^2*c^13*d^3
*h - 12306816*a^3*b^4*c^12*d^3*h + 37310976*a^3*b^3*c^13*d^3*f + 3037824*a^
2*b^6*c^11*d^3*h - 2654208*a^5*b^3*c^11*e*g^3 + 1949184*a^6*b^2*c^11*d*h^3
+ 1296000*a^5*b^4*c^10*d*h^3 - 155520*a^4*b^6*c^9*d*h^3 - 40500*a*b^10*c^8*
d^2*h^2 - 8100*a^3*b^8*c^8*d*h^3 + 4050*a^2*b^10*c^7*d*h^3 + 3870720*a^5*b*
c^13*e^2*f^2 + 34836480*a^4*b*c^14*d^2*e^2 - 108864*a*b^9*c^9*d^2*g^2 - 806
8032*a^2*b^5*c^12*d^3*f - 5623296*a^4*b^3*c^12*d*f^3 + 1737792*a^3*b^5*c^11
*d*f^3 - 260190*a*b^8*c^10*d^2*f^2 - 211680*a^2*b^7*c^10*d*f^3 - 435456*a*b
^7*c^11*d^2*e^2 - 377487360*a^12*b*c^6*e*k^3 + 1434977280*a^8*b^3*c^8*d^2*k
^2 + 173408256*a^7*c^12*d^2*e*k + 3276800*a^12*c^7*i*j^2*k - 125829120*a^13
*b*c^5*i*k^3 + 26214400*a^12*c^7*f*j*k^2 + 1179648*a^10*c^9*h^2*i*k + 13440
*a^6*b^13*h*j*k^2 + 50331648*a^11*c^8*e*i*k^2 + 110100480*a^10*c^9*d*f*k^2
+ 57802752*a^8*c^11*d^2*i*k + 9830400*a^11*c^8*e*j^2*k - 3276800*a^9*c^10*f
^2*i*k + 4480*a^5*b^14*f*j*k^2 + 15728640*a^11*c^8*f*h*k^2 - 409600*a^9*c^1
0*f*i^2*j - 1152*b^16*c^3*d^2*i*k - 1220516352*a^7*b^5*c^7*d^2*k^2 + 353894
4*a^9*c^10*e*h^2*k + 384000*a^8*c^11*f^2*h*j + 13440*a^4*b^15*d*j*k^2 + 384
*a^3*b^16*f*h*k^2 + 20321280*a^7*c^12*d^2*h*j - 245760*a^8*c^11*f*h*i^2 + 3
456*b^15*c^4*d^2*g*k - 270*b^14*c^5*d^2*h*j - 9830400*a^8*c^11*e*f^2*k + 48
38400*a^9*c^10*d*h*j^2 + 2903040*a^8*c^11*d*h^2*j - 1966080*a^10*b*c^8*i^3*
k + 1433600*a^9*b^9*c*i*k^3 + 1152*a^2*b^17*d*h*k^2 - 3686400*a^7*c^12*e^2*
f*j - 53084160*a^7*b*c^11*e^3*k - 6912*b^14*c^5*d^2*e*k - 3456*b^12*c^7*d^2
*g*i + 630*b^13*c^6*d^2*f*j + 2688000*a^7*c^12*d*f^2*j + 245760*a^8*b^10*c*
g*k^3 - 2211840*a^6*c^13*e^2*f*h - 1720320*a^7*c^12*d*f*i^2 - 9450*b^11*c^8
*d^2*f*h + 6912*b^11*c^8*d^2*e*i + 1612800*a^6*c^13*d*f^2*h - 1344000*a^10*
b*c^8*f*j^3 - 1344000*a^7*b*c^11*f^3*j - 393216*a^8*b*c^10*g*i^3 - 23616*a*
b^17*c*d^2*k^2 - 20736*b^10*c^9*d^2*e*g - 75188736*a^4*b*c^14*d^3*f - 88320
0*a^6*b*c^12*f^3*h - 317952*a^7*b*c^11*f*h^3 + 43416*a*b^10*c^8*d^3*j - 154
82880*a^5*c^14*d*e^2*f - 10616832*a^5*b*c^13*e^3*g - 345060*a*b^8*c^10*d^3*
h - 4262400*a^5*b*c^13*d*f^3 + 852768*a*b^7*c^11*d^3*f + 7350*a*b^9*c^9*d*f

^3 + 584578368*a^6*b^7*c^6*d^2*k^2 + 93905920*a^12*b^3*c^4*j^2*k^2 - 177997
248*a^5*b^9*c^5*d^2*k^2 - 50967040*a^11*b^5*c^3*j^2*k^2 + 104693760*a^9*b^2
*c^8*e^2*k^2 + 12849984*a^10*b^7*c^2*j^2*k^2 + 20021248*a^11*b^2*c^6*i^2*k^
2 - 85524480*a^8*b^4*c^7*e^2*k^2 + 33223680*a^10*b^3*c^6*h^2*k^2 + 4227072*
a^10*b^4*c^5*i^2*k^2 - 3973120*a^9*b^6*c^4*i^2*k^2 + 344064*a^7*b^10*c^2*i^
2*k^2 - 81920*a^8*b^8*c^3*i^2*k^2 - 11386368*a^9*b^5*c^5*h^2*k^2 + 26173440
*a^9*b^4*c^6*g^2*k^2 - 21381120*a^8*b^6*c^5*g^2*k^2 + 18874368*a^10*b^2*c^7
*g^2*k^2 + 501760*a^9*b^3*c^7*i^2*j^2 + 452160*a^8*b^7*c^4*h^2*k^2 + 385920
*a^7*b^9*c^3*h^2*k^2 + 170240*a^8*b^5*c^6*i^2*j^2 - 48960*a^6*b^11*c^2*h^2*
k^2 + 9216*a^7*b^7*c^5*i^2*j^2 - 1984*a^6*b^9*c^4*i^2*j^2 + 64*a^5*b^11*c^3
*i^2*j^2 + 5898240*a^7*b^8*c^4*g^2*k^2 + 1419840*a^8*b^4*c^7*h^2*j^2 + 1387
008*a^9*b^2*c^8*h^2*j^2 - 737280*a^6*b^10*c^3*g^2*k^2 + 84960*a^7*b^6*c^6*h
^2*j^2 + 36864*a^5*b^12*c^2*g^2*k^2 - 8010*a^6*b^8*c^5*h^2*j^2 - 180*a^5*b^
10*c^4*h^2*j^2 + 9*a^4*b^12*c^3*h^2*j^2 + 14115840*a^9*b^3*c^7*f^2*k^2 - 92
31552*a^7*b^7*c^5*f^2*k^2 + 23592960*a^7*b^6*c^6*e^2*k^2 + 4984320*a^8*b^5*
c^6*f^2*k^2 + 3759040*a^6*b^9*c^4*f^2*k^2 + 36190080*a^4*b^11*c^4*d^2*k^2 +
 967680*a^8*b^3*c^8*g^2*j^2 - 727360*a^5*b^11*c^3*f^2*k^2 + 276480*a^7*b^3*
c^9*h^2*i^2 + 161280*a^7*b^5*c^7*g^2*j^2 + 140544*a^6*b^5*c^8*h^2*i^2 + 729
60*a^4*b^13*c^2*f^2*k^2 + 25344*a^5*b^7*c^7*h^2*i^2 - 20160*a^6*b^7*c^6*g^2
*j^2 + 576*a^5*b^9*c^5*g^2*j^2 + 576*a^4*b^9*c^6*h^2*i^2 + 3808000*a^8*b^2*
c^9*f^2*j^2 - 2949120*a^6*b^8*c^5*e^2*k^2 + 1643712*a^7*b^4*c^8*f^2*j^2 + 8
84736*a^7*b^2*c^10*g^2*i^2 + 884736*a^6*b^4*c^9*g^2*i^2 + 221184*a^5*b^6*c^
8*g^2*i^2 + 147456*a^5*b^10*c^4*e^2*k^2 - 125440*a^6*b^6*c^7*f^2*j^2 - 1379
0*a^5*b^8*c^6*f^2*j^2 + 1785*a^4*b^10*c^5*f^2*j^2 - 70*a^3*b^12*c^4*f^2*j^2
 - 4953600*a^3*b^13*c^3*d^2*k^2 + 18427392*a^7*b^2*c^10*d^2*j^2 + 645120*a^
7*b^3*c^9*e^2*j^2 + 501760*a^6*b^3*c^10*f^2*i^2 + 442944*a^2*b^15*c^2*d^2*k
^2 + 414720*a^6*b^3*c^10*g^2*h^2 + 207360*a^5*b^5*c^9*g^2*h^2 + 170240*a^5*
b^5*c^9*f^2*i^2 - 80640*a^6*b^5*c^8*e^2*j^2 + 9216*a^4*b^7*c^8*f^2*i^2 + 51
84*a^4*b^7*c^8*g^2*h^2 + 2304*a^5*b^7*c^7*e^2*j^2 - 1984*a^3*b^9*c^7*f^2*i^
2 + 64*a^2*b^11*c^6*f^2*i^2 - 4148928*a^6*b^4*c^9*d^2*j^2 + 3538944*a^6*b^2
*c^11*e^2*i^2 + 1684224*a^6*b^2*c^11*f^2*h^2 + 1264320*a^5*b^4*c^10*f^2*h^2
 - 1183392*a^5*b^6*c^8*d^2*j^2 + 884736*a^5*b^4*c^10*e^2*i^2 + 645750*a^4*b
^8*c^7*d^2*j^2 + 126720*a^4*b^6*c^9*f^2*h^2 - 115920*a^3*b^10*c^6*d^2*j^2 -
 13950*a^3*b^8*c^8*f^2*h^2 + 10836*a^2*b^12*c^5*d^2*j^2 + 225*a^2*b^10*c^7*
f^2*h^2 + 1935360*a^5*b^3*c^11*d^2*i^2 + 967680*a^5*b^3*c^11*f^2*g^2 + 8294
40*a^5*b^3*c^11*e^2*h^2 - 532224*a^4*b^5*c^10*d^2*i^2 + 161280*a^4*b^5*c^10
*f^2*g^2 - 96768*a^3*b^7*c^9*d^2*i^2 + 62784*a^2*b^9*c^8*d^2*i^2 + 20736*a^
4*b^5*c^10*e^2*h^2 - 20160*a^3*b^7*c^9*f^2*g^2 + 576*a^2*b^9*c^8*f^2*g^2 +
11487744*a^5*b^2*c^12*d^2*h^2 + 7962624*a^5*b^2*c^12*e^2*g^2 + 35525376*a^4
*b^2*c^13*d^2*f^2 - 1412640*a^3*b^6*c^10*d^2*h^2 + 461376*a^4*b^4*c^11*d^2*
h^2 + 375030*a^2*b^8*c^9*d^2*h^2 + 8709120*a^4*b^3*c^12*d^2*g^2 - 4354560*a
^3*b^5*c^11*d^2*g^2 + 979776*a^2*b^7*c^10*d^2*g^2 + 645120*a^4*b^3*c^12*e^2
*f^2 - 80640*a^3*b^5*c^11*e^2*f^2 + 2304*a^2*b^7*c^10*e^2*f^2 - 15269184*a^
3*b^4*c^12*d^2*f^2 + 2870784*a^2*b^6*c^11*d^2*f^2 - 17418240*a^3*b^3*c^13*d
^2*e^2 + 3919104*a^2*b^5*c^12*d^2*e^2 + 384*a*b^18*d*f*k^2 - 199229440*a^14
*b^2*c^3*k^4 + 8388608*a^12*c^7*i^2*k^2 + 75497472*a^10*c^9*e^2*k^2 + 78400
*a^8*b^11*j^2*k^2 + 4096*a^5*b^14*i^2*k^2 + 345600*a^10*c^9*h^2*j^2 + 576*a
^4*b^15*h^2*k^2 + 57937920*a^13*b^4*c^2*k^4 + 320000*a^9*c^10*f^2*j^2 + 64*
a^2*b^17*f^2*k^2 + 16934400*a^8*c^11*d^2*j^2 + 9*b^16*c^3*d^2*j^2 + 3538944
*a^7*c^12*e^2*i^2 + 115200*a^7*c^12*f^2*h^2 + 576*b^13*c^6*d^2*i^2 + 2025*b
^12*c^7*d^2*h^2 + 6096384*a^6*c^13*d^2*h^2 + 492800*a^11*b^2*c^6*j^4 + 3514
56*a^10*b^4*c^5*j^4 - 43120*a^9*b^6*c^4*j^4 + 5184*b^11*c^8*d^2*g^2 + 1225*
a^8*b^8*c^3*j^4 + 131072*a^8*b^2*c^9*i^4 + 98304*a^7*b^4*c^8*i^4 + 32768*a^
6*b^6*c^7*i^4 + 11025*b^10*c^9*d^2*f^2 + 4096*a^5*b^8*c^6*i^4 + 5644800*a^5
*c^14*d^2*f^2 + 142560*a^6*b^4*c^9*h^4 + 103680*a^7*b^2*c^10*h^4 + 32400*a^
5*b^6*c^8*h^4 + 20736*b^9*c^10*d^2*e^2 + 2025*a^4*b^8*c^7*h^4 + 331776*a^5*
b^4*c^10*g^4 + 492800*a^5*b^2*c^12*f^4 + 351456*a^4*b^4*c^11*f^4 - 43120*a^
3*b^6*c^10*f^4 + 1225*a^2*b^8*c^9*f^4 - 27433728*a^3*b^2*c^14*d^4 + 6446304
*a^2*b^4*c^13*d^4 + a^2*b^14*c^3*f^2*j^2 - 81920*a^8*b^11*i*k^3 + 384000*a^

```
11*c^8*h*j^3 + 138240*a^9*c^10*h^3*j + 47416320*a^6*c^13*d^3*j - 1134*b^12*
c^7*d^3*j + 7077888*a^6*c^13*e^3*i + 2688000*a^10*c^9*d*j^3 + 786432*a^8*c^
11*e*i^3 + 28449792*a^5*c^14*d^3*h - 7782400*a^12*b^6*c*k^4 + 17010*b^10*c^
9*d^3*h + 580608*a^7*c^12*d*h^3 - 39690*b^9*c^10*d^3*f - 734832*a*b^6*c^12*
d^4 + 268435456*a^15*c^4*k^4 + 576*b^19*d^2*k^2 + 409600*a^11*b^8*k^4 + 160
000*a^12*c^7*j^4 + 65536*a^9*c^10*i^4 + 20736*a^8*c^11*h^4 + 49787136*a^4*c
^15*d^4 + 160000*a^6*c^13*f^4 + 5308416*a^5*c^14*e^4 + 35721*b^8*c^11*d^4,
z, n), n, 1, 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((k*x**11+j*x**8+i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2
+a)**3,x)
```

```
[Out] Timed out
```

3.60 $\int \left(a+bx^2+cx^4\right)^3 \left(ad+aex+(bd+af)x^2+bex^3+(cd$

Optimal. Leaf size=416

$$a^4dx+\frac{1}{2}a^4ex^2+\frac{1}{3}a^3x^3(af+4bd)+a^3bex^4+\frac{2}{5}a^2x^5\left(2abf+2acd+3b^2d\right)+\frac{1}{3}a^2ex^6\left(2ac+3b^2\right)+\frac{1}{10}ex^{10}\left(6a^2c^2+12ab\right.$$

```
[Out] a^4*d*x+1/2*a^4*e*x^2+1/3*a^3*(a*f+4*b*d)*x^3+a^3*b*e*x^4+2/5*a^2*(2*a*b*f+
2*a*c*d+3*b^2*d)*x^5+1/3*a^2*(2*a*c+3*b^2)*e*x^6+2/7*a*(2*a^2*c*f+3*a*b^2*f
+6*a*b*c*d+2*b^3*d)*x^7+1/2*a*b*(3*a*c+b^2)*e*x^8+1/9*(12*a^2*b*c*f+6*a^2*c
^2*d+4*a*b^3*f+12*a*b^2*c*d+b^4*d)*x^9+1/10*(6*a^2*c^2+12*a*b^2*c+b^4)*e*x^
10+1/11*(6*a^2*c^2*f+12*a*b^2*c*f+12*a*b*c^2*d+b^4*f+4*b^3*c*d)*x^11+1/3*b*
c*(3*a*c+b^2)*e*x^12+2/13*c*(6*a*b*c*f+2*a*c^2*d+2*b^3*f+3*b^2*c*d)*x^13+1/
7*c^2*(2*a*c+3*b^2)*e*x^14+2/15*c^2*(2*a*c*f+3*b^2*f+2*b*c*d)*x^15+1/4*b*c^
3*e*x^16+1/17*c^3*(4*b*f+c*d)*x^17+1/18*c^4*e*x^18+1/19*c^4*f*x^19
```

Rubi [A] time = 0.63, antiderivative size = 416, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 63, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.016, Rules used = {1671}

$$\frac{1}{11}x^{11}\left(6a^2c^2f+12ab^2cf+12abc^2d+4b^3cd+b^4f\right)+\frac{1}{9}x^9\left(12a^2bcf+6a^2c^2d+12ab^2cd+4ab^3f+b^4d\right)+\frac{1}{10}ex^{10}\left(\right.$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*x^2 + c*x^4)^3*(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d +
 b*f)*x^4 + c*e*x^5 + c*f*x^6),x]
```

```
[Out] a^4*d*x + (a^4*e*x^2)/2 + (a^3*(4*b*d + a*f)*x^3)/3 + a^3*b*e*x^4 + (2*a^2*
(3*b^2*d + 2*a*c*d + 2*a*b*f)*x^5)/5 + (a^2*(3*b^2 + 2*a*c)*e*x^6)/3 + (2*a
*(2*b^3*d + 6*a*b*c*d + 3*a*b^2*f + 2*a^2*c*f)*x^7)/7 + (a*b*(b^2 + 3*a*c)*
e*x^8)/2 + ((b^4*d + 12*a*b^2*c*d + 6*a^2*c^2*d + 4*a*b^3*f + 12*a^2*b*c*f)
*x^9)/9 + ((b^4 + 12*a*b^2*c + 6*a^2*c^2)*e*x^10)/10 + ((4*b^3*c*d + 12*a*b
*c^2*d + b^4*f + 12*a*b^2*c*f + 6*a^2*c^2*f)*x^11)/11 + (b*c*(b^2 + 3*a*c)*
e*x^12)/3 + (2*c*(3*b^2*c*d + 2*a*c^2*d + 2*b^3*f + 6*a*b*c*f)*x^13)/13 + (
c^2*(3*b^2 + 2*a*c)*e*x^14)/7 + (2*c^2*(2*b*c*d + 3*b^2*f + 2*a*c*f)*x^15)/
15 + (b*c^3*e*x^16)/4 + (c^3*(c*d + 4*b*f)*x^17)/17 + (c^4*e*x^18)/18 + (c^
4*f*x^19)/19
```

Rule 1671

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[Expa
ndIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && Poly
Q[Pq, x] && IGtQ[p, 0]
```

Rubi steps

$$\int \left(a+bx^2+cx^4\right)^3\left(ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6\right)dx=\int \left(a^4d+a^4ex+a^3(4bd\right.$$

$$=a^4dx+\frac{1}{2}a^4ex^2+\frac{1}{3}a^3(4bd$$

Mathematica [A] time = 0.12, size = 416, normalized size = 1.00

$$a^4dx+\frac{1}{2}a^4ex^2+\frac{1}{3}a^3x^3(af+4bd)+a^3bex^4+\frac{2}{5}a^2x^5\left(2abf+2acd+3b^2d\right)+\frac{1}{3}a^2ex^6\left(2ac+3b^2\right)+\frac{1}{10}ex^{10}\left(6a^2c^2+12ab\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*x^2 + c*x^4)^3*(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 +
(c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6),x]
```

```
[Out] a^4*d*x + (a^4*e*x^2)/2 + (a^3*(4*b*d + a*f)*x^3)/3 + a^3*b*e*x^4 + (2*a^2*
(3*b^2*d + 2*a*c*d + 2*a*b*f)*x^5)/5 + (a^2*(3*b^2 + 2*a*c)*e*x^6)/3 + (2*a
*(2*b^3*d + 6*a*b*c*d + 3*a*b^2*f + 2*a^2*c*f)*x^7)/7 + (a*b*(b^2 + 3*a*c)*
e*x^8)/2 + ((b^4*d + 12*a*b^2*c*d + 6*a^2*c^2*d + 4*a*b^3*f + 12*a^2*b*c*f)
*x^9)/9 + ((b^4 + 12*a*b^2*c + 6*a^2*c^2)*e*x^10)/10 + ((4*b^3*c*d + 12*a*b
*c^2*d + b^4*f + 12*a*b^2*c*f + 6*a^2*c^2*f)*x^11)/11 + (b*c*(b^2 + 3*a*c)*
e*x^12)/3 + (2*c*(3*b^2*c*d + 2*a*c^2*d + 2*b^3*f + 6*a*b*c*f)*x^13)/13 + (
c^2*(3*b^2 + 2*a*c)*e*x^14)/7 + (2*c^2*(2*b*c*d + 3*b^2*f + 2*a*c*f)*x^15)/
15 + (b*c^3*e*x^16)/4 + (c^3*(c*d + 4*b*f)*x^17)/17 + (c^4*e*x^18)/18 + (c^
4*f*x^19)/19
```

fricas [A] time = 0.81, size = 463, normalized size = 1.11

$$\frac{1}{19}x^{19}fc^4+\frac{1}{18}x^{18}ec^4+\frac{1}{17}x^{17}dc^4+\frac{4}{17}x^{17}fc^3b+\frac{1}{4}x^{16}ec^3b+\frac{4}{15}x^{15}dc^3b+\frac{2}{5}x^{15}fc^2b^2+\frac{4}{15}x^{15}fc^3a+\frac{3}{7}x^{14}ec^2b^2+\frac{2}{7}x^{14}e$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)^3*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+
c*e*x^5+c*f*x^6),x, algorithm="fricas")
```

```
[Out] 1/19*x^19*f*c^4 + 1/18*x^18*e*c^4 + 1/17*x^17*d*c^4 + 4/17*x^17*f*c^3*b + 1
/4*x^16*e*c^3*b + 4/15*x^15*d*c^3*b + 2/5*x^15*f*c^2*b^2 + 4/15*x^15*f*c^3*
a + 3/7*x^14*e*c^2*b^2 + 2/7*x^14*e*c^3*a + 6/13*x^13*d*c^2*b^2 + 4/13*x^13
*f*c*b^3 + 4/13*x^13*d*c^3*a + 12/13*x^13*f*c^2*b*a + 1/3*x^12*e*c*b^3 + x^
12*e*c^2*b*a + 4/11*x^11*d*c*b^3 + 1/11*x^11*f*b^4 + 12/11*x^11*d*c^2*b*a +
 12/11*x^11*f*c*b^2*a + 6/11*x^11*f*c^2*a^2 + 1/10*x^10*e*b^4 + 6/5*x^10*e*
c*b^2*a + 3/5*x^10*e*c^2*a^2 + 1/9*x^9*d*b^4 + 4/3*x^9*d*c*b^2*a + 4/9*x^9*
f*b^3*a + 2/3*x^9*d*c^2*a^2 + 4/3*x^9*f*c*b*a^2 + 1/2*x^8*e*b^3*a + 3/2*x^8
*e*c*b*a^2 + 4/7*x^7*d*b^3*a + 12/7*x^7*d*c*b*a^2 + 6/7*x^7*f*b^2*a^2 + 4/7
*x^7*f*c*a^3 + x^6*e*b^2*a^2 + 2/3*x^6*e*c*a^3 + 6/5*x^5*d*b^2*a^2 + 4/5*x^
5*d*c*a^3 + 4/5*x^5*f*b*a^3 + x^4*e*b*a^3 + 4/3*x^3*d*b*a^3 + 1/3*x^3*f*a^4
 + 1/2*x^2*e*a^4 + x*d*a^4
```

giac [A] time = 0.43, size = 478, normalized size = 1.15

$$\frac{1}{19}c^4fx^{19}+\frac{1}{18}c^4x^{18}e+\frac{1}{17}c^4dx^{17}+\frac{4}{17}bc^3fx^{17}+\frac{1}{4}bc^3x^{16}e+\frac{4}{15}bc^3dx^{15}+\frac{2}{5}b^2c^2fx^{15}+\frac{4}{15}ac^3fx^{15}+\frac{3}{7}b^2c^2x^{14}e+\frac{2}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)^3*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+
c*e*x^5+c*f*x^6),x, algorithm="giac")
```

```
[Out] 1/19*c^4*f*x^19 + 1/18*c^4*x^18*e + 1/17*c^4*d*x^17 + 4/17*b*c^3*f*x^17 + 1
/4*b*c^3*x^16*e + 4/15*b*c^3*d*x^15 + 2/5*b^2*c^2*f*x^15 + 4/15*a*c^3*f*x^1
5 + 3/7*b^2*c^2*x^14*e + 2/7*a*c^3*x^14*e + 6/13*b^2*c^2*d*x^13 + 4/13*a*c^
3*d*x^13 + 4/13*b^3*c*f*x^13 + 12/13*a*b*c^2*f*x^13 + 1/3*b^3*c*x^12*e + a*
b*c^2*x^12*e + 4/11*b^3*c*d*x^11 + 12/11*a*b*c^2*d*x^11 + 1/11*b^4*f*x^11 +
 12/11*a*b^2*c*f*x^11 + 6/11*a^2*c^2*f*x^11 + 1/10*b^4*x^10*e + 6/5*a*b^2*c
*x^10*e + 3/5*a^2*c^2*x^10*e + 1/9*b^4*d*x^9 + 4/3*a*b^2*c*d*x^9 + 2/3*a^2*
c^2*d*x^9 + 4/9*a*b^3*f*x^9 + 4/3*a^2*b*c*f*x^9 + 1/2*a*b^3*x^8*e + 3/2*a^2
*b*c*x^8*e + 4/7*a*b^3*d*x^7 + 12/7*a^2*b*c*d*x^7 + 6/7*a^2*b^2*f*x^7 + 4/7
*a^3*c*f*x^7 + a^2*b^2*x^6*e + 2/3*a^3*c*x^6*e + 6/5*a^2*b^2*d*x^5 + 4/5*a^
3*c*d*x^5 + 4/5*a^3*b*f*x^5 + a^3*b*x^4*e + 4/3*a^3*b*d*x^3 + 1/3*a^4*f*x^3
 + 1/2*a^4*x^2*e + a^4*d*x
```

maple [B] time = 0.00, size = 829, normalized size = 1.99

$$\frac{c^4fx^{19}}{19}+\frac{c^4ex^{18}}{18}+\frac{bc^3ex^{16}}{4}+\frac{\left(3bc^3f+\left(bf+cd\right)c^3\right)x^{17}}{17}+\frac{\left(3\left(bf+cd\right)bc^2+\left(af+bd\right)c^3+\left(ac^2+2b^2c+\left(2ac\right.\right.\right.}{15}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((c*x^4+b*x^2+a)^3*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^
5+c*f*x^6),x)
```

```
[Out] 1/19*c^4*f*x^19+1/18*c^4*e*x^18+1/17*(3*b*c^3*f+c^3*(b*f+c*d))*x^17+1/4*b*c
^3*e*x^16+1/15*((a*c^2+2*b^2*c+(2*a*c+b^2)*c)*c*f+3*b*c^2*(b*f+c*d)+c^3*(a*
f+b*d))*x^15+1/14*((a*c^2+2*b^2*c+(2*a*c+b^2)*c)*c*e+3*b^2*c^2*e+a*c^3*e)*x
^14+1/13*((4*a*b*c+(2*a*c+b^2)*b)*c*f+(a*c^2+2*b^2*c+(2*a*c+b^2)*c)*(b*f+c*
d)+3*b*c^2*(a*f+b*d)+a*c^3*d)*x^13+1/12*((4*a*b*c+(2*a*c+b^2)*b)*c*e+(a*c^2
+2*b^2*c+(2*a*c+b^2)*c)*b*e+3*a*b*c^2*e)*x^12+1/11*((a^2*c+2*a*b^2+(2*a*c+b
^2)*a)*c*f+(4*a*b*c+(2*a*c+b^2)*b)*(b*f+c*d)+(a*c^2+2*b^2*c+(2*a*c+b^2)*c)*
(a*f+b*d)+3*d*a*b*c^2)*x^11+1/10*((a^2*c+2*a*b^2+(2*a*c+b^2)*a)*c*e+(4*a*b*
c+(2*a*c+b^2)*b)*b*e+(a*c^2+2*b^2*c+(2*a*c+b^2)*c)*a*e)*x^10+1/9*(3*a^2*b*c
*f+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*(b*f+c*d)+(4*a*b*c+(2*a*c+b^2)*b)*(a*f+b*d
)+(a*c^2+2*b^2*c+(2*a*c+b^2)*c)*a*d)*x^9+1/8*(3*a^2*b*c*e+(a^2*c+2*a*b^2+(2
*a*c+b^2)*a)*b*e+(4*a*b*c+(2*a*c+b^2)*b)*a*e)*x^8+1/7*(a^3*c*f+3*a^2*b*(b*f
+c*d)+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*(a*f+b*d)+(4*a*b*c+(2*a*c+b^2)*b)*a*d)*
x^7+1/6*(a^3*c*e+3*a^2*b^2*e+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*a*e)*x^6+1/5*(a^
3*(b*f+c*d)+3*a^2*b*(a*f+b*d)+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*a*d)*x^5+a^3*b*
e*x^4+1/3*(a^3*(a*f+b*d)+3*a^3*b*d)*x^3+1/2*a^4*e*x^2+a^4*d*x
```

maxima [A] time = 0.52, size = 418, normalized size = 1.00

$$\frac{1}{19}\,c^4fx^{19}+\frac{1}{18}\,c^4ex^{18}+\frac{1}{4}\,bc^3ex^{16}+\frac{1}{17}\left(c^4d+4\,bc^3f\right)x^{17}+\frac{1}{7}\left(3\,b^2c^2+2\,ac^3\right)ex^{14}+\frac{2}{15}\left(2\,bc^3d+\left(3\,b^2c^2+2\,ac^3\right)f\right)x^{1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)^3*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+
c*e*x^5+c*f*x^6),x, algorithm="maxima")
```

```
[Out] 1/19*c^4*f*x^19 + 1/18*c^4*e*x^18 + 1/4*b*c^3*e*x^16 + 1/17*(c^4*d + 4*b*c^
3*f)*x^17 + 1/7*(3*b^2*c^2 + 2*a*c^3)*e*x^14 + 2/15*(2*b*c^3*d + (3*b^2*c^2
 + 2*a*c^3)*f)*x^15 + 1/3*(b^3*c + 3*a*b*c^2)*e*x^12 + 2/13*((3*b^2*c^2 + 2
*a*c^3)*d + 2*(b^3*c + 3*a*b*c^2)*f)*x^13 + 1/10*(b^4 + 12*a*b^2*c + 6*a^2*
c^2)*e*x^10 + 1/11*(4*(b^3*c + 3*a*b*c^2)*d + (b^4 + 12*a*b^2*c + 6*a^2*c^2
)*f)*x^11 + 1/2*(a*b^3 + 3*a^2*b*c)*e*x^8 + 1/9*((b^4 + 12*a*b^2*c + 6*a^2*
c^2)*d + 4*(a*b^3 + 3*a^2*b*c)*f)*x^9 + a^3*b*e*x^4 + 1/3*(3*a^2*b^2 + 2*a^
3*c)*e*x^6 + 2/7*(2*(a*b^3 + 3*a^2*b*c)*d + (3*a^2*b^2 + 2*a^3*c)*f)*x^7 +
1/2*a^4*e*x^2 + a^4*d*x + 2/5*(2*a^3*b*f + (3*a^2*b^2 + 2*a^3*c)*d)*x^5 + 1
/3*(4*a^3*b*d + a^4*f)*x^3
```

mupad [B] time = 0.38, size = 398, normalized size = 0.96

$$x^3\left(\frac{f\,a^4}{3}+\frac{4\,b\,d\,a^3}{3}\right)+x^{17}\left(\frac{d\,c^4}{17}+\frac{4\,b\,f\,c^3}{17}\right)+x^5\left(\frac{4\,f\,a^3\,b}{5}+\frac{4\,c\,d\,a^3}{5}+\frac{6\,d\,a^2\,b^2}{5}\right)+x^{15}\left(\frac{2\,f\,b^2\,c^2}{5}+\frac{4\,d\,b\,c^3}{15}+\frac{4\,a\,f\,c}{15}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*x^2 + c*x^4)^3*(a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x
+ b*e*x^3 + c*e*x^5 + c*f*x^6),x)
```

```
[Out] x^3*((a^4*f)/3 + (4*a^3*b*d)/3) + x^17*((c^4*d)/17 + (4*b*c^3*f)/17) + x^5*
((6*a^2*b^2*d)/5 + (4*a^3*c*d)/5 + (4*a^3*b*f)/5) + x^15*((2*b^2*c^2*f)/5 +
 (4*b*c^3*d)/15 + (4*a*c^3*f)/15) + x^9*((b^4*d)/9 + (2*a^2*c^2*d)/3 + (4*a
*b^3*f)/9 + (4*a*b^2*c*d)/3 + (4*a^2*b*c*f)/3) + x^11*((b^4*f)/11 + (6*a^2*
c^2*f)/11 + (4*b^3*c*d)/11 + (12*a*b*c^2*d)/11 + (12*a*b^2*c*f)/11) + x^7*(
(6*a^2*b^2*f)/7 + (4*a*b^3*d)/7 + (4*a^3*c*f)/7 + (12*a^2*b*c*d)/7) + x^13*
((6*b^2*c^2*d)/13 + (4*a*c^3*d)/13 + (4*b^3*c*f)/13 + (12*a*b*c^2*f)/13) +
(a^4*e*x^2)/2 + (c^4*e*x^18)/18 + (c^4*f*x^19)/19 + (e*x^10*(b^4 + 6*a^2*c^
2 + 12*a*b^2*c))/10 + a^4*d*x + (a^2*e*x^6*(2*a*c + 3*b^2))/3 + (c^2*e*x^14
```

```
*(2*a*c + 3*b^2))/7 + a^3*b*e*x^4 + (b*c^3*e*x^16)/4 + (a*b*e*x^8*(3*a*c +
b^2))/2 + (b*c*e*x^12*(3*a*c + b^2))/3
```

sympy [A] time = 0.16, size = 503, normalized size = 1.21

$$a^4dx+\frac{a^4ex^2}{2}+a^3bex^4+\frac{bc^3ex^{16}}{4}+\frac{c^4ex^{18}}{18}+\frac{c^4fx^{19}}{19}+x^{17}\left(\frac{4bc^3f}{17}+\frac{c^4d}{17}\right)+x^{15}\left(\frac{4ac^3f}{15}+\frac{2b^2c^2f}{5}+\frac{4bc^3d}{15}\right)+x^{14}\left(\frac{2ac}{7}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x**4+b*x**2+a)**3*(a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)
*x**4+c*e*x**5+c*f*x**6),x)
```

```
[Out] a**4*d*x + a**4*e*x**2/2 + a**3*b*e*x**4 + b*c**3*e*x**16/4 + c**4*e*x**18/
18 + c**4*f*x**19/19 + x**17*(4*b*c**3*f/17 + c**4*d/17) + x**15*(4*a*c**3*
f/15 + 2*b**2*c**2*f/5 + 4*b*c**3*d/15) + x**14*(2*a*c**3*e/7 + 3*b**2*c**2
*e/7) + x**13*(12*a*b*c**2*f/13 + 4*a*c**3*d/13 + 4*b**3*c*f/13 + 6*b**2*c*
*2*d/13) + x**12*(a*b*c**2*e + b**3*c*e/3) + x**11*(6*a**2*c**2*f/11 + 12*a
*b**2*c*f/11 + 12*a*b*c**2*d/11 + b**4*f/11 + 4*b**3*c*d/11) + x**10*(3*a**
2*c**2*e/5 + 6*a*b**2*c*e/5 + b**4*e/10) + x**9*(4*a**2*b*c*f/3 + 2*a**2*c*
*2*d/3 + 4*a*b**3*f/9 + 4*a*b**2*c*d/3 + b**4*d/9) + x**8*(3*a**2*b*c*e/2 +
 a*b**3*e/2) + x**7*(4*a**3*c*f/7 + 6*a**2*b**2*f/7 + 12*a**2*b*c*d/7 + 4*a
*b**3*d/7) + x**6*(2*a**3*c*e/3 + a**2*b**2*e) + x**5*(4*a**3*b*f/5 + 4*a**
3*c*d/5 + 6*a**2*b**2*d/5) + x**3*(a**4*f/3 + 4*a**3*b*d/3)
```

3.61 $\int \left(a+bx^2+cx^4\right)^2 \left(ad+aex+(bd+af)x^2+bex^3+(cd$

Optimal. Leaf size=259

$$a^3dx+\frac{1}{2}a^3ex^2+\frac{1}{7}x^7\left(3a^2cf+3ab^2f+6abcd+b^3d\right)+\frac{1}{3}a^2x^3(af+3bd)+\frac{3}{4}a^2bex^4+\frac{3}{11}cx^{11}\left(acf+b^2f+bcd\right)+\frac{3}{5}ax^5$$

```
[Out] a^3*d*x+1/2*a^3*e*x^2+1/3*a^2*(a*f+3*b*d)*x^3+3/4*a^2*b*e*x^4+3/5*a*(a*b*f+
a*c*d+b^2*d)*x^5+1/2*a*(a*c+b^2)*e*x^6+1/7*(3*a^2*c*f+3*a*b^2*f+6*a*b*c*d+b
^3*d)*x^7+1/8*b*(6*a*c+b^2)*e*x^8+1/9*(6*a*b*c*f+3*a*c^2*d+b^3*f+3*b^2*c*d)
*x^9+3/10*c*(a*c+b^2)*e*x^10+3/11*c*(a*c*f+b^2*f+b*c*d)*x^11+1/4*b*c^2*e*x^
12+1/13*c^2*(3*b*f+c*d)*x^13+1/14*c^3*e*x^14+1/15*c^3*f*x^15
```

Rubi [A] time = 0.33, antiderivative size = 259, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 63, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.016, Rules used = {1671}

$$\frac{1}{7}x^7\left(3a^2cf+3ab^2f+6abcd+b^3d\right)+\frac{1}{3}a^2x^3(af+3bd)+\frac{3}{4}a^2bex^4+a^3dx+\frac{1}{2}a^3ex^2+\frac{1}{9}x^9\left(6abcf+3ac^2d+3b^2cd+b\right.$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*x^2 + c*x^4)^2*(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d +
 b*f)*x^4 + c*e*x^5 + c*f*x^6),x]
```

```
[Out] a^3*d*x + (a^3*e*x^2)/2 + (a^2*(3*b*d + a*f)*x^3)/3 + (3*a^2*b*e*x^4)/4 + (
3*a*(b^2*d + a*c*d + a*b*f)*x^5)/5 + (a*(b^2 + a*c)*e*x^6)/2 + ((b^3*d + 6*
a*b*c*d + 3*a*b^2*f + 3*a^2*c*f)*x^7)/7 + (b*(b^2 + 6*a*c)*e*x^8)/8 + ((3*b
^2*c*d + 3*a*c^2*d + b^3*f + 6*a*b*c*f)*x^9)/9 + (3*c*(b^2 + a*c)*e*x^10)/1
0 + (3*c*(b*c*d + b^2*f + a*c*f)*x^11)/11 + (b*c^2*e*x^12)/4 + (c^2*(c*d +
3*b*f)*x^13)/13 + (c^3*e*x^14)/14 + (c^3*f*x^15)/15
```

Rule 1671

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[Expa
ndIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && Poly
Q[Pq, x] && IGtQ[p, 0]
```

Rubi steps

$$\int \left(a+bx^2+cx^4\right)^2 \left(ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6\right)\,dx=\int \left(a^3d+a^3ex+a^2(3bd+\right.$$

$$=a^3dx+\frac{1}{2}a^3ex^2+\frac{1}{3}a^2(3bd$$

Mathematica [A] time = 0.05, size = 259, normalized size = 1.00

$$a^3dx+\frac{1}{2}a^3ex^2+\frac{1}{7}x^7\left(3a^2cf+3ab^2f+6abcd+b^3d\right)+\frac{1}{3}a^2x^3(af+3bd)+\frac{3}{4}a^2bex^4+\frac{3}{11}cx^{11}\left(acf+b^2f+bcd\right)+\frac{3}{5}ax^5$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*x^2 + c*x^4)^2*(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 +
(c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6),x]
```

```
[Out] a^3*d*x + (a^3*e*x^2)/2 + (a^2*(3*b*d + a*f)*x^3)/3 + (3*a^2*b*e*x^4)/4 + (
3*a*(b^2*d + a*c*d + a*b*f)*x^5)/5 + (a*(b^2 + a*c)*e*x^6)/2 + ((b^3*d + 6*
a*b*c*d + 3*a*b^2*f + 3*a^2*c*f)*x^7)/7 + (b*(b^2 + 6*a*c)*e*x^8)/8 + ((3*b
^2*c*d + 3*a*c^2*d + b^3*f + 6*a*b*c*f)*x^9)/9 + (3*c*(b^2 + a*c)*e*x^10)/1
```

```
0 + (3*c*(b*c*d + b^2*f + a*c*f)*x^11)/11 + (b*c^2*e*x^12)/4 + (c^2*(c*d +
3*b*f)*x^13)/13 + (c^3*e*x^14)/14 + (c^3*f*x^15)/15
```

fricas [A] time = 0.70, size = 285, normalized size = 1.10

$$\frac{1}{15}x^{15}fc^3+\frac{1}{14}x^{14}ec^3+\frac{1}{13}x^{13}dc^3+\frac{3}{13}x^{13}fc^2b+\frac{1}{4}x^{12}ec^2b+\frac{3}{11}x^{11}dc^2b+\frac{3}{11}x^{11}fcb^2+\frac{3}{11}x^{11}fc^2a+\frac{3}{10}x^{10}ecb^2+\frac{3}{10}x^{10}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)^2*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+
c*e*x^5+c*f*x^6),x, algorithm="fricas")
```

```
[Out] 1/15*x^15*f*c^3 + 1/14*x^14*e*c^3 + 1/13*x^13*d*c^3 + 3/13*x^13*f*c^2*b + 1
/4*x^12*e*c^2*b + 3/11*x^11*d*c^2*b + 3/11*x^11*f*c*b^2 + 3/11*x^11*f*c^2*a
 + 3/10*x^10*e*c*b^2 + 3/10*x^10*e*c^2*a + 1/3*x^9*d*c*b^2 + 1/9*x^9*f*b^3
+ 1/3*x^9*d*c^2*a + 2/3*x^9*f*c*b*a + 1/8*x^8*e*b^3 + 3/4*x^8*e*c*b*a + 1/7
*x^7*d*b^3 + 6/7*x^7*d*c*b*a + 3/7*x^7*f*b^2*a + 3/7*x^7*f*c*a^2 + 1/2*x^6*
e*b^2*a + 1/2*x^6*e*c*a^2 + 3/5*x^5*d*b^2*a + 3/5*x^5*d*c*a^2 + 3/5*x^5*f*b
*a^2 + 3/4*x^4*e*b*a^2 + x^3*d*b*a^2 + 1/3*x^3*f*a^3 + 1/2*x^2*e*a^3 + x*d*
a^3
```

giac [A] time = 0.31, size = 295, normalized size = 1.14

$$\frac{1}{15}c^3fx^{15}+\frac{1}{14}c^3x^{14}e+\frac{1}{13}c^3dx^{13}+\frac{3}{13}bc^2fx^{13}+\frac{1}{4}bc^2x^{12}e+\frac{3}{11}bc^2dx^{11}+\frac{3}{11}b^2cfx^{11}+\frac{3}{11}ac^2fx^{11}+\frac{3}{10}b^2cx^{10}e+\frac{3}{10}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)^2*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+
c*e*x^5+c*f*x^6),x, algorithm="giac")
```

```
[Out] 1/15*c^3*f*x^15 + 1/14*c^3*x^14*e + 1/13*c^3*d*x^13 + 3/13*b*c^2*f*x^13 + 1
/4*b*c^2*x^12*e + 3/11*b*c^2*d*x^11 + 3/11*b^2*c*f*x^11 + 3/11*a*c^2*f*x^11
 + 3/10*b^2*c*x^10*e + 3/10*a*c^2*x^10*e + 1/3*b^2*c*d*x^9 + 1/3*a*c^2*d*x^
9 + 1/9*b^3*f*x^9 + 2/3*a*b*c*f*x^9 + 1/8*b^3*x^8*e + 3/4*a*b*c*x^8*e + 1/7
*b^3*d*x^7 + 6/7*a*b*c*d*x^7 + 3/7*a*b^2*f*x^7 + 3/7*a^2*c*f*x^7 + 1/2*a*b^
2*x^6*e + 1/2*a^2*c*x^6*e + 3/5*a*b^2*d*x^5 + 3/5*a^2*c*d*x^5 + 3/5*a^2*b*f
*x^5 + 3/4*a^2*b*x^4*e + a^2*b*d*x^3 + 1/3*a^3*f*x^3 + 1/2*a^3*x^2*e + a^3*
d*x
```

maple [A] time = 0.00, size = 354, normalized size = 1.37

$$\frac{c^3fx^{15}}{15}+\frac{c^3ex^{14}}{14}+\frac{bc^2ex^{12}}{4}+\frac{\left(2bc^2f+\left(bf+cd\right)c^2\right)x^{13}}{13}+\frac{\left(2\left(bf+cd\right)bc+\left(af+bd\right)c^2+\left(2ac+b^2\right)cf\right)x^{11}}{11}+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((c*x^4+b*x^2+a)^2*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^
5+c*f*x^6),x)
```

```
[Out] 1/15*c^3*f*x^15+1/14*c^3*e*x^14+1/13*(2*b*c^2*f+c^2*(b*f+c*d))*x^13+1/4*b*c
^2*e*x^12+1/11*((2*a*c+b^2)*c*f+2*b*c*(b*f+c*d)+c^2*(a*f+b*d))*x^11+1/10*((
2*a*c+b^2)*c*e+2*b^2*c*e+a*c^2*e)*x^10+1/9*(2*a*b*c*f+(2*a*c+b^2)*(b*f+c*d)
+2*b*c*(a*f+b*d)+a*c^2*d)*x^9+1/8*(4*a*b*c*e+(2*a*c+b^2)*b*e)*x^8+1/7*(a^2*
c*f+2*a*b*(b*f+c*d)+(2*a*c+b^2)*(a*f+b*d)+2*a*b*c*d)*x^7+1/6*(a^2*c*e+2*a*b
^2*e+(2*a*c+b^2)*a*e)*x^6+1/5*(a^2*(b*f+c*d)+2*a*b*(a*f+b*d)+(2*a*c+b^2)*a*
d)*x^5+3/4*a^2*b*e*x^4+1/3*(a^2*(a*f+b*d)+2*a^2*b*d)*x^3+1/2*a^3*e*x^2+a^3*
d*x
```

maxima [A] time = 0.70, size = 251, normalized size = 0.97

$$\frac{1}{15}c^3fx^{15}+\frac{1}{14}c^3ex^{14}+\frac{1}{4}bc^2ex^{12}+\frac{1}{13}\left(c^3d+3\,bc^2f\right)x^{13}+\frac{3}{10}\left(b^2c+ac^2\right)ex^{10}+\frac{3}{11}\left(bc^2d+\left(b^2c+ac^2\right)f\right)x^{11}+\frac{1}{8}\left(b\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)^2*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+
c*e*x^5+c*f*x^6),x, algorithm="maxima")
```

```
[Out] 1/15*c^3*f*x^15 + 1/14*c^3*e*x^14 + 1/4*b*c^2*e*x^12 + 1/13*(c^3*d + 3*b*c^
2*f)*x^13 + 3/10*(b^2*c + a*c^2)*e*x^10 + 3/11*(b*c^2*d + (b^2*c + a*c^2)*f
)*x^11 + 1/8*(b^3 + 6*a*b*c)*e*x^8 + 1/9*(3*(b^2*c + a*c^2)*d + (b^3 + 6*a*
b*c)*f)*x^9 + 3/4*a^2*b*e*x^4 + 1/2*(a*b^2 + a^2*c)*e*x^6 + 1/7*((b^3 + 6*a
*b*c)*d + 3*(a*b^2 + a^2*c)*f)*x^7 + 1/2*a^3*e*x^2 + 3/5*(a^2*b*f + (a*b^2
+ a^2*c)*d)*x^5 + a^3*d*x + 1/3*(3*a^2*b*d + a^3*f)*x^3
```

mupad [B] time = 0.95, size = 246, normalized size = 0.95

$$x^3\left(\frac{f\,a^3}{3}+b\,d\,a^2\right)+x^{13}\left(\frac{d\,c^3}{13}+\frac{3\,b\,f\,c^2}{13}\right)+x^5\left(\frac{3\,f\,a^2\,b}{5}+\frac{3\,c\,d\,a^2}{5}+\frac{3\,d\,a\,b^2}{5}\right)+x^{11}\left(\frac{3\,f\,b^2\,c}{11}+\frac{3\,d\,b\,c^2}{11}+\frac{3\,a\,f\,c^2}{11}\right)+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*x^2 + c*x^4)^2*(a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x
+ b*e*x^3 + c*e*x^5 + c*f*x^6),x)
```

```
[Out] x^3*((a^3*f)/3 + a^2*b*d) + x^13*((c^3*d)/13 + (3*b*c^2*f)/13) + x^5*((3*a*
b^2*d)/5 + (3*a^2*c*d)/5 + (3*a^2*b*f)/5) + x^11*((3*b*c^2*d)/11 + (3*a*c^2
*f)/11 + (3*b^2*c*f)/11) + x^7*((b^3*d)/7 + (3*a*b^2*f)/7 + (3*a^2*c*f)/7 +
 (6*a*b*c*d)/7) + x^9*((b^3*f)/9 + (a*c^2*d)/3 + (b^2*c*d)/3 + (2*a*b*c*f)/
3) + (a^3*e*x^2)/2 + (c^3*e*x^14)/14 + (c^3*f*x^15)/15 + a^3*d*x + (a*e*x^6
*(a*c + b^2))/2 + (b*e*x^8*(6*a*c + b^2))/8 + (3*c*e*x^10*(a*c + b^2))/10 +
 (3*a^2*b*e*x^4)/4 + (b*c^2*e*x^12)/4
```

sympy [A] time = 0.12, size = 309, normalized size = 1.19

$$a^3dx+\frac{a^3ex^2}{2}+\frac{3a^2bex^4}{4}+\frac{bc^2ex^{12}}{4}+\frac{c^3ex^{14}}{14}+\frac{c^3fx^{15}}{15}+x^{13}\left(\frac{3bc^2f}{13}+\frac{c^3d}{13}\right)+x^{11}\left(\frac{3ac^2f}{11}+\frac{3b^2cf}{11}+\frac{3bc^2d}{11}\right)+x^{10}\left(\frac{3ac^2e}{10}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x**4+b*x**2+a)**2*(a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)
*x**4+c*e*x**5+c*f*x**6),x)
```

```
[Out] a**3*d*x + a**3*e*x**2/2 + 3*a**2*b*e*x**4/4 + b*c**2*e*x**12/4 + c**3*e*x*
*14/14 + c**3*f*x**15/15 + x**13*(3*b*c**2*f/13 + c**3*d/13) + x**11*(3*a*c
**2*f/11 + 3*b**2*c*f/11 + 3*b*c**2*d/11) + x**10*(3*a*c**2*e/10 + 3*b**2*c
*e/10) + x**9*(2*a*b*c*f/3 + a*c**2*d/3 + b**3*f/9 + b**2*c*d/3) + x**8*(3*
a*b*c*e/4 + b**3*e/8) + x**7*(3*a**2*c*f/7 + 3*a*b**2*f/7 + 6*a*b*c*d/7 + b
**3*d/7) + x**6*(a**2*c*e/2 + a*b**2*e/2) + x**5*(3*a**2*b*f/5 + 3*a**2*c*d
/5 + 3*a*b**2*d/5) + x**3*(a**3*f/3 + a**2*b*d)
```

3.62 $\int (a + bx^2 + cx^4) (ad + aex + (bd + af)x^2 + bex^3 + (c$

Optimal. Leaf size=154

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{7}x^7 \left(2acf + b^2f + 2bcd\right)+\frac{1}{5}x^5 \left(2abf + 2acd + b^2d\right)+\frac{1}{6}ex^6 \left(2ac + b^2\right)+\frac{1}{3}ax^3(af+2bd)+\frac{1}{2}abex^4$$

```
[Out] a^2*d*x+1/2*a^2*e*x^2+1/3*a*(a*f+2*b*d)*x^3+1/2*a*b*e*x^4+1/5*(2*a*b*f+2*a*
c*d+b^2*d)*x^5+1/6*(2*a*c+b^2)*e*x^6+1/7*(2*a*c*f+b^2*f+2*b*c*d)*x^7+1/4*b*
c*e*x^8+1/9*c*(2*b*f+c*d)*x^9+1/10*c^2*e*x^10+1/11*c^2*f*x^11
```

Rubi [A] time = 0.15, antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 61, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.016, Rules used = {1671}

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{7}x^7 \left(2acf + b^2f + 2bcd\right)+\frac{1}{5}x^5 \left(2abf + 2acd + b^2d\right)+\frac{1}{6}ex^6 \left(2ac + b^2\right)+\frac{1}{3}ax^3(af+2bd)+\frac{1}{2}abex^4$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*x^2 + c*x^4)*(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b
*f)*x^4 + c*e*x^5 + c*f*x^6),x]
```

```
[Out] a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*b*e*x^4)/2 + ((b^2*d
 + 2*a*c*d + 2*a*b*f)*x^5)/5 + ((b^2 + 2*a*c)*e*x^6)/6 + ((2*b*c*d + b^2*f
+ 2*a*c*f)*x^7)/7 + (b*c*e*x^8)/4 + (c*(c*d + 2*b*f)*x^9)/9 + (c^2*e*x^10)/
10 + (c^2*f*x^11)/11
```

Rule 1671

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[Expa
ndIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && Poly
Q[Pq, x] && IGtQ[p, 0]
```

Rubi steps

$$\int \left(a + bx^2 + cx^4\right) \left(ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6\right) dx = \int \left(a^2d + a^2ex + a(2bd\right.$$

$$= a^2dx + \frac{1}{2}a^2ex^2 + \frac{1}{3}a(2b$$

Mathematica [A] time = 0.03, size = 154, normalized size = 1.00

$$a^2dx+\frac{1}{2}a^2ex^2+\frac{1}{7}x^7 \left(2acf + b^2f + 2bcd\right)+\frac{1}{5}x^5 \left(2abf + 2acd + b^2d\right)+\frac{1}{6}ex^6 \left(2ac + b^2\right)+\frac{1}{3}ax^3(af+2bd)+\frac{1}{2}abex^4$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*x^2 + c*x^4)*(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c
*d + b*f)*x^4 + c*e*x^5 + c*f*x^6),x]
```

```
[Out] a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*b*e*x^4)/2 + ((b^2*d
 + 2*a*c*d + 2*a*b*f)*x^5)/5 + ((b^2 + 2*a*c)*e*x^6)/6 + ((2*b*c*d + b^2*f
+ 2*a*c*f)*x^7)/7 + (b*c*e*x^8)/4 + (c*(c*d + 2*b*f)*x^9)/9 + (c^2*e*x^10)/
10 + (c^2*f*x^11)/11
```

fricas [A] time = 0.72, size = 151, normalized size = 0.98

$$\frac{1}{11}x^{11}fc^2+\frac{1}{10}x^{10}ec^2+\frac{1}{9}x^9dc^2+\frac{2}{9}x^9fcb+\frac{1}{4}x^8ecb+\frac{2}{7}x^7dcb+\frac{1}{7}x^7fb^2+\frac{2}{7}x^7fca+\frac{1}{6}x^6eb^2+\frac{1}{3}x^6eca+\frac{1}{5}x^5db^2+\frac{2}{5}x^5dc$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*
e*x^5+c*f*x^6),x, algorithm="fricas")
```

```
[Out] 1/11*x^11*f*c^2 + 1/10*x^10*e*c^2 + 1/9*x^9*d*c^2 + 2/9*x^9*f*c*b + 1/4*x^8
*e*c*b + 2/7*x^7*d*c*b + 1/7*x^7*f*b^2 + 2/7*x^7*f*c*a + 1/6*x^6*e*b^2 + 1/
3*x^6*e*c*a + 1/5*x^5*d*b^2 + 2/5*x^5*d*c*a + 2/5*x^5*f*b*a + 1/2*x^4*e*b*a
 + 2/3*x^3*d*b*a + 1/3*x^3*f*a^2 + 1/2*x^2*e*a^2 + x*d*a^2
```

giac [A] time = 0.28, size = 157, normalized size = 1.02

$$\frac{1}{11}c^2fx^{11}+\frac{1}{10}c^2x^{10}e+\frac{1}{9}c^2dx^9+\frac{2}{9}bcfx^9+\frac{1}{4}bcx^8e+\frac{2}{7}bcdx^7+\frac{1}{7}b^2fx^7+\frac{2}{7}acfx^7+\frac{1}{6}b^2x^6e+\frac{1}{3}acx^6e+\frac{1}{5}b^2dx^5+\frac{2}{5}aca$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*
e*x^5+c*f*x^6),x, algorithm="giac")
```

```
[Out] 1/11*c^2*f*x^11 + 1/10*c^2*x^10*e + 1/9*c^2*d*x^9 + 2/9*b*c*f*x^9 + 1/4*b*c
*x^8*e + 2/7*b*c*d*x^7 + 1/7*b^2*f*x^7 + 2/7*a*c*f*x^7 + 1/6*b^2*x^6*e + 1/
3*a*c*x^6*e + 1/5*b^2*d*x^5 + 2/5*a*c*d*x^5 + 2/5*a*b*f*x^5 + 1/2*a*b*x^4*e
 + 2/3*a*b*d*x^3 + 1/3*a^2*f*x^3 + 1/2*a^2*x^2*e + a^2*d*x
```

maple [A] time = 0.00, size = 161, normalized size = 1.05

$$\frac{c^2fx^{11}}{11}+\frac{c^2ex^{10}}{10}+\frac{bcex^8}{4}+\frac{\left(bcf+\left(bf+cd\right)c\right)x^9}{9}+\frac{abex^4}{2}+\frac{\left(acf+\left(bf+cd\right)b+\left(af+bd\right)c\right)x^7}{7}+\frac{\left(2ace+b^2e\right)x^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((c*x^4+b*x^2+a)*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+
c*f*x^6),x)
```

```
[Out] 1/11*c^2*f*x^11+1/10*c^2*e*x^10+1/9*(b*c*f+c*(b*f+c*d))*x^9+1/4*b*c*e*x^8+1
/7*(a*c*f+b*(b*f+c*d)+c*(a*f+b*d))*x^7+1/6*(2*a*c*e+b^2*e)*x^6+1/5*(a*(b*f+
c*d)+b*(a*f+b*d)+a*c*d)*x^5+1/2*a*b*e*x^4+1/3*(a*(a*f+b*d)+a*b*d)*x^3+1/2*a
^2*e*x^2+a^2*d*x
```

maxima [A] time = 0.59, size = 138, normalized size = 0.90

$$\frac{1}{11}c^2fx^{11}+\frac{1}{10}c^2ex^{10}+\frac{1}{4}bcex^8+\frac{1}{9}\left(c^2d+2bcf\right)x^9+\frac{1}{6}\left(b^2+2ac\right)ex^6+\frac{1}{7}\left(2bcd+\left(b^2+2ac\right)f\right)x^7+\frac{1}{2}abex^4+\frac{1}{5}\left(2a\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^4+b*x^2+a)*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*
e*x^5+c*f*x^6),x, algorithm="maxima")
```

```
[Out] 1/11*c^2*f*x^11 + 1/10*c^2*e*x^10 + 1/4*b*c*e*x^8 + 1/9*(c^2*d + 2*b*c*f)*x
^9 + 1/6*(b^2 + 2*a*c)*e*x^6 + 1/7*(2*b*c*d + (b^2 + 2*a*c)*f)*x^7 + 1/2*a*
b*e*x^4 + 1/5*(2*a*b*f + (b^2 + 2*a*c)*d)*x^5 + 1/2*a^2*e*x^2 + a^2*d*x + 1
/3*(2*a*b*d + a^2*f)*x^3
```

mupad [B] time = 0.09, size = 138, normalized size = 0.90

$$x^5\left(\frac{d\,b^2}{5}+\frac{2\,a\,f\,b}{5}+\frac{2\,a\,c\,d}{5}\right)+x^7\left(\frac{f\,b^2}{7}+\frac{2\,c\,d\,b}{7}+\frac{2\,a\,c\,f}{7}\right)+x^3\left(\frac{f\,a^2}{3}+\frac{2\,b\,d\,a}{3}\right)+x^9\left(\frac{d\,c^2}{9}+\frac{2\,b\,f\,c}{9}\right)+\frac{a^2\,e\,x^2}{2}+\frac{c^2\,e}{1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*x^2 + c*x^4)*(a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x +
b*e*x^3 + c*e*x^5 + c*f*x^6),x)
```

```
[Out] x^5*((b^2*d)/5 + (2*a*c*d)/5 + (2*a*b*f)/5) + x^7*((b^2*f)/7 + (2*b*c*d)/7
+ (2*a*c*f)/7) + x^3*((a^2*f)/3 + (2*a*b*d)/3) + x^9*((c^2*d)/9 + (2*b*c*f)
/9) + (a^2*e*x^2)/2 + (c^2*e*x^10)/10 + (c^2*f*x^11)/11 + (e*x^6*(2*a*c + b
^2))/6 + a^2*d*x + (a*b*e*x^4)/2 + (b*c*e*x^8)/4
```

sympy [A] time = 0.10, size = 165, normalized size = 1.07

$$a^2dx+\frac{a^2ex^2}{2}+\frac{abex^4}{2}+\frac{bcex^8}{4}+\frac{c^2ex^{10}}{10}+\frac{c^2fx^{11}}{11}+x^9\left(\frac{2bcf}{9}+\frac{c^2d}{9}\right)+x^7\left(\frac{2acf}{7}+\frac{b^2f}{7}+\frac{2bcd}{7}\right)+x^6\left(\frac{ace}{3}+\frac{b^2e}{6}\right)+x^5$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x**4+b*x**2+a)*(a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x*
*4+c*e*x**5+c*f*x**6),x)
```

```
[Out] a**2*d*x + a**2*e*x**2/2 + a*b*e*x**4/2 + b*c*e*x**8/4 + c**2*e*x**10/10 +
c**2*f*x**11/11 + x**9*(2*b*c*f/9 + c**2*d/9) + x**7*(2*a*c*f/7 + b**2*f/7
+ 2*b*c*d/7) + x**6*(a*c*e/3 + b**2*e/6) + x**5*(2*a*b*f/5 + 2*a*c*d/5 + b*
*2*d/5) + x**3*(a**2*f/3 + 2*a*b*d/3)
```

3.63 $\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{a+bx^2+cx^4} dx$

Optimal. Leaf size=20

$$dx+\frac{ex^2}{2}+\frac{fx^3}{3}$$

```
[Out] d*x+1/2*e*x^2+1/3*f*x^3
```

Rubi [A] time = 0.03, antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 63, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.016, Rules used = {1586}

$$dx+\frac{ex^2}{2}+\frac{fx^3}{3}$$

Antiderivative was successfully verified.

```
[In] Int[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4),x]
```

```
[Out] d*x + (e*x^2)/2 + (f*x^3)/3
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{a+bx^2+cx^4}\,dx &= \int \left(d+ex+fx^2\right)dx\\ &= dx+\frac{ex^2}{2}+\frac{fx^3}{3}\end{aligned}$$

Mathematica [A] time = 0.00, size = 20, normalized size = 1.00

$$dx+\frac{ex^2}{2}+\frac{fx^3}{3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4),x]
```

```
[Out] d*x + (e*x^2)/2 + (f*x^3)/3
```

fricas [A] time = 0.90, size = 16, normalized size = 0.80

$$\frac{1}{3}fx^3+\frac{1}{2}ex^2+dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a),x, algorithm="fricas")
```

```
[Out] 1/3*f*x^3 + 1/2*e*x^2 + d*x
```

giac [A] time = 1.77, size = 17, normalized size = 0.85

$$\frac{1}{3} f x^3 + \frac{1}{2} x^2 e + dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(
c*x^4+b*x^2+a),x, algorithm="giac")
```

```
[Out] 1/3*f*x^3 + 1/2*x^2*e + d*x
```

maple [A] time = 0.00, size = 17, normalized size = 0.85

$$\frac{1}{3} f x^3 + \frac{1}{2} e x^2 + dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+
b*x^2+a),x)
```

```
[Out] d*x+1/2*e*x^2+1/3*f*x^3
```

maxima [A] time = 0.62, size = 16, normalized size = 0.80

$$\frac{1}{3} f x^3 + \frac{1}{2} e x^2 + dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(
c*x^4+b*x^2+a),x, algorithm="maxima")
```

```
[Out] 1/3*f*x^3 + 1/2*e*x^2 + d*x
```

mupad [B] time = 0.03, size = 16, normalized size = 0.80

$$\frac{f x^3}{3} + \frac{e x^2}{2} + d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 +
c*f*x^6)/(a + b*x^2 + c*x^4),x)
```

```
[Out] d*x + (e*x^2)/2 + (f*x^3)/3
```

sympy [A] time = 0.09, size = 15, normalized size = 0.75

$$dx + \frac{ex^2}{2} + \frac{fx^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x**4+c*e*x**5+c*f*x*
*6)/(c*x**4+b*x**2+a),x)
```

```
[Out] d*x + e*x**2/2 + f*x**3/3
```

3.64 $\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{\left(a+bx^2+cx^4\right)^2}\,dx$

Optimal. Leaf size=211

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}}+f\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}}-\frac{e\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

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

Rubi [A] time = 0.32, antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 63, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.127, Rules used = {1586, 1673, 1166, 205, 12, 1107, 618, 206}

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}}+f\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}}-\frac{e\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

Antiderivative was successfully verified.

```
[In] Int[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 +
c*f*x^6)/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] ((f + (2*c*d - b*f)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b -
Sqrt[b^2 - 4*a*c]]])/(Sqrt[2]*Sqrt[c]*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((f -
(2*c*d - b*f)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b
^2 - 4*a*c]]])/(Sqrt[2]*Sqrt[c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - (e*ArcTanh[(
b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/Sqrt[b^2 - 4*a*c]
```

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 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$
\begin{aligned}
\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{\left(a+bx^2+cx^4\right)^2}\,dx &= \int \frac{d+ex+fx^2}{a+bx^2+cx^4}\,dx\\
&= \int \frac{ex}{a+bx^2+cx^4}\,dx+\int \frac{d+fx^2}{a+bx^2+cx^4}\,d\cdots\\
&= e\int \frac{x}{a+bx^2+cx^4}\,dx+\frac{1}{2}\left(f-\frac{2cd-bf}{\sqrt{b^2-4ac}}\cdots\right.\\
&= \frac{\left(f+\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\left(f-\cdots\right.}{\cdots}\\
&= \frac{\left(f+\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\left(f-\cdots\right.}{\cdots}\\
&= \frac{\left(f+\frac{2cd-bf}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\left(f-\cdots\right.}{\cdots}
\end{aligned}
$$

Mathematica [A] time = 0.06, size = 234, normalized size = 1.11

$$
\frac{\frac{\sqrt{2}\left(f\left(\sqrt{b^2-4ac}-b\right)+2cd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\sqrt{2}\left(f\left(\sqrt{b^2-4ac}+b\right)-2cd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}}+e\log\left(\sqrt{b^2-4ac}-b-2cx^2\right)-\cdots}{2\sqrt{b^2-4ac}}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*
x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] ((Sqrt[2]*(2*c*d + (-b + Sqrt[b^2 - 4*a*c])*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/S
qrt[b - Sqrt[b^2 - 4*a*c]]])/(Sqrt[c]*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[
2]*(-2*c*d + (b + Sqrt[b^2 - 4*a*c])*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b +
 Sqrt[b^2 - 4*a*c]]])/(Sqrt[c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + e*Log[-b + Sq
rt[b^2 - 4*a*c] - 2*c*x^2] - e*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(2*Sqr
t[b^2 - 4*a*c])
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(
c*x^4+b*x^2+a)^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 4.24, size = 1620, normalized size = 7.68

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(
c*x^4+b*x^2+a)^2,x, algorithm="giac")
```

```
[Out] -1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*
(b + sqrt(b^2 - 4*a*c))/c)/((b^4 - 8*a*b^2*c - 2*b^3*c + 16*a^2*c^2 + 8*a*b
*c^2 + b^2*c^2 - 4*a*c^3)*c^2) + 1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sq
rt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(b - sqrt(b^2 - 4*a*c))/c)/((b^4 - 8*a*b^2*
c - 2*b^3*c + 16*a^2*c^2 + 8*a*b*c^2 + b^2*c^2 - 4*a*c^3)*c^2) + 1/4*((sqrt
(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4
*a*c)*c)*a*b^2*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c - 2*b^4*
c + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^2 + 8*sqrt(2)*sqrt(b*c
 + sqrt(b^2 - 4*a*c)*c)*a*b*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b
^2*c^2 + 16*a*b^2*c^2 + 2*b^3*c^2 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*a*c^3 - 32*a^2*c^3 - 8*a*b*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sq
rt(b^2 - 4*a*c)*c)*b^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 -
4*a*c)*c)*a*b*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*b^2*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b*c^2
+ 2*(b^2 - 4*a*c)*b^2*c - 8*(b^2 - 4*a*c)*a*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*d
- 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^
2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*
a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*c^2 - 2
*(b^2 - 4*a*c)*a*c^2)*f)*arctan(2*sqrt(1/2)*x/sqrt((b + sqrt(b^2 - 4*a*c))/
c))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^
2 - 4*a^2*c^3)*abs(c)) + 1/4*((sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4
- 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c - 2*sqrt(2)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*b^3*c + 2*b^4*c + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a
*c)*c)*a^2*c^2 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^2 + sqrt(2
)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^2 - 16*a*b^2*c^2 - 2*b^3*c^2 - 4*sq
rt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*c^3 + 32*a^2*c^3 + 8*a*b*c^3 + sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3 - 4*sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c - 2*sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c + sqrt(2)*sqrt(b^2 - 4*a*c)*sqr
```

```
t(b*c - sqrt(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b^2*c + 8*(b^2 - 4*a*c
)*a*c^2 + 2*(b^2 - 4*a*c)*b*c^2)*d + 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqrt(b^2
 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b
*c - sqrt(b^2 - 4*a*c)*c)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*f)*arctan(2*sqrt(1
/2)*x/sqrt((b - sqrt(b^2 - 4*a*c))/c))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c +
16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*abs(c))
```

maple [B] time = 0.02, size = 616, normalized size = 2.92

$$-\frac{2\sqrt{2}\, acf \operatorname{arctanh}\left(\frac{\sqrt{2}\, cx}{\sqrt{\left(-b+\sqrt{-4ac+b^{2}}\right)c}}\right)}{\left(4ac-b^{2}\right)\sqrt{\left(-b+\sqrt{-4ac+b^{2}}\right)c}}+\frac{2\sqrt{2}\, acf \arctan\left(\frac{\sqrt{2}\, cx}{\sqrt{\left(b+\sqrt{-4ac+b^{2}}\right)c}}\right)}{\left(4ac-b^{2}\right)\sqrt{\left(b+\sqrt{-4ac+b^{2}}\right)c}}+\frac{\sqrt{2}\, b^{2} f \operatorname{arctanh}\left(\frac{\sqrt{2}\, cx}{\sqrt{\left(-b+\sqrt{-4ac+b^{2}}\right)}}\right)}{2\left(4ac-b^{2}\right)\sqrt{\left(-b+\sqrt{-4ac+b^{2}}\right.}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+
b*x^2+a)^2,x)
```

```
[Out] -1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*e*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))-2*c
/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b
+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f*a+1/2/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x
)*f*b^2-1/2*(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))
*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*f+c*(-4*
a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan
h(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*d+1/2*(-4*a*c+b^2)^(1/2)/(
4*a*c-b^2)*e*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+2/(4*a*c-b^2)*2^(1/2)/((b+(-4
*a*c+b^2)^(1/2))*c)^(1/2)*a*c*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(
1/2)*c*x)-1/2/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b^2*f*ar
ctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/2*(-4*a*c+b^2)^(1/2)/(
4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b*f*arctan(2^(1/2)/((b+
(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+(-4*a*c+b^2)^(1/2)/(4*a*c-b^2)*2^(1/2)/((
b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c
)^(1/2)*c*x)
```

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

$$\int \frac{cfx^{6}+cex^{5}+bex^{3}+\left(cd+bf\right)x^{4}+aex+\left(bd+af\right)x^{2}+ad}{\left(cx^{4}+bx^{2}+a\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(
c*x^4+b*x^2+a)^2,x, algorithm="maxima")
```

```
[Out] integrate((c*f*x^6 + c*e*x^5 + b*e*x^3 + (c*d + b*f)*x^4 + a*e*x + (b*d + a
*f)*x^2 + a*d)/(c*x^4 + b*x^2 + a)^2, x)
```

mupad [B] time = 1.17, size = 3942, normalized size = 18.68

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 +
c*f*x^6)/(a + b*x^2 + c*x^4)^2,x)
```

```
[Out] symsum(log(c^2*d*e^2 - c^2*d^2*f + c^2*e^3*x - a*c*f^3 - 8*root(16*a*b^4*c*
z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c
^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 +
32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z +
 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a
*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^
4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^3*b^3*c^2*x + b*c*d*f^2 - 16*roo
t(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z
^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c
^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^
2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*
d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2
*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*a*c^3*d - 4*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*c^3*d^2*x + 4*root(16
*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 +
 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d
^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*
e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^
2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2
 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*b^2*c^2*d + 32*root(1
6*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
+ 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*
d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c
*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e
^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^
2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^3*a*b*c^3*x + 16*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*a*c^3*e*x + 4*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*a*c^2*f^2*x + 2*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*b*c^2*e^2*x - 2*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*b^2*c*f^2*x - 4*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
```

```
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*b^2*c^2*e*x + 4*roo
t(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z
^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c
^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^
2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*
d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2
*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*b*c^2*d*e - 8*root(
16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2
 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*a*c^2*e*f + b*c*e*f^2
*x - 2*c^2*d*e*f*x + 4*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*
c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*
a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2
 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z -
 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f
^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4,
 z, k)*b*c^2*d*f*x)*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3
*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b
^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 +
4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16
*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3
+ b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z,
 k), k, 1, 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x**4+c*e*x**5+c*f*x*
*6)/(c*x**4+b*x**2+a)**2,x)
```

```
[Out] Timed out
```

3.65 $\displaystyle\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{\left(a+bx^2+cx^4\right)^3}\,dx$

Optimal. Leaf size=368

$$\frac{x\left(cx^2(bd-2af)-abf-2acd+b^2d\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}\,a\left(b^2-4ac\right)\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\sqrt{c}\left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}\cdots\right.}{2\sqrt{2}\,a\left(b^2\cdots\right.}$$

```
[Out] -1/2*e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*x*(b^2*d-2*a*c*d-a*b*f+
c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+2*c*e*arctanh((2*c*x^2+b
)/(-4*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(3/2)+1/4*arctan(x*2^(1/2)*c^(1/2)/(b-(-
4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(b*d-2*a*f+(4*a*b*f-12*a*c*d+b^2*d)/(-4*a*
c+b^2)^(1/2))/a/(-4*a*c+b^2)*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/4*arcta
n(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(b*d-2*a*f+(-4*a*
b*f+12*a*c*d-b^2*d)/(-4*a*c+b^2)^(1/2))/a/(-4*a*c+b^2)*2^(1/2)/(b+(-4*a*c+b
^2)^(1/2))^(1/2)
```

Rubi [A] time = 0.92, antiderivative size = 368, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, integrand size = 63, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.159, Rules used = {1586, 1673, 1178, 1166, 205, 12, 1107, 614, 618, 206}

$$\frac{x\left(cx^2(bd-2af)-abf-2acd+b^2d\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}\,x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}\,a\left(b^2-4ac\right)\sqrt{b-\sqrt{b^2-4ac}}}+\frac{\sqrt{c}\left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}\cdots\right.}{2\sqrt{2}\,a\left(b^2\cdots\right.}$$

Antiderivative was successfully verified.

```
[In] Int[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 +
c*f*x^6)/(a + b*x^2 + c*x^4)^3,x]
```

```
[Out] -(e*(b + 2*c*x^2))/(2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (x*(b^2*d - 2*a*
c*d - a*b*f + c*(b*d - 2*a*f)*x^2))/(2*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4))
 + (Sqrt[c]*(b*d - 2*a*f + (b^2*d - 12*a*c*d + 4*a*b*f)/Sqrt[b^2 - 4*a*c])*
ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(2*Sqrt[2]*a*(b^2
- 4*a*c)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[c]*(b*d - 2*a*f - (b^2*d - 12
*a*c*d + 4*a*b*f)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sq
rt[b^2 - 4*a*c]]])/(2*Sqrt[2]*a*(b^2 - 4*a*c)*Sqrt[b + Sqrt[b^2 - 4*a*c]])
+ (2*c*e*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(3/2)
```

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 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{\left(a+bx^2+cx^4\right)^3}\,dx = \int \frac{d+ex+fx^2}{\left(a+bx^2+cx^4\right)^2}\,dx$$

$$= \int \frac{ex}{\left(a+bx^2+cx^4\right)^2}\,dx + \int \frac{d+fx^2}{\left(a+bx^2+cx^4\right)^{}}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} - \int$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{2a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{1}{2}e$$

$$= -\frac{e\left(b+2cx^2\right)}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-2a\right.}{2a\left(b^2-\right.}$$

$$= -\frac{e\left(b+2cx^2\right)}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-2a\right.}{2a\left(b^2-\right.}$$

$$= -\frac{e\left(b+2cx^2\right)}{2\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)} + \frac{x\left(b^2d-2a\right.}{2a\left(b^2-\right.}$$

Mathematica [A] time = 1.20, size = 398, normalized size = 1.08

$$\frac{1}{4}\left(\frac{2ab(e+fx)+4acx(d+x(e+fx))-2bdx\left(b+cx^2\right)}{a\left(4ac-b^2\right)\left(a+bx^2+cx^4\right)} + \frac{\sqrt{2}\sqrt{c}\left(b\left(d\sqrt{b^2-4ac}+4af\right)-2a\left(f\sqrt{b^2-4ac}+6c\right.\right.}{a\left(b^2-4ac\right)^{3/2}\sqrt{b-\sqrt{b^2-4}}}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*
x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^3,x]
```

```
[Out] ((2*a*b*(e + f*x) - 2*b*d*x*(b + c*x^2) + 4*a*c*x*(d + x*(e + f*x)))/(a*(-b
^2 + 4*a*c)*(a + b*x^2 + c*x^4)) + (Sqrt[2]*Sqrt[c]*(b^2*d + b*(Sqrt[b^2 -
4*a*c]*d + 4*a*f) - 2*a*(6*c*d + Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt
[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^(3/2)*Sqrt[b - Sqrt[b
^2 - 4*a*c]]) + (Sqrt[2]*Sqrt[c]*(-(b^2*d) + 12*a*c*d + b*Sqrt[b^2 - 4*a*c]
*d - 4*a*b*f - 2*a*Sqrt[b^2 - 4*a*c]*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b +
 Sqrt[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^(3/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) -
 (4*c*e*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(3/2) + (4*c*e
*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(3/2))/4
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(
c*x^4+b*x^2+a)^3,x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 11.93, size = 5164, normalized size = 14.03

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(
c*x^4+b*x^2+a)^3,x, algorithm="giac")
```

```
[Out] 1/2*(b*c*d*x^3 - 2*a*c*f*x^3 - 2*a*c*x^2*e + b^2*d*x - 2*a*c*d*x - a*b*f*x
- a*b*e)/((c*x^4 + b*x^2 + a)*(a*b^2 - 4*a^2*c)) + 1/16*((2*b^3*c^2 - 8*a*b
*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3 + 4*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c + 2*sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c - sqrt(2)*sqrt(b^2 -
 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b
^2 - 4*a^2*c)^2*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4
*a*c)*c)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*(a*b^2 - 4*a^2*c)^2*f + 2*(sqrt(2)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6 - 14*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*
a*c)*c)*a^2*b^4*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c - 2*a
*b^6*c + 64*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^2 + 20*sqrt(2
)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2
 - 4*a*c)*c)*a*b^4*c^2 + 28*a^2*b^4*c^2 - 96*sqrt(2)*sqrt(b*c + sqrt(b^2 -
4*a*c)*c)*a^4*c^3 - 48*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 -
10*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 128*a^3*b^2*c^3 +
24*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^4 + 192*a^4*c^4 + 2*(b^2 -
 4*a*c)*a*b^4*c - 20*(b^2 - 4*a*c)*a^2*b^2*c^2 + 48*(b^2 - 4*a*c)*a^3*c^3)*
d*abs(a*b^2 - 4*a^2*c) + 2*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5
 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c - 2*sqrt(2)*sqrt(b*c
 + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c - 2*a^2*b^5*c + 16*sqrt(2)*sqrt(b*c + sqr
t(b^2 - 4*a*c)*c)*a^4*b*c^2 + 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3
*b^2*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + 16*a^3*b^3
*c^2 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 - 32*a^4*b*c^3 +
 2*(b^2 - 4*a*c)*a^2*b^3*c - 8*(b^2 - 4*a*c)*a^3*b*c^2)*f*abs(a*b^2 - 4*a^2
*c) + (2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b^3*c^4 - 384*a^5*b*c^5 - s
qrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^7 + 20*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c + 2*sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^6*c - 112*sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^3*c^2 - 32*sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c^2 - sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c^2 + 192*sqrt(2)*sqr
t(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^5*b*c^3 + 96*sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^3 + 16*sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^3 - 48*sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b*c^4 - 2*(b^2 - 4*a*c)*a^
2*b^5*c^2 + 32*(b^2 - 4*a*c)*a^3*b^3*c^3 - 96*(b^2 - 4*a*c)*a^4*b*c^4)*d +
4*(2*a^3*b^6*c^2 - 16*a^4*b^4*c^3 + 32*a^5*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a
*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^6 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*s
qrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b^4*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt
(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b
*c + sqrt(b^2 - 4*a*c)*c)*a^5*b^2*c^2 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^4*b^3*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c +
 sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c +
sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^3 - 2*(b^2 - 4*a*c)*a^3*b^4*c^2 + 8*(b^2 - 4
```

*a*c)*a^4*b^2*c^3)*f)*arctan(2*sqrt(1/2)*x/sqrt((a*b^3 - 4*a^2*b*c + sqrt((
a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2
*c - 4*a^2*c^2)))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^5*c + 48*a^5*b^2*c^2 +
16*a^4*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b*c^3 - 8*a^4*b^2*c^3 +
16*a^5*c^4)*abs(a*b^2 - 4*a^2*c)*abs(c)) - 1/16*((2*b^3*c^2 - 8*a*b*c^3 -
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3 + 4*sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c + 2*sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c - sqrt(2)*sqrt(b^2 - 4*a*c)
*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b^2 - 4*
a^2*c)^2*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c - sqrt(b^2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqr
t(b^2 - 4*a*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 -
4*a*c)*c)*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*(a*b^2 - 4*a^2*c)^2*f - 2*(sqrt(2)*sqrt(b*
c - sqrt(b^2 - 4*a*c)*c)*a*b^6 - 14*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)
*a^2*b^4*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c + 2*a*b^6*c
+ 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^2 + 20*sqrt(2)*sqrt(
b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*
c)*c)*a*b^4*c^2 - 28*a^2*b^4*c^2 - 96*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*
c)*a^4*c^3 - 48*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 - 10*sqrt
(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 128*a^3*b^2*c^3 + 24*sqrt
(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^4 - 192*a^4*c^4 - 2*(b^2 - 4*a*c)
*a*b^4*c + 20*(b^2 - 4*a*c)*a^2*b^2*c^2 - 48*(b^2 - 4*a*c)*a^3*c^3)*d*abs(a
*b^2 - 4*a^2*c) - 2*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^5 - 8*sq
rt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c - 2*sqrt(2)*sqrt(b*c - sqrt
(b^2 - 4*a*c)*c)*a^2*b^4*c + 2*a^2*b^5*c + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 -
4*a*c)*c)*a^4*b*c^2 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^
2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 - 16*a^3*b^3*c^2 -
4*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 + 32*a^4*b*c^3 - 2*(b^2
- 4*a*c)*a^2*b^3*c + 8*(b^2 - 4*a*c)*a^3*b*c^2)*f*abs(a*b^2 - 4*a^2*c) + (
2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b^3*c^4 - 384*a^5*b*c^5 - sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^7 + 20*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c + 2*sqrt(2)*sqrt(b^
2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^6*c - 112*sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^3*c^2 - 32*sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^4*c^2 - sqrt(2)*sqrt(b^2 -
4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c^2 + 192*sqrt(2)*sqrt(b^2 -
4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^5*b*c^3 + 96*sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b^2*c^3 + 16*sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^3 - 48*sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^4*b*c^4 - 2*(b^2 - 4*a*c)*a^2*b^5*c
^2 + 32*(b^2 - 4*a*c)*a^3*b^3*c^3 - 96*(b^2 - 4*a*c)*a^4*b*c^4)*d + 4*(2*a^
3*b^6*c^2 - 16*a^4*b^4*c^3 + 32*a^5*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqr
t(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^6 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
- sqrt(b^2 - 4*a*c)*c)*a^4*b^4*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*a^3*b^5*c - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sq
rt(b^2 - 4*a*c)*c)*a^5*b^2*c^2 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqr
t(b^2 - 4*a*c)*c)*a^4*b^3*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b
^2 - 4*a*c)*c)*a^3*b^4*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^
2 - 4*a*c)*c)*a^4*b^2*c^3 - 2*(b^2 - 4*a*c)*a^3*b^4*c^2 + 8*(b^2 - 4*a*c)*a
^4*b^2*c^3)*f)*arctan(2*sqrt(1/2)*x/sqrt((a*b^3 - 4*a^2*b*c - sqrt((a*b^3 -
4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*
a^2*c^2)))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^5*c + 48*a^5*b^2*c^2 + 16*a^4
*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b*c^3 - 8*a^4*b^2*c^3 + 16*a^5
*c^4)*abs(a*b^2 - 4*a^2*c)*abs(c)) - 1/4*((b^3*c^2 - 4*a*b*c^3 - 2*b^2*c^3
+ b*c^4 + (b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c))*abs(a*b^2
- 4*a^2*c)*e - (a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*
a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 + (a*b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^
3*c^3 + a*b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(a*b^3 - 4*a^2*b*c +

```
 sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))
/(a*b^2*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*
a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(a*b^2 - 4*a^2*c)) - 1/4*((b^3*c^
2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c^4 - (b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sqr
t(b^2 - 4*a*c))*abs(a*b^2 - 4*a^2*c)*e - (a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b
^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 - (a*b^4*c^
2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2
+ 1/2*(a*b^3 - 4*a^2*b*c - sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*
c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c - 2
*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(a*b^2
- 4*a^2*c))
```

maple [B] time = 0.14, size = 1813, normalized size = 4.93

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+
b*x^2+a)^3,x)
```

```
[Out] -1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1
/2)/a*b^2*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/4*c/(4
*a*c-b^2)^2/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-
b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*d-1/2/(4*a*c-b^2
)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*b^2*e-1/2/(4*a*c-b^2)^2/(x^2+1/2
*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*b^2*e-c/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b
^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*
(-4*a*c+b^2)^(1/2)*b*f-1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(
1/2)*(-4*a*c+b^2)^(1/2)*b*c*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/
2)*c*x)-2*c^2/(4*a*c-b^2)^2*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arc
tanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f+1/2*c/(4*a*c-b^2)^2*2
^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^
(1/2))*c)^(1/2)*c*x)*b^2*f+2/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*
c)^(1/2)*a*c^2*f*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/2/(
4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*b^2*c*f*arctan(2^(1/2
)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-
4*a*c+b^2)^(1/2)/c)*a*c*f*x+2/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(
1/2)/c)*a*c*f*x-1/4*c/(4*a*c-b^2)^2/a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(
1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*d-1/2/(4*a*
c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*b^2*f*x+1/(4*a*c-b^2)^2*(-4
*a*c+b^2)^(1/2)*c*e*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+2/(4*a*c-b^2)^2/(x^2+1
/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*a*c*e-1/(4*a*c-b^2)^2*(-4*a*c+b^2)^(1/2)*c
*e*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))-1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4
*a*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2)/a*b^2*d*x+3/(4*a*c-b^2)^2*2^(1/2)/((b
+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)*c^2*d*arctan(2^(1/2)/((b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)-1/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(
1/2))*c)^(1/2)*b*c^2*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)
+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2
)/a*b^2*d*x+3*c^2/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*a
rctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d+
c^2/(4*a*c-b^2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)
/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*d+1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(
-4*a*c+b^2)^(1/2))*c)^(1/2)/a*b^3*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2)
)*c)^(1/2)*c*x)+2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*a*c*
e-1/2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*b^2*f*x+1/(4*a*c
-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2)*c*d*x-1/(
4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*b*c*d*x+1/4/(4*a*c-b^2)
^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)/a*b^3*d*x-1/(4*a*c-b^2)^2/(x^2+1/
2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*(-4*a*c+b^2)^(1/2)*c*d*x-1/(4*a*c-b^2)^2/(x
```

```
^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*b*c*d*x+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c
-1/2*(-4*a*c+b^2)^(1/2)/c)/a*b^3*d*x
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(
c*x^4+b*x^2+a)^3,x, algorithm="maxima")
```

```
[Out] -1/2*(2*a*c*e*x^2 - (b*c*d - 2*a*c*f)*x^3 + a*b*e + (a*b*f - (b^2 - 2*a*c)*
d)*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)*
x^2) - 1/2*integrate((4*a*c*e*x - a*b*f - (b*c*d - 2*a*c*f)*x^2 - (b^2 - 6*
a*c)*d)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c)
```

mupad [B] time = 1.52, size = 4707, normalized size = 12.79

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 +
c*f*x^6)/(a + b*x^2 + c*x^4)^3,x)
```

```
[Out] symsum(log((5*b^3*c^4*d^3 + 8*a^3*c^4*f^3 - 96*a^2*c^5*d*e^2 + 72*a^2*c^5*d
^2*f - 3*b^4*c^3*d^2*f + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + 16*a*b^2*c^4*
d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 16*a^
2*b*c^4*e^2*f)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) -
 root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3
*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 -
256*a^3*b^12*z^4 + 576*a^2*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072
*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2 +
 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 81
92*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z
^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4
*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10
*d*f*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 - 4
096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*d*e*f*z - 768
*a^2*b^5*c^2*d*e*f*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 1536*
a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z +
 4992*a^2*b^4*c^3*d^2*e*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z +
32*b^8*c*d^2*e*z - 32*a*b^4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^2*f - 192*a^3
*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*
c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 2016*a^2*b*c^4*
d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3*c^2*e^2*f^2
- 960*a^2*b^2*c^3*d^2*f^2 - 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^5
*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9*
a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c^4*e^4 - 25*b
^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*((32*a*b^5*c^3*d*e - 512*a^4*c^5*e*f +
 1024*a^3*b*c^5*d*e - 384*a^2*b^3*c^4*d*e + 32*a^2*b^4*c^3*e*f)/(8*(a^2*b^6
 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) + root(1572864*a^8*b^2*c^5*
z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z
^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 576*a^2
*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 204
8*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2 + 61440*a^5*b*c^5*d^2*z^2 -
 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + 1
536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*
z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c
^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10*d*f*z^2 - 32768*a^6*c^5*e
^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 - 4096*a^4*b*c^4*d*e*f*z + 64
```

```
*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*d*e*f*z - 768*a^2*b^5*c^2*d*e*f*z + 32*
a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 1536*a^4*b^2*c^3*e*f^2*z - 384*
a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z
- 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 32*a*b^
4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^2*f - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4
*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^
3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 2016*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*
f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3*c^2*e^2*f^2 - 960*a^2*b^2*c^3*d^2*f^2
- 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*
c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9*a^2*b^4*c*f^4 + 360*a*b^2*
c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*
d^4, z, k)*((x*(1024*a^5*c^6*e - 16*a^2*b^6*c^3*e + 192*a^3*b^4*c^4*e - 768
*a^4*b^2*c^5*e))/(2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))
 - (6144*a^5*c^6*d - 288*a^2*b^6*c^3*d + 1920*a^3*b^4*c^4*d - 5632*a^4*b^2*
c^5*d + 16*a^2*b^7*c^2*f - 192*a^3*b^5*c^3*f + 768*a^4*b^3*c^4*f + 16*a*b^8
*c^2*d - 1024*a^5*b*c^5*f)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4
*b^2*c^2)) + (root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 32768
0*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a
^9*c^6*z^4 - 256*a^3*b^12*z^4 + 576*a^2*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d
*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*
c^4*f^2*z^2 + 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c
*d^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*
b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 6144
0*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^
2 - 32*a*b^10*d*f*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^1
1*d^2*z^2 - 4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*
d*e*f*z - 768*a^2*b^5*c^2*d*e*f*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^
2*e*z + 1536*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*
c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c
^5*d^2*e*z + 32*b^8*c*d^2*e*z - 32*a*b^4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^
2*f - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3
 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 20
16*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3
*c^2*e^2*f^2 - 960*a^2*b^2*c^3*d^2*f^2 - 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2
*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c
*d^2*f^2 - 9*a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c
^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*x*(4096*a^6*b*c^6 + 16*a^
2*b^9*c^2 - 256*a^3*b^7*c^3 + 1536*a^4*b^5*c^4 - 4096*a^5*b^3*c^5))/(2*(a^2
*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) + (x*(b^6*c^3*d^2 - 28
8*a^3*c^6*d^2 + 32*a^4*c^5*f^2 - 18*a*b^4*c^4*d^2 + 64*a^3*b*c^5*e^2 + 128*
a^2*b^2*c^5*d^2 - 16*a^2*b^3*c^4*e^2 + 10*a^2*b^4*c^3*f^2 - 48*a^3*b^2*c^4*
f^2 + 2*a*b^5*c^3*d*f + 160*a^3*b*c^5*d*f - 48*a^2*b^3*c^4*d*f))/(2*(a^2*b^
6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) - (x*(16*a^2*c^5*e^3 - b^
3*c^4*d^2*e + 12*a*b*c^5*d^2*e - 24*a^2*c^5*d*e*f + 8*a^2*b*c^4*e*f^2 - 2*a
*b^2*c^4*d*e*f))/(2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))
)*root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^
3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 -
 256*a^3*b^12*z^4 + 576*a^2*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 307
2*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2
+ 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8
192*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*
z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^
4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^1
0*d*f*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 -
4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*d*e*f*z - 76
8*a^2*b^5*c^2*d*e*f*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 1536
*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z
+ 4992*a^2*b^4*c^3*d^2*e*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z +
 32*b^8*c*d^2*e*z - 32*a*b^4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^2*f - 192*a^
```

```
3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b
*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 2016*a^2*b*c^4
*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3*c^2*e^2*f^2
 - 960*a^2*b^2*c^3*d^2*f^2 - 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^
5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9
*a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c^4*e^4 - 25*
b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k), k, 1, 4) + ((b*e)/(2*(4*a*c - b^2))
+ (c*e*x^2)/(4*a*c - b^2) + (x*(2*a*c*d - b^2*d + a*b*f))/(2*a*(4*a*c - b^2
)) - (c*x^3*(b*d - 2*a*f))/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x**4+c*e*x**5+c*f*x*
*6)/(c*x**4+b*x**2+a)**3,x)
```

```
[Out] Timed out
```

3.66 $\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{\left(a+bx^2+cx^4\right)^4}\,dx$

Optimal. Leaf size=621

$$\frac{x\left(cx^2\left(20a^2cf+ab^2f-24abcd+3b^3d\right)+8a^2bcf+28a^2c^2d+ab^3f-25ab^2cd+3b^4d\right)}{8a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\left(-\frac{-52a^2bcf+168a^2c}{\ldots}\right.}{\ldots}$$

```
[Out] -1/4*e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/4*x*(b^2*d-2*a*c*d-a*b*
f+c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+3/2*c*e*(2*c*x^2+b)/
(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/8*x*(3*b^4*d-25*a*b^2*c*d+28*a^2*c^2*d+a*b
^3*f+8*a^2*b*c*f+c*(20*a^2*c*f+a*b^2*f-24*a*b*c*d+3*b^3*d)*x^2)/a^2/(-4*a*c
+b^2)^2/(c*x^4+b*x^2+a)-6*c^2*e*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/(-4
*a*c+b^2)^(5/2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))
*c^(1/2)*(3*b^4*d+b^3*(a*f+3*d*(-4*a*c+b^2)^(1/2))-4*a*b*c*(13*a*f+6*d*(-4*
a*c+b^2)^(1/2))-a*b^2*(30*c*d-f*(-4*a*c+b^2)^(1/2))+4*a^2*c*(42*c*d+5*f*(-4
*a*c+b^2)^(1/2)))/a^2/(-4*a*c+b^2)^(5/2)*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/
2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(3*b
^3*d-24*a*b*c*d+a*b^2*f+20*a^2*c*f+(52*a^2*b*c*f-168*a^2*c^2*d-a*b^3*f+30*a
*b^2*c*d-3*b^4*d)/(-4*a*c+b^2)^(1/2))/a^2/(-4*a*c+b^2)^2*2^(1/2)/(b+(-4*a*c
+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 4.59, antiderivative size = 621, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 10, integrand size = 63, $\frac{\text{number of rules}}{\text{integrand size}} = 0.159$, Rules used = {1586, 1673, 1178, 1166, 205, 12, 1107, 614, 618, 206}

$$\frac{x\left(cx^2\left(20a^2cf+ab^2f-24abcd+3b^3d\right)+8a^2bcf+28a^2c^2d-25ab^2cd+ab^3f+3b^4d\right)}{8a^2\left(b^2-4ac\right)^2\left(a+bx^2+cx^4\right)}+\frac{\sqrt{c}\left(-\frac{-52a^2bcf+168a^2c}{\ldots}\right.}{\ldots}$$

Antiderivative was successfully verified.

```
[In] Int[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 +
c*f*x^6)/(a + b*x^2 + c*x^4)^4,x]
```

```
[Out] -(e*(b + 2*c*x^2))/(4*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (x*(b^2*d - 2*
a*c*d - a*b*f + c*(b*d - 2*a*f)*x^2))/(4*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4
)^2) + (3*c*e*(b + 2*c*x^2))/(2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (x*(
3*b^4*d - 25*a*b^2*c*d + 28*a^2*c^2*d + a*b^3*f + 8*a^2*b*c*f + c*(3*b^3*d
- 24*a*b*c*d + a*b^2*f + 20*a^2*c*f)*x^2))/(8*a^2*(b^2 - 4*a*c)^2*(a + b*x^
2 + c*x^4)) + (Sqrt[c]*(3*b^4*d + b^3*(3*Sqrt[b^2 - 4*a*c]*d + a*f) - 4*a*b
*c*(6*Sqrt[b^2 - 4*a*c]*d + 13*a*f) - a*b^2*(30*c*d - Sqrt[b^2 - 4*a*c]*f)
+ 4*a^2*c*(42*c*d + 5*Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt
[b - Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b - Sqrt[
b^2 - 4*a*c]]) + (Sqrt[c]*(3*b^3*d - 24*a*b*c*d + a*b^2*f + 20*a^2*c*f - (3
*b^4*d - 30*a*b^2*c*d + 168*a^2*c^2*d + a*b^3*f - 52*a^2*b*c*f)/Sqrt[b^2 -
4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]
*a^2*(b^2 - 4*a*c)^2*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - (6*c^2*e*ArcTanh[(b + 2
*c*x^2)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(5/2)
```

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 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[I
nt[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
```

```
&&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{\left(a + bx^2 + cx^4\right)^4} dx = \int \frac{d + ex + fx^2}{\left(a + bx^2 + cx^4\right)^3} dx$$

$$= \int \frac{ex}{\left(a + bx^2 + cx^4\right)^3} dx + \int \frac{d + fx^2}{\left(a + bx^2 + c\right.}$$

$$= \frac{x\left(b^2d - 2acd - abf + c(bd - 2af)x^2\right)}{4a\left(b^2 - 4ac\right)\left(a + bx^2 + cx^4\right)^2} - $$

$$= \frac{x\left(b^2d - 2acd - abf + c(bd - 2af)x^2\right)}{4a\left(b^2 - 4ac\right)\left(a + bx^2 + cx^4\right)^2} + $$

$$= -\frac{e\left(b + 2cx^2\right)}{4\left(b^2 - 4ac\right)\left(a + bx^2 + cx^4\right)^2} + \frac{x\left(b^2d - \right.}{4a\left(\right.}$$

$$= -\frac{e\left(b + 2cx^2\right)}{4\left(b^2 - 4ac\right)\left(a + bx^2 + cx^4\right)^2} + \frac{x\left(b^2d - \right.}{4a\left(\right.}$$

$$= -\frac{e\left(b + 2cx^2\right)}{4\left(b^2 - 4ac\right)\left(a + bx^2 + cx^4\right)^2} + \frac{x\left(b^2d - \right.}{4a\left(\right.}$$

$$= -\frac{e\left(b + 2cx^2\right)}{4\left(b^2 - 4ac\right)\left(a + bx^2 + cx^4\right)^2} + \frac{x\left(b^2d - \right.}{4a\left(\right.}$$

Mathematica [A] time = 3.58, size = 625, normalized size = 1.01

$$\frac{1}{16}\left(\frac{8a^2c\left(b(3e + 2fx) + cx\left(7d + 6ex + 5fx^2\right)\right) + 2abx\left(b^2f - 25bcd + bcfx^2 - 24c^2dx^2\right) + 6b^3dx\left(b + cx^2\right)}{a^2\left(b^2 - 4ac\right)^2\left(a + bx^2 + cx^4\right)} + \right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*
x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^4,x]
```

```
[Out] ((4*a*b*(e + f*x) - 4*b*d*x*(b + c*x^2) + 8*a*c*x*(d + x*(e + f*x)))/(a*(-b
^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (6*b^3*d*x*(b + c*x^2) + 2*a*b*x*(-25*
b*c*d + b^2*f - 24*c^2*d*x^2 + b*c*f*x^2) + 8*a^2*c*(b*(3*e + 2*f*x) + c*x*
(7*d + 6*e*x + 5*f*x^2)))/(a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (Sqrt
[2]*Sqrt[c]*(3*b^4*d + b^3*(3*Sqrt[b^2 - 4*a*c]*d + a*f) - 4*a*b*c*(6*Sqrt[
b^2 - 4*a*c]*d + 13*a*f) + a*b^2*(-30*c*d + Sqrt[b^2 - 4*a*c]*f) + 4*a^2*c*
(42*c*d + 5*Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[
```

```
b^2 - 4*a*c]]])/(a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sq
rt[2]*Sqrt[c]*(-3*b^4*d + b^3*(3*Sqrt[b^2 - 4*a*c]*d - a*f) + 4*a*b*c*(-6*S
qrt[b^2 - 4*a*c]*d + 13*a*f) + a*b^2*(30*c*d + Sqrt[b^2 - 4*a*c]*f) + 4*a^2
*c*(-42*c*d + 5*Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + S
qrt[b^2 - 4*a*c]]])/(a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) +
 (48*c^2*e*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(5/2) - (48
*c^2*e*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(5/2))/16
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(
c*x^4+b*x^2+a)^4,x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 6.43, size = 5288, normalized size = 8.52

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(
c*x^4+b*x^2+a)^4,x, algorithm="giac")
```

```
[Out] -3*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(a
^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*
b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^
2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^
6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 -
 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c
^4 - 64*a^3*c^5)*c^2) + 3*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*
a*c)*e*log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5
- 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a
^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^
4*c^3))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*
c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a
^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^2) + 1/32*(3*(sqrt(2)*sqrt(b*c +
sqrt(b^2 - 4*a*c)*c)*b^8 - 17*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6
*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^7*c - 2*b^8*c + 116*sqrt(2
)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + 26*sqrt(2)*sqrt(b*c + sqrt(
b^2 - 4*a*c)*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^6*c^2
 + 34*a*b^6*c^2 + 2*b^7*c^2 - 368*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 - 13*s
qrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^3 - 232*a^2*b^4*c^3 - 30*a*b
^5*c^3 + 448*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*c^4 + 224*sqrt(2)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 64*sqrt(2)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176*a^2*b^3*c^4 - 112*sqrt(2)*s
qrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^5 - 896*a^4*c^5 - 352*a^3*b*c^5 - sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^7 + 15*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c + 2*sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^6*c - 88*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 - 22*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sq
rt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^2 + 176*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 + 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 11*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 - 44*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
+ sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 + 2*(b^2 - 4*a*c)*b^6*c - 26*(b^2 - 4*a*c)
```

```
*a*b^4*c^2 - 2*(b^2 - 4*a*c)*b^5*c^2 + 128*(b^2 - 4*a*c)*a^2*b^2*c^3 + 22*(
b^2 - 4*a*c)*a*b^3*c^3 - 224*(b^2 - 4*a*c)*a^3*c^4 - 88*(b^2 - 4*a*c)*a^2*b
*c^4)*d + (sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^7 - 24*sqrt(2)*sqrt(
b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*
c)*c)*a*b^6*c - 2*a*b^7*c + 144*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3
*b^3*c^2 + 40*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + sqrt(2)
*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + 48*a^2*b^5*c^2 + 2*a*b^6*c^2 -
 256*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b*c^3 - 128*sqrt(2)*sqrt(b
*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 20*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*
a*c)*c)*a^2*b^3*c^3 - 288*a^3*b^3*c^3 - 44*a^2*b^4*c^3 + 64*sqrt(2)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 512*a^4*b*c^4 + 64*a^3*b^2*c^4 + 320*a
^4*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6 +
22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c + 2*
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c - 32*sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^2 - 36*sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 - sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 - 160*sqrt(2)*
sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*c^3 - 80*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 + 18*sqrt(2)*sqrt(b
^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 40*sqrt(2)*sqrt(b
^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^4 + 2*(b^2 - 4*a*c)*a*b^5
*c - 40*(b^2 - 4*a*c)*a^2*b^3*c^2 - 2*(b^2 - 4*a*c)*a*b^4*c^2 + 128*(b^2 -
4*a*c)*a^3*b*c^3 + 36*(b^2 - 4*a*c)*a^2*b^2*c^3 + 80*(b^2 - 4*a*c)*a^3*c^4)
*f)*arctan(2*sqrt(1/2)*x/sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + sqrt(
(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^
5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^
2 + 16*a^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c - 2*a^3*b^7*c + 96*a^5*b^4*c^2 +
 24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^3 - 96*a^5*b^3*c^3 - 12*a^4*b
^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*b^2*c^4 - 64*a^6*c^5)*abs(c))
 + 1/32*(3*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^8 - 17*sqrt(2)*sqrt(b
*c - sqrt(b^2 - 4*a*c)*c)*a*b^6*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*
c)*b^7*c + 2*b^8*c + 116*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^
2 + 26*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c
 - sqrt(b^2 - 4*a*c)*c)*b^6*c^2 - 34*a*b^6*c^2 - 2*b^7*c^2 - 368*sqrt(2)*sq
rt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c - sqrt(b^2
 - 4*a*c)*c)*a^2*b^3*c^3 - 13*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4
*c^3 + 232*a^2*b^4*c^3 + 30*a*b^5*c^3 + 448*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4
*a*c)*c)*a^4*c^4 + 224*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 +
64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^4 - 736*a^3*b^2*c^4 -
176*a^2*b^3*c^4 - 112*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*c^5 + 896
*a^4*c^5 + 352*a^3*b*c^5 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 -
4*a*c)*c)*b^7 - 15*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a*b^5*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^6
*c + 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c
^2 + 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2
 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^5*c^2 - 176*
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 - 88*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 11*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 + 44*sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 - 2*(b^2 -
4*a*c)*b^6*c + 26*(b^2 - 4*a*c)*a*b^4*c^2 + 2*(b^2 - 4*a*c)*b^5*c^2 - 128*(
b^2 - 4*a*c)*a^2*b^2*c^3 - 22*(b^2 - 4*a*c)*a*b^3*c^3 + 224*(b^2 - 4*a*c)*a
^3*c^4 + 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a
*c)*c)*a*b^7 - 24*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c - 2*sqr
t(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^6*c + 2*a*b^7*c + 144*sqrt(2)*sqrt
(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^3*c^2 + 40*sqrt(2)*sqrt(b*c - sqrt(b^2 -
4*a*c)*c)*a^2*b^4*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 -
 48*a^2*b^5*c^2 - 2*a*b^6*c^2 - 256*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)
*a^4*b*c^3 - 128*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 20*s
```

```
qrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 + 288*a^3*b^3*c^3 + 44*a
^2*b^4*c^3 + 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 - 512*a^4
*b*c^4 - 64*a^3*b^2*c^4 - 320*a^4*c^5 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
- sqrt(b^2 - 4*a*c)*c)*a*b^6 - 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt
(b^2 - 4*a*c)*c)*a^2*b^4*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^
2 - 4*a*c)*c)*a*b^5*c + 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 -
4*a*c)*c)*a^3*b^2*c^2 + 36*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 -
4*a*c)*c)*a^2*b^3*c^2 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a
*c)*c)*a*b^4*c^2 + 160*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*
c)*c)*a^4*c^3 + 80*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c
)*a^3*b*c^3 - 18*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*
a^2*b^2*c^3 - 40*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*
a^3*c^4 - 2*(b^2 - 4*a*c)*a*b^5*c + 40*(b^2 - 4*a*c)*a^2*b^3*c^2 + 2*(b^2 -
 4*a*c)*a*b^4*c^2 - 128*(b^2 - 4*a*c)*a^3*b*c^3 - 36*(b^2 - 4*a*c)*a^2*b^2*
c^3 - 80*(b^2 - 4*a*c)*a^3*c^4)*f)*arctan(2*sqrt(1/2)*x/sqrt((a^2*b^5 - 8*a
^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4
*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c
^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c -
 2*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*
c^3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^
5*b^2*c^4 - 64*a^6*c^5)*abs(c)) + 1/8*(3*b^3*c^2*d*x^7 - 24*a*b*c^3*d*x^7 +
 a*b^2*c^2*f*x^7 + 20*a^2*c^3*f*x^7 + 24*a^2*c^3*x^6*e + 6*b^4*c*d*x^5 - 49
*a*b^2*c^2*d*x^5 + 28*a^2*c^3*d*x^5 + 2*a*b^3*c*f*x^5 + 28*a^2*b*c^2*f*x^5
+ 36*a^2*b*c^2*x^4*e + 3*b^5*d*x^3 - 20*a*b^3*c*d*x^3 - 4*a^2*b*c^2*d*x^3 +
 a*b^4*f*x^3 + 5*a^2*b^2*c*f*x^3 + 36*a^3*c^2*f*x^3 + 8*a^2*b^2*c*x^2*e + 4
0*a^3*c^2*x^2*e + 5*a*b^4*d*x - 37*a^2*b^2*c*d*x + 44*a^3*c^2*d*x - a^2*b^3
*f*x + 16*a^3*b*c*f*x - 2*a^2*b^3*e + 20*a^3*b*c*e)/((a^2*b^4 - 8*a^3*b^2*c
 + 16*a^4*c^2)*(c*x^4 + b*x^2 + a)^2)
```

maple [B] time = 0.38, size = 7858, normalized size = 12.65

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+
b*x^2+a)^4,x)
```

```
[Out] result too large to display
```

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(
c*x^4+b*x^2+a)^4,x, algorithm="maxima")
```

```
[Out] 1/8*(24*a^2*c^3*e*x^6 + 36*a^2*b*c^2*e*x^4 + (3*(b^3*c^2 - 8*a*b*c^3)*d + (
a*b^2*c^2 + 20*a^2*c^3)*f)*x^7 + ((6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3)*d +
 2*(a*b^3*c + 14*a^2*b*c^2)*f)*x^5 + 8*(a^2*b^2*c + 5*a^3*c^2)*e*x^2 + ((3*
b^5 - 20*a*b^3*c - 4*a^2*b*c^2)*d + (a*b^4 + 5*a^2*b^2*c + 36*a^3*c^2)*f)*x
^3 - 2*(a^2*b^3 - 10*a^3*b*c)*e + ((5*a*b^4 - 37*a^2*b^2*c + 44*a^3*c^2)*d
- (a^2*b^3 - 16*a^3*b*c)*f)*x)/((a^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4)*
x^8 + a^4*b^4 - 8*a^5*b^2*c + 16*a^6*c^2 + 2*(a^2*b^5*c - 8*a^3*b^3*c^2 + 1
6*a^4*b*c^3)*x^6 + (a^2*b^6 - 6*a^3*b^4*c + 32*a^5*c^3)*x^4 + 2*(a^3*b^5 -
8*a^4*b^3*c + 16*a^5*b*c^2)*x^2) + 1/8*integrate((48*a^2*c^2*e*x + (3*(b^3*
c - 8*a*b*c^2)*d + (a*b^2*c + 20*a^2*c^2)*f)*x^2 + 3*(b^4 - 9*a*b^2*c + 28*
a^2*c^2)*d + (a*b^3 - 16*a^2*b*c)*f)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a
^3*b^2*c + 16*a^4*c^2)
```

mupad [B] time = 3.16, size = 8689, normalized size = 13.99

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 +
c*f*x^6)/(a + b*x^2 + c*x^4)^4,x)
```

```
[Out] ((x^2*(5*a*c^2*e + b^2*c*e))/(b^4 + 16*a^2*c^2 - 8*a*b^2*c) - (b^3*e - 10*a
*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^5*(28*a^2*c^3*d + 6*b^4*c*d
 + 2*a*b^3*c*f - 49*a*b^2*c^2*d + 28*a^2*b*c^2*f))/(8*a^2*(b^4 + 16*a^2*c^2
 - 8*a*b^2*c)) + (x*(5*b^4*d + 44*a^2*c^2*d - a*b^3*f - 37*a*b^2*c*d + 16*a
^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*c^3*e*x^6)/(b^4 + 16*a
^2*c^2 - 8*a*b^2*c) + (x^3*(3*b^5*d + 36*a^3*c^2*f + a*b^4*f - 20*a*b^3*c*d
 - 4*a^2*b*c^2*d + 5*a^2*b^2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) +
 (9*b*c^2*e*x^4)/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^7*(20*a^2*c^2*f
+ 3*b^3*c*d - 24*a*b*c^2*d + a*b^2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2
*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6) + symsum(
log(root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 471859
20*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4
*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 +
3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^1
0*z^4 + 65536*a^5*b^20*z^4 - 73728*a^2*b^16*c*d*f*z^2 - 1321205760*a^9*b^2*
c^8*d*f*z^2 + 732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2
 - 330301440*a^8*b^4*c^7*d*f*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 15175680
*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 440401920*a^10*b*c^8
*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330
240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b
*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*
z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^
5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 174325760*a^8*b^5*c^6*f
^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 + 1
1206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^
8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2
 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^
2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 25
6*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216
*a*b^13*c^2*d*e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^5*b^5*c^6
*d*e*f*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350
208*a^2*b^11*c^3*d*e*f*z - 428544*a*b^12*c^3*d^2*e*z + 1022754816*a^6*b^2*c
^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z
 - 50724864*a^7*b^2*c^7*e*f^2*z + 26542080*a^6*b^4*c^6*e*f^2*z - 46725120*a^
3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z + 1013760*a^4*b^8*c^4*e*f^2
*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930496*a^2*b
^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f^2*z + 13
824*b^14*c^2*d^2*e*z + 13824*a*b^8*c^4*d*e^2*f - 7741440*a^4*b^2*c^7*d*e^2*
f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 37310976*a^3
*b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 8
068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5*
d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7*
c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f - 4262400
*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 35525376
*a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f
^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*
b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^
2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c^4*d^2*e^
2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4
 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^
4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 160
```

000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*(root(5637
1445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c
^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 12
8849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^
9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536
*a^5*b^20*z^4 - 73728*a^2*b^16*c*d*f*z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 +
732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*
a^8*b^4*c^7*d*f*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 15175680*a^4*b^12*c^3
*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 440401920*a^10*b*c^8*f^2*z^2 + 17
61607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c
^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2
- 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a
*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2
*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 1887
43680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 + 11206656*a^7*b
^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2
- 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^
3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^
2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 256*a^2*b^17*f^
2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^13*c^2*d
*e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^5*b^5*c^6*d*e*f*z - 32
440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*
c^3*d*e*f*z - 428544*a*b^12*c^3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z -
642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z - 50724864*a^
7*b^2*c^7*e*f^2*z + 26542080*a^6*b^4*c^6*e*f^2*z - 46725120*a^3*b^8*c^5*d^2
*e*z - 7127040*a^5*b^6*c^5*e*f^2*z + 1013760*a^4*b^8*c^4*e*f^2*z - 69120*a^
3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930496*a^2*b^10*c^4*d^2*e
*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*
d^2*e*z + 13824*a*b^8*c^4*d*e^2*f - 7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a
^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 37310976*a^3*b^3*c^7*d^3*
f + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 8068032*a^2*b^
5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5*d*f^3 - 26019
0*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 -
75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f - 4262400*a^5*b*c^7*d*
f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 35525376*a^4*b^2*c^7*
d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2
*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f
^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 11025*b^1
0*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c^4*d^2*e^2 + 492800*a^
5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b
^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9
*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f
^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*((768*a^2*b^14*c^2*d -
22020096*a^9*c^9*d - 22272*a^3*b^12*c^3*d + 282624*a^4*b^10*c^4*d - 2027520
*a^5*b^8*c^5*d + 8847360*a^6*b^6*c^6*d - 23396352*a^7*b^4*c^7*d + 34603008*
a^8*b^2*c^8*d + 256*a^3*b^13*c^2*f - 9216*a^4*b^11*c^3*f + 122880*a^5*b^9*c
^4*f - 819200*a^6*b^7*c^5*f + 2949120*a^7*b^5*c^6*f - 5505024*a^8*b^3*c^7*f
+ 4194304*a^9*b*c^8*f)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 24
0*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) +
(x*(786432*a^9*c^9*e - 768*a^4*b^10*c^4*e + 15360*a^5*b^8*c^5*e - 122880*a^
6*b^6*c^6*e + 491520*a^7*b^4*c^7*e - 983040*a^8*b^2*c^8*e))/(32*(a^4*b^12 +
4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*
a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (root(56371445760*a^11*b^8*c^6*z^4 - 503
316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2
*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 -
16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b
^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 73728*a^2*b^16
*c*d*f*z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 + 732168192*a^7*b^6*c^6*d*f*z^2
- 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 96583680

*a^5*b^10*c^4*d*f*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^
2*d*f*z^2 - 440401920*a^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14
080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^
7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z
^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^
8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f
^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 14
6165760*a^4*b^11*c^4*d^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b
^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^
2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a
^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 +
1207959552*a^10*c^9*e^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 16
9869312*a^7*b*c^8*d*e*f*z + 9216*a*b^13*c^2*d*e*f*z - 221773824*a^6*b^3*c^7
*d*e*f*z + 117964800*a^5*b^5*c^6*d*e*f*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4
792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z - 428544*a*b^12*c^
3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z
+ 223395840*a^4*b^6*c^6*d^2*e*z - 50724864*a^7*b^2*c^7*e*f^2*z + 26542080*a
^6*b^4*c^6*e*f^2*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f
^2*z + 1013760*a^4*b^8*c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*
b^12*c^2*e*f^2*z + 5930496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z
 + 39321600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z + 13824*a*b^8*c^4*d*e^
2*f - 7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^
2*b^6*c^5*d*e^2*f + 37310976*a^3*b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2
+ 34836480*a^4*b*c^8*d^2*e^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*
c^6*d*f^3 + 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a
^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15
482880*a^5*c^8*d*e^2*f - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f +
 7350*a*b^9*c^3*d*f^3 + 35525376*a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e
^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^
3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*
e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^
8*d^2*f^2 + 20736*b^9*c^4*d^2*e^2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4
*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*
c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*
d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 357
21*b^8*c^5*d^4, z, k)*x*(4194304*a^11*b*c^9 - 256*a^4*b^15*c^2 + 7168*a^5*b
^13*c^3 - 86016*a^6*b^11*c^4 + 573440*a^7*b^9*c^5 - 2293760*a^8*b^7*c^6 + 5
505024*a^9*b^5*c^7 - 7340032*a^10*b^3*c^8))/(32*(a^4*b^12 + 4096*a^10*c^6 -
 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 61
44*a^9*b^2*c^5))) + (3244032*a^6*b*c^8*d*e - 983040*a^7*c^8*e*f + 4608*a^2*
b^9*c^4*d*e - 87552*a^3*b^7*c^5*d*e + 681984*a^4*b^5*c^6*d*e - 2433024*a^5*
b^3*c^7*d*e + 1536*a^3*b^8*c^4*e*f - 39936*a^4*b^6*c^5*e*f + 184320*a^5*b^4
*c^6*e*f + 49152*a^6*b^2*c^7*e*f)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b
^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^
2*c^5)) - (x*(225792*a^6*c^9*d^2 + 9*b^12*c^3*d^2 - 12800*a^7*c^8*f^2 - 252
*a*b^10*c^4*d^2 - 36864*a^6*b*c^8*e^2 + 3114*a^2*b^8*c^5*d^2 - 21312*a^3*b^
6*c^6*d^2 + 88128*a^4*b^4*c^7*d^2 - 211968*a^5*b^2*c^8*d^2 - 2304*a^4*b^5*c
^6*e^2 + 18432*a^5*b^3*c^7*e^2 + a^2*b^10*c^3*f^2 - 42*a^3*b^8*c^4*f^2 + 17
60*a^4*b^6*c^5*f^2 - 13120*a^5*b^4*c^6*f^2 + 29952*a^6*b^2*c^7*f^2 + 6*a*b^
11*c^3*d*f - 109056*a^6*b*c^8*d*f - 210*a^2*b^9*c^4*d*f + 2496*a^3*b^7*c^5*
d*f - 18240*a^4*b^5*c^6*d*f + 72192*a^5*b^3*c^7*d*f))/(32*(a^4*b^12 + 4096*
a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^
4*c^4 - 6144*a^9*b^2*c^5))) - (567*b^7*c^5*d^3 + 8000*a^5*c^7*f^3 - 10368*a
*b^5*c^6*d^3 - 169344*a^3*b*c^8*d^3 - 193536*a^4*c^8*d*e^2 + 141120*a^4*c^8
*d^2*f - 315*b^8*c^4*d^2*f + 67824*a^2*b^3*c^7*d^3 - 35*a^2*b^6*c^4*f^3 - 8
4*a^3*b^4*c^5*f^3 + 12720*a^4*b^2*c^6*f^3 + 6237*a*b^6*c^5*d^2*f - 210*a*b^
7*c^4*d*f^2 - 116160*a^4*b*c^7*d*f^2 + 36864*a^4*b*c^7*e^2*f - 6912*a^2*b^4
*c^6*d*e^2 + 62208*a^3*b^2*c^7*d*e^2 - 42372*a^2*b^4*c^6*d^2*f + 1764*a^2*b
^5*c^5*d*f^2 + 96048*a^3*b^2*c^7*d^2*f + 4608*a^3*b^3*c^6*d*f^2 - 2304*a^3*

```
b^3*c^6*e^2*f)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8
*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(6912*
a^4*c^8*e^3 - 27*b^7*c^5*d^2*e - 10080*a^4*c^8*d*e*f + 486*a*b^5*c^6*d^2*e
+ 12096*a^3*b*c^8*d^2*e + 3120*a^4*b*c^7*e*f^2 - 3672*a^2*b^3*c^7*d^2*e - 3
*a^2*b^5*c^5*e*f^2 + 96*a^3*b^3*c^6*e*f^2 - 18*a*b^6*c^5*d*e*f + 450*a^2*b^
4*c^6*d*e*f - 2448*a^3*b^2*c^7*d*e*f))/(32*(a^4*b^12 + 4096*a^10*c^6 - 24*a
^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^
9*b^2*c^5)))*root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4
 + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320
*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c
^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736
*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 73728*a^2*b^16*c*d*f*z^2 - 1321205760
*a^9*b^2*c^8*d*f*z^2 + 732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^
5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 -
 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 440401920*a
^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2
+ 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617
280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5
*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730
054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 174325760*a^8*
b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^
2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 235929
60*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2
*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1
771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2
*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f
*z + 9216*a*b^13*c^2*d*e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^
5*b^5*c^6*d*e*f*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*
f*z - 350208*a^2*b^11*c^3*d*e*f*z - 428544*a*b^12*c^3*d^2*e*z + 1022754816*
a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6
*d^2*e*z - 50724864*a^7*b^2*c^7*e*f^2*z + 26542080*a^6*b^4*c^6*e*f^2*z - 46
725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z + 1013760*a^4*b^8*
c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930
496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f
^2*z + 13824*b^14*c^2*d^2*e*z + 13824*a*b^8*c^4*d*e^2*f - 7741440*a^4*b^2*c
^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 373
10976*a^3*b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^
2*e^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3
*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 4354
56*a*b^7*c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f
- 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 +
 35525376*a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*
c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 287
0784*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c
^6*d^2*e^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c
^4*d^2*e^2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^
6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b
^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*
d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k),
k, 1, 4)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x**4+c*e*x**5+c*f*x*
*6)/(c*x**4+b*x**2+a)**4,x)
```

```
[Out] Timed out
```

3.67 $\int \frac{2-x-2x^2+x^3}{4-5x^2+x^4}\,dx$

Optimal. Leaf size=4

$$\log(x+2)$$

```
[Out] ln(2+x)
```

Rubi [A] time = 0.01, antiderivative size = 4, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {1586, 31}

$$\log(x+2)$$

Antiderivative was successfully verified.

```
[In] Int[(2 - x - 2*x^2 + x^3)/(4 - 5*x^2 + x^4),x]
```

```
[Out] Log[2 + x]
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{2-x-2x^2+x^3}{4-5x^2+x^4}\,dx &= \int \frac{1}{2+x}\,dx\\ &= \log(2+x)\end{aligned}$$

Mathematica [A] time = 0.00, size = 4, normalized size = 1.00

$$\log(x+2)$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 - x - 2*x^2 + x^3)/(4 - 5*x^2 + x^4),x]
```

```
[Out] Log[2 + x]
```

fricas [A] time = 0.77, size = 4, normalized size = 1.00

$$\log(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="fricas")
```

```
[Out] log(x + 2)
```

giac [A] time = 0.31, size = 5, normalized size = 1.25

$$\log(|x+2|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="giac")
```

```
[Out] log(abs(x + 2))
```

maple [A] time = 0.00, size = 5, normalized size = 1.25

$$\ln (x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3-2*x^2-x+2)/(x^4-5*x^2+4),x)
```

```
[Out] ln(x+2)
```

maxima [A] time = 0.43, size = 4, normalized size = 1.00

$$\log (x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="maxima")
```

```
[Out] log(x + 2)
```

mupad [B] time = 0.02, size = 4, normalized size = 1.00

$$\ln (x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-(x + 2*x^2 - x^3 - 2)/(x^4 - 5*x^2 + 4),x)
```

```
[Out] log(x + 2)
```

sympy [A] time = 0.07, size = 3, normalized size = 0.75

$$\log (x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**3-2*x**2-x+2)/(x**4-5*x**2+4),x)
```

```
[Out] log(x + 2)
```

3.68 $\int \frac{(d+ex)(2-x-2x^2+x^3)}{4-5x^2+x^4}\,dx$

Optimal. Leaf size=14

$$(d-2e)\log(x+2)+ex$$

```
[Out] e*x+(d-2*e)*ln(2+x)
```

Rubi [A] time = 0.02, antiderivative size = 14, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.065$, Rules used = {1586, 43}

$$(d-2e)\log(x+2)+ex$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4),x]
```

```
[Out] e*x + (d - 2*e)*Log[2 + x]
```

Rule 43

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

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rubi steps

$$\begin{aligned}
\int \frac{(d+ex)\left(2-x-2x^2+x^3\right)}{4-5x^2+x^4}\,dx &= \int \frac{d+ex}{2+x}\,dx\\
&= \int \left(e+\frac{d-2e}{2+x}\right)dx\\
&= ex+(d-2e)\log(2+x)
\end{aligned}$$

Mathematica [A] time = 0.00, size = 16, normalized size = 1.14

$$(d-2e)\log(x+2)+e(x+2)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4),x]
```

```
[Out] e*(2 + x) + (d - 2*e)*Log[2 + x]
```

fricas [A] time = 1.30, size = 14, normalized size = 1.00

$$ex+(d-2e)\log(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="fricas")
```

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

giac [A] time = 0.33, size = 17, normalized size = 1.21

$$xe + (d - 2e)\log(|x + 2|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="giac")
[Out] x*e + (d - 2*e)*log(abs(x + 2))
```

maple [A] time = 0.00, size = 18, normalized size = 1.29

$$d\ln(x + 2) + ex - 2e\ln(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x)
[Out] e*x+d*ln(x+2)-2*e*ln(x+2)
```

maxima [A] time = 0.44, size = 14, normalized size = 1.00

$$ex + (d - 2e)\log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="maxima")
[Out] e*x + (d - 2*e)*log(x + 2)
```

mupad [B] time = 0.73, size = 14, normalized size = 1.00

$$\ln(x + 2)\ (d - 2e) + e\,x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-((d + e*x)*(x + 2*x^2 - x^3 - 2))/(x^4 - 5*x^2 + 4),x)
[Out] log(x + 2)*(d - 2*e) + e*x
```

sympy [A] time = 0.12, size = 12, normalized size = 0.86

$$ex + (d - 2e)\log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x**3-2*x**2-x+2)/(x**4-5*x**2+4),x)
[Out] e*x + (d - 2*e)*log(x + 2)
```

3.69 $\int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{4-5x^2+x^4}\,dx$

Optimal. Leaf size=31

$$\log(x+2)(d-2e+4f)+x(e-4f)+\frac{1}{2}f(x+2)^2$$

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

Rubi [A] time = 0.05, antiderivative size = 31, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {1586, 698}

$$\log(x+2)(d-2e+4f)+x(e-4f)+\frac{1}{2}f(x+2)^2$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x + f*x^2)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4),x]
```

```
[Out] (e - 4*f)*x + (f*(2 + x)^2)/2 + (d - 2*e + 4*f)*Log[2 + x]
```

Rule 698

```
Int[((d_.) + (e_.)*(x_))^(m_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_
Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /; F
reeQ[{a, b, c, d, e, m}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a
*e^2, 0] && NeQ[2*c*d - b*e, 0] && IntegerQ[p] && (GtQ[p, 0] || (EqQ[a, 0]
&& IntegerQ[m]))
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rubi steps

$$\begin{aligned}
\int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{4-5x^2+x^4}\,dx &= \int \frac{d+ex+fx^2}{2+x}\,dx\\
&= \int \left(e-4f+\frac{d-2e+4f}{2+x}+f(2+x)\right)dx\\
&= (e-4f)x+\frac{1}{2}f(2+x)^2+(d-2e+4f)\log(2+x)
\end{aligned}$$

Mathematica [A] time = 0.01, size = 30, normalized size = 0.97

$$\log(x+2)(d-2e+4f)+\frac{1}{2}(x+2)(2e+f(x-6))$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x + f*x^2)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4),x]
```

```
[Out] ((2*e + f*(-6 + x))*(2 + x))/2 + (d - 2*e + 4*f)*Log[2 + x]
```

fricas [A] time = 1.19, size = 27, normalized size = 0.87

$$\frac{1}{2}fx^2+\left(e-2f\right)x+\left(d-2e+4f\right)\log\left(x+2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="fricas"
)
```

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

giac [A] time = 0.28, size = 30, normalized size = 0.97

$$\frac{1}{2} f x^2 - 2 f x + x e + \left(d + 4 f - 2 e\right) \log\left(|x + 2|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="giac")
```

```
[Out] 1/2*f*x^2 - 2*f*x + x*e + (d + 4*f - 2*e)*log(abs(x + 2))
```

maple [A] time = 0.00, size = 35, normalized size = 1.13

$$\frac{f x^2}{2} + d \ln\left(x + 2\right) + e x - 2e \ln\left(x + 2\right) - 2 f x + 4 f \ln\left(x + 2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x)
```

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

maxima [A] time = 0.45, size = 27, normalized size = 0.87

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="maxima"
)
```

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

mupad [B] time = 0.04, size = 27, normalized size = 0.87

$$x \left(e - 2 f\right) + \frac{f x^2}{2} + \ln\left(x + 2\right) \left(d - 2 e + 4 f\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-((d + e*x + f*x^2)*(x + 2*x^2 - x^3 - 2))/(x^4 - 5*x^2 + 4),x)
```

```
[Out] x*(e - 2*f) + (f*x^2)/2 + log(x + 2)*(d - 2*e + 4*f)
```

sympy [A] time = 0.15, size = 26, normalized size = 0.84

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)*(x**3-2*x**2-x+2)/(x**4-5*x**2+4),x)
```

```
[Out] f*x**2/2 + x*(e - 2*f) + (d - 2*e + 4*f)*log(x + 2)
```

3.70 $\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{4-5x^2+x^4}\,dx$

Optimal. Leaf size=51

$$\log(x+2)(d-2e+4f-8g)+x(e-4f+12g)+\frac{1}{2}(x+2)^2(f-6g)+\frac{1}{3}g(x+2)^3$$

```
[Out] (e-4*f+12*g)*x+1/2*(f-6*g)*(2+x)^2+1/3*g*(2+x)^3+(d-2*e+4*f-8*g)*ln(2+x)
```

Rubi [A] time = 0.08, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 41, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.049, Rules used = {1586, 1850}

$$\log(x+2)(d-2e+4f-8g)+x(e-4f+12g)+\frac{1}{2}(x+2)^2(f-6g)+\frac{1}{3}g(x+2)^3$$

Antiderivative was successfully verified.

```
[In] Int[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4),x]
```

```
[Out] (e - 4*f + 12*g)*x + ((f - 6*g)*(2 + x)^2)/2 + (g*(2 + x)^3)/3 + (d - 2*e +
 4*f - 8*g)*Log[2 + x]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 1850

```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[ExpandIntegrand
[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p
, 0] || EqQ[n, 1])
```

Rubi steps

$$\begin{aligned}\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{4-5x^2+x^4}\,dx &= \int \frac{d+ex+fx^2+gx^3}{2+x}\,dx\\ &= \int \left(e-4f+12g+\frac{d-2e+4f-8g}{2+x}+(f-6g)(2+x)+g(2\right.\\ &= (e-4f+12g)x+\frac{1}{2}(f-6g)(2+x)^2+\frac{1}{3}g(2+x)^3+(d-2e\end{aligned}$$

Mathematica [A] time = 0.02, size = 45, normalized size = 0.88

$$\log(x+2)(d-2e+4f-8g)+\frac{1}{6}(x+2)\left(6e+3f(x-6)+2g\left(x^2-5x+22\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^
4),x]
```

```
[Out] ((2 + x)*(6*e + 3*f*(-6 + x) + 2*g*(22 - 5*x + x^2)))/6 + (d - 2*e + 4*f -
8*g)*Log[2 + x]
```

fricas [A] time = 1.24, size = 43, normalized size = 0.84

$$\frac{1}{3}gx^3 + \frac{1}{2}\left(f - 2g\right)x^2 + \left(e - 2f + 4g\right)x + \left(d - 2e + 4f - 8g\right)\log\left(x + 2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="f
ricas")
```

```
[Out] 1/3*g*x^3 + 1/2*(f - 2*g)*x^2 + (e - 2*f + 4*g)*x + (d - 2*e + 4*f - 8*g)*l
og(x + 2)
```

giac [A] time = 0.25, size = 49, normalized size = 0.96

$$\frac{1}{3}gx^3 + \frac{1}{2}fx^2 - gx^2 - 2fx + 4gx + xe + \left(d + 4f - 8g - 2e\right)\log\left(|x + 2|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="g
iac")
```

```
[Out] 1/3*g*x^3 + 1/2*f*x^2 - g*x^2 - 2*f*x + 4*g*x + x*e + (d + 4*f - 8*g - 2*e)
*log(abs(x + 2))
```

maple [A] time = 0.00, size = 58, normalized size = 1.14

$$\frac{g\,x^3}{3} + \frac{f\,x^2}{2} - g\,x^2 + d\ln\left(x + 2\right) + ex - 2e\ln\left(x + 2\right) - 2fx + 4f\ln\left(x + 2\right) + 4gx - 8g\ln\left(x + 2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 1/3*g*x^3+1/2*f*x^2-g*x^2+e*x-2*f*x+4*g*x+d*ln(x+2)-2*e*ln(x+2)+4*f*ln(x+2)
-8*g*ln(x+2)
```

maxima [A] time = 0.45, size = 43, normalized size = 0.84

$$\frac{1}{3}gx^3 + \frac{1}{2}\left(f - 2g\right)x^2 + \left(e - 2f + 4g\right)x + \left(d - 2e + 4f - 8g\right)\log\left(x + 2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="m
axima")
```

```
[Out] 1/3*g*x^3 + 1/2*(f - 2*g)*x^2 + (e - 2*f + 4*g)*x + (d - 2*e + 4*f - 8*g)*l
og(x + 2)
```

mupad [B] time = 0.04, size = 44, normalized size = 0.86

$$x^2\,\left(\frac{f}{2} - g\right) + x\,\left(e - 2\,f + 4\,g\right) + \frac{g\,x^3}{3} + \ln\left(x + 2\right)\,\left(d - 2\,e + 4\,f - 8\,g\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-((d + e*x + f*x^2 + g*x^3)*(x + 2*x^2 - x^3 - 2))/(x^4 - 5*x^2 + 4),x)
```

```
[Out] x^2*(f/2 - g) + x*(e - 2*f + 4*g) + (g*x^3)/3 + log(x + 2)*(d - 2*e + 4*f -
 8*g)
```

sympy [A] time = 0.18, size = 41, normalized size = 0.80

$$\frac{gx^3}{3} + x^2\left(\frac{f}{2} - g\right) + x\left(e - 2f + 4g\right) + \left(d - 2e + 4f - 8g\right)\log\left(x + 2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**3-2*x**2-x+2)*(g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] g*x**3/3 + x**2*(f/2 - g) + x*(e - 2*f + 4*g) + (d - 2*e + 4*f - 8*g)*log(x
 + 2)
```

3.71 $\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4}\,dx$

Optimal. Leaf size=68

$$\log(x+2)(d-2e+4f-8g+16h)+x(e-2f+4g-8h)+\frac{1}{2}x^2(f-2g+4h)+\frac{1}{3}x^3(g-2h)+\frac{hx^4}{4}$$

```
[Out] (e-2*f+4*g-8*h)*x+1/2*(f-2*g+4*h)*x^2+1/3*(g-2*h)*x^3+1/4*h*x^4+(d-2*e+4*f-
8*g+16*h)*ln(2+x)
```

Rubi [A] time = 0.12, antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 46, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043, Rules used = {1586, 1850}

$$\log(x+2)(d-2e+4f-8g+16h)+x(e-2f+4g-8h)+\frac{1}{2}x^2(f-2g+4h)+\frac{1}{3}x^3(g-2h)+\frac{hx^4}{4}$$

Antiderivative was successfully verified.

```
[In] Int[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 +
x^4),x]
```

```
[Out] (e - 2*f + 4*g - 8*h)*x + ((f - 2*g + 4*h)*x^2)/2 + ((g - 2*h)*x^3)/3 + (h*
x^4)/4 + (d - 2*e + 4*f - 8*g + 16*h)*Log[2 + x]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 1850

```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[ExpandIntegrand
[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p
, 0] || EqQ[n, 1])
```

Rubi steps

$$\begin{aligned}\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4}\,dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{2+x}\,dx\\ &= \int \left(e\left(1-\frac{2(f-2g+4h)}{e}\right)+(f-2g+4h)x+(g-2h)x^2\right.\\ &= (e-2f+4g-8h)x+\frac{1}{2}(f-2g+4h)x^2+\frac{1}{3}(g-2h)x^3+\end{aligned}$$

Mathematica [A] time = 0.02, size = 68, normalized size = 1.00

$$\log(x+2)(d-2e+4f-8g+16h)+x(e-2f+4g-8h)+\frac{1}{2}x^2(f-2g+4h)+\frac{1}{3}x^3(g-2h)+\frac{hx^4}{4}$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*
x^2 + x^4),x]
```

```
[Out] (e - 2*f + 4*g - 8*h)*x + ((f - 2*g + 4*h)*x^2)/2 + ((g - 2*h)*x^3)/3 + (h*
x^4)/4 + (d - 2*e + 4*f - 8*g + 16*h)*Log[2 + x]
```

fricas [A] time = 1.21, size = 62, normalized size = 0.91

$$\frac{1}{4}hx^4+\frac{1}{3}\left(g-2h\right)x^3+\frac{1}{2}\left(f-2g+4h\right)x^2+\left(e-2f+4g-8h\right)x+\left(d-2e+4f-8g+16h\right)\log\left(x+2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algori
thm="fricas")
```

```
[Out] 1/4*h*x^4 + 1/3*(g - 2*h)*x^3 + 1/2*(f - 2*g + 4*h)*x^2 + (e - 2*f + 4*g -
8*h)*x + (d - 2*e + 4*f - 8*g + 16*h)*log(x + 2)
```

giac [A] time = 0.23, size = 74, normalized size = 1.09

$$\frac{1}{4}hx^4+\frac{1}{3}gx^3-\frac{2}{3}hx^3+\frac{1}{2}fx^2-gx^2+2hx^2-2fx+4gx-8hx+xe+\left(d+4f-8g+16h-2e\right)\log\left(|x+2|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algori
thm="giac")
```

```
[Out] 1/4*h*x^4 + 1/3*g*x^3 - 2/3*h*x^3 + 1/2*f*x^2 - g*x^2 + 2*h*x^2 - 2*f*x + 4
*g*x - 8*h*x + x*e + (d + 4*f - 8*g + 16*h - 2*e)*log(abs(x + 2))
```

maple [A] time = 0.00, size = 87, normalized size = 1.28

$$\frac{hx^4}{4}+\frac{gx^3}{3}-\frac{2hx^3}{3}+\frac{fx^2}{2}-gx^2+2hx^2+d\ln\left(x+2\right)+ex-2e\ln\left(x+2\right)-2fx+4f\ln\left(x+2\right)+4gx-8g\ln\left(x+2\right)-8h$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 1/4*h*x^4+1/3*g*x^3-2/3*h*x^3+1/2*f*x^2-g*x^2+2*h*x^2+e*x-2*f*x+4*g*x-8*h*x
+d*ln(x+2)-2*e*ln(x+2)+4*f*ln(x+2)-8*g*ln(x+2)+16*h*ln(x+2)
```

maxima [A] time = 0.44, size = 62, normalized size = 0.91

$$\frac{1}{4}hx^4+\frac{1}{3}\left(g-2h\right)x^3+\frac{1}{2}\left(f-2g+4h\right)x^2+\left(e-2f+4g-8h\right)x+\left(d-2e+4f-8g+16h\right)\log\left(x+2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algori
thm="maxima")
```

```
[Out] 1/4*h*x^4 + 1/3*(g - 2*h)*x^3 + 1/2*(f - 2*g + 4*h)*x^2 + (e - 2*f + 4*g -
8*h)*x + (d - 2*e + 4*f - 8*g + 16*h)*log(x + 2)
```

mupad [B] time = 0.03, size = 64, normalized size = 0.94

$$x^3\left(\frac{g}{3}-\frac{2h}{3}\right)+\ln\left(x+2\right)\left(d-2e+4f-8g+16h\right)+\frac{hx^4}{4}+x^2\left(\frac{f}{2}-g+2h\right)+x\left(e-2f+4g-8h\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-((x + 2*x^2 - x^3 - 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(x^4 - 5*x^2
 + 4),x)
```

```
[Out] x^3*(g/3 - (2*h)/3) + log(x + 2)*(d - 2*e + 4*f - 8*g + 16*h) + (h*x^4)/4 +
 x^2*(f/2 - g + 2*h) + x*(e - 2*f + 4*g - 8*h)
```

sympy [A] time = 0.21, size = 63, normalized size = 0.93

$$\frac{hx^4}{4}+x^3\left(\frac{g}{3}-\frac{2h}{3}\right)+x^2\left(\frac{f}{2}-g+2h\right)+x\left(e-2f+4g-8h\right)+\left(d-2e+4f-8g+16h\right)\log\left(x+2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**3-2*x**2-x+2)*(h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] h*x**4/4 + x**3*(g/3 - 2*h/3) + x**2*(f/2 - g + 2*h) + x*(e - 2*f + 4*g - 8
*h) + (d - 2*e + 4*f - 8*g + 16*h)*log(x + 2)
```

3.72 $\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx$

Optimal. Leaf size=92

$$\log(x+2)(d-2e+4f-8g+16h-32i)+x(e-2f+4g-8h+16i)+\frac{1}{2}x^2(f-2g+4h-8i)+\frac{1}{3}x^3(g-2h+4i)+\frac{1}{4}x^4(h-2i)+\frac{ix^5}{5}$$

```
[Out] (e-2*f+4*g-8*h+16*i)*x+1/2*(f-2*g+4*h-8*i)*x^2+1/3*(g-2*h+4*i)*x^3+1/4*(h-2
*i)*x^4+1/5*i*x^5+(d-2*e+4*f-8*g+16*h-32*i)*ln(2+x)
```

Rubi [A] time = 0.15, antiderivative size = 92, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 51, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.039, Rules used = {1586, 1850}

$$\log(x+2)(d-2e+4f-8g+16h-32i)+x(e-2f+4g-8h+16i)+\frac{1}{2}x^2(f-2g+4h-8i)+\frac{1}{3}x^3(g-2h+4i)+\frac{1}{4}x^4(h-2i)+\frac{ix^5}{5}$$

Antiderivative was successfully verified.

```
[In] Int[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 -
5*x^2 + x^4),x]
```

```
[Out] (e - 2*f + 4*g - 8*h + 16*i)*x + ((f - 2*g + 4*h - 8*i)*x^2)/2 + ((g - 2*h
+ 4*i)*x^3)/3 + ((h - 2*i)*x^4)/4 + (i*x^5)/5 + (d - 2*e + 4*f - 8*g + 16*h
 - 32*i)*Log[2 + x]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 1850

```
Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^(p_.), x_Symbol] :> Int[ExpandIntegrand
[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p
, 0] || EqQ[n, 1])
```

Rubi steps

$$\begin{aligned}
\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+72x^5)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+72x^5}{2+x} dx \\
&= \int \left(1152\left(1+\frac{e-2f+4g-8h}{1152}\right)+(-576+f-\right. \\
&= (1152+e-2f+4g-8h)x-\frac{1}{2}(576-f+2g-
\end{aligned}$$

Mathematica [A] time = 0.03, size = 92, normalized size = 1.00

$$\log(x+2)(d-2e+4f-8g+16h-32i)+x(e-2f+4g-8h+16i)+\frac{1}{2}x^2(f-2g+4h-8i)+\frac{1}{3}x^3(g-2h+4i)+\frac{1}{4}x^4(h-2i)+\frac{ix^5}{5}$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))
/(4 - 5*x^2 + x^4),x]
```

```
[Out] (e - 2*f + 4*g - 8*h + 16*i)*x + ((f - 2*g + 4*h - 8*i)*x^2)/2 + ((g - 2*h
+ 4*i)*x^3)/3 + ((h - 2*i)*x^4)/4 + (i*x^5)/5 + (d - 2*e + 4*f - 8*g + 16*h
 - 32*i)*Log[2 + x]
```

fricas [A] time = 0.90, size = 84, normalized size = 0.91

$$\frac{1}{5}ix^5+\frac{1}{4}(h-2i)x^4+\frac{1}{3}\left(g-2h+4i\right)x^3+\frac{1}{2}\left(f-2g+4h-8i\right)x^2+\left(e-2f+4g-8h+16i\right)x+\left(d-2e+4f-8\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x,
algorithm="fricas")
```

```
[Out] 1/5*i*x^5 + 1/4*(h - 2*i)*x^4 + 1/3*(g - 2*h + 4*i)*x^3 + 1/2*(f - 2*g + 4*
h - 8*i)*x^2 + (e - 2*f + 4*g - 8*h + 16*i)*x + (d - 2*e + 4*f - 8*g + 16*h
 - 32*i)*log(x + 2)
```

giac [A] time = 0.27, size = 105, normalized size = 1.14

$$\frac{1}{5}ix^5+\frac{1}{4}hx^4-\frac{1}{2}ix^4+\frac{1}{3}gx^3-\frac{2}{3}hx^3+\frac{4}{3}ix^3+\frac{1}{2}fx^2-gx^2+2hx^2-4ix^2-2fx+4gx-8hx+16ix+xe+\left(d+4f-8g+1\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x,
algorithm="giac")
```

```
[Out] 1/5*i*x^5 + 1/4*h*x^4 - 1/2*i*x^4 + 1/3*g*x^3 - 2/3*h*x^3 + 4/3*i*x^3 + 1/2
*f*x^2 - g*x^2 + 2*h*x^2 - 4*i*x^2 - 2*f*x + 4*g*x - 8*h*x + 16*i*x + x*e +
 (d + 4*f - 8*g + 16*h - 32*i - 2*e)*log(abs(x + 2))
```

maple [A] time = 0.00, size = 122, normalized size = 1.33

$$\frac{ix^5}{5}+\frac{hx^4}{4}-\frac{ix^4}{2}+\frac{gx^3}{3}-\frac{2hx^3}{3}+\frac{4ix^3}{3}+\frac{fx^2}{2}-gx^2+2hx^2-4ix^2+d\ln(x+2)+ex-2e\ln(x+2)-2fx+4f\ln(x+2)+4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 1/5*i*x^5+1/4*h*x^4-1/2*i*x^4+1/3*g*x^3-2/3*h*x^3+4/3*i*x^3+1/2*f*x^2-g*x^2
+2*h*x^2-4*i*x^2+e*x-2*f*x+4*g*x-8*h*x+16*i*x+d*ln(x+2)-2*e*ln(x+2)+4*f*ln(
x+2)-8*g*ln(x+2)+16*h*ln(x+2)-32*i*ln(x+2)
```

maxima [A] time = 0.46, size = 84, normalized size = 0.91

$$\frac{1}{5}ix^5+\frac{1}{4}(h-2i)x^4+\frac{1}{3}\left(g-2h+4i\right)x^3+\frac{1}{2}\left(f-2g+4h-8i\right)x^2+\left(e-2f+4g-8h+16i\right)x+\left(d-2e+4f-8\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x,
algorithm="maxima")
```

```
[Out] 1/5*i*x^5 + 1/4*(h - 2*i)*x^4 + 1/3*(g - 2*h + 4*i)*x^3 + 1/2*(f - 2*g + 4*
h - 8*i)*x^2 + (e - 2*f + 4*g - 8*h + 16*i)*x + (d - 2*e + 4*f - 8*g + 16*h
 - 32*i)*log(x + 2)
```

mupad [B] time = 0.04, size = 87, normalized size = 0.95

$$x^4\left(\frac{h}{4}-\frac{i}{2}\right)+\ln(x+2)\left(d-2e+4f-8g+16h-32i\right)+\frac{ix^5}{5}+x^2\left(\frac{f}{2}-g+2h-4i\right)+x\left(e-2f+4g-8h+16\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-((x + 2*x^2 - x^3 - 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(x^4
 - 5*x^2 + 4),x)
```

```
[Out] x^4*(h/4 - i/2) + log(x + 2)*(d - 2*e + 4*f - 8*g + 16*h - 32*i) + (i*x^5)/
5 + x^2*(f/2 - g + 2*h - 4*i) + x*(e - 2*f + 4*g - 8*h + 16*i) + x^3*(g/3 -
 (2*h)/3 + (4*i)/3)
```

sympy [**A**] time = 0.25, size = 88, normalized size = 0.96

$$\frac{ix^5}{5}+x^4\left(\frac{h}{4}-\frac{i}{2}\right)+x^3\left(\frac{g}{3}-\frac{2h}{3}+\frac{4i}{3}\right)+x^2\left(\frac{f}{2}-g+2h-4i\right)+x\left(e-2f+4g-8h+16i\right)+\left(d-2e+4f-8g+16$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**3-2*x**2-x+2)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**
2+4),x)
```

```
[Out] i*x**5/5 + x**4*(h/4 - i/2) + x**3*(g/3 - 2*h/3 + 4*i/3) + x**2*(f/2 - g +
2*h - 4*i) + x*(e - 2*f + 4*g - 8*h + 16*i) + (d - 2*e + 4*f - 8*g + 16*h -
 32*i)*log(x + 2)
```

3.73 $\int \frac{2-3x+x^2}{4-5x^2+x^4} dx$

Optimal. Leaf size=11

$$\log(x+1) - \log(x+2)$$

```
[Out] ln(1+x)-ln(2+x)
```

Rubi [A] time = 0.01, antiderivative size = 11, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143, Rules used = {1586, 616, 31}

$$\log(x+1) - \log(x+2)$$

Antiderivative was successfully verified.

```
[In] Int[(2 - 3*x + x^2)/(4 - 5*x^2 + x^4),x]
```

```
[Out] Log[1 + x] - Log[2 + x]
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> With[{q = Rt[b^2
 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
 Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rubi steps

$$\begin{aligned}
\int \frac{2-3x+x^2}{4-5x^2+x^4} dx &= \int \frac{1}{2+3x+x^2} dx \\
&= \int \frac{1}{1+x} dx - \int \frac{1}{2+x} dx \\
&= \log(1+x) - \log(2+x)
\end{aligned}$$

Mathematica [A] time = 0.00, size = 11, normalized size = 1.00

$$\log(x+1) - \log(x+2)$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 - 3*x + x^2)/(4 - 5*x^2 + x^4),x]
```

```
[Out] Log[1 + x] - Log[2 + x]
```

fricas [A] time = 0.93, size = 11, normalized size = 1.00

$$-\log(x+2) + \log(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4),x, algorithm="fricas")
```

```
[Out] -log(x + 2) + log(x + 1)
```

giac [A] time = 0.28, size = 13, normalized size = 1.18

$$-\log(|x+2|)+\log(|x+1|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4),x, algorithm="giac")
```

```
[Out] -log(abs(x + 2)) + log(abs(x + 1))
```

maple [A] time = 0.00, size = 12, normalized size = 1.09

$$-\ln(x+2)+\ln(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2-3*x+2)/(x^4-5*x^2+4),x)
```

```
[Out] ln(x+1)-ln(x+2)
```

maxima [A] time = 0.43, size = 11, normalized size = 1.00

$$-\log(x+2)+\log(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4),x, algorithm="maxima")
```

```
[Out] -log(x + 2) + log(x + 1)
```

mupad [B] time = 0.08, size = 8, normalized size = 0.73

$$-2\,\mathrm{atanh}(2\,x+3)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2 - 3*x + 2)/(x^4 - 5*x^2 + 4),x)
```

```
[Out] -2*atanh(2*x + 3)
```

sympy [A] time = 0.11, size = 8, normalized size = 0.73

$$\log(x+1)-\log(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)/(x**4-5*x**2+4),x)
```

```
[Out] log(x + 1) - log(x + 2)
```

3.74 $\int \frac{(d+ex)(2-3x+x^2)}{4-5x^2+x^4} \, dx$

Optimal. Leaf size=22

$$(d-e)\log(x+1)-(d-2e)\log(x+2)$$

```
[Out] (d-e)*ln(1+x)-(d-2*e)*ln(2+x)
```

Rubi [A] time = 0.02, antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.115, Rules used = {1586, 632, 31}

$$(d-e)\log(x+1)-(d-2e)\log(x+2)$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(2 - 3*x + x^2))/(4 - 5*x^2 + x^4),x]
```

```
[Out] (d - e)*Log[1 + x] - (d - 2*e)*Log[2 + x]
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 632

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> W
ith[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/
2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x
], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a
*c, 0] && NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex)\left(2-3x+x^2\right)}{4-5x^2+x^4}\,dx &= \int \frac{d+ex}{2+3x+x^2}\,dx\\ &= -\left((d-2e)\int \frac{1}{2+x}\,dx\right)+(d-e)\int \frac{1}{1+x}\,dx\\ &= (d-e)\log(1+x)-(d-2e)\log(2+x)\end{aligned}$$

Mathematica [A] time = 0.01, size = 23, normalized size = 1.05

$$(d-e)\log(x+1)+(2e-d)\log(x+2)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(2 - 3*x + x^2))/(4 - 5*x^2 + x^4),x]
```

```
[Out] (d - e)*Log[1 + x] + (-d + 2*e)*Log[2 + x]
```

fricas [A] time = 0.83, size = 22, normalized size = 1.00

$$-(d - 2e)\log(x + 2) + (d - e)\log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4),x, algorithm="fricas")
[Out] -(d - 2*e)*log(x + 2) + (d - e)*log(x + 1)
```

giac [A] time = 0.29, size = 26, normalized size = 1.18

$$-(d - 2e)\log(|x + 2|) + (d - e)\log(|x + 1|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4),x, algorithm="giac")
[Out] -(d - 2*e)*log(abs(x + 2)) + (d - e)*log(abs(x + 1))
```

maple [A] time = 0.00, size = 29, normalized size = 1.32

$$-d\ln(x + 2) + d\ln(x + 1) + 2e\ln(x + 2) - e\ln(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4),x)
[Out] d*ln(x+1)-e*ln(x+1)-d*ln(x+2)+2*e*ln(x+2)
```

maxima [A] time = 0.44, size = 22, normalized size = 1.00

$$-(d - 2e)\log(x + 2) + (d - e)\log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4),x, algorithm="maxima")
[Out] -(d - 2*e)*log(x + 2) + (d - e)*log(x + 1)
```

mupad [B] time = 0.80, size = 22, normalized size = 1.00

$$\ln(x + 1)\ (d - e) - \ln(x + 2)\ (d - 2e)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x)*(x^2 - 3*x + 2))/(x^4 - 5*x^2 + 4),x)
[Out] log(x + 1)*(d - e) - log(x + 2)*(d - 2*e)
```

sympy [A] time = 0.28, size = 29, normalized size = 1.32

$$(-d + 2e)\log\left(x + \frac{4d - 6e}{2d - 3e}\right) + (d - e)\log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x**2-3*x+2)/(x**4-5*x**2+4),x)
[Out] (-d + 2*e)*log(x + (4*d - 6*e)/(2*d - 3*e)) + (d - e)*log(x + 1)
```

3.75 $\int \frac{(2-3x+x^2)(d+ex+fx^2)}{4-5x^2+x^4} \, dx$

Optimal. Leaf size=29

$$\log(x+1)(d-e+f) - \log(x+2)(d-2e+4f) + fx$$

```
[Out] f*x+(d-e+f)*ln(1+x)-(d-2*e+4*f)*ln(2+x)
```

Rubi [A] time = 0.05, antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.129, Rules used = {1586, 1657, 632, 31}

$$\log(x+1)(d-e+f) - \log(x+2)(d-2e+4f) + fx$$

Antiderivative was successfully verified.

```
[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4),x]
```

```
[Out] f*x + (d - e + f)*Log[1 + x] - (d - 2*e + 4*f)*Log[2 + x]
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 632

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> W
ith[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/
2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x
], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a
*c, 0] && NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rubi steps

$$\begin{aligned}
\int \frac{(2-3x+x^2)(d+ex+fx^2)}{4-5x^2+x^4} \, dx &= \int \frac{d+ex+fx^2}{2+3x+x^2} \, dx \\
&= \int \left(f + \frac{d-2f+(e-3f)x}{2+3x+x^2}\right) dx \\
&= fx + \int \frac{d-2f+(e-3f)x}{2+3x+x^2} \, dx \\
&= fx + (d-e+f)\int \frac{1}{1+x} \, dx - (d-2e+4f)\int \frac{1}{2+x} \, dx \\
&= fx + (d-e+f)\log(1+x) - (d-2e+4f)\log(2+x)
\end{aligned}$$

Mathematica [A] time = 0.01, size = 30, normalized size = 1.03

$$\log(x+1)(d-e+f)+\log(x+2)(-d+2e-4f)+fx$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4),x]
[Out] f*x + (d - e + f)*Log[1 + x] + (-d + 2*e - 4*f)*Log[2 + x]
```

fricas [A] time = 0.95, size = 29, normalized size = 1.00

$$fx-\left(d-2\,e+4\,f\right)\log\left(x+2\right)+\left(d-e+f\right)\log\left(x+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")
[Out] f*x - (d - 2*e + 4*f)*log(x + 2) + (d - e + f)*log(x + 1)
```

giac [A] time = 0.25, size = 33, normalized size = 1.14

$$fx-\left(d+4\,f-2\,e\right)\log\left(|x+2|\right)+\left(d+f-e\right)\log\left(|x+1|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")
[Out] f*x - (d + 4*f - 2*e)*log(abs(x + 2)) + (d + f - e)*log(abs(x + 1))
```

maple [A] time = 0.01, size = 45, normalized size = 1.55

$$-d\ln\left(x+2\right)+d\ln\left(x+1\right)+2e\ln\left(x+2\right)-e\ln\left(x+1\right)+fx-4f\ln\left(x+2\right)+f\ln\left(x+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x)
[Out] f*x+d*ln(x+1)-e*ln(x+1)+f*ln(x+1)-d*ln(x+2)+2*e*ln(x+2)-4*f*ln(x+2)
```

maxima [A] time = 0.43, size = 29, normalized size = 1.00

$$fx-\left(d-2\,e+4\,f\right)\log\left(x+2\right)+\left(d-e+f\right)\log\left(x+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")
[Out] f*x - (d - 2*e + 4*f)*log(x + 2) + (d - e + f)*log(x + 1)
```

mupad [B] time = 0.07, size = 29, normalized size = 1.00

$$f\,x+\ln\left(x+1\right)\,\left(d-e+f\right)-\ln\left(x+2\right)\,\left(d-2\,e+4\,f\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2))/(x^4 - 5*x^2 + 4),x)
[Out] f*x + log(x + 1)*(d - e + f) - log(x + 2)*(d - 2*e + 4*f)
```

sympy [A] time = 0.51, size = 44, normalized size = 1.52

$$fx+\left(-d+2e-4f\right)\log\left(x+\frac{4d-6e+10f}{2d-3e+5f}\right)+\left(d-e+f\right)\log\left(x+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)*(f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] f*x + (-d + 2*e - 4*f)*log(x + (4*d - 6*e + 10*f)/(2*d - 3*e + 5*f)) + (d -
 e + f)*log(x + 1)
```

3.76 $\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{4-5x^2+x^4}\,dx$

Optimal. Leaf size=47

$$\log(x+1)(d-e+f-g)-\log(x+2)(d-2e+4f-8g)+x(f-3g)+\frac{gx^2}{2}$$

```
[Out] (f-3*g)*x+1/2*g*x^2+(d-e+f-g)*ln(1+x)-(d-2*e+4*f-8*g)*ln(2+x)
```

Rubi [A] time = 0.07, antiderivative size = 47, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = $\{1586, 1657, 632, 31\}$

$$\log(x+1)(d-e+f-g)-\log(x+2)(d-2e+4f-8g)+x(f-3g)+\frac{gx^2}{2}$$

Antiderivative was successfully verified.

```
[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4),x]
```

```
[Out] (f - 3*g)*x + (g*x^2)/2 + (d - e + f - g)*Log[1 + x] - (d - 2*e + 4*f - 8*g
)*Log[2 + x]
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 632

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> W
ith[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/
2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x
], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a
*c, 0] && NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rubi steps

$$
\begin{aligned}
\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{4-5x^2+x^4}\,dx &= \int \frac{d+ex+fx^2+gx^3}{2+3x+x^2}\,dx \\
&= \int \left(f-3g+gx+\frac{d-2f+6g+(e-3f+7g)x}{2+3x+x^2}\right)dx \\
&= (f-3g)x+\frac{gx^2}{2}+\int \frac{d-2f+6g+(e-3f+7g)x}{2+3x+x^2}\,dx \\
&= (f-3g)x+\frac{gx^2}{2}-(d-2e+4f-8g)\int \frac{1}{2+x}\,dx+(d-e+f-g)\int \\
&= (f-3g)x+\frac{gx^2}{2}+(d-e+f-g)\log(1+x)-(d-2e+4f-8g)\log
\end{aligned}
$$

Mathematica [A] time = 0.02, size = 44, normalized size = 0.94

$$
\log(x+1)(d-e+f-g)-\log(x+2)(d-2e+4f-8g)+fx+\frac{1}{2}g(x-6)x
$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4),x]
```

```
[Out] f*x + (g*(-6 + x)*x)/2 + (d - e + f - g)*Log[1 + x] - (d - 2*e + 4*f - 8*g)
*Log[2 + x]
```

fricas [A] time = 0.84, size = 45, normalized size = 0.96

$$
\frac{1}{2}gx^2+(f-3g)x-(d-2e+4f-8g)\log(x+2)+(d-e+f-g)\log(x+1)
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="frica
s")
```

```
[Out] 1/2*g*x^2 + (f - 3*g)*x - (d - 2*e + 4*f - 8*g)*log(x + 2) + (d - e + f - g
)*log(x + 1)
```

giac [A] time = 0.23, size = 49, normalized size = 1.04

$$
\frac{1}{2}gx^2+fx-3gx-(d+4f-8g-2e)\log(|x+2|)+(d+f-g-e)\log(|x+1|)
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac"
)
```

```
[Out] 1/2*g*x^2 + f*x - 3*g*x - (d + 4*f - 8*g - 2*e)*log(abs(x + 2)) + (d + f -
g - e)*log(abs(x + 1))
```

maple [A] time = 0.01, size = 69, normalized size = 1.47

$$
\frac{gx^2}{2}-d\ln(x+2)+d\ln(x+1)+2e\ln(x+2)-e\ln(x+1)+fx-4f\ln(x+2)+f\ln(x+1)-3gx+8g\ln(x+2)-g\ln(
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 1/2*g*x^2+f*x-3*g*x+d*ln(x+1)-e*ln(x+1)+f*ln(x+1)-g*ln(x+1)-d*ln(x+2)+2*e*l
n(x+2)-4*f*ln(x+2)+8*g*ln(x+2)
```

maxima [A] time = 0.45, size = 45, normalized size = 0.96

$$\frac{1}{2}gx^2 + (f - 3g)x - (d - 2e + 4f - 8g)\log(x + 2) + (d - e + f - g)\log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxim
a")
```

```
[Out] 1/2*g*x^2 + (f - 3*g)*x - (d - 2*e + 4*f - 8*g)*log(x + 2) + (d - e + f - g
)*log(x + 1)
```

mupad [B] time = 0.76, size = 45, normalized size = 0.96

$$\ln(x + 1)\left(d - e + f - g\right) + x\left(f - 3g\right) + \frac{g\,x^2}{2} - \ln(x + 2)\left(d - 2e + 4f - 8g\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + g*x^3))/(x^4 - 5*x^2 + 4),x)
```

```
[Out] log(x + 1)*(d - e + f - g) + x*(f - 3*g) + (g*x^2)/2 - log(x + 2)*(d - 2*e
+ 4*f - 8*g)
```

sympy [A] time = 0.86, size = 66, normalized size = 1.40

$$\frac{gx^2}{2} + x(f - 3g) + (-d + 2e - 4f + 8g)\log\left(x + \frac{4d - 6e + 10f - 18g}{2d - 3e + 5f - 9g}\right) + (d - e + f - g)\log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)*(g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] g*x**2/2 + x*(f - 3*g) + (-d + 2*e - 4*f + 8*g)*log(x + (4*d - 6*e + 10*f -
 18*g)/(2*d - 3*e + 5*f - 9*g)) + (d - e + f - g)*log(x + 1)
```

3.77 $\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} \, dx$

Optimal. Leaf size=66

$$\log(x+1)(d-e+f-g+h)-\log(x+2)(d-2e+4f-8g+16h)+x(f-3g+7h)+\frac{1}{2}x^2(g-3h)+\frac{hx^3}{3}$$

```
[Out] (f-3*g+7*h)*x+1/2*(g-3*h)*x^2+1/3*h*x^3+(d-e+f-g+h)*ln(1+x)-(d-2*e+4*f-8*g+
16*h)*ln(2+x)
```

Rubi [A] time = 0.09, antiderivative size = 66, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, integrand size = 41, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.098, Rules used = {1586, 1657, 632, 31}

$$\log(x+1)(d-e+f-g+h)-\log(x+2)(d-2e+4f-8g+16h)+x(f-3g+7h)+\frac{1}{2}x^2(g-3h)+\frac{hx^3}{3}$$

Antiderivative was successfully verified.

```
[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4),x
]
```

```
[Out] (f - 3*g + 7*h)*x + ((g - 3*h)*x^2)/2 + (h*x^3)/3 + (d - e + f - g + h)*Log
[1 + x] - (d - 2*e + 4*f - 8*g + 16*h)*Log[2 + x]
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 632

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> W
ith[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/
2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x
], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a
*c, 0] && NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rubi steps

$$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4}\,dx = \int \frac{d+ex+fx^2+gx^3+hx^4}{2+3x+x^2}\,dx$$
$$= \int \left(f-3g+7h+(g-3h)x+hx^2+\frac{d-2f+6g-14h+(e}{2+3x}\right.$$
$$= (f-3g+7h)x+\frac{1}{2}(g-3h)x^2+\frac{hx^3}{3}+\int \frac{d-2f+6g-14h}{2}$$
$$= (f-3g+7h)x+\frac{1}{2}(g-3h)x^2+\frac{hx^3}{3}+(d-e+f-g+h)\int$$
$$= (f-3g+7h)x+\frac{1}{2}(g-3h)x^2+\frac{hx^3}{3}+(d-e+f-g+h)\,\mathrm{lo}$$

Mathematica [A] time = 0.02, size = 67, normalized size = 1.02

$$\log(x+1)(d-e+f-g+h)+\log(x+2)(-d+2e-4f+8g-16h)+x(f-3g+7h)+\frac{1}{2}x^2(g-3h)+\frac{hx^3}{3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + 
x^4),x]
```

```
[Out] (f - 3*g + 7*h)*x + ((g - 3*h)*x^2)/2 + (h*x^3)/3 + (d - e + f - g + h)*Log
[1 + x] + (-d + 2*e - 4*f + 8*g - 16*h)*Log[2 + x]
```

fricas [A] time = 0.82, size = 62, normalized size = 0.94

$$\frac{1}{3}hx^3+\frac{1}{2}(g-3h)x^2+(f-3g+7h)x-(d-2e+4f-8g+16h)\log(x+2)+(d-e+f-g+h)\log(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm=
"fricas")
```

```
[Out] 1/3*h*x^3 + 1/2*(g - 3*h)*x^2 + (f - 3*g + 7*h)*x - (d - 2*e + 4*f - 8*g + 
16*h)*log(x + 2) + (d - e + f - g + h)*log(x + 1)
```

giac [A] time = 0.29, size = 69, normalized size = 1.05

$$\frac{1}{3}hx^3+\frac{1}{2}gx^2-\frac{3}{2}hx^2+fx-3gx+7hx-(d+4f-8g+16h-2e)\log(|x+2|)+(d+f-g+h-e)\log(|x+1|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm=
"giac")
```

```
[Out] 1/3*h*x^3 + 1/2*g*x^2 - 3/2*h*x^2 + f*x - 3*g*x + 7*h*x - (d + 4*f - 8*g + 
16*h - 2*e)*log(abs(x + 2)) + (d + f - g + h - e)*log(abs(x + 1))
```

maple [A] time = 0.01, size = 98, normalized size = 1.48

$$\frac{hx^3}{3}+\frac{gx^2}{2}-\frac{3hx^2}{2}-d\ln(x+2)+d\ln(x+1)+2e\ln(x+2)-e\ln(x+1)+fx-4f\ln(x+2)+f\ln(x+1)-3gx+8g$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 1/3*h*x^3+1/2*g*x^2-3/2*h*x^2+f*x-3*g*x+7*h*x+d*ln(x+1)-e*ln(x+1)+f*ln(x+1)
-g*ln(x+1)+h*ln(x+1)-d*ln(x+2)+2*e*ln(x+2)-4*f*ln(x+2)+8*g*ln(x+2)-16*h*ln(
x+2)
```

maxima [A] time = 0.44, size = 62, normalized size = 0.94

$$\frac{1}{3}\,hx^3+\frac{1}{2}\,\left(g-3\,h\right)x^2+\left(f-3\,g+7\,h\right)x-\left(d-2\,e+4\,f-8\,g+16\,h\right)\log\left(x+2\right)+\left(d-e+f-g+h\right)\log\left(x+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm=
"maxima")
```

```
[Out] 1/3*h*x^3 + 1/2*(g - 3*h)*x^2 + (f - 3*g + 7*h)*x - (d - 2*e + 4*f - 8*g +
16*h)*log(x + 2) + (d - e + f - g + h)*log(x + 1)
```

mupad [B] time = 0.07, size = 63, normalized size = 0.95

$$x^2\,\left(\frac{g}{2}-\frac{3\,h}{2}\right)+x\,\left(f-3\,g+7\,h\right)-\ln\left(x+2\right)\,\left(d-2\,e+4\,f-8\,g+16\,h\right)+\frac{h\,x^3}{3}+\ln\left(x+1\right)\,\left(d-e+f-g+h\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(x^4 - 5*x^2 + 4),x
)
```

```
[Out] x^2*(g/2 - (3*h)/2) + x*(f - 3*g + 7*h) - log(x + 2)*(d - 2*e + 4*f - 8*g +
 16*h) + (h*x^3)/3 + log(x + 1)*(d - e + f - g + h)
```

sympy [A] time = 1.53, size = 94, normalized size = 1.42

$$\frac{hx^3}{3}+x^2\left(\frac{g}{2}-\frac{3h}{2}\right)+x\left(f-3g+7h\right)+\left(-d+2e-4f+8g-16h\right)\log\left(x+\frac{4d-6e+10f-18g+34h}{2d-3e+5f-9g+17h}\right)+\left(d-e+f\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)*(h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] h*x**3/3 + x**2*(g/2 - 3*h/2) + x*(f - 3*g + 7*h) + (-d + 2*e - 4*f + 8*g -
 16*h)*log(x + (4*d - 6*e + 10*f - 18*g + 34*h)/(2*d - 3*e + 5*f - 9*g + 17
*h)) + (d - e + f - g + h)*log(x + 1)
```

3.78 $\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} \, dx$

Optimal. Leaf size=90

$$\log(x+1)(d-e+f-g+h-i)-\log(x+2)(d-2e+4f-8g+16h-32i)+x(f-3g+7h-15i)+\frac{1}{2}x^2(g-3h+7i)+\frac{1}{3}x^3(h-3i)+$$

```
[Out] (f-3*g+7*h-15*i)*x+1/2*(g-3*h+7*i)*x^2+1/3*(h-3*i)*x^3+1/4*i*x^4+(d-e+f-g+h
-i)*ln(1+x)-(d-2*e+4*f-8*g+16*h-32*i)*ln(2+x)
```

Rubi [A] time = 0.11, antiderivative size = 90, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, integrand size = 46, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.087, Rules used = {1586, 1657, 632, 31}

$$\log(x+1)(d-e+f-g+h-i)-\log(x+2)(d-2e+4f-8g+16h-32i)+x(f-3g+7h-15i)+\frac{1}{2}x^2(g-3h+7i)+\frac{1}{3}x^3(h-3i)+$$

Antiderivative was successfully verified.

```
[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2
+ x^4),x]
```

```
[Out] (f - 3*g + 7*h - 15*i)*x + ((g - 3*h + 7*i)*x^2)/2 + ((h - 3*i)*x^3)/3 + (i
*x^4)/4 + (d - e + f - g + h - i)*Log[1 + x] - (d - 2*e + 4*f - 8*g + 16*h
- 32*i)*Log[2 + x]
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 632

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> W
ith[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/
2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x
], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a
*c, 0] && NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rule Rubi steps

$$\int \frac{\left(2-3x+x^2\right)\left(d+ex+fx^2+gx^3+hx^4+78x^5\right)}{4-5x^2+x^4}\,dx = \int \frac{d+ex+fx^2+gx^3+hx^4+78x^5}{2+3x+x^2}\,dx$$

$$= \int \Big(-1170+f-3g+7h+(546+g-3h)x-(234-h$$

$$= -(1170-f+3g-7h)x+\frac{1}{2}(546+g-3h)x^2-\frac{1}{3}(234$$

$$= -(1170-f+3g-7h)x+\frac{1}{2}(546+g-3h)x^2-\frac{1}{3}(234$$

$$= -(1170-f+3g-7h)x+\frac{1}{2}(546+g-3h)x^2-\frac{1}{3}(234$$

Mathematica [A] time = 0.04, size = 91, normalized size = 1.01

$$\log(x+1)(d-e+f-g+h-i)+\log(x+2)(-d+2e-4f+8g-16h+32i)+x(f-3g+7h-15i)+\frac{1}{2}x^2(g-3h+7i)+\frac{1}{3}x^3(h-3i)+\frac{i}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 -
5*x^2 + x^4),x]
```

```
[Out] (f - 3*g + 7*h - 15*i)*x + ((g - 3*h + 7*i)*x^2)/2 + ((h - 3*i)*x^3)/3 + (i
*x^4)/4 + (d - e + f - g + h - i)*Log[1 + x] + (-d + 2*e - 4*f + 8*g - 16*h
 + 32*i)*Log[2 + x]
```

fricas [A] time = 0.82, size = 84, normalized size = 0.93

$$\frac{1}{4}ix^4+\frac{1}{3}(h-3i)x^3+\frac{1}{2}\left(g-3h+7i\right)x^2+\left(f-3g+7h-15i\right)x-\left(d-2e+4f-8g+16h-32i\right)\log(x+2)+\Big(d$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algo
rithm="fricas")
```

```
[Out] 1/4*i*x^4 + 1/3*(h - 3*i)*x^3 + 1/2*(g - 3*h + 7*i)*x^2 + (f - 3*g + 7*h -
15*i)*x - (d - 2*e + 4*f - 8*g + 16*h - 32*i)*log(x + 2) + (d - e + f - g +
 h - i)*log(x + 1)
```

giac [A] time = 0.39, size = 97, normalized size = 1.08

$$\frac{1}{4}ix^4+\frac{1}{3}hx^3-ix^3+\frac{1}{2}gx^2-\frac{3}{2}hx^2+\frac{7}{2}ix^2+fx-3gx+7hx-15ix-\left(d+4f-8g+16h-32i-2e\right)\log(|x+2|)+\Big(d+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algo
rithm="giac")
```

```
[Out] 1/4*i*x^4 + 1/3*h*x^3 - i*x^3 + 1/2*g*x^2 - 3/2*h*x^2 + 7/2*i*x^2 + f*x - 3
*g*x + 7*h*x - 15*i*x - (d + 4*f - 8*g + 16*h - 32*i - 2*e)*log(abs(x + 2))
 + (d + f - g + h - i - e)*log(abs(x + 1))
```

maple [A] time = 0.01, size = 134, normalized size = 1.49

$$\frac{ix^4}{4}+\frac{hx^3}{3}-ix^3+\frac{gx^2}{2}-\frac{3hx^2}{2}+\frac{7ix^2}{2}-d\ln(x+2)+d\ln(x+1)+2e\ln(x+2)-e\ln(x+1)+fx-4f\ln(x+2)+f\ln(x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 1/4*i*x^4+1/3*h*x^3-i*x^3+1/2*g*x^2-3/2*h*x^2+7/2*i*x^2+f*x-3*g*x+7*h*x-15*
i*x+d*ln(x+1)-e*ln(x+1)+f*ln(x+1)-g*ln(x+1)+h*ln(x+1)-i*ln(x+1)-d*ln(x+2)+2
*e*ln(x+2)-4*f*ln(x+2)+8*g*ln(x+2)-16*h*ln(x+2)+32*i*ln(x+2)
```

maxima [A] time = 0.44, size = 84, normalized size = 0.93

$$\frac{1}{4}\,ix^4+\frac{1}{3}\,(h-3\,i)x^3+\frac{1}{2}\,\left(g-3\,h+7\,i\right)x^2+\left(f-3\,g+7\,h-15\,i\right)x-\left(d-2\,e+4\,f-8\,g+16\,h-32\,i\right)\log\left(x+2\right)+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algo
rithm="maxima")
```

```
[Out] 1/4*i*x^4 + 1/3*(h - 3*i)*x^3 + 1/2*(g - 3*h + 7*i)*x^2 + (f - 3*g + 7*h -
15*i)*x - (d - 2*e + 4*f - 8*g + 16*h - 32*i)*log(x + 2) + (d - e + f - g +
 h - i)*log(x + 1)
```

mupad [B] time = 0.08, size = 86, normalized size = 0.96

$$x^3\,\left(\frac{h}{3}-i\right)-\ln\left(x+2\right)\,\left(d-2\,e+4\,f-8\,g+16\,h-32\,i\right)+\ln\left(x+1\right)\,\left(d-e+f-g+h-i\right)+\frac{i\,x^4}{4}+x^2\,\left(\frac{g}{2}-\frac{3\,h}{2}+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(x^4 - 5*x^
2 + 4),x)
```

```
[Out] x^3*(h/3 - i) - log(x + 2)*(d - 2*e + 4*f - 8*g + 16*h - 32*i) + log(x + 1)
*(d - e + f - g + h - i) + (i*x^4)/4 + x^2*(g/2 - (3*h)/2 + (7*i)/2) + x*(f
 - 3*g + 7*h - 15*i)
```

sympy [A] time = 2.59, size = 122, normalized size = 1.36

$$\frac{ix^4}{4}+x^3\left(\frac{h}{3}-i\right)+x^2\left(\frac{g}{2}-\frac{3h}{2}+\frac{7i}{2}\right)+x\left(f-3g+7h-15i\right)+\left(-d+2e-4f+8g-16h+32i\right)\log\left(x+\frac{4d-6e+}{2d-3e}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),
x)
```

```
[Out] i*x**4/4 + x**3*(h/3 - i) + x**2*(g/2 - 3*h/2 + 7*i/2) + x*(f - 3*g + 7*h -
 15*i) + (-d + 2*e - 4*f + 8*g - 16*h + 32*i)*log(x + (4*d - 6*e + 10*f - 1
8*g + 34*h - 66*i)/(2*d - 3*e + 5*f - 9*g + 17*h - 33*i)) + (d - e + f - g
+ h - i)*log(x + 1)
```

3.79 $\int \frac{2+x}{4-5x^2+x^4} \, dx$

Optimal. Leaf size=29

$$-\frac{1}{2}\log(1-x)+\frac{1}{3}\log(2-x)+\frac{1}{6}\log(x+1)$$

```
[Out] -1/2*ln(1-x)+1/3*ln(2-x)+1/6*ln(1+x)
```

Rubi [A] time = 0.02, antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {1586, 2058}

$$-\frac{1}{2}\log(1-x)+\frac{1}{3}\log(2-x)+\frac{1}{6}\log(x+1)$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x)/(4 - 5*x^2 + x^4),x]
```

```
[Out] -Log[1 - x]/2 + Log[2 - x]/3 + Log[1 + x]/6
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 2058

```
Int[(P_)^(p_), x_Symbol] :> With[{u = Factor[P]}, Int[ExpandIntegrand[u^p,
x], x] /;  !SumQ[NonfreeFactors[u, x]]] /; PolyQ[P, x] && ILtQ[p, 0]
```

Rubi steps

$$\begin{aligned}
\int \frac{2+x}{4-5x^2+x^4} \, dx &= \int \frac{1}{2-x-2x^2+x^3} \, dx \\
&= \int \left(\frac{1}{3(-2+x)}-\frac{1}{2(-1+x)}+\frac{1}{6(1+x)}\right) dx \\
&= -\frac{1}{2}\log(1-x)+\frac{1}{3}\log(2-x)+\frac{1}{6}\log(1+x)
\end{aligned}$$

Mathematica [A] time = 0.01, size = 29, normalized size = 1.00

$$-\frac{1}{2}\log(1-x)+\frac{1}{3}\log(2-x)+\frac{1}{6}\log(x+1)$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x)/(4 - 5*x^2 + x^4),x]
```

```
[Out] -1/2*Log[1 - x] + Log[2 - x]/3 + Log[1 + x]/6
```

fricas [A] time = 0.90, size = 19, normalized size = 0.66

$$\frac{1}{6}\log(x+1)-\frac{1}{2}\log(x-1)+\frac{1}{3}\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)/(x^4-5*x^2+4),x, algorithm="fricas")
```

```
[Out] 1/6*log(x + 1) - 1/2*log(x - 1) + 1/3*log(x - 2)
```

giac [A]   time = 0.24, size = 22, normalized size = 0.76

$$\frac{1}{6}\log\left(|x+1|\right)-\frac{1}{2}\log\left(|x-1|\right)+\frac{1}{3}\log\left(|x-2|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)/(x^4-5*x^2+4),x, algorithm="giac")
```

```
[Out] 1/6*log(abs(x + 1)) - 1/2*log(abs(x - 1)) + 1/3*log(abs(x - 2))
```

maple [A]   time = 0.01, size = 20, normalized size = 0.69

$$\frac{\ln\left(x-2\right)}{3}-\frac{\ln\left(x-1\right)}{2}+\frac{\ln\left(x+1\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x+2)/(x^4-5*x^2+4),x)
```

```
[Out] 1/3*ln(x-2)+1/6*ln(x+1)-1/2*ln(x-1)
```

maxima [A]   time = 0.44, size = 19, normalized size = 0.66

$$\frac{1}{6}\log\left(x+1\right)-\frac{1}{2}\log\left(x-1\right)+\frac{1}{3}\log\left(x-2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)/(x^4-5*x^2+4),x, algorithm="maxima")
```

```
[Out] 1/6*log(x + 1) - 1/2*log(x - 1) + 1/3*log(x - 2)
```

mupad [B]   time = 0.08, size = 19, normalized size = 0.66

$$\frac{\ln\left(x+1\right)}{6}-\frac{\ln\left(x-1\right)}{2}+\frac{\ln\left(x-2\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x + 2)/(x^4 - 5*x^2 + 4),x)
```

```
[Out] log(x + 1)/6 - log(x - 1)/2 + log(x - 2)/3
```

sympy [A]   time = 0.14, size = 19, normalized size = 0.66

$$\frac{\log\left(x-2\right)}{3}-\frac{\log\left(x-1\right)}{2}+\frac{\log\left(x+1\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)/(x**4-5*x**2+4),x)
```

```
[Out] log(x - 2)/3 - log(x - 1)/2 + log(x + 1)/6
```

3.80 $\int \frac{(2+x)(d+ex)}{4-5x^2+x^4} \, dx$

Optimal. Leaf size=42

$$-\frac{1}{2}(d+e)\log(1-x)+\frac{1}{3}(d+2e)\log(2-x)+\frac{1}{6}(d-e)\log(x+1)$$

```
[Out] -1/2*(d+e)*ln(1-x)+1/3*(d+2*e)*ln(2-x)+1/6*(d-e)*ln(1+x)
```

Rubi [A] time = 0.05, antiderivative size = 42, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {1586, 2074}

$$-\frac{1}{2}(d+e)\log(1-x)+\frac{1}{3}(d+2e)\log(2-x)+\frac{1}{6}(d-e)\log(x+1)$$

Antiderivative was successfully verified.

```
[In] Int[((2 + x)*(d + e*x))/(4 - 5*x^2 + x^4),x]
```

```
[Out] -((d + e)*Log[1 - x])/2 + ((d + 2*e)*Log[2 - x])/3 + ((d - e)*Log[1 + x])/6
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 2074

```
Int[(P_)^(p_)*(Q_)^(q_.), x_Symbol] :> With[{PP = Factor[P]}, Int[ExpandInt
egrand[PP^p*Q^q, x], x] /;  !SumQ[NonfreeFactors[PP, x]]] /; FreeQ[q, x] &&
 PolyQ[P, x] && PolyQ[Q, x] && IntegerQ[p] && NeQ[P, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{(2+x)(d+ex)}{4-5x^2+x^4} \, dx &= \int \frac{d+ex}{2-x-2x^2+x^3} \, dx \\
&= \int \left(\frac{d+2e}{3(-2+x)}+\frac{-d-e}{2(-1+x)}+\frac{d-e}{6(1+x)}\right) dx \\
&= -\frac{1}{2}(d+e)\log(1-x)+\frac{1}{3}(d+2e)\log(2-x)+\frac{1}{6}(d-e)\log(1+x)
\end{aligned}$$

Mathematica [A] time = 0.02, size = 39, normalized size = 0.93

$$\frac{1}{6}(-3(d+e)\log(1-x)+2(d+2e)\log(2-x)+(d-e)\log(x+1))$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + x)*(d + e*x))/(4 - 5*x^2 + x^4),x]
```

```
[Out] (-3*(d + e)*Log[1 - x] + 2*(d + 2*e)*Log[2 - x] + (d - e)*Log[1 + x])/6
```

fricas [A] time = 0.75, size = 32, normalized size = 0.76

$$\frac{1}{6}(d-e)\log(x+1)-\frac{1}{2}(d+e)\log(x-1)+\frac{1}{3}(d+2e)\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")
```

```
[Out] 1/6*(d - e)*log(x + 1) - 1/2*(d + e)*log(x - 1) + 1/3*(d + 2*e)*log(x - 2)
```

giac [A] time = 0.29, size = 38, normalized size = 0.90

$$\frac{1}{6}(d-e)\log(|x+1|)-\frac{1}{2}(d+e)\log(|x-1|)+\frac{1}{3}(d+2e)\log(|x-2|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")
```

```
[Out] 1/6*(d - e)*log(abs(x + 1)) - 1/2*(d + e)*log(abs(x - 1)) + 1/3*(d + 2*e)*l
og(abs(x - 2))
```

maple [A] time = 0.01, size = 44, normalized size = 1.05

$$\frac{d\ln(x-2)}{3}-\frac{d\ln(x-1)}{2}+\frac{d\ln(x+1)}{6}+\frac{2e\ln(x-2)}{3}-\frac{e\ln(x-1)}{2}-\frac{e\ln(x+1)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x+2)*(e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 1/3*d*ln(x-2)+2/3*e*ln(x-2)+1/6*d*ln(x+1)-1/6*e*ln(x+1)-1/2*d*ln(x-1)-1/2*e
*ln(x-1)
```

maxima [A] time = 0.44, size = 32, normalized size = 0.76

$$\frac{1}{6}(d-e)\log(x+1)-\frac{1}{2}(d+e)\log(x-1)+\frac{1}{3}(d+2e)\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")
```

```
[Out] 1/6*(d - e)*log(x + 1) - 1/2*(d + e)*log(x - 1) + 1/3*(d + 2*e)*log(x - 2)
```

mupad [B] time = 0.84, size = 38, normalized size = 0.90

$$\ln(x-2)\left(\frac{d}{3}+\frac{2e}{3}\right)-\ln(x-1)\left(\frac{d}{2}+\frac{e}{2}\right)+\ln(x+1)\left(\frac{d}{6}-\frac{e}{6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x + 2)*(d + e*x))/(x^4 - 5*x^2 + 4),x)
```

```
[Out] log(x - 2)*(d/3 + (2*e)/3) - log(x - 1)*(d/2 + e/2) + log(x + 1)*(d/6 - e/6
)
```

sympy [B] time = 1.76, size = 304, normalized size = 7.24

$$\frac{(d-e)\log\left(x+\frac{26d^3+66d^2e-9d^2(d-e)+78de^2-12de(d-e)-7d(d-e)^2+46e^3+3e^2(d-e)-8e(d-e)^2}{10d^3+69d^2e+102de^2+35e^3}\right)}{6}-\frac{(d+e)\log\left(x+\frac{26d^3+66d^2e+27d^2(d-}{}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] (d - e)*log(x + (26*d**3 + 66*d**2*e - 9*d**2*(d - e) + 78*d*e**2 - 12*d*e*
(d - e) - 7*d*(d - e)**2 + 46*e**3 + 3*e**2*(d - e) - 8*e*(d - e)**2)/(10*d
```

```
**3 + 69*d**2*e + 102*d*e**2 + 35*e**3))/6 - (d + e)*log(x + (26*d**3 + 66*
d**2*e + 27*d**2*(d + e) + 78*d*e**2 + 36*d*e*(d + e) - 63*d*(d + e)**2 + 4
6*e**3 - 9*e**2*(d + e) - 72*e*(d + e)**2)/(10*d**3 + 69*d**2*e + 102*d*e**
2 + 35*e**3))/2 + (d + 2*e)*log(x + (26*d**3 + 66*d**2*e - 18*d**2*(d + 2*e
) + 78*d*e**2 - 24*d*e*(d + 2*e) - 28*d*(d + 2*e)**2 + 46*e**3 + 6*e**2*(d
+ 2*e) - 32*e*(d + 2*e)**2)/(10*d**3 + 69*d**2*e + 102*d*e**2 + 35*e**3))/3
```

3.81 $\int \frac{(2+x)\left(d+ex+fx^2\right)}{4-5x^2+x^4} dx$

Optimal. Leaf size=47

$$-\frac{1}{2}\log(1-x)(d+e+f)+\frac{1}{3}\log(2-x)(d+2e+4f)+\frac{1}{6}\log(x+1)(d-e+f)$$

```
[Out] -1/2*(d+e+f)*ln(1-x)+1/3*(d+2*e+4*f)*ln(2-x)+1/6*(d-e+f)*ln(1+x)
```

Rubi [A] time = 0.06, antiderivative size = 47, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {1586, 2074}

$$-\frac{1}{2}\log(1-x)(d+e+f)+\frac{1}{3}\log(2-x)(d+2e+4f)+\frac{1}{6}\log(x+1)(d-e+f)$$

Antiderivative was successfully verified.

```
[In] Int[((2 + x)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4),x]
```

```
[Out] -((d + e + f)*Log[1 - x])/2 + ((d + 2*e + 4*f)*Log[2 - x])/3 + ((d - e + f)
*Log[1 + x])/6
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 2074

```
Int[(P_)^(p_)*(Q_)^(q_.), x_Symbol] :> With[{PP = Factor[P]}, Int[ExpandInt
egrand[PP^p*Q^q, x], x] /;  !SumQ[NonfreeFactors[PP, x]]] /; FreeQ[q, x] &&
 PolyQ[P, x] && PolyQ[Q, x] && IntegerQ[p] && NeQ[P, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{(2+x)\left(d+ex+fx^2\right)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2}{2-x-2x^2+x^3} dx\\
&= \int \left(\frac{d+2e+4f}{3(-2+x)}+\frac{-d-e-f}{2(-1+x)}+\frac{d-e+f}{6(1+x)}\right) dx\\
&= -\frac{1}{2}(d+e+f)\log(1-x)+\frac{1}{3}(d+2e+4f)\log(2-x)+\frac{1}{6}(d-e+f)\log(1+x
\end{aligned}$$

Mathematica [A] time = 0.02, size = 44, normalized size = 0.94

$$\frac{1}{6}(-3\log(1-x)(d+e+f)+2\log(2-x)(d+2e+4f)+\log(x+1)(d-e+f))$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + x)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4),x]
```

```
[Out] (-3*(d + e + f)*Log[1 - x] + 2*(d + 2*e + 4*f)*Log[2 - x] + (d - e + f)*Log
[1 + x])/6
```

fricas [A] time = 0.93, size = 37, normalized size = 0.79

$$\frac{1}{6}\left(d-e+f\right)\log\left(x+1\right)-\frac{1}{2}\left(d+e+f\right)\log\left(x-1\right)+\frac{1}{3}\left(d+2e+4f\right)\log\left(x-2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")
```

```
[Out] 1/6*(d - e + f)*log(x + 1) - 1/2*(d + e + f)*log(x - 1) + 1/3*(d + 2*e + 4*
f)*log(x - 2)
```

giac [A] time = 0.37, size = 43, normalized size = 0.91

$$\frac{1}{6}\left(d+f-e\right)\log\left(|x+1|\right)-\frac{1}{2}\left(d+f+e\right)\log\left(|x-1|\right)+\frac{1}{3}\left(d+4f+2e\right)\log\left(|x-2|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")
```

```
[Out] 1/6*(d + f - e)*log(abs(x + 1)) - 1/2*(d + f + e)*log(abs(x - 1)) + 1/3*(d
+ 4*f + 2*e)*log(abs(x - 2))
```

maple [A] time = 0.01, size = 65, normalized size = 1.38

$$\frac{d\ln\left(x-2\right)}{3}-\frac{d\ln\left(x-1\right)}{2}+\frac{d\ln\left(x+1\right)}{6}+\frac{2e\ln\left(x-2\right)}{3}-\frac{e\ln\left(x-1\right)}{2}-\frac{e\ln\left(x+1\right)}{6}+\frac{4f\ln\left(x-2\right)}{3}-\frac{f\ln\left(x-1\right)}{2}+\frac{f\ln(x}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 1/3*d*ln(x-2)+2/3*e*ln(x-2)+4/3*f*ln(x-2)+1/6*d*ln(x+1)-1/6*e*ln(x+1)+1/6*f
*ln(x+1)-1/2*d*ln(x-1)-1/2*e*ln(x-1)-1/2*f*ln(x-1)
```

maxima [A] time = 0.44, size = 37, normalized size = 0.79

$$\frac{1}{6}\left(d-e+f\right)\log\left(x+1\right)-\frac{1}{2}\left(d+e+f\right)\log\left(x-1\right)+\frac{1}{3}\left(d+2e+4f\right)\log\left(x-2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")
```

```
[Out] 1/6*(d - e + f)*log(x + 1) - 1/2*(d + e + f)*log(x - 1) + 1/3*(d + 2*e + 4*
f)*log(x - 2)
```

mupad [B] time = 0.11, size = 47, normalized size = 1.00

$$\ln\left(x-2\right)\left(\frac{d}{3}+\frac{2e}{3}+\frac{4f}{3}\right)-\ln\left(x-1\right)\left(\frac{d}{2}+\frac{e}{2}+\frac{f}{2}\right)+\ln\left(x+1\right)\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x + 2)*(d + e*x + f*x^2))/(x^4 - 5*x^2 + 4),x)
```

```
[Out] log(x - 2)*(d/3 + (2*e)/3 + (4*f)/3) - log(x - 1)*(d/2 + e/2 + f/2) + log(x
 + 1)*(d/6 - e/6 + f/6)
```

sympy [B] time = 12.72, size = 716, normalized size = 15.23

$$\frac{\left(d-e+f\right)\log\left(x+\frac{26d^3+66d^2e+132d^2f-9d^2\left(d-e+f\right)+78de^2+276def-12de\left(d-e+f\right)+222df^2+6df\left(d-e+f\right)-7d\left(d-e+f\right)^2+46e^3+204e^2f+3e^2(}{10d^3+69d^2e+102d^2f+102de^2+318def+246df^2+35e^3+174e}\right.}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] (d - e + f)*log(x + (26*d**3 + 66*d**2*e + 132*d**2*f - 9*d**2*(d - e + f)
+ 78*d*e**2 + 276*d*e*f - 12*d*e*(d - e + f) + 222*d*f**2 + 6*d*f*(d - e +
f) - 7*d*(d - e + f)**2 + 46*e**3 + 204*e**2*f + 3*e**2*(d - e + f) + 282*e
*f**2 + 36*e*f*(d - e + f) - 8*e*(d - e + f)**2 + 116*f**3 + 51*f**2*(d - e
 + f) - 13*f*(d - e + f)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 102*d*e**2
 + 318*d*e*f + 246*d*f**2 + 35*e**3 + 174*e**2*f + 285*e*f**2 + 154*f**3))/
6 - (d + e + f)*log(x + (26*d**3 + 66*d**2*e + 132*d**2*f + 27*d**2*(d + e
+ f) + 78*d*e**2 + 276*d*e*f + 36*d*e*(d + e + f) + 222*d*f**2 - 18*d*f*(d
+ e + f) - 63*d*(d + e + f)**2 + 46*e**3 + 204*e**2*f - 9*e**2*(d + e + f)
+ 282*e*f**2 - 108*e*f*(d + e + f) - 72*e*(d + e + f)**2 + 116*f**3 - 153*f
**2*(d + e + f) - 117*f*(d + e + f)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f +
 102*d*e**2 + 318*d*e*f + 246*d*f**2 + 35*e**3 + 174*e**2*f + 285*e*f**2 +
154*f**3))/2 + (d + 2*e + 4*f)*log(x + (26*d**3 + 66*d**2*e + 132*d**2*f -
18*d**2*(d + 2*e + 4*f) + 78*d*e**2 + 276*d*e*f - 24*d*e*(d + 2*e + 4*f) +
222*d*f**2 + 12*d*f*(d + 2*e + 4*f) - 28*d*(d + 2*e + 4*f)**2 + 46*e**3 + 2
04*e**2*f + 6*e**2*(d + 2*e + 4*f) + 282*e*f**2 + 72*e*f*(d + 2*e + 4*f) -
32*e*(d + 2*e + 4*f)**2 + 116*f**3 + 102*f**2*(d + 2*e + 4*f) - 52*f*(d + 2
*e + 4*f)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 102*d*e**2 + 318*d*e*f +
246*d*f**2 + 35*e**3 + 174*e**2*f + 285*e*f**2 + 154*f**3))/3
```

3.82 $\int \frac{(2+x)\left(d+ex+fx^2+gx^3\right)}{4-5x^2+x^4}\,dx$

Optimal. Leaf size=57

$$-\frac{1}{2}\log(1-x)(d+e+f+g)+\frac{1}{3}\log(2-x)(d+2e+4f+8g)+\frac{1}{6}\log(x+1)(d-e+f-g)+gx$$

```
[Out] g*x-1/2*(d+e+f+g)*ln(1-x)+1/3*(d+2*e+4*f+8*g)*ln(2-x)+1/6*(d-e+f-g)*ln(1+x)
```

Rubi [A] time = 0.08, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.065, Rules used = {1586, 2074}

$$-\frac{1}{2}\log(1-x)(d+e+f+g)+\frac{1}{3}\log(2-x)(d+2e+4f+8g)+\frac{1}{6}\log(x+1)(d-e+f-g)+gx$$

Antiderivative was successfully verified.

```
[In] Int[((2 + x)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4),x]
```

```
[Out] g*x - ((d + e + f + g)*Log[1 - x])/2 + ((d + 2*e + 4*f + 8*g)*Log[2 - x])/3
 + ((d - e + f - g)*Log[1 + x])/6
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 2074

```
Int[(P_)^(p_)*(Q_)^(q_.), x_Symbol] :> With[{PP = Factor[P]}, Int[ExpandInt
egrand[PP^p*Q^q, x], x] /;  !SumQ[NonfreeFactors[PP, x]]] /; FreeQ[q, x] &&
 PolyQ[P, x] && PolyQ[Q, x] && IntegerQ[p] && NeQ[P, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{(2+x)\left(d+ex+fx^2+gx^3\right)}{4-5x^2+x^4}\,dx &= \int \frac{d+ex+fx^2+gx^3}{2-x-2x^2+x^3}\,dx\\
&= \int \left(g+\frac{d+2e+4f+8g}{3(-2+x)}+\frac{-d-e-f-g}{2(-1+x)}+\frac{d-e+f-g}{6(1+x)}\right)dx\\
&= gx-\frac{1}{2}(d+e+f+g)\log(1-x)+\frac{1}{3}(d+2e+4f+8g)\log(2-x)+\frac{1}{6}(d-
\end{aligned}$$

Mathematica [A] time = 0.02, size = 55, normalized size = 0.96

$$\frac{1}{6}(-3\log(1-x)(d+e+f+g)+2\log(2-x)(d+2e+4f+8g)+\log(x+1)(d-e+f-g)+6gx)$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + x)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4),x]
```

```
[Out] (6*g*x - 3*(d + e + f + g)*Log[1 - x] + 2*(d + 2*e + 4*f + 8*g)*Log[2 - x]
+ (d - e + f - g)*Log[1 + x])/6
```

fricas [A] time = 0.93, size = 47, normalized size = 0.82

$$gx+\frac{1}{6}\left(d-e+f-g\right)\log\left(x+1\right)-\frac{1}{2}\left(d+e+f+g\right)\log\left(x-1\right)+\frac{1}{3}\left(d+2e+4f+8g\right)\log\left(x-2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")
```

```
[Out] g*x + 1/6*(d - e + f - g)*log(x + 1) - 1/2*(d + e + f + g)*log(x - 1) + 1/3
*(d + 2*e + 4*f + 8*g)*log(x - 2)
```

giac [A] time = 0.37, size = 53, normalized size = 0.93

$$gx+\frac{1}{6}\left(d+f-g-e\right)\log\left(|x+1|\right)-\frac{1}{2}\left(d+f+g+e\right)\log\left(|x-1|\right)+\frac{1}{3}\left(d+4f+8g+2e\right)\log\left(|x-2|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")
```

```
[Out] g*x + 1/6*(d + f - g - e)*log(abs(x + 1)) - 1/2*(d + f + g + e)*log(abs(x -
 1)) + 1/3*(d + 4*f + 8*g + 2*e)*log(abs(x - 2))
```

maple [A] time = 0.01, size = 89, normalized size = 1.56

$$\frac{d\ln\left(x-2\right)}{3}-\frac{d\ln\left(x-1\right)}{2}+\frac{d\ln\left(x+1\right)}{6}+\frac{2e\ln\left(x-2\right)}{3}-\frac{e\ln\left(x-1\right)}{2}-\frac{e\ln\left(x+1\right)}{6}+\frac{4f\ln\left(x-2\right)}{3}-\frac{f\ln\left(x-1\right)}{2}+\frac{f\ln}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] g*x+1/3*d*ln(x-2)+2/3*e*ln(x-2)+4/3*f*ln(x-2)+8/3*g*ln(x-2)+1/6*d*ln(x+1)-1
/6*e*ln(x+1)+1/6*f*ln(x+1)-1/6*g*ln(x+1)-1/2*d*ln(x-1)-1/2*e*ln(x-1)-1/2*f*
ln(x-1)-1/2*g*ln(x-1)
```

maxima [A] time = 0.44, size = 47, normalized size = 0.82

$$gx+\frac{1}{6}\left(d-e+f-g\right)\log\left(x+1\right)-\frac{1}{2}\left(d+e+f+g\right)\log\left(x-1\right)+\frac{1}{3}\left(d+2e+4f+8g\right)\log\left(x-2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")
```

```
[Out] g*x + 1/6*(d - e + f - g)*log(x + 1) - 1/2*(d + e + f + g)*log(x - 1) + 1/3
*(d + 2*e + 4*f + 8*g)*log(x - 2)
```

mupad [B] time = 0.82, size = 59, normalized size = 1.04

$$\ln\left(x+1\right)\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}-\frac{g}{6}\right)-\ln\left(x-1\right)\left(\frac{d}{2}+\frac{e}{2}+\frac{f}{2}+\frac{g}{2}\right)+\ln\left(x-2\right)\left(\frac{d}{3}+\frac{2e}{3}+\frac{4f}{3}+\frac{8g}{3}\right)+g\,x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x + 2)*(d + e*x + f*x^2 + g*x^3))/(x^4 - 5*x^2 + 4),x)
```

```
[Out] log(x + 1)*(d/6 - e/6 + f/6 - g/6) - log(x - 1)*(d/2 + e/2 + f/2 + g/2) + l
og(x - 2)*(d/3 + (2*e)/3 + (4*f)/3 + (8*g)/3) + g*x
```

sympy [B] time = 91.47, size = 1389, normalized size = 24.37

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] g*x + (d - e + f - g)*log(x + (26*d**3 + 66*d**2*e + 132*d**2*f + 174*d**2*
g - 9*d**2*(d - e + f - g) + 78*d*e**2 + 276*d*e*f + 444*d*e*g - 12*d*e*(d
- e + f - g) + 222*d*f**2 + 636*d*f*g + 6*d*f*(d - e + f - g) + 510*d*g**2
+ 36*d*g*(d - e + f - g) - 7*d*(d - e + f - g)**2 + 46*e**3 + 204*e**2*f +
390*e**2*g + 3*e**2*(d - e + f - g) + 282*e*f**2 + 984*e*f*g + 36*e*f*(d -
e + f - g) + 930*e*g**2 + 102*e*g*(d - e + f - g) - 8*e*(d - e + f - g)**2
+ 116*f**3 + 534*f**2*g + 51*f**2*(d - e + f - g) + 924*f*g**2 + 228*f*g*(d
 - e + f - g) - 13*f*(d - e + f - g)**2 + 586*g**3 + 243*g**2*(d - e + f -
g) - 20*g*(d - e + f - g)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 213*d**2*
g + 102*d*e**2 + 318*d*e*f + 564*d*e*g + 246*d*f**2 + 894*d*f*g + 750*d*g**
2 + 35*e**3 + 174*e**2*f + 249*e**2*g + 285*e*f**2 + 852*e*f*g + 537*e*g**2
 + 154*f**3 + 717*f**2*g + 966*f*g**2 + 323*g**3))/6 - (d + e + f + g)*log(
x + (26*d**3 + 66*d**2*e + 132*d**2*f + 174*d**2*g + 27*d**2*(d + e + f + g
) + 78*d*e**2 + 276*d*e*f + 444*d*e*g + 36*d*e*(d + e + f + g) + 222*d*f**2
 + 636*d*f*g - 18*d*f*(d + e + f + g) + 510*d*g**2 - 108*d*g*(d + e + f + g
) - 63*d*(d + e + f + g)**2 + 46*e**3 + 204*e**2*f + 390*e**2*g - 9*e**2*(d
 + e + f + g) + 282*e*f**2 + 984*e*f*g - 108*e*f*(d + e + f + g) + 930*e*g*
*2 - 306*e*g*(d + e + f + g) - 72*e*(d + e + f + g)**2 + 116*f**3 + 534*f**
2*g - 153*f**2*(d + e + f + g) + 924*f*g**2 - 684*f*g*(d + e + f + g) - 117
*f*(d + e + f + g)**2 + 586*g**3 - 729*g**2*(d + e + f + g) - 180*g*(d + e
+ f + g)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 213*d**2*g + 102*d*e**2 +
318*d*e*f + 564*d*e*g + 246*d*f**2 + 894*d*f*g + 750*d*g**2 + 35*e**3 + 174
*e**2*f + 249*e**2*g + 285*e*f**2 + 852*e*f*g + 537*e*g**2 + 154*f**3 + 717
*f**2*g + 966*f*g**2 + 323*g**3))/2 + (d + 2*e + 4*f + 8*g)*log(x + (26*d**
3 + 66*d**2*e + 132*d**2*f + 174*d**2*g - 18*d**2*(d + 2*e + 4*f + 8*g) + 7
8*d*e**2 + 276*d*e*f + 444*d*e*g - 24*d*e*(d + 2*e + 4*f + 8*g) + 222*d*f**
2 + 636*d*f*g + 12*d*f*(d + 2*e + 4*f + 8*g) + 510*d*g**2 + 72*d*g*(d + 2*e
 + 4*f + 8*g) - 28*d*(d + 2*e + 4*f + 8*g)**2 + 46*e**3 + 204*e**2*f + 390*
e**2*g + 6*e**2*(d + 2*e + 4*f + 8*g) + 282*e*f**2 + 984*e*f*g + 72*e*f*(d
+ 2*e + 4*f + 8*g) + 930*e*g**2 + 204*e*g*(d + 2*e + 4*f + 8*g) - 32*e*(d +
 2*e + 4*f + 8*g)**2 + 116*f**3 + 534*f**2*g + 102*f**2*(d + 2*e + 4*f + 8*
g) + 924*f*g**2 + 456*f*g*(d + 2*e + 4*f + 8*g) - 52*f*(d + 2*e + 4*f + 8*g
)**2 + 586*g**3 + 486*g**2*(d + 2*e + 4*f + 8*g) - 80*g*(d + 2*e + 4*f + 8*
g)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 213*d**2*g + 102*d*e**2 + 318*d*
e*f + 564*d*e*g + 246*d*f**2 + 894*d*f*g + 750*d*g**2 + 35*e**3 + 174*e**2*
f + 249*e**2*g + 285*e*f**2 + 852*e*f*g + 537*e*g**2 + 154*f**3 + 717*f**2*
g + 966*f*g**2 + 323*g**3))/3
```

3.83 $\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$

Optimal. Leaf size=74

$$-\frac{1}{2}\log(1-x)(d+e+f+g+h)+\frac{1}{3}\log(2-x)(d+2e+4f+8g+16h)+\frac{1}{6}\log(x+1)(d-e+f-g+h)+x(g+2h)+\frac{hx^2}{2}$$

```
[Out] (g+2*h)*x+1/2*h*x^2-1/2*(d+e+f+g+h)*ln(1-x)+1/3*(d+2*e+4*f+8*g+16*h)*ln(2-x
)+1/6*(d-e+f-g+h)*ln(1+x)
```

Rubi [A] time = 0.11, antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {1586, 2074}

$$-\frac{1}{2}\log(1-x)(d+e+f+g+h)+\frac{1}{3}\log(2-x)(d+2e+4f+8g+16h)+\frac{1}{6}\log(x+1)(d-e+f-g+h)+x(g+2h)+\frac{hx^2}{2}$$

Antiderivative was successfully verified.

```
[In] Int[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4),x]
```

```
[Out] (g + 2*h)*x + (h*x^2)/2 - ((d + e + f + g + h)*Log[1 - x])/2 + ((d + 2*e +
4*f + 8*g + 16*h)*Log[2 - x])/3 + ((d - e + f - g + h)*Log[1 + x])/6
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 2074

```
Int[(P_)^(p_)*(Q_)^(q_.), x_Symbol] :> With[{PP = Factor[P]}, Int[ExpandInt
egrand[PP^p*Q^q, x], x] /;  !SumQ[NonfreeFactors[PP, x]]] /; FreeQ[q, x] &&
 PolyQ[P, x] && PolyQ[Q, x] && IntegerQ[p] && NeQ[P, x]
```

Rubi steps

$$\begin{aligned}\int \frac{(2+x)\left(d+ex+fx^2+gx^3+hx^4\right)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{2-x-2x^2+x^3} dx\\ &= \int \left(g\left(1+\frac{2h}{g}\right)+\frac{d+2e+4f+8g+16h}{3(-2+x)}+\frac{-d-e-f-g-h}{2(-1+x)}+\right.\\ &= (g+2h)x+\frac{hx^2}{2}-\frac{1}{2}(d+e+f+g+h)\log(1-x)+\frac{1}{3}(d+2e+4\end{aligned}$$

Mathematica [A] time = 0.03, size = 71, normalized size = 0.96

$$\frac{1}{6}\left(-3\log(1-x)(d+e+f+g+h)+2\log(2-x)(d+2(e+2f+4g+8h))+\log(x+1)(d-e+f-g+h)+\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4),x]
```

```
[Out] (6*(g + 2*h)*x + 3*h*x^2 - 3*(d + e + f + g + h)*Log[1 - x] + 2*(d + 2*(e +
 2*f + 4*g + 8*h))*Log[2 - x] + (d - e + f - g + h)*Log[1 + x])/6
```

fricas [A] time = 1.03, size = 62, normalized size = 0.84

$$\frac{1}{2}hx^2+\left(g+2h\right)x+\frac{1}{6}\left(d-e+f-g+h\right)\log\left(x+1\right)-\frac{1}{2}\left(d+e+f+g+h\right)\log\left(x-1\right)+\frac{1}{3}\left(d+2e+4f+8g+16$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="frica
s")
```

```
[Out] 1/2*h*x^2 + (g + 2*h)*x + 1/6*(d - e + f - g + h)*log(x + 1) - 1/2*(d + e +
 f + g + h)*log(x - 1) + 1/3*(d + 2*e + 4*f + 8*g + 16*h)*log(x - 2)
```

giac [A] time = 0.33, size = 68, normalized size = 0.92

$$\frac{1}{2}hx^2+gx+2hx+\frac{1}{6}\left(d+f-g+h-e\right)\log\left(|x+1|\right)-\frac{1}{2}\left(d+f+g+h+e\right)\log\left(|x-1|\right)+\frac{1}{3}\left(d+4f+8g+16h+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac"
)
```

```
[Out] 1/2*h*x^2 + g*x + 2*h*x + 1/6*(d + f - g + h - e)*log(abs(x + 1)) - 1/2*(d
+ f + g + h + e)*log(abs(x - 1)) + 1/3*(d + 4*f + 8*g + 16*h + 2*e)*log(abs
(x - 2))
```

maple [A] time = 0.01, size = 120, normalized size = 1.62

$$\frac{hx^2}{2}+\frac{d\ln\left(x-2\right)}{3}-\frac{d\ln\left(x-1\right)}{2}+\frac{d\ln\left(x+1\right)}{6}+\frac{2e\ln\left(x-2\right)}{3}-\frac{e\ln\left(x-1\right)}{2}-\frac{e\ln\left(x+1\right)}{6}+\frac{4f\ln\left(x-2\right)}{3}-\frac{f\ln\left(x-1\right)}{2}+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 1/2*h*x^2+g*x+2*h*x+1/3*d*ln(x-2)+2/3*e*ln(x-2)+4/3*f*ln(x-2)+8/3*g*ln(x-2)
+16/3*h*ln(x-2)+1/6*d*ln(x+1)-1/6*e*ln(x+1)+1/6*f*ln(x+1)-1/6*g*ln(x+1)+1/6
*h*ln(x+1)-1/2*d*ln(x-1)-1/2*e*ln(x-1)-1/2*f*ln(x-1)-1/2*g*ln(x-1)-1/2*h*ln
(x-1)
```

maxima [A] time = 0.45, size = 62, normalized size = 0.84

$$\frac{1}{2}hx^2+\left(g+2h\right)x+\frac{1}{6}\left(d-e+f-g+h\right)\log\left(x+1\right)-\frac{1}{2}\left(d+e+f+g+h\right)\log\left(x-1\right)+\frac{1}{3}\left(d+2e+4f+8g+16$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxim
a")
```

```
[Out] 1/2*h*x^2 + (g + 2*h)*x + 1/6*(d - e + f - g + h)*log(x + 1) - 1/2*(d + e +
 f + g + h)*log(x - 1) + 1/3*(d + 2*e + 4*f + 8*g + 16*h)*log(x - 2)
```

mupad [B] time = 0.88, size = 78, normalized size = 1.05

$$x\left(g+2h\right)+\frac{hx^2}{2}-\ln\left(x-1\right)\left(\frac{d}{2}+\frac{e}{2}+\frac{f}{2}+\frac{g}{2}+\frac{h}{2}\right)+\ln\left(x+1\right)\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}-\frac{g}{6}+\frac{h}{6}\right)+\ln\left(x-2\right)\left(\frac{d}{3}+\frac{2e}{3}+\frac{4f}{3}+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(x^4 - 5*x^2 + 4),x)
```

```
[Out] x*(g + 2*h) + (h*x^2)/2 - log(x - 1)*(d/2 + e/2 + f/2 + g/2 + h/2) + log(x
+ 1)*(d/6 - e/6 + f/6 - g/6 + h/6) + log(x - 2)*(d/3 + (2*e)/3 + (4*f)/3 +
(8*g)/3 + (16*h)/3)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] Timed out
```

3.84 $\int \frac{(2+x)\left(d+ex+fx^2+gx^3+hx^4+ix^5\right)}{4-5x^2+x^4} \, dx$

Optimal. Leaf size=96

$$-\frac{1}{2}\log(1-x)(d+e+f+g+h+i)+\frac{1}{3}\log(2-x)(d+2e+4f+8g+16h+32i)+\frac{1}{6}\log(x+1)(d-e+f-g+h-i)+x(g+2h+5i)+$$

```
[Out] (g+2*h+5*i)*x+1/2*(h+2*i)*x^2+1/3*i*x^3-1/2*(d+e+f+g+h+i)*ln(1-x)+1/3*(d+2*
e+4*f+8*g+16*h+32*i)*ln(2-x)+1/6*(d-e+f-g+h-i)*ln(1+x)
```

Rubi [A] time = 0.14, antiderivative size = 96, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 41, $\frac{\text{number of rules}}{\text{integrand size}} = 0.049$, Rules used = {1586, 2074}

$$-\frac{1}{2}\log(1-x)(d+e+f+g+h+i)+\frac{1}{3}\log(2-x)(d+2e+4f+8g+16h+32i)+\frac{1}{6}\log(x+1)(d-e+f-g+h-i)+x(g+2h+5i)+$$

Antiderivative was successfully verified.

```
[In] Int[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 + x^4),x
]
```

```
[Out] (g + 2*h + 5*i)*x + ((h + 2*i)*x^2)/2 + (i*x^3)/3 - ((d + e + f + g + h + i
)*Log[1 - x])/2 + ((d + 2*e + 4*f + 8*g + 16*h + 32*i)*Log[2 - x])/3 + ((d
- e + f - g + h - i)*Log[1 + x])/6
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 2074

```
Int[(P_)^(p_)*(Q_)^(q_.), x_Symbol] :> With[{PP = Factor[P]}, Int[ExpandInt
egrand[PP^p*Q^q, x], x] /;  !SumQ[NonfreeFactors[PP, x]]] /; FreeQ[q, x] &&
 PolyQ[P, x] && PolyQ[Q, x] && IntegerQ[p] && NeQ[P, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{(2+x)\left(d+ex+fx^2+gx^3+hx^4+84x^5\right)}{4-5x^2+x^4} \, dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+84x^5}{2-x-2x^2+x^3} \, dx \\
&= \int \left(420\left(1+\frac{1}{420}(g+2h)\right)+\frac{2688+d+2e+4f+8g+16h}{3(-2+x)}\right. \\
&= (420+g+2h)x+\frac{1}{2}(168+h)x^2+28x^3-\frac{1}{2}(84+d+e+f+
\end{aligned}$$

Mathematica [A] time = 0.05, size = 91, normalized size = 0.95

$$\frac{1}{6}\left(-3\log(1-x)(d+e+f+g+h+i)+2\log(2-x)(d+2e+4(f+2g+4h+8i))+\log(x+1)(d-e+f-g+\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 +
x^4),x]
```

```
[Out] (6*(g + 2*h + 5*i)*x + 3*(h + 2*i)*x^2 + 2*i*x^3 - 3*(d + e + f + g + h + i
)*Log[1 - x] + 2*(d + 2*e + 4*(f + 2*g + 4*h + 8*i))*Log[2 - x] + (d - e +
f - g + h - i)*Log[1 + x])/6
```

fricas [A] time = 1.30, size = 82, normalized size = 0.85

$$\frac{1}{3}ix^3+\frac{1}{2}(h+2i)x^2+\left(g+2h+5i\right)x+\frac{1}{6}\left(d-e+f-g+h-i\right)\log(x+1)-\frac{1}{2}\left(d+e+f+g+h+i\right)\log(x-1$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm=
"fricas")
```

```
[Out] 1/3*i*x^3 + 1/2*(h + 2*i)*x^2 + (g + 2*h + 5*i)*x + 1/6*(d - e + f - g + h
- i)*log(x + 1) - 1/2*(d + e + f + g + h + i)*log(x - 1) + 1/3*(d + 2*e + 4
*f + 8*g + 16*h + 32*i)*log(x - 2)
```

giac [A] time = 0.24, size = 90, normalized size = 0.94

$$\frac{1}{3}ix^3+\frac{1}{2}hx^2+ix^2+gx+2hx+5ix+\frac{1}{6}\left(d+f-g+h-i-e\right)\log(|x+1|)-\frac{1}{2}\left(d+f+g+h+i+e\right)\log(|x-1|)+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm=
"giac")
```

```
[Out] 1/3*i*x^3 + 1/2*h*x^2 + i*x^2 + g*x + 2*h*x + 5*i*x + 1/6*(d + f - g + h -
i - e)*log(abs(x + 1)) - 1/2*(d + f + g + h + i + e)*log(abs(x - 1)) + 1/3*
(d + 4*f + 8*g + 16*h + 32*i + 2*e)*log(abs(x - 2))
```

maple [A] time = 0.01, size = 156, normalized size = 1.62

$$\frac{i\,x^3}{3}+\frac{h\,x^2}{2}+i\,x^2+\frac{d\ln(x-2)}{3}-\frac{d\ln(x-1)}{2}+\frac{d\ln(x+1)}{6}+\frac{2e\ln(x-2)}{3}-\frac{e\ln(x-1)}{2}-\frac{e\ln(x+1)}{6}+\frac{4f\ln(x-2)}{3}-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)
```

```
[Out] 1/3*d*ln(x-2)+2/3*e*ln(x-2)+4/3*f*ln(x-2)+8/3*g*ln(x-2)+16/3*h*ln(x-2)+32/3
*i*ln(x-2)+1/3*i*x^3+1/2*h*x^2+i*x^2+g*x+2*h*x+5*i*x+1/6*d*ln(x+1)-1/6*e*ln
(x+1)+1/6*f*ln(x+1)-1/6*g*ln(x+1)+1/6*h*ln(x+1)-1/6*i*ln(x+1)-1/2*d*ln(x-1)
-1/2*e*ln(x-1)-1/2*f*ln(x-1)-1/2*g*ln(x-1)-1/2*h*ln(x-1)-1/2*i*ln(x-1)
```

maxima [A] time = 0.45, size = 82, normalized size = 0.85

$$\frac{1}{3}ix^3+\frac{1}{2}(h+2i)x^2+\left(g+2h+5i\right)x+\frac{1}{6}\left(d-e+f-g+h-i\right)\log(x+1)-\frac{1}{2}\left(d+e+f+g+h+i\right)\log(x-1$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm=
"maxima")
```

```
[Out] 1/3*i*x^3 + 1/2*(h + 2*i)*x^2 + (g + 2*h + 5*i)*x + 1/6*(d - e + f - g + h
- i)*log(x + 1) - 1/2*(d + e + f + g + h + i)*log(x - 1) + 1/3*(d + 2*e + 4
*f + 8*g + 16*h + 32*i)*log(x - 2)
```

mupad [B] time = 0.88, size = 99, normalized size = 1.03

$$x\left(g+2h+5i\right)+\frac{i\,x^3}{3}-\ln(x-1)\left(\frac{d}{2}+\frac{e}{2}+\frac{f}{2}+\frac{g}{2}+\frac{h}{2}+\frac{i}{2}\right)+\ln(x+1)\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}-\frac{g}{6}+\frac{h}{6}-\frac{i}{6}\right)+\ln(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(x^4 - 5*x^2 + 4),x
)
```

```
[Out] x*(g + 2*h + 5*i) + (i*x^3)/3 - log(x - 1)*(d/2 + e/2 + f/2 + g/2 + h/2 + i
/2) + log(x + 1)*(d/6 - e/6 + f/6 - g/6 + h/6 - i/6) + log(x - 2)*(d/3 + (2
*e)/3 + (4*f)/3 + (8*g)/3 + (16*h)/3 + (32*i)/3) + x^2*(h/2 + i)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] Timed out
```

3.85 $\int \frac{2-x-2x^2+x^3}{\left(4-5x^2+x^4\right)^2} dx$

Optimal. Leaf size=46

$$\frac{1}{12(x+2)}-\frac{1}{18}\log(1-x)+\frac{1}{48}\log(2-x)+\frac{1}{6}\log(x+1)-\frac{19}{144}\log(x+2)$$

```
[Out] 1/12/(2+x)-1/18*ln(1-x)+1/48*ln(2-x)+1/6*ln(1+x)-19/144*ln(2+x)
```

Rubi [A] time = 0.05, antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {1586, 2074}

$$\frac{1}{12(x+2)}-\frac{1}{18}\log(1-x)+\frac{1}{48}\log(2-x)+\frac{1}{6}\log(x+1)-\frac{19}{144}\log(x+2)$$

Antiderivative was successfully verified.

```
[In] Int[(2 - x - 2*x^2 + x^3)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] 1/(12*(2 + x)) - Log[1 - x]/18 + Log[2 - x]/48 + Log[1 + x]/6 - (19*Log[2 +
 x])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 2074

```
Int[(P_)^(p_)*(Q_)^(q_.), x_Symbol] :> With[{PP = Factor[P]}, Int[ExpandInt
egrand[PP^p*Q^q, x], x] /;  !SumQ[NonfreeFactors[PP, x]]] /; FreeQ[q, x] &&
 PolyQ[P, x] && PolyQ[Q, x] && IntegerQ[p] && NeQ[P, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{2-x-2x^2+x^3}{\left(4-5x^2+x^4\right)^2} dx &= \int \frac{1}{(2+x)^2\left(2-x-2x^2+x^3\right)} dx\\
&= \int \left(\frac{1}{48(-2+x)}-\frac{1}{18(-1+x)}+\frac{1}{6(1+x)}-\frac{1}{12(2+x)^2}-\frac{19}{144(2+x)}\right) dx\\
&= \frac{1}{12(2+x)}-\frac{1}{18}\log(1-x)+\frac{1}{48}\log(2-x)+\frac{1}{6}\log(1+x)-\frac{19}{144}\log(2+x)
\end{aligned}$$

Mathematica [A] time = 0.02, size = 42, normalized size = 0.91

$$\frac{1}{144}\left(\frac{12}{x+2}+24\log(-x-1)-8\log(1-x)+3\log(2-x)-19\log(x+2)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 - x - 2*x^2 + x^3)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (12/(2 + x) + 24*Log[-1 - x] - 8*Log[1 - x] + 3*Log[2 - x] - 19*Log[2 + x])
/144
```

fricas [A] time = 0.95, size = 45, normalized size = 0.98

$$-\frac{19\,(x+2)\log\left(x+2\right)-24\,(x+2)\log\left(x+1\right)+8\,(x+2)\log\left(x-1\right)-3\,(x+2)\log\left(x-2\right)-12}{144\,(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] -1/144*(19*(x + 2)*log(x + 2) - 24*(x + 2)*log(x + 1) + 8*(x + 2)*log(x - 1
) - 3*(x + 2)*log(x - 2) - 12)/(x + 2)
```

giac [A] time = 0.25, size = 36, normalized size = 0.78

$$\frac{1}{12\,(x+2)}-\frac{19}{144}\log\left(|x+2|\right)+\frac{1}{6}\log\left(|x+1|\right)-\frac{1}{18}\log\left(|x-1|\right)+\frac{1}{48}\log\left(|x-2|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] 1/12/(x + 2) - 19/144*log(abs(x + 2)) + 1/6*log(abs(x + 1)) - 1/18*log(abs(
x - 1)) + 1/48*log(abs(x - 2))
```

maple [A] time = 0.01, size = 33, normalized size = 0.72

$$-\frac{19\ln\left(x+2\right)}{144}+\frac{\ln\left(x-2\right)}{48}-\frac{\ln\left(x-1\right)}{18}+\frac{\ln\left(x+1\right)}{6}+\frac{1}{12x+24}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 1/48*ln(x-2)+1/6*ln(x+1)-1/18*ln(x-1)+1/12/(x+2)-19/144*ln(x+2)
```

maxima [A] time = 0.44, size = 32, normalized size = 0.70

$$\frac{1}{12\,(x+2)}-\frac{19}{144}\log\left(x+2\right)+\frac{1}{6}\log\left(x+1\right)-\frac{1}{18}\log\left(x-1\right)+\frac{1}{48}\log\left(x-2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] 1/12/(x + 2) - 19/144*log(x + 2) + 1/6*log(x + 1) - 1/18*log(x - 1) + 1/48*
log(x - 2)
```

mupad [B] time = 0.05, size = 32, normalized size = 0.70

$$\frac{\ln\left(x+1\right)}{6}-\frac{\ln\left(x-1\right)}{18}+\frac{\ln\left(x-2\right)}{48}-\frac{19\,\ln\left(x+2\right)}{144}+\frac{1}{12\,\left(x+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-(x + 2*x^2 - x^3 - 2)/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x + 1)/6 - log(x - 1)/18 + log(x - 2)/48 - (19*log(x + 2))/144 + 1/(12*
(x + 2))
```

sympy [A] time = 0.26, size = 34, normalized size = 0.74

$$\frac{\log\left(x-2\right)}{48}-\frac{\log\left(x-1\right)}{18}+\frac{\log\left(x+1\right)}{6}-\frac{19\log\left(x+2\right)}{144}+\frac{1}{12x+24}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**3-2*x**2-x+2)/(x**4-5*x**2+4)**2,x)
```

```
[Out] log(x - 2)/48 - log(x - 1)/18 + log(x + 1)/6 - 19*log(x + 2)/144 + 1/(12*x
+ 24)
```

3.86 $\int \frac{(d+ex)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2}\,dx$

Optimal. Leaf size=71

$$\frac{d-2e}{12(x+2)}-\frac{1}{18}(d+e)\log(1-x)+\frac{1}{48}(d+2e)\log(2-x)+\frac{1}{6}(d-e)\log(x+1)-\frac{1}{144}(19d-26e)\log(x+2)$$

```
[Out] 1/12*(d-2*e)/(2+x)-1/18*(d+e)*ln(1-x)+1/48*(d+2*e)*ln(2-x)+1/6*(d-e)*ln(1+x
)-1/144*(19*d-26*e)*ln(2+x)
```

Rubi [A] time = 0.17, antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.065, Rules used = {1586, 6742}

$$\frac{d-2e}{12(x+2)}-\frac{1}{18}(d+e)\log(1-x)+\frac{1}{48}(d+2e)\log(2-x)+\frac{1}{6}(d-e)\log(x+1)-\frac{1}{144}(19d-26e)\log(x+2)$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (d - 2*e)/(12*(2 + x)) - ((d + e)*Log[1 - x])/18 + ((d + 2*e)*Log[2 - x])/4
8 + ((d - e)*Log[1 + x])/6 - ((19*d - 26*e)*Log[2 + x])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6742

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex)\left(2-x-2x^2+x^3\right)}{\left(4-5x^2+x^4\right)^2}\,dx &= \int \frac{d+ex}{(2+x)^2\left(2-x-2x^2+x^3\right)}\,dx\\ &= \int \left(\frac{d+2e}{48(-2+x)}+\frac{-d-e}{18(-1+x)}+\frac{d-e}{6(1+x)}+\frac{-d+2e}{12(2+x)^2}+\frac{-19d+26e}{144(2+x)}\right)dx\\ &= \frac{d-2e}{12(2+x)}-\frac{1}{18}(d+e)\log(1-x)+\frac{1}{48}(d+2e)\log(2-x)+\frac{1}{6}(d-e)\log(1\end{aligned}$$

Mathematica [A] time = 0.05, size = 66, normalized size = 0.93

$$\frac{1}{144}\left(\frac{12(d-2e)}{x+2}+24(d-e)\log(-x-1)-8(d+e)\log(1-x)+3(d+2e)\log(2-x)+(26e-19d)\log(x+2)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((12*(d - 2*e))/(2 + x) + 24*(d - e)*Log[-1 - x] - 8*(d + e)*Log[1 - x] + 3
*(d + 2*e)*Log[2 - x] + (-19*d + 26*e)*Log[2 + x])/144
```

fricas [A] time = 0.97, size = 93, normalized size = 1.31

$$-\frac{((19\,d-26\,e)x+38\,d-52\,e)\log\left(x+2\right)-24\,((d-e)x+2\,d-2\,e)\log\left(x+1\right)+8\,((d+e)x+2\,d+2\,e)\log\left(x-\right.}{144\,(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] -1/144*(((19*d - 26*e)*x + 38*d - 52*e)*log(x + 2) - 24*((d - e)*x + 2*d -
2*e)*log(x + 1) + 8*((d + e)*x + 2*d + 2*e)*log(x - 1) - 3*((d + 2*e)*x + 2
*d + 4*e)*log(x - 2) - 12*d + 24*e)/(x + 2)
```

giac [A] time = 0.26, size = 66, normalized size = 0.93

$$-\frac{1}{144}\,(19\,d-26\,e)\log\left(|x+2|\right)+\frac{1}{6}\,(d-e)\log\left(|x+1|\right)-\frac{1}{18}\,(d+e)\log\left(|x-1|\right)+\frac{1}{48}\,(d+2\,e)\log\left(|x-2|\right)+\frac{d-2\,e}{12\,(x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] -1/144*(19*d - 26*e)*log(abs(x + 2)) + 1/6*(d - e)*log(abs(x + 1)) - 1/18*(
d + e)*log(abs(x - 1)) + 1/48*(d + 2*e)*log(abs(x - 2)) + 1/12*(d - 2*e)/(x
 + 2)
```

maple [A] time = 0.01, size = 74, normalized size = 1.04

$$-\frac{19d\ln\left(x+2\right)}{144}+\frac{d\ln\left(x-2\right)}{48}-\frac{d\ln\left(x-1\right)}{18}+\frac{d\ln\left(x+1\right)}{6}+\frac{13e\ln\left(x+2\right)}{72}+\frac{e\ln\left(x-2\right)}{24}-\frac{e\ln\left(x-1\right)}{18}-\frac{e\ln\left(x+1\right)}{6}+\frac{}{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 1/48*d*ln(x-2)+1/24*e*ln(x-2)+1/6*d*ln(x+1)-1/6*e*ln(x+1)-1/18*d*ln(x-1)-1/
18*e*ln(x-1)-19/144*d*ln(x+2)+13/72*e*ln(x+2)+1/12/(x+2)*d-1/6/(x+2)*e
```

maxima [A] time = 0.44, size = 57, normalized size = 0.80

$$-\frac{1}{144}\,(19\,d-26\,e)\log\left(x+2\right)+\frac{1}{6}\,(d-e)\log\left(x+1\right)-\frac{1}{18}\,(d+e)\log\left(x-1\right)+\frac{1}{48}\,(d+2\,e)\log\left(x-2\right)+\frac{d-2\,e}{12\,(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] -1/144*(19*d - 26*e)*log(x + 2) + 1/6*(d - e)*log(x + 1) - 1/18*(d + e)*log
(x - 1) + 1/48*(d + 2*e)*log(x - 2) + 1/12*(d - 2*e)/(x + 2)
```

mupad [B] time = 0.81, size = 64, normalized size = 0.90

$$\frac{\frac{d}{12}-\frac{e}{6}}{x+2}+\ln\left(x+1\right)\left(\frac{d}{6}-\frac{e}{6}\right)-\ln\left(x-1\right)\left(\frac{d}{18}+\frac{e}{18}\right)+\ln\left(x-2\right)\left(\frac{d}{48}+\frac{e}{24}\right)-\ln\left(x+2\right)\left(\frac{19\,d}{144}-\frac{13\,e}{72}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-((d + e*x)*(x + 2*x^2 - x^3 - 2))/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] (d/12 - e/6)/(x + 2) + log(x + 1)*(d/6 - e/6) - log(x - 1)*(d/18 + e/18) +
log(x - 2)*(d/48 + e/24) - log(x + 2)*((19*d)/144 - (13*e)/72)
```

sympy [B] time = 10.54, size = 1188, normalized size = 16.73

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x**3-2*x**2-x+2)/(x**4-5*x**2+4)**2,x)
```

```
[Out] (d - 2*e)/(12*x + 24) + (d - e)*log(x + (-1534775*d**6 + 8032360*d**5*e - 9
84027*d**5*(d - e) - 12991180*d**4*e**2 + 11797266*d**4*e*(d - e) + 3567168
*d**4*(d - e)**2 + 1075200*d**3*e**3 - 32721528*d**3*e**2*(d - e) - 8725248
*d**3*e*(d - e)**2 - 247104*d**3*(d - e)**3 + 16959280*d**2*e**4 + 38977296
*d**2*e**3*(d - e) - 2820096*d**2*e**2*(d - e)**2 - 10357632*d**2*e*(d - e)
**3 - 15836800*d*e**5 - 21294960*d*e**4*(d - e) + 15436800*d*e**3*(d - e)**
2 + 16277760*d*e**2*(d - e)**3 + 4283840*e**6 + 3876000*e**5*(d - e) - 6865
920*e**4*(d - e)**2 - 4078080*e**3*(d - e)**3)/(801262*d**6 - 4662251*d**5*
e + 7296938*d**4*e**2 + 1388616*d**3*e**3 - 12447440*d**2*e**4 + 9990800*d*
e**5 - 2380000*e**6))/6 - (d + e)*log(x + (-1534775*d**6 + 8032360*d**5*e +
 328009*d**5*(d + e) - 12991180*d**4*e**2 - 3932422*d**4*e*(d + e) + 396352
*d**4*(d + e)**2 + 1075200*d**3*e**3 + 10907176*d**3*e**2*(d + e) - 969472*
d**3*e*(d + e)**2 + 9152*d**3*(d + e)**3 + 16959280*d**2*e**4 - 12992432*d*
*2*e**3*(d + e) - 313344*d**2*e**2*(d + e)**2 + 383616*d**2*e*(d + e)**3 -
15836800*d*e**5 + 7098320*d*e**4*(d + e) + 1715200*d*e**3*(d + e)**2 - 6028
80*d*e**2*(d + e)**3 + 4283840*e**6 - 1292000*e**5*(d + e) - 762880*e**4*(d
 + e)**2 + 151040*e**3*(d + e)**3)/(801262*d**6 - 4662251*d**5*e + 7296938*
d**4*e**2 + 1388616*d**3*e**3 - 12447440*d**2*e**4 + 9990800*d*e**5 - 23800
00*e**6))/18 + (d + 2*e)*log(x + (-1534775*d**6 + 8032360*d**5*e - 984027*d
**5*(d + 2*e)/8 - 12991180*d**4*e**2 + 5898633*d**4*e*(d + 2*e)/4 + 55737*d
**4*(d + 2*e)**2 + 1075200*d**3*e**3 - 4090191*d**3*e**2*(d + 2*e) - 136332
*d**3*e*(d + 2*e)**2 - 3861*d**3*(d + 2*e)**3/8 + 16959280*d**2*e**4 + 4872
162*d**2*e**3*(d + 2*e) - 44064*d**2*e**2*(d + 2*e)**2 - 80919*d**2*e*(d +
2*e)**3/4 - 15836800*d*e**5 - 2661870*d*e**4*(d + 2*e) + 241200*d*e**3*(d +
 2*e)**2 + 63585*d*e**2*(d + 2*e)**3/2 + 4283840*e**6 + 484500*e**5*(d + 2*
e) - 107280*e**4*(d + 2*e)**2 - 7965*e**3*(d + 2*e)**3)/(801262*d**6 - 4662
251*d**5*e + 7296938*d**4*e**2 + 1388616*d**3*e**3 - 12447440*d**2*e**4 + 9
990800*d*e**5 - 2380000*e**6))/48 - (19*d - 26*e)*log(x + (-1534775*d**6 +
8032360*d**5*e + 328009*d**5*(19*d - 26*e)/8 - 12991180*d**4*e**2 - 1966211
*d**4*e*(19*d - 26*e)/4 + 6193*d**4*(19*d - 26*e)**2 + 1075200*d**3*e**3 +
1363397*d**3*e**2*(19*d - 26*e) - 15148*d**3*e*(19*d - 26*e)**2 + 143*d**3*
(19*d - 26*e)**3/8 + 16959280*d**2*e**4 - 1624054*d**2*e**3*(19*d - 26*e) -
 4896*d**2*e**2*(19*d - 26*e)**2 + 2997*d**2*e*(19*d - 26*e)**3/4 - 1583680
0*d*e**5 + 887290*d*e**4*(19*d - 26*e) + 26800*d*e**3*(19*d - 26*e)**2 - 23
55*d*e**2*(19*d - 26*e)**3/2 + 4283840*e**6 - 161500*e**5*(19*d - 26*e) - 1
1920*e**4*(19*d - 26*e)**2 + 295*e**3*(19*d - 26*e)**3)/(801262*d**6 - 4662
251*d**5*e + 7296938*d**4*e**2 + 1388616*d**3*e**3 - 12447440*d**2*e**4 + 9
990800*d*e**5 - 2380000*e**6))/144
```

3.87 $\int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2}\,dx$

Optimal. Leaf size=82

$$\frac{d-2e+4f}{12(x+2)}-\frac{1}{18}\log(1-x)(d+e+f)+\frac{1}{48}\log(2-x)(d+2e+4f)+\frac{1}{6}\log(x+1)(d-e+f)-\frac{1}{144}\log(x+2)(19d-26e+28f)$$

```
[Out] 1/12*(d-2*e+4*f)/(2+x)-1/18*(d+e+f)*ln(1-x)+1/48*(d+2*e+4*f)*ln(2-x)+1/6*(d
-e+f)*ln(1+x)-1/144*(19*d-26*e+28*f)*ln(2+x)
```

Rubi [A] time = 0.20, antiderivative size = 82, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {1586, 6742}

$$\frac{d-2e+4f}{12(x+2)}-\frac{1}{18}\log(1-x)(d+e+f)+\frac{1}{48}\log(2-x)(d+2e+4f)+\frac{1}{6}\log(x+1)(d-e+f)-\frac{1}{144}\log(x+2)(19d-26e+28f)$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x + f*x^2)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (d - 2*e + 4*f)/(12*(2 + x)) - ((d + e + f)*Log[1 - x])/18 + ((d + 2*e + 4*
f)*Log[2 - x])/48 + ((d - e + f)*Log[1 + x])/6 - ((19*d - 26*e + 28*f)*Log[
2 + x])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6742

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}\int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2}\,dx &= \int \frac{d+ex+fx^2}{(2+x)^2(2-x-2x^2+x^3)}\,dx\\ &= \int \left(\frac{d+2e+4f}{48(-2+x)}+\frac{-d-e-f}{18(-1+x)}+\frac{d-e+f}{6(1+x)}+\frac{-d+2e-4f}{12(2+x)^2}+\frac{-19d+2}{144(}\right.\\ &= \frac{d-2e+4f}{12(2+x)}-\frac{1}{18}(d+e+f)\log(1-x)+\frac{1}{48}(d+2e+4f)\log(2-x)+\end{aligned}$$

Mathematica [A] time = 0.06, size = 77, normalized size = 0.94

$$\frac{1}{144}\left(\frac{12(d-2e+4f)}{x+2}+24\log(-x-1)(d-e+f)-8\log(1-x)(d+e+f)+3\log(2-x)(d+2e+4f)+\log(x+\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x + f*x^2)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((12*(d - 2*e + 4*f))/(2 + x) + 24*(d - e + f)*Log[-1 - x] - 8*(d + e + f)*
Log[1 - x] + 3*(d + 2*e + 4*f)*Log[2 - x] + (-19*d + 26*e - 28*f)*Log[2 + x
])/144
```

fricas [A] time = 1.10, size = 116, normalized size = 1.41

$$-\frac{\left(\left(19\,d-26\,e+28\,f\right)x+38\,d-52\,e+56\,f\right)\log\left(x+2\right)-24\left(\left(d-e+f\right)x+2\,d-2\,e+2\,f\right)\log\left(x+1\right)+8\left(\left(\right.\right.}{144}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="frica
s")
```

```
[Out] -1/144*(((19*d - 26*e + 28*f)*x + 38*d - 52*e + 56*f)*log(x + 2) - 24*((d -
 e + f)*x + 2*d - 2*e + 2*f)*log(x + 1) + 8*((d + e + f)*x + 2*d + 2*e + 2*
f)*log(x - 1) - 3*((d + 2*e + 4*f)*x + 2*d + 4*e + 8*f)*log(x - 2) - 12*d +
 24*e - 48*f)/(x + 2)
```

giac [A] time = 0.25, size = 77, normalized size = 0.94

$$-\frac{1}{144}\left(19\,d+28\,f-26\,e\right)\log\left(|x+2|\right)+\frac{1}{6}\left(d+f-e\right)\log\left(|x+1|\right)-\frac{1}{18}\left(d+f+e\right)\log\left(|x-1|\right)+\frac{1}{48}\left(d+4\,f+2\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="giac"
)
```

```
[Out] -1/144*(19*d + 28*f - 26*e)*log(abs(x + 2)) + 1/6*(d + f - e)*log(abs(x + 1
)) - 1/18*(d + f + e)*log(abs(x - 1)) + 1/48*(d + 4*f + 2*e)*log(abs(x - 2)
) + 1/12*(d + 4*f - 2*e)/(x + 2)
```

maple [A] time = 0.01, size = 110, normalized size = 1.34

$$-\frac{19d\ln\left(x+2\right)}{144}+\frac{d\ln\left(x-2\right)}{48}-\frac{d\ln\left(x-1\right)}{18}+\frac{d\ln\left(x+1\right)}{6}+\frac{13e\ln\left(x+2\right)}{72}+\frac{e\ln\left(x-2\right)}{24}-\frac{e\ln\left(x-1\right)}{18}-\frac{e\ln\left(x+1\right)}{6}-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 1/48*d*ln(x-2)+1/24*e*ln(x-2)+1/12*f*ln(x-2)+1/6*d*ln(x+1)-1/6*e*ln(x+1)+1/
6*f*ln(x+1)-1/18*d*ln(x-1)-1/18*e*ln(x-1)-1/18*f*ln(x-1)+13/72*e*ln(x+2)-7/
36*f*ln(x+2)-19/144*d*ln(x+2)+1/12/(x+2)*d-1/6/(x+2)*e+1/3/(x+2)*f
```

maxima [A] time = 0.46, size = 68, normalized size = 0.83

$$-\frac{1}{144}\left(19\,d-26\,e+28\,f\right)\log\left(x+2\right)+\frac{1}{6}\left(d-e+f\right)\log\left(x+1\right)-\frac{1}{18}\left(d+e+f\right)\log\left(x-1\right)+\frac{1}{48}\left(d+2\,e+4\,f\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="maxim
a")
```

```
[Out] -1/144*(19*d - 26*e + 28*f)*log(x + 2) + 1/6*(d - e + f)*log(x + 1) - 1/18*
(d + e + f)*log(x - 1) + 1/48*(d + 2*e + 4*f)*log(x - 2) + 1/12*(d - 2*e +
4*f)/(x + 2)
```

mupad [B] time = 0.84, size = 79, normalized size = 0.96

$$\frac{\frac{d}{12}-\frac{e}{6}+\frac{f}{3}}{x+2}+\ln\left(x+1\right)\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}\right)-\ln\left(x-1\right)\left(\frac{d}{18}+\frac{e}{18}+\frac{f}{18}\right)+\ln\left(x-2\right)\left(\frac{d}{48}+\frac{e}{24}+\frac{f}{12}\right)-\ln\left(x+2\right)\left(\frac{19\,d}{144}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-((d + e*x + f*x^2)*(x + 2*x^2 - x^3 - 2))/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] (d/12 - e/6 + f/3)/(x + 2) + log(x + 1)*(d/6 - e/6 + f/6) - log(x - 1)*(d/1
8 + e/18 + f/18) + log(x - 2)*(d/48 + e/24 + f/12) - log(x + 2)*((19*d)/144
 - (13*e)/72 + (7*f)/36)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)*(x**3-2*x**2-x+2)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

3.88 $\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2}\,dx$

Optimal. Leaf size=95

$$\frac{d-2e+4f-8g}{12(x+2)}-\frac{1}{18}\log(1-x)(d+e+f+g)+\frac{1}{48}\log(2-x)(d+2e+4f+8g)+\frac{1}{6}\log(x+1)(d-e+f-g)-\frac{1}{144}\log(x+2$$

```
[Out] 1/12*(d-2*e+4*f-8*g)/(2+x)-1/18*(d+e+f+g)*ln(1-x)+1/48*(d+2*e+4*f+8*g)*ln(2
-x)+1/6*(d-e+f-g)*ln(1+x)-1/144*(19*d-26*e+28*f-8*g)*ln(2+x)
```

Rubi [A] time = 0.22, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 41, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.049, Rules used = {1586, 6742}

$$\frac{d-2e+4f-8g}{12(x+2)}-\frac{1}{18}\log(1-x)(d+e+f+g)+\frac{1}{48}\log(2-x)(d+2e+4f+8g)+\frac{1}{6}\log(x+1)(d-e+f-g)-\frac{1}{144}\log(x+2$$

Antiderivative was successfully verified.

```
[In] Int[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4)^2,x
]
```

```
[Out] (d - 2*e + 4*f - 8*g)/(12*(2 + x)) - ((d + e + f + g)*Log[1 - x])/18 + ((d
+ 2*e + 4*f + 8*g)*Log[2 - x])/48 + ((d - e + f - g)*Log[1 + x])/6 - ((19*d
 - 26*e + 28*f - 8*g)*Log[2 + x])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6742

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2}\,dx &= \int \frac{d+ex+fx^2+gx^3}{(2+x)^2(2-x-2x^2+x^3)}\,dx \\
&= \int \left(\frac{d+2e+4f+8g}{48(-2+x)}+\frac{-d-e-f-g}{18(-1+x)}+\frac{d-e+f-g}{6(1+x)}+\frac{-d
\\
&= \frac{d-2e+4f-8g}{12(2+x)}-\frac{1}{18}(d+e+f+g)\log(1-x)+\frac{1}{48}(d+2e
\end{aligned}$$

Mathematica [A] time = 0.05, size = 90, normalized size = 0.95

$$\frac{1}{144}\left(\frac{12(d-2e+4f-8g)}{x+2}+24\log(-x-1)(d-e+f-g)-8\log(1-x)(d+e+f+g)+3\log(2-x)(d+2e$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^
4)^2,x]
```

```
[Out] ((12*(d - 2*e + 4*f - 8*g))/(2 + x) + 24*(d - e + f - g)*Log[-1 - x] - 8*(d
 + e + f + g)*Log[1 - x] + 3*(d + 2*e + 4*f + 8*g)*Log[2 - x] + (-19*d + 26
*e - 28*f + 8*g)*Log[2 + x])/144
```

fricas [A] time = 2.42, size = 141, normalized size = 1.48

$$-\frac{\left(\left(19\,d-26\,e+28\,f-8\,g\right)x+38\,d-52\,e+56\,f-16\,g\right)\log\left(x+2\right)-24\left(\left(d-e+f-g\right)x+2\,d-2\,e+2\,f-2\,g\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm=
"fricas")
```

```
[Out] -1/144*(((19*d - 26*e + 28*f - 8*g)*x + 38*d - 52*e + 56*f - 16*g)*log(x +
2) - 24*((d - e + f - g)*x + 2*d - 2*e + 2*f - 2*g)*log(x + 1) + 8*((d + e
+ f + g)*x + 2*d + 2*e + 2*f + 2*g)*log(x - 1) - 3*((d + 2*e + 4*f + 8*g)*x
 + 2*d + 4*e + 8*f + 16*g)*log(x - 2) - 12*d + 24*e - 48*f + 96*g)/(x + 2)
```

giac [A] time = 0.33, size = 90, normalized size = 0.95

$$-\frac{1}{144}\left(19\,d+28\,f-8\,g-26\,e\right)\log\left(|x+2|\right)+\frac{1}{6}\left(d+f-g-e\right)\log\left(|x+1|\right)-\frac{1}{18}\left(d+f+g+e\right)\log\left(|x-1|\right)+\frac{1}{48}\left(\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm=
"giac")
```

```
[Out] -1/144*(19*d + 28*f - 8*g - 26*e)*log(abs(x + 2)) + 1/6*(d + f - g - e)*log
(abs(x + 1)) - 1/18*(d + f + g + e)*log(abs(x - 1)) + 1/48*(d + 4*f + 8*g +
 2*e)*log(abs(x - 2)) + 1/12*(d + 4*f - 8*g - 2*e)/(x + 2)
```

maple [A] time = 0.01, size = 146, normalized size = 1.54

$$-\frac{19d\ln\left(x+2\right)}{144}+\frac{d\ln\left(x-2\right)}{48}-\frac{d\ln\left(x-1\right)}{18}+\frac{d\ln\left(x+1\right)}{6}+\frac{13e\ln\left(x+2\right)}{72}+\frac{e\ln\left(x-2\right)}{24}-\frac{e\ln\left(x-1\right)}{18}-\frac{e\ln\left(x+1\right)}{6}-\frac{7f}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 1/48*d*ln(x-2)+1/24*e*ln(x-2)+1/12*f*ln(x-2)+1/6*g*ln(x-2)+1/6*d*ln(x+1)-1/
6*e*ln(x+1)+1/6*f*ln(x+1)-1/6*g*ln(x+1)-1/18*d*ln(x-1)-1/18*e*ln(x-1)-1/18*
f*ln(x-1)-1/18*g*ln(x-1)+13/72*e*ln(x+2)-7/36*f*ln(x+2)+1/18*g*ln(x+2)-19/1
44*d*ln(x+2)+1/12/(x+2)*d-1/6/(x+2)*e+1/3/(x+2)*f-2/3/(x+2)*g
```

maxima [A] time = 0.44, size = 81, normalized size = 0.85

$$-\frac{1}{144}\left(19\,d-26\,e+28\,f-8\,g\right)\log\left(x+2\right)+\frac{1}{6}\left(d-e+f-g\right)\log\left(x+1\right)-\frac{1}{18}\left(d+e+f+g\right)\log\left(x-1\right)+\frac{1}{48}\left(d+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm=
"maxima")
```

```
[Out] -1/144*(19*d - 26*e + 28*f - 8*g)*log(x + 2) + 1/6*(d - e + f - g)*log(x +
1) - 1/18*(d + e + f + g)*log(x - 1) + 1/48*(d + 2*e + 4*f + 8*g)*log(x - 2
) + 1/12*(d - 2*e + 4*f - 8*g)/(x + 2)
```

mupad [B] time = 0.88, size = 94, normalized size = 0.99

$$\frac{\frac{d}{12}-\frac{e}{6}+\frac{f}{3}-\frac{2g}{3}}{x+2}+\ln\left(x+1\right)\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}-\frac{g}{6}\right)-\ln\left(x-1\right)\left(\frac{d}{18}+\frac{e}{18}+\frac{f}{18}+\frac{g}{18}\right)+\ln\left(x-2\right)\left(\frac{d}{48}+\frac{e}{24}+\frac{f}{12}+\frac{g}{6}\right)-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-((d + e*x + f*x^2 + g*x^3)*(x + 2*x^2 - x^3 - 2))/(x^4 - 5*x^2 + 4)^2,
x)
```

```
[Out] (d/12 - e/6 + f/3 - (2*g)/3)/(x + 2) + log(x + 1)*(d/6 - e/6 + f/6 - g/6) -
 log(x - 1)*(d/18 + e/18 + f/18 + g/18) + log(x - 2)*(d/48 + e/24 + f/12 +
g/6) - log(x + 2)*((19*d)/144 - (13*e)/72 + (7*f)/36 - g/18)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**3-2*x**2-x+2)*(g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

3.89 $\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2}\,dx$

Optimal. Leaf size=106

$$\frac{d-2e+4f-8g+16h}{12(x+2)}-\frac{1}{18}\log(1-x)(d+e+f+g+h)+\frac{1}{48}\log(2-x)(d+2e+4f+8g+16h)+\frac{1}{6}\log(x+1)(d-e+f-g+h$$

```
[Out] 1/12*(d-2*e+4*f-8*g+16*h)/(2+x)-1/18*(d+e+f+g+h)*ln(1-x)+1/48*(d+2*e+4*f+8*
g+16*h)*ln(2-x)+1/6*(d-e+f-g+h)*ln(1+x)-1/144*(19*d-26*e+28*f-8*g-80*h)*ln(
2+x)
```

Rubi [A] time = 0.27, antiderivative size = 106, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 46, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043, Rules used = {1586, 6742}

$$\frac{d-2e+4f-8g+16h}{12(x+2)}-\frac{1}{18}\log(1-x)(d+e+f+g+h)+\frac{1}{48}\log(2-x)(d+2e+4f+8g+16h)+\frac{1}{6}\log(x+1)(d-e+f-g+h$$

Antiderivative was successfully verified.

```
[In] Int[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 +
x^4)^2,x]
```

```
[Out] (d - 2*e + 4*f - 8*g + 16*h)/(12*(2 + x)) - ((d + e + f + g + h)*Log[1 - x]
)/18 + ((d + 2*e + 4*f + 8*g + 16*h)*Log[2 - x])/48 + ((d - e + f - g + h)*
Log[1 + x])/6 - ((19*d - 26*e + 28*f - 8*g - 80*h)*Log[2 + x])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6742

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2}\,dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{(2+x)^2(2-x-2x^2+x^3)}\,dx\\ &= \int \left(\frac{d+2e+4f+8g+16h}{48(-2+x)}+\frac{-d-e-f-g-h}{18(-1+x)}+\frac{d-e}{6}\right.\\ &= \frac{d-2e+4f-8g+16h}{12(2+x)}-\frac{1}{18}(d+e+f+g+h)\log(1-x\end{aligned}$$

Mathematica [A] time = 0.06, size = 102, normalized size = 0.96

$$\frac{1}{144}\left(\frac{12(d-2e+4f-8g+16h)}{x+2}+24\log(-x-1)(d-e+f-g+h)-8\log(1-x)(d+e+f+g+h)+3\log(2\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*
x^2 + x^4)^2,x]
```

```
[Out] ((12*(d - 2*e + 4*f - 8*g + 16*h))/(2 + x) + 24*(d - e + f - g + h)*Log[-1
- x] - 8*(d + e + f + g + h)*Log[1 - x] + 3*(d + 2*(e + 2*f + 4*g + 8*h))*L
og[2 - x] + (-19*d + 26*e - 28*f + 8*g + 80*h)*Log[2 + x])/144
```

fricas [A] time = 11.24, size = 164, normalized size = 1.55

$$-\frac{\left(\left(19\,d-26\,e+28\,f-8\,g-80\,h\right)x+38\,d-52\,e+56\,f-16\,g-160\,h\right)\log\left(x+2\right)-24\left(\left(d-e+f-g+h\right)x\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algo
rithm="fricas")
```

```
[Out] -1/144*((((19*d - 26*e + 28*f - 8*g - 80*h)*x + 38*d - 52*e + 56*f - 16*g -
160*h)*log(x + 2) - 24*((d - e + f - g + h)*x + 2*d - 2*e + 2*f - 2*g + 2*h
)*log(x + 1) + 8*((d + e + f + g + h)*x + 2*d + 2*e + 2*f + 2*g + 2*h)*log(
x - 1) - 3*((d + 2*e + 4*f + 8*g + 16*h)*x + 2*d + 4*e + 8*f + 16*g + 32*h)
*log(x - 2) - 12*d + 24*e - 48*f + 96*g - 192*h)/(x + 2)
```

giac [A] time = 0.29, size = 101, normalized size = 0.95

$$-\frac{1}{144}\left(19\,d+28\,f-8\,g-80\,h-26\,e\right)\log\left(|x+2|\right)+\frac{1}{6}\left(d+f-g+h-e\right)\log\left(|x+1|\right)-\frac{1}{18}\left(d+f+g+h+e\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algo
rithm="giac")
```

```
[Out] -1/144*(19*d + 28*f - 8*g - 80*h - 26*e)*log(abs(x + 2)) + 1/6*(d + f - g +
 h - e)*log(abs(x + 1)) - 1/18*(d + f + g + h + e)*log(abs(x - 1)) + 1/48*(
d + 4*f + 8*g + 16*h + 2*e)*log(abs(x - 2)) + 1/12*(d + 4*f - 8*g + 16*h -
2*e)/(x + 2)
```

maple [A] time = 0.01, size = 182, normalized size = 1.72

$$\frac{5h\ln\left(x+2\right)}{9}-\frac{h\ln\left(x-1\right)}{18}+\frac{h\ln\left(x+1\right)}{6}+\frac{h\ln\left(x-2\right)}{3}-\frac{g\ln\left(x-1\right)}{18}+\frac{g\ln\left(x+2\right)}{18}+\frac{g\ln\left(x-2\right)}{6}-\frac{g\ln\left(x+1\right)}{6}-\frac{19d}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 5/9*h*ln(x+2)-1/18*h*ln(x-1)+1/6*h*ln(x+1)+1/3*h*ln(x-2)-1/18*g*ln(x-1)+1/1
8*g*ln(x+2)+1/6*g*ln(x-2)-1/6*g*ln(x+1)-19/144*d*ln(x+2)+13/72*e*ln(x+2)-1/
18*e*ln(x-1)-1/18*d*ln(x-1)-1/6*e*ln(x+1)+1/6*d*ln(x+1)+1/48*d*ln(x-2)+1/24
*e*ln(x-2)+1/12*f*ln(x-2)+1/6*f*ln(x+1)-1/18*f*ln(x-1)-7/36*f*ln(x+2)+4/3/(
x+2)*h-2/3/(x+2)*g+1/12/(x+2)*d-1/6/(x+2)*e+1/3/(x+2)*f
```

maxima [A] time = 0.44, size = 92, normalized size = 0.87

$$-\frac{1}{144}\left(19\,d-26\,e+28\,f-8\,g-80\,h\right)\log\left(x+2\right)+\frac{1}{6}\left(d-e+f-g+h\right)\log\left(x+1\right)-\frac{1}{18}\left(d+e+f+g+h\right)\log$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algo
rithm="maxima")
```

```
[Out] -1/144*(19*d - 26*e + 28*f - 8*g - 80*h)*log(x + 2) + 1/6*(d - e + f - g +
h)*log(x + 1) - 1/18*(d + e + f + g + h)*log(x - 1) + 1/48*(d + 2*e + 4*f +
 8*g + 16*h)*log(x - 2) + 1/12*(d - 2*e + 4*f - 8*g + 16*h)/(x + 2)
```

mupad [B] time = 1.36, size = 108, normalized size = 1.02

$$\frac{\frac{d}{12}-\frac{e}{6}+\frac{f}{3}-\frac{2g}{3}+\frac{4h}{3}}{x+2}+\ln(x+1)\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}-\frac{g}{6}+\frac{h}{6}\right)-\ln(x-1)\left(\frac{d}{18}+\frac{e}{18}+\frac{f}{18}+\frac{g}{18}+\frac{h}{18}\right)+\ln(x-2)\left(\frac{d}{48}+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-((x + 2*x^2 - x^3 - 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(x^4 - 5*x^2
 + 4)^2,x)
```

```
[Out] (d/12 - e/6 + f/3 - (2*g)/3 + (4*h)/3)/(x + 2) + log(x + 1)*(d/6 - e/6 + f/
6 - g/6 + h/6) - log(x - 1)*(d/18 + e/18 + f/18 + g/18 + h/18) + log(x - 2)
*(d/48 + e/24 + f/12 + g/6 + h/3) + log(x + 2)*((13*e)/72 - (19*d)/144 - (7
*f)/36 + g/18 + (5*h)/9)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**3-2*x**2-x+2)*(h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2
,x)
```

```
[Out] Timed out
```

3.90 $\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2}\,dx$

Optimal. Leaf size=122

$$\frac{d-2e+4f-8g+16h-32i}{12(x+2)}-\frac{1}{18}\log(1-x)(d+e+f+g+h+i)+\frac{1}{48}\log(2-x)(d+2e+4f+8g+16h+32i)+\frac{1}{6}\log(x+$$

```
[Out] i*x+1/12*(d-2*e+4*f-8*g+16*h-32*i)/(2+x)-1/18*(d+e+f+g+h+i)*ln(1-x)+1/48*(d
+2*e+4*f+8*g+16*h+32*i)*ln(2-x)+1/6*(d-e+f-g+h-i)*ln(1+x)-1/144*(19*d-26*e+
28*f-8*g-80*h+352*i)*ln(2+x)
```

Rubi [A] time = 0.31, antiderivative size = 122, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 51, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.039, Rules used = {1586, 6742}

$$\frac{d-2e+4f-8g+16h-32i}{12(x+2)}-\frac{1}{18}\log(1-x)(d+e+f+g+h+i)+\frac{1}{48}\log(2-x)(d+2e+4f+8g+16h+32i)+\frac{1}{6}\log(x+$$

Antiderivative was successfully verified.

```
[In] Int[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 -
5*x^2 + x^4)^2,x]
```

```
[Out] i*x + (d - 2*e + 4*f - 8*g + 16*h - 32*i)/(12*(2 + x)) - ((d + e + f + g +
h + i)*Log[1 - x])/18 + ((d + 2*e + 4*f + 8*g + 16*h + 32*i)*Log[2 - x])/48
 + ((d - e + f - g + h - i)*Log[1 + x])/6 - ((19*d - 26*e + 28*f - 8*g - 80
*h + 352*i)*Log[2 + x])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6742

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+90x^5)}{(4-5x^2+x^4)^2}\,dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+90x^5}{(2+x)^2(2-x-2x^2+x^3)}\,dx\\ &= \int \left(90+\frac{2880+d+2e+4f+8g+16h}{48(-2+x)}+\frac{-9\right.\\ &= 90x-\frac{2880-d+2e-4f+8g-16h}{12(2+x)}-\frac{1}{18}(90\end{aligned}$$

Mathematica [A] time = 0.06, size = 118, normalized size = 0.97

$$\frac{1}{144}\left(\frac{12(d-2(e-2f+4g-8h+16i))}{x+2}-8\log(1-x)(d+e+f+g+h+i)+3\log(2-x)(d+2e+4(f+2g\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))
/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (144*i*x + (12*(d - 2*(e - 2*f + 4*g - 8*h + 16*i)))/(2 + x) - 8*(d + e + f
 + g + h + i)*Log[1 - x] + 3*(d + 2*e + 4*(f + 2*g + 4*h + 8*i))*Log[2 - x]
 + 24*(d - e + f - g + h - i)*Log[1 + x] + (-19*d + 26*e - 28*f + 8*g + 80*
h - 352*i)*Log[2 + x])/144
```

fricas [A] time = 66.48, size = 200, normalized size = 1.64

$$\frac{144\, ix^{2} + 288\, ix - \left(\left(19\, d - 26\, e + 28\, f - 8\, g - 80\, h + 352\, i\right)x + 38\, d - 52\, e + 56\, f - 16\, g - 160\, h + 704\, i\right) \log\left(x + \right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x
, algorithm="fricas")
```

```
[Out] 1/144*(144*i*x^2 + 288*i*x - ((19*d - 26*e + 28*f - 8*g - 80*h + 352*i)*x +
 38*d - 52*e + 56*f - 16*g - 160*h + 704*i)*log(x + 2) + 24*((d - e + f - g
 + h - i)*x + 2*d - 2*e + 2*f - 2*g + 2*h - 2*i)*log(x + 1) - 8*((d + e + f
 + g + h + i)*x + 2*d + 2*e + 2*f + 2*g + 2*h + 2*i)*log(x - 1) + 3*((d + 2
*e + 4*f + 8*g + 16*h + 32*i)*x + 2*d + 4*e + 8*f + 16*g + 32*h + 64*i)*log
(x - 2) + 12*d - 24*e + 48*f - 96*g + 192*h - 384*i)/(x + 2)
```

giac [A] time = 0.37, size = 117, normalized size = 0.96

$$ix - \frac{1}{144}\left(19\, d + 28\, f - 8\, g - 80\, h + 352\, i - 26\, e\right) \log\left(|x + 2|\right) + \frac{1}{6}\left(d + f - g + h - i - e\right) \log\left(|x + 1|\right) - \frac{1}{18}\left(d + f + g\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x
, algorithm="giac")
```

```
[Out] i*x - 1/144*(19*d + 28*f - 8*g - 80*h + 352*i - 26*e)*log(abs(x + 2)) + 1/6
*(d + f - g + h - i - e)*log(abs(x + 1)) - 1/18*(d + f + g + h + i + e)*log
(abs(x - 1)) + 1/48*(d + 4*f + 8*g + 16*h + 32*i + 2*e)*log(abs(x - 2)) + 1
/12*(d + 4*f - 8*g + 16*h - 32*i - 2*e)/(x + 2)
```

maple [A] time = 0.01, size = 221, normalized size = 1.81

$$-\frac{22 i \ln\left(x + 2\right)}{9} - \frac{i \ln\left(x - 1\right)}{18} - \frac{i \ln\left(x + 1\right)}{6} + \frac{2 i \ln\left(x - 2\right)}{3} + \frac{5 h \ln\left(x + 2\right)}{9} - \frac{h \ln\left(x - 1\right)}{18} + \frac{h \ln\left(x + 1\right)}{6} + \frac{h \ln\left(x - 2\right)}{3} - \frac{g \ln}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] -22/9*i*ln(x+2)-1/18*i*ln(x-1)-1/6*i*ln(x+1)+2/3*i*ln(x-2)+5/9*h*ln(x+2)-1/
18*h*ln(x-1)+1/6*h*ln(x+1)+1/3*h*ln(x-2)-1/18*g*ln(x-1)+1/18*g*ln(x+2)+1/6*
g*ln(x-2)-1/6*g*ln(x+1)-19/144*d*ln(x+2)+13/72*e*ln(x+2)-1/18*e*ln(x-1)-1/1
8*d*ln(x-1)-1/6*e*ln(x+1)+1/6*d*ln(x+1)+1/48*d*ln(x-2)+1/24*e*ln(x-2)+1/12*
f*ln(x-2)+1/6*f*ln(x+1)-1/18*f*ln(x-1)-7/36*f*ln(x+2)+i*x-8/3/(x+2)*i+4/3/(
x+2)*h-2/3/(x+2)*g+1/12/(x+2)*d-1/6/(x+2)*e+1/3/(x+2)*f
```

maxima [A] time = 0.45, size = 108, normalized size = 0.89

$$ix - \frac{1}{144}\left(19\, d - 26\, e + 28\, f - 8\, g - 80\, h + 352\, i\right) \log\left(x + 2\right) + \frac{1}{6}\left(d - e + f - g + h - i\right) \log\left(x + 1\right) - \frac{1}{18}\left(d + e + f +\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x
, algorithm="maxima")
```

```
[Out] i*x - 1/144*(19*d - 26*e + 28*f - 8*g - 80*h + 352*i)*log(x + 2) + 1/6*(d -
 e + f - g + h - i)*log(x + 1) - 1/18*(d + e + f + g + h + i)*log(x - 1) +
1/48*(d + 2*e + 4*f + 8*g + 16*h + 32*i)*log(x - 2) + 1/12*(d - 2*e + 4*f -
 8*g + 16*h - 32*i)/(x + 2)
```

mupad [B] time = 1.67, size = 127, normalized size = 1.04

$$i\,x+\frac{\frac{d}{12}-\frac{e}{6}+\frac{f}{3}-\frac{2\,g}{3}+\frac{4\,h}{3}-\frac{8\,i}{3}}{x+2}+\ln\left(x+1\right)\,\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}-\frac{g}{6}+\frac{h}{6}-\frac{i}{6}\right)+\ln\left(x-2\right)\,\left(\frac{d}{48}+\frac{e}{24}+\frac{f}{12}+\frac{g}{6}+\frac{h}{3}+\frac{2}{3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-((x + 2*x^2 - x^3 - 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(x^4
 - 5*x^2 + 4)^2,x)
```

```
[Out] i*x + (d/12 - e/6 + f/3 - (2*g)/3 + (4*h)/3 - (8*i)/3)/(x + 2) + log(x + 1)
*(d/6 - e/6 + f/6 - g/6 + h/6 - i/6) + log(x - 2)*(d/48 + e/24 + f/12 + g/6
 + h/3 + (2*i)/3) - log(x - 1)*(d/18 + e/18 + f/18 + g/18 + h/18 + i/18) -
log(x + 2)*((19*d)/144 - (13*e)/72 + (7*f)/36 - g/18 - (5*h)/9 + (22*i)/9)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**3-2*x**2-x+2)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**
2+4)**2,x)
```

```
[Out] Timed out
```

3.91 $\int \frac{2-3x+x^2}{\left(4-5x^2+x^4\right)^2}\,dx$

Optimal. Leaf size=56

$$-\frac{3x+5}{12\left(x^2+3x+2\right)}-\frac{1}{36}\log(1-x)+\frac{1}{144}\log(2-x)-\frac{7}{36}\log(x+1)+\frac{31}{144}\log(x+2)$$

```
[Out] 1/12*(-5-3*x)/(x^2+3*x+2)-1/36*ln(1-x)+1/144*ln(2-x)-7/36*ln(1+x)+31/144*ln
(2+x)
```

Rubi [A] time = 0.06, antiderivative size = 56, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 5, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.238, Rules used = {1586, 974, 1072, 632, 31}

$$-\frac{3x+5}{12\left(x^2+3x+2\right)}-\frac{1}{36}\log(1-x)+\frac{1}{144}\log(2-x)-\frac{7}{36}\log(x+1)+\frac{31}{144}\log(x+2)$$

Antiderivative was successfully verified.

```
[In] Int[(2 - 3*x + x^2)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] -(5 + 3*x)/(12*(2 + 3*x + x^2)) - Log[1 - x]/36 + Log[2 - x]/144 - (7*Log[1
 + x])/36 + (31*Log[2 + x])/144
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 632

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> W
ith[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/
2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x
], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a
*c, 0] && NiceSqrtQ[b^2 - 4*a*c]
```

Rule 974

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_)*((d_.) + (e_.)*(x_) + (f_.)*(x
_)^2)^(q_), x_Symbol] :> Simp[((2*a*c^2*e - b^2*c*e + b^3*f + b*c*(c*d - 3*
a*f) + c*(2*c^2*d + b^2*f - c*(b*e + 2*a*f))*x)*(a + b*x + c*x^2)^(p + 1)*(
d + e*x + f*x^2)^(q + 1))/((b^2 - 4*a*c)*((c*d - a*f)^2 - (b*d - a*e)*(c*e
- b*f))*(p + 1)), x] - Dist[1/((b^2 - 4*a*c)*((c*d - a*f)^2 - (b*d - a*e)*(
c*e - b*f))*(p + 1)), Int[(a + b*x + c*x^2)^(p + 1)*(d + e*x + f*x^2)^q*Sim
p[2*c*((c*d - a*f)^2 - (b*d - a*e)*(c*e - b*f))*(p + 1) - (2*c^2*d + b^2*f
- c*(b*e + 2*a*f))*(a*f*(p + 1) - c*d*(p + 2)) - e*(b^2*c*e - 2*a*c^2*e - b
^3*f - b*c*(c*d - 3*a*f))*(p + q + 2) + (2*f*(2*a*c^2*e - b^2*c*e + b^3*f +
 b*c*(c*d - 3*a*f))*(p + q + 2) - (2*c^2*d + b^2*f - c*(b*e + 2*a*f))*(b*f*
(p + 1) - c*e*(2*p + q + 4)))*x + c*f*(2*c^2*d + b^2*f - c*(b*e + 2*a*f))*(
2*p + 2*q + 5)*x^2, x], x], x] /; FreeQ[{a, b, c, d, e, f, q}, x] && NeQ[b^
2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0] && LtQ[p, -1] && NeQ[(c*d - a*f)^2 - (
b*d - a*e)*(c*e - b*f), 0] &&  !( !IntegerQ[p] && ILtQ[q, -1]) &&  !IGtQ[q,
 0]
```

Rule 1072

```
Int[((A_.) + (B_.)*(x_) + (C_.)*(x_)^2)/(((a_) + (b_.)*(x_) + (c_.)*(x_)^2)
*((d_) + (e_.)*(x_) + (f_.)*(x_)^2)), x_Symbol] :> With[{q = c^2*d^2 - b*c*
```

```
d*e + a*c*e^2 + b^2*d*f - 2*a*c*d*f - a*b*e*f + a^2*f^2}, Dist[1/q, Int[(A*
c^2*d - a*c*C*d - A*b*c*e + a*B*c*e + A*b^2*f - a*b*B*f - a*A*c*f + a^2*C*f
 + c*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B*f)*x)/(a + b*x + c*x^2),
x], x] + Dist[1/q, Int[(c*C*d^2 - B*c*d*e + A*c*e^2 + b*B*d*f - A*c*d*f - a
*C*d*f - A*b*e*f + a*A*f^2 - f*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B
*f)*x)/(d + e*x + f*x^2), x], x] /; NeQ[q, 0]] /; FreeQ[{a, b, c, d, e, f,
A, B, C}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rubi steps

$$\begin{aligned}
\int \frac{2-3x+x^2}{\left(4-5x^2+x^4\right)^2}\,dx &= \int \frac{1}{\left(2-3x+x^2\right)\left(2+3x+x^2\right)^2}\,dx\\
&= -\frac{5+3x}{12\left(2+3x+x^2\right)}+\frac{1}{72}\int \frac{-18+48x-18x^2}{\left(2-3x+x^2\right)\left(2+3x+x^2\right)}\,dx\\
&= -\frac{5+3x}{12\left(2+3x+x^2\right)}+\frac{\int \frac{252-108x}{2-3x+x^2}\,dx}{5184}+\frac{\int \frac{-900+108x}{2+3x+x^2}\,dx}{5184}\\
&= -\frac{5+3x}{12\left(2+3x+x^2\right)}+\frac{1}{144}\int \frac{1}{-2+x}\,dx-\frac{1}{36}\int \frac{1}{-1+x}\,dx-\frac{7}{36}\int \frac{1}{1+x}\,dx+\frac{31}{144}\int\\
&= -\frac{5+3x}{12\left(2+3x+x^2\right)}-\frac{1}{36}\log(1-x)+\frac{1}{144}\log(2-x)-\frac{7}{36}\log(1+x)+\frac{31}{144}\log(2+x
\end{aligned}$$

Mathematica [A] time = 0.02, size = 48, normalized size = 0.86

$$\frac{1}{144}\left(-\frac{12(3x+5)}{x^2+3x+2}-4\log(1-x)+\log(2-x)-28\log(x+1)+31\log(x+2)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 - 3*x + x^2)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((-12*(5 + 3*x))/(2 + 3*x + x^2) - 4*Log[1 - x] + Log[2 - x] - 28*Log[1 + x
] + 31*Log[2 + x])/144
```

fricas [A] time = 0.74, size = 72, normalized size = 1.29

$$\frac{31\left(x^2+3x+2\right)\log\left(x+2\right)-28\left(x^2+3x+2\right)\log\left(x+1\right)-4\left(x^2+3x+2\right)\log\left(x-1\right)+\left(x^2+3x+2\right)\log\left(\right.}{144\left(x^2+3x+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] 1/144*(31*(x^2 + 3*x + 2)*log(x + 2) - 28*(x^2 + 3*x + 2)*log(x + 1) - 4*(x
^2 + 3*x + 2)*log(x - 1) + (x^2 + 3*x + 2)*log(x - 2) - 36*x - 60)/(x^2 + 3
*x + 2)
```

giac [A] time = 0.35, size = 46, normalized size = 0.82

$$-\frac{3\,x+5}{12\,(x+2)(x+1)}+\frac{31}{144}\,\log\left(|x+2|\right)-\frac{7}{36}\,\log\left(|x+1|\right)-\frac{1}{36}\,\log\left(|x-1|\right)+\frac{1}{144}\,\log\left(|x-2|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] -1/12*(3*x + 5)/((x + 2)*(x + 1)) + 31/144*log(abs(x + 2)) - 7/36*log(abs(x
 + 1)) - 1/36*log(abs(x - 1)) + 1/144*log(abs(x - 2))
```

maple [A] time = 0.01, size = 40, normalized size = 0.71

$$\frac{31\ln\left(x+2\right)}{144}+\frac{\ln\left(x-2\right)}{144}-\frac{\ln\left(x-1\right)}{36}-\frac{7\ln\left(x+1\right)}{36}-\frac{1}{6\left(x+1\right)}-\frac{1}{12\left(x+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2-3*x+2)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 1/144*ln(x-2)-1/6/(x+1)-7/36*ln(x+1)-1/36*ln(x-1)-1/12/(x+2)+31/144*ln(x+2)
```

maxima [A] time = 0.43, size = 42, normalized size = 0.75

$$-\frac{3\,x+5}{12\left(x^2+3\,x+2\right)}+\frac{31}{144}\,\log\left(x+2\right)-\frac{7}{36}\,\log\left(x+1\right)-\frac{1}{36}\,\log\left(x-1\right)+\frac{1}{144}\,\log\left(x-2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] -1/12*(3*x + 5)/(x^2 + 3*x + 2) + 31/144*log(x + 2) - 7/36*log(x + 1) - 1/3
6*log(x - 1) + 1/144*log(x - 2)
```

mupad [B] time = 0.05, size = 42, normalized size = 0.75

$$\frac{\ln\left(x-2\right)}{144}-\frac{7\,\ln\left(x+1\right)}{36}-\frac{\ln\left(x-1\right)}{36}+\frac{31\,\ln\left(x+2\right)}{144}-\frac{\frac{x}{4}+\frac{5}{12}}{x^2+3\,x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2 - 3*x + 2)/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 2)/144 - (7*log(x + 1))/36 - log(x - 1)/36 + (31*log(x + 2))/144 -
(x/4 + 5/12)/(3*x + x^2 + 2)
```

sympy [A] time = 0.29, size = 46, normalized size = 0.82

$$\frac{-3x-5}{12x^2+36x+24}+\frac{\log\left(x-2\right)}{144}-\frac{\log\left(x-1\right)}{36}-\frac{7\log\left(x+1\right)}{36}+\frac{31\log\left(x+2\right)}{144}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)/(x**4-5*x**2+4)**2,x)
```

```
[Out] (-3*x - 5)/(12*x**2 + 36*x + 24) + log(x - 2)/144 - log(x - 1)/36 - 7*log(x
 + 1)/36 + 31*log(x + 2)/144
```

3.92 $\int \frac{(d+ex)\left(2-3x+x^2\right)}{\left(4-5x^2+x^4\right)^2}\,dx$

Optimal. Leaf size=89

$$-\frac{x(3d-4e)+5d-6e}{12\left(x^2+3x+2\right)}-\frac{1}{36}(d+e)\log(1-x)+\frac{1}{144}(d+2e)\log(2-x)-\frac{1}{36}(7d-13e)\log(x+1)+\frac{1}{144}(31d-50e)\log(x+$$

```
[Out] 1/12*(-5*d+6*e-(3*d-4*e)*x)/(x^2+3*x+2)-1/36*(d+e)*ln(1-x)+1/144*(d+2*e)*ln
(2-x)-1/36*(7*d-13*e)*ln(1+x)+1/144*(31*d-50*e)*ln(2+x)
```

Rubi [A] time = 0.26, antiderivative size = 89, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.192, Rules used = {1586, 1016, 1072, 632, 31}

$$-\frac{x(3d-4e)+5d-6e}{12\left(x^2+3x+2\right)}-\frac{1}{36}(d+e)\log(1-x)+\frac{1}{144}(d+2e)\log(2-x)-\frac{1}{36}(7d-13e)\log(x+1)+\frac{1}{144}(31d-50e)\log(x+$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)*(2 - 3*x + x^2))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] -(5*d - 6*e + (3*d - 4*e)*x)/(12*(2 + 3*x + x^2)) - ((d + e)*Log[1 - x])/36
 + ((d + 2*e)*Log[2 - x])/144 - ((7*d - 13*e)*Log[1 + x])/36 + ((31*d - 50*
e)*Log[2 + x])/144
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 632

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> W
ith[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/
2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x
], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a
*c, 0] && NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1016

```
Int[((g_.) + (h_.)*(x_))*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_)*((d_) + (e
_.)*(x_) + (f_.)*(x_)^2)^(q_), x_Symbol] :> Simp[((a + b*x + c*x^2)^(p + 1)
*(d + e*x + f*x^2)^(q + 1)*(g*c*(2*a*c*e - b*(c*d + a*f)) + (g*b - a*h)*(2*
c^2*d + b^2*f - c*(b*e + 2*a*f)) + c*(g*(2*c^2*d + b^2*f - c*(b*e + 2*a*f))
 - h*(b*c*d - 2*a*c*e + a*b*f))*x))/((b^2 - 4*a*c)*((c*d - a*f)^2 - (b*d -
a*e)*(c*e - b*f))*(p + 1)), x] + Dist[1/((b^2 - 4*a*c)*((c*d - a*f)^2 - (b*
d - a*e)*(c*e - b*f))*(p + 1)), Int[(a + b*x + c*x^2)^(p + 1)*(d + e*x + f*
x^2)^q*Simp[(b*h - 2*g*c)*((c*d - a*f)^2 - (b*d - a*e)*(c*e - b*f))*(p + 1)
 + (b^2*(g*f) - b*(h*c*d + g*c*e + a*h*f) + 2*(g*c*(c*d - a*f) - a*(-(h*c*e
))))*(a*f*(p + 1) - c*d*(p + 2)) - e*((g*c)*(2*a*c*e - b*(c*d + a*f)) + (g*
b - a*h)*(2*c^2*d + b^2*f - c*(b*e + 2*a*f)))*(p + q + 2) - (2*f*((g*c)*(2*
a*c*e - b*(c*d + a*f)) + (g*b - a*h)*(2*c^2*d + b^2*f - c*(b*e + 2*a*f)))*(
p + q + 2) - (b^2*g*f - b*(h*c*d + g*c*e + a*h*f) + 2*(g*c*(c*d - a*f) - a*
(-(h*c*e))))*(b*f*(p + 1) - c*e*(2*p + q + 4)))*x - c*f*(b^2*(g*f) - b*(h*c
*d + g*c*e + a*h*f) + 2*(g*c*(c*d - a*f) + a*h*c*e))*(2*p + 2*q + 5)*x^2, x
], x], x] /; FreeQ[{a, b, c, d, e, f, g, h, q}, x] && NeQ[b^2 - 4*a*c, 0] &
& NeQ[e^2 - 4*d*f, 0] && LtQ[p, -1] && NeQ[(c*d - a*f)^2 - (b*d - a*e)*(c*e
 - b*f), 0] &&  !( !IntegerQ[p] && ILtQ[q, -1])
```

Rule 1072

```
Int[((A_.) + (B_.)*(x_) + (C_.)*(x_)^2)/(((a_) + (b_.)*(x_) + (c_.)*(x_)^2)
*((d_) + (e_.)*(x_) + (f_.)*(x_)^2)), x_Symbol] :> With[{q = c^2*d^2 - b*c*
d*e + a*c*e^2 + b^2*d*f - 2*a*c*d*f - a*b*e*f + a^2*f^2}, Dist[1/q, Int[(A*
c^2*d - a*c*C*d - A*b*c*e + a*B*c*e + A*b^2*f - a*b*B*f - a*A*c*f + a^2*C*f
 + c*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B*f)*x)/(a + b*x + c*x^2),
x], x] + Dist[1/q, Int[(c*C*d^2 - B*c*d*e + A*c*e^2 + b*B*d*f - A*c*d*f - a
*C*d*f - A*b*e*f + a*A*f^2 - f*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B
*f)*x)/(d + e*x + f*x^2), x], x] /; NeQ[q, 0]] /; FreeQ[{a, b, c, d, e, f,
A, B, C}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rubi steps

$$\int \frac{(d+ex)\left(2-3x+x^2\right)}{\left(4-5x^2+x^4\right)^2}\,dx = \int \frac{d+ex}{\left(2-3x+x^2\right)\left(2+3x+x^2\right)^2}\,dx$$

$$= -\frac{5d-6e+(3d-4e)x}{12\left(2+3x+x^2\right)} - \frac{1}{72}\int \frac{6(3d-10e)-24(2d-3e)x+6(3d-4e)x^2}{\left(2-3x+x^2\right)\left(2+3x+x^2\right)}\,dx$$

$$= -\frac{5d-6e+(3d-4e)x}{12\left(2+3x+x^2\right)} - \frac{\int \frac{108(3d-10e)-288(2d-3e)+(-36(3d-10e)+72(3d-4e))x}{2-3x+x^2}\,dx}{5184} - \frac{\int \frac{108(3}{}}{}$$

$$= -\frac{5d-6e+(3d-4e)x}{12\left(2+3x+x^2\right)} - \frac{1}{36}(7d-13e)\int \frac{1}{1+x}\,dx - \frac{1}{144}(-d-2e)\int \frac{1}{-2+x}\,dx -$$

$$= -\frac{5d-6e+(3d-4e)x}{12\left(2+3x+x^2\right)} - \frac{1}{36}(d+e)\log(1-x) + \frac{1}{144}(d+2e)\log(2-x) - \frac{1}{36}(7d-$$

Mathematica [A] time = 0.05, size = 80, normalized size = 0.90

$$\frac{1}{144}\left(\frac{12(-3dx-5d+4ex+6e)}{x^2+3x+2} - 4(d+e)\log(1-x) + (d+2e)\log(2-x) + 4(13e-7d)\log(x+1) + (31d-50e)\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(2 - 3*x + x^2))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((12*(-5*d + 6*e - 3*d*x + 4*e*x))/(2 + 3*x + x^2) - 4*(d + e)*Log[1 - x] +
 (d + 2*e)*Log[2 - x] + 4*(-7*d + 13*e)*Log[1 + x] + (31*d - 50*e)*Log[2 +
x])/144
```

fricas [A] time = 0.72, size = 153, normalized size = 1.72

$$-\frac{12\,(3\,d-4\,e)x - \left((31\,d-50\,e)x^2 + 3\,(31\,d-50\,e)x + 62\,d-100\,e\right)\log\left(x+2\right) + 4\left((7\,d-13\,e)x^2 + 3\,(7\,d-13\,e)\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] -1/144*(12*(3*d - 4*e)*x - ((31*d - 50*e)*x^2 + 3*(31*d - 50*e)*x + 62*d -
100*e)*log(x + 2) + 4*((7*d - 13*e)*x^2 + 3*(7*d - 13*e)*x + 14*d - 26*e)*l
og(x + 1) + 4*((d + e)*x^2 + 3*(d + e)*x + 2*d + 2*e)*log(x - 1) - ((d + 2*
e)*x^2 + 3*(d + 2*e)*x + 2*d + 4*e)*log(x - 2) + 60*d - 72*e)/(x^2 + 3*x +
2)
```

giac [A] time = 0.38, size = 85, normalized size = 0.96

$$\frac{1}{144}(31d-50e)\log(|x+2|)-\frac{1}{36}(7d-13e)\log(|x+1|)-\frac{1}{36}(d+e)\log(|x-1|)+\frac{1}{144}(d+2e)\log(|x-2|)-\frac{(}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] 1/144*(31*d - 50*e)*log(abs(x + 2)) - 1/36*(7*d - 13*e)*log(abs(x + 1)) - 1
/36*(d + e)*log(abs(x - 1)) + 1/144*(d + 2*e)*log(abs(x - 2)) - 1/12*((3*d
- 4*e)*x + 5*d - 6*e)/((x + 2)*(x + 1))
```

maple [A] time = 0.01, size = 90, normalized size = 1.01

$$\frac{31d\ln(x+2)}{144}+\frac{d\ln(x-2)}{144}-\frac{d\ln(x-1)}{36}-\frac{7d\ln(x+1)}{36}-\frac{25e\ln(x+2)}{72}+\frac{e\ln(x-2)}{72}-\frac{e\ln(x-1)}{36}+\frac{13e\ln(x+1}{36}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 1/144*d*ln(x-2)+1/72*e*ln(x-2)-7/36*d*ln(x+1)+13/36*e*ln(x+1)-1/6/(x+1)*d+1
/6/(x+1)*e-1/36*d*ln(x-1)-1/36*e*ln(x-1)-1/12/(x+2)*d+1/6/(x+2)*e+31/144*d*
ln(x+2)-25/72*e*ln(x+2)
```

maxima [A] time = 0.45, size = 75, normalized size = 0.84

$$\frac{1}{144}(31d-50e)\log(x+2)-\frac{1}{36}(7d-13e)\log(x+1)-\frac{1}{36}(d+e)\log(x-1)+\frac{1}{144}(d+2e)\log(x-2)-\frac{(3d-}{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] 1/144*(31*d - 50*e)*log(x + 2) - 1/36*(7*d - 13*e)*log(x + 1) - 1/36*(d + e
)*log(x - 1) + 1/144*(d + 2*e)*log(x - 2) - 1/12*((3*d - 4*e)*x + 5*d - 6*e
)/(x^2 + 3*x + 2)
```

mupad [B] time = 0.10, size = 79, normalized size = 0.89

$$\ln(x-2)\left(\frac{d}{144}+\frac{e}{72}\right)-\ln(x-1)\left(\frac{d}{36}+\frac{e}{36}\right)-\ln(x+1)\left(\frac{7d}{36}-\frac{13e}{36}\right)-\frac{\frac{5d}{12}-\frac{e}{2}+x\left(\frac{d}{4}-\frac{e}{3}\right)}{x^2+3x+2}+\ln(x+2)\left(\frac{31d}{144}-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((d + e*x)*(x^2 - 3*x + 2))/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 2)*(d/144 + e/72) - log(x - 1)*(d/36 + e/36) - log(x + 1)*((7*d)/36
 - (13*e)/36) - ((5*d)/12 - e/2 + x*(d/4 - e/3))/(3*x + x^2 + 2) + log(x +
2)*((31*d)/144 - (25*e)/72)
```

sympy [B] time = 10.51, size = 1255, normalized size = 14.10

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(x**2-3*x+2)/(x**4-5*x**2+4)**2,x)
```

```
[Out] -(d + e)*log(x + (-24383100*d**6 + 187408066*d**5*e + 10439775*d**5*(d + e)
 - 511591980*d**4*e**2 - 94132290*d**4*e*(d + e) + 667200*d**4*(d + e)**2 +
 469491120*d**3*e**3 + 333672552*d**3*e**2*(d + e) - 2703328*d**3*e*(d + e)
**2 - 198000*d**3*(d + e)**3 + 322778400*d**2*e**4 - 582497712*d**2*e**3*(d
 + e) + 1752768*d**2*e**2*(d + e)**2 + 1107552*d**2*e*(d + e)**3 - 86349385
6*d*e**5 + 500776560*d*e**4*(d + e) + 4226944*d*e**3*(d + e)**2 - 1880640*d
*e**2*(d + e)**3 + 429000000*e**6 - 169242912*e**5*(d + e) - 4538112*e**4*(
d + e)**2 + 964224*e**3*(d + e)**3)/(13474125*d**6 - 102860175*d**5*e + 274
190390*d**4*e**2 - 224142072*d**3*e**3 - 245084096*d**2*e**4 + 535797456*d*
e**5 - 256183200*e**6))/36 + (d + 2*e)*log(x + (-24383100*d**6 + 187408066*
d**5*e - 10439775*d**5*(d + 2*e)/4 - 511591980*d**4*e**2 + 47066145*d**4*e*
(d + 2*e)/2 + 41700*d**4*(d + 2*e)**2 + 469491120*d**3*e**3 - 83418138*d**3
*e**2*(d + 2*e) - 168958*d**3*e*(d + 2*e)**2 + 12375*d**3*(d + 2*e)**3/4 +
322778400*d**2*e**4 + 145624428*d**2*e**3*(d + 2*e) + 109548*d**2*e**2*(d +
 2*e)**2 - 34611*d**2*e*(d + 2*e)**3/2 - 863493856*d*e**5 - 125194140*d*e**
4*(d + 2*e) + 264184*d*e**3*(d + 2*e)**2 + 29385*d*e**2*(d + 2*e)**3 + 4290
00000*e**6 + 42310728*e**5*(d + 2*e) - 283632*e**4*(d + 2*e)**2 - 15066*e**
3*(d + 2*e)**3)/(13474125*d**6 - 102860175*d**5*e + 274190390*d**4*e**2 - 2
24142072*d**3*e**3 - 245084096*d**2*e**4 + 535797456*d*e**5 - 256183200*e**
6))/144 - (7*d - 13*e)*log(x + (-24383100*d**6 + 187408066*d**5*e + 1043977
5*d**5*(7*d - 13*e) - 511591980*d**4*e**2 - 94132290*d**4*e*(7*d - 13*e) +
667200*d**4*(7*d - 13*e)**2 + 469491120*d**3*e**3 + 333672552*d**3*e**2*(7*
d - 13*e) - 2703328*d**3*e*(7*d - 13*e)**2 - 198000*d**3*(7*d - 13*e)**3 +
322778400*d**2*e**4 - 582497712*d**2*e**3*(7*d - 13*e) + 1752768*d**2*e**2*
(7*d - 13*e)**2 + 1107552*d**2*e*(7*d - 13*e)**3 - 863493856*d*e**5 + 50077
6560*d*e**4*(7*d - 13*e) + 4226944*d*e**3*(7*d - 13*e)**2 - 1880640*d*e**2*
(7*d - 13*e)**3 + 429000000*e**6 - 169242912*e**5*(7*d - 13*e) - 4538112*e*
*4*(7*d - 13*e)**2 + 964224*e**3*(7*d - 13*e)**3)/(13474125*d**6 - 10286017
5*d**5*e + 274190390*d**4*e**2 - 224142072*d**3*e**3 - 245084096*d**2*e**4
+ 535797456*d*e**5 - 256183200*e**6))/36 + (31*d - 50*e)*log(x + (-24383100
*d**6 + 187408066*d**5*e - 10439775*d**5*(31*d - 50*e)/4 - 511591980*d**4*e
**2 + 47066145*d**4*e*(31*d - 50*e)/2 + 41700*d**4*(31*d - 50*e)**2 + 46949
1120*d**3*e**3 - 83418138*d**3*e**2*(31*d - 50*e) - 168958*d**3*e*(31*d - 5
0*e)**2 + 12375*d**3*(31*d - 50*e)**3/4 + 322778400*d**2*e**4 + 145624428*d
**2*e**3*(31*d - 50*e) + 109548*d**2*e**2*(31*d - 50*e)**2 - 34611*d**2*e*(
31*d - 50*e)**3/2 - 863493856*d*e**5 - 125194140*d*e**4*(31*d - 50*e) + 264
184*d*e**3*(31*d - 50*e)**2 + 29385*d*e**2*(31*d - 50*e)**3 + 429000000*e**
6 + 42310728*e**5*(31*d - 50*e) - 283632*e**4*(31*d - 50*e)**2 - 15066*e**3
*(31*d - 50*e)**3)/(13474125*d**6 - 102860175*d**5*e + 274190390*d**4*e**2
- 224142072*d**3*e**3 - 245084096*d**2*e**4 + 535797456*d*e**5 - 256183200*
e**6))/144 + (-5*d + 6*e + x*(-3*d + 4*e))/(12*x**2 + 36*x + 24)
```

3.93 $\int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2}\,dx$

Optimal. Leaf size=105

$$-\frac{x(3d-4e+6f)+5d-6e+8f}{12\left(x^2+3x+2\right)}-\frac{1}{36}\log(1-x)(d+e+f)+\frac{1}{144}\log(2-x)(d+2e+4f)-\frac{1}{36}\log(x+1)(7d-13e+19f$$

```
[Out] 1/12*(-5*d+6*e-8*f-(3*d-4*e+6*f)*x)/(x^2+3*x+2)-1/36*(d+e+f)*ln(1-x)+1/144*
(d+2*e+4*f)*ln(2-x)-1/36*(7*d-13*e+19*f)*ln(1+x)+1/144*(31*d-50*e+76*f)*ln(
2+x)
```

Rubi [A] time = 0.32, antiderivative size = 105, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 5, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.161, Rules used = {1586, 1060, 1072, 632, 31}

$$-\frac{x(3d-4e+6f)+5d-6e+8f}{12\left(x^2+3x+2\right)}-\frac{1}{36}\log(1-x)(d+e+f)+\frac{1}{144}\log(2-x)(d+2e+4f)-\frac{1}{36}\log(x+1)(7d-13e+19f$$

Antiderivative was successfully verified.

```
[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] -(5*d - 6*e + 8*f + (3*d - 4*e + 6*f)*x)/(12*(2 + 3*x + x^2)) - ((d + e + f
)*Log[1 - x])/36 + ((d + 2*e + 4*f)*Log[2 - x])/144 - ((7*d - 13*e + 19*f)*
Log[1 + x])/36 + ((31*d - 50*e + 76*f)*Log[2 + x])/144
```

Rule 31

```
Int[((a_) + (b_.)*(x_))^(-1), x_Symbol] :> Simp[Log[RemoveContent[a + b*x,
x]]/b, x] /; FreeQ[{a, b}, x]
```

Rule 632

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> W
ith[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/
2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x
], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a
*c, 0] && NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1060

```
Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_)*((A_.) + (B_.)*(x_) + (C_.)*(x_
)^2)*((d_) + (e_.)*(x_) + (f_.)*(x_)^2)^(q_), x_Symbol] :> Simp[((a + b*x +
 c*x^2)^(p + 1)*(d + e*x + f*x^2)^(q + 1)*((A*c - a*C)*(2*a*c*e - b*(c*d +
a*f)) + (A*b - a*B)*(2*c^2*d + b^2*f - c*(b*e + 2*a*f)) + c*(A*(2*c^2*d + b
^2*f - c*(b*e + 2*a*f)) - B*(b*c*d - 2*a*c*e + a*b*f) + C*(b^2*d - a*b*e -
2*a*(c*d - a*f)))*x))/((b^2 - 4*a*c)*((c*d - a*f)^2 - (b*d - a*e)*(c*e - b*
f))*(p + 1)), x] + Dist[1/((b^2 - 4*a*c)*((c*d - a*f)^2 - (b*d - a*e)*(c*e
- b*f))*(p + 1)), Int[(a + b*x + c*x^2)^(p + 1)*(d + e*x + f*x^2)^q*Simp[(b
*B - 2*A*c - 2*a*C)*((c*d - a*f)^2 - (b*d - a*e)*(c*e - b*f))*(p + 1) + (b^
2*(C*d + A*f) - b*(B*c*d + A*c*e + a*C*e + a*B*f) + 2*(A*c*(c*d - a*f) - a*
(c*C*d - B*c*e - a*C*f)))*(a*f*(p + 1) - c*d*(p + 2)) - e*((A*c - a*C)*(2*a
*c*e - b*(c*d + a*f)) + (A*b - a*B)*(2*c^2*d + b^2*f - c*(b*e + 2*a*f)))*(p
 + q + 2) - (2*f*((A*c - a*C)*(2*a*c*e - b*(c*d + a*f)) + (A*b - a*B)*(2*c^
2*d + b^2*f - c*(b*e + 2*a*f)))*(p + q + 2) - (b^2*(C*d + A*f) - b*(B*c*d +
 A*c*e + a*C*e + a*B*f) + 2*(A*c*(c*d - a*f) - a*(c*C*d - B*c*e - a*C*f)))*
(b*f*(p + 1) - c*e*(2*p + q + 4)))*x - c*f*(b^2*(C*d + A*f) - b*(B*c*d + A*
c*e + a*C*e + a*B*f) + 2*(A*c*(c*d - a*f) - a*(c*C*d - B*c*e - a*C*f)))*(2*
```

```
p + 2*q + 5)*x^2, x], x], x] /; FreeQ[{a, b, c, d, e, f, A, B, C, q}, x] &&
 NeQ[b^2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0] && LtQ[p, -1] && NeQ[(c*d - a*f
)^2 - (b*d - a*e)*(c*e - b*f), 0] &&  !( !IntegerQ[p] && ILtQ[q, -1]) &&  !
IGtQ[q, 0]
```

Rule 1072

```
Int[((A_.) + (B_.)*(x_) + (C_.)*(x_)^2)/(((a_) + (b_.)*(x_) + (c_.)*(x_)^2)
*((d_) + (e_.)*(x_) + (f_.)*(x_)^2)), x_Symbol] :> With[{q = c^2*d^2 - b*c*
d*e + a*c*e^2 + b^2*d*f - 2*a*c*d*f - a*b*e*f + a^2*f^2}, Dist[1/q, Int[(A*
c^2*d - a*c*C*d - A*b*c*e + a*B*c*e + A*b^2*f - a*b*B*f - a*A*c*f + a^2*C*f
 + c*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B*f)*x)/(a + b*x + c*x^2),
x], x] + Dist[1/q, Int[(c*C*d^2 - B*c*d*e + A*c*e^2 + b*B*d*f - A*c*d*f - a
*C*d*f - A*b*e*f + a*A*f^2 - f*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B
*f)*x)/(d + e*x + f*x^2), x], x] /; NeQ[q, 0]] /; FreeQ[{a, b, c, d, e, f,
A, B, C}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rubi steps

$$\int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2}\,dx = \int \frac{d+ex+fx^2}{(2-3x+x^2)(2+3x+x^2)^2}\,dx$$
$$= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{1}{72}\int \frac{6(3d-10e+12f)-24(2d-3e}{(2-3x+x^2)(2}$$
$$= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{\int \frac{-288(2d-3e+5f)+108(3d-10e+12f)+(72(3d-4e}{2-3x+x^2}}{5184}$$
$$= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{1}{144}(-31d+50e-76f)\int \frac{1}{2+x}\,dx -$$
$$= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{1}{36}(d+e+f)\log(1-x) + \frac{1}{144}(d+2e$$

Mathematica [A] time = 0.07, size = 97, normalized size = 0.92

$$\frac{1}{144}\left(-\frac{12(d(3x+5)-4ex-6e+6fx+8f)}{x^2+3x+2} - 4\log(1-x)(d+e+f) + \log(2-x)(d+2e+4f) - 4\log(x+1)(7$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((-12*(-6*e + 8*f - 4*e*x + 6*f*x + d*(5 + 3*x)))/(2 + 3*x + x^2) - 4*(d +
e + f)*Log[1 - x] + (d + 2*e + 4*f)*Log[2 - x] - 4*(7*d - 13*e + 19*f)*Log[
1 + x] + (31*d - 50*e + 76*f)*Log[2 + x])/144
```

fricas [B] time = 0.88, size = 191, normalized size = 1.82

$$-\frac{12(3d-4e+6f)x - ((31d-50e+76f)x^2 + 3(31d-50e+76f)x + 62d-100e+152f)\log(x+2) + 4(}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] -1/144*(12*(3*d - 4*e + 6*f)*x - ((31*d - 50*e + 76*f)*x^2 + 3*(31*d - 50*e
 + 76*f)*x + 62*d - 100*e + 152*f)*log(x + 2) + 4*((7*d - 13*e + 19*f)*x^2
+ 3*(7*d - 13*e + 19*f)*x + 14*d - 26*e + 38*f)*log(x + 1) + 4*((d + e + f)
*x^2 + 3*(d + e + f)*x + 2*d + 2*e + 2*f)*log(x - 1) - ((d + 2*e + 4*f)*x^2
 + 3*(d + 2*e + 4*f)*x + 2*d + 4*e + 8*f)*log(x - 2) + 60*d - 72*e + 96*f)/
(x^2 + 3*x + 2)
```

giac [A] time = 0.32, size = 101, normalized size = 0.96

$$\frac{1}{144}\left(31\,d+76\,f-50\,e\right)\log\left(|x+2|\right)-\frac{1}{36}\left(7\,d+19\,f-13\,e\right)\log\left(|x+1|\right)-\frac{1}{36}\left(d+f+e\right)\log\left(|x-1|\right)+\frac{1}{144}\left(d+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] 1/144*(31*d + 76*f - 50*e)*log(abs(x + 2)) - 1/36*(7*d + 19*f - 13*e)*log(a
bs(x + 1)) - 1/36*(d + f + e)*log(abs(x - 1)) + 1/144*(d + 4*f + 2*e)*log(a
bs(x - 2)) - 1/12*((3*d + 6*f - 4*e)*x + 5*d + 8*f - 6*e)/((x + 2)*(x + 1))
```

maple [A] time = 0.01, size = 134, normalized size = 1.28

$$\frac{31d\ln\left(x+2\right)}{144}+\frac{d\ln\left(x-2\right)}{144}-\frac{d\ln\left(x-1\right)}{36}-\frac{7d\ln\left(x+1\right)}{36}-\frac{25e\ln\left(x+2\right)}{72}+\frac{e\ln\left(x-2\right)}{72}-\frac{e\ln\left(x-1\right)}{36}+\frac{13e\ln\left(x+1\right.}{36}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 1/144*d*ln(x-2)+1/72*e*ln(x-2)+1/36*f*ln(x-2)-7/36*d*ln(x+1)+13/36*e*ln(x+1
)-19/36*f*ln(x+1)-1/6/(x+1)*d+1/6/(x+1)*e-1/6/(x+1)*f-1/36*d*ln(x-1)-1/36*e
*ln(x-1)-1/36*f*ln(x-1)-1/12/(x+2)*d+1/6/(x+2)*e-1/3/(x+2)*f+31/144*d*ln(x+
2)-25/72*e*ln(x+2)+19/36*f*ln(x+2)
```

maxima [A] time = 0.44, size = 91, normalized size = 0.87

$$\frac{1}{144}\left(31\,d-50\,e+76\,f\right)\log\left(x+2\right)-\frac{1}{36}\left(7\,d-13\,e+19\,f\right)\log\left(x+1\right)-\frac{1}{36}\left(d+e+f\right)\log\left(x-1\right)+\frac{1}{144}\left(d+2\,e\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] 1/144*(31*d - 50*e + 76*f)*log(x + 2) - 1/36*(7*d - 13*e + 19*f)*log(x + 1)
 - 1/36*(d + e + f)*log(x - 1) + 1/144*(d + 2*e + 4*f)*log(x - 2) - 1/12*((
3*d - 4*e + 6*f)*x + 5*d - 6*e + 8*f)/(x^2 + 3*x + 2)
```

mupad [B] time = 0.83, size = 97, normalized size = 0.92

$$\ln\left(x-2\right)\left(\frac{d}{144}+\frac{e}{72}+\frac{f}{36}\right)-\ln\left(x+1\right)\left(\frac{7\,d}{36}-\frac{13\,e}{36}+\frac{19\,f}{36}\right)-\ln\left(x-1\right)\left(\frac{d}{36}+\frac{e}{36}+\frac{f}{36}\right)+\ln\left(x+2\right)\left(\frac{31\,d}{144}-\frac{2}{7}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2))/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 2)*(d/144 + e/72 + f/36) - log(x + 1)*((7*d)/36 - (13*e)/36 + (19*f
)/36) - log(x - 1)*(d/36 + e/36 + f/36) + log(x + 2)*((31*d)/144 - (25*e)/7
```

```
2 + (19*f)/36) - ((5*d)/12 - e/2 + (2*f)/3 + x*(d/4 - e/3 + f/2))/(3*x + x^
2 + 2)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)*(f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

3.94 $\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} \, dx$

Optimal. Leaf size=117

$$-\frac{d-2e+4f-8g}{12(x+2)}-\frac{d-e+f-g}{6(x+1)}-\frac{1}{36}\log(1-x)(d+e+f+g)+\frac{1}{144}\log(2-x)(d+2e+4f+8g)-\frac{1}{36}\log(x+1)(7d-1$$

```
[Out] 1/6*(-d+e-f+g)/(1+x)+1/12*(-d+2*e-4*f+8*g)/(2+x)-1/36*(d+e+f+g)*ln(1-x)+1/1
44*(d+2*e+4*f+8*g)*ln(2-x)-1/36*(7*d-13*e+19*f-25*g)*ln(1+x)+1/144*(31*d-50
*e+76*f-104*g)*ln(2+x)
```

Rubi [A] time = 0.25, antiderivative size = 117, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {1586, 6728}

$$-\frac{d-2e+4f-8g}{12(x+2)}-\frac{d-e+f-g}{6(x+1)}-\frac{1}{36}\log(1-x)(d+e+f+g)+\frac{1}{144}\log(2-x)(d+2e+4f+8g)-\frac{1}{36}\log(x+1)(7d-1$$

Antiderivative was successfully verified.

```
[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] -(d - e + f - g)/(6*(1 + x)) - (d - 2*e + 4*f - 8*g)/(12*(2 + x)) - ((d + e
 + f + g)*Log[1 - x])/36 + ((d + 2*e + 4*f + 8*g)*Log[2 - x])/144 - ((7*d -
 13*e + 19*f - 25*g)*Log[1 + x])/36 + ((31*d - 50*e + 76*f - 104*g)*Log[2 +
 x])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6728

```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

Rubi steps

$$\begin{aligned}
\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} \, dx &= \int \frac{d+ex+fx^2+gx^3}{(2-3x+x^2)(2+3x+x^2)^2} \, dx \\
&= \int \left(\frac{d+2e+4f+8g}{144(-2+x)}+\frac{-d-e-f-g}{36(-1+x)}+\frac{d-e+f-g}{6(1+x)^2}+\frac{-7d+1}{3}\right. \\
&= -\frac{d-e+f-g}{6(1+x)}-\frac{d-2e+4f-8g}{12(2+x)}-\frac{1}{36}(d+e+f+g)\log(1-x)
\end{aligned}$$

Mathematica [A] time = 0.06, size = 114, normalized size = 0.97

$$\frac{1}{144}\left(\frac{12(-3dx-5d+4ex+6e-6fx-8f+10gx+12g)}{x^2+3x+2}-4\log(1-x)(d+e+f+g)+\log(2-x)(d+2e+\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4)^2,x
]
```

```
[Out] ((12*(-5*d + 6*e - 8*f + 12*g - 3*d*x + 4*e*x - 6*f*x + 10*g*x))/(2 + 3*x +
 x^2) - 4*(d + e + f + g)*Log[1 - x] + (d + 2*e + 4*f + 8*g)*Log[2 - x] + 4
*(-7*d + 13*e - 19*f + 25*g)*Log[1 + x] + (31*d - 50*e + 76*f - 104*g)*Log[
2 + x])/144
```

fricas [B] time = 2.55, size = 229, normalized size = 1.96

$$-\frac{12\left(3d-4e+6f-10g\right)x-\left(\left(31d-50e+76f-104g\right)x^2+3\left(31d-50e+76f-104g\right)x+62d-100e+1$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fri
cas")
```

```
[Out] -1/144*(12*(3*d - 4*e + 6*f - 10*g)*x - ((31*d - 50*e + 76*f - 104*g)*x^2 +
 3*(31*d - 50*e + 76*f - 104*g)*x + 62*d - 100*e + 152*f - 208*g)*log(x + 2
) + 4*((7*d - 13*e + 19*f - 25*g)*x^2 + 3*(7*d - 13*e + 19*f - 25*g)*x + 14
*d - 26*e + 38*f - 50*g)*log(x + 1) + 4*((d + e + f + g)*x^2 + 3*(d + e + f
 + g)*x + 2*d + 2*e + 2*f + 2*g)*log(x - 1) - ((d + 2*e + 4*f + 8*g)*x^2 +
3*(d + 2*e + 4*f + 8*g)*x + 2*d + 4*e + 8*f + 16*g)*log(x - 2) + 60*d - 72*
e + 96*f - 144*g)/(x^2 + 3*x + 2)
```

giac [A] time = 0.38, size = 117, normalized size = 1.00

$$\frac{1}{144}\left(31d+76f-104g-50e\right)\log\left(|x+2|\right)-\frac{1}{36}\left(7d+19f-25g-13e\right)\log\left(|x+1|\right)-\frac{1}{36}\left(d+f+g+e\right)\log\left(|x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="gia
c")
```

```
[Out] 1/144*(31*d + 76*f - 104*g - 50*e)*log(abs(x + 2)) - 1/36*(7*d + 19*f - 25*
g - 13*e)*log(abs(x + 1)) - 1/36*(d + f + g + e)*log(abs(x - 1)) + 1/144*(d
 + 4*f + 8*g + 2*e)*log(abs(x - 2)) - 1/12*((3*d + 6*f - 10*g - 4*e)*x + 5*
d + 8*f - 12*g - 6*e)/((x + 2)*(x + 1))
```

maple [A] time = 0.02, size = 178, normalized size = 1.52

$$\frac{31d\ln\left(x+2\right)}{144}+\frac{d\ln\left(x-2\right)}{144}-\frac{d\ln\left(x-1\right)}{36}-\frac{7d\ln\left(x+1\right)}{36}-\frac{25e\ln\left(x+2\right)}{72}+\frac{e\ln\left(x-2\right)}{72}-\frac{e\ln\left(x-1\right)}{36}+\frac{13e\ln\left(x+1\right)}{36}+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 1/144*d*ln(x-2)+1/72*e*ln(x-2)+1/36*f*ln(x-2)+1/18*g*ln(x-2)-7/36*d*ln(x+1)
+13/36*e*ln(x+1)-19/36*f*ln(x+1)+25/36*g*ln(x+1)-1/6/(x+1)*d+1/6/(x+1)*e-1/
6/(x+1)*f+1/6/(x+1)*g-1/36*d*ln(x-1)-1/36*e*ln(x-1)-1/36*f*ln(x-1)-1/36*g*l
n(x-1)-1/12/(x+2)*d+1/6/(x+2)*e-1/3/(x+2)*f+2/3/(x+2)*g+31/144*d*ln(x+2)-25
/72*e*ln(x+2)+19/36*f*ln(x+2)-13/18*g*ln(x+2)
```

maxima [A] time = 0.44, size = 107, normalized size = 0.91

$$\frac{1}{144}\left(31d-50e+76f-104g\right)\log\left(x+2\right)-\frac{1}{36}\left(7d-13e+19f-25g\right)\log\left(x+1\right)-\frac{1}{36}\left(d+e+f+g\right)\log\left(x-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="max
ima")
```

```
[Out] 1/144*(31*d - 50*e + 76*f - 104*g)*log(x + 2) - 1/36*(7*d - 13*e + 19*f - 2
5*g)*log(x + 1) - 1/36*(d + e + f + g)*log(x - 1) + 1/144*(d + 2*e + 4*f +
8*g)*log(x - 2) - 1/12*((3*d - 4*e + 6*f - 10*g)*x + 5*d - 6*e + 8*f - 12*g
)/(x^2 + 3*x + 2)
```

mupad [B] time = 0.91, size = 115, normalized size = 0.98

$$\ln(x-2)\left(\frac{d}{144}+\frac{e}{72}+\frac{f}{36}+\frac{g}{18}\right)-\ln(x+1)\left(\frac{7d}{36}-\frac{13e}{36}+\frac{19f}{36}-\frac{25g}{36}\right)-\ln(x-1)\left(\frac{d}{36}+\frac{e}{36}+\frac{f}{36}+\frac{g}{36}\right)+\mathrm{ln}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + g*x^3))/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 2)*(d/144 + e/72 + f/36 + g/18) - log(x + 1)*((7*d)/36 - (13*e)/36
+ (19*f)/36 - (25*g)/36) - log(x - 1)*(d/36 + e/36 + f/36 + g/36) + log(x +
 2)*((31*d)/144 - (25*e)/72 + (19*f)/36 - (13*g)/18) - ((5*d)/12 - e/2 + (2
*f)/3 - g + x*(d/4 - e/3 + f/2 - (5*g)/6))/(3*x + x^2 + 2)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)*(g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

3.95 $\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$

Optimal. Leaf size=131

$$-\frac{d-e+f-g+h}{6(x+1)}-\frac{d-2e+4f-8g+16h}{12(x+2)}-\frac{1}{36}\log(1-x)(d+e+f+g+h)+\frac{1}{144}\log(2-x)(d+2e+4f+8g+16h)-\frac{1}{36}$$

```
[Out] 1/6*(-d+e-f+g-h)/(1+x)+1/12*(-d+2*e-4*f+8*g-16*h)/(2+x)-1/36*(d+e+f+g+h)*ln
(1-x)+1/144*(d+2*e+4*f+8*g+16*h)*ln(2-x)-1/36*(7*d-13*e+19*f-25*g+31*h)*ln(
1+x)+1/144*(31*d-50*e+76*f-104*g+112*h)*ln(2+x)
```

Rubi [A] time = 0.28, antiderivative size = 131, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 41, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.049, Rules used = {1586, 6728}

$$-\frac{d-e+f-g+h}{6(x+1)}-\frac{d-2e+4f-8g+16h}{12(x+2)}-\frac{1}{36}\log(1-x)(d+e+f+g+h)+\frac{1}{144}\log(2-x)(d+2e+4f+8g+16h)-\frac{1}{36}$$

Antiderivative was successfully verified.

```
[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4)^2
,x]
```

```
[Out] -(d - e + f - g + h)/(6*(1 + x)) - (d - 2*e + 4*f - 8*g + 16*h)/(12*(2 + x)
) - ((d + e + f + g + h)*Log[1 - x])/36 + ((d + 2*e + 4*f + 8*g + 16*h)*Log
[2 - x])/144 - ((7*d - 13*e + 19*f - 25*g + 31*h)*Log[1 + x])/36 + ((31*d -
 50*e + 76*f - 104*g + 112*h)*Log[2 + x])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6728

```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2}\,dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{(2-3x+x^2)(2+3x+x^2)^2}\,dx\\ &= \int \left(\frac{d+2e+4f+8g+16h}{144(-2+x)}+\frac{-d-e-f-g-h}{36(-1+x)}+\frac{d-e+f-}{6(1+}\right.\\ &= -\frac{d-e+f-g+h}{6(1+x)}-\frac{d-2e+4f-8g+16h}{12(2+x)}-\frac{1}{36}(d+e+f+\end{aligned}$$

Mathematica [A] time = 0.06, size = 136, normalized size = 1.04

$$\frac{1}{144}\left(-\frac{12(d(3x+5)+2(-e(2x+3)+3fx+4f-5gx-6g+9hx+10h))}{x^2+3x+2}-4\log(1-x)(d+e+f+g+h)+\log\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 +
x^4)^2,x]
```

```
[Out] ((-12*(d*(5 + 3*x) + 2*(4*f - 6*g + 10*h + 3*f*x - 5*g*x + 9*h*x - e*(3 + 2
*x))))/(2 + 3*x + x^2) - 4*(d + e + f + g + h)*Log[1 - x] + (d + 2*(e + 2*f
 + 4*g + 8*h))*Log[2 - x] - 4*(7*d - 13*e + 19*f - 25*g + 31*h)*Log[1 + x]
+ (31*d - 50*e + 76*f - 104*g + 112*h)*Log[2 + x])/144
```

fricas [B] time = 11.82, size = 267, normalized size = 2.04

$$-\frac{12\left(3d-4e+6f-10g+18h\right)x-\left(\left(31d-50e+76f-104g+112h\right)x^2+3\left(31d-50e+76f-104g+\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorith
m="fricas")
```

```
[Out] -1/144*(12*(3*d - 4*e + 6*f - 10*g + 18*h)*x - ((31*d - 50*e + 76*f - 104*g
 + 112*h)*x^2 + 3*(31*d - 50*e + 76*f - 104*g + 112*h)*x + 62*d - 100*e + 1
52*f - 208*g + 224*h)*log(x + 2) + 4*((7*d - 13*e + 19*f - 25*g + 31*h)*x^2
 + 3*(7*d - 13*e + 19*f - 25*g + 31*h)*x + 14*d - 26*e + 38*f - 50*g + 62*h
)*log(x + 1) + 4*((d + e + f + g + h)*x^2 + 3*(d + e + f + g + h)*x + 2*d +
 2*e + 2*f + 2*g + 2*h)*log(x - 1) - ((d + 2*e + 4*f + 8*g + 16*h)*x^2 + 3*
(d + 2*e + 4*f + 8*g + 16*h)*x + 2*d + 4*e + 8*f + 16*g + 32*h)*log(x - 2)
+ 60*d - 72*e + 96*f - 144*g + 240*h)/(x^2 + 3*x + 2)
```

giac [A] time = 0.33, size = 133, normalized size = 1.02

$$\frac{1}{144}\left(31d+76f-104g+112h-50e\right)\log\left(|x+2|\right)-\frac{1}{36}\left(7d+19f-25g+31h-13e\right)\log\left(|x+1|\right)-\frac{1}{36}\left(d+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorith
m="giac")
```

```
[Out] 1/144*(31*d + 76*f - 104*g + 112*h - 50*e)*log(abs(x + 2)) - 1/36*(7*d + 19
*f - 25*g + 31*h - 13*e)*log(abs(x + 1)) - 1/36*(d + f + g + h + e)*log(abs
(x - 1)) + 1/144*(d + 4*f + 8*g + 16*h + 2*e)*log(abs(x - 2)) - 1/12*((3*d
+ 6*f - 10*g + 18*h - 4*e)*x + 5*d + 8*f - 12*g + 20*h - 6*e)/((x + 2)*(x +
 1))
```

maple [A] time = 0.01, size = 222, normalized size = 1.69

$$\frac{7h\ln\left(x+2\right)}{9}-\frac{h\ln\left(x-1\right)}{36}-\frac{31h\ln\left(x+1\right)}{36}+\frac{h\ln\left(x-2\right)}{9}-\frac{g\ln\left(x-1\right)}{36}-\frac{13g\ln\left(x+2\right)}{18}+\frac{g\ln\left(x-2\right)}{18}+\frac{25g\ln\left(x+\right.}{36}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 7/9*h*ln(x+2)-1/36*h*ln(x-1)-31/36*h*ln(x+1)+1/9*h*ln(x-2)-1/36*g*ln(x-1)-1
3/18*g*ln(x+2)+1/18*g*ln(x-2)+25/36*g*ln(x+1)+31/144*d*ln(x+2)-25/72*e*ln(x
+2)-1/36*e*ln(x-1)-1/36*d*ln(x-1)+13/36*e*ln(x+1)-7/36*d*ln(x+1)+1/144*d*ln
(x-2)+1/72*e*ln(x-2)+1/36*f*ln(x-2)-19/36*f*ln(x+1)-1/36*f*ln(x-1)+19/36*f*
ln(x+2)-4/3/(x+2)*h-1/6/(x+1)*h+2/3/(x+2)*g+1/6/(x+1)*g-1/12/(x+2)*d+1/6/(x
+2)*e-1/6/(x+1)*d+1/6/(x+1)*e-1/3/(x+2)*f-1/6/(x+1)*f
```

maxima [A] time = 0.45, size = 123, normalized size = 0.94

$$\frac{1}{144}\left(31d-50e+76f-104g+112h\right)\log\left(x+2\right)-\frac{1}{36}\left(7d-13e+19f-25g+31h\right)\log\left(x+1\right)-\frac{1}{36}\left(d+e\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorith
m="maxima")
```

```
[Out] 1/144*(31*d - 50*e + 76*f - 104*g + 112*h)*log(x + 2) - 1/36*(7*d - 13*e +
19*f - 25*g + 31*h)*log(x + 1) - 1/36*(d + e + f + g + h)*log(x - 1) + 1/14
4*(d + 2*e + 4*f + 8*g + 16*h)*log(x - 2) - 1/12*((3*d - 4*e + 6*f - 10*g +
 18*h)*x + 5*d - 6*e + 8*f - 12*g + 20*h)/(x^2 + 3*x + 2)
```

mupad [B] time = 1.33, size = 133, normalized size = 1.02

$$\ln(x-2)\left(\frac{d}{144}+\frac{e}{72}+\frac{f}{36}+\frac{g}{18}+\frac{h}{9}\right)-\ln(x-1)\left(\frac{d}{36}+\frac{e}{36}+\frac{f}{36}+\frac{g}{36}+\frac{h}{36}\right)-\ln(x+1)\left(\frac{7d}{36}-\frac{13e}{36}+\frac{19f}{36}-\frac{2}{3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(x^4 - 5*x^2 + 4)^2
,x)
```

```
[Out] log(x - 2)*(d/144 + e/72 + f/36 + g/18 + h/9) - log(x - 1)*(d/36 + e/36 + f
/36 + g/36 + h/36) - log(x + 1)*((7*d)/36 - (13*e)/36 + (19*f)/36 - (25*g)/
36 + (31*h)/36) - ((5*d)/12 - e/2 + (2*f)/3 - g + (5*h)/3 + x*(d/4 - e/3 +
f/2 - (5*g)/6 + (3*h)/2))/(3*x + x^2 + 2) + log(x + 2)*((31*d)/144 - (25*e)
/72 + (19*f)/36 - (13*g)/18 + (7*h)/9)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)*(h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

3.96 $\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$

Optimal. Leaf size=147

$$-\frac{d-2e+4f-8g+16h-32i}{12(x+2)}-\frac{d-e+f-g+h-i}{6(x+1)}-\frac{1}{36}\log(1-x)(d+e+f+g+h+i)+\frac{1}{144}\log(2-x)(d+2e+4f$$

[Out] 1/6*(-d+e-f+g-h+i)/(1+x)+1/12*(-d+2*e-4*f+8*g-16*h+32*i)/(2+x)-1/36*(d+e+f+g+h+i)*ln(1-x)+1/144*(d+2*e+4*f+8*g+16*h+32*i)*ln(2-x)-1/36*(7*d-13*e+19*f-25*g+31*h-37*i)*ln(1+x)+1/144*(31*d-50*e+76*f-104*g+112*h-32*i)*ln(2+x)

Rubi [A] time = 0.33, antiderivative size = 147, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 46, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043, Rules used = {1586, 6728}

$$-\frac{d-2e+4f-8g+16h-32i}{12(x+2)}-\frac{d-e+f-g+h-i}{6(x+1)}-\frac{1}{36}\log(1-x)(d+e+f+g+h+i)+\frac{1}{144}\log(2-x)(d+2e+4f$$

Antiderivative was successfully verified.

```
[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2
+ x^4)^2,x]
```

```
[Out] -(d - e + f - g + h - i)/(6*(1 + x)) - (d - 2*e + 4*f - 8*g + 16*h - 32*i)/
(12*(2 + x)) - ((d + e + f + g + h + i)*Log[1 - x])/36 + ((d + 2*e + 4*f +
8*g + 16*h + 32*i)*Log[2 - x])/144 - ((7*d - 13*e + 19*f - 25*g + 31*h - 37
*i)*Log[1 + x])/36 + ((31*d - 50*e + 76*f - 104*g + 112*h - 32*i)*Log[2 + x
])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6728

```
Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] :> With[
{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; Su
mQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]
```

Rubi steps

$$\begin{aligned}\int \frac{\left(2-3x+x^2\right)\left(d+ex+fx^2+gx^3+hx^4+96x^5\right)}{\left(4-5x^2+x^4\right)^2}dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+96x^5}{\left(2-3x+x^2\right)\left(2+3x+x^2\right)^2}dx\\ &= \int \left(\frac{3072+d+2e+4f+8g+16h}{144(-2+x)}+\frac{-96-d-e-}{36(-1}\right.\\ &= \frac{96-d+e-f+g-h}{6(1+x)}+\frac{3072-d+2e-4f+8g-}{12(2+x)}\end{aligned}$$

Mathematica [A] time = 0.08, size = 153, normalized size = 1.04

$$\frac{1}{144}\left(\frac{12(2(e(2x+3)-3fx-4f+5gx+6g-9hx-10h+17ix+18i)-d(3x+5))}{x^2+3x+2}-4\log(1-x)(d+e+f+\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 -
5*x^2 + x^4)^2,x]
```

```
[Out] ((12*(-(d*(5 + 3*x)) + 2*(-4*f + 6*g - 10*h + 18*i - 3*f*x + 5*g*x - 9*h*x
+ 17*i*x + e*(3 + 2*x))))/(2 + 3*x + x^2) - 4*(d + e + f + g + h + i)*Log[1
 - x] + (d + 2*e + 4*(f + 2*g + 4*h + 8*i))*Log[2 - x] + 4*(-7*d + 13*e - 1
9*f + 25*g - 31*h + 37*i)*Log[1 + x] + (31*d - 50*e + 76*f - 104*g + 112*h
- 32*i)*Log[2 + x])/144
```

fricas [B] time = 70.06, size = 305, normalized size = 2.07

$$-\frac{12\left(3d-4e+6f-10g+18h-34i\right)x-\left(\left(31d-50e+76f-104g+112h-32i\right)x^2+3\left(31d-50e+76f\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, al
gorithm="fricas")
```

```
[Out] -1/144*(12*(3*d - 4*e + 6*f - 10*g + 18*h - 34*i)*x - ((31*d - 50*e + 76*f
- 104*g + 112*h - 32*i)*x^2 + 3*(31*d - 50*e + 76*f - 104*g + 112*h - 32*i)
*x + 62*d - 100*e + 152*f - 208*g + 224*h - 64*i)*log(x + 2) + 4*((7*d - 13
*e + 19*f - 25*g + 31*h - 37*i)*x^2 + 3*(7*d - 13*e + 19*f - 25*g + 31*h -
37*i)*x + 14*d - 26*e + 38*f - 50*g + 62*h - 74*i)*log(x + 1) + 4*((d + e +
 f + g + h + i)*x^2 + 3*(d + e + f + g + h + i)*x + 2*d + 2*e + 2*f + 2*g +
 2*h + 2*i)*log(x - 1) - ((d + 2*e + 4*f + 8*g + 16*h + 32*i)*x^2 + 3*(d +
2*e + 4*f + 8*g + 16*h + 32*i)*x + 2*d + 4*e + 8*f + 16*g + 32*h + 64*i)*lo
g(x - 2) + 60*d - 72*e + 96*f - 144*g + 240*h - 432*i)/(x^2 + 3*x + 2)
```

giac [A] time = 0.39, size = 149, normalized size = 1.01

$$\frac{1}{144}\left(31d+76f-104g+112h-32i-50e\right)\log\left(|x+2|\right)-\frac{1}{36}\left(7d+19f-25g+31h-37i-13e\right)\log\left(|x+1|\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, al
gorithm="giac")
```

```
[Out] 1/144*(31*d + 76*f - 104*g + 112*h - 32*i - 50*e)*log(abs(x + 2)) - 1/36*(7
*d + 19*f - 25*g + 31*h - 37*i - 13*e)*log(abs(x + 1)) - 1/36*(d + f + g +
h + i + e)*log(abs(x - 1)) + 1/144*(d + 4*f + 8*g + 16*h + 32*i + 2*e)*log(
abs(x - 2)) - 1/12*((3*d + 6*f - 10*g + 18*h - 34*i - 4*e)*x + 5*d + 8*f -
12*g + 20*h - 36*i - 6*e)/((x + 2)*(x + 1))
```

maple [A] time = 0.01, size = 266, normalized size = 1.81

$$-\frac{2i\ln\left(x+2\right)}{9}-\frac{i\ln\left(x-1\right)}{36}+\frac{37i\ln\left(x+1\right)}{36}+\frac{2i\ln\left(x-2\right)}{9}+\frac{7h\ln\left(x+2\right)}{9}-\frac{h\ln\left(x-1\right)}{36}-\frac{31h\ln\left(x+1\right)}{36}+\frac{h\ln\left(x-2\right)}{9}-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] -2/9*i*ln(x+2)-1/36*i*ln(x-1)+37/36*i*ln(x+1)+2/9*i*ln(x-2)+7/9*h*ln(x+2)-1
/36*h*ln(x-1)-31/36*h*ln(x+1)+1/9*h*ln(x-2)-1/36*g*ln(x-1)-13/18*g*ln(x+2)+
1/18*g*ln(x-2)+25/36*g*ln(x+1)+31/144*d*ln(x+2)-25/72*e*ln(x+2)-1/36*e*ln(x
-1)-1/36*d*ln(x-1)+13/36*e*ln(x+1)-7/36*d*ln(x+1)+1/144*d*ln(x-2)+1/72*e*ln
(x-2)+1/36*f*ln(x-2)-19/36*f*ln(x+1)-1/36*f*ln(x-1)+19/36*f*ln(x+2)+8/3/(x+
```

```
2)*i+1/6/(x+1)*i-4/3/(x+2)*h-1/6/(x+1)*h+2/3/(x+2)*g+1/6/(x+1)*g-1/12/(x+2)
*d+1/6/(x+2)*e-1/6/(x+1)*d+1/6/(x+1)*e-1/3/(x+2)*f-1/6/(x+1)*f
```

maxima [A] time = 0.45, size = 139, normalized size = 0.95

$$\frac{1}{144}\left(31\,d-50\,e+76\,f-104\,g+112\,h-32\,i\right)\log\left(x+2\right)-\frac{1}{36}\left(7\,d-13\,e+19\,f-25\,g+31\,h-37\,i\right)\log\left(x+1\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, al
gorithm="maxima")
```

```
[Out] 1/144*(31*d - 50*e + 76*f - 104*g + 112*h - 32*i)*log(x + 2) - 1/36*(7*d -
13*e + 19*f - 25*g + 31*h - 37*i)*log(x + 1) - 1/36*(d + e + f + g + h + i)
*log(x - 1) + 1/144*(d + 2*e + 4*f + 8*g + 16*h + 32*i)*log(x - 2) - 1/12*(
(3*d - 4*e + 6*f - 10*g + 18*h - 34*i)*x + 5*d - 6*e + 8*f - 12*g + 20*h -
36*i)/(x^2 + 3*x + 2)
```

mupad [B] time = 1.68, size = 151, normalized size = 1.03

$$\ln\left(x-2\right)\left(\frac{d}{144}+\frac{e}{72}+\frac{f}{36}+\frac{g}{18}+\frac{h}{9}+\frac{2\,i}{9}\right)-\ln\left(x-1\right)\left(\frac{d}{36}+\frac{e}{36}+\frac{f}{36}+\frac{g}{36}+\frac{h}{36}+\frac{i}{36}\right)-\ln\left(x+1\right)\left(\frac{7\,d}{36}-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(x^4 - 5*x^
2 + 4)^2,x)
```

```
[Out] log(x - 2)*(d/144 + e/72 + f/36 + g/18 + h/9 + (2*i)/9) - log(x - 1)*(d/36
+ e/36 + f/36 + g/36 + h/36 + i/36) - log(x + 1)*((7*d)/36 - (13*e)/36 + (1
9*f)/36 - (25*g)/36 + (31*h)/36 - (37*i)/36) + log(x + 2)*((31*d)/144 - (25
*e)/72 + (19*f)/36 - (13*g)/18 + (7*h)/9 - (2*i)/9) - ((5*d)/12 - e/2 + (2*
f)/3 - g + (5*h)/3 - 3*i + x*(d/4 - e/3 + f/2 - (5*g)/6 + (3*h)/2 - (17*i)/
6))/(3*x + x^2 + 2)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)*
*2,x)
```

```
[Out] Timed out
```

3.97 $\int \frac{2+x}{\left(4-5x^2+x^4\right)^2}\,dx$

Optimal. Leaf size=68

$$\frac{1}{12(1-x)}+\frac{1}{36(2-x)}-\frac{1}{36(x+1)}+\frac{1}{18}\log(1-x)-\frac{35}{432}\log(2-x)+\frac{1}{54}\log(x+1)+\frac{1}{144}\log(x+2)$$

```
[Out] 1/12/(1-x)+1/36/(2-x)-1/36/(1+x)+1/18*ln(1-x)-35/432*ln(2-x)+1/54*ln(1+x)+1
/144*ln(2+x)
```

Rubi [A] time = 0.06, antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125, Rules used = {1586, 2074}

$$\frac{1}{12(1-x)}+\frac{1}{36(2-x)}-\frac{1}{36(x+1)}+\frac{1}{18}\log(1-x)-\frac{35}{432}\log(2-x)+\frac{1}{54}\log(x+1)+\frac{1}{144}\log(x+2)$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] 1/(12*(1 - x)) + 1/(36*(2 - x)) - 1/(36*(1 + x)) + Log[1 - x]/18 - (35*Log[
2 - x])/432 + Log[1 + x]/54 + Log[2 + x]/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 2074

```
Int[(P_)^(p_)*(Q_)^(q_.), x_Symbol] :> With[{PP = Factor[P]}, Int[ExpandInt
egrand[PP^p*Q^q, x], x] /;  !SumQ[NonfreeFactors[PP, x]]] /; FreeQ[q, x] &&
 PolyQ[P, x] && PolyQ[Q, x] && IntegerQ[p] && NeQ[P, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{2+x}{\left(4-5x^2+x^4\right)^2}\,dx &= \int \frac{1}{(2+x)\left(2-x-2x^2+x^3\right)^2}\,dx\\
&= \int \left(\frac{1}{36(-2+x)^2}-\frac{35}{432(-2+x)}+\frac{1}{12(-1+x)^2}+\frac{1}{18(-1+x)}+\frac{1}{36(1+x)^2}+\frac{1}{54(1+x)}\right.\\
&= \frac{1}{12(1-x)}+\frac{1}{36(2-x)}-\frac{1}{36(1+x)}+\frac{1}{18}\log(1-x)-\frac{35}{432}\log(2-x)+\frac{1}{54}\log(1+x)+
\end{aligned}$$

Mathematica [A] time = 0.03, size = 60, normalized size = 0.88

$$\frac{1}{432}\left(\frac{12\left(-5x^2+6x+5\right)}{x^3-2x^2-x+2}+24\log(1-x)-35\log(2-x)+8\log(x+1)+3\log(x+2)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x)/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((12*(5 + 6*x - 5*x^2))/(2 - x - 2*x^2 + x^3) + 24*Log[1 - x] - 35*Log[2 -
x] + 8*Log[1 + x] + 3*Log[2 + x])/432
```

fricas [B] time = 0.66, size = 103, normalized size = 1.51

$$-\frac{60\,x^2 - 3\left(x^3 - 2\,x^2 - x + 2\right)\log\left(x + 2\right) - 8\left(x^3 - 2\,x^2 - x + 2\right)\log\left(x + 1\right) - 24\left(x^3 - 2\,x^2 - x + 2\right)\log\left(x - 1\right)}{432\left(x^3 - 2\,x^2 - x + 2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] -1/432*(60*x^2 - 3*(x^3 - 2*x^2 - x + 2)*log(x + 2) - 8*(x^3 - 2*x^2 - x +
2)*log(x + 1) - 24*(x^3 - 2*x^2 - x + 2)*log(x - 1) + 35*(x^3 - 2*x^2 - x +
 2)*log(x - 2) - 72*x - 60)/(x^3 - 2*x^2 - x + 2)
```

giac [A] time = 0.40, size = 56, normalized size = 0.82

$$-\frac{5\,x^2 - 6\,x - 5}{36\,(x + 1)(x - 1)(x - 2)} + \frac{1}{144}\,\log\left(|x + 2|\right) + \frac{1}{54}\,\log\left(|x + 1|\right) + \frac{1}{18}\,\log\left(|x - 1|\right) - \frac{35}{432}\,\log\left(|x - 2|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] -1/36*(5*x^2 - 6*x - 5)/((x + 1)*(x - 1)*(x - 2)) + 1/144*log(abs(x + 2)) +
 1/54*log(abs(x + 1)) + 1/18*log(abs(x - 1)) - 35/432*log(abs(x - 2))
```

maple [A] time = 0.01, size = 47, normalized size = 0.69

$$\frac{\ln\left(x + 2\right)}{144} - \frac{35\ln\left(x - 2\right)}{432} + \frac{\ln\left(x - 1\right)}{18} + \frac{\ln\left(x + 1\right)}{54} - \frac{1}{36\,(x - 2)} - \frac{1}{36\,(x + 1)} - \frac{1}{12\,(x - 1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x+2)/(x^4-5*x^2+4)^2,x)
```

```
[Out] -1/36/(x-2)-35/432*ln(x-2)-1/36/(x+1)+1/54*ln(x+1)-1/12/(x-1)+1/18*ln(x-1)+
1/144*ln(x+2)
```

maxima [A] time = 0.44, size = 52, normalized size = 0.76

$$-\frac{5\,x^2 - 6\,x - 5}{36\left(x^3 - 2\,x^2 - x + 2\right)} + \frac{1}{144}\,\log\left(x + 2\right) + \frac{1}{54}\,\log\left(x + 1\right) + \frac{1}{18}\,\log\left(x - 1\right) - \frac{35}{432}\,\log\left(x - 2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] -1/36*(5*x^2 - 6*x - 5)/(x^3 - 2*x^2 - x + 2) + 1/144*log(x + 2) + 1/54*log
(x + 1) + 1/18*log(x - 1) - 35/432*log(x - 2)
```

mupad [B] time = 0.05, size = 52, normalized size = 0.76

$$\frac{\ln\left(x - 1\right)}{18} + \frac{\ln\left(x + 1\right)}{54} - \frac{35\,\ln\left(x - 2\right)}{432} + \frac{\ln\left(x + 2\right)}{144} - \frac{-\frac{5\,x^2}{36} + \frac{x}{6} + \frac{5}{36}}{-x^3 + 2\,x^2 + x - 2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x + 2)/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 1)/18 + log(x + 1)/54 - (35*log(x - 2))/432 + log(x + 2)/144 - (x/6
 - (5*x^2)/36 + 5/36)/(x + 2*x^2 - x^3 - 2)
```

sympy [A] time = 0.31, size = 53, normalized size = 0.78

$$\frac{-5x^2+6x+5}{36x^3-72x^2-36x+72}-\frac{35\log(x-2)}{432}+\frac{\log(x-1)}{18}+\frac{\log(x+1)}{54}+\frac{\log(x+2)}{144}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)/(x**4-5*x**2+4)**2,x)
```

```
[Out] (-5*x**2 + 6*x + 5)/(36*x**3 - 72*x**2 - 36*x + 72) - 35*log(x - 2)/432 + l
og(x - 1)/18 + log(x + 1)/54 + log(x + 2)/144
```

3.98 $\int \frac{(2+x)(d+ex)}{\left(4-5x^2+x^4\right)^2} dx$

Optimal. Leaf size=105

$$-\frac{d-e}{36(x+1)}+\frac{d+e}{12(1-x)}+\frac{d+2e}{36(2-x)}+\frac{1}{36}(2d+5e)\log(1-x)-\frac{1}{432}(35d+58e)\log(2-x)+\frac{1}{108}(2d+e)\log(x+1)+\frac{1}{144}$$

```
[Out] 1/12*(d+e)/(1-x)+1/36*(d+2*e)/(2-x)+1/36*(-d+e)/(1+x)+1/36*(2*d+5*e)*ln(1-x
)-1/432*(35*d+58*e)*ln(2-x)+1/108*(2*d+e)*ln(1+x)+1/144*(d-2*e)*ln(2+x)
```

Rubi [A] time = 0.20, antiderivative size = 105, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.095, Rules used = {1586, 6742}

$$-\frac{d-e}{36(x+1)}+\frac{d+e}{12(1-x)}+\frac{d+2e}{36(2-x)}+\frac{1}{36}(2d+5e)\log(1-x)-\frac{1}{432}(35d+58e)\log(2-x)+\frac{1}{108}(2d+e)\log(x+1)+\frac{1}{144}$$

Antiderivative was successfully verified.

```
[In] Int[((2 + x)*(d + e*x))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (d + e)/(12*(1 - x)) + (d + 2*e)/(36*(2 - x)) - (d - e)/(36*(1 + x)) + ((2*
d + 5*e)*Log[1 - x])/36 - ((35*d + 58*e)*Log[2 - x])/432 + ((2*d + e)*Log[1
 + x])/108 + ((d - 2*e)*Log[2 + x])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6742

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}\int \frac{(2+x)(d+ex)}{\left(4-5x^2+x^4\right)^2} dx &= \int \frac{d+ex}{(2+x)\left(2-x-2x^2+x^3\right)^2} dx\\ &= \int \left(\frac{d+2e}{36(-2+x)^2}+\frac{-35d-58e}{432(-2+x)}+\frac{d+e}{12(-1+x)^2}+\frac{2d+5e}{36(-1+x)}+\frac{d-e}{36(1+x)^2}+\frac{2d+}{108(1+}\right.\\ &= \frac{d+e}{12(1-x)}+\frac{d+2e}{36(2-x)}-\frac{d-e}{36(1+x)}+\frac{1}{36}(2d+5e)\log(1-x)-\frac{1}{432}(35d+58e)\log(2\end{aligned}$$

Mathematica [A] time = 0.09, size = 97, normalized size = 0.92

$$\frac{1}{432}\left(\frac{12\left(d\left(-5x^2+6x+5\right)+2e\left(5-2x^2\right)\right)}{x^3-2x^2-x+2}+12(2d+5e)\log(1-x)-(35d+58e)\log(2-x)+4(2d+e)\log(\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + x)*(d + e*x))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((12*(d*(5 + 6*x - 5*x^2) + 2*e*(5 - 2*x^2)))/(2 - x - 2*x^2 + x^3) + 12*(2
*d + 5*e)*Log[1 - x] - (35*d + 58*e)*Log[2 - x] + 4*(2*d + e)*Log[1 + x] +
3*(d - 2*e)*Log[2 + x])/432
```

fricas [B] time = 0.94, size = 211, normalized size = 2.01

$$-\frac{12\,(5\,d+4\,e)x^2-72\,dx-3\left((d-2\,e)x^3-2\,(d-2\,e)x^2-(d-2\,e)x+2\,d-4\,e\right)\log\left(x+2\right)-4\left((2\,d+e)x^3-2\,(2\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] -1/432*(12*(5*d + 4*e)*x^2 - 72*d*x - 3*((d - 2*e)*x^3 - 2*(d - 2*e)*x^2 -
(d - 2*e)*x + 2*d - 4*e)*log(x + 2) - 4*((2*d + e)*x^3 - 2*(2*d + e)*x^2 -
(2*d + e)*x + 4*d + 2*e)*log(x + 1) - 12*((2*d + 5*e)*x^3 - 2*(2*d + 5*e)*x
^2 - (2*d + 5*e)*x + 4*d + 10*e)*log(x - 1) + ((35*d + 58*e)*x^3 - 2*(35*d
+ 58*e)*x^2 - (35*d + 58*e)*x + 70*d + 116*e)*log(x - 2) - 60*d - 120*e)/(x
^3 - 2*x^2 - x + 2)
```

giac [A] time = 0.31, size = 98, normalized size = 0.93

$$\frac{1}{144}\,(d-2\,e)\log\left(|x+2|\right)+\frac{1}{108}\,(2\,d+e)\log\left(|x+1|\right)+\frac{1}{36}\,(2\,d+5\,e)\log\left(|x-1|\right)-\frac{1}{432}\,(35\,d+58\,e)\log\left(|x-2|\right)-\frac{(5}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] 1/144*(d - 2*e)*log(abs(x + 2)) + 1/108*(2*d + e)*log(abs(x + 1)) + 1/36*(2
*d + 5*e)*log(abs(x - 1)) - 1/432*(35*d + 58*e)*log(abs(x - 2)) - 1/36*((5*
d + 4*e)*x^2 - 6*d*x - 5*d - 10*e)/((x + 1)*(x - 1)*(x - 2))
```

maple [A] time = 0.01, size = 106, normalized size = 1.01

$$\frac{d\ln\left(x+2\right)}{144}-\frac{35d\ln\left(x-2\right)}{432}+\frac{d\ln\left(x-1\right)}{18}+\frac{d\ln\left(x+1\right)}{54}-\frac{e\ln\left(x+2\right)}{72}-\frac{29e\ln\left(x-2\right)}{216}+\frac{5e\ln\left(x-1\right)}{36}+\frac{e\ln\left(x+1\right)}{108}-\frac{}{36}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x+2)*(e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] -35/432*d*ln(x-2)-29/216*e*ln(x-2)-1/36/(x-2)*d-1/18/(x-2)*e-1/36/(x+1)*d+1
/36/(x+1)*e+1/54*d*ln(x+1)+1/108*e*ln(x+1)-1/12/(x-1)*d-1/12/(x-1)*e+1/18*d
*ln(x-1)+5/36*e*ln(x-1)+1/144*d*ln(x+2)-1/72*e*ln(x+2)
```

maxima [A] time = 0.44, size = 88, normalized size = 0.84

$$\frac{1}{144}\,(d-2\,e)\log\left(x+2\right)+\frac{1}{108}\,(2\,d+e)\log\left(x+1\right)+\frac{1}{36}\,(2\,d+5\,e)\log\left(x-1\right)-\frac{1}{432}\,(35\,d+58\,e)\log\left(x-2\right)-\frac{(5\,d+}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] 1/144*(d - 2*e)*log(x + 2) + 1/108*(2*d + e)*log(x + 1) + 1/36*(2*d + 5*e)*
log(x - 1) - 1/432*(35*d + 58*e)*log(x - 2) - 1/36*((5*d + 4*e)*x^2 - 6*d*x
 - 5*d - 10*e)/(x^3 - 2*x^2 - x + 2)
```

mupad [B] time = 0.09, size = 90, normalized size = 0.86

$$\ln\left(x-1\right)\left(\frac{d}{18}+\frac{5\,e}{36}\right)-\frac{\left(-\frac{5\,d}{36}-\frac{e}{9}\right)\,x^2+\frac{d\,x}{6}+\frac{5\,d}{36}+\frac{5\,e}{18}}{-x^3+2\,x^2+x-2}+\ln\left(x+1\right)\left(\frac{d}{54}+\frac{e}{108}\right)+\ln\left(x+2\right)\left(\frac{d}{144}-\frac{e}{72}\right)-\ln\left(x-2\right)\left(\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x + 2)*(d + e*x))/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 1)*(d/18 + (5*e)/36) - ((5*d)/36 + (5*e)/18 - x^2*((5*d)/36 + e/9)
+ (d*x)/6)/(x + 2*x^2 - x^3 - 2) + log(x + 1)*(d/54 + e/108) + log(x + 2)*(
d/144 - e/72) - log(x - 2)*((35*d)/432 + (29*e)/216)
```

sympy [B] time = 8.79, size = 1034, normalized size = 9.85

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] (d - 2*e)*log(x + (8710660*d**5 + 91884504*d**4*e - 7579779*d**4*(d - 2*e)/
4 + 364910432*d**3*e**2 - 18128055*d**3*e*(d - 2*e) - 83772*d**3*(d - 2*e)*
*2 + 686697536*d**2*e**3 - 60296868*d**2*e**2*(d - 2*e) - 597816*d**2*e*(d
- 2*e)**2 + 65907*d**2*(d - 2*e)**3/4 + 614357568*d*e**4 - 85949220*d*e**3*
(d - 2*e) - 1500048*d*e**2*(d - 2*e)**2 + 105840*d*e*(d - 2*e)**3 + 2084704
00*e**5 - 45136356*e**4*(d - 2*e) - 1196064*e**3*(d - 2*e)**2 + 128277*e**2
*(d - 2*e)**3)/(3374210*d**5 + 38645295*d**4*e + 170558380*d**3*e**2 + 3620
61760*d**2*e**3 + 370298160*d*e**4 + 146466320*e**5))/144 + (2*d + e)*log(x
 + (8710660*d**5 + 91884504*d**4*e - 2526593*d**4*(2*d + e) + 364910432*d**
3*e**2 - 24170740*d**3*e*(2*d + e) - 148928*d**3*(2*d + e)**2 + 686697536*d
**2*e**3 - 80395824*d**2*e**2*(2*d + e) - 1062784*d**2*e*(2*d + e)**2 + 390
56*d**2*(2*d + e)**3 + 614357568*d*e**4 - 114598960*d*e**3*(2*d + e) - 2666
752*d*e**2*(2*d + e)**2 + 250880*d*e*(2*d + e)**3 + 208470400*e**5 - 601818
08*e**4*(2*d + e) - 2126336*e**3*(2*d + e)**2 + 304064*e**2*(2*d + e)**3)/(
3374210*d**5 + 38645295*d**4*e + 170558380*d**3*e**2 + 362061760*d**2*e**3
+ 370298160*d*e**4 + 146466320*e**5))/108 + (2*d + 5*e)*log(x + (8710660*d*
*5 + 91884504*d**4*e - 7579779*d**4*(2*d + 5*e) + 364910432*d**3*e**2 - 725
12220*d**3*e*(2*d + 5*e) - 1340352*d**3*(2*d + 5*e)**2 + 686697536*d**2*e**
3 - 241187472*d**2*e**2*(2*d + 5*e) - 9565056*d**2*e*(2*d + 5*e)**2 + 10545
12*d**2*(2*d + 5*e)**3 + 614357568*d*e**4 - 343796880*d*e**3*(2*d + 5*e) -
24000768*d*e**2*(2*d + 5*e)**2 + 6773760*d*e*(2*d + 5*e)**3 + 208470400*e**
5 - 180545424*e**4*(2*d + 5*e) - 19137024*e**3*(2*d + 5*e)**2 + 8209728*e**
2*(2*d + 5*e)**3)/(3374210*d**5 + 38645295*d**4*e + 170558380*d**3*e**2 + 3
62061760*d**2*e**3 + 370298160*d*e**4 + 146466320*e**5))/36 - (35*d + 58*e)
*log(x + (8710660*d**5 + 91884504*d**4*e + 2526593*d**4*(35*d + 58*e)/4 + 3
64910432*d**3*e**2 + 6042685*d**3*e*(35*d + 58*e) - 9308*d**3*(35*d + 58*e)
**2 + 686697536*d**2*e**3 + 20098956*d**2*e**2*(35*d + 58*e) - 66424*d**2*e
*(35*d + 58*e)**2 - 2441*d**2*(35*d + 58*e)**3/4 + 614357568*d*e**4 + 28649
740*d*e**3*(35*d + 58*e) - 166672*d*e**2*(35*d + 58*e)**2 - 3920*d*e*(35*d
+ 58*e)**3 + 208470400*e**5 + 15045452*e**4*(35*d + 58*e) - 132896*e**3*(35
*d + 58*e)**2 - 4751*e**2*(35*d + 58*e)**3)/(3374210*d**5 + 38645295*d**4*e
 + 170558380*d**3*e**2 + 362061760*d**2*e**3 + 370298160*d*e**4 + 146466320
*e**5))/432 + (6*d*x + 5*d + 10*e + x**2*(-5*d - 4*e))/(36*x**3 - 72*x**2 -
 36*x + 72)
```

3.99 $\int \frac{(2+x)\left(d+ex+fx^2\right)}{\left(4-5x^2+x^4\right)^2}\,dx$

Optimal. Leaf size=122

$$-\frac{d-e+f}{36(x+1)}+\frac{d+e+f}{12(1-x)}+\frac{d+2e+4f}{36(2-x)}+\frac{1}{36}\log(1-x)(2d+5e+8f)-\frac{1}{432}\log(2-x)(35d+58e+92f)+\frac{1}{108}\log(x+1)(2d$$

```
[Out] 1/12*(d+e+f)/(1-x)+1/36*(d+2*e+4*f)/(2-x)+1/36*(-d+e-f)/(1+x)+1/36*(2*d+5*e
+8*f)*ln(1-x)-1/432*(35*d+58*e+92*f)*ln(2-x)+1/108*(2*d+e-4*f)*ln(1+x)+1/14
4*(d-2*e+4*f)*ln(2+x)
```

Rubi [A] time = 0.22, antiderivative size = 122, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.077, Rules used = {1586, 6742}

$$-\frac{d-e+f}{36(x+1)}+\frac{d+e+f}{12(1-x)}+\frac{d+2e+4f}{36(2-x)}+\frac{1}{36}\log(1-x)(2d+5e+8f)-\frac{1}{432}\log(2-x)(35d+58e+92f)+\frac{1}{108}\log(x+1)(2d$$

Antiderivative was successfully verified.

```
[In] Int[((2 + x)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (d + e + f)/(12*(1 - x)) + (d + 2*e + 4*f)/(36*(2 - x)) - (d - e + f)/(36*(
1 + x)) + ((2*d + 5*e + 8*f)*Log[1 - x])/36 - ((35*d + 58*e + 92*f)*Log[2 -
 x])/432 + ((2*d + e - 4*f)*Log[1 + x])/108 + ((d - 2*e + 4*f)*Log[2 + x])/
144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6742

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}\int \frac{(2+x)\left(d+ex+fx^2\right)}{\left(4-5x^2+x^4\right)^2}\,dx &= \int \frac{d+ex+fx^2}{(2+x)\left(2-x-2x^2+x^3\right)^2}\,dx\\ &= \int \left(\frac{d+2e+4f}{36(-2+x)^2}+\frac{-35d-58e-92f}{432(-2+x)}+\frac{d+e+f}{12(-1+x)^2}+\frac{2d+5e+8f}{36(-1+x)}+\frac{d-e+f}{36(1+x)^2}\right.\\ &= \frac{d+e+f}{12(1-x)}+\frac{d+2e+4f}{36(2-x)}-\frac{d-e+f}{36(1+x)}+\frac{1}{36}(2d+5e+8f)\log(1-x)-\frac{1}{432}(35d+\end{aligned}$$

Mathematica [A] time = 0.05, size = 121, normalized size = 0.99

$$\frac{1}{432}\left(\frac{12\left(d\left(-5x^2+6x+5\right)+e\left(10-4x^2\right)+2f\left(-4x^2+3x+4\right)\right)}{x^3-2x^2-x+2}+12\log(1-x)(2d+5e+8f)-\log(2-x)(35c\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + x)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((12*(d*(5 + 6*x - 5*x^2) + e*(10 - 4*x^2) + 2*f*(4 + 3*x - 4*x^2)))/(2 - x
 - 2*x^2 + x^3) + 12*(2*d + 5*e + 8*f)*Log[1 - x] - (35*d + 58*e + 92*f)*Lo
g[2 - x] + 4*(2*d + e - 4*f)*Log[1 + x] + 3*(d - 2*e + 4*f)*Log[2 + x])/432
```

fricas [B] time = 1.24, size = 267, normalized size = 2.19

$$-\frac{12\left(5d+4e+8f\right)x^2-72\left(d+f\right)x-3\left(\left(d-2e+4f\right)x^3-2\left(d-2e+4f\right)x^2-\left(d-2e+4f\right)x+2d-4e\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] -1/432*(12*(5*d + 4*e + 8*f)*x^2 - 72*(d + f)*x - 3*((d - 2*e + 4*f)*x^3 -
2*(d - 2*e + 4*f)*x^2 - (d - 2*e + 4*f)*x + 2*d - 4*e + 8*f)*log(x + 2) - 4
*((2*d + e - 4*f)*x^3 - 2*(2*d + e - 4*f)*x^2 - (2*d + e - 4*f)*x + 4*d + 2
*e - 8*f)*log(x + 1) - 12*((2*d + 5*e + 8*f)*x^3 - 2*(2*d + 5*e + 8*f)*x^2
- (2*d + 5*e + 8*f)*x + 4*d + 10*e + 16*f)*log(x - 1) + ((35*d + 58*e + 92*
f)*x^3 - 2*(35*d + 58*e + 92*f)*x^2 - (35*d + 58*e + 92*f)*x + 70*d + 116*e
 + 184*f)*log(x - 2) - 60*d - 120*e - 96*f)/(x^3 - 2*x^2 - x + 2)
```

giac [A] time = 0.33, size = 118, normalized size = 0.97

$$\frac{1}{144}\left(d+4f-2e\right)\log\left(|x+2|\right)+\frac{1}{108}\left(2d-4f+e\right)\log\left(|x+1|\right)+\frac{1}{36}\left(2d+8f+5e\right)\log\left(|x-1|\right)-\frac{1}{432}\left(35d+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] 1/144*(d + 4*f - 2*e)*log(abs(x + 2)) + 1/108*(2*d - 4*f + e)*log(abs(x + 1
)) + 1/36*(2*d + 8*f + 5*e)*log(abs(x - 1)) - 1/432*(35*d + 92*f + 58*e)*lo
g(abs(x - 2)) - 1/36*((5*d + 8*f + 4*e)*x^2 - 6*(d + f)*x - 5*d - 8*f - 10*
e)/((x + 1)*(x - 1)*(x - 2))
```

maple [A] time = 0.02, size = 158, normalized size = 1.30

$$\frac{d\ln\left(x+2\right)}{144}-\frac{35d\ln\left(x-2\right)}{432}+\frac{d\ln\left(x-1\right)}{18}+\frac{d\ln\left(x+1\right)}{54}-\frac{e\ln\left(x+2\right)}{72}-\frac{29e\ln\left(x-2\right)}{216}+\frac{5e\ln\left(x-1\right)}{36}+\frac{e\ln\left(x+1\right)}{108}+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] -35/432*d*ln(x-2)-29/216*e*ln(x-2)-23/108*f*ln(x-2)-1/36/(x-2)*d-1/18/(x-2)
*e-1/9/(x-2)*f-1/36/(x+1)*d+1/36/(x+1)*e-1/36/(x+1)*f+1/54*d*ln(x+1)+1/108*
e*ln(x+1)-1/27*f*ln(x+1)-1/12/(x-1)*d-1/12/(x-1)*e-1/12/(x-1)*f+1/18*d*ln(x
-1)+5/36*e*ln(x-1)+2/9*f*ln(x-1)+1/144*d*ln(x+2)-1/72*e*ln(x+2)+1/36*f*ln(x
+2)
```

maxima [A] time = 0.44, size = 108, normalized size = 0.89

$$\frac{1}{144}\left(d-2e+4f\right)\log\left(x+2\right)+\frac{1}{108}\left(2d+e-4f\right)\log\left(x+1\right)+\frac{1}{36}\left(2d+5e+8f\right)\log\left(x-1\right)-\frac{1}{432}\left(35d+58\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] 1/144*(d - 2*e + 4*f)*log(x + 2) + 1/108*(2*d + e - 4*f)*log(x + 1) + 1/36*
(2*d + 5*e + 8*f)*log(x - 1) - 1/432*(35*d + 58*e + 92*f)*log(x - 2) - 1/36
```

```
*((5*d + 4*e + 8*f)*x^2 - 6*(d + f)*x - 5*d - 10*e - 8*f)/(x^3 - 2*x^2 - x
+ 2)
```

mupad [B] time = 0.13, size = 113, normalized size = 0.93

$$\ln(x-1)\left(\frac{d}{18}+\frac{5e}{36}+\frac{2f}{9}\right)+\ln(x+1)\left(\frac{d}{54}+\frac{e}{108}-\frac{f}{27}\right)+\ln(x+2)\left(\frac{d}{144}-\frac{e}{72}+\frac{f}{36}\right)-\ln(x-2)\left(\frac{35d}{432}+\frac{29e}{216}+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x + 2)*(d + e*x + f*x^2))/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 1)*(d/18 + (5*e)/36 + (2*f)/9) + log(x + 1)*(d/54 + e/108 - f/27) +
 log(x + 2)*(d/144 - e/72 + f/36) - log(x - 2)*((35*d)/432 + (29*e)/216 + (
23*f)/108) - ((5*d)/36 + (5*e)/18 + (2*f)/9 + x*(d/6 + f/6) - x^2*((5*d)/36
 + e/9 + (2*f)/9))/(x + 2*x^2 - x^3 - 2)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

3.100 $\int \frac{(2+x)\left(d+ex+fx^2+gx^3\right)}{\left(4-5x^2+x^4\right)^2}\,dx$

Optimal. Leaf size=141

$$-\frac{d-e+f-g}{36(x+1)}+\frac{d+e+f+g}{12(1-x)}+\frac{d+2e+4f+8g}{36(2-x)}+\frac{1}{36}\log(1-x)(2d+5e+8f+11g)-\frac{1}{432}\log(2-x)(35d+58e+92$$

```
[Out] 1/12*(d+e+f+g)/(1-x)+1/36*(d+2*e+4*f+8*g)/(2-x)+1/36*(-d+e-f+g)/(1+x)+1/36*
(2*d+5*e+8*f+11*g)*ln(1-x)-1/432*(35*d+58*e+92*f+136*g)*ln(2-x)+1/108*(2*d+
e-4*f+7*g)*ln(1+x)+1/144*(d-2*e+4*f-8*g)*ln(2+x)
```

Rubi [A] time = 0.25, antiderivative size = 141, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.065, Rules used = {1586, 6742}

$$-\frac{d-e+f-g}{36(x+1)}+\frac{d+e+f+g}{12(1-x)}+\frac{d+2e+4f+8g}{36(2-x)}+\frac{1}{36}\log(1-x)(2d+5e+8f+11g)-\frac{1}{432}\log(2-x)(35d+58e+92$$

Antiderivative was successfully verified.

```
[In] Int[((2 + x)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (d + e + f + g)/(12*(1 - x)) + (d + 2*e + 4*f + 8*g)/(36*(2 - x)) - (d - e
+ f - g)/(36*(1 + x)) + ((2*d + 5*e + 8*f + 11*g)*Log[1 - x])/36 - ((35*d +
 58*e + 92*f + 136*g)*Log[2 - x])/432 + ((2*d + e - 4*f + 7*g)*Log[1 + x])/
108 + ((d - 2*e + 4*f - 8*g)*Log[2 + x])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6742

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}
\int \frac{(2+x)\left(d+ex+fx^2+gx^3\right)}{\left(4-5x^2+x^4\right)^2}\,dx &= \int \frac{d+ex+fx^2+gx^3}{(2+x)\left(2-x-2x^2+x^3\right)^2}\,dx\\
&= \int \left(\frac{d+2e+4f+8g}{36(-2+x)^2}+\frac{-35d-58e-92f-136g}{432(-2+x)}+\frac{d+e+f+g}{12(-1+x)^2}+\frac{2d
\right.\\
&= \frac{d+e+f+g}{12(1-x)}+\frac{d+2e+4f+8g}{36(2-x)}-\frac{d-e+f-g}{36(1+x)}+\frac{1}{36}(2d+5e+8f+
\end{aligned}$$

Mathematica [A] time = 0.07, size = 144, normalized size = 1.02

$$\frac{1}{432}\left(\frac{12\left(d\left(-5x^2+6x+5\right)+2\left(e\left(5-2x^2\right)+f\left(-4x^2+3x+4\right)+g\left(8-5x^2\right)\right)\right)}{x^3-2x^2-x+2}+12\log(1-x)(2d+5e+8f\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + x)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] ((12*(d*(5 + 6*x - 5*x^2) + 2*(g*(8 - 5*x^2) + f*(4 + 3*x - 4*x^2) + e*(5 -
 2*x^2))))/(2 - x - 2*x^2 + x^3) + 12*(2*d + 5*e + 8*f + 11*g)*Log[1 - x] -
 (35*d + 58*e + 92*f + 136*g)*Log[2 - x] + 4*(2*d + e - 4*f + 7*g)*Log[1 +
x] + 3*(d - 2*e + 4*f - 8*g)*Log[2 + x])/432
```

fricas [B] time = 2.53, size = 321, normalized size = 2.28

$$-\frac{12\left(5d+4e+8f+10g\right)x^2-72\left(d+f\right)x-3\left(\left(d-2e+4f-8g\right)x^3-2\left(d-2e+4f-8g\right)x^2-\left(d-2e+4\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")
```

```
[Out] -1/432*(12*(5*d + 4*e + 8*f + 10*g)*x^2 - 72*(d + f)*x - 3*((d - 2*e + 4*f
- 8*g)*x^3 - 2*(d - 2*e + 4*f - 8*g)*x^2 - (d - 2*e + 4*f - 8*g)*x + 2*d -
4*e + 8*f - 16*g)*log(x + 2) - 4*((2*d + e - 4*f + 7*g)*x^3 - 2*(2*d + e -
4*f + 7*g)*x^2 - (2*d + e - 4*f + 7*g)*x + 4*d + 2*e - 8*f + 14*g)*log(x +
1) - 12*((2*d + 5*e + 8*f + 11*g)*x^3 - 2*(2*d + 5*e + 8*f + 11*g)*x^2 - (2
*d + 5*e + 8*f + 11*g)*x + 4*d + 10*e + 16*f + 22*g)*log(x - 1) + ((35*d +
58*e + 92*f + 136*g)*x^3 - 2*(35*d + 58*e + 92*f + 136*g)*x^2 - (35*d + 58*
e + 92*f + 136*g)*x + 70*d + 116*e + 184*f + 272*g)*log(x - 2) - 60*d - 120
*e - 96*f - 192*g)/(x^3 - 2*x^2 - x + 2)
```

giac [A] time = 0.32, size = 136, normalized size = 0.96

$$\frac{1}{144}\left(d+4f-8g-2e\right)\log\left(|x+2|\right)+\frac{1}{108}\left(2d-4f+7g+e\right)\log\left(|x+1|\right)+\frac{1}{36}\left(2d+8f+11g+5e\right)\log\left(|x-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")
```

```
[Out] 1/144*(d + 4*f - 8*g - 2*e)*log(abs(x + 2)) + 1/108*(2*d - 4*f + 7*g + e)*l
og(abs(x + 1)) + 1/36*(2*d + 8*f + 11*g + 5*e)*log(abs(x - 1)) - 1/432*(35*
d + 92*f + 136*g + 58*e)*log(abs(x - 2)) - 1/36*((5*d + 8*f + 10*g + 4*e)*x
^2 - 6*(d + f)*x - 5*d - 8*f - 16*g - 10*e)/((x + 1)*(x - 1)*(x - 2))
```

maple [A] time = 0.02, size = 210, normalized size = 1.49

$$\frac{11g\ln\left(x-1\right)}{36}-\frac{g\ln\left(x+2\right)}{18}-\frac{17g\ln\left(x-2\right)}{54}+\frac{7g\ln\left(x+1\right)}{108}+\frac{d\ln\left(x+2\right)}{144}-\frac{e\ln\left(x+2\right)}{72}+\frac{5e\ln\left(x-1\right)}{36}+\frac{d\ln\left(x-1\right)}{18}+\frac{e}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 11/36*g*ln(x-1)-1/18*g*ln(x+2)-17/54*g*ln(x-2)+7/108*g*ln(x+1)+1/144*d*ln(x
+2)-1/72*e*ln(x+2)+5/36*e*ln(x-1)+1/18*d*ln(x-1)+1/108*e*ln(x+1)+1/54*d*ln(
x+1)-35/432*d*ln(x-2)-29/216*e*ln(x-2)-23/108*f*ln(x-2)-1/27*f*ln(x+1)+2/9*
f*ln(x-1)+1/36*f*ln(x+2)+1/36/(x+1)*g-1/12/(x-1)*g-2/9/(x-2)*g-1/36/(x-2)*d
-1/18/(x-2)*e-1/36/(x+1)*d+1/36/(x+1)*e-1/12/(x-1)*d-1/12/(x-1)*e-1/12/(x-1
)*f-1/9/(x-2)*f-1/36/(x+1)*f
```

maxima [A] time = 0.45, size = 126, normalized size = 0.89

$$\frac{1}{144}\left(d-2e+4f-8g\right)\log\left(x+2\right)+\frac{1}{108}\left(2d+e-4f+7g\right)\log\left(x+1\right)+\frac{1}{36}\left(2d+5e+8f+11g\right)\log\left(x-1\right)-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")
```

```
[Out] 1/144*(d - 2*e + 4*f - 8*g)*log(x + 2) + 1/108*(2*d + e - 4*f + 7*g)*log(x
+ 1) + 1/36*(2*d + 5*e + 8*f + 11*g)*log(x - 1) - 1/432*(35*d + 58*e + 92*f
 + 136*g)*log(x - 2) - 1/36*((5*d + 4*e + 8*f + 10*g)*x^2 - 6*(d + f)*x - 5
*d - 10*e - 8*f - 16*g)/(x^3 - 2*x^2 - x + 2)
```

mupad [B] time = 0.88, size = 131, normalized size = 0.93

$$\ln(x-1)\left(\frac{d}{18}+\frac{5e}{36}+\frac{2f}{9}+\frac{11g}{36}\right)+\ln(x+2)\left(\frac{d}{144}-\frac{e}{72}+\frac{f}{36}-\frac{g}{18}\right)+\ln(x+1)\left(\frac{d}{54}+\frac{e}{108}-\frac{f}{27}+\frac{7g}{108}\right)-\ln$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x + 2)*(d + e*x + f*x^2 + g*x^3))/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 1)*(d/18 + (5*e)/36 + (2*f)/9 + (11*g)/36) + log(x + 2)*(d/144 - e/
72 + f/36 - g/18) + log(x + 1)*(d/54 + e/108 - f/27 + (7*g)/108) - log(x -
2)*((35*d)/432 + (29*e)/216 + (23*f)/108 + (17*g)/54) - ((5*d)/36 + (5*e)/1
8 + (2*f)/9 + (4*g)/9 - x^2*((5*d)/36 + e/9 + (2*f)/9 + (5*g)/18) + x*(d/6
+ f/6))/(x + 2*x^2 - x^3 - 2)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

3.101 $\int \frac{(2+x)\left(d+ex+fx^2+gx^3+hx^4\right)}{\left(4-5x^2+x^4\right)^2}\,dx$

Optimal. Leaf size=158

$$-\frac{d-e+f-g+h}{36(x+1)}+\frac{d+e+f+g+h}{12(1-x)}+\frac{d+2e+4f+8g+16h}{36(2-x)}+\frac{1}{36}\log(1-x)(2d+5e+8f+11g+14h)-\frac{1}{432}\log(2$$

```
[Out] 1/12*(d+e+f+g+h)/(1-x)+1/36*(d+2*e+4*f+8*g+16*h)/(2-x)+1/36*(-d+e-f+g-h)/(1
+x)+1/36*(2*d+5*e+8*f+11*g+14*h)*ln(1-x)-1/432*(35*d+58*e+92*f+136*g+176*h)
*ln(2-x)+1/108*(2*d+e-4*f+7*g-10*h)*ln(1+x)+1/144*(d-2*e+4*f-8*g+16*h)*ln(2
+x)
```

Rubi [A] time = 0.29, antiderivative size = 158, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056, Rules used = {1586, 6742}

$$-\frac{d-e+f-g+h}{36(x+1)}+\frac{d+e+f+g+h}{12(1-x)}+\frac{d+2e+4f+8g+16h}{36(2-x)}+\frac{1}{36}\log(1-x)(2d+5e+8f+11g+14h)-\frac{1}{432}\log(2$$

Antiderivative was successfully verified.

```
[In] Int[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4)^2,x]
```

```
[Out] (d + e + f + g + h)/(12*(1 - x)) + (d + 2*e + 4*f + 8*g + 16*h)/(36*(2 - x)
) - (d - e + f - g + h)/(36*(1 + x)) + ((2*d + 5*e + 8*f + 11*g + 14*h)*Log
[1 - x])/36 - ((35*d + 58*e + 92*f + 136*g + 176*h)*Log[2 - x])/432 + ((2*d
 + e - 4*f + 7*g - 10*h)*Log[1 + x])/108 + ((d - 2*e + 4*f - 8*g + 16*h)*Lo
g[2 + x])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6742

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\int \frac{(2+x)\left(d+ex+fx^2+gx^3+hx^4\right)}{\left(4-5x^2+x^4\right)^2}\,dx = \int \frac{d+ex+fx^2+gx^3+hx^4}{(2+x)\left(2-x-2x^2+x^3\right)^2}\,dx$$
$$= \int \left(\frac{d+2e+4f+8g+16h}{36(-2+x)^2}+\frac{-35d-58e-92f-136g-176h}{432(-2+x)}+\frac{d}{}\right.$$
$$= \frac{d+e+f+g+h}{12(1-x)}+\frac{d+2e+4f+8g+16h}{36(2-x)}-\frac{d-e+f-g+h}{36(1+x)}+\frac{1}{3}$$

Mathematica [A] time = 0.09, size = 169, normalized size = 1.07

$$\frac{1}{432}\left(\frac{12\left(d\left(-5x^2+6x+5\right)+2\left(e\left(5-2x^2\right)+f\left(-4x^2+3x+4\right)-5gx^2+8g-10hx^2+3hx+10h\right)\right)}{x^3-2x^2-x+2}+12\log(1\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4)^2,x
]
```

```
[Out] ((12*(d*(5 + 6*x - 5*x^2) + 2*(8*g + 10*h + 3*h*x - 5*g*x^2 - 10*h*x^2 + f*
(4 + 3*x - 4*x^2) + e*(5 - 2*x^2))))/(2 - x - 2*x^2 + x^3) + 12*(2*d + 5*e
+ 8*f + 11*g + 14*h)*Log[1 - x] - (35*d + 58*e + 92*f + 136*g + 176*h)*Log[
2 - x] + 4*(2*d + e - 4*f + 7*g - 10*h)*Log[1 + x] + 3*(d - 2*e + 4*f - 8*g
 + 16*h)*Log[2 + x])/432
```

fricas [B] time = 12.11, size = 376, normalized size = 2.38

$$-\frac{12\left(5d+4e+8f+10g+20h\right)x^2-72\left(d+f+h\right)x-3\left(\left(d-2e+4f-8g+16h\right)x^3-2\left(d-2e+4f-\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fri
cas")
```

```
[Out] -1/432*(12*(5*d + 4*e + 8*f + 10*g + 20*h)*x^2 - 72*(d + f + h)*x - 3*((d -
 2*e + 4*f - 8*g + 16*h)*x^3 - 2*(d - 2*e + 4*f - 8*g + 16*h)*x^2 - (d - 2*
e + 4*f - 8*g + 16*h)*x + 2*d - 4*e + 8*f - 16*g + 32*h)*log(x + 2) - 4*((2
*d + e - 4*f + 7*g - 10*h)*x^3 - 2*(2*d + e - 4*f + 7*g - 10*h)*x^2 - (2*d
+ e - 4*f + 7*g - 10*h)*x + 4*d + 2*e - 8*f + 14*g - 20*h)*log(x + 1) - 12*
((2*d + 5*e + 8*f + 11*g + 14*h)*x^3 - 2*(2*d + 5*e + 8*f + 11*g + 14*h)*x^
2 - (2*d + 5*e + 8*f + 11*g + 14*h)*x + 4*d + 10*e + 16*f + 22*g + 28*h)*lo
g(x - 1) + ((35*d + 58*e + 92*f + 136*g + 176*h)*x^3 - 2*(35*d + 58*e + 92*
f + 136*g + 176*h)*x^2 - (35*d + 58*e + 92*f + 136*g + 176*h)*x + 70*d + 11
6*e + 184*f + 272*g + 352*h)*log(x - 2) - 60*d - 120*e - 96*f - 192*g - 240
*h)/(x^3 - 2*x^2 - x + 2)
```

giac [A] time = 0.37, size = 155, normalized size = 0.98

$$\frac{1}{144}\left(d+4f-8g+16h-2e\right)\log\left(|x+2|\right)+\frac{1}{108}\left(2d-4f+7g-10h+e\right)\log\left(|x+1|\right)+\frac{1}{36}\left(2d+8f+11g\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="gia
c")
```

```
[Out] 1/144*(d + 4*f - 8*g + 16*h - 2*e)*log(abs(x + 2)) + 1/108*(2*d - 4*f + 7*g
 - 10*h + e)*log(abs(x + 1)) + 1/36*(2*d + 8*f + 11*g + 14*h + 5*e)*log(abs
(x - 1)) - 1/432*(35*d + 92*f + 136*g + 176*h + 58*e)*log(abs(x - 2)) - 1/3
6*((5*d + 8*f + 10*g + 20*h + 4*e)*x^2 - 6*(d + f + h)*x - 5*d - 8*f - 16*g
 - 20*h - 10*e)/((x + 1)*(x - 1)*(x - 2))
```

maple [A] time = 0.02, size = 262, normalized size = 1.66

$$\frac{h\ln(x+2)}{9}+\frac{7h\ln(x-1)}{18}-\frac{5h\ln(x+1)}{54}-\frac{11h\ln(x-2)}{27}+\frac{11g\ln(x-1)}{36}-\frac{g\ln(x+2)}{18}-\frac{17g\ln(x-2)}{54}+\frac{7g\ln(x}{108}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] 1/9*h*ln(x+2)+7/18*h*ln(x-1)-5/54*h*ln(x+1)-11/27*h*ln(x-2)+11/36*g*ln(x-1)
-1/18*g*ln(x+2)-17/54*g*ln(x-2)+7/108*g*ln(x+1)+1/144*d*ln(x+2)-1/72*e*ln(x
+2)+5/36*e*ln(x-1)+1/18*d*ln(x-1)+1/108*e*ln(x+1)+1/54*d*ln(x+1)-35/432*d*l
n(x-2)-29/216*e*ln(x-2)-23/108*f*ln(x-2)-1/27*f*ln(x+1)+2/9*f*ln(x-1)+1/36*
```

```
f*ln(x+2)-1/36/(x+1)*h-1/12/(x-1)*h-4/9/(x-2)*h+1/36/(x+1)*g-1/12/(x-1)*g-2
/9/(x-2)*g-1/36/(x-2)*d-1/18/(x-2)*e-1/36/(x+1)*d+1/36/(x+1)*e-1/12/(x-1)*d
-1/12/(x-1)*e-1/12/(x-1)*f-1/9/(x-2)*f-1/36/(x+1)*f
```

maxima [A] time = 0.45, size = 145, normalized size = 0.92

$$\frac{1}{144}\left(d-2e+4f-8g+16h\right)\log\left(x+2\right)+\frac{1}{108}\left(2d+e-4f+7g-10h\right)\log\left(x+1\right)+\frac{1}{36}\left(2d+5e+8f+11g\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="max
ima")
```

```
[Out] 1/144*(d - 2*e + 4*f - 8*g + 16*h)*log(x + 2) + 1/108*(2*d + e - 4*f + 7*g
- 10*h)*log(x + 1) + 1/36*(2*d + 5*e + 8*f + 11*g + 14*h)*log(x - 1) - 1/43
2*(35*d + 58*e + 92*f + 136*g + 176*h)*log(x - 2) - 1/36*((5*d + 4*e + 8*f
+ 10*g + 20*h)*x^2 - 6*(d + f + h)*x - 5*d - 10*e - 8*f - 16*g - 20*h)/(x^3
 - 2*x^2 - x + 2)
```

mupad [B] time = 1.39, size = 152, normalized size = 0.96

$$\ln\left(x-1\right)\left(\frac{d}{18}+\frac{5e}{36}+\frac{2f}{9}+\frac{11g}{36}+\frac{7h}{18}\right)-\frac{\left(-\frac{5d}{36}-\frac{e}{9}-\frac{2f}{9}-\frac{5g}{18}-\frac{5h}{9}\right)x^2+\left(\frac{d}{6}+\frac{f}{6}+\frac{h}{6}\right)x+\frac{5d}{36}+\frac{5e}{18}+\frac{2f}{9}+\frac{4g}{9}+}{-x^3+2x^2+x-2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 1)*(d/18 + (5*e)/36 + (2*f)/9 + (11*g)/36 + (7*h)/18) - ((5*d)/36 +
 (5*e)/18 + (2*f)/9 + (4*g)/9 + (5*h)/9 - x^2*((5*d)/36 + e/9 + (2*f)/9 + (
5*g)/18 + (5*h)/9) + x*(d/6 + f/6 + h/6))/(x + 2*x^2 - x^3 - 2) + log(x + 2
)*(d/144 - e/72 + f/36 - g/18 + h/9) + log(x + 1)*(d/54 + e/108 - f/27 + (7
*g)/108 - (5*h)/54) - log(x - 2)*((35*d)/432 + (29*e)/216 + (23*f)/108 + (1
7*g)/54 + (11*h)/27)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

3.102 $\int \frac{(2+x)\left(d+ex+fx^2+gx^3+hx^4+ix^5\right)}{\left(4-5x^2+x^4\right)^2}\,dx$

Optimal. Leaf size=177

$$-\frac{d-e+f-g+h-i}{36(x+1)}+\frac{d+e+f+g+h+i}{12(1-x)}+\frac{d+2e+4f+8g+16h+32i}{36(2-x)}+\frac{1}{36}\log(1-x)(2d+5e+8f+11g+1$$

```
[Out] 1/12*(d+e+f+g+h+i)/(1-x)+1/36*(d+2*e+4*f+8*g+16*h+32*i)/(2-x)+1/36*(-d+e-f+
g-h+i)/(1+x)+1/36*(2*d+5*e+8*f+11*g+14*h+17*i)*ln(1-x)-1/432*(35*d+58*e+92*
f+136*g+176*h+160*i)*ln(2-x)+1/108*(2*d+e-4*f+7*g-10*h+13*i)*ln(1+x)+1/144*
(d-2*e+4*f-8*g+16*h-32*i)*ln(2+x)
```

Rubi [A] time = 0.34, antiderivative size = 177, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 41, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.049, Rules used = {1586, 6742}

$$-\frac{d-e+f-g+h-i}{36(x+1)}+\frac{d+e+f+g+h+i}{12(1-x)}+\frac{d+2e+4f+8g+16h+32i}{36(2-x)}+\frac{1}{36}\log(1-x)(2d+5e+8f+11g+1$$

Antiderivative was successfully verified.

```
[In] Int[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 + x^4)^2
,x]
```

```
[Out] (d + e + f + g + h + i)/(12*(1 - x)) + (d + 2*e + 4*f + 8*g + 16*h + 32*i)/
(36*(2 - x)) - (d - e + f - g + h - i)/(36*(1 + x)) + ((2*d + 5*e + 8*f + 1
1*g + 14*h + 17*i)*Log[1 - x])/36 - ((35*d + 58*e + 92*f + 136*g + 176*h +
160*i)*Log[2 - x])/432 + ((2*d + e - 4*f + 7*g - 10*h + 13*i)*Log[1 + x])/1
08 + ((d - 2*e + 4*f - 8*g + 16*h - 32*i)*Log[2 + x])/144
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
 EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 6742

```
Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]
]
```

Rubi steps

$$\begin{aligned}\int \frac{(2+x)\left(d+ex+fx^2+gx^3+hx^4+102x^5\right)}{\left(4-5x^2+x^4\right)^2}\,dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+102x^5}{(2+x)\left(2-x-2x^2+x^3\right)^2}\,dx\\ &= \int \left(\frac{3264+d+2e+4f+8g+16h}{36(-2+x)^2}+\frac{-16320-35d-58}{432}\right.\\ &= \frac{102+d+e+f+g+h}{12(1-x)}+\frac{3264+d+2e+4f+8g+16}{36(2-x)}\end{aligned}$$

Mathematica [A] time = 0.11, size = 195, normalized size = 1.10

$$\frac{-5dx^2+6dx+5d-4ex^2+10e-8fx^2+6fx+8f-10gx^2+16g-20hx^2+6hx+20h-34ix^2+40i}{36\left(x^3-2x^2-x+2\right)}+\frac{1}{36}\log$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 +
x^4)^2,x]
```

```
[Out] (5*d + 10*e + 8*f + 16*g + 20*h + 40*i + 6*d*x + 6*f*x + 6*h*x - 5*d*x^2 -
4*e*x^2 - 8*f*x^2 - 10*g*x^2 - 20*h*x^2 - 34*i*x^2)/(36*(2 - x - 2*x^2 + x^
3)) + ((2*d + 5*e + 8*f + 11*g + 14*h + 17*i)*Log[1 - x])/36 + ((-35*d - 58
*e - 92*f - 136*g - 176*h - 160*i)*Log[2 - x])/432 + ((2*d + e - 4*f + 7*g
- 10*h + 13*i)*Log[1 + x])/108 + ((d - 2*e + 4*f - 8*g + 16*h - 32*i)*Log[2
 + x])/144
```

fricas [B] time = 70.99, size = 430, normalized size = 2.43

$$-\frac{12\left(5d+4e+8f+10g+20h+34i\right)x^2-72\left(d+f+h\right)x-3\left(\left(d-2e+4f-8g+16h-32i\right)x^3-2\left(d-2\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorith
m="fricas")
```

```
[Out] -1/432*(12*(5*d + 4*e + 8*f + 10*g + 20*h + 34*i)*x^2 - 72*(d + f + h)*x -
3*((d - 2*e + 4*f - 8*g + 16*h - 32*i)*x^3 - 2*(d - 2*e + 4*f - 8*g + 16*h
- 32*i)*x^2 - (d - 2*e + 4*f - 8*g + 16*h - 32*i)*x + 2*d - 4*e + 8*f - 16*
g + 32*h - 64*i)*log(x + 2) - 4*((2*d + e - 4*f + 7*g - 10*h + 13*i)*x^3 -
2*(2*d + e - 4*f + 7*g - 10*h + 13*i)*x^2 - (2*d + e - 4*f + 7*g - 10*h + 1
3*i)*x + 4*d + 2*e - 8*f + 14*g - 20*h + 26*i)*log(x + 1) - 12*((2*d + 5*e
+ 8*f + 11*g + 14*h + 17*i)*x^3 - 2*(2*d + 5*e + 8*f + 11*g + 14*h + 17*i)*
x^2 - (2*d + 5*e + 8*f + 11*g + 14*h + 17*i)*x + 4*d + 10*e + 16*f + 22*g +
 28*h + 34*i)*log(x - 1) + ((35*d + 58*e + 92*f + 136*g + 176*h + 160*i)*x^
3 - 2*(35*d + 58*e + 92*f + 136*g + 176*h + 160*i)*x^2 - (35*d + 58*e + 92*
f + 136*g + 176*h + 160*i)*x + 70*d + 116*e + 184*f + 272*g + 352*h + 320*i
)*log(x - 2) - 60*d - 120*e - 96*f - 192*g - 240*h - 480*i)/(x^3 - 2*x^2 -
x + 2)
```

giac [A] time = 0.43, size = 173, normalized size = 0.98

$$\frac{1}{144}\left(d+4f-8g+16h-32i-2e\right)\log\left(|x+2|\right)+\frac{1}{108}\left(2d-4f+7g-10h+13i+e\right)\log\left(|x+1|\right)+\frac{1}{36}\left(2d+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorith
m="giac")
```

```
[Out] 1/144*(d + 4*f - 8*g + 16*h - 32*i - 2*e)*log(abs(x + 2)) + 1/108*(2*d - 4*
f + 7*g - 10*h + 13*i + e)*log(abs(x + 1)) + 1/36*(2*d + 8*f + 11*g + 14*h
+ 17*i + 5*e)*log(abs(x - 1)) - 1/432*(35*d + 92*f + 136*g + 176*h + 160*i
+ 58*e)*log(abs(x - 2)) - 1/36*((5*d + 8*f + 10*g + 20*h + 34*i + 4*e)*x^2
- 6*(d + f + h)*x - 5*d - 8*f - 16*g - 20*h - 40*i - 10*e)/((x + 1)*(x - 1)
*(x - 2))
```

maple [A] time = 0.02, size = 314, normalized size = 1.77

$$-\frac{2i\ln\left(x+2\right)}{9}+\frac{17i\ln\left(x-1\right)}{36}+\frac{13i\ln\left(x+1\right)}{108}-\frac{10i\ln\left(x-2\right)}{27}+\frac{h\ln\left(x+2\right)}{9}+\frac{7h\ln\left(x-1\right)}{18}-\frac{5h\ln\left(x+1\right)}{54}-\frac{11h\ln\left(x-\right.}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)
```

```
[Out] -2/9*i*ln(x+2)+17/36*i*ln(x-1)+13/108*i*ln(x+1)-10/27*i*ln(x-2)+1/9*h*ln(x+
2)+7/18*h*ln(x-1)-5/54*h*ln(x+1)-11/27*h*ln(x-2)+11/36*g*ln(x-1)-1/18*g*ln(
x+2)-17/54*g*ln(x-2)+7/108*g*ln(x+1)+1/144*d*ln(x+2)-1/72*e*ln(x+2)+5/36*e*
ln(x-1)+1/18*d*ln(x-1)+1/108*e*ln(x+1)+1/54*d*ln(x+1)-35/432*d*ln(x-2)-29/2
16*e*ln(x-2)-23/108*f*ln(x-2)-1/27*f*ln(x+1)+2/9*f*ln(x-1)+1/36*f*ln(x+2)+1
/36/(x+1)*i-1/12/(x-1)*i-8/9/(x-2)*i-1/36/(x+1)*h-1/12/(x-1)*h-4/9/(x-2)*h+
1/36/(x+1)*g-1/12/(x-1)*g-2/9/(x-2)*g-1/36/(x-2)*d-1/18/(x-2)*e-1/36/(x+1)*
d+1/36/(x+1)*e-1/12/(x-1)*d-1/12/(x-1)*e-1/12/(x-1)*f-1/9/(x-2)*f-1/36/(x+1
)*f
```

maxima [A] time = 0.46, size = 163, normalized size = 0.92

$$\frac{1}{144}\left(d-2e+4f-8g+16h-32i\right)\log\left(x+2\right)+\frac{1}{108}\left(2d+e-4f+7g-10h+13i\right)\log\left(x+1\right)+\frac{1}{36}\left(2d+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorith
m="maxima")
```

```
[Out] 1/144*(d - 2*e + 4*f - 8*g + 16*h - 32*i)*log(x + 2) + 1/108*(2*d + e - 4*f
 + 7*g - 10*h + 13*i)*log(x + 1) + 1/36*(2*d + 5*e + 8*f + 11*g + 14*h + 17
*i)*log(x - 1) - 1/432*(35*d + 58*e + 92*f + 136*g + 176*h + 160*i)*log(x -
 2) - 1/36*((5*d + 4*e + 8*f + 10*g + 20*h + 34*i)*x^2 - 6*(d + f + h)*x -
5*d - 10*e - 8*f - 16*g - 20*h - 40*i)/(x^3 - 2*x^2 - x + 2)
```

mupad [B] time = 1.75, size = 170, normalized size = 0.96

$$\ln\left(x-1\right)\left(\frac{d}{18}+\frac{5e}{36}+\frac{2f}{9}+\frac{11g}{36}+\frac{7h}{18}+\frac{17i}{36}\right)+\ln\left(x+2\right)\left(\frac{d}{144}-\frac{e}{72}+\frac{f}{36}-\frac{g}{18}+\frac{h}{9}-\frac{2i}{9}\right)+\ln\left(x+1\right)\left(\frac{d}{54}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(x^4 - 5*x^2 + 4)^2
,x)
```

```
[Out] log(x - 1)*(d/18 + (5*e)/36 + (2*f)/9 + (11*g)/36 + (7*h)/18 + (17*i)/36) +
 log(x + 2)*(d/144 - e/72 + f/36 - g/18 + h/9 - (2*i)/9) + log(x + 1)*(d/54
 + e/108 - f/27 + (7*g)/108 - (5*h)/54 + (13*i)/108) - log(x - 2)*((35*d)/4
32 + (29*e)/216 + (23*f)/108 + (17*g)/54 + (11*h)/27 + (10*i)/27) - ((5*d)/
36 + (5*e)/18 + (2*f)/9 + (4*g)/9 + (5*h)/9 + (10*i)/9 - x^2*((5*d)/36 + e/
9 + (2*f)/9 + (5*g)/18 + (5*h)/9 + (17*i)/18) + x*(d/6 + f/6 + h/6))/(x + 2
*x^2 - x^3 - 2)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

3.103 $\int \left(d+ex+fx^2+gx^3\right)\left(a+bx^2+cx^4\right)^{3/2}\,dx$

Optimal. Leaf size=717

$$-\frac{x\sqrt{a+bx^2+cx^4}\left(-84a^2c^2f+57ab^2cf-144abc^2d-8b^4f+18b^3cd\right)}{315c^{5/2}\left(\sqrt{a}+\sqrt{c}\,x^2\right)}-\frac{\sqrt[4]{a}\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\left(-84a^2c\right.}{}$$

```
[Out] 1/32*(-b*g+2*c*e)*(2*c*x^2+b)*(c*x^4+b*x^2+a)^(3/2)/c^2+1/63*x*(7*c*f*x^2+3
*b*f+9*c*d)*(c*x^4+b*x^2+a)^(3/2)/c+1/10*g*(c*x^4+b*x^2+a)^(5/2)/c+3/512*(-
4*a*c+b^2)^2*(-b*g+2*c*e)*arctanh(1/2*(2*c*x^2+b)/c^(1/2)/(c*x^4+b*x^2+a)^(
1/2))/c^(7/2)-3/256*(-4*a*c+b^2)*(-b*g+2*c*e)*(2*c*x^2+b)*(c*x^4+b*x^2+a)^(
1/2)/c^3+1/315*x*(9*b^2*c*d+90*a*c^2*d-4*b^3*f+9*a*b*c*f+3*c*(14*a*c*f-4*b^
2*f+9*b*c*d)*x^2)*(c*x^4+b*x^2+a)^(1/2)/c^2-1/315*(-84*a^2*c^2*f+57*a*b^2*c
*f-144*a*b*c^2*d-8*b^4*f+18*b^3*c*d)*x*(c*x^4+b*x^2+a)^(1/2)/c^(5/2)/(a^(1/
2)+x^2*c^(1/2))+1/315*a^(1/4)*(-84*a^2*c^2*f+57*a*b^2*c*f-144*a*b*c^2*d-8*b
^4*f+18*b^3*c*d)*(cos(2*arctan(c^(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arctan(c^
(1/4)*x/a^(1/4)))*EllipticE(sin(2*arctan(c^(1/4)*x/a^(1/4))),1/2*(2-b/a^(1/
2)/c^(1/2))^(1/2))*(a^(1/2)+x^2*c^(1/2))*((c*x^4+b*x^2+a)/(a^(1/2)+x^2*c^(1
/2))^2)^(1/2)/c^(11/4)/(c*x^4+b*x^2+a)^(1/2)-1/630*a^(1/4)*(cos(2*arctan(c^
(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arctan(c^(1/4)*x/a^(1/4)))*EllipticF(sin(2
*arctan(c^(1/4)*x/a^(1/4))),1/2*(2-b/a^(1/2)/c^(1/2))^(1/2))*(a^(1/2)+x^2*c
^(1/2))*(18*b^3*c*d-144*a*b*c^2*d-8*b^4*f+57*a*b^2*c*f-84*a^2*c^2*f+(24*a*b
*c*f-180*a*c^2*d-4*b^3*f+9*b^2*c*d)*a^(1/2)*c^(1/2))*((c*x^4+b*x^2+a)/(a^(1
/2)+x^2*c^(1/2))^2)^(1/2)/c^(11/4)/(c*x^4+b*x^2+a)^(1/2)
```

Rubi [A] time = 0.60, antiderivative size = 717, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 10, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.312$, Rules used = {1673, 1176, 1197, 1103, 1195, 1247, 640, 612, 621, 206}

$$-\frac{x\sqrt{a+bx^2+cx^4}\left(-84a^2c^2f+57ab^2cf-144abc^2d+18b^3cd-8b^4f\right)}{315c^{5/2}\left(\sqrt{a}+\sqrt{c}\,x^2\right)}-\frac{\sqrt[4]{a}\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\left(-84a^2c\right.}{}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4)^(3/2),x]
```

```
[Out] -((18*b^3*c*d - 144*a*b*c^2*d - 8*b^4*f + 57*a*b^2*c*f - 84*a^2*c^2*f)*x*Sq
rt[a + b*x^2 + c*x^4])/(315*c^(5/2)*(Sqrt[a] + Sqrt[c]*x^2)) - (3*(b^2 - 4*
a*c)*(2*c*e - b*g)*(b + 2*c*x^2)*Sqrt[a + b*x^2 + c*x^4])/(256*c^3) + (x*(9
*b^2*c*d + 90*a*c^2*d - 4*b^3*f + 9*a*b*c*f + 3*c*(9*b*c*d - 4*b^2*f + 14*a
*c*f)*x^2)*Sqrt[a + b*x^2 + c*x^4])/(315*c^2) + ((2*c*e - b*g)*(b + 2*c*x^2
)*(a + b*x^2 + c*x^4)^(3/2))/(32*c^2) + (x*(3*(3*c*d + b*f) + 7*c*f*x^2)*(a
 + b*x^2 + c*x^4)^(3/2))/(63*c) + (g*(a + b*x^2 + c*x^4)^(5/2))/(10*c) + (3
*(b^2 - 4*a*c)^2*(2*c*e - b*g)*ArcTanh[(b + 2*c*x^2)/(2*Sqrt[c]*Sqrt[a + b*
x^2 + c*x^4])])/(512*c^(7/2)) + (a^(1/4)*(18*b^3*c*d - 144*a*b*c^2*d - 8*b^
4*f + 57*a*b^2*c*f - 84*a^2*c^2*f)*(Sqrt[a] + Sqrt[c]*x^2)*Sqrt[(a + b*x^2
+ c*x^4)/(Sqrt[a] + Sqrt[c]*x^2)^2]*EllipticE[2*ArcTan[(c^(1/4)*x)/a^(1/4)]
, (2 - b/(Sqrt[a]*Sqrt[c]))/4])/(315*c^(11/4)*Sqrt[a + b*x^2 + c*x^4]) - (a
^(1/4)*(18*b^3*c*d - 144*a*b*c^2*d - 8*b^4*f + 57*a*b^2*c*f - 84*a^2*c^2*f
+ Sqrt[a]*Sqrt[c]*(9*b^2*c*d - 180*a*c^2*d - 4*b^3*f + 24*a*b*c*f))*(Sqrt[a
] + Sqrt[c]*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(Sqrt[a] + Sqrt[c]*x^2)^2]*Ellipt
icF[2*ArcTan[(c^(1/4)*x)/a^(1/4)], (2 - b/(Sqrt[a]*Sqrt[c]))/4])/(630*c^(11
/4)*Sqrt[a + b*x^2 + c*x^4])
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 612

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^p)/(2*c*(2*p + 1)), x] - Dist[(p*(b^2 - 4*a*c))/(2*c*(2
*p + 1)), Int[(a + b*x + c*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && N
eQ[b^2 - 4*a*c, 0] && GtQ[p, 0] && IntegerQ[4*p]
```

Rule 621

```
Int[1/Sqrt[(a_) + (b_.)*(x_) + (c_.)*(x_)^2], x_Symbol] :> Dist[2, Subst[In
t[1/(4*c - x^2), x], x, (b + 2*c*x)/Sqrt[a + b*x + c*x^2]], x] /; FreeQ[{a,
 b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 640

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

Rule 1103

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol] :> With[{q = Rt[c
/a, 4]}, Simp[((1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^2)^2)]*
EllipticF[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(2*q*Sqrt[a + b*x^2 + c*x^4]
), x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]
```

Rule 1176

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(2*b*e*p + c*d*(4*p + 3) + c*e*(4*p + 1)*x^2)*(a + b*x^2 + c
*x^4)^p)/(c*(4*p + 1)*(4*p + 3)), x] + Dist[(2*p)/(c*(4*p + 1)*(4*p + 3)),
Int[Simp[2*a*c*d*(4*p + 3) - a*b*e + (2*a*c*e*(4*p + 1) + b*c*d*(4*p + 3) -
 b^2*e*(2*p + 1))*x^2, x]*(a + b*x^2 + c*x^4)^(p - 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
GtQ[p, 0] && FractionQ[p] && IntegerQ[2*p]
```

Rule 1195

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbo
l] :> With[{q = Rt[c/a, 4]}, -Simp[(d*x*Sqrt[a + b*x^2 + c*x^4])/(a*(1 + q^
2*x^2)), x] + Simp[(d*(1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^
2)^2)]*EllipticE[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(q*Sqrt[a + b*x^2 + c
*x^4]), x] /; EqQ[e + d*q^2, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 -
4*a*c, 0] && PosQ[c/a]
```

Rule 1197

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbo
l] :> With[{q = Rt[c/a, 2]}, Dist[(e + d*q)/q, Int[1/Sqrt[a + b*x^2 + c*x^4
], x], x] - Dist[e/q, Int[(1 - q*x^2)/Sqrt[a + b*x^2 + c*x^4], x], x] /; Ne
Q[e + d*q, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[
c/a]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \left(d+ex+fx^2+gx^3\right)\left(a+bx^2+cx^4\right)^{3/2}dx = \int \left(d+fx^2\right)\left(a+bx^2+cx^4\right)^{3/2}dx + \int x\left(e+gx^2\right)\left(a+bx^2+cx\right.$$

$$= \frac{x\left(3(3cd+bf)+7cfx^2\right)\left(a+bx^2+cx^4\right)^{3/2}}{63c} + \frac{1}{2}\text{Subst}\left(\int (e+g\right.$$

$$= \frac{x\left(9b^2cd+90ac^2d-4b^3f+9abcf+3c\left(9bcd-4b^2f+14acf\right)x\right.}{315c^2}$$

$$= \frac{x\left(9b^2cd+90ac^2d-4b^3f+9abcf+3c\left(9bcd-4b^2f+14acf\right)x\right.}{315c^2}$$

$$= -\frac{\left(18b^3cd-144abc^2d-8b^4f+57ab^2cf-84a^2c^2f\right)x\sqrt{a+bx^2+}}{315c^{5/2}\left(\sqrt{a}+\sqrt{c}x^2\right)}$$

$$= -\frac{\left(18b^3cd-144abc^2d-8b^4f+57ab^2cf-84a^2c^2f\right)x\sqrt{a+bx^2+}}{315c^{5/2}\left(\sqrt{a}+\sqrt{c}x^2\right)}$$

$$= -\frac{\left(18b^3cd-144abc^2d-8b^4f+57ab^2cf-84a^2c^2f\right)x\sqrt{a+bx^2+}}{315c^{5/2}\left(\sqrt{a}+\sqrt{c}x^2\right)}$$

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

$Aborted

Verification is Not applicable to the result.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4)^(3/2),x]
[Out] $Aborted
```

fricas [F] time = 1.55, size = 0, normalized size = 0.00

$$\text{integral}\left(\left(cgx^7+cfx^6+\left(ce+bg\right)x^5+\left(cd+bf\right)x^4+\left(be+ag\right)x^3+aex+\left(bd+af\right)x^2+ad\right)\sqrt{cx^4+bx^2+a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((c*g*x^7 + c*f*x^6 + (c*e + b*g)*x^5 + (c*d + b*f)*x^4 + (b*e + a*
g)*x^3 + a*e*x + (b*d + a*f)*x^2 + a*d)*sqrt(c*x^4 + b*x^2 + a), x)
```

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

$$\int \left(cx^4 + bx^2 + a\right)^{\frac{3}{2}} \left(gx^3 + fx^2 + ex + d\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((c*x^4 + b*x^2 + a)^(3/2)*(g*x^3 + f*x^2 + e*x + d), x)
```

maple [B] time = 0.02, size = 3038, normalized size = 4.24

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(3/2),x)
```

```
[Out] 1/7*d*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))
/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1
/2)*EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4
*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))*a^2+2/15*f*a^3*2^(1/2)/((-b+(-4*a*c+b^2)^(
1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2
)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*Ellipt
icE(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^
(1/2))/a*b/c-4)^(1/2))-2/15*f*a^3*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)
*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2
+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*EllipticF(1/2*2^(1/2
)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4
)^(1/2))+19/210*f*a^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4
*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c
*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))/c*b^2*EllipticF(1/2*2^(1/2)*((-b
+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2
))-4/315*f*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)
^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^
2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*b^4/c^2*EllipticF(1/2*2^(1/2)*((-b+(-4*a*
c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))+4/31
5*f*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))
/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1
/2)/(b+(-4*a*c+b^2)^(1/2))*b^4/c^2*EllipticE(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^
(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))+1/35*d*a*2^
(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4
)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(
-4*a*c+b^2)^(1/2))*b^3/c*EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^
(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))-1/35*d*a*2^(1/2)/((-b
+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2
*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2
)^(1/2))*b^3/c*EllipticE(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/
2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))-19/210*f*a^2*2^(1/2)/((-b+(-4*a
*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-
4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2
))/c*b^2*EllipticE(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(
b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))+1/315*f/c^2*a*2^(1/2)/((-b+(-4*a*c+b^
2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c
+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)*EllipticF(1/2*2^(1/2)*((-
b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/
2))*b^3-1/140*d*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b
```

```
^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b
*x^2+a)^(1/2)*EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2
*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))*a/c*b^2-8/35*d*a^2*2^(1/2)/((-b+
(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*
(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)
^(1/2))*b*EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*
(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))+8/35*d*a^2*2^(1/2)/((-b+(-4*a*c+b^2)
^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b
^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*b*El
lipticE(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b
^2)^(1/2))/a*b/c-4)^(1/2))-2/105*f/c*a^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a
)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2)
)/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)*EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b
^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))*b+3/64*
g*a*b^3/c^(5/2)*ln((c*x^2+1/2*b)/c^(1/2)+(c*x^4+b*x^2+a)^(1/2))-5/64*g*a*b^
2/c^2*(c*x^4+b*x^2+a)^(1/2)+8/105*f/c*x*(c*x^4+b*x^2+a)^(1/2)*a*b+7/160*g*a
*b*x^2/c*(c*x^4+b*x^2+a)^(1/2)+5/16*e*a*x^2*(c*x^4+b*x^2+a)^(1/2)-3/128*e*b
^3/c^2*(c*x^4+b*x^2+a)^(1/2)+3/256*e*b^4/c^(5/2)*ln((c*x^2+1/2*b)/c^(1/2)+(
c*x^4+b*x^2+a)^(1/2))-3/512*g*b^5/c^(7/2)*ln((c*x^2+1/2*b)/c^(1/2)+(c*x^4+b
*x^2+a)^(1/2))+1/10*g*a^2/c*(c*x^4+b*x^2+a)^(1/2)+1/9*f*c*x^7*(c*x^4+b*x^2+
a)^(1/2)+10/63*f*b*x^5*(c*x^4+b*x^2+a)^(1/2)+11/45*f*x^3*(c*x^4+b*x^2+a)^(1
/2)*a+3/16*e*b*x^4*(c*x^4+b*x^2+a)^(1/2)+1/8*e*c*x^6*(c*x^4+b*x^2+a)^(1/2)+
3/16*e*a^2*ln((c*x^2+1/2*b)/c^(1/2)+(c*x^4+b*x^2+a)^(1/2))/c^(1/2)+1/7*d*c*
x^5*(c*x^4+b*x^2+a)^(1/2)+8/35*d*b*x^3*(c*x^4+b*x^2+a)^(1/2)+3/7*d*x*(c*x^4
+b*x^2+a)^(1/2)*a+1/5*g*a*x^4*(c*x^4+b*x^2+a)^(1/2)+3/256*g*b^4/c^3*(c*x^4+
b*x^2+a)^(1/2)+1/10*g*c*x^8*(c*x^4+b*x^2+a)^(1/2)+11/80*g*b*x^6*(c*x^4+b*x^
2+a)^(1/2)+1/160*g*b^2*x^4/c*(c*x^4+b*x^2+a)^(1/2)-1/128*g*b^3/c^2*x^2*(c*x
^4+b*x^2+a)^(1/2)-3/32*g*a^2*b/c^(3/2)*ln((c*x^2+1/2*b)/c^(1/2)+(c*x^4+b*x^
2+a)^(1/2))-3/32*e*a*b^2/c^(3/2)*ln((c*x^2+1/2*b)/c^(1/2)+(c*x^4+b*x^2+a)^(
1/2))+1/35*d/c*x*(c*x^4+b*x^2+a)^(1/2)*b^2+1/105*f/c*x^3*(c*x^4+b*x^2+a)^(1
/2)*b^2-4/315*f/c^2*x*(c*x^4+b*x^2+a)^(1/2)*b^3+1/64*e*b^2*x^2/c*(c*x^4+b*x
^2+a)^(1/2)+5/32*e*a*b/c*(c*x^4+b*x^2+a)^(1/2)
```

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

$$\int \left(cx^4 + bx^2 + a\right)^{\frac{3}{2}} \left(gx^3 + fx^2 + ex + d\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(3/2),x, algorithm="maxima")
[Out] integrate((c*x^4 + b*x^2 + a)^(3/2)*(g*x^3 + f*x^2 + e*x + d), x)
```

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

$$\int {\left(c\,x^4+b\,x^2+a\right)}^{3/2}\,\left(g\,x^3+f\,x^2+e\,x+d\right) \,d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*x^2 + c*x^4)^(3/2)*(d + e*x + f*x^2 + g*x^3),x)
[Out] int((a + b*x^2 + c*x^4)^(3/2)*(d + e*x + f*x^2 + g*x^3), x)
```

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

$$\int \left(a + bx^{2} + cx^{4}\right)^{\frac{3}{2}} \left(d + ex + fx^{2} + gx^{3}\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)*(c*x**4+b*x**2+a)**(3/2),x)
[Out] Integral((a + b*x**2 + c*x**4)**(3/2)*(d + e*x + f*x**2 + g*x**3), x)
```

3.104 $\int \left(d+ex+fx^2+gx^3\right)\sqrt{a+bx^2+cx^4}\,dx$

Optimal. Leaf size=505

$$\frac{x\sqrt{a+bx^2+cx^4}\left(6acf-2b^2f+5bcd\right)}{15c^{3/2}\left(\sqrt{a}+\sqrt{c}\,x^2\right)}-\frac{\sqrt[4]{a}\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\left(6acf-2b^2f+5bcd\right)E\left(2\tan^{-1}\left(\frac{\sqrt[4]{c}}{\sqrt[4]{a}}\right.\right.}{15c^{7/4}\sqrt{a+bx^2+cx^4}}$$

```
[Out] 1/6*g*(c*x^4+b*x^2+a)^(3/2)/c-1/32*(-4*a*c+b^2)*(-b*g+2*c*e)*arctanh(1/2*(2
*c*x^2+b)/c^(1/2)/(c*x^4+b*x^2+a)^(1/2))/c^(5/2)+1/16*(-b*g+2*c*e)*(2*c*x^2
+b)*(c*x^4+b*x^2+a)^(1/2)/c^2+1/15*x*(3*c*f*x^2+b*f+5*c*d)*(c*x^4+b*x^2+a)^
(1/2)/c+1/15*(6*a*c*f-2*b^2*f+5*b*c*d)*x*(c*x^4+b*x^2+a)^(1/2)/c^(3/2)/(a^(
1/2)+x^2*c^(1/2))-1/15*a^(1/4)*(6*a*c*f-2*b^2*f+5*b*c*d)*(cos(2*arctan(c^(1
/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arctan(c^(1/4)*x/a^(1/4)))*EllipticE(sin(2*a
rctan(c^(1/4)*x/a^(1/4))),1/2*(2-b/a^(1/2)/c^(1/2))^(1/2))*(a^(1/2)+x^2*c^(
1/2))*((c*x^4+b*x^2+a)/(a^(1/2)+x^2*c^(1/2))^2)^(1/2)/c^(7/4)/(c*x^4+b*x^2+
a)^(1/2)+1/30*a^(1/4)*(cos(2*arctan(c^(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arct
an(c^(1/4)*x/a^(1/4)))*EllipticF(sin(2*arctan(c^(1/4)*x/a^(1/4))),1/2*(2-b/
a^(1/2)/c^(1/2))^(1/2))*(a^(1/2)+x^2*c^(1/2))*(b+2*a^(1/2)*c^(1/2))*(5*c*d-
2*b*f+3*f*a^(1/2)*c^(1/2))*((c*x^4+b*x^2+a)/(a^(1/2)+x^2*c^(1/2))^2)^(1/2)/
c^(7/4)/(c*x^4+b*x^2+a)^(1/2)
```

Rubi [A] time = 0.28, antiderivative size = 505, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 10, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.312, Rules used = {1673, 1176, 1197, 1103, 1195, 1247, 640, 612, 621, 206}

$$\frac{x\sqrt{a+bx^2+cx^4}\left(6acf-2b^2f+5bcd\right)}{15c^{3/2}\left(\sqrt{a}+\sqrt{c}\,x^2\right)}-\frac{\sqrt[4]{a}\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\left(6acf-2b^2f+5bcd\right)E\left(2\tan^{-1}\left(\frac{\sqrt[4]{c}}{\sqrt[4]{a}}\right.\right.}{15c^{7/4}\sqrt{a+bx^2+cx^4}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)*Sqrt[a + b*x^2 + c*x^4],x]
```

```
[Out] ((5*b*c*d - 2*b^2*f + 6*a*c*f)*x*Sqrt[a + b*x^2 + c*x^4])/(15*c^(3/2)*(Sqrt
[a] + Sqrt[c]*x^2)) + ((2*c*e - b*g)*(b + 2*c*x^2)*Sqrt[a + b*x^2 + c*x^4])
/(16*c^2) + (x*(5*c*d + b*f + 3*c*f*x^2)*Sqrt[a + b*x^2 + c*x^4])/(15*c) +
(g*(a + b*x^2 + c*x^4)^(3/2))/(6*c) - ((b^2 - 4*a*c)*(2*c*e - b*g)*ArcTanh[
(b + 2*c*x^2)/(2*Sqrt[c]*Sqrt[a + b*x^2 + c*x^4])])/(32*c^(5/2)) - (a^(1/4)
*(5*b*c*d - 2*b^2*f + 6*a*c*f)*(Sqrt[a] + Sqrt[c]*x^2)*Sqrt[(a + b*x^2 + c*
x^4)/(Sqrt[a] + Sqrt[c]*x^2)^2]*EllipticE[2*ArcTan[(c^(1/4)*x)/a^(1/4)], (2
 - b/(Sqrt[a]*Sqrt[c]))/4])/(15*c^(7/4)*Sqrt[a + b*x^2 + c*x^4]) + (a^(1/4)
*(b + 2*Sqrt[a]*Sqrt[c])*(5*c*d - 2*b*f + 3*Sqrt[a]*Sqrt[c]*f)*(Sqrt[a] + S
qrt[c]*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(Sqrt[a] + Sqrt[c]*x^2)^2]*EllipticF[2
*ArcTan[(c^(1/4)*x)/a^(1/4)], (2 - b/(Sqrt[a]*Sqrt[c]))/4])/(30*c^(7/4)*Sqr
t[a + b*x^2 + c*x^4])
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 612

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^p)/(2*c*(2*p + 1)), x] - Dist[(p*(b^2 - 4*a*c))/(2*c*(2
*p + 1)), Int[(a + b*x + c*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && N
```

```
eQ[b^2 - 4*a*c, 0] && GtQ[p, 0] && IntegerQ[4*p]
```

Rule 621

```
Int[1/Sqrt[(a_) + (b_.)*(x_) + (c_.)*(x_)^2], x_Symbol] :> Dist[2, Subst[In
t[1/(4*c - x^2), x], x, (b + 2*c*x)/Sqrt[a + b*x + c*x^2]], x] /; FreeQ[{a,
 b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 640

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

Rule 1103

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol] :> With[{q = Rt[c
/a, 4]}, Simp[((1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^2)^2)]*
EllipticF[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(2*q*Sqrt[a + b*x^2 + c*x^4]
), x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]
```

Rule 1176

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(2*b*e*p + c*d*(4*p + 3) + c*e*(4*p + 1)*x^2)*(a + b*x^2 + c
*x^4)^p)/(c*(4*p + 1)*(4*p + 3)), x] + Dist[(2*p)/(c*(4*p + 1)*(4*p + 3)),
Int[Simp[2*a*c*d*(4*p + 3) - a*b*e + (2*a*c*e*(4*p + 1) + b*c*d*(4*p + 3) -
 b^2*e*(2*p + 1))*x^2, x]*(a + b*x^2 + c*x^4)^(p - 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
GtQ[p, 0] && FractionQ[p] && IntegerQ[2*p]
```

Rule 1195

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbo
l] :> With[{q = Rt[c/a, 4]}, -Simp[(d*x*Sqrt[a + b*x^2 + c*x^4])/(a*(1 + q^
2*x^2)), x] + Simp[(d*(1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^
2)^2)]*EllipticE[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(q*Sqrt[a + b*x^2 + c
*x^4]), x] /; EqQ[e + d*q^2, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 -
4*a*c, 0] && PosQ[c/a]
```

Rule 1197

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbo
l] :> With[{q = Rt[c/a, 2]}, Dist[(e + d*q)/q, Int[1/Sqrt[a + b*x^2 + c*x^4
], x], x] - Dist[e/q, Int[(1 - q*x^2)/Sqrt[a + b*x^2 + c*x^4], x], x] /; Ne
Q[e + d*q, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[
c/a]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
```

```
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int\left(d+ex+fx^2+gx^3\right)\sqrt{a+bx^2+cx^4}\,dx=\int\left(d+fx^2\right)\sqrt{a+bx^2+cx^4}\,dx+\int x\left(e+gx^2\right)\sqrt{a+bx^2+cx^4}$$

$$=\frac{x\left(5cd+bf+3cfx^2\right)\sqrt{a+bx^2+cx^4}}{15c}+\frac{1}{2}\text{Subst}\left(\int(e+gx)\sqrt{a}\right.$$

$$=\frac{x\left(5cd+bf+3cfx^2\right)\sqrt{a+bx^2+cx^4}}{15c}+\frac{g\left(a+bx^2+cx^4\right)^{3/2}}{6c}+$$

$$=\frac{\left(5bcd-2b^2f+6acf\right)x\sqrt{a+bx^2+cx^4}}{15c^{3/2}\left(\sqrt{a}+\sqrt{c}\,x^2\right)}+\frac{(2ce-bg)\left(b+2cx^2\right)}{16c^2}$$

$$=\frac{\left(5bcd-2b^2f+6acf\right)x\sqrt{a+bx^2+cx^4}}{15c^{3/2}\left(\sqrt{a}+\sqrt{c}\,x^2\right)}+\frac{(2ce-bg)\left(b+2cx^2\right)}{16c^2}$$

$$=\frac{\left(5bcd-2b^2f+6acf\right)x\sqrt{a+bx^2+cx^4}}{15c^{3/2}\left(\sqrt{a}+\sqrt{c}\,x^2\right)}+\frac{(2ce-bg)\left(b+2cx^2\right)}{16c^2}$$

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

$Aborted

Verification is Not applicable to the result.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)*Sqrt[a + b*x^2 + c*x^4],x]
[Out] $Aborted
```

fricas [F] time = 1.51, size = 0, normalized size = 0.00

$$\text{integral}\left(\sqrt{cx^4+bx^2+a}\left(gx^3+fx^2+ex+d\right),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(1/2),x, algorithm="fricas")
[Out] integral(sqrt(c*x^4 + b*x^2 + a)*(g*x^3 + f*x^2 + e*x + d), x)
```

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

$$\int\sqrt{cx^4+bx^2+a}\left(gx^3+fx^2+ex+d\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(1/2),x, algorithm="giac")
[Out] integrate(sqrt(c*x^4 + b*x^2 + a)*(g*x^3 + f*x^2 + e*x + d), x)
```

maple [B] time = 0.01, size = 1585, normalized size = 3.14

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(1/2),x)
```

```
[Out] 1/6*g*(c*x^4+b*x^2+a)^(3/2)/c-1/8*g*b/c*x^2*(c*x^4+b*x^2+a)^(1/2)-1/16*g*b^
2/c^2*(c*x^4+b*x^2+a)^(1/2)-1/8*g*b/c^(3/2)*ln((c*x^2+1/2*b)/c^(1/2)+(c*x^4
+b*x^2+a)^(1/2))*a+1/32*g*b^3/c^(5/2)*ln((c*x^2+1/2*b)/c^(1/2)+(c*x^4+b*x^2
+a)^(1/2))+1/5*f*x^3*(c*x^4+b*x^2+a)^(1/2)+1/15*f*b/c*x*(c*x^4+b*x^2+a)^(1/
2)-1/60*f*b/c*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b
^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b
*x^2+a)^(1/2)*EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2
*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))-1/5*f*a^2*2^(1/2)/((-b+(-4*a*c+b
^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*
c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*E
llipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+
b^2)^(1/2))/a*b/c-4)^(1/2))+1/5*f*a^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(
1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a
*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*EllipticE(1/2*2^
(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b
/c-4)^(1/2))+1/15*f*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4
*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c
*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*b^2/c*EllipticF(1/2*2^(1/2)*((-b
+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2
))-1/15*f*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^
(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2
+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*b^2/c*EllipticE(1/2*2^(1/2)*((-b+(-4*a*c+b
^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))+1/4*e*x
^2*(c*x^4+b*x^2+a)^(1/2)+1/8*e/c*(c*x^4+b*x^2+a)^(1/2)*b+1/4*e/c^(1/2)*ln((
c*x^2+1/2*b)/c^(1/2)+(c*x^4+b*x^2+a)^(1/2))*a-1/16*e/c^(3/2)*ln((c*x^2+1/2*
b)/c^(1/2)+(c*x^4+b*x^2+a)^(1/2))*b^2+1/3*d*x*(c*x^4+b*x^2+a)^(1/2)+1/6*d*a
*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^
2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)*E
llipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+
b^2)^(1/2))/a*b/c-4)^(1/2))-1/6*d*b*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(
1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a
*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*EllipticF(1/2*2^
(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b
/c-4)^(1/2))+1/6*d*b*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-
4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(
c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*EllipticE(1/2*2^(1/2)*((-b+(-4*
a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))
```

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

$$\int \sqrt{cx^4 + bx^2 + a}\left(gx^3 + fx^2 + ex + d\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(c*x^4 + b*x^2 + a)*(g*x^3 + f*x^2 + e*x + d), x)
```

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

$$\int \sqrt{c\,x^4 + b\,x^2 + a}\,\left(g\,x^3 + f\,x^2 + e\,x + d\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*x^2 + c*x^4)^(1/2)*(d + e*x + f*x^2 + g*x^3),x)
[Out] int((a + b*x^2 + c*x^4)^(1/2)*(d + e*x + f*x^2 + g*x^3), x)
```

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

$$\int \sqrt{a + bx^2 + cx^4} \left(d + ex + fx^2 + gx^3\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)*(c*x**4+b*x**2+a)**(1/2),x)
[Out] Integral(sqrt(a + b*x**2 + c*x**4)*(d + e*x + f*x**2 + g*x**3), x)
```

3.105 $\int \frac{d+ex+fx^2+gx^3}{\sqrt{a+bx^2+cx^4}}\,dx$

Optimal. Leaf size=359

$$\frac{\sqrt[4]{a}\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\left(\frac{\sqrt{c}\,d}{\sqrt{a}}+f\right)F\left(2\tan^{-1}\left(\frac{\sqrt[4]{c}\,x}{\sqrt[4]{a}}\right)|\frac{1}{4}\left(2-\frac{b}{\sqrt{a}\sqrt{c}}\right)\right)}{2c^{3/4}\sqrt{a+bx^2+cx^4}}+\frac{(2ce-bg)\tanh^{-1}\left(\frac{b+2cx^2}{2\sqrt{c}\sqrt{a+bx^2+cx^4}}\right)}{4c^{3/2}}$$

```
[Out] 1/4*(-b*g+2*c*e)*arctanh(1/2*(2*c*x^2+b)/c^(1/2)/(c*x^4+b*x^2+a)^(1/2))/c^(
3/2)+1/2*g*(c*x^4+b*x^2+a)^(1/2)/c+f*x*(c*x^4+b*x^2+a)^(1/2)/c^(1/2)/(a^(1/
2)+x^2*c^(1/2))-a^(1/4)*f*(cos(2*arctan(c^(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*
arctan(c^(1/4)*x/a^(1/4)))*EllipticE(sin(2*arctan(c^(1/4)*x/a^(1/4))),1/2*(
2-b/a^(1/2)/c^(1/2))^(1/2))*(a^(1/2)+x^2*c^(1/2))*((c*x^4+b*x^2+a)/(a^(1/2)
+x^2*c^(1/2))^2)^(1/2)/c^(3/4)/(c*x^4+b*x^2+a)^(1/2)+1/2*a^(1/4)*(cos(2*arc
tan(c^(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arctan(c^(1/4)*x/a^(1/4)))*EllipticF
(sin(2*arctan(c^(1/4)*x/a^(1/4))),1/2*(2-b/a^(1/2)/c^(1/2))^(1/2))*(a^(1/2)
+x^2*c^(1/2))*(f+d*c^(1/2)/a^(1/2))*((c*x^4+b*x^2+a)/(a^(1/2)+x^2*c^(1/2))^
2)^(1/2)/c^(3/4)/(c*x^4+b*x^2+a)^(1/2)
```

Rubi [A] time = 0.16, antiderivative size = 359, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 8, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {1673, 1197, 1103, 1195, 1247, 640, 621, 206}

$$\frac{\sqrt[4]{a}\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\left(\frac{\sqrt{c}\,d}{\sqrt{a}}+f\right)F\left(2\tan^{-1}\left(\frac{\sqrt[4]{c}\,x}{\sqrt[4]{a}}\right)|\frac{1}{4}\left(2-\frac{b}{\sqrt{a}\sqrt{c}}\right)\right)}{2c^{3/4}\sqrt{a+bx^2+cx^4}}+\frac{(2ce-bg)\tanh^{-1}\left(\frac{b+2cx^2}{2\sqrt{c}\sqrt{a+bx^2+cx^4}}\right)}{4c^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)/Sqrt[a + b*x^2 + c*x^4],x]
```

```
[Out] (g*Sqrt[a + b*x^2 + c*x^4])/(2*c) + (f*x*Sqrt[a + b*x^2 + c*x^4])/(Sqrt[c]*
(Sqrt[a] + Sqrt[c]*x^2)) + ((2*c*e - b*g)*ArcTanh[(b + 2*c*x^2)/(2*Sqrt[c]*
Sqrt[a + b*x^2 + c*x^4])])/(4*c^(3/2)) - (a^(1/4)*f*(Sqrt[a] + Sqrt[c]*x^2)
*Sqrt[(a + b*x^2 + c*x^4)/(Sqrt[a] + Sqrt[c]*x^2)^2]*EllipticE[2*ArcTan[(c^
(1/4)*x)/a^(1/4)], (2 - b/(Sqrt[a]*Sqrt[c]))/4])/(c^(3/4)*Sqrt[a + b*x^2 +
c*x^4]) + (a^(1/4)*((Sqrt[c]*d)/Sqrt[a] + f)*(Sqrt[a] + Sqrt[c]*x^2)*Sqrt[(
a + b*x^2 + c*x^4)/(Sqrt[a] + Sqrt[c]*x^2)^2]*EllipticF[2*ArcTan[(c^(1/4)*x
)/a^(1/4)], (2 - b/(Sqrt[a]*Sqrt[c]))/4])/(2*c^(3/4)*Sqrt[a + b*x^2 + c*x^4
])
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 621

```
Int[1/Sqrt[(a_) + (b_.)*(x_) + (c_.)*(x_)^2], x_Symbol] :> Dist[2, Subst[In
t[1/(4*c - x^2), x], x, (b + 2*c*x)/Sqrt[a + b*x + c*x^2]], x] /; FreeQ[{a,
 b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 640

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[(e*(a + b*x + c*x^2)^(p + 1))/(2*c*(p + 1)), x] + Dist[(2*c*d - b
*e)/(2*c), Int[(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, p}, x]
```

```
&& NeQ[2*c*d - b*e, 0] && NeQ[p, -1]
```

Rule 1103

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol] :> With[{q = Rt[c
/a, 4]}, Simp[((1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^2)^2)]*
EllipticF[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(2*q*Sqrt[a + b*x^2 + c*x^4]
), x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]
```

Rule 1195

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbo
l] :> With[{q = Rt[c/a, 4]}, -Simp[(d*x*Sqrt[a + b*x^2 + c*x^4])/(a*(1 + q^
2*x^2)), x] + Simp[(d*(1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^
2)^2)]*EllipticE[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(q*Sqrt[a + b*x^2 + c
*x^4]), x] /; EqQ[e + d*q^2, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 -
4*a*c, 0] && PosQ[c/a]
```

Rule 1197

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbo
l] :> With[{q = Rt[c/a, 2]}, Dist[(e + d*q)/q, Int[1/Sqrt[a + b*x^2 + c*x^4
], x], x] - Dist[e/q, Int[(1 - q*x^2)/Sqrt[a + b*x^2 + c*x^4], x], x] /; Ne
Q[e + d*q, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[
c/a]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3}{\sqrt{a+bx^2+cx^4}}\,dx = \int \frac{d+fx^2}{\sqrt{a+bx^2+cx^4}}\,dx + \int \frac{x\left(e+gx^2\right)}{\sqrt{a+bx^2+cx^4}}\,dx$$

$$= \frac{1}{2}\,\mathrm{Subst}\left(\int \frac{e+gx}{\sqrt{a+bx+cx^2}}\,dx, x, x^2\right) - \frac{\left(\sqrt{a}\,f\right)\int \frac{1-\frac{\sqrt{c}\,x^2}{\sqrt{a}}}{\sqrt{a+bx^2+cx^4}}\,dx}{\sqrt{c}} + \left(d+\frac{\sqrt{a}\,f}{\sqrt{c}}\right)\int \frac{}{\sqrt{a}}$$

$$= \frac{g\sqrt{a+bx^2+cx^4}}{2c} + \frac{fx\sqrt{a+bx^2+cx^4}}{\sqrt{c}\left(\sqrt{a}+\sqrt{c}\,x^2\right)} - \frac{\sqrt[4]{a}\,f\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\,E\left(2\tan^{-}\right.}{c^{3/4}\sqrt{a+bx^2+cx^4}}$$

$$= \frac{g\sqrt{a+bx^2+cx^4}}{2c} + \frac{fx\sqrt{a+bx^2+cx^4}}{\sqrt{c}\left(\sqrt{a}+\sqrt{c}\,x^2\right)} - \frac{\sqrt[4]{a}\,f\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\,E\left(2\tan^{-}\right.}{c^{3/4}\sqrt{a+bx^2+cx^4}}$$

$$= \frac{g\sqrt{a+bx^2+cx^4}}{2c} + \frac{fx\sqrt{a+bx^2+cx^4}}{\sqrt{c}\left(\sqrt{a}+\sqrt{c}\,x^2\right)} + \frac{(2ce-bg)\tanh^{-1}\left(\frac{b+2cx^2}{2\sqrt{c}\sqrt{a+bx^2+cx^4}}\right)}{4c^{3/2}} - \frac{\sqrt[4]{a}\,f}{}$$

Mathematica [C] time = 1.38, size = 526, normalized size = 1.47

$$\frac{-i\sqrt{2}\sqrt{c}\sqrt{\frac{-\sqrt{b^2-4ac}+b+2cx^2}{b-\sqrt{b^2-4ac}}}\sqrt{\frac{\sqrt{b^2-4ac}+b+2cx^2}{\sqrt{b^2-4ac}+b}}\left(f\left(\sqrt{b^2-4ac}-b\right)+2cd\right)F\left(i\sinh^{-1}\left(\sqrt{2}\sqrt{\frac{c}{b+\sqrt{b^2-4ac}}}\,x\right)|\frac{b+\sqrt{b^2-4ac}}{b-\sqrt{b^2-4ac}}\right.}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/Sqrt[a + b*x^2 + c*x^4],x]
```

```
[Out] (I*Sqrt[2]*Sqrt[c]*(-b + Sqrt[b^2 - 4*a*c])*f*Sqrt[(b - Sqrt[b^2 - 4*a*c] +
 2*c*x^2)/(b - Sqrt[b^2 - 4*a*c])]*Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x^2)/(
b + Sqrt[b^2 - 4*a*c])]*EllipticE[I*ArcSinh[Sqrt[2]*Sqrt[c/(b + Sqrt[b^2 -
4*a*c])]*x], (b + Sqrt[b^2 - 4*a*c])/(b - Sqrt[b^2 - 4*a*c])] - I*Sqrt[2]*S
qrt[c]*(2*c*d + (-b + Sqrt[b^2 - 4*a*c])*f)*Sqrt[(b - Sqrt[b^2 - 4*a*c] + 2
*c*x^2)/(b - Sqrt[b^2 - 4*a*c])]*Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x^2)/(b
+ Sqrt[b^2 - 4*a*c])]*EllipticF[I*ArcSinh[Sqrt[2]*Sqrt[c/(b + Sqrt[b^2 - 4*
a*c])]*x], (b + Sqrt[b^2 - 4*a*c])/(b - Sqrt[b^2 - 4*a*c])] + Sqrt[c/(b + S
qrt[b^2 - 4*a*c])]*(2*Sqrt[c]*g*(a + b*x^2 + c*x^4) + (2*c*e - b*g)*Sqrt[a
+ b*x^2 + c*x^4]*Log[b + 2*c*x^2 + 2*Sqrt[c]*Sqrt[a + b*x^2 + c*x^4]]))/(4*
c^(3/2)*Sqrt[c/(b + Sqrt[b^2 - 4*a*c])]*Sqrt[a + b*x^2 + c*x^4])
```

fricas [F] time = 0.98, size = 0, normalized size = 0.00

$$\mathrm{integral}\left(\frac{gx^3+fx^2+ex+d}{\sqrt{cx^4+bx^2+a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(1/2),x, algorithm="fricas")
```

```
[Out] integral((g*x^3 + f*x^2 + e*x + d)/sqrt(c*x^4 + b*x^2 + a), x)
```

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

$$\int \frac{gx^3+fx^2+ex+d}{\sqrt{cx^4+bx^2+a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((g*x^3 + f*x^2 + e*x + d)/sqrt(c*x^4 + b*x^2 + a), x)
```

maple [A] time = 0.01, size = 453, normalized size = 1.26

$$-\frac{\sqrt{2}\,\sqrt{-\frac{2\left(-b+\sqrt{-4ac+b^2}\right)x^2}{a}+4}\,\sqrt{\frac{2\left(b+\sqrt{-4ac+b^2}\right)x^2}{a}+4}\,\left(-\mathrm{EllipticE}\left(\frac{\sqrt{2}\,\sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}}\,x}{2},\frac{\sqrt{\frac{2\left(b+\sqrt{-4ac+b^2}\right)b}{ac}-4}}{2}\right)+\mathrm{Elli}}{2\sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}}\,\sqrt{c\,x^4+b\,x^2+a}\,\left(b+\sqrt{-4ac+b^2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(1/2),x)
```

```
[Out] 1/2*g*(c*x^4+b*x^2+a)^(1/2)/c-1/4*g*b/c^(3/2)*ln((c*x^2+1/2*b)/c^(1/2)+(c*x
^4+b*x^2+a)^(1/2))-1/2*f*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-
b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/
2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*(EllipticF(1/2*2^(1/2)*((-b
+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2
))-EllipticE(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*
a*c+b^2)^(1/2))/a*b/c-4)^(1/2)))+1/2*e*ln((c*x^2+1/2*b)/c^(1/2)+(c*x^4+b*x^
2+a)^(1/2))/c^(1/2)+1/4*d*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b
+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2
)/(c*x^4+b*x^2+a)^(1/2)*EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(
1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))
```

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

$$\int \frac{gx^3+fx^2+ex+d}{\sqrt{cx^4+bx^2+a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(1/2),x, algorithm="maxima")
```

```
[Out] integrate((g*x^3 + f*x^2 + e*x + d)/sqrt(c*x^4 + b*x^2 + a), x)
```

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

$$\int \frac{g\,x^3+f\,x^2+e\,x+d}{\sqrt{c\,x^4+b\,x^2+a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(1/2),x)
```

```
[Out] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(1/2), x)
```

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

$$\int \frac{d+ex+fx^2+gx^3}{\sqrt{a+bx^2+cx^4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2 + g*x**3)/sqrt(a + b*x**2 + c*x**4), x)
```

3.106 $\int \frac{d+ex+fx^2+gx^3}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx$

Optimal. Leaf size=447

$$\frac{\sqrt[4]{c}\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\,(bd-2af)E\left(2\tan^{-1}\left(\frac{\sqrt[4]{c}\,x}{\sqrt[4]{a}}\right)|\frac{1}{4}\left(2-\frac{b}{\sqrt{a}\sqrt{c}}\right)\right)}{a^{3/4}\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}}-\frac{\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\left(\sqrt{c}\,d-\cdots\right.}{2a^{3/4}\sqrt[4]{c}\left(b-2\sqrt{a}\cdots\right.}$$

```
[Out] x*(b^2*d-2*a*c*d-a*b*f+c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^(
1/2)+(-b*e+2*a*g-(-b*g+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^(1/2)-(-2*a
*f+b*d)*x*c^(1/2)*(c*x^4+b*x^2+a)^(1/2)/a/(-4*a*c+b^2)/(a^(1/2)+x^2*c^(1/2)
)+c^(1/4)*(-2*a*f+b*d)*(cos(2*arctan(c^(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arc
tan(c^(1/4)*x/a^(1/4)))*EllipticE(sin(2*arctan(c^(1/4)*x/a^(1/4))),1/2*(2-b
/a^(1/2)/c^(1/2))^(1/2))*(a^(1/2)+x^2*c^(1/2))*((c*x^4+b*x^2+a)/(a^(1/2)+x^
2*c^(1/2))^2)^(1/2)/a^(3/4)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^(1/2)-1/2*(cos(2*a
rctan(c^(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arctan(c^(1/4)*x/a^(1/4)))*Ellipti
cF(sin(2*arctan(c^(1/4)*x/a^(1/4))),1/2*(2-b/a^(1/2)/c^(1/2))^(1/2))*(-f*a^
(1/2)+d*c^(1/2))*(a^(1/2)+x^2*c^(1/2))*((c*x^4+b*x^2+a)/(a^(1/2)+x^2*c^(1/2
))^2)^(1/2)/a^(3/4)/c^(1/4)/(-2*a^(1/2)*c^(1/2)+b)/(c*x^4+b*x^2+a)^(1/2)
```

Rubi [A] time = 0.27, antiderivative size = 447, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.219, Rules used = {1673, 1178, 1197, 1103, 1195, 1247, 636}

$$\frac{\sqrt[4]{c}\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\,(bd-2af)E\left(2\tan^{-1}\left(\frac{\sqrt[4]{c}\,x}{\sqrt[4]{a}}\right)|\frac{1}{4}\left(2-\frac{b}{\sqrt{a}\sqrt{c}}\right)\right)}{a^{3/4}\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}}-\frac{\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\left(\sqrt{c}\,d-\cdots\right.}{2a^{3/4}\sqrt[4]{c}\left(b-2\sqrt{a}\cdots\right.}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(3/2),x]
```

```
[Out] (x*(b^2*d - 2*a*c*d - a*b*f + c*(b*d - 2*a*f)*x^2))/(a*(b^2 - 4*a*c)*Sqrt[a
 + b*x^2 + c*x^4]) - (b*e - 2*a*g + (2*c*e - b*g)*x^2)/((b^2 - 4*a*c)*Sqrt[
a + b*x^2 + c*x^4]) - (Sqrt[c]*(b*d - 2*a*f)*x*Sqrt[a + b*x^2 + c*x^4])/(a*
(b^2 - 4*a*c)*(Sqrt[a] + Sqrt[c]*x^2)) + (c^(1/4)*(b*d - 2*a*f)*(Sqrt[a] +
Sqrt[c]*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(Sqrt[a] + Sqrt[c]*x^2)^2]*EllipticE[
2*ArcTan[(c^(1/4)*x)/a^(1/4)], (2 - b/(Sqrt[a]*Sqrt[c]))/4])/(a^(3/4)*(b^2
- 4*a*c)*Sqrt[a + b*x^2 + c*x^4]) - ((Sqrt[c]*d - Sqrt[a]*f)*(Sqrt[a] + Sqr
t[c]*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(Sqrt[a] + Sqrt[c]*x^2)^2]*EllipticF[2*A
rcTan[(c^(1/4)*x)/a^(1/4)], (2 - b/(Sqrt[a]*Sqrt[c]))/4])/(2*a^(3/4)*(b - 2
*Sqrt[a]*Sqrt[c])*c^(1/4)*Sqrt[a + b*x^2 + c*x^4])
```

Rule 636

```
Int[((d_.) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(3/2), x_Symbo
l] :> Simp[(-2*(b*d - 2*a*e + (2*c*d - b*e)*x))/((b^2 - 4*a*c)*Sqrt[a + b*x
 + c*x^2]), x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b
^2 - 4*a*c, 0]
```

Rule 1103

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol] :> With[{q = Rt[c
/a, 4]}, Simp[((1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^2)^2)]*
EllipticF[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(2*q*Sqrt[a + b*x^2 + c*x^4]
), x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1195

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbo
l] :> With[{q = Rt[c/a, 4]}, -Simp[(d*x*Sqrt[a + b*x^2 + c*x^4])/(a*(1 + q^
2*x^2)), x] + Simp[(d*(1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^
2)^2)]*EllipticE[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(q*Sqrt[a + b*x^2 + c
*x^4]), x] /; EqQ[e + d*q^2, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 -
4*a*c, 0] && PosQ[c/a]
```

Rule 1197

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbo
l] :> With[{q = Rt[c/a, 2]}, Dist[(e + d*q)/q, Int[1/Sqrt[a + b*x^2 + c*x^4
], x], x] - Dist[e/q, Int[(1 - q*x^2)/Sqrt[a + b*x^2 + c*x^4], x], x] /; Ne
Q[e + d*q, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[
c/a]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx = \int \frac{d+fx^2}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx + \int \frac{x\left(e+gx^2\right)}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{a\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}} + \frac{1}{2}\text{Subst}\left(\int \frac{e+gx}{\left(a+bx+cx^2\right)^{3/2}}\,dx, x, x^2\right) - \frac{\int}{}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{a\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}} - \frac{be-2ag+(2ce-bg)x^2}{\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}} + \frac{\left(\sqrt{c}\,(bd-2af\right.}{\sqrt{a}\,(}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{a\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}} - \frac{be-2ag+(2ce-bg)x^2}{\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}} - \frac{\sqrt{c}\,(bd-2af)}{a\left(b^2-4ac\right)}$$

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

$$\text{\$Aborted}$$

Verification is Not applicable to the result.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(3/2),x]
[Out] $Aborted
```

fricas [F] time = 0.61, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sqrt{cx^4+bx^2+a}\left(gx^3+fx^2+ex+d\right)}{c^2x^8+2\,bcx^6+\left(b^2+2\,ac\right)x^4+2\,abx^2+a^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="fricas")
[Out] integral(sqrt(c*x^4 + b*x^2 + a)*(g*x^3 + f*x^2 + e*x + d)/(c^2*x^8 + 2*b*c
*x^6 + (b^2 + 2*a*c)*x^4 + 2*a*b*x^2 + a^2), x)
```

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

$$\int \frac{gx^3+fx^2+ex+d}{\left(cx^4+bx^2+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="giac")
[Out] integrate((g*x^3 + f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a)^(3/2), x)
```

maple [B] time = 0.03, size = 1005, normalized size = 2.25

$$\left(-\frac{\sqrt{2}\sqrt{-\frac{2\left(-b+\sqrt{-4ac+b^2}\right)x^2}{a}+4}\sqrt{\frac{2\left(b+\sqrt{-4ac+b^2}\right)x^2}{a}+4}\left(-\text{EllipticE}\left(\frac{\sqrt{2}\sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}}\,x}{2}, \frac{\sqrt{\frac{2\left(b+\sqrt{-4ac+b^2}\right)b}{ac}-4}}{2}\right)+\text{Ellipt}\right.}{2\left(4ac-b^2\right)\sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}}\sqrt{c\,x^4+b\,x^2+a}\left(b+\sqrt{-4ac+b^2}\right)}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(3/2),x)
```

```
[Out] -g/(c*x^4+b*x^2+a)^(1/2)*(b*x^2+2*a)/(4*a*c-b^2)+f*(-2*c*(-1/(4*a*c-b^2)*x^
3-1/2/(4*a*c-b^2)*b/c*x)/((x^4+b/c*x^2+a/c)*c)^(1/2)-1/4/(4*a*c-b^2)*b*2^(1
/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^
(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)*Ellipt
icF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^
(1/2))/a*b/c-4)^(1/2))+c/(4*a*c-b^2)*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^
(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/
a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*(EllipticF(1/2*
2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a
*b/c-4)^(1/2))-EllipticE(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/
2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))))+e*(2*c*x^2+b)/(4*a*c-b^2)/(c*
x^4+b*x^2+a)^(1/2)+d*(-2*c*(1/2/a*b/(4*a*c-b^2)*x^3-1/2*(2*a*c-b^2)/a/(4*a*
c-b^2)/c*x)/((x^4+b/c*x^2+a/c)*c)^(1/2)+1/4*(1/a-(2*a*c-b^2)/a/(4*a*c-b^2))
*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^
2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)*E
llipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+
b^2)^(1/2))/a*b/c-4)^(1/2))-1/2*b/(4*a*c-b^2)*c*2^(1/2)/((-b+(-4*a*c+b^2)^(
1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2
)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*(Ellip
ticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)
^(1/2))/a*b/c-4)^(1/2))-EllipticE(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(
1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))))
```

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

$$\int \frac{gx^3 + fx^2 + ex + d}{\left(cx^4 + bx^2 + a\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((g*x^3 + f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a)^(3/2), x)
```

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

$$\int \frac{g\,x^3 + f\,x^2 + e\,x + d}{{\left(c\,x^4 + b\,x^2 + a\right)}^{3/2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(3/2),x)
```

```
[Out] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(3/2), x)
```

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

$$\int \frac{d + ex + fx^2 + gx^3}{\left(a + bx^2 + cx^4\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**(3/2),x)
```

```
[Out] Integral((d + e*x + f*x**2 + g*x**3)/(a + b*x**2 + c*x**4)**(3/2), x)
```

3.107 $\int \frac{d+ex+fx^2+gx^3}{\left(a+bx^2+cx^4\right)^{5/2}}\,dx$

Optimal. Leaf size=680

$$-\frac{\sqrt[4]{c}\left(\sqrt{a}+\sqrt{c}\,x^2\right)\sqrt{\frac{a+bx^2+cx^4}{\left(\sqrt{a}+\sqrt{c}\,x^2\right)^2}}\left(6a^{3/2}\sqrt{c}\,f-3\sqrt{a}\,b\sqrt{c}\,d+abf-10acd+2b^2d\right)F\left(2\tan^{-1}\left(\frac{\sqrt[4]{c}\,x}{\sqrt[4]{a}}\right)|\frac{1}{4}\left(2-\frac{b}{\sqrt{a}\sqrt{c}}\right.\right.}{6a^{7/4}\left(b-2\sqrt{a}\sqrt{c}\right)\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}}$$

```
[Out] 1/3*x*(b^2*d-2*a*c*d-a*b*f+c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+
a)^(3/2)+1/3*(-b*e+2*a*g-(-b*g+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^(3/
2)+4/3*(-b*g+2*c*e)*(2*c*x^2+b)/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)^(1/2)+1/3*x*
(2*b^4*d-17*a*b^2*c*d+20*a^2*c^2*d+a*b^3*f+4*a^2*b*c*f+c*(12*a^2*c*f+a*b^2*
f-16*a*b*c*d+2*b^3*d)*x^2)/a^2/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)^(1/2)-1/3*(12
*a^2*c*f+a*b^2*f-16*a*b*c*d+2*b^3*d)*x*c^(1/2)*(c*x^4+b*x^2+a)^(1/2)/a^2/(-
4*a*c+b^2)^2/(a^(1/2)+x^2*c^(1/2))+1/3*c^(1/4)*(12*a^2*c*f+a*b^2*f-16*a*b*c
*d+2*b^3*d)*(cos(2*arctan(c^(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arctan(c^(1/4)
*x/a^(1/4)))*EllipticE(sin(2*arctan(c^(1/4)*x/a^(1/4))),1/2*(2-b/a^(1/2)/c^
(1/2))^(1/2))*(a^(1/2)+x^2*c^(1/2))*((c*x^4+b*x^2+a)/(a^(1/2)+x^2*c^(1/2))^
2)^(1/2)/a^(7/4)/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)^(1/2)-1/6*c^(1/4)*(cos(2*ar
ctan(c^(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arctan(c^(1/4)*x/a^(1/4)))*Elliptic
F(sin(2*arctan(c^(1/4)*x/a^(1/4))),1/2*(2-b/a^(1/2)/c^(1/2))^(1/2))*(a^(1/2
)+x^2*c^(1/2))*(2*b^2*d-10*a*c*d+a*b*f+6*a^(3/2)*f*c^(1/2)-3*b*d*a^(1/2)*c^
(1/2))*((c*x^4+b*x^2+a)/(a^(1/2)+x^2*c^(1/2))^2)^(1/2)/a^(7/4)/(-4*a*c+b^2)
/(-2*a^(1/2)*c^(1/2)+b)/(c*x^4+b*x^2+a)^(1/2)
```

Rubi [A] time = 0.51, antiderivative size = 680, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.250, Rules used = {1673, 1178, 1197, 1103, 1195, 1247, 638, 613}

$$\frac{x\left(cx^2\left(12a^2cf+ab^2f-16abcd+2b^3d\right)+4a^2bcf+20a^2c^2d-17ab^2cd+ab^3f+2b^4d\right)}{3a^2\left(b^2-4ac\right)^2\sqrt{a+bx^2+cx^4}}-\frac{\sqrt{c}\,x\sqrt{a+bx^2+cx^4}\left(12\right.}{3a^2\left(b^2-4\right.}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(5/2),x]
```

```
[Out] (x*(b^2*d - 2*a*c*d - a*b*f + c*(b*d - 2*a*f)*x^2))/(3*a*(b^2 - 4*a*c)*(a +
 b*x^2 + c*x^4)^(3/2)) - (b*e - 2*a*g + (2*c*e - b*g)*x^2)/(3*(b^2 - 4*a*c)
*(a + b*x^2 + c*x^4)^(3/2)) + (4*(2*c*e - b*g)*(b + 2*c*x^2))/(3*(b^2 - 4*a
*c)^2*Sqrt[a + b*x^2 + c*x^4]) + (x*(2*b^4*d - 17*a*b^2*c*d + 20*a^2*c^2*d
+ a*b^3*f + 4*a^2*b*c*f + c*(2*b^3*d - 16*a*b*c*d + a*b^2*f + 12*a^2*c*f)*x
^2))/(3*a^2*(b^2 - 4*a*c)^2*Sqrt[a + b*x^2 + c*x^4]) - (Sqrt[c]*(2*b^3*d -
16*a*b*c*d + a*b^2*f + 12*a^2*c*f)*x*Sqrt[a + b*x^2 + c*x^4])/(3*a^2*(b^2 -
 4*a*c)^2*(Sqrt[a] + Sqrt[c]*x^2)) + (c^(1/4)*(2*b^3*d - 16*a*b*c*d + a*b^2
*f + 12*a^2*c*f)*(Sqrt[a] + Sqrt[c]*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(Sqrt[a]
+ Sqrt[c]*x^2)^2]*EllipticE[2*ArcTan[(c^(1/4)*x)/a^(1/4)], (2 - b/(Sqrt[a]*
Sqrt[c]))/4])/(3*a^(7/4)*(b^2 - 4*a*c)^2*Sqrt[a + b*x^2 + c*x^4]) - (c^(1/4
)*(2*b^2*d - 3*Sqrt[a]*b*Sqrt[c]*d - 10*a*c*d + a*b*f + 6*a^(3/2)*Sqrt[c]*f
)*(Sqrt[a] + Sqrt[c]*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(Sqrt[a] + Sqrt[c]*x^2)^
2]*EllipticF[2*ArcTan[(c^(1/4)*x)/a^(1/4)], (2 - b/(Sqrt[a]*Sqrt[c]))/4])/(
6*a^(7/4)*(b - 2*Sqrt[a]*Sqrt[c])*(b^2 - 4*a*c)*Sqrt[a + b*x^2 + c*x^4])
```

Rule 613

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-3/2), x_Symbol] :> Simp[(-2*(b +
2*c*x))/((b^2 - 4*a*c)*Sqrt[a + b*x + c*x^2]), x] /; FreeQ[{a, b, c}, x] &&
```

```
 NeQ[b^2 - 4*a*c, 0]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] :> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
 NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1103

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol] :> With[{q = Rt[c
/a, 4]}, Simp[((1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^2)^2)]*
EllipticF[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(2*q*Sqrt[a + b*x^2 + c*x^4]
), x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
 c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1195

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbo
l] :> With[{q = Rt[c/a, 4]}, -Simp[(d*x*Sqrt[a + b*x^2 + c*x^4])/(a*(1 + q^
2*x^2)), x] + Simp[(d*(1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^
2)^2)]*EllipticE[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(q*Sqrt[a + b*x^2 + c
*x^4]), x] /; EqQ[e + d*q^2, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 -
4*a*c, 0] && PosQ[c/a]
```

Rule 1197

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbo
l] :> With[{q = Rt[c/a, 2]}, Dist[(e + d*q)/q, Int[1/Sqrt[a + b*x^2 + c*x^4
], x], x] - Dist[e/q, Int[(1 - q*x^2)/Sqrt[a + b*x^2 + c*x^4], x], x] /; Ne
Q[e + d*q, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[
c/a]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{d+ex+fx^2+gx^3}{\left(a+bx^2+cx^4\right)^{5/2}}\,dx = \int \frac{d+fx^2}{\left(a+bx^2+cx^4\right)^{5/2}}\,dx + \int \frac{x\left(e+gx^2\right)}{\left(a+bx^2+cx^4\right)^{5/2}}\,dx$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{3a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^{3/2}} + \frac{1}{2}\text{Subst}\left(\int \frac{e+gx}{\left(a+bx+cx^2\right)^{5/2}}\,dx, x, x^2\right) - -$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{3a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^{3/2}} - \frac{be-2ag+(2ce-bg)x^2}{3\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^{3/2}} + \frac{x\left(2b^4d-\right.}{}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{3a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^{3/2}} - \frac{be-2ag+(2ce-bg)x^2}{3\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^{3/2}} + \frac{4(2ce-}{3\left(b^2-4a\right.}$$

$$= \frac{x\left(b^2d-2acd-abf+c(bd-2af)x^2\right)}{3a\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^{3/2}} - \frac{be-2ag+(2ce-bg)x^2}{3\left(b^2-4ac\right)\left(a+bx^2+cx^4\right)^{3/2}} + \frac{4(2ce-}{3\left(b^2-4a\right.}$$

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

$Aborted

Verification is Not applicable to the result.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(5/2),x]
[Out] $Aborted
```

fricas [F] time = 0.96, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sqrt{cx^4+bx^2+a}\left(gx^3+fx^2+ex+d\right)}{c^3x^{12}+3\,bc^2x^{10}+3\left(b^2c+ac^2\right)x^8+\left(b^3+6\,abc\right)x^6+3\,a^2bx^2+3\left(ab^2+a^2c\right)x^4+a^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(5/2),x, algorithm="fricas")
[Out] integral(sqrt(c*x^4 + b*x^2 + a)*(g*x^3 + f*x^2 + e*x + d)/(c^3*x^12 + 3*b*
c^2*x^10 + 3*(b^2*c + a*c^2)*x^8 + (b^3 + 6*a*b*c)*x^6 + 3*a^2*b*x^2 + 3*(a
*b^2 + a^2*c)*x^4 + a^3), x)
```

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

$$\int \frac{gx^3+fx^2+ex+d}{\left(cx^4+bx^2+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(5/2),x, algorithm="giac")
[Out] integrate((g*x^3 + f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a)^(5/2), x)
```

maple [B] time = 0.06, size = 1395, normalized size = 2.05

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(5/2),x)
```

```
[Out] -1/3*g*(8*b*c^2*x^6+12*b^2*c*x^4+12*a*b*c*x^2+3*b^3*x^2+8*a^2*c+2*a*b^2)/(c
*x^4+b*x^2+a)^(3/2)/(16*a^2*c^2-8*a*b^2*c+b^4)+f*((2/3/c/(4*a*c-b^2)*x^3+1/
3*b/(4*a*c-b^2)/c^2*x)*(c*x^4+b*x^2+a)^(1/2)/(x^4+b/c*x^2+a/c)^2-2*c*(-1/6*
(12*a*c+b^2)/a/(4*a*c-b^2)^2*x^3-1/6*(4*a*c+b^2)*b/a/(4*a*c-b^2)^2/c*x)/((x
^4+b/c*x^2+a/c)*c)^(1/2)+1/4*(-1/3/a*b/(4*a*c-b^2)-1/3*(4*a*c+b^2)*b/a/(4*a
*c-b^2)^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(
1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+
a)^(1/2)*EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(
b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))+1/6*c*(12*a*c+b^2)/(4*a*c-b^2)^2*2^(1
/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^
(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4
*a*c+b^2)^(1/2))*(EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x
,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))-EllipticE(1/2*2^(1/2)*((-b+(
-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))
))+1/3*e*(16*c^3*x^6+24*b*c^2*x^4+24*a*c^2*x^2+6*b^2*c*x^2+12*a*b*c-b^3)/(c
*x^4+b*x^2+a)^(3/2)/(16*a^2*c^2-8*a*b^2*c+b^4)+d*((-1/3/a*b/(4*a*c-b^2)/c*x
^3+1/3*(2*a*c-b^2)/(4*a*c-b^2)/a/c^2*x)*(c*x^4+b*x^2+a)^(1/2)/(x^4+b/c*x^2+
a/c)^2-2*c*(1/3*b*(8*a*c-b^2)/(4*a*c-b^2)^2/a^2*x^3-1/6*(20*a^2*c^2-17*a*b^
2*c+2*b^4)/a^2/(4*a*c-b^2)^2/c*x)/((x^4+b/c*x^2+a/c)*c)^(1/2)+1/4*(2/3*(5*a
*c-b^2)/a^2/(4*a*c-b^2)-1/3*(20*a^2*c^2-17*a*b^2*c+2*b^4)/a^2/(4*a*c-b^2)^2
)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x
^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)*
EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c
+b^2)^(1/2))/a*b/c-4)^(1/2))-1/3*b*c*(8*a*c-b^2)/(4*a*c-b^2)^2/a*2^(1/2)/((
-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*
(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b
^2)^(1/2))*(EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(
2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))-EllipticE(1/2*2^(1/2)*((-b+(-4*a*c
+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))))
```

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

$$\int \frac{gx^3 + fx^2 + ex + d}{\left(cx^4 + bx^2 + a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((g*x^3 + f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a)^(5/2), x)
```

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

$$\int \frac{g\,x^3+f\,x^2+e\,x+d}{{\left(c\,x^4+b\,x^2+a\right)}^{5/2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(5/2),x)
```

```
[Out] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(5/2), x)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**(5/2),x)

[Out] Timed out
```

3.108 $\int \frac{ag-cgx^4}{(a+bx^2+cx^4)^{3/2}}\,dx$

Optimal. Leaf size=19

$$\frac{gx}{\sqrt{a+bx^2+cx^4}}$$

```
[Out] g*x/(c*x^4+b*x^2+a)^(1/2)
```

Rubi [A] time = 0.02, antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.036, Rules used = {1588}

$$\frac{gx}{\sqrt{a+bx^2+cx^4}}$$

Antiderivative was successfully verified.

```
[In] Int[(a*g - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x]
```

```
[Out] (g*x)/Sqrt[a + b*x^2 + c*x^4]
```

Rule 1588

```
Int[(Pp_)*(Qq_)^(m_.), x_Symbol] :> With[{p = Expon[Pp, x], q = Expon[Qq, x
]}, Simp[(Coeff[Pp, x, p]*x^(p - q + 1)*Qq^(m + 1))/((p + m*q + 1)*Coeff[Qq
, x, q]), x] /; NeQ[p + m*q + 1, 0] && EqQ[(p + m*q + 1)*Coeff[Qq, x, q]*Pp
, Coeff[Pp, x, p]*x^(p - q)*((p - q + 1)*Qq + (m + 1)*x*D[Qq, x])]] /; Free
Q[m, x] && PolyQ[Pp, x] && PolyQ[Qq, x] && NeQ[m, -1]
```

Rubi steps

$$\int \frac{ag-cgx^4}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx=\frac{gx}{\sqrt{a+bx^2+cx^4}}$$

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

$Aborted

Verification is Not applicable to the result.

```
[In] Integrate[(a*g - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x]
```

```
[Out] $Aborted
```

fricas [A] time = 0.71, size = 17, normalized size = 0.89

$$\frac{gx}{\sqrt{cx^4+bx^2+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x^4+a*g)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="fricas")
```

```
[Out] g*x/sqrt(c*x^4 + b*x^2 + a)
```

giac [B] time = 1.91, size = 60, normalized size = 3.16

$$\frac{\left(b^4g-8\,ab^2cg+16\,a^2c^2g\right)x}{\sqrt{cx^4+bx^2+a}\left(b^4-8\,ab^2c+16\,a^2c^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x^4+a*g)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="giac")
```

```
[Out] (b^4*g - 8*a*b^2*c*g + 16*a^2*c^2*g)*x/(sqrt(c*x^4 + b*x^2 + a)*(b^4 - 8*a*
b^2*c + 16*a^2*c^2))
```

maple [A] time = 0.00, size = 18, normalized size = 0.95

$$\frac{g x}{\sqrt{c\,x^{4}+b\,x^{2}+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((-c*g*x^4+a*g)/(c*x^4+b*x^2+a)^(3/2),x)
```

```
[Out] g*x/(c*x^4+b*x^2+a)^(1/2)
```

maxima [A] time = 0.63, size = 17, normalized size = 0.89

$$\frac{gx}{\sqrt{cx^{4}+bx^{2}+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x^4+a*g)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="maxima")
```

```
[Out] g*x/sqrt(c*x^4 + b*x^2 + a)
```

mupad [B] time = 0.99, size = 17, normalized size = 0.89

$$\frac{g\,x}{\sqrt{c\,x^4+b\,x^2+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*g - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x)
```

```
[Out] (g*x)/(a + b*x^2 + c*x^4)^(1/2)
```

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

$$-g\left(\int\left(-\frac{a}{a\sqrt{a+bx^{2}+cx^{4}}+bx^{2}\sqrt{a+bx^{2}+cx^{4}}+cx^{4}\sqrt{a+bx^{2}+cx^{4}}}\right)dx+\int\frac{cx^{4}}{a\sqrt{a+bx^{2}+cx^{4}}+bx^{2}\sqrt{a+bx^{2}+cx^{4}}+\dots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x**4+a*g)/(c*x**4+b*x**2+a)**(3/2),x)
```

```
[Out] -g*(Integral(-a/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x
**4) + c*x**4*sqrt(a + b*x**2 + c*x**4)), x) + Integral(c*x**4/(a*sqrt(a +
b*x**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x**4) + c*x**4*sqrt(a + b*x**
2 + c*x**4)), x))
```

3.109 $\int \frac{ag+ex-cgx^4}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx$

Optimal. Leaf size=57

$$\frac{gx}{\sqrt{a+bx^2+cx^4}}-\frac{e\left(b+2cx^2\right)}{\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}}$$

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

Rubi [A] time = 0.07, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.161, Rules used = {1673, 1588, 12, 1107, 613}

$$\frac{gx}{\sqrt{a+bx^2+cx^4}}-\frac{e\left(b+2cx^2\right)}{\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}}$$

Antiderivative was successfully verified.

```
[In] Int[(a*g + e*x - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x]
```

```
[Out] (g*x)/Sqrt[a + b*x^2 + c*x^4] - (e*(b + 2*c*x^2))/((b^2 - 4*a*c)*Sqrt[a + b
*x^2 + c*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 613

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-3/2), x_Symbol] :> Simp[(-2*(b +
2*c*x))/((b^2 - 4*a*c)*Sqrt[a + b*x + c*x^2]), x] /; FreeQ[{a, b, c}, x] &&
 NeQ[b^2 - 4*a*c, 0]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2,
 Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1588

```
Int[(Pp_)*(Qq_)^(m_.), x_Symbol] :> With[{p = Expon[Pp, x], q = Expon[Qq, x
]}, Simp[(Coeff[Pp, x, p]*x^(p - q + 1)*Qq^(m + 1))/((p + m*q + 1)*Coeff[Qq
, x, q]), x] /; NeQ[p + m*q + 1, 0] && EqQ[(p + m*q + 1)*Coeff[Qq, x, q]*Pp
, Coeff[Pp, x, p]*x^(p - q)*((p - q + 1)*Qq + (m + 1)*x*D[Qq, x])]] /; Free
Q[m, x] && PolyQ[Pp, x] && PolyQ[Qq, x] && NeQ[m, -1]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}\int \frac{ag+ex-cgx^4}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx &= \int \frac{ex}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx + \int \frac{ag-cgx^4}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx\\ &= \frac{gx}{\sqrt{a+bx^2+cx^4}} + e\int \frac{x}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx\\ &= \frac{gx}{\sqrt{a+bx^2+cx^4}} + \frac{1}{2}e\,\mathrm{Subst}\left(\int \frac{1}{\left(a+bx+cx^2\right)^{3/2}}\,dx, x, x^2\right)\\ &= \frac{gx}{\sqrt{a+bx^2+cx^4}} - \frac{e\left(b+2cx^2\right)}{\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}}\end{aligned}$$

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

$Aborted

Verification is Not applicable to the result.

```
[In] Integrate[(a*g + e*x - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x]
```

```
[Out] $Aborted
```

fricas [A] time = 0.83, size = 82, normalized size = 1.44

$$-\frac{\sqrt{cx^4+bx^2+a}\left(2\,cex^2-\left(b^2-4\,ac\right)gx+be\right)}{\left(b^2c-4\,ac^2\right)x^4+ab^2-4\,a^2c+\left(b^3-4\,abc\right)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x^4+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="fricas")
```

```
[Out] -sqrt(c*x^4 + b*x^2 + a)*(2*c*e*x^2 - (b^2 - 4*a*c)*g*x + b*e)/((b^2*c - 4*
a*c^2)*x^4 + a*b^2 - 4*a^2*c + (b^3 - 4*a*b*c)*x^2)
```

giac [B] time = 2.01, size = 142, normalized size = 2.49

$$-\frac{\left(\frac{2\left(b^2ce-4\,ac^2e\right)x}{b^4-8\,ab^2c+16\,a^2c^2}-\frac{b^4g-8\,ab^2cg+16\,a^2c^2g}{b^4-8\,ab^2c+16\,a^2c^2}\right)x+\frac{b^3e-4\,abce}{b^4-8\,ab^2c+16\,a^2c^2}}{\sqrt{cx^4+bx^2+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x^4+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="giac")
```

```
[Out] -((2*(b^2*c*e - 4*a*c^2*e)*x/(b^4 - 8*a*b^2*c + 16*a^2*c^2) - (b^4*g - 8*a*
b^2*c*g + 16*a^2*c^2*g)/(b^4 - 8*a*b^2*c + 16*a^2*c^2))*x + (b^3*e - 4*a*b*
c*e)/(b^4 - 8*a*b^2*c + 16*a^2*c^2))/sqrt(c*x^4 + b*x^2 + a)
```

maple [A] time = 0.00, size = 52, normalized size = 0.91

$$\frac{4acgx-b^2gx+2ce\,x^2+be}{\sqrt{c\,x^4+b\,x^2+a}\,\left(4ac-b^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((-c*g*x^4+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x)
```

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

maxima [A] time = 0.64, size = 51, normalized size = 0.89

$$-\frac{2\,cex^2 + be - \left(b^2g - 4\,acg\right)x}{\sqrt{cx^4 + bx^2 + a}\left(b^2 - 4\,ac\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x^4+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="maxima")
```

```
[Out] -(2*c*e*x^2 + b*e - (b^2*g - 4*a*c*g)*x)/(sqrt(c*x^4 + b*x^2 + a)*(b^2 - 4*
a*c))
```

mupad [B] time = 0.93, size = 51, normalized size = 0.89

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

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*g + e*x - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x)
```

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

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

$$-\int\left(-\frac{ag}{a\sqrt{a + bx^2 + cx^4} + bx^2\sqrt{a + bx^2 + cx^4} + cx^4\sqrt{a + bx^2 + cx^4}}\right)dx - \int\left(-\frac{}{a\sqrt{a + bx^2 + cx^4} + bx^2\sqrt{a + b}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x**4+a*g+e*x)/(c*x**4+b*x**2+a)**(3/2),x)
```

```
[Out] -Integral(-a*g/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x*
*4) + c*x**4*sqrt(a + b*x**2 + c*x**4)), x) - Integral(-e*x/(a*sqrt(a + b*x
**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x**4) + c*x**4*sqrt(a + b*x**2 +
 c*x**4)), x) - Integral(c*g*x**4/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*sqr
t(a + b*x**2 + c*x**4) + c*x**4*sqrt(a + b*x**2 + c*x**4)), x)
```

3.110 $\int \frac{ag+fx^3-cgx^4}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx$

Optimal. Leaf size=57

$$\frac{f\left(2a+bx^2\right)}{\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}}+\frac{gx}{\sqrt{a+bx^2+cx^4}}$$

```
[Out] g*x/(c*x^4+b*x^2+a)^(1/2)+f*(b*x^2+2*a)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^(1/2)
```

Rubi [A] time = 0.08, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.152, Rules used = {1673, 1588, 12, 1114, 636}

$$\frac{f\left(2a+bx^2\right)}{\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}}+\frac{gx}{\sqrt{a+bx^2+cx^4}}$$

Antiderivative was successfully verified.

```
[In] Int[(a*g + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x]
```

```
[Out] (g*x)/Sqrt[a + b*x^2 + c*x^4] + (f*(2*a + b*x^2))/((b^2 - 4*a*c)*Sqrt[a + b
*x^2 + c*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 636

```
Int[((d_.) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(3/2), x_Symbo
l] :> Simp[(-2*(b*d - 2*a*e + (2*c*d - b*e)*x))/((b^2 - 4*a*c)*Sqrt[a + b*x
 + c*x^2]), x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b
^2 - 4*a*c, 0]
```

Rule 1114

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dis
t[1/2, Subst[Int[x^((m - 1)/2)*(a + b*x + c*x^2)^p, x], x, x^2], x] /; Free
Q[{a, b, c, p}, x] && IntegerQ[(m - 1)/2]
```

Rule 1588

```
Int[(Pp_)*(Qq_)^(m_.), x_Symbol] :> With[{p = Expon[Pp, x], q = Expon[Qq, x
]}, Simp[(Coeff[Pp, x, p]*x^(p - q + 1)*Qq^(m + 1))/((p + m*q + 1)*Coeff[Qq
, x, q]), x] /; NeQ[p + m*q + 1, 0] && EqQ[(p + m*q + 1)*Coeff[Qq, x, q]*Pp
, Coeff[Pp, x, p]*x^(p - q)*((p - q + 1)*Qq + (m + 1)*x*D[Qq, x])]] /; Free
Q[m, x] && PolyQ[Pp, x] && PolyQ[Qq, x] && NeQ[m, -1]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 &&  !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}\int \frac{ag+fx^3-cgx^4}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx &= \int \frac{fx^3}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx+\int \frac{ag-cgx^4}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx\\ &= \frac{gx}{\sqrt{a+bx^2+cx^4}}+f\int \frac{x^3}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx\\ &= \frac{gx}{\sqrt{a+bx^2+cx^4}}+\frac{1}{2}f\,\text{Subst}\left(\int \frac{x}{\left(a+bx+cx^2\right)^{3/2}}\,dx,x,x^2\right)\\ &= \frac{gx}{\sqrt{a+bx^2+cx^4}}+\frac{f\left(2a+bx^2\right)}{\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}}\end{aligned}$$

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

$Aborted

Verification is Not applicable to the result.

```
[In] Integrate[(a*g + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x]
```

```
[Out] $Aborted
```

fricas [A] time = 0.61, size = 80, normalized size = 1.40

$$\frac{\sqrt{cx^4+bx^2+a}\left(bfx^2+\left(b^2-4\,ac\right)gx+2\,af\right)}{\left(b^2c-4\,ac^2\right)x^4+ab^2-4\,a^2c+\left(b^3-4\,abc\right)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x^4+f*x^3+a*g)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="fricas")
```

```
[Out] sqrt(c*x^4 + b*x^2 + a)*(b*f*x^2 + (b^2 - 4*a*c)*g*x + 2*a*f)/((b^2*c - 4*a
*c^2)*x^4 + a*b^2 - 4*a^2*c + (b^3 - 4*a*b*c)*x^2)
```

giac [B] time = 1.95, size = 136, normalized size = 2.39

$$\frac{\left(\frac{\left(b^3f-4\,abcf\right)x}{b^4-8\,ab^2c+16\,a^2c^2}+\frac{b^4g-8\,ab^2cg+16\,a^2c^2g}{b^4-8\,ab^2c+16\,a^2c^2}\right)x+\frac{2\left(ab^2f-4\,a^2cf\right)}{b^4-8\,ab^2c+16\,a^2c^2}}{\sqrt{cx^4+bx^2+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x^4+f*x^3+a*g)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="giac")
```

```
[Out] (((b^3*f - 4*a*b*c*f)*x/(b^4 - 8*a*b^2*c + 16*a^2*c^2) + (b^4*g - 8*a*b^2*c
*g + 16*a^2*c^2*g)/(b^4 - 8*a*b^2*c + 16*a^2*c^2))*x + 2*(a*b^2*f - 4*a^2*c
*f)/(b^4 - 8*a*b^2*c + 16*a^2*c^2))/sqrt(c*x^4 + b*x^2 + a)
```

maple [A] time = 0.00, size = 53, normalized size = 0.93

$$\frac{4acgx-b^2gx-bf\,x^2-2af}{\sqrt{c\,x^4+b\,x^2+a}\,\left(4ac-b^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((-c*g*x^4+f*x^3+a*g)/(c*x^4+b*x^2+a)^(3/2),x)
```

```
[Out] (4*a*c*g*x-b^2*g*x-b*f*x^2-2*a*f)/(c*x^4+b*x^2+a)^(1/2)/(4*a*c-b^2)
```

maxima [A] time = 0.63, size = 49, normalized size = 0.86

$$\frac{bfx^2 + 2\,af + \left(b^2g - 4\,acg\right)x}{\sqrt{cx^4 + bx^2 + a}\left(b^2 - 4\,ac\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x^4+f*x^3+a*g)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="maxima")
```

```
[Out] (b*f*x^2 + 2*a*f + (b^2*g - 4*a*c*g)*x)/(sqrt(c*x^4 + b*x^2 + a)*(b^2 - 4*a
*c))
```

mupad [B] time = 0.96, size = 51, normalized size = 0.89

$$-\frac{g\,b^2\,x + f\,b\,x^2 - 4\,a\,c\,g\,x + 2\,a\,f}{\left(4\,a\,c - b^2\right)\,\sqrt{c\,x^4 + b\,x^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*g + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x)
```

```
[Out] -(2*a*f + b*f*x^2 + b^2*g*x - 4*a*c*g*x)/((4*a*c - b^2)*(a + b*x^2 + c*x^4)
^(1/2))
```

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

$$-\int\left(-\frac{ag}{a\sqrt{a + bx^2 + cx^4} + bx^2\sqrt{a + bx^2 + cx^4} + cx^4\sqrt{a + bx^2 + cx^4}}\right)dx - \int\left(-\frac{fx^3}{a\sqrt{a + bx^2 + cx^4} + bx^2\sqrt{a + bx^2}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x**4+f*x**3+a*g)/(c*x**4+b*x**2+a)**(3/2),x)
```

```
[Out] -Integral(-a*g/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x*
*4) + c*x**4*sqrt(a + b*x**2 + c*x**4)), x) - Integral(-f*x**3/(a*sqrt(a +
b*x**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x**4) + c*x**4*sqrt(a + b*x**
2 + c*x**4)), x) - Integral(c*g*x**4/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*
sqrt(a + b*x**2 + c*x**4) + c*x**4*sqrt(a + b*x**2 + c*x**4)), x)
```

3.111 $\int \frac{ag+ex+fx^3-cgx^4}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx$

Optimal. Leaf size=69

$$\frac{gx}{\sqrt{a+bx^2+cx^4}}-\frac{-2af+x^2(2ce-bf)+be}{\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}}$$

```
[Out] g*x/(c*x^4+b*x^2+a)^(1/2)+(-b*e+2*a*f-(-b*f+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4
+b*x^2+a)^(1/2)
```

Rubi [A] time = 0.09, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {1673, 1588, 1247, 636}

$$\frac{gx}{\sqrt{a+bx^2+cx^4}}-\frac{-2af+x^2(2ce-bf)+be}{\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}}$$

Antiderivative was successfully verified.

```
[In] Int[(a*g + e*x + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x]
```

```
[Out] (g*x)/Sqrt[a + b*x^2 + c*x^4] - (b*e - 2*a*f + (2*c*e - b*f)*x^2)/((b^2 - 4
*a*c)*Sqrt[a + b*x^2 + c*x^4])
```

Rule 636

```
Int[((d_.) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(3/2), x_Symbo
l] :> Simp[(-2*(b*d - 2*a*e + (2*c*d - b*e)*x))/((b^2 - 4*a*c)*Sqrt[a + b*x
 + c*x^2]), x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b
^2 - 4*a*c, 0]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
 x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1588

```
Int[(Pp_)*(Qq_)^(m_.), x_Symbol] :> With[{p = Expon[Pp, x], q = Expon[Qq, x
]}, Simp[(Coeff[Pp, x, p]*x^(p - q + 1)*Qq^(m + 1))/((p + m*q + 1)*Coeff[Qq
, x, q]), x] /; NeQ[p + m*q + 1, 0] && EqQ[(p + m*q + 1)*Coeff[Qq, x, q]*Pp
, Coeff[Pp, x, p]*x^(p - q)*((p - q + 1)*Qq + (m + 1)*x*D[Qq, x])]] /; Free
Q[m, x] && PolyQ[Pp, x] && PolyQ[Qq, x] && NeQ[m, -1]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
 = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 && !PolyQ[Pq, x^2]
```

Rubi steps

$$\int \frac{ag+ex+fx^3-cgx^4}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx = \int \frac{x\left(e+fx^2\right)}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx + \int \frac{ag-cgx^4}{\left(a+bx^2+cx^4\right)^{3/2}}\,dx$$
$$= \frac{gx}{\sqrt{a+bx^2+cx^4}} + \frac{1}{2}\text{Subst}\left(\int \frac{e+fx}{\left(a+bx+cx^2\right)^{3/2}}\,dx, x, x^2\right)$$
$$= \frac{gx}{\sqrt{a+bx^2+cx^4}} - \frac{be-2af+(2ce-bf)x^2}{\left(b^2-4ac\right)\sqrt{a+bx^2+cx^4}}$$

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

$Aborted

Verification is Not applicable to the result.

```
[In] Integrate[(a*g + e*x + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x]
[Out] $Aborted
```

fricas [A] time = 0.75, size = 92, normalized size = 1.33

$$\frac{\sqrt{cx^4+bx^2+a}\left(\left(b^2-4\,ac\right)gx-\left(2\,ce-bf\right)x^2-be+2\,af\right)}{\left(b^2c-4\,ac^2\right)x^4+ab^2-4\,a^2c+\left(b^3-4\,abc\right)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x^4+f*x^3+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="fric
as")
[Out] sqrt(c*x^4 + b*x^2 + a)*((b^2 - 4*a*c)*g*x - (2*c*e - b*f)*x^2 - b*e + 2*a*
f)/((b^2*c - 4*a*c^2)*x^4 + a*b^2 - 4*a^2*c + (b^3 - 4*a*b*c)*x^2)
```

giac [B] time = 2.10, size = 166, normalized size = 2.41

$$\frac{\left(\frac{\left(b^3f-4\,abcf-2\,b^2ce+8\,ac^2e\right)x}{b^4-8\,ab^2c+16\,a^2c^2}+\frac{b^4g-8\,ab^2cg+16\,a^2c^2g}{b^4-8\,ab^2c+16\,a^2c^2}\right)x+\frac{2\,ab^2f-8\,a^2cf-b^3e+4\,abce}{b^4-8\,ab^2c+16\,a^2c^2}}{\sqrt{cx^4+bx^2+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x^4+f*x^3+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="giac
")
[Out] (((b^3*f - 4*a*b*c*f - 2*b^2*c*e + 8*a*c^2*e)*x/(b^4 - 8*a*b^2*c + 16*a^2*c
^2) + (b^4*g - 8*a*b^2*c*g + 16*a^2*c^2*g)/(b^4 - 8*a*b^2*c + 16*a^2*c^2))*
x + (2*a*b^2*f - 8*a^2*c*f - b^3*e + 4*a*b*c*e)/(b^4 - 8*a*b^2*c + 16*a^2*c
^2))/sqrt(c*x^4 + b*x^2 + a)
```

maple [A] time = 0.00, size = 63, normalized size = 0.91

$$\frac{4acgx-b^2gx-bf\,x^2+2ce\,x^2-2af+be}{\sqrt{c\,x^4+b\,x^2+a}\,\left(4ac-b^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((-c*g*x^4+f*x^3+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x)
```

```
[Out] (4*a*c*g*x-b^2*g*x-b*f*x^2+2*c*e*x^2-2*a*f+b*e)/(c*x^4+b*x^2+a)^(1/2)/(4*a*
c-b^2)
```

maxima [A] time = 0.68, size = 94, normalized size = 1.36

$$-\frac{\sqrt{cx^4+bx^2+a}\left(\left(2\,ce-bf\right)x^2+be-2\,af-\left(b^2g-4\,acg\right)x\right)}{\left(b^2c-4\,ac^2\right)x^4+ab^2-4\,a^2c+\left(b^3-4\,abc\right)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x^4+f*x^3+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="maxi
ma")
```

```
[Out] -sqrt(c*x^4 + b*x^2 + a)*((2*c*e - b*f)*x^2 + b*e - 2*a*f - (b^2*g - 4*a*c*
g)*x)/((b^2*c - 4*a*c^2)*x^4 + a*b^2 - 4*a^2*c + (b^3 - 4*a*b*c)*x^2)
```

mupad [B] time = 0.98, size = 62, normalized size = 0.90

$$-\frac{g\,b^2\,x+f\,b\,x^2-e\,b-2\,c\,e\,x^2-4\,a\,c\,g\,x+2\,a\,f}{\left(4\,a\,c-b^2\right)\,\sqrt{c\,x^4+b\,x^2+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*g + e*x + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x)
```

```
[Out] -(2*a*f - b*e + b*f*x^2 - 2*c*e*x^2 + b^2*g*x - 4*a*c*g*x)/((4*a*c - b^2)*(
a + b*x^2 + c*x^4)^(1/2))
```

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

$$-\int\left(-\frac{ag}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}\right)dx-\int\left(-\frac{e}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+b}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-c*g*x**4+f*x**3+a*g+e*x)/(c*x**4+b*x**2+a)**(3/2),x)
```

```
[Out] -Integral(-a*g/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x*
*4) + c*x**4*sqrt(a + b*x**2 + c*x**4)), x) - Integral(-e*x/(a*sqrt(a + b*x
**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x**4) + c*x**4*sqrt(a + b*x**2 +
 c*x**4)), x) - Integral(-f*x**3/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*sqrt
(a + b*x**2 + c*x**4) + c*x**4*sqrt(a + b*x**2 + c*x**4)), x) - Integral(c*
g*x**4/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x**4) + c*
x**4*sqrt(a + b*x**2 + c*x**4)), x)
```

Chapter 4

Listing of Grading functions

The following are the current version of the grading functions used for grading the quality of the antiderivative with reference to the optimal antiderivative included in the test suite.

There is a version for Maple and for Mathematica/Rubi. There is a version for grading Sympy and version for use with Sagemath.

The following are links to the current source code.

The following are the listings of source code of the grading functions.

4.0.1 Mathematica and Rubi grading function

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)

(* ::Subsection:: *)
(*GradeAntiderivative[result,optimal]*)


(* ::Text:: *)
(*If result and optimal are mathematical expressions, *)
(*          GradeAntiderivative[result,optimal] returns*)
(*  "F" if the result fails to integrate an expression that*)
(*      is integrable*)
(*  "C" if result involves higher level functions than necessary*)
(*  "B" if result is more than twice the size of the optimal*)
(*      antiderivative*)
(*  "A" if result can be considered optimal*)


GradeAntiderivative[result_,optimal_] :=
  If[ExpnType[result]<=ExpnType[optimal],
    If[FreeQ[result,Complex] || Not[FreeQ[optimal,Complex]],
      If[LeafCount[result]<=2*LeafCount[optimal],
        "A",
      "B"],
    "C"],
  If[FreeQ[result,Integrate] && FreeQ[result,Int],
    "C",
  "F"]]


(* ::Text:: *)
(*The following summarizes the type number assigned an *)
(*expression based on the functions it involves*)
(*1 = rational function*)
(*2 = algebraic function*)
```

```
(*3 = elementary function*)
(*4 = special function*)
(*5 = hyperpergeometric function*)
(*6 = appell function*)
(*7 = rootsum function*)
(*8 = integrate function*)
(*9 = unknown function*)


ExpnType[expn_] :=
  If[AtomQ[expn],
    1,
  If[ListQ[expn],
    Max[Map[ExpnType,expn]],
  If[Head[expn]===Power,
    If[IntegerQ[expn[[2]]],
      ExpnType[expn[[1]]],
    If[Head[expn[[2]]]===Rational,
      If[IntegerQ[expn[[1]]] || Head[expn[[1]]]===Rational,
        1,
      Max[ExpnType[expn[[1]]],2]],
    Max[ExpnType[expn[[1]]],ExpnType[expn[[2]]],3]]],
  If[Head[expn]===Plus || Head[expn]===Times,
    Max[ExpnType[First[expn]],ExpnType[Rest[expn]]],
  If[ElementaryFunctionQ[Head[expn]],
    Max[3,ExpnType[expn[[1]]]]],
  If[SpecialFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],4]],
  If[HypergeometricFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],5]],
  If[AppellFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],6]],
  If[Head[expn]===RootSum,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
  If[Head[expn]===Integrate || Head[expn]===Int,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],8]],
  9]]]]]]]]]]


ElementaryFunctionQ[func_] :=
  MemberQ[{
        Exp,Log,
        Sin,Cos,Tan,Cot,Sec,Csc,
        ArcSin,ArcCos,ArcTan,ArcCot,ArcSec,ArcCsc,
        Sinh,Cosh,Tanh,Coth,Sech,Csch,
        ArcSinh,ArcCosh,ArcTanh,ArcCoth,ArcSech,ArcCsch
},func]


SpecialFunctionQ[func_] :=
  MemberQ[{
        Erf, Erfc, Erfi,
        FresnelS, FresnelC,
        ExpIntegralE, ExpIntegralEi, LogIntegral,
        SinIntegral, CosIntegral, SinhIntegral, CoshIntegral,
        Gamma, LogGamma, PolyGamma,
        Zeta, PolyLog, ProductLog,
        EllipticF, EllipticE, EllipticPi
},func]


HypergeometricFunctionQ[func_] :=
  MemberQ[{Hypergeometric1F1,Hypergeometric2F1,HypergeometricPFQ},func]
```

```
AppellFunctionQ[func_] :=
  MemberQ[{AppellF1},func]
```

4.0.2 Maple grading function

```
# File: GradeAntiderivative.mpl
# Original version thanks to Albert Rich emailed on 03/21/2017

#Nasser 03/22/2017  Use Maple leaf count instead since buildin
#Nasser 03/23/2017  missing 'ln' for ElementaryFunctionQ added
#Nasser 03/24/2017  corrected the check for complex result
#Nasser 10/27/2017  check for leafsize and do not call ExpnType()
#                   if leaf size is "too large". Set at 500,000
#Nasser 12/22/2019  Added debug flag, added 'dilog' to special functions
#                   see problem 156, file Apostol_Problems

GradeAntiderivative := proc(result,optimal)
local leaf_count_result, leaf_count_optimal,ExpnType_result,ExpnType_optimal,
   debug:=false;

      leaf_count_result:=leafcount(result);
      #do NOT call ExpnType() if leaf size is too large. Recursion problem
      if leaf_count_result > 500000 then
          return "B";
      fi;

      leaf_count_optimal:=leafcount(optimal);

      ExpnType_result:=ExpnType(result);
      ExpnType_optimal:=ExpnType(optimal);

      if debug then
         print("ExpnType_result",ExpnType_result," ExpnType_optimal=",
   ExpnType_optimal);
      fi;

# If result and optimal are mathematical expressions,
#  GradeAntiderivative[result,optimal] returns
#   "F" if the result fails to integrate an expression that
#       is integrable
#   "C" if result involves higher level functions than necessary
#   "B" if result is more than twice the size of the optimal
#       antiderivative
#   "A" if result can be considered optimal

  #This check below actually is not needed, since I only
  #call this grading only for passed integrals. i.e. I check
  #for "F" before calling this. But no harm of keeping it here.
  #just in case.


  if not type(result,freeof('int')) then
     return "F";
  end if;


  if ExpnType_result<=ExpnType_optimal then
      if debug then
          print("ExpnType_result<=ExpnType_optimal");
      fi;
```

```
      if is_contains_complex(result) then
         if is_contains_complex(optimal) then
            if debug then
               print("both result and optimal complex");
            fi;
            #both result and optimal complex
            if leaf_count_result<=2*leaf_count_optimal then
               return "A";
            else
               return "B";
            end if
         else #result contains complex but optimal is not
            if debug then
               print("result contains complex but optimal is not");
            fi;
            return "C";
         end if
      else # result do not contain complex
           # this assumes optimal do not as well
           if debug then
               print("result do not contain complex, this assumes optimal do
   not as well");
           fi;
           if leaf_count_result<=2*leaf_count_optimal then
              if debug then
                 print("leaf_count_result<=2*leaf_count_optimal");
              fi;
              return "A";
           else
              if debug then
                 print("leaf_count_result>2*leaf_count_optimal");
              fi;
              return "B";
           end if
      end if
  else #ExpnType(result) > ExpnType(optimal)
      if debug then
         print("ExpnType(result) > ExpnType(optimal)");
      fi;
      return "C";
  end if

end proc:

#
# is_contains_complex(result)
# takes expressions and returns true if it contains "I" else false
#
#Nasser 032417
is_contains_complex:= proc(expression)
  return (has(expression,I));
end proc:

# The following summarizes the type number assigned an expression
# based on the functions it involves
# 1 = rational function
# 2 = algebraic function
# 3 = elementary function
# 4 = special function
# 5 = hyperpergeometric function
# 6 = appell function
# 7 = rootsum function
# 8 = integrate function
```

```
# 9 = unknown function

ExpnType := proc(expn)
  if type(expn,'atomic') then
    1
  elif type(expn,'list') then
    apply(max,map(ExpnType,expn))
  elif type(expn,'sqrt') then
    if type(op(1,expn),'rational') then
       1
    else
       max(2,ExpnType(op(1,expn)))
    end if
  elif type(expn,'`^`') then
    if type(op(2,expn),'integer') then
      ExpnType(op(1,expn))
    elif type(op(2,expn),'rational') then
      if type(op(1,expn),'rational') then
         1
      else
         max(2,ExpnType(op(1,expn)))
      end if
    else
         max(3,ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    end if
  elif type(expn,'`+`') or type(expn,'`*`') then
    max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
  elif ElementaryFunctionQ(op(0,expn)) then
    max(3,ExpnType(op(1,expn)))
  elif SpecialFunctionQ(op(0,expn)) then
    max(4,apply(max,map(ExpnType,[op(expn)])))
  elif HypergeometricFunctionQ(op(0,expn)) then
    max(5,apply(max,map(ExpnType,[op(expn)])))
  elif AppellFunctionQ(op(0,expn)) then
    max(6,apply(max,map(ExpnType,[op(expn)])))
  elif op(0,expn)='int' then
    max(8,apply(max,map(ExpnType,[op(expn)]))) else
  9
  end if
end proc:


ElementaryFunctionQ := proc(func)
  member(func,[
        exp,log,ln,
        sin,cos,tan,cot,sec,csc,
        arcsin,arccos,arctan,arccot,arcsec,arccsc,
        sinh,cosh,tanh,coth,sech,csch,
        arcsinh,arccosh,arctanh,arccoth,arcsech,arccsch])
end proc:

SpecialFunctionQ := proc(func)
  member(func,[
        erf,erfc,erfi,
        FresnelS,FresnelC,
        Ei,Ei,Li,Si,Ci,Shi,Chi,
        GAMMA,lnGAMMA,Psi,Zeta,polylog,dilog,LambertW,
        EllipticF,EllipticE,EllipticPi])
end proc:

HypergeometricFunctionQ := proc(func)
  member(func,[Hypergeometric1F1,hypergeom,HypergeometricPFQ])
end proc:
```

```
AppellFunctionQ := proc(func)
  member(func,[AppellF1])
end proc:

# u is a sum or product.  rest(u) returns all but the
# first term or factor of u.
rest := proc(u) local v;
  if nops(u)=2 then
     op(2,u)
  else
     apply(op(0,u),op(2..nops(u),u))
  end if
end proc:

#leafcount(u) returns the number of nodes in u.
#Nasser 3/23/17  Replaced by build-in leafCount from package in Maple
leafcount := proc(u)
   MmaTranslator[Mma][LeafCount](u);
end proc:
```

4.0.3 Sympy grading function

```
#Dec 24, 2019. Nasser M. Abbasi:
#              Port of original Maple grading function by
#              Albert Rich to use with Sympy/Python
#Dec 27, 2019  Nasser. Added `RootSum`. See problem 177, Timofeev file
#              added 'exp_polar'
from sympy import *

def leaf_count(expr):
    #sympy do not have leaf count function. This is approximation
    return round(1.7*count_ops(expr))

def is_sqrt(expr):
    if isinstance(expr,Pow):
        if expr.args[1] == Rational(1,2):
            return True
        else:
            return False
    else:
        return False

def is_elementary_function(func):
    return func in [exp,log,ln,sin,cos,tan,cot,sec,csc,
            asin,acos,atan,acot,asec,acsc,sinh,cosh,tanh,coth,sech,csch,
            asinh,acosh,atanh,acoth,asech,acsch
        ]

def is_special_function(func):
    return func in [ erf,erfc,erfi,
             fresnels,fresnelc,Ei,Ei,Li,Si,Ci,Shi,Chi,
             gamma,loggamma,digamma,zeta,polylog,LambertW,
             elliptic_f,elliptic_e,elliptic_pi,exp_polar
         ]

def is_hypergeometric_function(func):
    return func in [hyper]

def is_appell_function(func):
    return func in [appellf1]
```

```
def is_atom(expn):
    try:
        if expn.isAtom or isinstance(expn,int) or isinstance(expn,float):
           return True
        else:
           return False

    except AttributeError as error:
        return False

def expnType(expn):
    debug=False
    if debug:
        print("expn=",expn,"type(expn)=",type(expn))

    if is_atom(expn):
       return 1
    elif isinstance(expn,list):
        return max(map(expnType, expn))   #apply(max,map(ExpnType,expn))
    elif  is_sqrt(expn):
        if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
            return 1
        else:
            return max(2,expnType(expn.args[0]))  #max(2,ExpnType(op(1,expn)))
    elif isinstance(expn,Pow):   #type(expn,'`^`')
        if isinstance(expn.args[1],Integer):  #type(op(2,expn),'integer')
            return expnType(expn.args[0])   #ExpnType(op(1,expn))
        elif isinstance(expn.args[1],Rational):  #type(op(2,expn),'rational')
            if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
                return 1
            else:
                return max(2,expnType(expn.args[0]))  #max(2,ExpnType(op(1,expn
   )))
        else:
            return max(3,expnType(expn.args[0]),expnType(expn.args[1])) #max(3,
   ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    elif isinstance(expn,Add) or isinstance(expn,Mul): #type(expn,'`+`') or
   type(expn,'`*`')
        m1 = expnType(expn.args[0])
        m2 = expnType(list(expn.args[1:]))
        return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.func):  #ElementaryFunctionQ(op(0,expn))
        return max(3,expnType(expn.args[0]))  #max(3,ExpnType(op(1,expn)))
    elif is_special_function(expn.func): #SpecialFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(4,m1)   #max(4,apply(max,map(ExpnType,[op(expn)])))
    elif is_hypergeometric_function(expn.func): #HypergeometricFunctionQ(op(0,
   expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(5,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif is_appell_function(expn.func):
        m1 = max(map(expnType, list(expn.args)))
        return max(6,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif isinstance(expn,RootSum):
        m1 = max(map(expnType, list(expn.args))) #Apply[Max,Append[Map[ExpnType
   ,Apply[List,expn]],7]],
        return max(7,m1)
    elif str(expn).find("Integral") != -1:
        m1 = max(map(expnType, list(expn.args)))
        return max(8,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9
```

```
#main function
def grade_antiderivative(result,optimal):

    leaf_count_result  = leaf_count(result)
    leaf_count_optimal = leaf_count(optimal)

    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if str(result).find("Integral") != -1:
        return "F"

    if expnType_result <= expnType_optimal:
        if result.has(I):
            if optimal.has(I): #both result and optimal complex
                if leaf_count_result <= 2*leaf_count_optimal:
                    return "A"
                else:
                    return "B"
            else: #result contains complex but optimal is not
                return "C"
        else: # result do not contain complex, this assumes optimal do not as
   well
            if leaf_count_result <= 2*leaf_count_optimal:
                return "A"
            else:
                return "B"
    else:
        return "C"
```

4.0.4 SageMath grading function

```
#Dec 24, 2019. Nasser: Ported original Maple grading function by
#              Albert Rich to use with Sagemath. This is used to
#              grade Fricas, Giac and Maxima results.
#Dec 24, 2019. Nasser: Added 'exp_integral_e' and 'sng', 'sin_integral'
#              'arctan2','floor','abs','log_integral'

from sage.all import *
from sage.symbolic.operators import add_vararg, mul_vararg

debug=False;

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

def is_sqrt(expr):
    if expr.operator() == operator.pow:   #isinstance(expr,Pow):
        if expr.operands()[1]==1/2: #expr.args[1] == Rational(1,2):
            if debug: print ("expr is sqrt")
            return True
```

```
        else:
            return False
    else:
        return False

def is_elementary_function(func):
    debug=False
    m = func.name() in ['exp','log','ln',
            'sin','cos','tan','cot','sec','csc',
            'arcsin','arccos','arctan','arccot','arcsec','arccsc',
            'sinh','cosh','tanh','coth','sech','csch',
            'arcsinh','arccosh','arctanh','arccoth','arcsech','arccsch','sgn',
        'arctan2','floor','abs'
        ]
    if debug:
        if m:
            print ("func ", func , " is elementary_function")
        else:
            print ("func ", func , " is NOT elementary_function")


    return m

def is_special_function(func):
    debug=False
    if debug: print ("type(func)=", type(func))

    m= func.name() in ['erf','erfc','erfi','fresnel_sin','fresnel_cos','Ei',
           'Ei','Li','Si','sin_integral','Ci','cos_integral','Shi','
   sinh_integral'
           'Chi','cosh_integral','gamma','log_gamma','psi,zeta',
           'polylog','lambert_w','elliptic_f','elliptic_e',
           'elliptic_pi','exp_integral_e','log_integral']

    if debug:
        print ("m=",m)
        if m:
            print ("func ", func ," is special_function")
        else:
            print ("func ", func ," is NOT special_function")


    return m


def is_hypergeometric_function(func):
    return func.name() in ['hypergeometric','hypergeometric_M','
   hypergeometric_U']

def is_appell_function(func):
    return func.name() in ['hypergeometric']   #[appellf1] can't find this in
   sagemath

def is_atom(expn):

    debug=False
    if debug: print ("Enter is_atom")


    #thanks to answer at https://ask.sagemath.org/question/49179/what-is-
   sagemath-equivalent-to-atomic-type-in-maple/
    try:
        if expn.parent() is SR:
```

```
            return expn.operator() is None
        if expn.parent() in (ZZ, QQ, AA, QQbar):
            return expn in expn.parent() # Should always return True
        if hasattr(expn.parent(),"base_ring") and hasattr(expn.parent(),"gens")
    :
            return expn in expn.parent().base_ring() or expn in expn.parent().
    gens()
        return False

    except AttributeError as error:
        return False


def expnType(expn):

    if debug:
        print (">>>>>Enter expnType, expn=", expn)
        print (">>>>>is_atom(expn)=", is_atom(expn))

    if is_atom(expn):
        return 1
    elif type(expn)==list:   #isinstance(expn,list):
        return max(map(expnType, expn))   #apply(max,map(ExpnType,expn))
    elif  is_sqrt(expn):
        if  type(expn.operands()[0])==Rational: #type(isinstance(expn.args[0],
    Rational):
            return 1
        else:
            return max(2,expnType(expn.operands()[0]))  #max(2,expnType(expn.
    args[0]))
    elif expn.operator() == operator.pow:   #isinstance(expn,Pow)
        if type(expn.operands()[1])==Integer:  #isinstance(expn.args[1],Integer
    )
            return expnType(expn.operands()[0])   #expnType(expn.args[0])
        elif type(expn.operands()[1])==Rational:  #isinstance(expn.args[1],
    Rational)
            if type(expn.operands()[0])==Rational: #isinstance(expn.args[0],
    Rational)
                return 1
            else:
                return max(2,expnType(expn.operands()[0]))  #max(2,expnType(
    expn.args[0]))
        else:
            return max(3,expnType(expn.operands()[0]),expnType(expn.operands()
    [1])) #max(3,expnType(expn.operands()[0]),expnType(expn.operands()[1]))
    elif expn.operator() == add_vararg or expn.operator() == mul_vararg: #
    isinstance(expn,Add) or isinstance(expn,Mul)
        m1 = expnType(expn.operands()[0]) #expnType(expn.args[0])
        m2 = expnType(expn.operands()[1:]) #expnType(list(expn.args[1:]))
        return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.operator()):  #is_elementary_function(expn
    .func)
        return max(3,expnType(expn.operands()[0]))
    elif is_special_function(expn.operator()): #is_special_function(expn.func)
        m1 = max(map(expnType, expn.operands()))      #max(map(expnType, list(
    expn.args)))
        return max(4,m1)   #max(4,m1)
    elif is_hypergeometric_function(expn.operator()): #
    is_hypergeometric_function(expn.func)
        m1 = max(map(expnType, expn.operands()))       #max(map(expnType, list(
    expn.args)))
        return max(5,m1)   #max(5,m1)
    elif is_appell_function(expn.operator()):
```

```
        m1 = max(map(expnType, expn.operands()))       #max(map(expnType, list(
    expn.args)))
        return max(6,m1)   #max(6,m1)
    elif str(expn).find("Integral") != -1: #this will never happen, since it
                #is checked before calling the grading function that is passed.
                #but kept it here.
        m1 = max(map(expnType, expn.operands()))       #max(map(expnType, list(
    expn.args)))
        return max(8,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
def grade_antiderivative(result,optimal):

    if debug: print ("Enter grade_antiderivative for sagemath")

    leaf_count_result  = tree_size(result) #leaf_count(result)
    leaf_count_optimal = tree_size(optimal) #leaf_count(optimal)

    if debug: print ("leaf_count_result=", leaf_count_result, "
    leaf_count_optimal=",leaf_count_optimal)


    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if debug: print ("expnType_result=", expnType_result, "expnType_optimal=",
    expnType_optimal)

    if expnType_result <= expnType_optimal:
        if result.has(I):
            if optimal.has(I): #both result and optimal complex
                if leaf_count_result <= 2*leaf_count_optimal:
                    return "A"
                else:
                    return "B"
            else: #result contains complex but optimal is not
                return "C"
        else: # result do not contain complex, this assumes optimal do not as
    well
            if leaf_count_result <= 2*leaf_count_optimal:
                return "A"
            else:
                return "B"
    else:
        return "C"
```