

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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Chapter 1

Introduction

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This report gives the result of running the computer algebra independent integration test. Elementary Algebraic integrals version.

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

The number of integrals in this report is [106]. This is test number [29].

1.1 Listing of CAS systems tested

The following systems were tested at this time.

1. Mathematica 12.3.1 (64 bit) on windows 10.
2. Rubi 4.16.1 in Mathematica 12.3.1 on windows 10.
3. Maple 2021.1 (64 bit) on windows 10.
4. Maxima 5.45 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)
9. IntegrateAlgebraic under Mathematica 12.3.1 on windows 10. https://github.com/stblake/algebraic_integration. September 15, 2021 version.

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 (106)	0.00 (0)
Maple	100.00 (106)	0.00 (0)
Mupad	100.00 (106)	0.00 (0)
Mathematica	96.23 (102)	3.77 (4)
Giac	94.34 (100)	5.66 (6)
Fricas	78.30 (83)	21.70 (23)
Maxima	78.30 (83)	21.70 (23)
Sympy	44.34 (47)	% 55.66 (59)
IntegrateAlgebraic	4.72 (5)	95.28 (101)

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 <ol style="list-style-type: none"> 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.

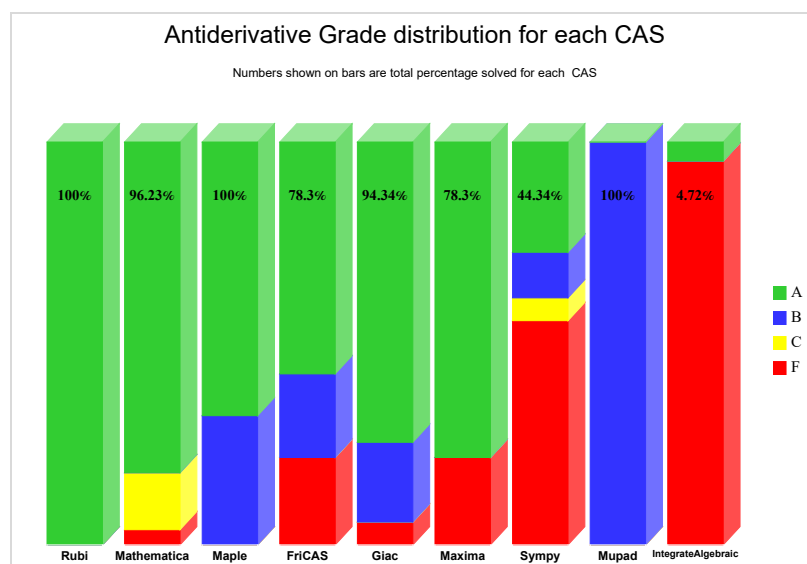
Table 1.2: Description of grading applied to integration result

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

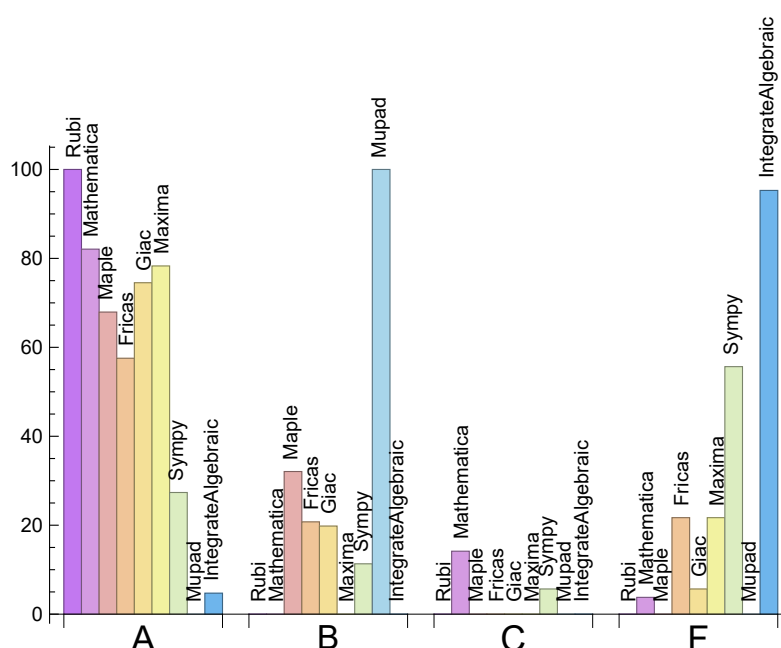
System	% A grade	% B grade	% C grade	% F grade
Rubi	100.00	0.00	0.00	0.00
Mathematica	82.08	0.00	14.15	3.77
Maxima	78.30	0.00	0.00	21.70
Giac	74.53	19.81	0.00	5.66
Maple	67.92	32.08	0.00	0.00
Fricas	57.55	20.75	0.00	21.70
Sympy	27.36	11.32	5.66	55.66
IntegrateAlgebraic	4.72	0.00	0.00	95.28
Mupad	N/A	100.00	0.00	0.00

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 is 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	4	0.00 %	100.00 %	0.00 %
Maple	0	0.00 %	0.00 %	0.00 %
Fricas	23	0.00 %	100.00 %	0.00 %
IntegrateAlgebraic	101	100.00 %	0.00 %	0.00 %
Giac	6	0.00 %	100.00 %	0.00 %
Maxima	23	100.00 %	0.00 %	0.00 %
Sympy	59	6.78 %	93.22 %	0.00 %
Mupad	0	0.00 %	0.00 %	0.00 %

Table 1.4: Failure statistics for each CAS

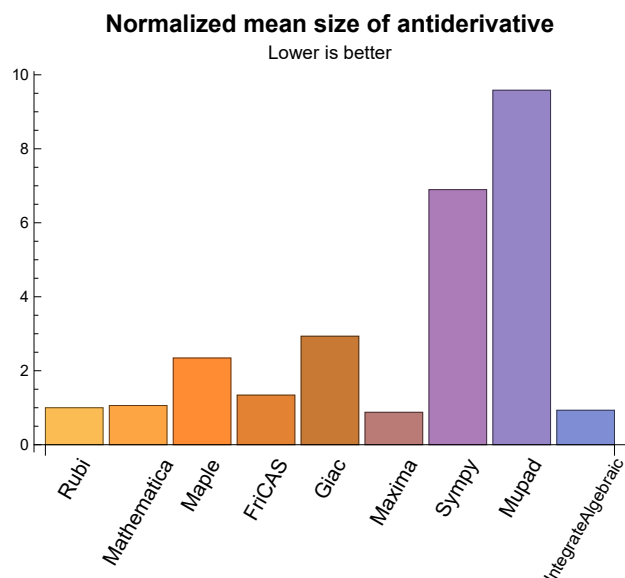
1.3 Performance

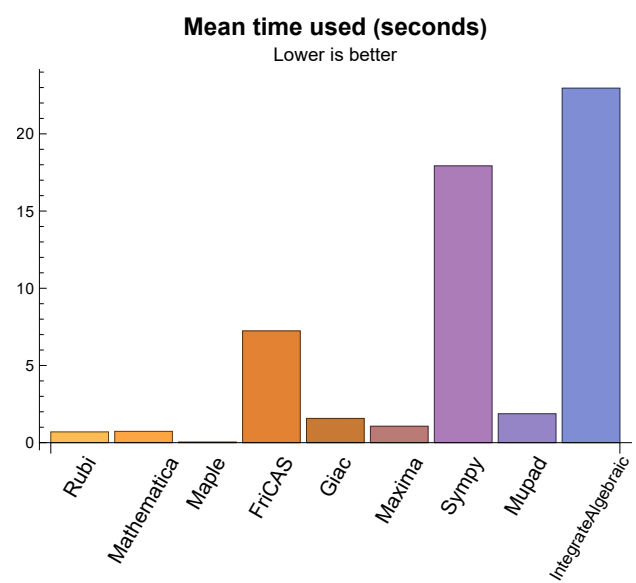
The table below summarizes the performance of each CAS system in terms of CPU time and leaf size of results.

System	Mean time (sec)	Mean size	Normalized mean	Median size	Normalized median
Rubi	0.70	202.47	1.00	133.50	1.00
Mathematica	0.73	236.24	1.06	145.00	1.02
Maple	0.04	854.27	2.34	182.00	1.51
Maxima	1.06	100.89	0.88	88.00	0.87
Fricas	7.24	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
IntegrateAlgebraic	22.96	40.60	0.93	51.00	0.93

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 {}

IntegrateAlgebraic {}

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}

IntegrateAlgebraic {}

Maple Verification phase not implemented yet.

Maxima Verification phase not implemented yet.

Fricas Verification phase not implemented yet.

Sympy Verification phase not implemented yet.

Giac Verification phase not implemented yet.

Mupad Verification phase not implemented yet.

1.7 Timing

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

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

For all other CAS systems, the elapsed time to complete each integral was found by taking the difference between the time after the call 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 percentage 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 builtin system function LeafSize is used to find the leaf size of each antiderivative.

The other CAS systems (SageMath and Sympy) do not have special builtin function for this purpose at this time. Therefore the leaf size for Fricas and Sympy 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.

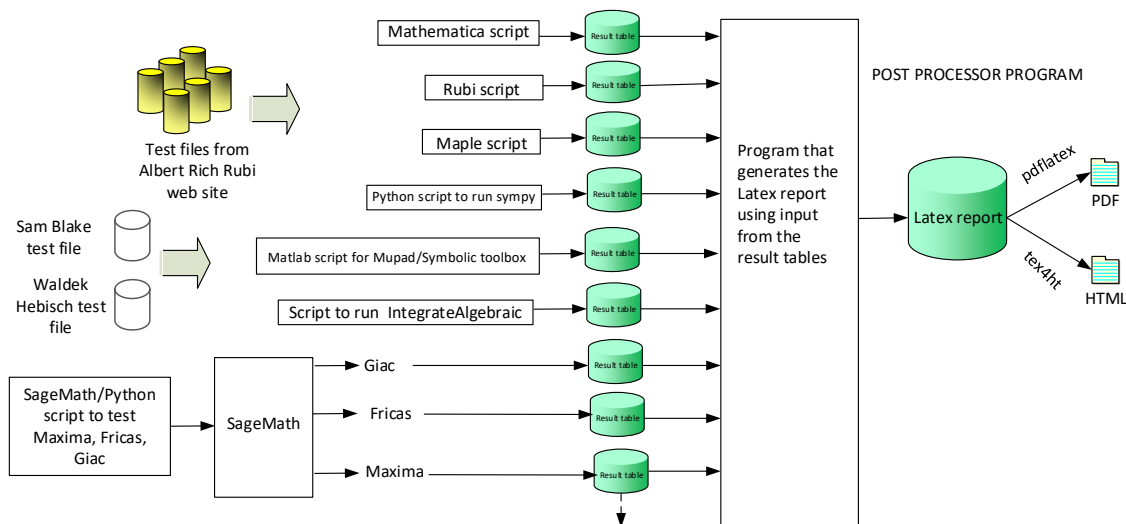
The following is an example of using Matlab's symbolic toolbox (Mupad) to solve an integral

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

Which gives $\sin(x) \sim 2/2$

1.10 Design of the test system

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



One record (line) per one integral result. The line is CSV comma separated. This is description of each record

1. integer. the problem number.
2. integer. 0 for failed, 1 for passed, -1 for timeout, -2 for CAS specific exception. (this is not the grade field)
3. integer. Leaf size of result.
4. integer. Leaf size of the optimal antiderivative.
5. number. CPU time used to solve this integral. 0 if failed.
6. string. The integral in Latex format
7. string. The input used in CAS own syntax.
8. string. The result (antiderivative) produced by CAS in Latex format
9. string. The optimal antiderivative in Latex format.
10. integer. 0 or 1. Indicates if problem has known antiderivative or not
11. String. The result (antiderivative) in CAS own syntax.
12. String. The grade of the antiderivative. Can be "A", "B", "C", or "F"
The following field present only in Rubi and Mathematica Tables
13. integer. 1 if result was verified or 0 if not verified.
The following fields present only in Rubi Tables
14. integer. Number of rules used.
15. integer. Integrand leaf size.
16. real number. Ratio of field 14 over field 15
17. integer. 1 if result was verified or 0 if not verified.
18. String of form "{n,n,...}" which is list of the rules used by Rubi

High level overview of the CAS independent integration test build system

Chapter 2

detailed summary tables of results

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2.1 List of integrals sorted by grade for each CAS

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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 }

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 }

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

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, 103, 104, 105, 106 }

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 }

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, 103, 104, 105, 106 }

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 }

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, 103, 104, 105, 106 }

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 }

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 }

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, 103, 104, 105, 106 }

C grade: { }

F grade: { 40, 41, 56, 57, 58, 59 }

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, 103, 104, 105, 106 }

C grade: { }

F grade: { }

2.1.9 IntegrateAlgebraic

A grade: { 63, 103, 104, 105, 106 }

B grade: { }

C grade: { }

F 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, 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 }

2.2 Detailed conclusion table per each integral for all CAS systems

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

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

Problem 1	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	50	50	50	41	40	40	46	43	40	0
N.S.	1	1.00	1.00	0.82	0.80	0.80	0.92	0.86	0.80	0.00
time (sec)	N/A	0.041	0.002	0.000	1.249	0.850	0.064	0.320	0.027	0.000
Problem 2	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	69	69	69	58	57	61	65	64	59	0
N.S.	1	1.00	1.00	0.84	0.83	0.88	0.94	0.93	0.86	0.00
time (sec)	N/A	0.045	0.021	0.002	1.207	0.703	0.069	0.244	0.033	0.000
Problem 3	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	88	88	88	75	74	82	83	85	78	0
N.S.	1	1.00	1.00	0.85	0.84	0.93	0.94	0.97	0.89	0.00
time (sec)	N/A	0.073	0.019	0.002	1.559	0.556	0.074	0.218	0.662	0.000
Problem 4	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	105	105	105	90	89	103	102	106	95	0
N.S.	1	1.00	1.00	0.86	0.85	0.98	0.97	1.01	0.90	0.00
time (sec)	N/A	0.095	0.034	0.002	1.643	0.865	0.079	0.360	0.659	0.000
Problem 5	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	122	122	122	105	104	124	121	127	112	0
N.S.	1	1.00	1.00	0.86	0.85	1.02	0.99	1.04	0.92	0.00
time (sec)	N/A	0.111	0.038	0.001	1.174	0.845	0.083	0.319	0.058	0.000

Problem 6	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	112	112	97	95	94	100	116	106	94	0
N.S.	1	1.00	0.87	0.85	0.84	0.89	1.04	0.95	0.84	0.00
time (sec)	N/A	0.126	0.049	0.001	1.060	0.828	0.084	0.389	0.056	0.000
Problem 7	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	154	154	154	139	138	151	165	157	138	0
N.S.	1	1.00	1.00	0.90	0.90	0.98	1.07	1.02	0.90	0.00
time (sec)	N/A	0.130	0.045	0.000	1.027	0.747	0.093	0.256	0.697	0.000
Problem 8	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	196	196	196	183	182	202	209	208	182	0
N.S.	1	1.00	1.00	0.93	0.93	1.03	1.07	1.06	0.93	0.00
time (sec)	N/A	0.168	0.057	0.000	1.400	0.631	0.102	0.299	0.716	0.000
Problem 9	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	234	234	234	219	218	253	258	259	220	0
N.S.	1	1.00	1.00	0.94	0.93	1.08	1.10	1.11	0.94	0.00
time (sec)	N/A	0.238	0.083	0.000	1.138	0.974	0.110	0.258	0.114	0.000
Problem 10	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	45	45	50	58	43	43	515	51	51	0
N.S.	1	1.00	1.11	1.29	0.96	0.96	11.44	1.13	1.13	0.00
time (sec)	N/A	0.032	0.018	0.012	1.125	0.940	3.147	0.251	0.709	0.000
Problem 11	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	A	A	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	51	51	58	86	51	51	2195	59	63	0
N.S.	1	1.00	1.14	1.69	1.00	1.00	43.04	1.16	1.24	0.00
time (sec)	N/A	0.057	0.026	0.009	1.122	0.894	110.122	0.306	0.715	0.001

Problem 12	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	A	A	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	57	57	68	114	61	61	0	69	75	0
N.S.	1	1.00	1.19	2.00	1.07	1.07	0.00	1.21	1.32	0.00
time (sec)	N/A	0.072	0.032	0.008	1.355	1.632	0.000	0.310	0.742	0.001
Problem 13	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	A	A	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	64	64	81	145	72	72	0	80	90	0
N.S.	1	1.00	1.27	2.27	1.12	1.12	0.00	1.25	1.41	0.00
time (sec)	N/A	0.147	0.045	0.010	1.238	4.716	0.000	0.434	0.815	0.001
Problem 14	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	A	A	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	76	76	98	179	88	88	0	96	108	0
N.S.	1	1.00	1.29	2.36	1.16	1.16	0.00	1.26	1.42	0.00
time (sec)	N/A	0.192	0.064	0.009	1.245	20.105	0.000	0.261	1.190	0.001
Problem 15	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	A	A	A	C	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	92	92	98	92	65	65	923	67	118	0
N.S.	1	1.00	1.07	1.00	0.71	0.71	10.03	0.73	1.28	0.00
time (sec)	N/A	0.077	0.178	0.007	2.209	1.119	2.887	0.378	0.242	0.000
Problem 16	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	A	A	A	C	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	104	104	121	148	75	75	3589	77	159	0
N.S.	1	1.00	1.16	1.42	0.72	0.72	34.51	0.74	1.53	0.00
time (sec)	N/A	0.085	0.138	0.003	2.579	1.087	98.602	0.228	0.951	0.000
Problem 17	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	A	A	A	F(-1)	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	127	127	150	204	83	83	0	85	199	0
N.S.	1	1.00	1.18	1.61	0.65	0.65	0.00	0.67	1.57	0.00
time (sec)	N/A	0.101	0.481	0.003	2.385	1.857	0.000	0.291	1.127	0.001

Problem 18	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	B	A	A	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	136	136	165	241	92	92	0	94	1209	0
N.S.	1	1.00	1.21	1.77	0.68	0.68	0.00	0.69	8.89	0.00
time (sec)	N/A	0.140	0.603	0.006	2.618	4.519	0.000	0.301	6.108	0.001
Problem 19	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	B	A	A	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	151	151	187	303	106	106	0	108	1509	0
N.S.	1	1.00	1.24	2.01	0.70	0.70	0.00	0.72	9.99	0.00
time (sec)	N/A	0.176	0.582	0.006	2.367	18.844	0.000	0.307	7.805	0.001
Problem 20	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	189	189	194	231	0	0	0	1248	1308	0
N.S.	1	1.00	1.03	1.22	0.00	0.00	0.00	6.60	6.92	0.00
time (sec)	N/A	0.211	0.251	0.034	0.000	0.000	0.000	4.590	1.316	0.000
Problem 21	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	211	211	234	616	0	0	0	1618	3942	0
N.S.	1	1.00	1.11	2.92	0.00	0.00	0.00	7.67	18.68	0.00
time (sec)	N/A	0.240	0.219	0.031	0.000	0.000	0.000	3.540	2.139	0.001
Problem 22	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	245	245	280	866	0	0	0	3272	15179	0
N.S.	1	1.00	1.14	3.53	0.00	0.00	0.00	13.36	61.96	0.00
time (sec)	N/A	0.159	0.289	0.033	0.000	0.000	0.000	2.827	2.539	0.001
Problem 23	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	290	290	383	1132	0	0	0	5201	5981	0
N.S.	1	1.00	1.32	3.90	0.00	0.00	0.00	17.93	20.62	0.00
time (sec)	N/A	0.725	0.500	0.042	0.000	0.000	0.000	4.908	1.749	0.001

Problem 24	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	321	321	441	1435	0	0	0	6096	11383	0
N.S.	1	1.00	1.37	4.47	0.00	0.00	0.00	18.99	35.46	0.00
time (sec)	N/A	0.534	0.647	0.043	0.000	0.000	0.000	3.720	2.030	0.001
Problem 25	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	545	545	816	3835	0	0	0	11831	49150	0
N.S.	1	1.00	1.50	7.04	0.00	0.00	0.00	21.71	90.18	0.00
time (sec)	N/A	4.213	1.293	0.080	0.000	0.000	0.000	7.208	4.306	0.001
Problem 26	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	94	94	90	122	83	169	604	93	84	0
N.S.	1	1.00	0.96	1.30	0.88	1.80	6.43	0.99	0.89	0.00
time (sec)	N/A	0.052	0.054	0.019	1.677	1.470	3.565	0.230	0.088	0.001
Problem 27	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	115	115	112	182	106	217	2689	115	107	0
N.S.	1	1.00	0.97	1.58	0.92	1.89	23.38	1.00	0.93	0.00
time (sec)	N/A	0.140	0.080	0.018	1.068	1.801	118.426	0.252	0.104	0.001
Problem 28	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	138	138	134	242	127	262	0	136	128	0
N.S.	1	1.00	0.97	1.75	0.92	1.90	0.00	0.99	0.93	0.00
time (sec)	N/A	0.154	0.054	0.023	0.971	2.865	0.000	0.253	0.136	0.001
Problem 29	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	150	150	159	302	145	304	0	158	146	0
N.S.	1	1.00	1.06	2.01	0.97	2.03	0.00	1.05	0.97	0.00
time (sec)	N/A	0.214	0.072	0.017	1.183	5.978	0.000	0.298	0.870	0.001

Problem 30	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	162	162	185	362	163	346	0	179	164	0
N.S.	1	1.00	1.14	2.23	1.01	2.14	0.00	1.10	1.01	0.00
time (sec)	N/A	0.232	0.086	0.020	1.349	29.567	0.000	0.316	0.583	0.001
Problem 31	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	A	A	A	C	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	140	140	146	146	96	154	952	100	149	0
N.S.	1	1.00	1.04	1.04	0.69	1.10	6.80	0.71	1.06	0.00
time (sec)	N/A	0.098	0.489	0.014	2.417	1.493	3.495	0.239	0.252	0.001
Problem 32	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	A	A	A	C	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	165	165	186	214	120	212	4106	128	201	0
N.S.	1	1.00	1.13	1.30	0.73	1.28	24.88	0.78	1.22	0.00
time (sec)	N/A	0.129	0.419	0.013	2.391	1.591	108.823	0.234	0.315	0.001
Problem 33	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	A	A	A	F(-1)	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	179	179	200	260	135	239	0	142	237	0
N.S.	1	1.00	1.12	1.45	0.75	1.34	0.00	0.79	1.32	0.00
time (sec)	N/A	0.141	0.434	0.016	2.581	2.028	0.000	0.308	1.154	0.001
Problem 34	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	A	A	A	F(-1)	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	187	187	234	328	143	255	0	155	1547	0
N.S.	1	1.00	1.25	1.75	0.76	1.36	0.00	0.83	8.27	0.00
time (sec)	N/A	0.167	0.606	0.015	2.951	5.910	0.000	0.318	5.349	0.001
Problem 35	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	B	A	A	F(-1)	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	194	194	243	374	155	279	0	169	1894	0
N.S.	1	1.00	1.25	1.93	0.80	1.44	0.00	0.87	9.76	0.00
time (sec)	N/A	0.197	0.659	0.015	2.628	23.835	0.000	0.305	8.177	0.001

Problem 36	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	330	330	341	1237	0	0	0	3434	2382	0
N.S.	1	1.00	1.03	3.75	0.00	0.00	0.00	10.41	7.22	0.00
time (sec)	N/A	0.745	0.756	0.145	0.000	0.000	0.000	5.020	1.504	0.001
Problem 37	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	368	368	398	1813	0	0	0	5164	4707	0
N.S.	1	1.00	1.08	4.93	0.00	0.00	0.00	14.03	12.79	0.00
time (sec)	N/A	0.870	1.170	0.179	0.000	0.000	0.000	6.669	1.709	0.001
Problem 38	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	386	386	421	2310	0	0	0	5579	7373	0
N.S.	1	1.00	1.09	5.98	0.00	0.00	0.00	14.45	19.10	0.00
time (sec)	N/A	0.490	1.296	0.175	0.000	0.000	0.000	6.114	1.771	0.001
Problem 39	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	439	439	489	1801	0	0	0	7502	13024	0
N.S.	1	1.00	1.11	4.10	0.00	0.00	0.00	17.09	29.67	0.00
time (sec)	N/A	1.894	1.882	0.070	0.000	0.000	0.000	8.028	2.306	0.001
Problem 40	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	468	468	524	1917	0	0	0	0	18449	0
N.S.	1	1.00	1.12	4.10	0.00	0.00	0.00	0.00	39.42	0.00
time (sec)	N/A	1.118	2.112	0.049	0.000	0.000	0.000	0.000	3.116	0.001
Problem 41	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	770	770	935	4570	0	0	0	0	82785	0
N.S.	1	1.00	1.21	5.94	0.00	0.00	0.00	0.00	107.51	0.00
time (sec)	N/A	7.835	5.697	0.104	0.000	0.000	0.000	0.000	13.909	0.001

Problem 42	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	143	143	128	186	121	307	668	123	118	0
N.S.	1	1.00	0.90	1.30	0.85	2.15	4.67	0.86	0.83	0.00
time (sec)	N/A	0.076	0.098	0.020	1.062	1.352	3.687	0.334	0.092	0.000
Problem 43	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	175	175	161	278	155	389	2822	157	151	0
N.S.	1	1.00	0.92	1.59	0.89	2.22	16.13	0.90	0.86	0.00
time (sec)	N/A	0.224	0.126	0.023	1.098	1.406	124.287	0.353	0.113	0.001
Problem 44	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	204	204	193	370	188	470	0	190	182	0
N.S.	1	1.00	0.95	1.81	0.92	2.30	0.00	0.93	0.89	0.00
time (sec)	N/A	0.252	0.084	0.022	1.082	2.614	0.000	0.394	0.847	0.001
Problem 45	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	224	224	231	462	214	544	0	224	209	0
N.S.	1	1.00	1.03	2.06	0.96	2.43	0.00	1.00	0.93	0.00
time (sec)	N/A	0.307	0.118	0.022	1.065	6.781	0.000	0.333	0.248	0.001
Problem 46	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	239	239	261	554	238	616	0	257	233	0
N.S.	1	1.00	1.09	2.32	1.00	2.58	0.00	1.08	0.97	0.00
time (sec)	N/A	0.345	0.129	0.021	1.117	27.046	0.000	0.370	0.616	0.001
Problem 47	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	A	A	A	C	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	185	185	186	180	137	278	1103	131	185	0
N.S.	1	1.00	1.01	0.97	0.74	1.50	5.96	0.71	1.00	0.00
time (sec)	N/A	0.117	0.746	0.017	2.554	1.063	3.615	0.362	0.260	0.000

Problem 48	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	A	A	A	C	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	223	223	235	264	173	384	4496	171	249	0
N.S.	1	1.00	1.05	1.18	0.78	1.72	20.16	0.77	1.12	0.00
time (sec)	N/A	0.215	0.592	0.017	2.568	1.146	117.113	0.365	1.008	0.001
Problem 49	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	A	A	A	F(-1)	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	243	243	259	322	200	435	0	198	295	0
N.S.	1	1.00	1.07	1.33	0.82	1.79	0.00	0.81	1.21	0.00
time (sec)	N/A	0.227	0.658	0.019	2.606	1.747	0.000	0.379	1.170	0.001
Problem 50	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	A	A	B	F(-1)	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	263	263	303	396	217	485	0	228	1611	0
N.S.	1	1.00	1.15	1.51	0.83	1.84	0.00	0.87	6.13	0.00
time (sec)	N/A	0.263	0.904	0.023	3.147	5.139	0.000	0.388	5.453	0.001
Problem 51	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	C	A	A	B	F(-1)	A	B	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD	NO
size	269	269	325	454	229	521	0	255	1963	0
N.S.	1	1.00	1.21	1.69	0.85	1.94	0.00	0.95	7.30	0.00
time (sec)	N/A	0.286	0.977	0.019	2.120	24.063	0.000	0.375	8.217	0.001
Problem 52	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	474	474	488	3725	0	0	0	3397	4225	0
N.S.	1	1.00	1.03	7.86	0.00	0.00	0.00	7.17	8.91	0.00
time (sec)	N/A	2.193	1.911	0.359	0.000	0.000	0.000	13.320	2.344	0.001
Problem 53	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	621	621	625	7858	0	0	0	5288	8689	0
N.S.	1	1.00	1.01	12.65	0.00	0.00	0.00	8.52	13.99	0.00
time (sec)	N/A	4.512	3.609	0.616	0.000	0.000	0.000	10.792	3.265	0.001

Problem 54	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	646	646	661	10222	0	0	0	5439	13431	0
N.S.	1	1.00	1.02	15.82	0.00	0.00	0.00	8.42	20.79	0.00
time (sec)	N/A	3.299	4.293	0.448	0.000	0.000	0.000	10.391	4.558	0.001
Problem 55	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	679	679	845	3492	0	0	0	6861	23811	0
N.S.	1	1.00	1.24	5.14	0.00	0.00	0.00	10.10	35.07	0.00
time (sec)	N/A	4.182	6.548	0.096	0.000	0.000	0.000	13.218	5.347	0.001
Problem 56	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	728	728	980	3824	0	0	0	0	36653	0
N.S.	1	1.00	1.35	5.25	0.00	0.00	0.00	0.00	50.35	0.00
time (sec)	N/A	2.733	6.674	0.063	0.000	0.000	0.000	0.000	7.160	0.001
Problem 57	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	1150	1144	1590	6026	0	0	0	0	114377	0
N.S.	1	0.99	1.38	5.24	0.00	0.00	0.00	0.00	99.46	0.00
time (sec)	N/A	8.164	7.480	0.125	0.000	0.000	0.000	0.000	20.572	0.001
Problem 58	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	645	645	775	3107	0	0	0	0	53538	0
N.S.	1	1.00	1.20	4.82	0.00	0.00	0.00	0.00	83.00	0.00
time (sec)	N/A	3.367	4.405	0.089	0.000	0.000	0.000	0.000	8.852	0.001
Problem 59	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	1177	1179	1649	6130	0	0	0	0	97905	0
N.S.	1	1.00	1.40	5.21	0.00	0.00	0.00	0.00	83.18	0.00
time (sec)	N/A	7.926	7.346	0.129	0.000	0.000	0.000	0.000	17.175	0.001

Problem 60	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	416	416	416	829	418	463	503	478	398	0
N.S.	1	1.00	1.00	1.99	1.00	1.11	1.21	1.15	0.96	0.00
time (sec)	N/A	0.629	0.122	0.003	0.517	1.446	0.161	0.428	0.383	0.000
Problem 61	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	259	259	259	354	251	285	309	295	246	0
N.S.	1	1.00	1.00	1.37	0.97	1.10	1.19	1.14	0.95	0.00
time (sec)	N/A	0.332	0.046	0.002	0.698	1.021	0.125	0.306	0.948	0.000
Problem 62	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	154	154	154	161	138	151	165	157	138	0
N.S.	1	1.00	1.00	1.05	0.90	0.98	1.07	1.02	0.90	0.00
time (sec)	N/A	0.152	0.032	0.001	0.588	1.102	0.096	0.284	0.089	0.000
Problem 63	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	20	20	20	17	16	16	15	17	16	19
N.S.	1	1.00	1.00	0.85	0.80	0.80	0.75	0.85	0.80	0.95
time (sec)	N/A	0.033	0.002	0.001	0.617	0.880	0.090	1.774	0.027	2.156
Problem 64	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	211	211	234	616	0	0	0	1620	3942	0
N.S.	1	1.00	1.11	2.92	0.00	0.00	0.00	7.68	18.68	0.00
time (sec)	N/A	0.318	0.059	0.024	0.000	0.000	0.000	4.239	1.174	0.001
Problem 65	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	368	368	398	1813	0	0	0	5164	4707	0
N.S.	1	1.00	1.08	4.93	0.00	0.00	0.00	14.03	12.79	0.00
time (sec)	N/A	0.923	1.197	0.140	0.000	0.000	0.000	11.929	1.523	0.001

Problem 66	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	B	F	F(-1)	F(-1)	B	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	621	621	625	7858	0	0	0	5288	8689	0
N.S.	1	1.00	1.01	12.65	0.00	0.00	0.00	8.52	13.99	0.00
time (sec)	N/A	4.594	3.584	0.381	0.000	0.000	0.000	6.426	3.161	0.001
Problem 67	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	4	4	4	5	4	4	3	5	4	0
N.S.	1	1.00	1.00	1.25	1.00	1.00	0.75	1.25	1.00	0.00
time (sec)	N/A	0.011	0.001	0.002	0.430	1.124	0.069	0.307	0.018	0.000
Problem 68	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	14	14	16	18	14	14	12	17	14	0
N.S.	1	1.00	1.14	1.29	1.00	1.00	0.86	1.21	1.00	0.00
time (sec)	N/A	0.024	0.004	0.003	0.436	1.379	0.121	0.331	0.728	0.000
Problem 69	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	31	31	30	35	27	27	26	30	27	0
N.S.	1	1.00	0.97	1.13	0.87	0.87	0.84	0.97	0.87	0.00
time (sec)	N/A	0.052	0.012	0.003	0.455	1.222	0.146	0.278	0.037	0.001
Problem 70	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	51	51	45	58	43	43	41	49	44	0
N.S.	1	1.00	0.88	1.14	0.84	0.84	0.80	0.96	0.86	0.00
time (sec)	N/A	0.085	0.025	0.003	0.448	1.385	0.176	0.248	0.038	0.001
Problem 71	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	68	68	68	87	62	62	63	74	64	0
N.S.	1	1.00	1.00	1.28	0.91	0.91	0.93	1.09	0.94	0.00
time (sec)	N/A	0.117	0.018	0.002	0.436	1.352	0.209	0.230	0.034	0.001

Problem 72	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	92	92	92	122	84	84	88	105	87	0
N.S.	1	1.00	1.00	1.33	0.91	0.91	0.96	1.14	0.95	0.00
time (sec)	N/A	0.149	0.032	0.003	0.463	1.145	0.247	0.267	0.038	0.001
Problem 73	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	11	11	11	12	11	11	8	13	8	0
N.S.	1	1.00	1.00	1.09	1.00	1.00	0.73	1.18	0.73	0.00
time (sec)	N/A	0.010	0.003	0.004	0.429	1.225	0.107	0.279	0.083	0.000
Problem 74	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	22	22	23	29	22	22	29	26	22	0
N.S.	1	1.00	1.05	1.32	1.00	1.00	1.32	1.18	1.00	0.00
time (sec)	N/A	0.021	0.007	0.004	0.437	0.979	0.283	0.285	0.799	0.000
Problem 75	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	29	29	30	45	29	29	44	33	29	0
N.S.	1	1.00	1.03	1.55	1.00	1.00	1.52	1.14	1.00	0.00
time (sec)	N/A	0.050	0.013	0.006	0.434	0.851	0.510	0.250	0.071	0.001
Problem 76	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	47	47	44	69	45	45	66	49	45	0
N.S.	1	1.00	0.94	1.47	0.96	0.96	1.40	1.04	0.96	0.00
time (sec)	N/A	0.068	0.019	0.006	0.448	0.881	0.858	0.228	0.764	0.001
Problem 77	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	66	66	67	98	62	62	94	69	63	0
N.S.	1	1.00	1.02	1.48	0.94	0.94	1.42	1.05	0.95	0.00
time (sec)	N/A	0.085	0.023	0.008	0.444	0.924	1.531	0.293	0.074	0.001

Problem 78	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	90	90	91	134	84	84	122	97	86	0
N.S.	1	1.00	1.01	1.49	0.93	0.93	1.36	1.08	0.96	0.00
time (sec)	N/A	0.107	0.036	0.007	0.441	0.722	2.591	0.388	0.084	0.001
Problem 79	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	29	29	29	20	19	19	19	22	19	0
N.S.	1	1.00	1.00	0.69	0.66	0.66	0.66	0.76	0.66	0.00
time (sec)	N/A	0.021	0.007	0.008	0.439	1.201	0.141	0.237	0.078	0.000
Problem 80	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	42	42	39	44	32	32	304	38	38	0
N.S.	1	1.00	0.93	1.05	0.76	0.76	7.24	0.90	0.90	0.00
time (sec)	N/A	0.052	0.019	0.006	0.444	0.964	1.760	0.287	0.843	0.001
Problem 81	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	47	47	44	65	37	37	716	43	47	0
N.S.	1	1.00	0.94	1.38	0.79	0.79	15.23	0.91	1.00	0.00
time (sec)	N/A	0.064	0.021	0.006	0.436	1.179	12.723	0.367	0.111	0.001
Problem 82	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	57	57	55	89	47	47	1389	53	59	0
N.S.	1	1.00	0.96	1.56	0.82	0.82	24.37	0.93	1.04	0.00
time (sec)	N/A	0.079	0.025	0.007	0.438	1.156	91.466	0.374	0.820	0.001
Problem 83	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	74	74	71	120	62	62	0	68	78	0
N.S.	1	1.00	0.96	1.62	0.84	0.84	0.00	0.92	1.05	0.00
time (sec)	N/A	0.107	0.033	0.007	0.450	0.737	0.000	0.328	0.880	0.001

Problem 84	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	96	96	91	156	82	82	0	90	99	0
N.S.	1	1.00	0.95	1.62	0.85	0.85	0.00	0.94	1.03	0.00
time (sec)	N/A	0.137	0.046	0.009	0.449	1.210	0.000	0.243	0.883	0.001
Problem 85	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	46	46	42	33	32	45	34	36	32	0
N.S.	1	1.00	0.91	0.72	0.70	0.98	0.74	0.78	0.70	0.00
time (sec)	N/A	0.051	0.022	0.010	0.436	1.058	0.260	0.252	0.049	0.001
Problem 86	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	71	71	66	74	57	93	1188	66	64	0
N.S.	1	1.00	0.93	1.04	0.80	1.31	16.73	0.93	0.90	0.00
time (sec)	N/A	0.174	0.047	0.010	0.439	1.144	10.543	0.256	0.807	0.001
Problem 87	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	82	82	77	110	68	116	0	77	79	0
N.S.	1	1.00	0.94	1.34	0.83	1.41	0.00	0.94	0.96	0.00
time (sec)	N/A	0.199	0.061	0.010	0.461	1.183	0.000	0.251	0.842	0.001
Problem 88	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	95	95	90	146	81	141	0	90	94	0
N.S.	1	1.00	0.95	1.54	0.85	1.48	0.00	0.95	0.99	0.00
time (sec)	N/A	0.221	0.049	0.013	0.444	2.739	0.000	0.329	0.876	0.001
Problem 89	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	106	106	102	182	92	164	0	101	108	0
N.S.	1	1.00	0.96	1.72	0.87	1.55	0.00	0.95	1.02	0.00
time (sec)	N/A	0.266	0.057	0.010	0.442	14.095	0.000	0.289	1.364	0.001

Problem 90	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	122	122	118	221	108	200	0	117	127	0
N.S.	1	1.00	0.97	1.81	0.89	1.64	0.00	0.96	1.04	0.00
time (sec)	N/A	0.315	0.063	0.013	0.450	83.278	0.000	0.367	1.673	0.001
Problem 91	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	56	56	48	40	42	72	46	46	42	0
N.S.	1	1.00	0.86	0.71	0.75	1.29	0.82	0.82	0.75	0.00
time (sec)	N/A	0.057	0.024	0.010	0.433	0.946	0.291	0.351	0.046	0.001
Problem 92	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	A	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	89	89	80	90	75	153	1255	85	79	0
N.S.	1	1.00	0.90	1.01	0.84	1.72	14.10	0.96	0.89	0.00
time (sec)	N/A	0.260	0.051	0.013	0.454	0.938	10.508	0.381	0.101	0.001
Problem 93	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	105	105	97	134	91	191	0	101	97	0
N.S.	1	1.00	0.92	1.28	0.87	1.82	0.00	0.96	0.92	0.00
time (sec)	N/A	0.320	0.074	0.013	0.442	1.285	0.000	0.322	0.828	0.001
Problem 94	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	117	117	114	178	107	229	0	117	115	0
N.S.	1	1.00	0.97	1.52	0.91	1.96	0.00	1.00	0.98	0.00
time (sec)	N/A	0.246	0.055	0.015	0.440	3.200	0.000	0.380	0.905	0.001
Problem 95	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	131	131	136	222	123	267	0	133	133	0
N.S.	1	1.00	1.04	1.69	0.94	2.04	0.00	1.02	1.02	0.00
time (sec)	N/A	0.280	0.062	0.013	0.454	14.850	0.000	0.328	1.332	0.001

Problem 96	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	147	147	153	266	139	305	0	149	151	0
N.S.	1	1.00	1.04	1.81	0.95	2.07	0.00	1.01	1.03	0.00
time (sec)	N/A	0.330	0.083	0.014	0.452	104.668	0.000	0.394	1.680	0.001
Problem 97	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	A	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	68	68	60	47	52	103	53	56	52	0
N.S.	1	1.00	0.88	0.69	0.76	1.51	0.78	0.82	0.76	0.00
time (sec)	N/A	0.058	0.031	0.013	0.442	1.031	0.305	0.400	0.046	0.001
Problem 98	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	B	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	105	105	97	106	88	211	1034	98	90	0
N.S.	1	1.00	0.92	1.01	0.84	2.01	9.85	0.93	0.86	0.00
time (sec)	N/A	0.196	0.089	0.014	0.441	1.291	8.787	0.311	0.093	0.001
Problem 99	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	122	122	121	158	108	267	0	118	113	0
N.S.	1	1.00	0.99	1.30	0.89	2.19	0.00	0.97	0.93	0.00
time (sec)	N/A	0.222	0.051	0.015	0.442	1.319	0.000	0.326	0.126	0.001
Problem 100	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	141	141	144	210	126	321	0	136	131	0
N.S.	1	1.00	1.02	1.49	0.89	2.28	0.00	0.96	0.93	0.00
time (sec)	N/A	0.253	0.074	0.017	0.447	3.678	0.000	0.320	0.881	0.001
Problem 101	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	158	158	169	262	145	376	0	155	152	0
N.S.	1	1.00	1.07	1.66	0.92	2.38	0.00	0.98	0.96	0.00
time (sec)	N/A	0.289	0.090	0.016	0.450	18.483	0.000	0.365	1.392	0.001

Problem 102	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	A	A	A	B	F(-1)	A	B	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD	Yes
size	177	177	195	314	163	430	0	173	170	0
N.S.	1	1.00	1.10	1.77	0.92	2.43	0.00	0.98	0.96	0.00
time (sec)	N/A	0.343	0.108	0.017	0.462	104.724	0.000	0.430	1.755	0.001
Problem 103	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	F(-1)	A	A	A	F	B	B	A
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD	N/A
size	19	19	0	18	17	17	0	60	17	19
N.S.	1	1.00	0.00	0.95	0.89	0.89	0.00	3.16	0.89	1.00
time (sec)	N/A	0.018	0.000	0.005	0.633	1.410	0.000	1.911	0.987	1.241
Problem 104	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	F(-1)	A	A	A	F	B	B	A
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD	N/A
size	57	57	0	52	51	82	0	142	51	51
N.S.	1	1.00	0.00	0.91	0.89	1.44	0.00	2.49	0.89	0.89
time (sec)	N/A	0.067	0.000	0.005	0.638	1.501	0.000	2.012	0.928	31.279
Problem 105	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	F(-1)	A	A	A	F	B	B	A
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD	N/A
size	57	57	0	53	49	80	0	136	51	53
N.S.	1	1.00	0.00	0.93	0.86	1.40	0.00	2.39	0.89	0.93
time (sec)	N/A	0.080	0.000	0.005	0.630	1.360	0.000	1.946	0.957	34.506
Problem 106	Optimal	Rubi	MMA	Maple	Maxima	Fricas	Sympy	Giac	Mupad	I.A.
grade	A	A	F(-1)	A	A	A	F	B	B	A
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD	N/A
size	69	69	0	63	94	92	0	166	62	61
N.S.	1	1.00	0.00	0.91	1.36	1.33	0.00	2.41	0.90	0.88
time (sec)	N/A	0.091	0.000	0.005	0.678	1.029	0.000	2.099	0.977	45.616

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
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

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
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
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

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
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	1	1	1.00	28	0.036
104	A	5	5	1.00	31	0.161
105	A	5	5	1.00	33	0.152
106	A	4	4	1.00	36	0.111

Chapter 3

Listing of integrals

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3.7	$\int (d + ex + fx^2)(a + bx^2 + cx^4)^2 dx$	59
3.8	$\int (d + ex + fx^2 + gx^3)(a + bx^2 + cx^4)^2 dx$	62
3.9	$\int (a + bx^2 + cx^4)^2 (d + ex + fx^2 + gx^3 + hx^4) dx$	65
3.10	$\int \frac{d+ex}{4-5x^2+x^4} dx$	68
3.11	$\int \frac{d+ex+fx^2}{4-5x^2+x^4} dx$	71
3.12	$\int \frac{d+ex+fx^2+gx^3}{4-5x^2+x^4} dx$	75
3.13	$\int \frac{d+ex+fx^2+gx^3+hx^4}{4-5x^2+x^4} dx$	78
3.14	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{4-5x^2+x^4} dx$	81
3.15	$\int \frac{d+ex}{1+x^2+x^4} dx$	85
3.16	$\int \frac{d+ex+fx^2}{1+x^2+x^4} dx$	89
3.17	$\int \frac{d+ex+fx^2+gx^3}{1+x^2+x^4} dx$	94
3.18	$\int \frac{d+ex+fx^2+gx^3+hx^4}{1+x^2+x^4} dx$	98
3.19	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{1+x^2+x^4} dx$	102
3.20	$\int \frac{d+ex}{a+bx^2+cx^4} dx$	107
3.21	$\int \frac{d+ex+fx^2}{a+bx^2+cx^4} dx$	111
3.22	$\int \frac{d+ex+fx^2+gx^3}{a+bx^2+cx^4} dx$	117
3.23	$\int \frac{d+ex+fx^2+gx^3+hx^4}{a+bx^2+cx^4} dx$	128
3.24	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{a+bx^2+cx^4} dx$	136
3.25	$\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{a+bx^2+cx^4} dx$	147
3.26	$\int \frac{d+ex}{(4-5x^2+x^4)^2} dx$	175
3.27	$\int \frac{d+ex+fx^2}{(4-5x^2+x^4)^2} dx$	179

3.28	$\int \frac{d+ex+fx^2+gx^3}{(4-5x^2+x^4)^2} dx$	184
3.29	$\int \frac{d+ex+fx^2+gx^3+hx^4}{(4-5x^2+x^4)^2} dx$	188
3.30	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(4-5x^2+x^4)^2} dx$	192
3.31	$\int \frac{d+ex}{(1+x^2+x^4)^2} dx$	196
3.32	$\int \frac{d+ex+fx^2}{(1+x^2+x^4)^2} dx$	200
3.33	$\int \frac{d+ex+fx^2+gx^3}{(1+x^2+x^4)^2} dx$	206
3.34	$\int \frac{d+ex+fx^2+gx^3+hx^4}{(1+x^2+x^4)^2} dx$	210
3.35	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(1+x^2+x^4)^2} dx$	215
3.36	$\int \frac{d+ex}{(a+bx^2+cx^4)^2} dx$	221
3.37	$\int \frac{d+ex+fx^2}{(a+bx^2+cx^4)^2} dx$	227
3.38	$\int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^2} dx$	235
3.39	$\int \frac{d+ex+fx^2+gx^3+hx^4}{(a+bx^2+cx^4)^2} dx$	244
3.40	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(a+bx^2+cx^4)^2} dx$	256
3.41	$\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{(a+bx^2+cx^4)^2} dx$	268
3.42	$\int \frac{d+ex}{(4-5x^2+x^4)^3} dx$	306
3.43	$\int \frac{d+ex+fx^2}{(4-5x^2+x^4)^3} dx$	311
3.44	$\int \frac{d+ex+fx^2+gx^3}{(4-5x^2+x^4)^3} dx$	317
3.45	$\int \frac{d+ex+fx^2+gx^3+hx^4}{(4-5x^2+x^4)^3} dx$	321
3.46	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(4-5x^2+x^4)^3} dx$	326
3.47	$\int \frac{d+ex}{(1+x^2+x^4)^3} dx$	331
3.48	$\int \frac{d+ex+fx^2}{(1+x^2+x^4)^3} dx$	336
3.49	$\int \frac{d+ex+fx^2+gx^3}{(1+x^2+x^4)^3} dx$	343
3.50	$\int \frac{d+ex+fx^2+gx^3+hx^4}{(1+x^2+x^4)^3} dx$	348
3.51	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(1+x^2+x^4)^3} dx$	354
3.52	$\int \frac{d+ex}{(a+bx^2+cx^4)^3} dx$	360
3.53	$\int \frac{d+ex+fx^2}{(a+bx^2+cx^4)^3} dx$	369
3.54	$\int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^3} dx$	379
3.55	$\int \frac{d+ex+fx^2+gx^3+hx^4}{(a+bx^2+cx^4)^3} dx$	391

- 3.56 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(a+bx^2+cx^4)^3} dx \dots\dots\dots 410$
- 3.57 $\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{(a+bx^2+cx^4)^3} dx \dots\dots\dots 432$
- 3.58 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5+jx^6+kx^7}{(a+bx^2+cx^4)^2} dx \dots\dots\dots 486$
- 3.59 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5+jx^8+kx^{11}}{(a+bx^2+cx^4)^3} dx \dots\dots\dots 512$
- 3.60 $\int (a+bx^2+cx^4)^3 (ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6) dx 560$
- 3.61 $\int (a+bx^2+cx^4)^2 (ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6) dx 564$
- 3.62 $\int (a+bx^2+cx^4) (ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6) dx 567$
- 3.63 $\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{a+bx^2+cx^4} dx \dots\dots\dots 570$
- 3.64 $\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^2} dx \dots\dots\dots 572$
- 3.65 $\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^3} dx \dots\dots\dots 578$
- 3.66 $\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^4} dx \dots\dots\dots 587$
- 3.67 $\int \frac{2-x-2x^2+x^3}{4-5x^2+x^4} dx \dots\dots\dots 598$
- 3.68 $\int \frac{(d+ex)(2-x-2x^2+x^3)}{4-5x^2+x^4} dx \dots\dots\dots 600$
- 3.69 $\int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{4-5x^2+x^4} dx \dots\dots\dots 602$
- 3.70 $\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx \dots\dots\dots 605$
- 3.71 $\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx \dots\dots\dots 608$
- 3.72 $\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx \dots\dots\dots 611$
- 3.73 $\int \frac{2-3x+x^2}{4-5x^2+x^4} dx \dots\dots\dots 614$
- 3.74 $\int \frac{(d+ex)(2-3x+x^2)}{4-5x^2+x^4} dx \dots\dots\dots 616$
- 3.75 $\int \frac{(2-3x+x^2)(d+ex+fx^2)}{4-5x^2+x^4} dx \dots\dots\dots 619$
- 3.76 $\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx \dots\dots\dots 622$
- 3.77 $\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx \dots\dots\dots 625$
- 3.78 $\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx \dots\dots\dots 628$
- 3.79 $\int \frac{2+x}{4-5x^2+x^4} dx \dots\dots\dots 631$
- 3.80 $\int \frac{(2+x)(d+ex)}{4-5x^2+x^4} dx \dots\dots\dots 633$
- 3.81 $\int \frac{(2+x)(d+ex+fx^2)}{4-5x^2+x^4} dx \dots\dots\dots 636$
- 3.82 $\int \frac{(2+x)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx \dots\dots\dots 639$
- 3.83 $\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx \dots\dots\dots 642$
- 3.84 $\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx \dots\dots\dots 645$
- 3.85 $\int \frac{2-x-2x^2+x^3}{(4-5x^2+x^4)^2} dx \dots\dots\dots 648$
- 3.86 $\int \frac{(d+ex)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 651$
- 3.87 $\int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 654$
- 3.88 $\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 657$

3.89	$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$	660
3.90	$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$	663
3.91	$\int \frac{2-3x+x^2}{(4-5x^2+x^4)^2} dx$	666
3.92	$\int \frac{(d+ex)(2-3x+x^2)}{(4-5x^2+x^4)^2} dx$	669
3.93	$\int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$	673
3.94	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$	677
3.95	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$	680
3.96	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$	683
3.97	$\int \frac{2+x}{(4-5x^2+x^4)^2} dx$	686
3.98	$\int \frac{(2+x)(d+ex)}{(4-5x^2+x^4)^2} dx$	689
3.99	$\int \frac{(2+x)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$	692
3.100	$\int \frac{(2+x)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$	695
3.101	$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$	698
3.102	$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$	701
3.103	$\int \frac{ag-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$	704
3.104	$\int \frac{ag+ex-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$	706
3.105	$\int \frac{ag+fx^3-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$	709
3.106	$\int \frac{ag+ex+fx^3-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$	712

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

Optimal. Leaf size=50

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

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[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

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

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

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

$$\int (d + ex)(a + bx^2 + cx^4) dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x)*(a + b*x^2 + c*x^4), x]

fricas [A] time = 0.85, 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

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

Verification of antiderivative is not currently implemented for this CAS.

[In] 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

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

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

Optimal. Leaf size=69

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

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

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

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

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2)*(a + b*x^2 + c*x^4), x]

fricas [A] time = 0.70, 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] $\frac{1}{7}cx^7 + \frac{1}{6}cx^6e + \frac{1}{5}cdx^5 + \frac{1}{5}bfx^5 + \frac{1}{4}bx^4e + \frac{1}{3}bdx^3 + \frac{1}{3}afx^3 + \frac{1}{2}ax^2e + adx$

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] $\frac{1}{7}c*f*x^7 + \frac{1}{6}c*x^6*e + \frac{1}{5}c*d*x^5 + \frac{1}{5}b*f*x^5 + \frac{1}{4}b*x^4*e + \frac{1}{3}b*d*x^3 + \frac{1}{3}a*f*x^3 + \frac{1}{2}a*x^2*e + a*d*x$

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

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

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] $a*d*x + \frac{1}{2}a*e*x^2 + \frac{1}{3}(a*f+b*d)*x^3 + \frac{1}{4}b*e*x^4 + \frac{1}{5}(b*f+c*d)*x^5 + \frac{1}{6}c*e*x^6 + \frac{1}{7}c*f*x^7$

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $\frac{1}{7}c*f*x^7 + \frac{1}{6}c*e*x^6 + \frac{1}{4}b*e*x^4 + \frac{1}{5}(c*d + b*f)*x^5 + \frac{1}{2}a*e*x^2 + \frac{1}{3}(b*d + a*f)*x^3 + a*d*x$

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

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

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

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

Optimal. Leaf size=88

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

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[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

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

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

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4), x]

fricas [A] time = 0.56, 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] $\frac{1}{8}cx^8 + \frac{1}{7}cfx^7 + \frac{1}{6}bgx^6 + \frac{1}{6}cx^6e + \frac{1}{5}cdx^5 + \frac{1}{5}bfx^5 + \frac{1}{4}agx^4 + \frac{1}{4}bx^4e + \frac{1}{3}bdx^3 + \frac{1}{3}afx^3 + \frac{1}{2}ax^2e + adx + xda$

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] $\frac{1}{8}c*gx^8 + \frac{1}{7}c*fx^7 + \frac{1}{6}b*gx^6 + \frac{1}{6}c*x^6e + \frac{1}{5}c*d*x^5 + \frac{1}{5}b*f*x^5 + \frac{1}{4}a*gx^4 + \frac{1}{4}b*x^4e + \frac{1}{3}b*d*x^3 + \frac{1}{3}a*f*x^3 + \frac{1}{2}a*x^2e + ad*x$

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

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

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] $a*d*x + \frac{1}{2}a*e*x^2 + \frac{1}{3}(a*f+b*d)*x^3 + \frac{1}{4}(a*g+b*e)*x^4 + \frac{1}{5}(b*f+c*d)*x^5 + \frac{1}{6}(b*g+c*e)*x^6 + \frac{1}{7}c*f*x^7 + \frac{1}{8}c*g*x^8$

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] $\frac{1}{8}c*gx^8 + \frac{1}{7}c*fx^7 + \frac{1}{6}(c*e + b*g)*x^6 + \frac{1}{5}(c*d + b*f)*x^5 + \frac{1}{4}(b*e + a*g)*x^4 + \frac{1}{2}a*e*x^2 + \frac{1}{3}(b*d + a*f)*x^3 + a*d*x$

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

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

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

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] $a*d*x + \frac{a*e*x**2}{2} + \frac{c*f*x**7}{7} + \frac{c*g*x**8}{8} + x**6*(\frac{b*g}{6} + \frac{c*e}{6}) + x**5*(\frac{b*f}{5} + \frac{c*d}{5}) + x**4*(\frac{a*g}{4} + \frac{b*e}{4}) + x**3*(\frac{a*f}{3} + \frac{b*d}{3})$

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

Optimal. Leaf size=105

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

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[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\begin{aligned} \int (a + bx^2 + cx^4)(d + ex + fx^2 + gx^3 + hx^4) dx &= \int (ad + aex + (bd + af)x^2 + (be + ag)x^3 + (cd + bf + ah)x^4 \\ &\quad + (cde + bdf + aef)x^5 + (cde + bdf + aef)x^6 + (cde + bdf + aef)x^7 + (cde + bdf + aef)x^8 + (cde + bdf + aef)x^9) dx \\ &= adx + \frac{1}{2}aex^2 + \frac{1}{3}(bd + af)x^3 + \frac{1}{4}(be + ag)x^4 + \frac{1}{5}(cd + bf + ah)x^5 \\ &\quad + \frac{1}{6}(cde + bdf + aef)x^6 + \frac{1}{7}(cde + bdf + aef)x^7 + \frac{1}{8}(cde + bdf + aef)x^8 + \frac{1}{9}(cde + bdf + aef)x^9 \end{aligned}$$

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

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

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

Verification is not applicable to the result.

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

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

fricas [A] time = 0.86, size = 103, normalized size = 0.98

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

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

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

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

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="giac")

[Out] $\frac{1}{9}c*h*x^9 + \frac{1}{8}c*g*x^8 + \frac{1}{7}c*f*x^7 + \frac{1}{7}b*h*x^7 + \frac{1}{6}b*g*x^6 + \frac{1}{6}c*x^6*e + \frac{1}{5}c*d*x^5 + \frac{1}{5}b*f*x^5 + \frac{1}{5}a*h*x^5 + \frac{1}{4}a*g*x^4 + \frac{1}{4}b*x^4*e + \frac{1}{3}b*d*x^3 + \frac{1}{3}a*f*x^3 + \frac{1}{2}a*x^2*e + a*d*x$

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

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

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] $a*d*x + \frac{1}{2}a*e*x^2 + \frac{1}{3}(a*f+b*d)*x^3 + \frac{1}{4}(a*g+b*e)*x^4 + \frac{1}{5}(a*h+b*f+c*d)*x^5 + \frac{1}{6}(b*g+c*e)*x^6 + \frac{1}{7}(b*h+c*f)*x^7 + \frac{1}{8}c*g*x^8 + \frac{1}{9}c*h*x^9$

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $\frac{1}{9}c*h*x^9 + \frac{1}{8}c*g*x^8 + \frac{1}{7}(c*f + b*h)*x^7 + \frac{1}{6}(c*e + b*g)*x^6 + \frac{1}{5}(c*d + b*f + a*h)*x^5 + \frac{1}{4}(b*e + a*g)*x^4 + \frac{1}{2}a*e*x^2 + \frac{1}{3}(b*d + a*f)*x^3 + a*d*x$

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

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

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)
```

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

Optimal. Leaf size=122

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{6}x^6(ai+bg+ce)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}x^8(bi+cg)+\frac{1}{9}chx^9+\frac{1}{10}cix^{10}$$

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}

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{6}x^6(ai+bg+ce)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}x^8(bi+cg)+\frac{1}{9}chx^9+\frac{1}{10}cix^{10}$$

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[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

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

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

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{6}x^6(ai+bg+ce)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}x^8(bi+cg)+\frac{1}{9}chx^9+\frac{1}{10}cix^{10}$$

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

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

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

Verification is not applicable to the result.

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

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

fricas [A] time = 0.84, size = 124, normalized size = 1.02

$$\frac{1}{10}x^{10}ic + \frac{1}{9}x^9hc + \frac{1}{8}x^8gc + \frac{1}{8}x^8ib + \frac{1}{7}x^7fc + \frac{1}{7}x^7hb + \frac{1}{6}x^6ec + \frac{1}{6}x^6gb + \frac{1}{6}x^6ia + \frac{1}{5}x^5dc + \frac{1}{5}x^5fb + \frac{1}{5}x^5ha + \frac{1}{4}x^4eb + \frac{1}{4}x^4ga + \frac{1}{3}x^3db + \frac{1}{3}x^3fa + \frac{1}{2}x^2ea + xda$$

Verification of antiderivative is not currently implemented for this CAS.

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

[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

$$\frac{1}{10}cix^{10} + \frac{1}{9}chx^9 + \frac{1}{8}cgx^8 + \frac{1}{8}bix^8 + \frac{1}{7}cfx^7 + \frac{1}{7}bhx^7 + \frac{1}{6}bgx^6 + \frac{1}{6}aix^6 + \frac{1}{6}cx^6e + \frac{1}{5}cdx^5 + \frac{1}{5}bfx^5 + \frac{1}{5}ahx^5 + \frac{1}{4}agx^4 + \frac{1}{4}bx^4e + \frac{1}{3}bdx^3 + \frac{1}{3}afx^3 + \frac{1}{2}ax^2e + adx$$

Verification of antiderivative is not currently implemented for this CAS.

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

[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

$$\frac{cix^{10}}{10} + \frac{chx^9}{9} + \frac{(bi+cg)x^8}{8} + \frac{(bh+cf)x^7}{7} + \frac{(ai+bg+ce)x^6}{6} + \frac{(ah+bf+cd)x^5}{5} + \frac{aex^2}{2} + \frac{(ag+be)x^4}{4} + adx + \frac{(af+bd)x^3}{3}$$

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

$$\frac{1}{10}cix^{10} + \frac{1}{9}chx^9 + \frac{1}{8}(cg+bi)x^8 + \frac{1}{7}(cf+bh)x^7 + \frac{1}{6}(ce+bg+ai)x^6 + \frac{1}{5}(cd+bf+ah)x^5 + \frac{1}{4}(be+ag)x^4 + \frac{1}{2}aex^2 + \frac{1}{3}(bd+af)x^3 + adx$$

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="maxima")

[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

$$\frac{cix^{10}}{10} + \frac{chx^9}{9} + \left(\frac{cg}{8} + \frac{bi}{8}\right)x^8 + \left(\frac{cf}{7} + \frac{bh}{7}\right)x^7 + \left(\frac{ce}{6} + \frac{bg}{6} + \frac{ai}{6}\right)x^6 + \left(\frac{cd}{5} + \frac{bf}{5} + \frac{ah}{5}\right)x^5 + \left(\frac{be}{4} + \frac{ag}{4}\right)x^4 + \left(\frac{bd}{3} + \frac{af}{3}\right)x^3 + \frac{aex^2}{2} + adx$$

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

$$adx + \frac{aex^2}{2} + \frac{chx^9}{9} + \frac{cix^{10}}{10} + x^8\left(\frac{bi}{8} + \frac{cg}{8}\right) + x^7\left(\frac{bh}{7} + \frac{cf}{7}\right) + x^6\left(\frac{ai}{6} + \frac{bg}{6} + \frac{ce}{6}\right) + x^5\left(\frac{ah}{5} + \frac{bf}{5} + \frac{cd}{5}\right) + x^4\left(\frac{ag}{4} + \frac{be}{4}\right) + x^3\left(\frac{af}{3} + \frac{bd}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x**4+b*x**2+a)*(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 $\int (d + ex) (a + bx^2 + cx^4)^2 dx$

Optimal. Leaf size=112

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

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}

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

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[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

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

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

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

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

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

$$\int (d + ex) (a + bx^2 + cx^4)^2 dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x)*(a + b*x^2 + c*x^4)^2, x]

fricas [A] time = 0.83, 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

$$\frac{c^2ex^{10}}{10} + \frac{c^2dx^9}{9} + \frac{bce x^8}{4} + \frac{2bcdx^7}{7} + \frac{abex^4}{2} + \frac{(2ac + b^2)ex^6}{6} + \frac{2abd x^3}{3} + \frac{(2ac + b^2)dx^5}{5} + \frac{a^2ex^2}{2} + a^2dx$$

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^10

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

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

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

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

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)

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

Optimal. Leaf size=154

$$a^2 dx + \frac{1}{2}a^2 ex^2 + \frac{1}{7}x^7(2acf + b^2f + 2bcd) + \frac{1}{5}x^5(2abf + 2acd + b^2d) + \frac{1}{6}ex^6(2ac + b^2) + \frac{1}{3}ax^3(af + 2bd) + \frac{1}{2}abex^4 + \frac{1}{9}$$

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}

$$a^2 dx + \frac{1}{2}a^2 ex^2 + \frac{1}{7}x^7(2acf + b^2f + 2bcd) + \frac{1}{5}x^5(2abf + 2acd + b^2d) + \frac{1}{6}ex^6(2ac + b^2) + \frac{1}{3}ax^3(af + 2bd) + \frac{1}{2}abex^4 + \frac{1}{9}cx^9(2bf + cd) + \frac{1}{4}bcex^8 + \frac{1}{10}c^2ex^{10} + \frac{1}{11}c^2fx^{11}$$

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

$$\begin{aligned} \int (d + ex + fx^2)(a + bx^2 + cx^4)^2 dx &= \int (a^2d + a^2ex + a(2bd + af)x^2 + 2abex^3 + (b^2d + 2acd + 2abf)x^4 + (b^2d + 2acd + 2abf)x^5 \\ &= a^2dx + \frac{1}{2}a^2ex^2 + \frac{1}{3}a(2bd + af)x^3 + \frac{1}{2}abex^4 + \frac{1}{5}(b^2d + 2acd + 2abf)x^5 \end{aligned}$$

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

$$a^2 dx + \frac{1}{2}a^2 ex^2 + \frac{1}{7}x^7(2acf + b^2f + 2bcd) + \frac{1}{5}x^5(2abf + 2acd + b^2d) + \frac{1}{6}ex^6(2ac + b^2) + \frac{1}{3}ax^3(af + 2bd) + \frac{1}{2}abex^4 + \frac{1}{9}cx^9(2bf + cd) + \frac{1}{4}bcex^8 + \frac{1}{10}c^2ex^{10} + \frac{1}{11}c^2fx^{11}$$

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

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2)*(a + b*x^2 + c*x^4)^2, x]

fricas [A] time = 0.75, size = 151, normalized size = 0.98

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

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")

$$\begin{aligned} \text{[Out]} & \frac{1}{11}x^{11}f*c^2 + \frac{1}{10}x^{10}*e*c^2 + \frac{1}{9}x^9*d*c^2 + \frac{2}{9}x^9*f*c*b + \frac{1}{4}x^8 \\ & *e*c*b + \frac{2}{7}x^7*d*c*b + \frac{1}{7}x^7*f*b^2 + \frac{2}{7}x^7*f*c*a + \frac{1}{6}x^6*e*b^2 + \frac{1}{3}x^6 \\ & *e*c*a + \frac{1}{5}x^5*d*b^2 + \frac{2}{5}x^5*d*c*a + \frac{2}{5}x^5*f*b*a + \frac{1}{2}x^4*e*b*a \\ & + \frac{2}{3}x^3*d*b*a + \frac{1}{3}x^3*f*a^2 + \frac{1}{2}x^2*e*a^2 + x*d*a^2 \end{aligned}$$

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

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

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")

$$\begin{aligned} \text{[Out]} & \frac{1}{11}c^2*f*x^{11} + \frac{1}{10}c^2*x^{10}*e + \frac{1}{9}c^2*d*x^9 + \frac{2}{9}b*c*f*x^9 + \frac{1}{4}b*c \\ & *x^8*e + \frac{2}{7}b*c*d*x^7 + \frac{1}{7}b^2*f*x^7 + \frac{2}{7}a*c*f*x^7 + \frac{1}{6}b^2*x^6*e + \frac{1}{3} \\ & a*c*x^6*e + \frac{1}{5}b^2*d*x^5 + \frac{2}{5}a*c*d*x^5 + \frac{2}{5}a*b*f*x^5 + \frac{1}{2}a*b*x^4*e \\ & + \frac{2}{3}a*b*d*x^3 + \frac{1}{3}a^2*f*x^3 + \frac{1}{2}a^2*x^2*e + a^2*d*x \end{aligned}$$

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

$$\frac{c^2fx^{11}}{11} + \frac{c^2ex^{10}}{10} + \frac{bce x^8}{4} + \frac{(2fbc + c^2d)x^9}{9} + \frac{abex^4}{2} + \frac{(2ac + b^2)ex^6}{6} + \frac{(2bcd + (2ac + b^2)f)x^7}{7} + \frac{a^2ex^2}{2} + \frac{(2abf + (2ac + b^2)d)x^5}{5} + a^2dx + \frac{(fa^2 + 2abd)x^3}{3}$$

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)^2,x)

$$\begin{aligned} \text{[Out]} & \frac{1}{11}c^2*f*x^{11} + \frac{1}{10}c^2*e*x^{10} + \frac{1}{9}(2*b*c*f + c^2*d)*x^9 + \frac{1}{4}b*c*e*x^8 + \frac{1}{7} \\ & (2*b*c*d + f*(2*a*c + b^2))*x^7 + \frac{1}{6}(2*a*c + b^2)*e*x^6 + \frac{1}{5}(d*(2*a*c + b^2) + 2*a*b*f) \\ & *x^5 + \frac{1}{2}a*b*e*x^4 + \frac{1}{3}(a^2*f + 2*a*b*d)*x^3 + \frac{1}{2}a^2*e*x^2 + a^2*d*x \end{aligned}$$

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

$$\frac{1}{11}c^2fx^{11} + \frac{1}{10}c^2ex^{10} + \frac{1}{4}bcex^8 + \frac{1}{9}(c^2d + 2bcf)x^9 + \frac{1}{6}(b^2 + 2ac)ex^6 + \frac{1}{7}(2bcd + (b^2 + 2ac)f)x^7 + \frac{1}{2}abex^4 + \frac{1}{5}(2abf + (b^2 + 2ac)d)x^5 + \frac{1}{2}a^2ex^2 + a^2dx + \frac{1}{3}(2abd + a^2f)x^3$$

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")

$$\begin{aligned} \text{[Out]} & \frac{1}{11}c^2*f*x^{11} + \frac{1}{10}c^2*e*x^{10} + \frac{1}{4}b*c*e*x^8 + \frac{1}{9}(c^2*d + 2*b*c*f)*x \\ & ^9 + \frac{1}{6}(b^2 + 2*a*c)*e*x^6 + \frac{1}{7}(2*b*c*d + (b^2 + 2*a*c)*f)*x^7 + \frac{1}{2}a*b \\ & *e*x^4 + \frac{1}{5}(2*a*b*f + (b^2 + 2*a*c)*d)*x^5 + \frac{1}{2}a^2*e*x^2 + a^2*d*x + \frac{1}{3} \\ & (2*a*b*d + a^2*f)*x^3 \end{aligned}$$

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

$$x^5 \left(\frac{db^2}{5} + \frac{2afb}{5} + \frac{2acd}{5} \right) + x^7 \left(\frac{fb^2}{7} + \frac{2cdb}{7} + \frac{2acf}{7} \right) + x^3 \left(\frac{fa^2}{3} + \frac{2bda}{3} \right) + x^9 \left(\frac{dc^2}{9} + \frac{2bfc}{9} \right) + \frac{a^2ex^2}{2} + \frac{c^2ex^{10}}{10} + \frac{c^2fx^{11}}{11} + \frac{ex^6(b^2 + 2ac)}{6} + a^2dx + \frac{abex^4}{2} + \frac{bcex^8}{4}$$

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)

$$\begin{aligned} \text{[Out]} & x^5*((b^2*d)/5 + (2*a*c*d)/5 + (2*a*b*f)/5) + x^7*((b^2*f)/7 + (2*b*c*d)/7 \\ & + (2*a*c*f)/7) + x^3*((a^2*f)/3 + (2*a*b*d)/3) + x^9*((c^2*d)/9 + (2*b*c*f) \\ & /9) + (a^2*e*x^2)/2 + (c^2*e*x^{10})/10 + (c^2*f*x^{11})/11 + (e*x^6*(2*a*c + b \\ & ^2))/6 + a^2*d*x + (a*b*e*x^4)/2 + (b*c*e*x^8)/4 \end{aligned}$$

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

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

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)**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)

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

Optimal. Leaf size=196

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

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}

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{8} x^8 (2acg + b^2 g + 2bce) + \frac{1}{6} x^6 (2abg + 2ace + b^2 e) + \frac{1}{3} ax^3 (af + 2bd) + \frac{1}{4} ax^4 (ag + 2be) + \frac{1}{9} cx^9 (2bf + cd) + \frac{1}{10} cx^{10} (2bg + ce) + \frac{1}{11} c^2 fx^{11} + \frac{1}{12} c^2 gx^{12}$$

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[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\begin{aligned} \int (d + ex + fx^2 + gx^3) (a + bx^2 + cx^4)^2 dx &= \int (a^2 d + a^2 ex + a(2bd + af)x^2 + a(2be + ag)x^3 + (b^2 d + 2acd \\ &= a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{3} a(2bd + af)x^3 + \frac{1}{4} a(2be + ag)x^4 + \frac{1}{5} (b^2 d + \end{aligned}$$

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

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{8} x^8 (2acg + b^2 g + 2bce) + \frac{1}{6} x^6 (2abg + 2ace + b^2 e) + \frac{1}{3} ax^3 (af + 2bd) + \frac{1}{4} ax^4 (ag + 2be) + \frac{1}{9} cx^9 (2bf + cd) + \frac{1}{10} cx^{10} (2bg + ce) + \frac{1}{11} c^2 fx^{11} + \frac{1}{12} c^2 gx^{12}$$

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

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4)^2, x]

fricas [A] time = 0.63, size = 202, normalized size = 1.03

$$\frac{1}{12}x^{12}g^2 + \frac{1}{11}x^{11}fc^2 + \frac{1}{10}x^{10}ec^2 + \frac{1}{9}x^9gcb + \frac{1}{8}x^8d^2 + \frac{2}{9}x^8fcb + \frac{1}{4}x^8ecb + \frac{1}{8}x^8gb^2 + \frac{1}{4}x^8gca + \frac{2}{7}x^7dcb + \frac{1}{7}x^7fb^2 + \frac{2}{7}x^7fca + \frac{1}{6}x^6eb^2 + \frac{1}{3}x^6eca + \frac{1}{3}x^6gba + \frac{1}{5}x^5db^2 + \frac{2}{5}x^5dca + \frac{2}{5}x^5fba + \frac{1}{2}x^4eba + \frac{1}{4}x^4g^2 + \frac{2}{3}x^4dba + \frac{1}{3}x^3fa^2 + \frac{1}{2}x^2ea^2 + xda^2$$

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

$$\frac{1}{12}c^2gx^{12} + \frac{1}{11}c^2fx^{11} + \frac{1}{10}c^2ex^{10} + \frac{1}{9}c^2dx^9 + \frac{2}{9}bcfx^9 + \frac{1}{8}b^2gx^8 + \frac{1}{4}acgx^8 + \frac{1}{4}bc^2e + \frac{2}{7}bc^2d^2 + \frac{1}{7}b^2fx^7 + \frac{2}{7}acfx^7 + \frac{1}{3}abgx^6 + \frac{1}{6}b^2x^6e + \frac{1}{3}acx^6e + \frac{1}{5}b^2dx^5 + \frac{2}{5}acdx^5 + \frac{2}{5}abfx^5 + \frac{1}{4}e^2gx^4 + \frac{1}{2}abx^4e + \frac{2}{3}abdx^3 + \frac{1}{3}a^2fx^3 + \frac{1}{2}a^2x^2e + a^2dx$$

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

$$\frac{c^2gx^{12}}{12} + \frac{c^2fx^{11}}{11} + \frac{(2gbc+e^2c)x^{10}}{10} + \frac{(2fbc+c^2d)x^9}{9} + \frac{(2bce+(b^2+2ac)g)x^8}{8} + \frac{(2bcd+(b^2+2ac)f)x^7}{7} + \frac{(2abg+(2ac+b^2)e)x^6}{6} + \frac{a^2ex^2}{2} + \frac{(2abf+(2ac+b^2)d)x^5}{5} + a^2dx + \frac{(ga^2+2abe)x^4}{4} + \frac{(fa^2+2abd)x^3}{3}$$

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)^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

$$\frac{1}{12}c^2gx^{12} + \frac{1}{11}c^2fx^{11} + \frac{1}{10}(c^2e+2bcg)x^{10} + \frac{1}{9}(c^2d+2bcf)x^9 + \frac{1}{8}(2bce+(b^2+2ac)g)x^8 + \frac{1}{7}(2bcd+(b^2+2ac)f)x^7 + \frac{1}{6}(2abg+(b^2+2ac)e)x^6 + \frac{1}{5}(2abf+(b^2+2ac)d)x^5 + \frac{1}{2}a^2ex^2 + \frac{1}{4}(2abe+a^2g)x^4 + a^2dx + \frac{1}{3}(2abd+a^2f)x^3$$

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

$$x^8\left(\frac{db^2}{5} + \frac{2afb}{5} + \frac{2acd}{5}\right) + x^6\left(\frac{eb^2}{6} + \frac{agb}{3} + \frac{ace}{3}\right) + x^7\left(\frac{fb^2}{7} + \frac{2cdb}{7} + \frac{2acf}{7}\right) + x^8\left(\frac{gb^2}{8} + \frac{ceb}{4} + \frac{acg}{4}\right) + x^3\left(\frac{fa^2}{3} + \frac{2bda}{3}\right) + x^4\left(\frac{ga^2}{4} + \frac{bea}{2}\right) + x^9\left(\frac{dc^2}{9} + \frac{2bfc}{9}\right) + x^{10}\left(\frac{ec^2}{10} + \frac{bgc}{5}\right) + \frac{a^2ex^2}{2} + \frac{c^2fx^{11}}{11} + \frac{c^2gx^{12}}{12} + a^2dx$$

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

$$a^2 dx + \frac{a^2 e x^2}{2} + \frac{c^2 f x^{11}}{11} + \frac{c^2 g x^{12}}{12} + x^{10} \left(\frac{b c g}{5} + \frac{c^2 e}{10} \right) + x^9 \left(\frac{2 b c f}{9} + \frac{c^2 d}{9} \right) + x^8 \left(\frac{a c g}{4} + \frac{b^2 g}{8} + \frac{b c e}{4} \right) + x^7 \left(\frac{2 a c f}{7} + \frac{b^2 f}{7} + \frac{2 b c d}{7} \right) + x^6 \left(\frac{a b g}{3} + \frac{a c e}{3} + \frac{b^2 e}{6} \right) + x^5 \left(\frac{2 a b f}{5} + \frac{2 a c d}{5} + \frac{b^2 d}{5} \right) + x^4 \left(\frac{a^2 g}{4} + \frac{a b e}{2} \right) + x^3 \left(\frac{a^2 f}{3} + \frac{2 a b d}{3} \right)$$

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)**2,x)`

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

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

Optimal. Leaf size=234

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

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}

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

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[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\int (a + bx^2 + cx^4)^2 (d + ex + fx^2 + gx^3 + hx^4) dx = \int (a^2 d + a^2 ex + a(2bd + af)x^2 + a(2be + ag)x^3 + (b^2 d + 2abf + a^2 d)x^4 + (b^2 e + 2ac e + 2abg)x^5 + (b^2 f + 2ac f + 2b(c d + ah))x^6 + (2bc e + b^2 g + 2ac g)x^7 + (c^2 d + b^2 h + 2c(b f + ah))x^8 + (c(c e + 2bg))x^9 + (c(c f + 2bh))x^{10} + c^2 g x^{11} + c^2 h x^{12}) dx$$

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

$$\frac{1}{5} x^5 (a^2 h + 2abf + 2acd + b^2 d) + a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{9} x^9 (2ach + b^2 h + 2bcf + c^2 d) + \frac{1}{7} x^7 (2abh + 2acf + b^2 f + 2bcd) + \frac{1}{8} x^8 (2acg + b^2 g + 2bce) + \frac{1}{6} x^6 (2abg + 2ace + b^2 e) + \frac{1}{3} ax^3 (af + 2bd) + \frac{1}{4} ax^4 (ag + 2be) + \frac{1}{10} cx^{10} (2bg + ce) + \frac{1}{11} cx^{11} (2bh + cf) + \frac{1}{12} c^2 gx^{12} + \frac{1}{13} c^2 hx^{13}$$

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

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

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

Verification is not applicable to the result.

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

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

fricas [A] time = 0.97, size = 253, normalized size = 1.08

$$\frac{1}{13}x^{13}hc^2 + \frac{1}{12}x^{12}gc^2 + \frac{1}{11}x^{11}fc^2 + \frac{2}{11}x^{11}hcb + \frac{1}{10}x^{10}ec^2 + \frac{1}{5}x^{10}gb + \frac{1}{9}x^9db + \frac{1}{9}x^9hb^2 + \frac{2}{9}x^9hca + \frac{1}{4}x^8ecb + \frac{1}{8}x^8gb^2 + \frac{1}{8}x^8gca + \frac{2}{7}x^7fdb + \frac{1}{7}x^7fcb + \frac{2}{7}x^7fca + \frac{2}{7}x^7hba + \frac{1}{6}x^6db^2 + \frac{1}{3}x^6cca + \frac{1}{5}x^6gba + \frac{1}{5}x^6ab^2 + \frac{2}{5}x^6da + \frac{2}{5}x^6fba + \frac{1}{2}x^6ha^2 + \frac{1}{4}x^6gcb + \frac{1}{4}x^6gca + \frac{2}{3}x^5fba + \frac{1}{3}x^5fa^2 + \frac{1}{2}x^5ca^2 + xda^2$$

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 + 1/10*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 + 1/9*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

$$\frac{1}{13}c^2hx^{13} + \frac{1}{12}c^2gx^{12} + \frac{1}{11}c^2fx^{11} + \frac{2}{11}bcx^{11} + \frac{1}{10}c^2ex^{10} + \frac{1}{5}c^2gbx^{10} + \frac{1}{9}c^2dbx^9 + \frac{2}{9}c^2fcbx^9 + \frac{1}{9}c^2hb^2x^9 + \frac{2}{9}ac^2hbx^9 + \frac{1}{8}c^2ebx^8 + \frac{1}{8}c^2gb^2x^8 + \frac{1}{4}ac^2gcbx^8 + \frac{1}{4}c^2hba^2x^8 + \frac{2}{7}c^2fdbx^7 + \frac{2}{7}c^2fcbx^7 + \frac{2}{7}c^2fcbx^7 + \frac{2}{7}c^2hba^2x^7 + \frac{1}{6}c^2db^2x^6 + \frac{1}{3}c^2dcbx^6 + \frac{1}{5}c^2dgbx^5 + \frac{2}{5}c^2dcbx^5 + \frac{2}{5}c^2dgbx^5 + \frac{1}{5}c^2dgbx^5 + \frac{1}{2}c^2dgbx^4 + \frac{1}{4}c^2dgbx^4 + \frac{2}{3}c^2dgbx^3 + \frac{1}{3}c^2dgbx^3 + \frac{1}{2}c^2dgbx^2 + a^2d*x$$

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="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

$$\frac{c^2hx^{13}}{13} + \frac{c^2gx^{12}}{12} + \frac{(2bhc + c^2f)x^{11}}{11} + \frac{(2gbc + c^2e)x^{10}}{10} + \frac{(2bdf + c^2d + (2ac + b^2)h)x^9}{9} + \frac{(2bcc + (2ac + b^2)g)x^8}{8} + \frac{(2abh + 2bcd + (2ac + b^2)f)x^7}{7} + \frac{(2abg + (2ac + b^2)e)x^6}{6} + \frac{a^2ex^5}{2} + \frac{(a^2h + 2abf + (2ac + b^2)d)x^5}{5} + a^2dx + \frac{(g^2 + 2abde)x^4}{4} + \frac{(f^2 + 2abd)x^3}{3}$$

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

$$\frac{1}{13}c^2hx^{13} + \frac{1}{12}c^2gx^{12} + \frac{1}{11}(c^2f + 2bch)x^{11} + \frac{1}{10}(c^2e + 2bcg)x^{10} + \frac{1}{9}(c^2d + 2bdf + (b^2 + 2ac)h)x^9 + \frac{1}{8}(2bcc + (b^2 + 2ac)g)x^8 + \frac{1}{7}(2abd + 2bcd + (b^2 + 2ac)f)x^7 + \frac{1}{6}(2abg + (b^2 + 2ac)e)x^6 + \frac{1}{5}(2abf + a^2h + (b^2 + 2ac)d)x^5 + \frac{1}{2}a^2ex^4 + \frac{1}{4}(2abg + a^2g)x^4 + a^2dx + \frac{1}{3}(2abd + a^2f)x^3$$

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

$x^6 \left(\frac{c^2 b^2}{6} + \frac{a b c}{3} + \frac{a c c}{3} \right) + x^5 \left(\frac{g b^2}{8} + \frac{c e b}{4} + \frac{a c g}{4} \right) + x^4 \left(\frac{f a^2}{3} + \frac{2 b d a}{3} \right) + x^3 \left(\frac{g a^2}{4} + \frac{b c a}{2} \right) + x^{10} \left(\frac{c^2}{10} + \frac{b g c}{5} \right) + x^{11} \left(\frac{f c^2}{11} + \frac{2 b h c}{11} \right) + x^8 \left(\frac{h a^2}{5} + \frac{2 f a b}{5} + \frac{2 c d a}{5} + \frac{d b^2}{5} \right) + x^7 \left(\frac{b^2 f}{7} + \frac{2 b c d}{7} + \frac{2 a c f}{7} + \frac{2 a b h}{7} \right) + x^9 \left(\frac{h b^2}{9} + \frac{2 f b c}{9} + \frac{d c^2}{9} + \frac{2 a h c}{9} \right) + \frac{a^2 e x^2}{2} + \frac{c^2 g x^{12}}{12} + \frac{c^2 h x^{13}}{13} + a^2 d x$

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

$a^2 d x + \frac{a^2 c x^2}{2} + \frac{c^2 g x^{12}}{12} + \frac{c^2 h x^{13}}{13} + x^{11} \left(\frac{2 b c h}{11} + \frac{c^2 f}{11} \right) + x^{10} \left(\frac{b c g}{5} + \frac{c^2 e}{10} \right) + x^8 \left(\frac{2 a c h}{9} + \frac{b^2 h}{9} + \frac{2 b c f}{9} + \frac{c^2 d}{9} \right) + x^7 \left(\frac{a c g}{4} + \frac{b^2 g}{8} + \frac{b c e}{4} \right) + x^9 \left(\frac{2 a b h}{7} + \frac{2 a c f}{7} + \frac{b^2 f}{7} + \frac{2 b c d}{7} \right) + x^6 \left(\frac{a b g}{3} + \frac{a c e}{3} + \frac{b^2 e}{6} \right) + x^5 \left(\frac{a^2 h}{5} + \frac{2 a b f}{5} + \frac{2 a c d}{5} + \frac{b^2 d}{5} \right) + x^4 \left(\frac{a^2 g}{4} + \frac{a b e}{2} \right) + x^3 \left(\frac{a^2 f}{3} + \frac{2 a b d}{3} \right)$

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

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

Optimal. Leaf size=45

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

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}

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

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] && !MatchQ[u, (b_)*(v_) /; FreeQ[b, x]]

Rule 31

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

Rule 207

Int[((a_) + (b_.)*(x_)^2)^(n_), 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)^(n_), 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] - Dist[c/q, Int[1/Simp[b/2 + q/2 + c*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)^(n_), 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

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

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

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x)/(4 - 5*x^2 + x^4), x]

fricas [A] time = 0.94, 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] $-1/12*(d - 2*e)*\log(\text{abs}(x + 2)) + 1/6*(d - e)*\log(\text{abs}(x + 1)) - 1/6*(d + e)*\log(\text{abs}(x - 1)) + 1/12*(d + 2*e)*\log(\text{abs}(x - 2))$

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

$$-\frac{1}{12} \log\left(x + \frac{-35d^4e + 51d^4(d - 2e)}{2} - 180d^2e^3 - 90d^2e^2(d - 2e) + 41d^2e(d - 2e)^2 - 15d^2(d - 2e)^3/2 + 320e^5 - 96e^4(d - 2e) - 80e^3(d - 2e)^2 + 24e^2(d - 2e)^3\right)/(9d^5 - 160d^3e^2 + 256de^4) + \frac{1}{6} \log\left(x + \frac{-35d^4e - 51d^4(d - e) - 180d^2e^3 + 180d^2e^2(d - e) + 164d^2e(d - e)^2 + 60d^2(d - e)^3 + 320e^5 + 192e^4(d - e) - 320e^3(d - e)^2 - 192e^2(d - e)^3\right)/(9d^5 - 160d^3e^2 + 256de^4) - \frac{1}{6} \log\left(x + \frac{-35d^4e + 51d^4(d + e) - 180d^2e^3 - 180d^2e^2(d + e) + 164d^2e(d + e)^2 - 60d^2(d + e)^3 + 320e^5 - 192e^4(d + e) - 320e^3(d + e)^2 + 192e^2(d + e)^3\right)/(9d^5 - 160d^3e^2 + 256de^4) + \frac{1}{12} \log\left(x + \frac{-35d^4e - 51d^4(d + 2e)}{2} - 180d^2e^3 + 90d^2e^2(d + 2e) + 41d^2e(d + 2e)^2 + 15d^2(d + 2e)^3/2 + 320e^5 + 96e^4(d + 2e) - 80e^3(d + 2e)^2 - 24e^2(d + 2e)^3\right)/(9d^5 - 160d^3e^2 + 256de^4)$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

Optimal. Leaf size=51

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

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}

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

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] && !MatchQ[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] - 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] && NeQ[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

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

Rubi steps

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

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

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4), x]

fricas [A] time = 0.89, size = 51, normalized size = 1.00

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

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

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

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="giac")

[Out] $-1/12*(d + 4*f - 2*e)*\log(\text{abs}(x + 2)) + 1/6*(d + f - e)*\log(\text{abs}(x + 1)) - 1/6*(d + f + e)*\log(\text{abs}(x - 1)) + 1/12*(d + 4*f + 2*e)*\log(\text{abs}(x - 2))$

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

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

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

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

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="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

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

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

$$\begin{aligned}
& *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
\end{aligned}$$

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

Optimal. Leaf size=57

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

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}

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

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] := With[{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] && NeQ[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

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

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

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

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

Verification is not applicable to the result.

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

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

fricas [A] time = 1.63, size = 61, normalized size = 1.07

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

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

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

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)*log(abs(x - 2))

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

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

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

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

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

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

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) + log(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

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

Optimal. Leaf size=64

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

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}

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

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_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^(n_), 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] := With[{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] && NeQ[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[ExpandIntegrand[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

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

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

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

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

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

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

Verification is not applicable to the result.

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

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

fricas [A] time = 4.72, size = 72, normalized size = 1.12

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

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

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

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

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

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

Optimal. Leaf size=76

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

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}

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

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_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^(n_), 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] := With[{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] && NeQ[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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3 + hx^4 + 14x^5}{4 - 5x^2 + x^4} dx &= \int \frac{x(e + gx^2 + 14x^4)}{4 - 5x^2 + x^4} dx + \int \frac{d + fx^2 + hx^4}{4 - 5x^2 + x^4} dx \\ &= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx + 14x^2}{4 - 5x + x^2} dx, x, x^2 \right) + \int \left(h + \frac{d - 4h + (f + 5h)x^2}{4 - 5x^2 + x^4} \right) dx \\ &= hx + \frac{1}{2} \text{Subst} \left(\int \left(14 - \frac{56 - e - (70 + g)x}{4 - 5x + x^2} \right) dx, x, x^2 \right) + \int \frac{d - 4h + (f + 5h)x^2}{4 - 5x^2 + x^4} dx \\ &= hx + 7x^2 - \frac{1}{2} \text{Subst} \left(\int \frac{56 - e - (70 + g)x}{4 - 5x + x^2} dx, x, x^2 \right) - \frac{1}{3}(d + f + h) \int \frac{1}{4 - 5x^2 + x^4} dx \\ &= hx + 7x^2 - \frac{1}{6}(d + 4f + 16h) \tanh^{-1} \left(\frac{x}{2} \right) + \frac{1}{3}(d + f + h) \tanh^{-1}(x) - \frac{1}{3}(d + f + h) \int \frac{1}{4 - 5x^2 + x^4} dx \\ &= hx + 7x^2 - \frac{1}{6}(d + 4f + 16h) \tanh^{-1} \left(\frac{x}{2} \right) + \frac{1}{3}(d + f + h) \tanh^{-1}(x) - \frac{1}{3}(d + f + h) \int \frac{1}{4 - 5x^2 + x^4} dx \end{aligned}$$

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

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

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
```

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

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

Verification is not applicable to the result.

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

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

fricas [A] time = 20.10, size = 88, normalized size = 1.16

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

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="fricas")

[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

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

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

$$\frac{i^2}{2} \frac{d \ln(x+2)}{12} + \frac{d \ln(x-2)}{12} - \frac{d \ln(x-1)}{6} + \frac{d \ln(x+1)}{6} + \frac{e \ln(x+2)}{6} - \frac{e \ln(x-2)}{6} - \frac{e \ln(x-1)}{6} + \frac{e \ln(x+1)}{6} + \frac{f \ln(x+2)}{3} - \frac{f \ln(x-2)}{3} - \frac{f \ln(x-1)}{6} + \frac{f \ln(x+1)}{6} + \frac{2g \ln(x+2)}{3} - \frac{2g \ln(x-2)}{3} - \frac{2g \ln(x-1)}{6} + \frac{2g \ln(x+1)}{6} + \frac{4h \ln(x+2)}{3} - \frac{4h \ln(x-2)}{3} - \frac{4h \ln(x-1)}{6} + \frac{4h \ln(x+1)}{6} + \frac{8i \ln(x+2)}{3} - \frac{8i \ln(x-2)}{3} - \frac{8i \ln(x-1)}{6} + \frac{8i \ln(x+1)}{6}$$

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

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

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="maxima")

[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

$$hx + \frac{ix^2}{2} - \ln(x-1) \left(\frac{d}{6} + \frac{e}{6} + \frac{f}{6} + \frac{g}{6} + \frac{h}{6} + \frac{i}{6} \right) + \ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} - \frac{i}{6} \right) + \ln(x-2) \left(\frac{d}{12} + \frac{e}{6} + \frac{f}{3} + \frac{2g}{3} + \frac{4h}{3} + \frac{8i}{3} \right) - \ln(x+2) \left(\frac{d}{12} - \frac{e}{6} + \frac{f}{3} - \frac{2g}{3} + \frac{4h}{3} - \frac{8i}{3} \right)$$

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
```

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

Optimal. Leaf size=92

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

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}

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

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] && !MatchQ[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[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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

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

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

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

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)]
```

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

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

Verification is not applicable to the result.

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

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

fricas [A] time = 1.12, size = 65, normalized size = 0.71

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $\frac{1}{4}d*\ln(x^2+x+1) + \frac{1}{6}d*\arctan\left(\frac{1}{3}(1+2*x)*3^{(1/2)}\right)*3^{(1/2)} - \frac{1}{3}3^{(1/2)}*\arctan\left(\frac{1}{3}(1+2*x)*3^{(1/2)}\right)*e - \frac{1}{4}d*\ln(x^2-x+1) + \frac{1}{6}3^{(1/2)}*\arctan\left(\frac{1}{3}(2*x-1)*3^{(1/2)}\right)*d + \frac{1}{3}3^{(1/2)}*\arctan\left(\frac{1}{3}(2*x-1)*3^{(1/2)}\right)*e$

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

$$-\ln\left(x - \frac{1}{2} - \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} + \frac{\sqrt{3}d1i}{12} + \frac{\sqrt{3}e1i}{6}\right) + \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} - \frac{\sqrt{3}d1i}{12} + \frac{\sqrt{3}e1i}{6}\right) + \ln\left(x - \frac{1}{2} + \frac{\sqrt{3}1i}{2}\right)\left(-\frac{d}{4} + \frac{\sqrt{3}d1i}{12} + \frac{\sqrt{3}e1i}{6}\right) + \ln\left(x + \frac{1}{2} + \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} + \frac{\sqrt{3}d1i}{12} - \frac{\sqrt{3}e1i}{6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

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] $(-\frac{d}{4} - \sqrt{3}I\frac{d+2e}{12})\log(x + (-7d^4e + 6d^4(-\frac{d}{4} - \sqrt{3}I\frac{d+2e}{12}) - 15d^2e^3 - 18d^2e^2(-\frac{d}{4} - \sqrt{3}I\frac{d+2e}{12}) + 60d^2e(-\frac{d}{4} - \sqrt{3}I\frac{d+2e}{12})^2 + 72d^2(-\frac{d}{4} - \sqrt{3}I\frac{d+2e}{12})^3 + 4e^5 + 24e^4(-\frac{d}{4} - \sqrt{3}I\frac{d+2e}{12}) + 48e^3(-\frac{d}{4} - \sqrt{3}I\frac{d+2e}{12})^2 + 288e^2(-\frac{d}{4} - \sqrt{3}I\frac{d+2e}{12})^3)/(3d^5 - 8d^3e^2 - 16de^4)) + (-\frac{d}{4} + \sqrt{3}I\frac{d+2e}{12})\log(x + (-7d^4e + 6d^4(\frac{d}{4} + \sqrt{3}I\frac{d+2e}{12}) - 15d^2e^3 - 18d^2e^2(-\frac{d}{4} + \sqrt{3}I\frac{d+2e}{12}) + 60d^2e(-\frac{d}{4} + \sqrt{3}I\frac{d+2e}{12})^2 + 72d^2(-\frac{d}{4} + \sqrt{3}I\frac{d+2e}{12})^3 + 4e^5 + 24e^4(-\frac{d}{4} + \sqrt{3}I\frac{d+2e}{12}) + 48e^3(-\frac{d}{4} + \sqrt{3}I\frac{d+2e}{12})^2 + 288e^2(-\frac{d}{4} + \sqrt{3}I\frac{d+2e}{12})^3)/(3d^5 - 8d^3e^2 - 16de^4)) + (\frac{d}{4} - \sqrt{3}I\frac{d-2e}{12})\log(x + (-7d^4e + 6d^4(\frac{d}{4} - \sqrt{3}I\frac{d-2e}{12}) - 15d^2e^3 - 18d^2e^2(\frac{d}{4} - \sqrt{3}I\frac{d-2e}{12}) + 60d^2e(\frac{d}{4} - \sqrt{3}I\frac{d-2e}{12})^2 + 72d^2(\frac{d}{4} - \sqrt{3}I\frac{d-2e}{12})^3 + 4e^5 + 24e^4(\frac{d}{4} - \sqrt{3}I\frac{d-2e}{12}) + 48e^3(\frac{d}{4} - \sqrt{3}I\frac{d-2e}{12})^2 + 288e^2(\frac{d}{4} - \sqrt{3}I\frac{d-2e}{12})^3)/(3d^5 - 8d^3e^2 - 16de^4)) + (\frac{d}{4} + \sqrt{3}I\frac{d-2e}{12})\log(x + (-7d^4e + 6d^4(\frac{d}{4} + \sqrt{3}I\frac{d-2e}{12}) - 15d^2e^3 - 18d^2e^2(\frac{d}{4} + \sqrt{3}I\frac{d-2e}{12}) + 60d^2e(\frac{d}{4} + \sqrt{3}I\frac{d-2e}{12})^2 + 72d^2(\frac{d}{4} + \sqrt{3}I\frac{d-2e}{12})^3 + 4e^5 + 24e^4(\frac{d}{4} + \sqrt{3}I\frac{d-2e}{12}) + 48e^3(\frac{d}{4} + \sqrt{3}I\frac{d-2e}{12})^2 + 288e^2(\frac{d}{4} + \sqrt{3}I\frac{d-2e}{12})^3)/(3d^5 - 8d^3e^2 - 16de^4))$

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

Optimal. Leaf size=104

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

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}

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

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] && !MatchQ[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[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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

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

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

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

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]
```

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

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

Verification is not applicable to the result.

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

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

fricas [A] time = 1.09, size = 75, normalized size = 0.72

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

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

giac [A] time = 0.23, size = 77, normalized size = 0.74

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

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

maple [A] time = 0.00, size = 148, normalized size = 1.42

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

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] $\frac{1}{4}d*\ln(x^2+x+1) - \frac{1}{4}d*\ln(x^2-x+1) + \frac{1}{6}3^{(1/2)}*d*\arctan\left(\frac{1}{3}(2x+1)*3^{(1/2)}\right) - \frac{1}{6}3^{(1/2)}*e*\arctan\left(\frac{1}{3}(2x+1)*3^{(1/2)}\right) + \frac{1}{6}3^{(1/2)}*\arctan\left(\frac{1}{3}(2x+1)*3^{(1/2)}\right)*f + \frac{1}{4}4*\ln(x^2-x+1)*f - \frac{1}{4}d*\ln(x^2-x+1) + \frac{1}{6}3^{(1/2)}*d*\arctan\left(\frac{1}{3}(2x-1)*3^{(1/2)}\right) + \frac{1}{6}3^{(1/2)}*e*\arctan\left(\frac{1}{3}(2x-1)*3^{(1/2)}\right) + \frac{1}{6}3^{(1/2)}*\arctan\left(\frac{1}{3}(2x-1)*3^{(1/2)}\right)*f$

maxima [A] time = 2.58, size = 75, normalized size = 0.72

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

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

mupad [B] time = 0.95, size = 159, normalized size = 1.53

$$-\ln\left(x - \frac{1}{2} - \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} - \frac{f}{4} + \frac{\sqrt{3}d1i}{12} + \frac{\sqrt{3}e1i}{6} + \frac{\sqrt{3}f1i}{12}\right) - \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} - \frac{f}{4} + \frac{\sqrt{3}d1i}{12} - \frac{\sqrt{3}e1i}{6} + \frac{\sqrt{3}f1i}{12}\right) + \ln\left(x - \frac{1}{2} + \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} - \frac{f}{4} + \frac{\sqrt{3}d1i}{12} + \frac{\sqrt{3}e1i}{6} + \frac{\sqrt{3}f1i}{12}\right) + \ln\left(x + \frac{1}{2} + \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} - \frac{f}{4} + \frac{\sqrt{3}d1i}{12} - \frac{\sqrt{3}e1i}{6} + \frac{\sqrt{3}f1i}{12}\right)$$

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] $\log(x + (3^{(1/2)}*1i)/2 - 1/2)*(f/4 - d/4 + (3^{(1/2)}*d*1i)/12 + (3^{(1/2)}*e*1i)/6 + (3^{(1/2)}*f*1i)/12) - \log(x - (3^{(1/2)}*1i)/2 + 1/2)*(f/4 - d/4 + (3^{(1/2)}*d*1i)/12 - (3^{(1/2)}*e*1i)/6 + (3^{(1/2)}*f*1i)/12) - \log(x - (3^{(1/2)}*1i)/2 - 1/2)*(d/4 - f/4 + (3^{(1/2)}*d*1i)/12 + (3^{(1/2)}*e*1i)/6 + (3^{(1/2)}*f*1i)/12) + \log(x + (3^{(1/2)}*1i)/2 + 1/2)*(d/4 - f/4 + (3^{(1/2)}*d*1i)/12 - (3^{(1/2)}*e*1i)/6 + (3^{(1/2)}*f*1i)/12)$

sympy [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 + 2e + f)/12) \log(x + (-7d^{5e} + 6d^{5e}(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 25d^{4e}ef + 18d^{4e}f(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) - 15d^{3e}e^3 - 18d^{3e}e^2(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) - 25d^{3e}ef^2 + 60d^{3e}e(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^2 - 42d^{3e}f^2(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 72d^{3e}(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^3 + 108d^{2e}e^2f(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 20d^{2e}ef^3 - 144d^{2e}ef(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^2 - 12d^{2e}f^3(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) - 144d^{2e}f(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^3 + 4d^{5e} + 24d^{4e}(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 15d^{3e}f^2 + 48d^{3e}(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^2 - 54d^{2e}f^2(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 288d^{2e}(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^3 - 20d^{2e}f^4 + 180d^{2e}f^2(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^2 + 36d^{2e}f^4(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) - 72d^{2e}f^2(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^3 - 8e^{5f} - 96e^{3f}(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^2 + 36e^{2f}f^3(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 11ef^5 - 48ef^3(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^2 - 6f^5(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 144f^3(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^3)/(3d^{6e} - 3d^{5e}f - 8d^{4e}e^2 - 3d^{4e}f^2 + 40d^{3e}e^2f + 6d^{3e}f^3 - 16d^{2e}e^4 - 48d^{2e}e^2f^2 - 3d^{2e}f^4 + 16d^{2e}ef + 40d^{2e}f^3 - 3df^5 - 16e^{4f}f^2 - 8e^{2f}f^4 + 3f^6)) + (-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) \log(x + (-7d^{5e} + 6d^{5e}(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) + 25d^{4e}ef + 18d^{4e}f(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) - 15d^{3e}e^3 - 18d^{3e}e^2(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) - 25d^{3e}ef^2 + 60d^{3e}e(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^2 - 42d^{3e}f^2(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) + 72d^{3e}(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^3 + 108d^{2e}e^2f(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) + 20d^{2e}ef^3 - 144d^{2e}ef(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^2 - 12d^{2e}f^3(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) - 144d^{2e}f(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^3 + 4d^{5e} + 24d^{4e}(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) + 15d^{3e}f^2 + 48d^{3e}(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^2 - 54d^{2e}f^2(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) + 288d^{2e}(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^3 - 20d^{2e}f^4 + 180d^{2e}f^2(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^2 + 36d^{2e}f^4(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) - 72d^{2e}f^2(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^3 - 8e^{5f} - 96e^{3f}(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^2 + 36e^{2f}f^3(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) + 11ef^5 - 48ef^3(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^2 - 6f^5(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) + 144f^3(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^3)/(3d^{6e} - 3d^{5e}f - 8d^{4e}e^2 - 3d^{4e}f^2 + 40d^{3e}e^2f + 6d^{3e}f^3 - 16d^{2e}e^4 - 48d^{2e}e^2f^2 - 3d^{2e}f^4 + 16d^{2e}ef + 40d^{2e}f^3 - 3df^5 - 16e^{4f}f^2 - 8e^{2f}f^4 + 3f^6)) + (d/4 - f/4 - \sqrt{3}I(d - 2e + f)/12) \log(x + (-7d^{5e} + 6d^{5e}(d/4 - f/4 - \sqrt{3}I(d - 2e + f)/12) + 25d^{4e}ef + 18d^{4e}f(d/4 - f/4 - \sqrt{3}I(d - 2e + f)/12) - 15d^{3e}e^3 - 18d^{3e}e^2(d/4 - f/4 - \sqrt{3}I(d - 2e + f)/12) - 25d^{3e}ef^2 + 60d^{3e}e(d/4 - f/4 - \sqrt{3}I(d - 2e + f)/12)^2 - 42d^{3e}f^2(d/4 - f/4 - \sqrt{3}I(d - 2e + f)/12) + 72d^{3e}(d/4 - f/4 - \sqrt{3}I(d - 2e + f)/12)^3 + 108d^{2e}e^2f(d/4 - f/4 - \sqrt{3}I(d - 2e + f)/12) + 20d^{2e}ef^3 - 144d^{2e}ef(d/4 - f/4 - \sqrt{3}I(d - 2e + f)/12)^2 - 12d^{2e}f^3(d/4 - f/4 - \sqrt{3}I(d - 2e + f)/12) - 144d^{2e}f(d/4 - f/4 - \sqrt{3}I(d - 2e + f)/12)^3 + 4d^{5e} + 24d^{4e}(d/4 - f/4 - \sqrt{3}I(d - 2e + f)/12) + 15d^{3e}f^2 +$

$$\begin{aligned}
& 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} \\
& (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 \\
& \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 \\
&))
\end{aligned}$$

$$3.17 \quad \int \frac{d+ex+fx^2+gx^3}{1+x^2+x^4} dx$$

Optimal. Leaf size=127

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

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}

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

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[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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],

$x, x^2], x] /; \text{FreeQ}\{a, b, c, d, e, p, q\}, x]$

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

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

Mathematica [C] time = 0.48, size = 150, normalized size = 1.18

$$\frac{2\left(\sqrt{2+2i\sqrt{3}}\left((\sqrt{3}+i)f-2id\right)\tan^{-1}\left(\frac{1}{2}(\sqrt{3}+i)x\right)+(2g-4e)\tan^{-1}\left(\frac{\sqrt{3}}{2x^2+1}\right)+\sqrt{3}g\log\left(x^4+x^2+1\right)\right)+2\sqrt{2-2i\sqrt{3}}\left(2id+(\sqrt{3}-i)f\right)\tan^{-1}\left(\frac{1}{2}(\sqrt{3}-i)x\right)}{8\sqrt{3}}$$

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])
```

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

$$\int \frac{d + ex + fx^2 + gx^3}{1 + x^2 + x^4} dx$$

Verification is not applicable to the result.

```
[In] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4), x]
```

```
[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4), x]
```

fricas [A] time = 1.86, size = 83, normalized size = 0.65

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

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

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

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

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

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] $1/4*d*\ln(x^2+x+1) - 1/4*f*\ln(x^2+x+1) + 1/4*\ln(x^2+x+1)*g + 1/6*3^{(1/2)}*d*\arctan(1/3*(2*x+1)*3^{(1/2)}) - 1/3*3^{(1/2)}*e*\arctan(1/3*(2*x+1)*3^{(1/2)}) + 1/6*3^{(1/2)}*f*\arctan(1/3*(2*x+1)*3^{(1/2)}) + 1/6*3^{(1/2)}*\arctan(1/3*(2*x+1)*3^{(1/2)})*g + 1/4*f*\ln(x^2-x+1) - 1/4*d*\ln(x^2-x+1) + 1/4*\ln(x^2-x+1)*g + 1/6*3^{(1/2)}*d*\arctan(1/3*(2*x-1)*3^{(1/2)}) + 1/3*3^{(1/2)}*e*\arctan(1/3*(2*x-1)*3^{(1/2)}) + 1/6*3^{(1/2)}*f*\arctan(1/3*(2*x-1)*3^{(1/2)}) - 1/6*3^{(1/2)}*\arctan(1/3*(2*x-1)*3^{(1/2)})*g$

maxima [A] time = 2.39, size = 83, normalized size = 0.65

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

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

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

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
```

$$3.18 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{1+x^2+x^4} dx$$

Optimal. Leaf size=136

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

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}

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

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)/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[Int[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] :> Simp[(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] :> Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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],

$x, x^2], x] /; \text{FreeQ}\{a, b, c, d, e, p, q\}, x]$

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

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

Mathematica [C] time = 0.60, size = 165, normalized size = 1.21

$$\frac{1}{24} \left(4 \tan^{-1} \left(\frac{1}{2} (\sqrt{3} - i)x \right) ((\sqrt{3} + 3i)d + (\sqrt{3} - 3i)f - 2\sqrt{3}h) + 4 \tan^{-1} \left(\frac{1}{2} (\sqrt{3} + i)x \right) ((\sqrt{3} - 3i)d + (\sqrt{3} + 3i)f - 2\sqrt{3}h) - 8\sqrt{3}e \tan^{-1} \left(\frac{\sqrt{3}}{2x^2 + 1} \right) + 4\sqrt{3}g \tan^{-1} \left(\frac{\sqrt{3}}{2x^2 + 1} \right) + 6g \log(x^4 + x^2 + 1) + 24hx \right)$$

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

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4}{1 + x^2 + x^4} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4),x]

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4), x]

fricas [A] time = 4.52, size = 92, normalized size = 0.68

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

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+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*sqrt(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

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

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+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*sqrt(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

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

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*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+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

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

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+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*sqrt(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
```


$$3.19 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{1+x^2+x^4} dx$$

Optimal. Leaf size=151

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

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}

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

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(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)*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 - 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[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 19x^5}{1 + x^2 + x^4} dx &= \int \frac{x(e + gx^2 + 19x^4)}{1 + x^2 + x^4} dx + \int \frac{d + fx^2 + hx^4}{1 + x^2 + x^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx + 19x^2}{1 + x + x^2} dx, x, x^2 \right) + \int \left(h + \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} \right) dx \\
&= hx + \frac{1}{2} \text{Subst} \left(\int \left(19 - \frac{19 - e + (19 - g)x}{1 + x + x^2} \right) dx, x, x^2 \right) + \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \\
&= hx + \frac{19x^2}{2} + \frac{1}{2} \int \frac{d - h - (d - f)x}{1 - x + x^2} dx + \frac{1}{2} \int \frac{d - h + (d - f)x}{1 + x + x^2} dx - \frac{1}{2} \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \\
&= hx + \frac{19x^2}{2} + \frac{1}{4}(d - f) \int \frac{1 + 2x}{1 + x + x^2} dx + \frac{1}{4}(-d + f) \int \frac{-1 + 2x}{1 - x + x^2} dx - \frac{1}{4} \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \\
&= hx + \frac{19x^2}{2} - \frac{1}{4}(d - f) \log(1 - x + x^2) + \frac{1}{4}(d - f) \log(1 + x + x^2) - \frac{1}{4} \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \\
&= hx + \frac{19x^2}{2} - \frac{(d + f - 2h) \tan^{-1} \left(\frac{1 - 2x}{\sqrt{3}} \right)}{2\sqrt{3}} + \frac{(d + f - 2h) \tan^{-1} \left(\frac{1 + 2x}{\sqrt{3}} \right)}{2\sqrt{3}} - \frac{1}{4} \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx
\end{aligned}$$

Mathematica [C] time = 0.58, size = 187, normalized size = 1.24

$$\frac{1}{12} \left((1 + i\sqrt{3}) \tan^{-1} \left(\frac{1}{2}(\sqrt{3} - i)x \right) (2\sqrt{3}d - (\sqrt{3} + 3i)f - (\sqrt{3} - 3i)h) + (\sqrt{3} + i) \tan^{-1} \left(\frac{1}{2}(\sqrt{3} + i)x \right) (-2i\sqrt{3}d + (3 + i\sqrt{3})f + i(\sqrt{3} + 3i)h) - 2\sqrt{3} \tan^{-1} \left(\frac{\sqrt{3}}{2x^2 + 1} \right) (2e - g - i) + 3(g - i) \log(x^4 + x^2 + 1) + 6x(2h + ix) \right)$$

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
```

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + ix^5}{1 + x^2 + x^4} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4), x]

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4), x]

fricas [A] time = 18.84, size = 106, normalized size = 0.70

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

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

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

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

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

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

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

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

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] $hx - \log(dg^3i - d^2f^9i - d^2e^6i + d^2h^3i + d^2i^3i + e^2h^6i - f^2h^3i - g^2h^3i - h^2i^3i - 3^{3/2}d^2 - d^2x^6i - f^2x^3i + d^2x^3i + f^2x^6i - 2^{3/2}d^2e + 3^{3/2}d^2f + 3^{3/2}d^2g + 4^{3/2}e^2f + 3^{3/2}d^2h + 3^{3/2}d^2i - 2^{3/2}e^2h - 2^{3/2}f^2g - 3^{3/2}f^2h - 2^{3/2}f^2i + 3^{3/2}g^2h + 3^{3/2}h^2i + d^2fx^9i + e^2fx^6i + d^2hx^3i - e^2hx^6i - f^2gx^3i - f^2hx^3i - f^2ix^3i + g^2hx^3i + h^2ix^3i - 3^{3/2}f^2x + 3^{3/2}d^2fx - 2^{3/2}d^2gx - 2^{3/2}e^2fx - 3^{3/2}d^2hx - 2^{3/2}(1/2)d^2ix - 2^{3/2}e^2hx + 3^{3/2}f^2gx + 3^{3/2}f^2hx + 3^{3/2}f^2ix + 3^{3/2}g^2hx + 3^{3/2}h^2ix + 4^{3/2}d^2e)x(d/4 - f/4 - g/4 + i/4 + (3^{3/2}d^2i)/12 + (3^{3/2}e^2i)/6 + (3^{3/2}f^2i)/12 - (3^{3/2}g^2i)/12 - (3^{3/2}h^2i)/6 - (3^{3/2}i^2i)/12) - \log(d^2e^6i + d^2f^9i - d^2g^3i - d^2h^3i - d^2i^3i - e^2h^6i + f^2h^3i + g^2h^3i + h^2i^3i - 3^{3/2}d^2 + d^2x^6i + f^2x^3i - d^2x^3i - f^2x^6i - 2^{3/2}d^2e + 3^{3/2}d^2f + 3^{3/2}d^2g + 4^{3/2}e^2f + 3^{3/2}d^2h + 3^{3/2}d^2i - 2^{3/2}e^2h - 2^{3/2}f^2g - 3^{3/2}f^2h - 2^{3/2}f^2i + 3^{3/2}g^2h + 3^{3/2}h^2i - d^2fx^9i - e^2fx^6i - d^2hx^3i + e^2hx^6i + f^2gx^3i + f^2hx^3i + f^2ix^3i - g^2hx^3i - h^2ix^3i - 3^{3/2}f^2x + 3^{3/2}d^2fx - 2^{3/2}d^2gx - 2^{3/2}e^2fx - 3^{3/2}d^2hx - 2^{3/2}d^2ix - 2^{3/2}e^2hx + 3^{3/2}f^2gx + 3^{3/2}f^2hx + 3^{3/2}f^2ix + 3^{3/2}g^2hx + 3^{3/2}h^2ix + 4^{3/2}d^2e)x(d/4 - f/4 - g/4 + i/4 - (3^{3/2}d^2i)/12 - (3^{3/2}e^2i)/6 - (3^{3/2}f^2i)/12 + (3^{3/2}g^2i)/12 + (3^{3/2}h^2i)/6 + (3^{3/2}i^2i)/12) - \log(d^2f^9i - d^2e^6i + d^2g^3i - d^2h^3i + d^2i^3i + e^2h^6i + f^2h^3i - g^2h^3i - h^2i^3i - 3^{3/2}d^2 - d^2x^6i - f^2x^3i - d^2x^3i - f^2x^6i + 2^{3/2}d^2e + 3^{3/2}d^2f - 3^{3/2}d^2g - 4^{3/2}e^2f + 3^{3/2}(1/2)d^2h - 3^{3/2}d^2i + 2^{3/2}e^2h + 2^{3/2}f^2g - 3^{3/2}f^2h + 2^{3/2}f^2i - 3^{3/2}g^2h - 3^{3/2}h^2i + d^2fx^9i - e^2fx^6i + d^2hx^3i + e^2hx^6i + f^2gx^3i - f^2hx^3i + f^2ix^3i - g^2hx^3i - h^2ix^3i + 3^{3/2}f^2x - 3^{3/2}d^2fx - 2^{3/2}d^2gx - 2^{3/2}e^2fx + 3^{3/2}d^2hx - 2^{3/2}d^2ix - 2^{3/2}e^2hx + 3^{3/2}f^2gx - 3^{3/2}f^2hx + 3^{3/2}f^2ix + 3^{3/2}g^2hx + 3^{3/2}h^2ix + 4^{3/2}d^2e)x(f/4 - d/4 - g/4 + i/4 + (3^{3/2}d^2i)/12 - (3^{3/2}e^2i)/6 + (3^{3/2}f^2i)/12 + (3^{3/2}g^2i)/12 - (3^{3/2}h^2i)/6 + (3^{3/2}i^2i)/12) + \log(d^2f^9i - d^2e^6i + d^2g^3i - d^2h^3i + d^2i^3i + e^2h^6i + f^2h^3i - g^2h^3i - h^2i^3i + 3^{3/2}(1/2)d^2 - d^2x^6i - f^2x^3i - d^2x^3i - f^2x^6i - 2^{3/2}d^2e - 3^{3/2}(1/2)d^2f + 3^{3/2}d^2g + 4^{3/2}e^2f - 3^{3/2}d^2h + 3^{3/2}d^2i - 2^{3/2}e^2h - 2^{3/2}f^2g + 3^{3/2}f^2h - 2^{3/2}f^2i + 3^{3/2}g^2h + 3^{3/2}h^2i + d^2fx^9i - e^2fx^6i + d^2hx^3i + e^2hx^6i + f^2gx^3i - f^2hx^3i + f^2ix^3i - g^2hx^3i - h^2ix^3i - 3^{3/2}f^2x + 3^{3/2}d^2fx + 2^{3/2}(1/2)d^2gx + 2^{3/2}e^2fx - 3^{3/2}d^2hx + 2^{3/2}d^2ix + 2^{3/2}e^2hx - 3^{3/2}f^2gx + 3^{3/2}f^2hx - 3^{3/2}f^2ix - 3^{3/2}g^2hx - 3^{3/2}h^2ix - 4^{3/2}d^2e)x(d/4 - f/4 + g/4 - i/4 + (3^{3/2}d^2i)/12 - (3^{3/2}e^2i)/6 + (3^{3/2}f^2i)/12 + (3^{3/2}g^2i)/12 - (3^{3/2}h^2i)/6 + (3^{3/2}i^2i)/12) + (ix^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

$$3.20 \quad \int \frac{d+ex}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=189

$$\frac{\sqrt{2} \sqrt{c} d \tan^{-1}\left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{b^2-4ac} \sqrt{b-\sqrt{b^2-4ac}}} - \frac{\sqrt{2} \sqrt{c} d \tan^{-1}\left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{b^2-4ac} \sqrt{\sqrt{b^2-4ac}+b}} - \frac{e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

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*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]]) - (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] && !MatchQ[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] && (GtQ[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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

$$\begin{aligned} \int \frac{d + ex}{a + bx^2 + cx^4} dx &= \int \frac{d}{a + bx^2 + cx^4} dx + \int \frac{ex}{a + bx^2 + cx^4} dx \\ &= d \int \frac{1}{a + bx^2 + cx^4} dx + e \int \frac{x}{a + bx^2 + cx^4} dx \\ &= \frac{(cd) \int \frac{1}{\frac{b}{2} - \frac{1}{2} \sqrt{b^2 - 4ac} + cx^2} dx}{\sqrt{b^2 - 4ac}} - \frac{(cd) \int \frac{1}{\frac{b}{2} + \frac{1}{2} \sqrt{b^2 - 4ac} + cx^2} dx}{\sqrt{b^2 - 4ac}} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{a + bx + cx^2} dx, x \right) \\ &= \frac{\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b^2 - 4ac} \sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b^2 - 4ac} \sqrt{b + \sqrt{b^2 - 4ac}}} - e \operatorname{Subst} \left(\int \frac{1}{b^2 - 4ac - x} dx, x \right) \\ &= \frac{\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b^2 - 4ac} \sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b^2 - 4ac} \sqrt{b + \sqrt{b^2 - 4ac}}} - \frac{e \tanh^{-1} \left(\frac{b + 2cx^2}{\sqrt{b^2 - 4ac}} \right)}{\sqrt{b^2 - 4ac}} \end{aligned}$$

Mathematica [A] time = 0.25, size = 194, normalized size = 1.03

$$\frac{2\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{2\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b + \sqrt{b^2 - 4ac}}} + e \left(\log \left(\sqrt{b^2 - 4ac} - b - 2cx^2 \right) - \log \left(\sqrt{b^2 - 4ac} + b + 2cx^2 \right) \right) / (2\sqrt{b^2 - 4ac})$$

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])

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

$$\int \frac{d + ex}{a + bx^2 + cx^4} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x)/(a + b*x^2 + c*x^4), x]

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]
$$\frac{1}{4}(\sqrt{2})\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^4 - 8\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^3 c - 2\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c^2 + 16\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} a b^2 c^2 + 8\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} a^2 c^2 + \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} a^2 b c^2 + 16 a^2 b^2 c^2 + 2 b^3 c^2 - 4\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} a^2 c^3 - 32 a^2 b c^3 - 8 a^2 b^2 c^3 - \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^3 + 4\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c + 2\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c - \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c + 2(b^2 - 4ac) b^2 c - 8(b^2 - 4ac) a c^2 - 2(b^2 - 4ac) b^2 c^2) d \arctan(2\sqrt{1/2} x / \sqrt{(b + \sqrt{b^2 - 4ac})/c}) / ((a b^4 - 8 a^2 b^2 c - 2 a^2 b^3 c + 16 a^3 c^2 + 8 a^2 b^2 c^2 + a b^2 c^2 - 4 a^2 c^3) a b s(c)) + \frac{1}{4}(\sqrt{2})\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^4 - 8\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^3 c + 2\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c^2 + 16\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} a b^2 c^2 + 8\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} a^2 b c^2 + \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} a^2 c^2 + \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} a^2 b c^2 - 16 a^2 b^2 c^2 - 2 b^3 c^2 - 4\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} a^2 c^3 + 32 a^2 b c^3 + 8 a^2 b^2 c^3 + \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^3 - 4\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c - 2\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c + \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c - \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c + \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c - 2(b^2 - 4ac) b^2 c + 8(b^2 - 4ac) a c^2 + 2(b^2 - 4ac) b^2 c^2) d \arctan(2\sqrt{1/2} x / \sqrt{(b - \sqrt{b^2 - 4ac})/c}) / ((a b^4 - 8 a^2 b^2 c - 2 a^2 b^3 c + 16 a^3 c^2 + 8 a^2 b^2 c^2 + a b^2 c^2 - 4 a^2 c^3) a b s(c)) - \frac{1}{2}(b^2 c^2 - 4 a^2 c^3 - 2 b^2 c^3 + c^4) \sqrt{b^2 - 4ac} e \log(x^2 + 1/2(b + \sqrt{b^2 - 4ac})/c) / ((b^4 - 8 a^2 b^2 c - 2 b^3 c + 16 a^2 c^2 + 8 a^2 b^2 c^2 + b^2 c^2 - 4 a^2 c^3) c^2) + \frac{1}{2}(b^2 c^2 - 4 a^2 c^3 - 2 b^2 c^3 + c^4) \sqrt{b^2 - 4ac} e \log(x^2 + 1/2(b - \sqrt{b^2 - 4ac})/c) / ((b^4 - 8 a^2 b^2 c - 2 b^3 c + 16 a^2 c^2 + 8 a^2 b^2 c^2 + b^2 c^2 - 4 a^2 c^3) c^2)$$

maple [A] time = 0.03, size = 231, normalized size = 1.22

$$\frac{2\sqrt{-4ac + b^2} \sqrt{2} \operatorname{cd} \arctan\left(\frac{\sqrt{2} cx}{\sqrt{(-b + \sqrt{-4ac + b^2})c}}\right)}{(8ac - 2b^2)\sqrt{(-b + \sqrt{-4ac + b^2})c}} + \frac{2\sqrt{-4ac + b^2} \sqrt{2} \operatorname{cd} \arctan\left(\frac{\sqrt{2} cx}{\sqrt{(b + \sqrt{-4ac + b^2})c}}\right)}{(8ac - 2b^2)\sqrt{(b + \sqrt{-4ac + b^2})c}} - \frac{\sqrt{-4ac + b^2} e \ln(-2cx^2 - b + \sqrt{-4ac + b^2})}{8ac - 2b^2} + \frac{\sqrt{-4ac + b^2} e \ln(2cx^2 + b + \sqrt{-4ac + b^2})}{8ac - 2b^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out]
$$-(-4ac + b^2)^{1/2} / (8ac - 2b^2) e \ln(-2cx^2 + (-4ac + b^2)^{1/2} - b) + 2c * (-4ac + b^2)^{1/2} / (8ac - 2b^2) d * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2})c)^{1/2} * cx) + (-4ac + b^2)^{1/2} / (8ac - 2b^2) e \ln(2cx^2 + (-4ac + b^2)^{1/2} + b) + 2c * (-4ac + b^2)^{1/2} / (8ac - 2b^2)$$

$a*c^{-2}*b^2*d^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*arctan(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)$

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

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), 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

$$3.21 \quad \int \frac{d+ex+fx^2}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=211

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}} - \frac{e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

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] && !MatchQ[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] && (GtQ[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] && NeQ[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

$$\begin{aligned} \int \frac{d + ex + fx^2}{a + bx^2 + cx^4} dx &= \int \frac{ex}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2}{a + bx^2 + cx^4} dx \\ &= e \int \frac{x}{a + bx^2 + cx^4} dx + \frac{1}{2} \left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \int \frac{1}{\frac{b}{2} + \frac{1}{2}\sqrt{b^2 - 4ac} + cx^2} dx + \frac{1}{2} \left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \int \frac{1}{\frac{b}{2} - \frac{1}{2}\sqrt{b^2 - 4ac} + cx^2} dx \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{t} dt, t, \frac{b}{2} + \frac{1}{2}\sqrt{b^2 - 4ac} + cx^2 \right) \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} - e \operatorname{Subst} \left(\int \frac{1}{t} dt, t, \frac{b}{2} - \frac{1}{2}\sqrt{b^2 - 4ac} + cx^2 \right) \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} - \frac{e \tanh^{-1} \left(\frac{b}{\sqrt{b^2 - 4ac}} \right)}{\sqrt{b^2 - 4ac}} \end{aligned}$$

Mathematica [A] time = 0.22, size = 234, normalized size = 1.11

$$\frac{\sqrt{2} \left(f \left(\sqrt{b^2 - 4ac} - b \right) + 2cd \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\sqrt{2} \left(f \left(\sqrt{b^2 - 4ac} + b \right) - 2cd \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} + e \log \left(\sqrt{b^2 - 4ac} - b - 2cx^2 \right) - e \log \left(\sqrt{b^2 - 4ac} + b + 2cx^2 \right)}{2\sqrt{b^2 - 4ac}}$$

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)/Sqrt[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 + Sqrt[b^2 - 4*a*c] - 2*c*x^2] - e*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(2*Sqrt[b^2 - 4*a*c])

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

$$\int \frac{d + ex + fx^2}{a + bx^2 + cx^4} dx$$

Verification is not applicable to the result.

```
[In] IntegrateAlgebraic[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4),x]
[Out] IntegrateAlgebraic[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4), x]
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)*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) + 1/4*((sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*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))*b^3*c - 2*b^4*c + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*c^2 + 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*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))*b^3 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^2*c + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*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))*a*b^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*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))*b^4 - 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b^2*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^3*c + 2*b^4*c + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^2*c^2 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*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))*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))*b^3 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^2*c + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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))*a*b^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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
```

$$\frac{2\sqrt{e} \operatorname{arctanh}\left(\frac{\sqrt{e}}{\sqrt{b+\sqrt{4ac+e}}}\right)}{(4ac-e)\sqrt{b+\sqrt{4ac+e}}} - \frac{2\sqrt{e} \operatorname{arctanh}\left(\frac{\sqrt{e}}{\sqrt{b-\sqrt{4ac+e}}}\right)}{(4ac-e)\sqrt{b-\sqrt{4ac+e}}} + \frac{\sqrt{e} \operatorname{arctanh}\left(\frac{\sqrt{e}}{\sqrt{b+\sqrt{4ac+e}}}\right)}{2(4ac-e)\sqrt{b+\sqrt{4ac+e}}} + \frac{\sqrt{e} \operatorname{arctanh}\left(\frac{\sqrt{e}}{\sqrt{b-\sqrt{4ac+e}}}\right)}{2(4ac-e)\sqrt{b-\sqrt{4ac+e}}} + \frac{\sqrt{4ac+e} \sqrt{e} \operatorname{arctanh}\left(\frac{\sqrt{e}}{\sqrt{b+\sqrt{4ac+e}}}\right)}{2(4ac-e)\sqrt{b+\sqrt{4ac+e}}} + \frac{\sqrt{4ac+e} \sqrt{e} \operatorname{arctanh}\left(\frac{\sqrt{e}}{\sqrt{b-\sqrt{4ac+e}}}\right)}{2(4ac-e)\sqrt{b-\sqrt{4ac+e}}} + \frac{\sqrt{4ac+e} \sqrt{e} \operatorname{arctanh}\left(\frac{\sqrt{e}}{\sqrt{b+\sqrt{4ac+e}}}\right)}{(4ac-e)\sqrt{b+\sqrt{4ac+e}}} + \frac{\sqrt{4ac+e} \sqrt{e} \operatorname{arctanh}\left(\frac{\sqrt{e}}{\sqrt{b-\sqrt{4ac+e}}}\right)}{(4ac-e)\sqrt{b-\sqrt{4ac+e}}} + \frac{\sqrt{4ac+e} \operatorname{atan}\left(\frac{2x^2-b+\sqrt{4ac+e}}{\sqrt{b+\sqrt{4ac+e}}}\right)}{2(4ac-e)} + \frac{\sqrt{4ac+e} \operatorname{atan}\left(\frac{2x^2-b+\sqrt{4ac+e}}{\sqrt{b-\sqrt{4ac+e}}}\right)}{2(4ac-e)}$$


```
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

$$3.22 \quad \int \frac{d+ex+fx^2+gx^3}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=245

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right) + \left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{\sqrt{b^2-4ac}+b}}\right) + (2ce-bg) \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right) + g \log(a+bx^2+cx^4)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}} + \sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b} + 2c\sqrt{b^2-4ac} + 4c}$$

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}

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right) + \left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{\sqrt{b^2-4ac}+b}}\right) - \frac{(2ce-bg) \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{2c\sqrt{b^2-4ac}} + \frac{g \log(a+bx^2+cx^4)}{4c}}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}} + \sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b} + 2c\sqrt{b^2-4ac} + 4c}$$

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*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] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{a + bx^2 + cx^4} dx &= \int \frac{d + fx^2}{a + bx^2 + cx^4} dx + \int \frac{x(e + gx^2)}{a + bx^2 + cx^4} dx \\ &= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{a + bx + cx^2} dx, x, x^2 \right) + \frac{1}{2} \left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \int \frac{1}{\frac{b}{2} + \frac{1}{2}\sqrt{b^2 - 4ac} + cx^2} dx \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b + \sqrt{b^2 - 4ac}}} + \frac{g \text{Subst} \left(\int \frac{1}{\frac{b}{2} + \frac{1}{2}\sqrt{b^2 - 4ac} + cx^2} dx, x, x^2 \right)}{2c} \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b + \sqrt{b^2 - 4ac}}} + \frac{g \log \left(\frac{b + \sqrt{b^2 - 4ac} + 2cx^2}{b - \sqrt{b^2 - 4ac} + 2cx^2} \right)}{2c} \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b + \sqrt{b^2 - 4ac}}} - \frac{(2ce - g) \log \left(\frac{b + \sqrt{b^2 - 4ac} + 2cx^2}{b - \sqrt{b^2 - 4ac} + 2cx^2} \right)}{4c\sqrt{b^2 - 4ac}} \end{aligned}$$

Mathematica [A] time = 0.29, size = 280, normalized size = 1.14

$$\frac{2\sqrt{2}\sqrt{c}\left(f\left(\sqrt{b^2-4ac}-b\right)+2cd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)+2\sqrt{2}\sqrt{c}\left(f\left(\sqrt{b^2-4ac}+b\right)-2cd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)+\left(g\left(\sqrt{b^2-4ac}-b\right)+2ce\right)\log\left(\frac{b+\sqrt{b^2-4ac}+2cx^2}{b-\sqrt{b^2-4ac}+2cx^2}\right)}{4c\sqrt{b^2-4ac}}$$

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]*Sqr
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 + (
```

$b + \text{Sqrt}[b^2 - 4*a*c])*g)*\text{Log}[b + \text{Sqrt}[b^2 - 4*a*c] + 2*c*x^2)]/(4*c*\text{Sqrt}[b^2 - 4*a*c])$

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

$$\int \frac{d + ex + fx^2 + gx^3}{a + bx^2 + cx^4} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4), x]

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] $\frac{1}{4}g*\log(\text{abs}(c*x^4 + b*x^2 + a))/c + \frac{1}{8}*((2*b^4*c^2 - 16*a*b^2*c^3 + 32*a^2*c^4 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*b^4 + 8*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b^2*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^3*c - 16*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a^2*c^2 - 8*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b*c^2 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^2*c^2 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*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*(\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^4*c^2 - 8*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b^2*c^3 - 2*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^3*c^3 + 2*b^4*c^3 + 16*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a^2*c^4 + 8*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b*c^4 + \text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^2*c^4 - 16*a*b^2*c^4 - 4*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*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*\text{abs}(c) + 2*(2*b^3*c^5 - 8*a*b*c^6 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^3*c^3 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b*c^4 + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^2*c^4 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*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 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^4*c^2 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b^2*c^3 + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^3*c^3 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^2*c^4 - 2*(b^2 - 4*a*c)*b^2*c^4)*f)*\text{arctan}(2*\text{sqrt}(1/2)*x/\text{sqrt}((b*c + \text{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) - \frac{1}{8}*((2*b^4*c^2 - 16*a*b^2*c^3 + 32*a^2*c^4 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^4 + 8*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^2*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^3*c - 16*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*c^2 - 8*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b*c^2 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*$

$$\begin{aligned} & \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*\sqrt{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}*\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 - \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)*\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)) \end{aligned}$$

maple [B] time = 0.03, size = 866, normalized size = 3.53



Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a), x)$

[Out] $\frac{1}{(4*a*c-b^2)}*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*g*a-1/4/(4*a*c-b^2)/c*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*g*b^2+1/4*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)/c*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*b*g-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})-2*c/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f*a+1/2/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f*b^2-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*f+c*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+$

$$-4*a*c+b^2)^{(1/2)}*c)^{(1/2)}*arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*d+1/(4*a*c-b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*g*a-1/4/(4*a*c-b^2)/c*ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*g*b^2-1/4*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)/c*ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*b*g+1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})+2/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c)^{(1/2)}*a*c*f*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/2/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b^2*f*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b*f*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)+(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*d*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)$$

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 -

$$\begin{aligned}
& *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 \\
& *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^
\end{aligned}$$

$$\begin{aligned}
& 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*
\end{aligned}$$

$$\begin{aligned}
& a^3c^2g^2z^2 - 32a^2c^3e^2z^2 - 4b^3c^2d^2z^2 - 4a^4b^4g^2z^2 \\
& - 8a^2b^2c^2d^2f^2g^2z + 32a^2c^2d^2f^2g^2z - 16a^2b^2c^2e^2g^2z - 4a^2b^2c^2e^2g^2z \\
& - 16a^2b^2c^2d^2g^2z + 4a^2b^2c^2e^2f^2z + 16a^2c^2e^2g^2z - 16a^2c^2e^2f^2z - 4b^2c^2d^2e^2z \\
& + 4b^3c^2d^2g^2z + 4a^2b^3e^2g^2z + 16a^2c^3d^2e^2z + 16a^3c^2g^3z - 4a^2b^2g^3z - 4a^2b^2c^2d^2e^2f^2g \\
& + 2a^2b^2c^2e^2f^2g + 2a^2b^2c^2d^2f^3 + 4a^2c^2e^2f^2g - 4a^2c^2d^2f^2g + 2b^2c^2d^2e^2g \\
& - 4a^2c^2d^2e^2g + 2a^2b^2d^2f^2g + 4a^2c^2d^2e^2f + 3a^2b^2c^2d^2g^2 + 2a^2b^2e^2g^3 \\
& + 2b^2c^2d^3f - a^2b^2c^2e^2f^2 - 2a^2c^2e^2g^2 - 2a^2c^2d^2f^2 - a^2b^2f^2g^2 - b^2c^2d^2f^2 \\
& - a^2b^2e^2g^2 - b^2c^2d^2e^2 - b^3d^2g^2 - a^2c^2f^4 - a^2c^2e^4 - a^3g^4 - c^3d^4, z, k) \\
& a^2c^2e^2g^2x - 32\text{root}(128a^2b^2c^3z^4 - 16a^4b^4c^2z^4 - 256a^3c^4z^4 - 128a^2b^2c^2g^2z^3 \\
& + 16a^4b^4c^2g^2z^3 + 256a^3c^3g^2z^3 + 32a^2b^2c^2e^2g^2z^2 + 16a^2b^2c^2d^2f^2z^2 \\
& - 8a^2b^3c^2e^2g^2z^2 + 40a^2b^2c^2g^2z^2 + 16a^2b^2c^2f^2z^2 + 8a^2b^2c^2e^2z^2 \\
& - 64a^2c^3d^2f^2z^2 - 4a^2b^3c^2f^2z^2 + 16a^2b^2c^3d^2z^2 - 96a^3c^2g^2z^2 - 32a^2c^3e^2z^2 \\
& - 4b^3c^2d^2z^2 - 4a^2b^4g^2z^2 - 8a^2b^2c^2d^2f^2g^2z + 32a^2c^2d^2f^2g^2z - 16a^2b^2c^2e^2g^2z \\
& - 4a^2b^2c^2e^2g^2z - 16a^2b^2c^2d^2g^2z + 4a^2b^2c^2e^2f^2z + 16a^2c^2e^2g^2z \\
& - 16a^2c^2e^2f^2z - 4b^2c^2d^2e^2z + 4b^3c^2d^2g^2z + 4a^2b^3e^2g^2z + 16a^2c^3d^2e^2z \\
& + 16a^3c^2g^3z - 4a^2b^2g^3z - 4a^2b^2c^2d^2e^2f^2g + 2a^2b^2c^2d^2e^2f^2g + 2a^2b^2c^2d^2f^3 \\
& + 4a^2c^2e^2f^2g - 4a^2c^2d^2f^2g + 2b^2c^2d^2e^2g - 4a^2c^2d^2e^2g + 2a^2b^2d^2f^2g + 4 \\
& a^2c^2d^2e^2f + 3a^2b^2c^2d^2g^2 + 2a^2b^2e^2g^3 + 2b^2c^2d^3f - a^2b^2c^2e^2f^2 - 2a^2c^2e^2g^2 \\
& - 2a^2c^2d^2f^2 - a^2b^2f^2g^2 - b^2c^2d^2f^2 - a^2b^2e^2g^2 - b^2c^2d^2e^2 - b^3d^2g^2 \\
& - a^2c^2f^4 - a^2c^2e^4 - a^3g^4 - c^3d^4, z, k) \\
& a^2b^2c^2e^2g^2x + 4\text{root}(128a^2b^2c^3z^4 - 16a^4b^4c^2z^4 - 256a^3c^4z^4 - 128a^2b^2c^2g^2z^3 \\
& + 16a^4b^4c^2g^2z^3 + 256a^3c^3g^2z^3 + 32a^2b^2c^2e^2g^2z^2 + 16a^2b^2c^2d^2f^2z^2 \\
& - 8a^2b^3c^2e^2g^2z^2 + 40a^2b^2c^2g^2z^2 + 16a^2b^2c^2f^2z^2 + 8a^2b^2c^2e^2z^2 - 64a^2c^3d^2f^2z^2 \\
& - 4a^2b^3c^2f^2z^2 + 16a^2b^2c^3d^2z^2 - 96a^3c^2g^2z^2 - 32a^2c^3e^2z^2 - 4b^3c^2d^2z^2 \\
& - 4a^2b^4g^2z^2 - 8a^2b^2c^2d^2f^2g^2z + 32a^2c^2d^2f^2g^2z - 16a^2b^2c^2e^2g^2z \\
& - 4a^2b^2c^2e^2g^2z - 16a^2b^2c^2d^2g^2z + 4a^2b^2c^2e^2f^2z + 16a^2c^2e^2g^2z \\
& - 16a^2c^2e^2f^2z - 4b^2c^2d^2e^2z + 4b^3c^2d^2g^2z + 4a^2b^3e^2g^2z + 16a^2c^3d^2e^2z \\
& + 16a^3c^2g^3z - 4a^2b^2g^3z - 4a^2b^2c^2d^2e^2f^2g + 2a^2b^2c^2d^2e^2f^2g + 2a^2b^2c^2d^2f^3 \\
& + 4a^2c^2e^2f^2g - 4a^2c^2d^2f^2g + 2b^2c^2d^2e^2g - 4a^2c^2d^2e^2g + 2a^2b^2d^2f^2g + 4a^2c^2d^2e^2f \\
& + 3a^2b^2c^2d^2g^2 + 2a^2b^2e^2g^3 + 2b^2c^2d^3f - a^2b^2c^2e^2f^2 - 2a^2c^2e^2g^2 \\
& - 2a^2c^2d^2f^2 - a^2b^2f^2g^2 - b^2c^2d^2f^2 - a^2b^2e^2g^2 - b^2c^2d^2e^2 - b^3d^2g^2 \\
& - a^2c^2f^4 - a^2c^2e^4 - a^3g^4 - c^3d^4, z, k) \\
& a^2b^2c^2e^2g^2x) \text{root}(128a^2b^2c^3z^4 - 16a^4b^4c^2z^4 - 256a^3c^4z^4 - 128a^2b^2c^2g^2z^3 \\
& + 16a^4b^4c^2g^2z^3 + 256a^3c^3g^2z^3 + 32a^2b^2c^2e^2g^2z^2 + 16a^2b^2c^2d^2f^2z^2 \\
& - 8a^2b^3c^2e^2g^2z^2 + 40a^2b^2c^2g^2z^2 + 16a^2b^2c^2f^2z^2 + 8a^2b^2c^2e^2z^2 - 64a^2c^3d^2f^2z^2 \\
& - 4a^2b^3c^2f^2z^2 + 16a^2b^2c^3d^2z^2 - 96a^3c^2g^2z^2 - 32a^2c^3e^2z^2 - 4b^3c^2d^2z^2 - 4a^2b^4g^2z^2 \\
& - 8a^2b^2c^2d^2f^2g^2z + 32a^2c^2d^2f^2g^2z - 16a^2b^2c^2e^2g^2z - 4a^2b^2c^2e^2g^2z - 16a^2b^2c^2d^2g^2z \\
& + 4a^2b^2c^2e^2f^2z + 16a^2c^2e^2g^2z - 16a^2c^2e^2f^2z - 4b^2c^2d^2e^2z + 4b^3c^2d^2g^2z + 4a^2b^3e^2g^2z \\
& + 16a^2c^3d^2e^2z + 16a^3c^2g^3z - 4a^2b^2g^3z - 4a^2b^2c^2d^2e^2f^2g + 2a^2b^2c^2d^2e^2f^2g + 2a^2b^2c^2d^2f^3 \\
& + 4a^2c^2e^2f^2g - 4a^2c^2d^2f^2g + 2b^2c^2d^2e^2g - 4a^2c^2d^2e^2g + 2a^2b^2d^2f^2g + 4a^2c^2d^2e^2f \\
& + 3a^2b^2c^2d^2g^2 + 2a^2b^2e^2g^3 + 2b^2c^2d^3f - a^2b^2c^2e^2f^2 - 2a^2c^2e^2g^2 \\
& - 2a^2c^2d^2f^2 - a^2b^2f^2g^2 - b^2c^2d^2f^2 - a^2b^2e^2g^2 - b^2c^2d^2e^2 - b^3d^2g^2 \\
& - a^2c^2f^4 - a^2c^2e^4 - a^3g^4 - c^3d^4, z, k), k, 1, 4)
\end{aligned}$$

`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),x)
```

```
[Out] Timed out
```

$$3.23 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=290

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}}-bh+cf\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{\sqrt{b^2-4ac}+b}}\right)\left(\frac{-2ach+b^2h-bcf+2c^2d}{\sqrt{b^2-4ac}}-bh+cf\right)}{\sqrt{2}c^{3/2}\sqrt{\sqrt{b^2-4ac}+b}} \quad (2ce$$

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, number of rules used = 0.257, Rules used = {1673, 1676, 1166, 205, 1247, 634, 618, 206, 628}

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}}-bh+cf\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{\sqrt{b^2-4ac}+b}}\right)\left(\frac{-2ach+b^2h-bcf+2c^2d}{\sqrt{b^2-4ac}}-bh+cf\right)}{\sqrt{2}c^{3/2}\sqrt{\sqrt{b^2-4ac}+b}} - \frac{(2ce-bg)\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{2c\sqrt{b^2-4ac}} + \frac{g\log(a+bx^2+cx^4)}{4c} + \frac{hx}{c}$$

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)*ArcTanh[(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] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[Int[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] :> Simp[(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] :> Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4}{a + bx^2 + cx^4} dx = \int \frac{x(e + gx^2)}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2 + hx^4}{a + bx^2 + cx^4} dx$$

$$= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{a + bx + cx^2} dx, x, x^2 \right) + \int \left(\frac{h}{c} + \frac{cd - ah + (cf - bh)x^2}{c(a + bx^2 + cx^4)} \right) dx$$

$$= \frac{hx}{c} + \frac{\int \frac{cd - ah + (cf - bh)x^2}{a + bx^2 + cx^4} dx}{c} + \frac{g \text{Subst} \left(\int \frac{b + 2cx}{a + bx + cx^2} dx, x, x^2 \right)}{4c} + \frac{(2ce - bg) \text{Subst} \left(\int \frac{1}{b^2 - 4ac - x^2} dx, x, b + 2cx^2 \right)}{2c}$$

$$= \frac{hx}{c} + \frac{g \log(a + bx^2 + cx^4)}{4c} - \frac{(2ce - bg) \text{Subst} \left(\int \frac{1}{b^2 - 4ac - x^2} dx, x, b + 2cx^2 \right)}{2c} + \frac{hx}{c} + \frac{\left(cf - bh + \frac{2c^2d + b^2h - c(bf + 2ah)}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(cf - bh - \frac{2c^2d - bcf + b^2h}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b + \sqrt{b^2 - 4ac}}}$$

Mathematica [A] time = 0.50, size = 383, normalized size = 1.32

$$\frac{2\sqrt{2} \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left(c \left(f \sqrt{b^2 - 4ac} - 2ah - bf \right) + bh \left(b - \sqrt{b^2 - 4ac} \right) + 2c^2d \right)}{\sqrt{b^2 - 4ac} \sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{2\sqrt{2} \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b^2 - 4ac} + b} \right) \left(-c \left(f \sqrt{b^2 - 4ac} + 2ah + bf \right) + bh \left(\sqrt{b^2 - 4ac} + b \right) + 2c^2d \right)}{\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} + b}}{4c^{3/2}} + \frac{\sqrt{c} \left(g \left(\sqrt{b^2 - 4ac} - b \right) + 2ce \right) \log \left(\sqrt{b^2 - 4ac} - b - 2cx^2 \right)}{\sqrt{b^2 - 4ac}} + \frac{\sqrt{c} \left(g \left(\sqrt{b^2 - 4ac} + b \right) - 2ce \right) \log \left(\sqrt{b^2 - 4ac} + b + 2cx^2 \right)}{\sqrt{b^2 - 4ac}} + 4\sqrt{c} hx$$

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] + (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))/(4*c^(3/2))

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4}{a + bx^2 + cx^4} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4), x]

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*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 - 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 - 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

$$\begin{aligned}
& *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)* \\
& *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 \\
& ^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*\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} \\
& (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*(\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 + \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*
\end{aligned}$$

$$\begin{aligned}
& b^5c^4 - 12ab^3c^5 + 16a^2b^2c^6 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
& + \sqrt{b^2 - 4ac}c) * b^5c^2 + 6\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
& c) * a * b^3c^3 + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
& c) * b^4c^3 - 8\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
& c) * a^2b^2c^4 - 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
& c) * a * b^2c^4 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
& c) * b^3c^4 + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
& c) * a * b^5c^5 - 2(b^2 - 4ac) * b^3c^4 + 4(b^2 - 4ac) * a * b^2c^5) * h) * \arctan\left(\frac{2\sqrt{2} * x / \sqrt{(b^3c^3 - \sqrt{b^2c^6 - 4ac^7}) / c^4}}{(a * b^4c^3 - 8a^2b^2c^4 - 2 * a * b^3c^4 + 16a^3c^5 + 8a^2b^2c^5 + a * b^2c^5 - 4a^2c^6) * c^2} - 1/16 * ((b^6 - 8a * b^4c - 2b^5c + 16a^2b^2c^2 + 8a * b^3c^2 + b^4c^2 - 4a * b^2c^3 - (b^5 - 8a * b^3c - 2b^4c + 16a^2b^2c^2 + 8a * b^2c^2 + b^3c^2 - 4a * b^2c^3) * \sqrt{b^2 - 4ac})) * g * \text{abs}(c) - 2 * (b^5c - 8a * b^3c^2 - 2b^4c^2 + 16a^2b^2c^3 + 8a * b^3c^3 + b^3c^3 - 4a * b^2c^4 - (b^4c - 8a * b^2c^2 - 2b^3c^2 + 16a^2c^3 + 8a * b^2c^3 + b^2c^3 - 4a * c^4) * \sqrt{b^2 - 4ac})) * \text{abs}(c) * e + (b^6c - 8a * b^4c^2 - 2b^5c^2 + 16a^2b^2c^3 + 8a * b^3c^3 + b^4c^3 - 4a * b^2c^4 + (b^5c - 4a * b^3c^2 - 2b^4c^2 + b^3c^3) * \sqrt{b^2 - 4ac})) * g - 2 * (b^5c^2 - 8a * b^3c^3 - 2b^4c^3 + 16a^2b^2c^4 + 8a * b^2c^4 + b^3c^4 - 4a * b^2c^5 - (b^4c^2 - 4a * b^2c^3 - 2b^3c^3 + b^2c^4) * \sqrt{b^2 - 4ac})) * e) * \log(x^2 + 1/2 * (b^3c^3 + \sqrt{b^2c^6 - 4ac^7}) / c^4) / ((a * b^4 - 8a^2b^2c - 2a * b^3c + 16a^3c^2 + 8a^2b^2c^2 + a * b^2c^2 - 4a^2c^3) * c^2 * \text{abs}(c)) - 1/16 * ((b^6 - 8a * b^4c - 2b^5c + 16a^2b^2c^2 + 8a * b^3c^2 + b^4c^2 - 4a * b^2c^3 + (b^5 - 8a * b^3c - 2b^4c + 16a^2b^2c^2 + 8a * b^2c^2 + b^3c^2 - 4a * b^2c^3) * \sqrt{b^2 - 4ac})) * g * \text{abs}(c) - 2 * (b^5c - 8a * b^3c^2 - 2b^4c^2 + 16a^2b^2c^3 + 8a * b^2c^3 + b^3c^3 - 4a * b^2c^4 + (b^4c - 8a * b^2c^2 - 2b^3c^2 + 16a^2c^3 + 8a * b^2c^3 + b^2c^3 - 4a * c^4) * \sqrt{b^2 - 4ac})) * \text{abs}(c) * e + (b^6c - 8a * b^4c^2 - 2b^5c^2 + 16a^2b^2c^3 + 8a * b^3c^3 + b^4c^3 - 4a * b^2c^4 + (b^5c - 4a * b^3c^2 - 2b^4c^2 + b^3c^3) * \sqrt{b^2 - 4ac})) * g - 2 * (b^5c^2 - 8a * b^3c^3 - 2b^4c^3 + 16a^2b^2c^4 + 8a * b^2c^4 + b^3c^4 - 4a * b^2c^5 + (b^4c^2 - 4a * b^2c^3 - 2b^3c^3 + b^2c^4) * \sqrt{b^2 - 4ac})) * e) * \log(x^2 + 1/2 * (b^3c^3 - \sqrt{b^2c^6 - 4ac^7}) / c^4) / ((a * b^4 - 8a^2b^2c - 2a * b^3c + 16a^3c^2 + 8a^2b^2c^2 + a * b^2c^2 - 4a^2c^3) * c^2 * \text{abs}(c))
\end{aligned}$$

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] $\text{int}((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a), x)$

[Out] $\begin{aligned}
& h*x/c - 1/4 * (-4ac + b^2) / (4ac - b^2) / c * \ln(-2cx^2 - b + (-4ac + b^2)^{1/2}) * g + 1/4 * (-4ac + b^2)^{1/2} / (4ac - b^2) * b/c * g * \ln(-2cx^2 - b + (-4ac + b^2)^{1/2}) - 1/2 * (-4ac + b^2)^{1/2} / (4ac - b^2) * e * \ln(-2cx^2 - b + (-4ac + b^2)^{1/2}) - 1/2 * (-4ac + b^2) / (4ac - b^2) / c * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b * h + 1/2 * (-4ac + b^2) / (4ac - b^2) * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * f - (-4ac + b^2)^{1/2} / (4ac - b^2) * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * a * h + 1/2 * (-4ac + b^2)^{1/2} / (4ac - b^2) / c * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b^2 * h - 1/2 * (-4ac + b^2)^{1/2} / (4ac - b^2) * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b * f + c * (-4ac + b^2)^{1/2} / (4ac - b^2) * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * d - 1/4 * (-4ac + b^2) / (4ac - b^2) / c * \ln(2cx^2 + b + (-4ac + b^2)^{1/2}) * g - 1/4 * (-4ac + b^2)^{1/2} / (4ac - b^2) * b/c * g * \ln(2cx^2 + b + (-4ac + b^2)^{1/2}) + 1/2 * (-4ac + b^2) / (4ac - b^2) / c * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c)
\end{aligned}$

$$*x)*b*h-1/2*(-4*a*c+b^2)/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f-(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*a*h+1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)/c*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^2*h-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b*f*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)+(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*d*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)$$

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 -

$$\begin{aligned}
& 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*(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
\end{aligned}$$

$$\begin{aligned} & \left(\frac{d^2 c^2 d^2 h + 12 a b c^2 f^2 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 \right) \cdot \text{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, 1, 4) + (h*x)/c \end{aligned}$$

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

$$3.24 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=321

$$\frac{\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)(-2aci + b^2i - bcg + 2c^2e)}{2c^2\sqrt{b^2-4ac}} + \frac{\tanh^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\tanh^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{b+\sqrt{b^2-4ac}}}$$

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, number of rules / integrand size = 0.250, Rules used = {1673, 1676, 1166, 205, 1663, 1657, 634, 618, 206, 628}

$$\frac{\tanh^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\tanh^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{b+\sqrt{b^2-4ac}}} - \frac{\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)(-2aci + b^2i - bcg + 2c^2e)}{2c^2\sqrt{b^2-4ac}} + \frac{(cg - bi)\log(a + bx^2 + cx^4)}{4c^2} + \frac{hx}{c} + \frac{ix^2}{2c}$$

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] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[Int[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] :> Simp[(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] :> Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 24x^5}{a + bx^2 + cx^4} dx &= \int \frac{x(e + gx^2 + 24x^4)}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2 + hx^4}{a + bx^2 + cx^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx + 24x^2}{a + bx + cx^2} dx, x, x^2 \right) + \int \left(\frac{h}{c} + \frac{cd - ah + (cf - bh)}{c(a + bx^2 + cx^4)} \right) dx \\
&= \frac{hx}{c} + \frac{1}{2} \text{Subst} \left(\int \left(\frac{24}{c} - \frac{24a - ce + (24b - cg)x}{c(a + bx + cx^2)} \right) dx, x, x^2 \right) + \int \frac{cd - ah + (cf - bh)}{c(a + bx^2 + cx^4)} dx \\
&= \frac{hx}{c} + \frac{12x^2}{c} - \frac{\text{Subst} \left(\int \frac{24a - ce + (24b - cg)x}{a + bx + cx^2} dx, x, x^2 \right)}{2c} + \frac{(cf - bh - \frac{2c^2d - b^2h}{c})}{\sqrt{b^2 - 4ac}} \\
&= \frac{hx}{c} + \frac{12x^2}{c} + \frac{\left(cf - bh + \frac{2c^2d + b^2h - c(bf + 2ah)}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(cf - bh + \frac{2c^2d + b^2h - c(bf + 2ah)}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(cf - bh + \frac{2c^2d + b^2h - c(bf + 2ah)}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(cf - bh + \frac{2c^2d + b^2h - c(bf + 2ah)}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \dots
\end{aligned}$$

Mathematica [A] time = 0.65, size = 441, normalized size = 1.37

$$\frac{2\sqrt{2}\sqrt{c}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\left(\sqrt{b^2-4ac}-2ah-bf\right)+b\left(b-\sqrt{b^2-4ac}\right)+2c^2\right)}{\sqrt{b^2-4ac}\sqrt{b-\sqrt{b^2-4ac}}}-\frac{2\sqrt{2}\sqrt{c}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b^2-4ac}+b}\right)\left(-\left(\sqrt{b^2-4ac}+2ah+bf\right)+b\left(\sqrt{b^2-4ac}+b\right)+2c^2\right)}{\sqrt{b^2-4ac}\sqrt{b^2-4ac}+b}+\frac{\log\left(\sqrt{b^2-4ac}-b-2cx\right)\left(\left(\sqrt{b^2-4ac}-2ah-bf\right)+b\left(b-\sqrt{b^2-4ac}\right)+2c^2\right)}{\sqrt{b^2-4ac}}-\frac{\log\left(\sqrt{b^2-4ac}+b+2cx\right)\left(-\left(\sqrt{b^2-4ac}+2ah+bf\right)+b\left(\sqrt{b^2-4ac}+b\right)+2c^2\right)}{\sqrt{b^2-4ac}}+4chx+2cix^2}{4c^2}$$

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), 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)

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + ix^5}{a + bx^2 + cx^4} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4), x]

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="fricas")

[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="giac")

[Out] $\frac{1}{4}(c g - b i) \log(\operatorname{abs}(c x^4 + b x^2 + a)) / c^2 + \frac{1}{2}(c i x^2 + 2 c h x) / c^2 + \frac{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 - \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) 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 \operatorname{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 + \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 \operatorname{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) \sqrt{b c - \sqrt{b^2 - 4 a c}} c)$

$$\begin{aligned}
& (b^2c - \sqrt{b^2 - 4ac})c) a^2 b^2 c^4 - 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c - \sqrt{b^2 - 4ac}}c) a^2 b^2 c^4 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c - \sqrt{b^2 - 4ac}}c) a^2 b^2 c^4 + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c - \sqrt{b^2 - 4ac}}c) a^2 b^2 c^4 - 2(b^2 - 4ac)b^3c^4 + 4(b^2 - 4ac)a^2 b^2 c^5) \\
& *h) \arctan(2\sqrt{1/2}x/\sqrt{(b^5c + \sqrt{b^2c^{10} - 4a^3c^{11}})/c^6})/((a^2 b^4 c^3 - 8a^2 b^2 c^4 - 2a^2 b^3 c^4 + 16a^3 c^5 + 8a^2 b^2 c^5 + a^2 b^2 c^5 - 4a^2 c^6)c^2) - 1/8((2b^4 c^3 - 16a^2 b^2 c^4 + 32a^2 c^5 - \sqrt{2})\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^4 c + 8\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^2 + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^3 c^2 - 16\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 c^3 - 8\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^3 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^2 c^3 + 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 c^4 - 2(b^2 - 4ac)b^2 c^3 + 8(b^2 - 4ac)a^2 c^4) c^2 f - (2b^5 c^2 - 16a^2 b^3 c^3 + 32a^2 b^2 c^4 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^5 + 8\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^3 c + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^4 c - 16\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^2 - 8\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^2 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^3 c^2 + 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^2 - 2(b^2 - 4ac)b^3 c^2 + 8(b^2 - 4ac)a^2 b^2 c^3) c^2 h - 2(\sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^4 c^3 - 8\sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^4 - 2\sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^3 c^4 - 2b^4 c^4 + 16\sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 c^5 + 8\sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^5 + \sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^2 c^5 + 16a^2 b^2 c^5 - 4\sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 c^6 - 32a^2 c^6 + 2(b^2 - 4ac)b^2 c^4 - 8(b^2 - 4ac)a^2 c^5) \\
& *d \operatorname{abs}(c) + 2(\sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^4 c^2 - 8\sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^3 - 2\sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^3 c^3 - 2a^2 b^4 c^3 + 16\sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^3 c^4 + 8\sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^4 + 16a^2 b^2 c^4 - 4\sqrt{2}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 c^5 - 32a^3 c^5 + 2(b^2 - 4ac)a^2 b^2 c^3 - 8(b^2 - 4ac)a^2 c^4) h \operatorname{abs}(c) + 2(2b^3 c^6 - 8a^2 b^2 c^7 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^3 c^4 + 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^5 + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^2 c^5 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^2 c^5 - 2(b^2 - 4ac)b^2 c^6) d - (2b^4 c^5 - 8a^2 b^2 c^6 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^4 c^3 + 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^4 + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^3 c^4 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^2 c^5 - 2(b^2 - 4ac)b^2 c^5) f + (2b^5 c^4 - 12a^2 b^3 c^5 + 16a^2 b^2 c^6 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^5 c^2 + 6\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^3 c^3 + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^4 c^3 - 8\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^4 - 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^4 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) b^3 c^4 + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2c + \sqrt{b^2 - 4ac}}c) a^2 b^2 c^4 - 2(b^2 - 4ac)b^3 c^4 + 4(b^2 - 4ac)a^2 b^2 c^5) h) \arctan(2\sqrt{1/2}x/\sqrt{(b^5c - \sqrt{b^2c^{10} - 4a^3c^{11}})/c^6})/((a^2 b^4 c^3 - 8a^2 b^2 c^4 - 2a^2 b^3 c^4 + 16a^3 c^5 + 8a^2 b^2 c^5 + a^2 b^2 c^5 - 4a^2 c^6)c^2) + 1/16(b^7 c - 10a^2 b^5 c^2 - 2b^6 c^2 + 32a^2 b^3 c^3 + 12a^2 b^4 c^3 + b^5 c^3 - 32a^3 b^2 c^4 - 16a^2 b^2 c^4 - 6a^2 b^3 c^4 + 8a^2 b^2 c^5 + (b^7 - 10a^2 b^5 c - 2b^6 c + 32a^2 b^3 c^2 + 12a^2 b^4 c^2 + b^5 c^2 - 32a^3 b^2 c^3 - 16a^2 b^2 c^3 - 6a^2 b^3 c^3 + 8a^2 b^2 c^4 - (b^6 - 10a^2 b^4 c - 2b^5 c + 32a^2 b^2 c^2 + 12a^2 b^3 c^2 + b^4 c^2 - 32a^3 c^3 - 16a^2 b^2 c^3 - 6a^2 b^2 c^3 + 8a^2 c^4)\sqrt{b^2 - 4ac}
\end{aligned}$$

```

- 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)*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))

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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)*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)^(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))

```


$$\begin{aligned} & (1/2)) * c)^{(1/2)} * \operatorname{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 * \operatorname{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 * \operatorname{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)} * \operatorname{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 \end{aligned}$$

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

$$\frac{ix^2 + 2hx}{2c} - \frac{\int \frac{(cg-bi)x^3 + (cf-bh)x^2 + cd-ah+(ce-ai)x}{cx^4+bx^2+a} dx}{c}$$

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="maxima")

[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

$g^2z^2 + 16a^2b^3c^4f^2z^2 - 4a^3b^3c^3f^2z^2 + 8a^2b^2c^4e^2z^2$
 $+ 64a^3c^4f^2h^2z^2 + 64a^3c^4e^2i^2z^2 - 64a^2c^5d^2f^2z^2 - 4a^2b^5c^4h^2z^2 + 16a^2b^3c^5d^2z^2 - 56a^3b^2c^2i^2z^2 + 28a^2b^3c^2h^2z^2$
 $+ 40a^2b^2c^3g^2z^2 - 32a^4c^3i^2z^2 - 96a^3c^4g^2z^2 - 32a^2c^5e^2z^2 - 4b^3c^4d^2z^2 - 4a^2b^6i^2z^2 + 32a^2b^3c^3e^2f^2h^2z$
 $- 32a^2b^3c^3d^2f^2i^2z - 8a^2b^3c^2e^2f^2h^2z + 8a^2b^3c^2d^2f^2i^2z - 8a^2b^2c^3d^2f^2g^2z$
 $+ 8a^2b^2c^3d^2e^2h^2z - 8a^2b^4c^2e^2g^2i^2z + 40a^2b^2c^2e^2g^2i^2z + 8a^2b^2c^2f^2g^2h^2z$
 $- 8a^2b^2c^2d^2h^2i^2z + 4a^3b^2c^2h^2i^2z - 32a^3b^2c^2g^2i^2z + 12a^3b^2c^2g^2i^2z + 8a^2b^3c^2g^2i^2z$
 $+ 16a^3b^2c^2g^2h^2z - 4a^2b^3c^2g^2h^2z + 32a^3b^2c^2e^2i^2z - 24a^2b^3c^2e^2i^2z - 16a^2b^3c^3e^2i^2z$
 $+ 4a^2b^3c^2e^2i^2z + 20a^2b^2c^3d^2i^2z - 16a^2b^2c^3e^2g^2z + 4a^2b^3c^2e^2g^2z - 4a^2b^2c^3e^2g^2z$
 $+ 4a^2b^2c^3e^2f^2z - 32a^3c^3f^2g^2h^2z - 32a^3c^3e^2g^2i^2z + 32a^3c^3d^2h^2i^2z$
 $+ 32a^2c^4d^2f^2g^2z - 32a^2c^4d^2e^2h^2z + 4a^2b^4c^2e^2h^2z - 16a^2b^3c^4d^2g^2z$
 $- 4a^2b^2c^2f^2i^2z - 20a^2b^2c^2e^2h^2z - 4a^2b^2c^2g^3z - 16a^4c^2h^2i^2z + 16a^4c^2g^2i^2z$
 $+ 16a^3c^3f^2i^2z - 4a^2b^4g^2i^2z - 4b^4c^2d^2i^2z + 16a^3c^3e^2h^2z - 16a^2c^4d^2i^2z$
 $+ 16a^2c^4e^2g^2z + 4b^3c^3d^2g^2z - 16a^2c^4e^2f^2z - 4b^2c^4d^2e^2z + 4a^2b^5e^2i^2z$
 $- 16a^4b^2c^3i^2z + 16a^2c^5d^2e^2z + 4a^3b^3i^3z + 16a^3c^3g^3z + 4a^2b^2c^2d^2g^2h^2i$
 $+ 12a^2b^2c^2d^2f^2g^2i - 4a^2b^2c^2e^2f^2g^2h^2 - 4a^2b^2c^2d^2e^2h^2i + 4a^2b^2c^2d^2e^2f^2i$
 $- 4a^3b^2c^2d^2e^2f^2g^2i - 4a^2b^3c^2d^2e^2f^2g^2i - 4a^2b^2c^3d^2e^2f^2g^2i + 2a^2b^2c^2f^2g^2i$
 $- 4a^2b^2c^2e^2g^2i - 2a^2b^2c^2e^2g^2i - 8a^2b^2c^2d^2g^2i + 2a^2b^2c^2e^2g^2h^2$
 $- 2a^2b^2c^2e^2f^2i - 8a^2b^2c^2d^2f^2i - 2a^2b^2c^2d^2g^2h^2 + 2a^2b^2c^2e^2f^2h^2$
 $- 4a^2b^2c^2d^2f^2h^2 - 2a^2b^2c^2d^2f^2h^2 + 2a^2b^2c^2d^2f^2g^2 + 8a^3c^2e^2f^2h^2i$
 $- 8a^3c^2d^2g^2h^2i + 8a^2c^3d^2e^2g^2h^2 - 8a^2c^3d^2e^2f^2i - 2a^3b^2c^2d^2h^2i$
 $+ 6a^3b^2c^2d^2h^2i^2 - 2a^3b^2c^2e^2g^2i^2 + 2a^2b^3c^2e^2g^2i + 6a^2b^3c^2d^2e^2i$
 $+ 2a^2b^3c^2d^2f^2h^2 - 2a^2b^3c^2d^2f^2h^2 - 2a^2b^3c^3d^2e^2h^2 + 4a^2b^2c^2e^2i^2$
 $- 5a^2b^2c^2d^2i^2 + 3a^2b^2c^2e^2h^2 + 4a^2b^2c^2d^2h^2 - 4a^3c^2f^2g^2i + 2a^3b^2c^2f^2h^2i^2$
 $+ 4a^3c^2f^2g^2h^2 + 4a^3c^2e^2g^2i - 4a^3c^2e^2g^2h^2 + 4a^2c^3d^2g^2i + 2a^2b^3e^2g^2i^2$
 $- 2a^2b^3d^2h^2i^2 + 4a^3c^2d^2f^2i^2 - 4a^2c^3e^2f^2h^2 + 2b^3c^2d^2f^2h^2 - 2b^3c^2d^2e^2i$
 $+ 4a^2c^3e^2f^2g^2 + 4a^2c^3d^2f^2h^2 - 4a^2c^3d^2f^2g^2 + 3a^3b^2c^2f^2i^2 + 2b^2c^3d^2e^2g^2$
 $+ 2a^2b^2c^2f^3h^2 - 2a^2b^2c^2e^3i + 5a^2b^3c^2d^2i^2 - 2a^2b^2c^2d^2h^3 + 2a^2b^2c^2e^2g^3$
 $+ 3a^2b^2c^3d^2g^2 + 4a^4c^2g^2h^2i - 4a^4c^2f^2h^2i^2 + 2b^4c^2d^2g^2i + 2a^3b^2c^2g^3i$
 $+ 2a^2b^4d^2f^2i^2 - 4a^2c^4d^2e^2g^2 + 2a^3b^2c^2f^2h^3 + 4a^2c^4d^2e^2f^2 + 2a^2b^2c^3e^3g^2$
 $+ 2a^2b^2c^3d^2f^3 - a^2b^2c^2f^2h^2 - a^2b^2c^2f^2g^2 - a^2b^2c^2e^2g^2 + 2a^4b^2g^2i^3$
 $+ 4a^4c^2e^2i^3 + 4a^2c^4d^3h^2 + 2b^2c^4d^3f^2 - a^3b^2c^2g^2h^2 - a^3b^2c^2e^2h^2$
 $- 6a^3c^2e^2i^2 - 2a^3c^2f^2h^2 - a^2b^2c^3e^2f^2 - 6a^2c^3d^2h^2 - 2a^2c^3e^2g^2$
 $- 2a^4c^2g^2i^2 + 4a^2c^3e^3i - 2b^2c^3d^3h^2 - 2a^3b^2e^2i^3 + 4a^3c^2d^2h^3 - 2a^2c^4d^2f^2$
 $- a^3b^2g^2i^2 - a^2b^3f^2i^2 - b^3c^2d^2g^2 - b^2c^3d^2f^2 - a^4b^2h^2i^2 - b^4c^2d^2h^2$
 $- a^2b^4e^2i^2 - b^2c^4d^2e^2 - b^5d^2i^2 - a^3c^2g^4 - a^2c^3f^4 - a^4c^2h^4 - a^2c^4e^4 - a^5i^4 - c^5d^4,$
 $z, 1) \cdot (\text{root}(128a^2b^2c^5z^4 - 16a^2b^4c^4z^4 - 256a^3c^6z^4 + 128a^2b^3c^3i^2z^3 - 128a^2b^2c^4g^2z^3$
 $- 256a^3b^2c^4i^2z^3 - 16a^2b^5c^2i^2z^3 + 16a^2b^4c^3g^2z^3 + 256a^3c^5g^2z^3 + 160a^3b^2c^3g^2i^2z^2$
 $+ 8a^2b^4c^2f^2h^2z^2 + 8a^2b^4c^2e^2i^2z^2 + 32a^2b^2c^4e^2g^2z^2 + 32a^2b^2c^4d^2h^2z^2$
 $- 8a^2b^3c^3e^2g^2z^2 - 8a^2b^3c^3d^2h^2z^2 + 16a^2b^2c^4d^2f^2z^2 + 8a^2b^5c^2g^2i^2z^2$
 $- 72a^2b^3c^2g^2i^2z^2 - 48a^2b^2c^3f^2h^2z^2 - 48a^2b^2c^3e^2i^2z^2 + 32a^2b^4c^2i^2z^2 - 48a^3b^2c^3h^2z^2$
 $- 4a^2b^4c^2g^2z^2 + 16a^2b^2c^4f^2z^2 - 4a^2b^3c^3f^2z^2 + 8a^2b^2c^4e^2z^2 + 64a^3c^4f^2h^2z^2$
 $+ 64a^3c^4e^2i^2z^2 - 64a^2c^5d^2f^2z^2 - 4a^2b^5c^2h^2z^2 + 16a^2b^2c^5d^2z^2 - 56a^3b^2c^2i^2z^2$
 $+ 28a^2b^3c^2h^2z^2 + 40a^2b^2c^3g^2z^2 - 32a^4c^3i^2z^2 - 96a^3c^4g^2z^2 - 32a^2c^5e^2z^2$
 $- 4b^3c^4d^2z^2 - 4a^2b^6i^2z^2 + 32a^2b^2c^3e^2f^2h^2z - 32a^2b^2c^3d^2f^2i^2z$
 $- 8a^2b^3c^2e^2f^2h^2z + 8a^2b^3c^2d^2f^2i^2z - 8a^2b^2c^3d^2f^2g^2z + 8a^2b^2c^3d^2e^2h^2z$
 $- 8a^2b^4c^2e^2g^2i^2z + 40a^2b^2c^2e^2g^2i^2z + 8a^2b^2c^2f^2g^2h^2z - 8a^2b^2c^2d^2h^2i^2z$
 $+ 4a^3b^2c^2h^2i^2z - 32a^3b^2c^2g^2i^2z + 12a^3b^2c^2g^2i^2z + 8a^2b^3c^2g^2i^2z + 16a^3b^2c^2g^2h^2z$
 $- 4a^2b^3c^2g^2h^2z + 32a^3b^2c^2e^2i^2z - 24a^2b^3c^2e^2i^2z - 16a^2b^3c^3e^2i^2z + 4a^2b^3c^2e^2i^2z$
 $+ 20a^2b^2c^3d^2i^2z - 16a^2b^2c^3e^2g^2z + 4a^2b^3c^2e^2g^2z - 4a^2b^2c^3e^2g^2z + 4a^2b^2c^3e^2f^2z$
 $- 32a^3c^3f^2g^2h^2z - 32a^3c^3e^2g^2i^2z + 32a^3c^3d^2h^2i^2z + 32a^2c^4d^2f^2g^2z$
 $- 32a^2c^4d^2e^2h^2z + 4a^2b^4c^2e^2h^2z - 16a^2b^3c^4d^2g^2z - 4a^2b^2c^2f^2i^2z - 20a^2b^2c^2e^2h^2z$
 $- 4a^2b^2c^2g^3z - 16a^4c^2h^2i^2z + 16a^4c^2g^2i^2z + 16a^3c^3f^2i^2z - 4a^2b^4g^2i^2z$
 $- 4b^4c^2d^2i^2z + 16a^3c^3e^2h^2z - 16a^2c^4d^2i^2z + 16a^2c^4e^2g^2z + 4b^3c^3d^2g^2z$
 $- 16a^2c^4e^2f^2z - 4b^2c^4d^2e^2z + 4a^2b^5e^2i^2z - 16a^4b^2c^3i^2z + 16a^2c^5d^2e^2z$
 $+ 4a^3b^3i^3z + 16a^3c^3g^3z + 4a^2b^2c^2d^2g^2h^2i + 12a^2b^2c^2d^2f^2g^2i - 4a^2b^2c^2e^2f^2g^2h^2$
 $- 4a^2b^2c^2d^2e^2h^2i + 4a^2b^2c^2d^2e^2f^2i - 4a^3b^2c^2d^2e^2f^2g^2i - 4a^2b^3c^2d^2e^2f^2g^2i$
 $- 4a^2b^2c^3d^2e^2f^2g^2i + 2a^2b^2c^2f^2g^2i - 4a^2b^2c^2e^2g^2i - 2a^2b^2c^2e^2g^2i - 8a^2b^2c^2d^2g^2i$
 $+ 2a^2b^2c^2e^2g^2h^2 - 2a^2b^2c^2e^2f^2i - 8a^2b^2c^2d^2f^2i - 2a^2b^2c^2d^2g^2h^2 + 2a^2b^2c^2e^2f^2h^2$
 $- 4a^2b^2c^2d^2f^2h^2 - 2a^2b^2c^2d^2f^2h^2 + 2a^2b^2c^2d^2f^2g^2 + 8a^3c^2e^2f^2h^2i - 8a^3c^2d^2g^2h^2i$
 $+ 8a^2c^3d^2e^2g^2h^2 - 8a^2c^3d^2e^2f^2i - 2a^3b^2c^2d^2h^2i + 6a^3b^2c^2d^2h^2i^2 - 2a^3b^2c^2e^2g^2i^2$
 $+ 2a^2b^3c^2e^2g^2i + 6a^2b^3c^2d^2e^2i + 2a^2b^3c^2d^2f^2h^2 - 2a^2b^3c^2d^2f^2h^2 - 2a^2b^3c^3d^2e^2h^2$
 $+ 4a^2b^2c^2e^2i^2 - 5a^2b^2c^2d^2i^2 + 3a^2b^2c^2e^2h^2 + 4a^2b^2c^2d^2h^2 - 4a^3c^2f^2g^2i + 2a^3b^2c^2f^2h^2i^2$
 $+ 4a^3c^2f^2g^2h^2 + 4a^3c^2e^2g^2i - 4a^3c^2e^2g^2h^2 + 4a^2c^3d^2g^2i + 2a^2b^3e^2g^2i^2 - 2a^2b^3d^2h^2i^2$
 $+ 4a^3c^2d^2f^2i^2 - 4a^2c^3e^2f^2h^2 + 2b^3c^2d^2f^2h^2 - 2b^3c^2d^2e^2i + 4a^2c^3e^2f^2g^2 + 4a^2c^3d^2f^2h^2$
 $- 4a^2c^3d^2f^2g^2 + 3a^3b^2c^2f^2i^2 + 2b^2c^3d^2e^2g^2 + 2a^2b^2c^2f^3h^2 - 2a^2b^2c^2e^3i + 5a^2b^3c^2d^2i^2$
 $- 2a^2b^2c^2d^2h^3 + 2a^2b^2c^2e^2g^3 + 3a^2b^2c^3d^2g^2 + 4a^4c^2g^2h^2i - 4a^4c^2f^2h^2i^2 + 2b^4c^2d^2g^2i$
 $+ 2a^3b^2c^2g^3i + 2a^2b^4d^2f^2i^2 - 4a^2c^4d^2e^2g^2 + 2a^3b^2c^2f^2h^3 + 4a^2c^4d^2e^2f^2 + 2a^2b^2c^3e^3g^2$
 $+ 2a^2b^2c^3d^2f^3 - a^2b^2c^2f^2h^2 - a^2b^2c^2f^2g^2 - a^2b^2c^2e^2g^2 + 2a^4b^2g^2i^3 + 4a^4c^2e^2i^3$
 $+ 4a^2c^4d^3h^2 + 2b^2c^4d^3f^2 - a^3b^2c^2g^2h^2 - a^3b^2c^2e^2h^2 - 6a^3c^2e^2i^2 - 2a^3c^2f^2h^2$
 $- a^2b^2c^3e^2f^2 - 6a^2c^3d^2h^2 - 2a^2c^3e^2g^2 - 2a^4c^2g^2i^2 + 4a^2c^3e^3i - 2b^2c^3d^3h^2$
 $- 2a^3b^2e^2i^3 + 4a^3c^2d^2h^3 - 2a^2c^4d^2f^2 - a^3b^2g^2i^2 - a^2b^3f^2i^2 - b^3c^2d^2g^2 - b^2c^3d^2f^2$
 $- a^4b^2h^2i^2 - b^4c^2d^2h^2 - a^2b^4e^2i^2 - b^2c^4d^2e^2 - b^5d^2i^2 - a^3c^2g^4 - a^2c^3f^4 - a^4c^2h^4$
 $- a^2c^4e^4 - a^5i^4 - c^5d^4,$

$$\begin{aligned}
& *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, 1)*((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
\end{aligned}$$

$$\begin{aligned}
& ^2b^3c^*g^h^2z + 32a^3b^*c^2e^*i^2z - 24a^2b^3c^*e^*i^2z - 16a^2b^*c^3e^2i^*z + 4a^*b^3c^2e^2i^*z + 20a^*b^2c^3d^2i^*z - 16a^2b^*c^3e^*g^2z + 4a^*b^3c^2e^*g^2z - 4a^*b^2c^3e^2g^*z + 4a^*b^2c^3e^*f^2z - 32a^3c^3f^*g^*h^z - 32a^3c^3e^*g^*i^z + 32a^3c^3d^*h^*i^z + 32a^2c^4d^*f^*g^z - 32a^2c^4d^*e^*h^z + 4a^*b^4c^*e^*h^2z - 16a^*b^*c^4d^2g^*z - 4a^2b^2c^2f^2i^*z - 20a^2b^2c^2e^*h^2z - 4a^2b^2c^2g^3z - 16a^4c^2h^2i^*z + 16a^4c^2g^*i^2z + 16a^3c^3f^2i^*z - 4a^2b^4g^*i^2z - 4b^4c^2d^2i^*z + 16a^3c^3e^*h^2z - 16a^2c^4d^2i^*z + 16a^2c^4e^2g^*z + 4b^3c^3d^2g^*z - 16a^2c^4e^*f^2z - 4b^2c^4d^2e^*z + 4a^*b^5e^*i^2z - 16a^4b^*c^i^3z + 16a^*c^5d^2e^*z + 4a^3b^3i^3z + 16a^3c^3g^3z + 4a^2b^2c^*d^*g^*h^i + 12a^2b^*c^2d^*f^*g^*i - 4a^2b^*c^2e^*f^*g^*h - 4a^2b^*c^2d^*e^*h^i + 4a^*b^2c^2d^*e^*f^*i - 4a^3b^*c^*f^*g^*h^i - 4a^*b^3c^*d^*f^*g^*i - 4a^*b^*c^3d^*e^*f^*g + 2a^2b^2c^*f^2g^*i - 4a^2b^2c^*e^*g^2i - 2a^2b^*c^2e^2g^*i - 8a^*b^2c^2d^2g^*i + 2a^2b^2c^*e^*g^*h^2 - 2a^2b^*c^2e^*f^2i - 8a^2b^2c^*d^*f^*i^2 - 2a^2b^*c^2d^*g^2h + 2a^*b^2c^2e^2f^*h - 4a^*b^2c^2d^*f^2h - 2a^2b^*c^2d^*f^*h^2 + 2a^*b^2c^2d^*f^*g^2 + 8a^3c^2e^*f^*h^i - 8a^3c^2d^*g^*h^i + 8a^2c^3d^*e^*g^*h - 8a^2c^3d^*e^*f^*i - 2a^3b^*c^*e^*h^2i + 6a^3b^*c^*d^*h^i^2 - 2a^3b^*c^*e^*g^*i^2 + 2a^*b^3c^*e^2g^*i + 6a^*b^*c^3d^2e^*i + 2a^*b^3c^*d^*f^*h^2 - 2a^*b^*c^3d^2f^*h - 2a^*b^*c^3d^*e^2h + 4a^2b^2c^*e^2i^2 - 5a^2b^*c^2d^2i^2 + 3a^2b^*c^2e^2h^2 + 4a^*b^2c^2d^2h^2 - 4a^3c^2f^2g^*i + 2a^3b^2f^*h^i^2 + 4a^3c^2f^*g^2h + 4a^3c^2e^*g^2i - 4a^3c^2e^*g^*h^2 + 4a^2c^3d^2g^*i + 2a^2b^3e^*g^*i^2 - 2a^2b^3d^*h^i^2 + 4a^3c^2d^*f^*i^2 - 4a^2c^3e^2f^*h + 2b^3c^2d^2f^*h - 2b^3c^2d^2e^*i + 4a^2c^3e^*f^2g + 4a^2c^3d^*f^2h - 4a^2c^3d^*f^*g^2 + 3a^3b^*c^*f^2i^2 + 2b^2c^3d^2e^*g + 2a^2b^*c^2f^3h - 2a^*b^2c^2e^3i + 5a^*b^3c^*d^2i^2 - 2a^2b^2c^*d^*h^3 + 2a^2b^*c^2e^*g^3 + 3a^*b^*c^3d^2g^2 + 4a^4c^*g^*h^2i - 4a^4c^*f^*h^i^2 + 2b^4c^*d^2g^*i + 2a^3b^*c^*g^3i + 2a^*b^4d^*f^*i^2 - 4a^*c^4d^2e^*g + 2a^3b^*c^*f^*h^3 + 4a^*c^4d^*e^2f + 2a^*b^*c^3e^3g + 2a^*b^*c^3d^*f^3 - a^2b^2c^*f^2h^2 - a^2b^*c^2f^2g^2 - a^*b^2c^2e^2g^2 + 2a^4b^*g^*i^3 + 4a^4c^*e^*i^3 + 4a^*c^4d^3h + 2b^*c^4d^3f - a^3b^*c^*g^2h^2 - a^*b^3c^*e^2h^2 - 6a^3c^2e^2i^2 - 2a^3c^2f^2h^2 - a^*b^*c^3e^2f^2 - 6a^2c^3d^2h^2 - 2a^2c^3e^2g^2 - 2a^4c^*g^2i^2 + 4a^2c^3e^3i - 2b^2c^3d^3h - 2a^3b^2e^*i^3 + 4a^3c^2d^*h^3 - 2a^*c^4d^2f^2 - a^3b^2g^2i^2 - a^2b^3f^2i^2 - b^3c^2d^2g^2 - b^2c^3d^2f^2 - a^4b^*h^2i^2 - b^4c^*d^2h^2 - a^*b^4e^2i^2 - b^*c^4d^2e^2 - b^5d^2i^2 - a^3c^2g^4 - a^2c^3f^4 - a^4c^*h^4 - a^*c^4e^4 - a^5i^4 - c^5d^4, z, 1)*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^2c^3d^*g + 4*b^3c^2d^*i + 8a^2c^3f^*i - 8a^2c^3g^*h - 4a^*b^2c^2f^*i + 4a^2b^*c^2h^i - 12a^*b^*c^3d^*i + 4a^*b^*c^3e^*h + 4a^*b^*c^3f^*g)/c^2 + (x*(4*c^5*d^2 + 2*b^5*i^2 - 4*a^*c^4*f^2 - 2*b^*c^4e^2 + 2*b^4c^*h^2 + 2*b^2c^3f^2 + 4*a^2c^3h^2 + 2*b^3c^2g^2 - 8a^*b^2c^2h^2 + 6a^2b^*c^2i^2 - 4b^*c^4d^*f - 8a^*c^4d^*h + 8a^*c^4e^*g - 4b^4c^*g^*i - 10a^*b^*c^3g^2 - 10a^*b^3c^*i^2 + 4b^2c^3d^*h - 4b^3c^2f^*h - 8a^2c^3g^*i + 20a^*b^2c^2g^*i - 4a^*b^*c^3e^*i + 12a^*b^*c^3f^*h))/c^2))*root(128*a^2b^2c^5z^4 - 16a^*b^4c^4z^4 - 256a^3c^6z^4 + 128a^2b^3c^3i^*z^3 - 128a^2b^2c^4g^*z^3 - 256a^3b^*c^4i^*z^3 - 16a^*b^5c^2i^*z^3 + 16a^*b^4c^3g^*z^3 + 256a^3c^5g^*z^3 + 160a^3b^*c^3g^*i^*z^2 + 8a^*b^4c^2f^*h^*z^2 + 8a^*b^4c^2e^*i^*z^2 + 32a^2b^*c^4e^*g^*z^2 + 32a^2b^*c^4d^*h^*z^2 - 8a^*b^3c^3e^*g^*z^2 - 8a^*b^3c^3d^*h^*z^2 + 16a^*b^2c^4d^*f^*z^2 + 8a^*b^5c^*g^*i^*z^2 - 72a^2b^3c^2g^*i^*z^2 - 48a^2b^2c^3f^*h^*z^2 - 48a^2b^2c^3e^*i^*z^2 + 32a^2b^4c^*i^2z^2 - 48a^3b^*c^3h^2z^2 - 4a^*b^4c^2g^2z^2 + 16a^2b^*c^4f^2z^2 - 4a^*b^3c^3f^2z^2 + 8a^*b^2c^4e^2z^2 + 64a^3c^4f^*h^z^2 + 64a^3c^4e^*i^z^2 - 64a^2c^5d^*f^z^2 - 4a^*b^5c^*h^2z^2 + 16a^*b^*c^5d^2z^2 - 56a^3b^2c^2i^2z^2 + 28a^2b^3c^2h^2z^2 + 40a^2b^2c^3g^2z^2 - 32a^4c^3i^2z^2 - 96a^3c^4g^2z^2 - 32a^2c^5e^2z^2 - 4b^3c^4d^2z^2 - 4a^*b^6i^2z^2 + 32a^2b^*c^3e^*f^*h^z - 32a^2b^*c^3d^*f^*i^z - 8a^*b^3c^2e^*f^*h^z + 8a^*b^3c^2d^*f^*i^z - 8a^*b^2c^3d^*f^*g^z + 8a^*b^2c^3d^*e^*h^z - 8a^*b^4c^*e^*g^*i^z + 40a^2b^2c^2e^*g^*i^z + 8a^2b^2c^2f^*g^*h^z
\end{aligned}$$

$$\begin{aligned}
& - 8a^2b^2c^2d^2h^2i^2z + 4a^3b^2c^2h^2i^2z - 32a^3b^2c^2g^2i^2z + 12a^3b^2c^2g^2i^2z + 8a^2b^3c^2g^2i^2z + 16a^3b^2c^2g^2h^2z - 4a^2b^3c^2g^2h^2z + 32a^3b^2c^2e^2i^2z - 24a^2b^3c^2e^2i^2z - 16a^2b^3c^2e^2i^2z + 4a^2b^3c^2e^2i^2z + 20a^2b^2c^3d^2i^2z - 16a^2b^2c^3e^2g^2z + 4a^2b^3c^2e^2g^2z - 4a^2b^2c^3e^2g^2z + 4a^2b^2c^3e^2f^2z - 32a^3c^3f^2g^2h^2z - 32a^3c^3e^2g^2i^2z + 32a^3c^3d^2h^2i^2z + 32a^2c^4d^2f^2g^2z - 32a^2c^4d^2e^2h^2z + 4a^2b^4c^2e^2h^2z - 16a^2b^4c^2d^2g^2z - 4a^2b^2c^2f^2g^2i^2z - 20a^2b^2c^2e^2h^2z - 4a^2b^2c^2g^2i^2z - 16a^4c^2h^2i^2z + 16a^4c^2g^2i^2z + 16a^3c^3f^2i^2z - 4a^2b^4g^2i^2z - 4b^4c^2d^2i^2z + 16a^3c^3e^2h^2z - 16a^2c^4d^2i^2z + 16a^2c^4e^2g^2z + 4b^3c^3d^2g^2z - 16a^2c^4e^2f^2z - 4b^2c^4d^2e^2z + 4a^2b^5e^2i^2z - 16a^4b^2c^3i^2z + 16a^2c^5d^2e^2z + 4a^3b^3i^2z + 16a^3c^3g^2i^2z + 4a^2b^2c^2d^2g^2h^2i + 12a^2b^2c^2d^2f^2g^2i - 4a^2b^2c^2e^2f^2g^2h - 4a^2b^2c^2d^2e^2h^2i + 4a^2b^2c^2d^2e^2f^2i - 4a^3b^2c^2f^2g^2h^2i - 4a^2b^3c^2d^2f^2g^2i - 4a^2b^2c^2d^2e^2f^2g^2i - 4a^2b^2c^2d^2e^2f^2g^2i - 8a^2b^2c^2d^2g^2i + 2a^2b^2c^2e^2g^2h^2 - 2a^2b^2c^2e^2f^2i - 8a^2b^2c^2d^2f^2i^2 - 2a^2b^2c^2d^2g^2h + 2a^2b^2c^2e^2f^2h - 4a^2b^2c^2d^2f^2h - 2a^2b^2c^2d^2f^2h^2 + 2a^2b^2c^2d^2f^2g^2 + 8a^3c^2e^2f^2h^2i - 8a^3c^2d^2g^2h^2i + 8a^2c^3d^2e^2g^2h - 8a^2c^3d^2e^2f^2i - 2a^3b^2c^2e^2h^2i + 6a^3b^2c^2d^2h^2i - 2a^3b^2c^2e^2g^2i + 2a^2b^3c^2e^2g^2i + 6a^2b^2c^3d^2e^2i + 2a^2b^3c^2d^2f^2h^2 - 2a^2b^2c^3d^2f^2h - 2a^2b^2c^3d^2e^2h + 4a^2b^2c^2e^2i^2 - 5a^2b^2c^2d^2i^2 + 3a^2b^2c^2e^2h^2 + 4a^2b^2c^2d^2h^2 - 4a^3c^2f^2g^2i + 2a^3b^2f^2h^2i + 4a^3c^2f^2g^2h + 4a^3c^2e^2g^2i - 4a^3c^2e^2g^2h + 4a^2c^3d^2g^2i + 2a^2b^3e^2g^2i^2 - 2a^2b^3d^2h^2i + 4a^3c^2d^2f^2i^2 - 4a^2c^3e^2f^2h + 2b^3c^2d^2f^2h - 2b^3c^2d^2e^2i + 4a^2c^3e^2f^2g + 4a^2c^3d^2f^2h - 4a^2c^3d^2f^2g^2 + 3a^3b^2c^2f^2i^2 + 2b^2c^3d^2e^2g + 2a^2b^2c^2f^3h - 2a^2b^2c^2e^3i + 5a^2b^3c^2d^2i^2 - 2a^2b^2c^2d^2h^3 + 2a^2b^2c^2e^2g^3 + 3a^2b^2c^3d^2g^2 + 4a^4c^2g^2h^2i - 4a^4c^2f^2h^2i + 2b^4c^2d^2g^2i + 2a^3b^2c^2g^3i + 2a^2b^4d^2f^2i^2 - 4a^2c^4d^2e^2g + 2a^3b^2c^2f^2h^3 + 4a^2c^4d^2e^2f + 2a^2b^2c^3e^3g + 2a^2b^2c^3d^2f^3 - a^2b^2c^2f^2h^2 - a^2b^2c^2f^2g^2 - a^2b^2c^2e^2g^2 + 2a^4b^2g^2i^3 + 4a^4c^2e^2i^3 + 4a^2c^4d^3h + 2b^2c^4d^3f - a^3b^2c^2g^2h^2 - a^2b^3c^2e^2h^2 - 6a^3c^2e^2i^2 - 2a^3c^2f^2h^2 - a^2b^3c^3e^2f^2 - 6a^2c^3d^2h^2 - 2a^2c^3e^2g^2 - 2a^4c^2g^2i^2 + 4a^2c^3e^3i - 2b^2c^3d^3h - 2a^3b^2e^2i^3 + 4a^3c^2d^2h^3 - 2a^2c^4d^2f^2 - a^3b^2g^2i^2 - a^2b^3f^2i^2 - b^3c^2d^2g^2 - b^2c^3d^2f^2 - a^4b^2h^2i^2 - b^4c^2d^2h^2 - a^2b^4e^2i^2 - b^2c^4d^2e^2 - b^5d^2i^2 - a^3c^2g^4 - a^2c^3f^4 - a^4c^2h^4 - a^2c^4e^4 - a^5i^4 - c^5d^4, z, 1), 1, 1, 4) + (h*x)/c + (i*x^2)/(2*c)
\end{aligned}$$

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

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{c^2(2a^2m+3abk+b^2h)-b^2c(4am+bk)-c^3(2ah+bf)+b^4m+2c^4d}{\sqrt{b^2-4ac}} - c^2(ak+bh) + bc(2am+bk) + b^3(-m) + c^3f\right)}{\sqrt{2}c^{7/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

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, number of rules / integrand size = 0.182, Rules used = {1673, 1676, 1166, 205, 1663, 1657, 634, 618, 206, 628}

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{c^2(2a^2m+3abk+b^2h)-b^2c(4am+bk)-c^3(2ah+bf)+b^4m+2c^4d}{\sqrt{b^2-4ac}} - c^2(ak+bh) + bc(2am+bk) + b^3(-m) + c^3f\right)}{\sqrt{2}c^{7/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

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])*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]]) + ((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] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In

$\text{Int}[(b + 2cx)/(a + bx + cx^2), x], x] /;$ FreeQ[{a, b, c, d, e}, x] && NeQ[2cd - b², 0] && NeQ[b² - 4ac, 0] && !NiceSqrtQ[b² - 4ac]

Rule 1166

$\text{Int}[(d + e(x)^2)/(a + b(x)^2 + c(x)^4), x_Symbol] :$
 $> \text{With}\{q = \text{Rt}[b^2 - 4ac, 2]\}, \text{Dist}[e/2 + (2cd - b^2e)/(2q), \text{Int}[1/(b/2 - q/2 + cx^2), x], x] + \text{Dist}[e/2 - (2cd - b^2e)/(2q), \text{Int}[1/(b/2 + q/2 + cx^2), x], x] /;$ FreeQ[{a, b, c, d, e}, x] && NeQ[b² - 4ac, 0] && NeQ[cd² - ae², 0] && PosQ[b² - 4ac]

Rule 1657

$\text{Int}[(Pq) \cdot ((a) + (b)(x) + (c)(x)^2)^{(p)}, x_Symbol] := \text{Int}[\text{ExpandIntegrand}[Pq(a + bx + cx^2)^p, x], x] /;$ FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, -2]

Rule 1663

$\text{Int}[(Pq)(x)^{(m)} \cdot ((a) + (b)(x)^2 + (c)(x)^4)^{(p)}, x_Symbol] :$
 $> \text{Dist}[1/2, \text{Subst}[\text{Int}[x^{(m-1)/2} \cdot \text{SubstFor}[x^2, Pq, x] \cdot (a + bx + cx^2)^p, x], x, x^2], x] /;$ FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x²] && IntegerQ[(m - 1)/2]

Rule 1673

$\text{Int}[(Pq) \cdot ((a) + (b)(x)^2 + (c)(x)^4)^{(p)}, x_Symbol] := \text{Module}\{q = \text{Expon}[Pq, x], k\}, \text{Int}[\text{Sum}[\text{Coeff}[Pq, x, 2k] \cdot x^{(2k)}, \{k, 0, q/2\}] \cdot (a + b \cdot x^2 + c \cdot x^4)^p, x] + \text{Int}[x \cdot \text{Sum}[\text{Coeff}[Pq, x, 2k + 1] \cdot x^{(2k)}, \{k, 0, (q - 1)/2\}] \cdot (a + b \cdot x^2 + c \cdot x^4)^p, x] /;$ FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x²]

Rule 1676

$\text{Int}[(Pq)/((a) + (b)(x)^2 + (c)(x)^4), x_Symbol] := \text{Int}[\text{ExpandIntegrand}[Pq/(a + bx^2 + cx^4), x], x] /;$ FreeQ[{a, b, c}, x] && PolyQ[Pq, x²] && Expon[Pq, x²] > 1

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{a + bx^2 + cx^4} dx &= \int \frac{x(e + gx^2 + jx^4 + lx^6)}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2 + hx^4 + kx^6}{a + bx^2 + cx^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx + jx^2 + lx^3}{a + bx + cx^2} dx, x, x^2 \right) + \int \left(\frac{c^2h + b^2m - c(bk + am)}{c^3} x + \frac{(ck - bm)x^3}{3c^2} + \frac{mx^5}{5c} + \dots \right) dx \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(ck - bm)x^3}{3c^2} + \frac{mx^5}{5c} + \dots \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(cj - bl)x^2}{2c^2} + \frac{(ck - bm)}{3c^2} \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(cj - bl)x^2}{2c^2} + \frac{(ck - bm)}{3c^2} \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(cj - bl)x^2}{2c^2} + \frac{(ck - bm)}{3c^2} \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(cj - bl)x^2}{2c^2} + \frac{(ck - bm)}{3c^2}
\end{aligned}$$

Mathematica [A] time = 1.29, size = 816, normalized size = 1.50

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) + (1*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 + 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^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])

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{a + bx^2 + cx^4} dx$$

$$\begin{aligned}
& *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^{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*\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 - 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*\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} * \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}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}} * c) * b^3*c^6 - 2*b^4*c^6 + 16*\sqrt{2}*\sqrt{b*c + \sqrt{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*\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 * \text{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
\end{aligned}$$

$$\begin{aligned}
& * \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 + \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 * \text{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} * \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 * \text{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} * \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 * \text{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}) * \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}) * \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 * \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}) * \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^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) + 1/4 * (c^2 * g - b * c * j + b^2 * l - a * c * l) * \log(\text{abs}(c
\end{aligned}$$

```

*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

$$\begin{aligned}
& -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*1*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*1-1} \\
& /c/(4*a*c-b^2)*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*a^{2*1-1/4}/c^3/(4*a*c-b^2)*\ln \\
& (2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*b^{4*1-1/4}/c^3/(4*a*c-b^2)*\ln(-2*c*x^2-b+(-4 \\
& *a*c+b^2)^{(1/2)})*b^{4*1+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)}*\operatorname{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)}*\operatorname{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)}*\operatorname{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)}*\operatorname{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)}*\operatorname{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)}*\operatorname{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)}*\operatorname{arctan} \\
& (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)*\ln \\
& (-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*a*1*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*1*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*1-1/4}/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*1+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}
\end{aligned}$$

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

$$\frac{12c^2mx^5 + 15c^2lx^4 + 20(c^2k - bcm)x^3 + 30(c^2j - bcl)x^2 + 60(c^2h - bck + (b^2 - ac)m)x - \int \frac{c^3d - ac^2h + abck + (c^3g - b^2j + (b^2c - ac^2))x^3 + (c^3f - b^2h + (b^2c - ac^2)k - (b^3 - 2abc)m)x^2 - (ab^2 - a^2c)m + (c^3e - ac^2j + abcl)x}{c^3} dx}{60c^3}$$

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*1*x^4 + 20*(c^2*k - b*c*m)*x^3 + 30*(c^2*j - b*c*1)*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)*1)*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*1)*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*1)/(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*

$$\begin{aligned}
& 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 - \text{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*
\end{aligned}$$

$$\begin{aligned}
& b^2c^4l^2z^2 - 132a^3b^4c^3l^2z^2 + 40a^2b^6c^2l^2z^2 - 100a^3b^3c^4k^2z^2 + 36a^2b^5c^3k^2z^2 - 56a^3b^2c^5j^2z^2 + 32a^2b^4c^4j^2z^2 + 28a^2b^3c^5h^2z^2 + 40a^2b^2c^6g^2z^2 - 96a^5c^5l^2z^2 - 32a^4c^6j^2z^2 - 96a^3c^7g^2z^2 - 32a^2c^8e^2z^2 - 4b^3c^7d^2z^2 - 4a^b^9m^2z^2 + 32a^5b^3c^3h^1m^2z + 8a^2b^6c^3g^1k^1m^2z + 96a^4b^3c^4e^1k^1m^2z + 32a^4b^3c^4h^1j^1k^1m^2z + 32a^4b^3c^4g^1j^1l^1m^2z + 32a^4b^3c^4f^1j^1m^2z - 64a^4b^3c^4g^1h^1m^2z - 8a^2b^6c^2e^1j^1l^1m^2z + 8a^2b^6c^2e^1h^1m^2z - 64a^3b^3c^5e^1h^1k^1m^2z + 64a^3b^3c^5e^1g^1l^1m^2z - 64a^3b^3c^5e^1f^1m^2z + 32a^3b^3c^5f^1g^1k^1m^2z - 32a^3b^3c^5d^1h^1l^1m^2z + 32a^3b^3c^5d^1g^1m^2z - 8a^2b^5c^3e^1h^1k^1m^2z + 8a^2b^5c^3e^1g^1l^1m^2z - 8a^2b^5c^3e^1f^1m^2z - 8a^2b^4c^4e^1g^1j^1m^2z + 8a^2b^4c^4e^1f^1k^1m^2z - 8a^2b^4c^4d^1f^1l^1m^2z + 8a^2b^4c^4d^1e^1m^2z - 32a^2b^3c^6d^1f^1j^1m^2z + 32a^2b^3c^6d^1e^1k^1m^2z + 8a^2b^3c^5d^1f^1j^1m^2z - 8a^2b^3c^5d^1e^1k^1m^2z + 32a^2b^3c^6e^1f^1h^1m^2z - 8a^2b^3c^5e^1f^1h^1m^2z - 8a^2b^2c^6d^1f^1g^1m^2z + 8a^2b^2c^6d^1e^1h^1m^2z - 8a^2b^7c^6e^1k^1m^2z - 40a^5b^2c^2k^1l^1m^2z + 48a^4b^3c^2j^1k^1m^2z - 8a^4b^3c^2h^1l^1m^2z + 104a^4b^2c^3g^1k^1m^2z - 56a^3b^4c^2g^1k^1m^2z - 40a^4b^2c^3h^1j^1m^2z + 8a^4b^2c^3h^1k^1l^1m^2z + 8a^4b^2c^3f^1l^1m^2z + 8a^3b^4c^2h^1j^1m^2z - 152a^3b^3c^3e^1k^1m^2z + 64a^2b^5c^2e^1k^1m^2z - 40a^3b^3c^3g^1j^1l^1m^2z - 8a^3b^3c^3h^1j^1k^1m^2z - 8a^3b^3c^3f^1j^1m^2z + 8a^2b^5c^2g^1j^1l^1m^2z + 48a^3b^3c^3g^1h^1m^2z - 8a^2b^5c^2g^1h^1m^2z - 104a^3b^2c^4e^1j^1l^1m^2z + 56a^2b^4c^3e^1j^1l^1m^2z + 8a^3b^2c^4f^1j^1k^1m^2z - 8a^3b^2c^4d^1k^1l^1m^2z + 8a^3b^2c^4d^1j^1m^2z + 104a^3b^2c^4e^1h^1m^2z - 56a^2b^4c^3e^1h^1m^2z - 40a^3b^2c^4g^1h^1k^1m^2z - 40a^3b^2c^4f^1g^1m^2z - 8a^3b^2c^4f^1h^1l^1m^2z + 8a^2b^4c^3g^1h^1k^1m^2z + 8a^2b^4c^3f^1g^1m^2z + 48a^2b^3c^4e^1h^1k^1m^2z - 48a^2b^3c^4e^1g^1l^1m^2z + 48a^2b^3c^4e^1f^1m^2z - 8a^2b^3c^4f^1g^1k^1m^2z + 8a^2b^3c^4d^1h^1l^1m^2z - 8a^2b^3c^4d^1g^1m^2z + 40a^2b^2c^5e^1g^1j^1l^1m^2z - 40a^2b^2c^5e^1f^1k^1m^2z + 40a^2b^2c^5d^1f^1l^1m^2z - 40a^2b^2c^5d^1e^1m^2z - 8a^2b^2c^5d^1h^1j^1m^2z + 8a^2b^2c^5d^1g^1k^1m^2z + 8a^2b^2c^5f^1g^1h^1m^2z + 8a^4b^4c^4k^1l^1m^2z - 64a^5b^3c^3j^1k^1m^2z - 8a^3b^5c^2j^1k^1m^2z - 32a^6b^3c^2l^1m^2z + 24a^5b^3c^1m^2z - 28a^4b^4c^2j^1m^2z + 16a^5b^3c^3k^2l^1m^2z + 4a^3b^5c^2j^1l^2z + 48a^5b^3c^3g^1m^2z + 32a^3b^5c^2g^1m^2z - 4a^2b^6c^2g^1l^2z - 36a^2b^6c^2e^1m^2z - 32a^4b^3c^4g^1k^2z - 16a^3b^3c^5f^2l^1z - 48a^4b^3c^4e^1l^2z - 32a^3b^3c^5g^2j^1z - 4a^2b^4c^4e^2l^1z + 32a^2b^3c^6d^2l^1z - 24a^2b^3c^5d^2l^1z + 4a^2b^6c^2e^1k^2z + 32a^3b^3c^5e^1j^2z + 16a^3b^3c^5g^1h^2z - 16a^2b^3c^6e^2j^1z + 4a^2b^5c^3e^1j^2z + 4a^2b^3c^5e^2j^1z + 20a^2b^2c^6d^2j^1z + 4a^2b^4c^4e^1h^2z - 16a^2b^3c^6e^1g^2z + 4a^2b^3c^5e^1g^2z - 4a^2b^2c^6e^2g^1z + 4a^2b^2c^6e^1f^2z + 32a^6c^3k^1l^1m^2z - 32a^5c^4h^1k^1l^1m^2z + 32a^5c^4h^1j^1m^2z - 32a^5c^4g^1k^1m^2z - 32a^5c^4f^1l^1m^2z - 32a^4c^5f^1j^1k^1m^2z + 32a^4c^5e^1j^1l^1m^2z + 32a^4c^5d^1k^1l^1m^2z - 32a^4c^5d^1j^1m^2z + 32a^4c^5g^1h^1k^1m^2z + 32a^4c^5f^1h^1l^1m^2z + 32a^4c^5f^1g^1m^2z - 32a^4c^5e^1h^1m^2z - 32a^3c^6e^1g^1j^1m^2z + 32a^3c^6e^1f^1k^1m^2z + 32a^3c^6d^1h^1j^1m^2z - 32a^3c^6d^1g^1k^1m^2z - 32a^3c^6d^1f^1l^1m^2z + 32a^3c^6d^1e^1m^2z - 32a^3c^6f^1g^1h^1m^2z + 4a^2b^7c^6e^1l^2z + 32a^2c^7d^1f^1g^1z - 32a^2c^7d^1e^1h^1z - 16a^2b^7c^6d^2g^1z + 52a^5b^2c^2j^1m^2z - 4a^4b^3c^2k^2l^1z + 36a^4b^2c^3j^2l^1z - 16a^4b^3c^2j^1l^2z - 8a^3b^4c^2j^2l^1z - 20a^4b^2c^3j^1k^2z + 4a^3b^4c^2j^1k^2z - 76a^4b^3c^2g^1m^2z - 60a^4b^2c^3g^1l^2z + 44a^3b^2c^4g^2l^1z + 28a^3b^4c^2g^1l^2z - 8a^2b^4c^3g^2l^1z + 104a^3b^4c^2e^1m^2z - 100a^4b^2c^3e^1m^2z + 24a^3b^3c^3g^1k^2z + 4a^3b^2c^4h^2j^1z - 4a^2b^5c^2g^1k^2z + 4a^2b^3c^4f^2l^1z + 76a^3b^3c^3e^1l^2z - 32a^2b^5c^2e^1l^2z + 20a^2b^2c^5e^2l^1z + 12a^3b^2c^4g^1j^2z + 8a^2b^3c^4g^2j^1z - 4a^2b^4c^3g^1j^2z + 52a^3b^2c^4e^1k^2z - 28a^2b^4c^3e^1k^2z - 4a^2b^2c^5f^2j^1z - 24a^2b^3c^4e^1j^2z - 4a^2b^3c^4g^1h^2z - 20a^2b^2c^5e^1h^2z + 20a^5b^2c^2l^3z + 4a^3b^3c^3j^3z - 4a^2b^2c^5g^3z - 4a^4b^5l^1m^2z - 16a^6c^3j^1m^2z - 16a^5c^4j^2l^1z + 4a^3b^6j^1m^2z + 16a^5c^4j^1k^2z + 48a^5c^4g^1l^2z - 48a^4c^5g^2l^1z - 4a^2b^7g^1m^2z + 16a^5c^4e^1m^2z - 16a^4c^5h^2j^1z + 16a^4c^5g^1j^2z - 16a^3c^6e^2l^1z + 4b^5c^4d^2l^1z - 16a^4c^5e^1k^2z + 16a^3c^6f^2j^1z - 4b^4c^5d^2j^1z - 16a^2c^7
\end{aligned}$$

$$\begin{aligned}
& d^2jz - 4a^4b^4c^1z + 16a^3c^6e^h2z - 16a^4b^4c^4j^3z + 16a^2c^7e^2gz + 4b^3c^6d^2gz - 16a^2c^7e^f2z - 4b^2c^7d^2ez + 4a^4b^8em^2z + 16a^3c^8d^2ez - 16a^6c^3l^3z + 16a^3c^6g^3z + 4a^5b^2c^2g^2k^1m + 12a^5b^2c^2g^2j^2k^1m + 12a^5b^2c^2e^2k^1m - 4a^5b^2c^2h^2j^2k^1m - 4a^5b^2c^2f^2j^2k^1m - 4a^4b^3c^2g^2j^2k^1m - 4a^4b^3c^2e^2k^1m - 4a^5b^2c^2g^2h^2k^1m + 4a^3b^4c^2e^2j^2k^1m - 4a^3b^4c^2f^2h^2k^1m + 12a^4b^3c^3d^2j^2k^1m - 20a^4b^3c^3e^2g^2k^1m + 12a^4b^3c^3f^2h^2j^1m + 12a^4b^3c^3e^2h^2j^1m + 12a^4b^3c^3d^2h^2k^1m - 4a^4b^3c^3g^2h^2j^1k - 4a^4b^3c^3f^2g^2k^1m - 4a^4b^3c^3f^2g^2j^1m - 4a^4b^3c^3e^2h^2k^1m - 4a^4b^3c^3e^2f^1m - 4a^4b^3c^3d^2g^1m - 4a^2b^5c^2e^2g^2k^1m + 4a^2b^5c^2d^2h^2k^1m - 20a^3b^4c^4d^2f^2j^1m - 4a^3b^4c^4e^2f^2j^1k - 4a^3b^4c^4d^2g^2j^1k - 4a^3b^4c^4d^2e^2k^1m - 4a^3b^4c^4d^2e^2j^1m - 4a^2b^5c^2d^2f^2j^1m + 12a^3b^4c^4e^2g^2h^2k + 12a^3b^4c^4e^2f^2g^2m + 12a^3b^4c^4d^2g^2h^1m + 12a^3b^4c^4d^2f^2h^1m - 4a^3b^4c^4f^2g^2h^1j - 4a^3b^4c^4e^2f^2h^1m + 4a^2b^5c^2d^2f^2h^1m - 4a^2b^4c^3d^2f^2h^1k + 4a^2b^4c^3d^2f^2g^1m + 12a^2b^4c^3d^2f^2g^1j + 12a^2b^4c^3d^2e^2f^1m - 4a^2b^4c^3d^2e^2h^1j - 4a^2b^4c^3d^2e^2g^1k - 4a^2b^3c^4d^2f^2g^1j - 4a^2b^3c^4d^2e^2f^1m - 4a^2b^4c^3e^2f^2g^1h + 4a^2b^2c^5d^2e^2f^1j - 4a^6b^4c^2j^2k^1m - 4a^2b^6c^2d^2f^2k^1m - 4a^2b^4c^6d^2e^2f^1g - 16a^4b^2c^2e^2j^2k^1m + 4a^4b^2c^2f^2j^2k^1m + 4a^4b^2c^2d^2j^1m + 12a^4b^2c^2f^2h^2k^1m + 4a^4b^2c^2g^2h^2j^1m + 4a^4b^2c^2e^2h^1m - 4a^3b^3c^2d^2j^2k^1m + 20a^3b^3c^2e^2g^2k^1m - 16a^3b^3c^2d^2h^2k^1m - 4a^3b^3c^2f^2h^2j^1m - 4a^3b^3c^2e^2h^2j^1m - 40a^3b^2c^3d^2f^2k^1m + 24a^2b^4c^2d^2f^2k^1m - 16a^3b^2c^3d^2h^2j^1m + 12a^3b^2c^3e^2g^2j^1m + 4a^3b^2c^3e^2h^2j^1k + 4a^3b^2c^3e^2f^2j^1m + 4a^3b^2c^3d^2g^2k^1m - 4a^2b^4c^2e^2g^2j^1m + 4a^2b^4c^2d^2h^2j^1m - 16a^3b^2c^3e^2g^2h^1m + 4a^3b^2c^3f^2g^2h^1m + 4a^2b^4c^2e^2g^2h^1m + 20a^2b^3c^3d^2f^2j^1m - 16a^2b^3c^3d^2f^2h^1m - 4a^2b^3c^3e^2g^2h^1k - 4a^2b^3c^3e^2f^2g^1m - 4a^2b^3c^3d^2g^2h^1m - 16a^2b^2c^4d^2f^2g^1m + 12a^2b^2c^4d^2f^2h^1k + 4a^2b^2c^4e^2f^2g^1k + 4a^2b^2c^4d^2g^2h^1j + 4a^2b^2c^4d^2e^2h^1m + 4a^2b^2c^4d^2e^2g^1m + 2a^5b^2c^2j^2k^1m - 4a^5b^2c^2e^2h^2k^1m - 2a^5b^2c^2h^2k^1m + 2a^4b^3c^2h^2k^1m + 2a^5b^2c^2h^2k^1m^2 + 2a^5b^2c^2f^1m^2 - 2a^5b^2c^2h^2j^2m + 2a^3b^4c^2g^2k^1m + 14a^4b^3c^3f^2k^1m - 10a^5b^2c^2f^2k^2m - 8a^5b^2c^2g^2j^1m^2 - 8a^5b^2c^2e^1m^2 + 4a^5b^2c^2f^2k^1m^2 + 4a^4b^3c^2f^2k^2m - 2a^5b^2c^2g^2k^2m + 2a^2b^5c^2f^2k^1m + 6a^5b^2c^2f^2k^1m^2 + 6a^5b^2c^2d^1m^2 - 2a^5b^2c^2g^2j^1m^2 + 2a^4b^3c^2g^2j^1m^2 - 2a^4b^3c^2f^2k^1m^2 - 2a^4b^3c^2d^1m^2m - 2a^4b^3c^2g^2j^1m - 14a^2b^5c^2d^2k^1m - 10a^5b^2c^2e^2j^1m^2 + 10a^4b^3c^2e^2j^1m^2 - 10a^3b^4c^4d^2k^1m - 6a^4b^3c^2d^2k^1m^2 + 6a^4b^3c^3g^2h^1m - 4a^3b^4c^2d^2k^1m - 2a^5b^2c^2d^2k^1m^2 + 14a^5b^2c^2f^2h^1m^2 + 14a^3b^4c^4e^2j^1m - 10a^4b^3c^2f^2h^1m^2 - 10a^4b^3c^3f^2h^2m - 10a^4b^3c^3e^2j^2m - 2a^4b^3c^3g^2h^2m - 2a^4b^3c^3f^2j^2k - 2a^4b^3c^3d^2j^2m - 2a^3b^4c^2e^2j^1m^2 + 2a^3b^4c^2d^2k^1m^2 + 2a^2b^5c^2e^2j^1m - 12a^2b^4c^3d^2j^1m - 10a^3b^4c^4e^2h^1m + 6a^4b^3c^3e^2j^1k^2 + 2a^3b^4c^3e^2f^1m^2 - 2a^2b^5c^2e^2h^1m - 12a^3b^4c^2e^2g^1m^2 + 12a^3b^4c^2d^2h^1m^2 + 12a^2b^4c^3d^2h^1m + 6a^3b^4c^4f^2g^1m - 2a^4b^3c^3f^2h^1k^2 - 2a^3b^4c^4f^2h^1k + 14a^4b^3c^3e^2g^1m^2 - 10a^4b^3c^3d^2h^1m^2 - 10a^3b^4c^4e^2g^1m - 2a^3b^4c^4f^2g^2k - 2a^3b^4c^4d^2g^2m + 2a^2b^5c^2e^2g^1m^2 - 2a^2b^5c^2d^2h^1m^2 + 2a^2b^4c^3e^2h^1k - 2a^2b^4c^3e^2g^1m + 2a^2b^4c^3e^2f^1m - 14a^2b^5c^2d^2f^1m^2 + 14a^2b^5c^2d^2h^1k - 10a^4b^3c^3d^2f^1m^2 - 10a^3b^4c^4d^2h^2k - 10a^2b^5c^5d^2g^1m - 10a^2b^3c^4d^2h^2k + 10a^2b^3c^4d^2g^1m - 6a^2b^3c^4d^2f^1m - 4a^2b^4c^3d^2f^2m - 2a^3b^4c^4e^2h^2j - 2a^2b^5c^5d^2f^1m + 6a^3b^4c^4d^2h^2j^2 + 6a^2b^5c^5e^2f^1k + 6a^2b^5c^5d^2e^2m - 2a^3b^4c^4e^2g^2j^2 - 2a^2b^5c^5e^2g^2j + 2a^2b^3c^4e^2g^2j - 2a^2b^3c^4e^2f^1k - 2a^2b^3c^4d^2e^2m + 14a^3b^4c^4d^2f^1k^2 - 10a^2b^5c^5d^2f^2k - 8a^2b^2c^5d^2g^2j - 8a^2b^2c^5d^2e^1m + 4a^2b^3c^4d^2f^2k + 4a^2b^2c^5d^2f^1k - 2a^2b^5c^5e^2f^2j + 2a^2b^5c^5d^2f^1k^2 + 2a^2b^4c^3d^2f^1j^2 + 2a^2b^2c^5d^2e^2k - 2a^2b^2c^5d^2g^2h + 2a^2b^2c^5e^2f^1h - 4a^2b^2c^5d^2f^2h - 2a^2b^2c^5d^2f^1h^2 + 2a^2b^3c^4d^2f^1h^2 + 2a^2b^2c^5d^2f^1g^2 + 8a^6c^2h^2j^1m - 8a^6c^2g^2k^1m - 8a^5c^3f^2j^2k^1m + 8a^5c^3e^2j^2k^1m - 8a^5c^3d^2j^1m
\end{aligned}$$

$$\begin{aligned}
& + 8a^5c^3g^*h^*k^*l - 8a^5c^3g^*h^*j^*m - 8a^5c^3f^*h^*k^*m + 8a^5c^3f^* \\
& g^*l^*m - 8a^5c^3e^*h^*l^*m - 2a^6b^*c^*h^*l^2m + 8a^4c^4f^*g^*j^*k - 8a^4c^4 \\
& e^*h^*j^*k - 8a^4c^4e^*g^*j^*l + 8a^4c^4e^*f^*k^*l - 8a^4c^4e^*f^*j^*m + 8 \\
& a^4c^4d^*h^*j^*l - 8a^4c^4d^*g^*k^*l + 8a^4c^4d^*g^*j^*m + 8a^4c^4d^*f^*k^*m \\
& + 8a^4c^4d^*e^*l^*m + 6a^6b^*c^*g^*l^2m - 2a^6b^*c^*h^*k^2m - 8a^4c^4f^* \\
& g^*h^*l + 8a^4c^4e^*g^*h^*m + 2a^*b^6c^*e^2k^*m + 8a^3c^5d^*e^*j^*k + 8a^3c^5 \\
& e^*f^*h^*j - 8a^3c^5e^*f^*g^*k - 8a^3c^5d^*g^*h^*j - 8a^3c^5d^*f^*h^*k + 8 \\
& a^3c^5d^*f^*g^*l - 8a^3c^5d^*e^*h^*l - 8a^3c^5d^*e^*g^*m - 8a^2c^6d^*e^*f^*j \\
& + 8a^2c^6d^*e^*g^*h + 2a^*b^6c^*d^*f^*l^2 + 6a^*b^*c^6d^2e^*j - 2a^*b^*c^6d^2 \\
& f^*h - 2a^*b^*c^6d^2e^2h - 8a^4b^2c^2g^2k^*m - 10a^3b^3c^2f^2k^*m \\
& + 2a^4b^2c^2h^2j^*l + 18a^3b^2c^3e^2k^*m - 12a^2b^4c^2e^2k^*m - \\
& 4a^4b^2c^2g^*j^2l + 2a^3b^3c^2g^2j^*l + 28a^2b^3c^3d^2k^*m + 1 \\
& 4a^4b^2c^2d^*k^2m - 8a^3b^2c^3f^2j^*l + 2a^4b^2c^2g^*j^*k^2 + 2a^4 \\
& b^2c^2e^*k^2l - 2a^3b^3c^2g^2h^*m + 2a^2b^4c^2f^2j^*l - 10a^2 \\
& b^3c^3e^2j^*l - 8a^4b^2c^2d^*k^*l^2 + 4a^4b^2c^2e^*j^*l^2 + 4a^3b^3 \\
& c^2f^*h^2m + 4a^3b^3c^2e^*j^2l + 4a^3b^2c^3f^2h^*m - 2a^2b^4c^2 \\
& f^2h^*m + 18a^2b^2c^4d^2j^*l + 10a^2b^3c^3e^2h^*m - 8a^4b^2c^2 \\
& f^*h^*l^2 - 2a^3b^3c^2e^*j^*k^2 + 2a^3b^2c^3g^2h^*k + 2a^3b^2c^3f^ \\
& g^2m - 22a^4b^2c^2d^*h^*m^2 - 22a^2b^2c^4d^2h^*m + 18a^4b^2c^2e^ \\
& g^*m^2 + 16a^3b^2c^3d^*h^2m - 4a^3b^2c^3f^*h^2k - 4a^2b^4c^2d^*h^ \\
& ^2m + 2a^3b^3c^2f^*h^*k^2 + 2a^3b^2c^3d^*j^2k + 2a^2b^3c^3f^2h^* \\
& k - 2a^2b^3c^3f^2g^*l - 10a^3b^3c^2e^*g^*l^2 + 10a^3b^3c^2d^*h^*l^2 \\
& - 8a^2b^2c^4e^2h^*k - 8a^2b^2c^4e^2f^*m + 4a^2b^3c^3e^*g^2l + \\
& 4a^2b^2c^4e^2g^*l + 2a^3b^2c^3f^*h^*j^2 + 28a^3b^3c^2d^*f^*m^2 + 14 \\
& a^2b^2c^4d^*f^2m - 8a^3b^2c^3e^*g^*k^2 + 4a^3b^2c^3d^*h^*k^2 + 4a^2 \\
& b^3c^3d^*h^2k + 2a^2b^4c^2e^*g^*k^2 - 2a^2b^4c^2d^*h^*k^2 + 2a^2b^ \\
& ^2c^4f^2g^*j + 2a^2b^2c^4e^*f^2l + 18a^3b^2c^3d^*f^*l^2 - 12a^2b^4 \\
& c^2d^*f^*l^2 - 4a^2b^2c^4e^*g^2j + 2a^2b^3c^3e^*g^*j^2 - 2a^2b^3c^3 \\
& d^*h^*j^2 - 10a^2b^3c^3d^*f^*k^2 - 8a^2b^2c^4d^*f^*j^2 + 2a^2b^2c^4 \\
& e^*g^*h^2 + 4a^5b^2c^*h^2m^2 - 2a^4b^2c^2h^3m - 5a^5b^*c^2g^2m^2 \\
& + 5a^4b^3c^*g^2m^2 + 3a^5b^*c^2h^2l^2 + 6a^3b^4c^*f^2m^2 - 2a^3b^ \\
& ^2c^3g^3l + 2a^2b^3c^3f^3m + 7a^4b^*c^3e^2m^2 + 7a^2b^5c^*e^2 \\
& m^2 - 5a^4b^*c^3f^2l^2 + 3a^4b^*c^3g^2k^2 - 2a^4b^2c^2f^*k^3 - 2a^ \\
& ^2b^2c^4f^3k + 7a^3b^*c^4d^2l^2 + 7a^*b^5c^2d^2l^2 - 5a^3b^*c^4 \\
& e^2k^2 + 3a^3b^*c^4f^2j^2 + 6a^*b^4c^3d^2k^2 + 2a^3b^3c^2d^*k^3 - \\
& 2a^3b^2c^3e^*j^3 - 5a^2b^*c^5d^2j^2 + 5a^*b^3c^4d^2j^2 + 3a^2b^* \\
& c^5e^2h^2 + 4a^*b^2c^5d^2h^2 - 2a^2b^2c^4d^*h^3 - 4a^6c^2j^2k^*m \\
& + 2a^6b^2j^*l^2m + 4a^6c^2j^*k^2l + 4a^6c^2h^*k^2m - 4a^6c^2h^* \\
& k^*l^2 - 4a^6c^2f^*l^2m + 4a^5c^3g^2k^*m + 2a^5b^3h^*k^*m^2 - 2a^5b^ \\
& ^3g^*l^2m + 4a^6c^2g^*j^*m^2 + 4a^6c^2f^*k^*m^2 + 4a^6c^2e^*l^*m^2 - 4 \\
& a^5c^3h^2j^*l + 4a^5c^3h^*j^2k + 4a^5c^3g^*j^2l + 4a^5c^3f^*j^2m \\
& - 4a^4c^4e^2k^*m + 2a^4b^4g^*j^*m^2 - 2a^4b^4f^*k^*m^2 + 2a^4b^4e^* \\
& l^*m^2 - 4a^5c^3g^*j^*k^2 - 4a^5c^3e^*k^2l - 4a^5c^3d^*k^2m + 4a^4c^ \\
& ^4f^2j^*l + 4a^5c^3e^*j^*l^2 + 4a^5c^3d^*k^*l^2 + 4a^4c^4f^2h^*m + 2 \\
& b^6c^2d^2j^*l - 2a^3b^5e^*j^*m^2 + 2a^3b^5d^*k^*m^2 + 4a^5c^3f^*h^*l^2 \\
& - 4a^4c^4g^2h^*k - 4a^4c^4f^*g^2m - 4a^3c^5d^2j^*l - 2b^6c^2d^ \\
& ^2h^*m + 2a^3b^5f^*h^*m^2 + 12a^5c^3d^*h^*m^2 - 12a^4c^4d^*h^2m + 12a^ \\
& ^3c^5d^2h^*m - 4a^5c^3e^*g^*m^2 + 4a^4c^4g^*h^2j + 4a^4c^4f^*h^2k + \\
& 4a^4c^4e^*h^2l - 4a^4c^4d^*j^2k + 3a^6b^*c^*j^2m^2 - 4a^4c^4f^*h^* \\
& j^2 + 4a^3c^5e^2h^*k + 4a^3c^5e^2g^*l + 4a^3c^5e^2f^*m + 2b^5c^3 \\
& d^2h^*k - 2b^5c^3d^2g^*l + 2b^5c^3d^2f^*m + 2a^5b^*c^2j^3l + 2a^ \\
& ^2b^6e^*g^*m^2 - 2a^2b^6d^*h^*m^2 + 4a^4c^4e^*g^*k^2 + 4a^4c^4d^*h^*k^2 - \\
& 4a^3c^5f^2g^*j - 4a^3c^5e^*f^2l - 4a^3c^5d^*f^2m - 4a^4c^4d^*f^* \\
& l^2 + 4a^3c^5e^*g^2j + 4a^3c^5d^*g^2k + 2b^4c^4d^2g^*j - 2b^4c^4 \\
& d^2f^*k + 2b^4c^4d^2e^*l - 6a^3b^*c^4f^3m + 4a^3c^5f^*g^2h + 4a^ \\
& ^2c^6d^2g^*j + 4a^2c^6d^2f^*k + 4a^2c^6d^2e^*l - 2a^5b^2c^*g^*l^3 + \\
& 2a^5b^*c^2h^*k^3 + 2a^4b^*c^3h^3k - 4a^3c^5e^*g^*h^2 + 4a^3c^5d^*f^* \\
& j^2 - 4a^2c^6d^2e^2k - 2b^3c^5d^2e^*j + 8a^5b^2c^*d^*m^3 + 8a^*b^6c^ \\
& ^*d^2m^2 + 8a^*b^2c^5d^3m - 6a^5b^*c^2e^*l^3 - 6a^2b^*c^5e^3l - 4a^
\end{aligned}$$

$$\begin{aligned}
& 2*c^6*e^2*f*h + 2*b^3*c^5*d^2*f*h + 2*a^4*b^3*c*e^1^3 + 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*1 + 4*a^2*c^6*e*f^2*g + 4*a^2*c^6*d*f^2* \\
& 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*1^2 - 14*a^3*b^3*c^2* \\
& e^2*m^2 + 5*a^3*b^3*c^2*f^2*1^2 - 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*1^2 + 6*a^2*b^4*c^2*e^2*1^2 + 4*a^3*b^2*c^3*f^2*k^2 - \\
& 14*a^2*b^3*c^3*d^2*1^2 + 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*1^2*m - 4*a^7*c*j*1^2*m^2 + 2*b^7*c*d^2*k*m + 2*a^6*b* \\
& c*k^3*m + 2*a^6*b*c*j*1^3 + 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*1^2 - a^5*b*c^2*j^2*k^2 - a^4*b^3*c*h^2*1^2 - a^3*b^4*c*g^2*1^2 - a^4*b*c^3*h^2*j^2 - \\
& a^2*b^5*c*f^2*1^2 - 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*1^2 - 2*a^6*c^2*j^2*1^2 - 6*a^6*c^2*h^2*m^2 - \\
& a*b^6*c*e^2*1^2 - 6*a^5*c^3*g^2*1^2 - 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*1^2 - 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*1^3 + 4*a^4*c^4*g^3*1 - 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*1^2*m^2 - b^7*c*d^2*1^2 - 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*1^4 - 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*1*z^3 - 144*a^2*b^4*c^5*1*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*1*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*1*z^3 + 256*a^3*c^8*g*z^3 - 96*a^4*b*c^5*j*1*z^2 + 8*a* \\
& b^7*c^2*j*1*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*1*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*1*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*1*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* \\
& 1*z^2 - 72*a^2*b^5*c^3*j*1*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*1*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*1*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*1*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*1*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*1^2*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*1^2*z^2 - 132*a^3*b^4*c^3*1^2*z^2 + 40*a^2*b^6*c^2*1^2*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*1^2*z^2 - 32*a^4*c^6*j^2*z^2
\end{aligned}$$

$$\begin{aligned}
&^2 - 96a^3c^7g^2z^2 - 32a^2c^8e^2z^2 - 4b^3c^7d^2z^2 - 4a^2b^9m^2z^2 + 32a^5b^3c^3h^1m^2z + 8a^2b^6c^3g^2k^2m^2z + 96a^4b^3c^4e^2k^2m^2z \\
&+ 32a^4b^3c^4h^2j^2k^2z + 32a^4b^3c^4g^2j^2k^2z + 32a^4b^3c^4f^2j^2k^2z - 64a^4b^3c^4g^2h^2m^2z - 8a^2b^6c^2e^2j^2k^2z + 8a^2b^6c^2e^2h^2m^2z - 64a^3b^3c^5e^2h^2k^2z \\
&+ 64a^3b^3c^5e^2g^2l^2z - 64a^3b^3c^5e^2f^2m^2z + 32a^3b^3c^5f^2g^2k^2z - 32a^3b^3c^5d^2h^2l^2z + 32a^3b^3c^5d^2g^2m^2z - 8a^2b^5c^3e^2h^2k^2z + 8a^2b^5c^3e^2g^2l^2z \\
&- 8a^2b^5c^3e^2f^2m^2z - 8a^2b^4c^4e^2g^2j^2z + 8a^2b^4c^4e^2f^2k^2z - 8a^2b^4c^4d^2f^2l^2z + 8a^2b^4c^4d^2e^2m^2z - 32a^2b^3c^6d^2f^2j^2z \\
&+ 32a^2b^3c^6d^2e^2k^2z + 8a^2b^3c^5d^2f^2j^2z - 8a^2b^3c^5d^2e^2k^2z + 32a^2b^3c^6e^2f^2h^2z - 8a^2b^3c^5e^2f^2h^2z - 8a^2b^2c^6d^2f^2g^2z \\
&+ 8a^2b^2c^6d^2e^2h^2z - 8a^2b^7c^2e^2k^2m^2z - 40a^5b^2c^2k^2l^2m^2z + 48a^4b^3c^2j^2k^2m^2z - 8a^4b^3c^2h^2l^2m^2z + 104a^4b^2c^3g^2k^2m^2z \\
&- 56a^3b^4c^2g^2k^2m^2z - 40a^4b^2c^3h^2j^2m^2z + 8a^4b^2c^3h^2k^2l^2z + 8a^4b^2c^3f^2l^2m^2z + 8a^3b^4c^2h^2j^2m^2z - 152a^3b^3c^3e^2k^2m^2z \\
&+ 64a^2b^5c^2e^2k^2m^2z - 40a^3b^3c^3g^2j^2k^2z - 8a^3b^3c^3h^2j^2k^2z - 8a^3b^3c^3f^2j^2k^2z + 8a^2b^5c^2g^2j^2k^2z + 48a^3b^3c^3g^2h^2m^2z \\
&- 8a^2b^5c^2g^2h^2m^2z - 104a^3b^2c^4e^2j^2k^2z + 56a^2b^4c^3e^2j^2k^2z + 8a^3b^2c^4f^2j^2k^2z - 8a^3b^2c^4d^2k^2l^2z + 8a^3b^2c^4d^2j^2m^2z \\
&+ 104a^3b^2c^4e^2h^2m^2z - 56a^2b^4c^3e^2h^2m^2z - 40a^3b^2c^4g^2h^2k^2z - 40a^3b^2c^4f^2g^2m^2z - 8a^3b^2c^4f^2h^2l^2z + 8a^2b^4c^3g^2h^2k^2z \\
&+ 8a^2b^4c^3f^2g^2m^2z + 48a^2b^3c^4e^2h^2k^2z - 48a^2b^3c^4e^2g^2l^2z + 48a^2b^3c^4e^2f^2m^2z - 8a^2b^3c^4f^2g^2k^2z + 8a^2b^3c^4d^2h^2l^2z \\
&- 8a^2b^3c^4d^2g^2m^2z + 40a^2b^2c^5e^2g^2j^2z - 40a^2b^2c^5e^2f^2k^2z + 40a^2b^2c^5d^2f^2l^2z - 40a^2b^2c^5d^2e^2m^2z - 8a^2b^2c^5d^2h^2j^2z \\
&+ 8a^2b^2c^5d^2g^2k^2z + 8a^2b^2c^5d^2f^2l^2z + 8a^2b^2c^5f^2g^2h^2z + 8a^4b^4c^2k^2l^2m^2z - 64a^5b^3c^3j^2k^2m^2z - 8a^3b^5c^2j^2k^2m^2z \\
&- 32a^6b^2c^2l^2m^2z + 24a^5b^3c^2l^2m^2z - 28a^4b^4c^2j^2m^2z + 16a^5b^3c^3k^2l^2z + 4a^3b^5c^2j^2l^2z + 48a^5b^3c^3g^2m^2z + 32a^3b^5c^2g^2m^2z \\
&- 4a^2b^6c^2g^2l^2z - 36a^2b^6c^2e^2m^2z - 32a^4b^3c^4g^2k^2z - 16a^3b^3c^5f^2l^2z - 48a^4b^3c^4e^2l^2z - 32a^3b^3c^5g^2j^2z - 4a^2b^4c^4e^2l^2z \\
&+ 32a^2b^3c^6d^2l^2z - 24a^2b^3c^5d^2l^2z + 4a^2b^6c^2e^2k^2z + 32a^3b^3c^5e^2j^2z + 16a^3b^3c^5g^2h^2z - 16a^2b^3c^6e^2j^2z + 4a^2b^5c^3e^2j^2z \\
&+ 4a^2b^3c^5e^2j^2z + 20a^2b^2c^6d^2j^2z + 4a^2b^4c^4e^2h^2z - 16a^2b^3c^6e^2g^2z + 4a^2b^3c^5e^2g^2z - 4a^2b^2c^6e^2g^2z + 4a^2b^2c^6e^2f^2z \\
&+ 32a^6c^3k^2l^2m^2z - 32a^5c^4h^2k^2l^2z + 32a^5c^4h^2j^2m^2z - 32a^5c^4g^2k^2m^2z - 32a^5c^4f^2l^2m^2z - 32a^4c^5f^2j^2k^2z + 32a^4c^5e^2j^2l^2z \\
&+ 32a^4c^5d^2k^2l^2z - 32a^4c^5d^2j^2m^2z + 32a^4c^5g^2h^2k^2z + 32a^4c^5f^2h^2l^2z + 32a^4c^5f^2g^2m^2z - 32a^4c^5e^2h^2m^2z - 32a^3c^6e^2g^2j^2z \\
&+ 32a^3c^6e^2f^2k^2z + 32a^3c^6d^2h^2j^2z - 32a^3c^6d^2g^2k^2z - 32a^3c^6d^2f^2l^2z + 32a^3c^6d^2e^2m^2z - 32a^3c^6f^2g^2h^2z + 4a^2b^7c^2e^2l^2z \\
&+ 32a^2c^7d^2f^2g^2z - 32a^2c^7d^2e^2h^2z - 16a^2b^7c^2d^2g^2z + 52a^5b^2c^2j^2m^2z - 4a^4b^3c^2k^2l^2z + 36a^4b^2c^3j^2l^2z - 16a^4b^3c^2j^2l^2z \\
&- 8a^3b^4c^2j^2l^2z - 20a^4b^2c^3j^2k^2z + 4a^3b^4c^2j^2k^2z - 76a^4b^3c^2g^2m^2z - 60a^4b^2c^3g^2l^2z + 44a^3b^2c^4g^2l^2z + 28a^3b^4c^2g^2l^2z \\
&- 8a^2b^4c^3g^2l^2z + 104a^3b^4c^2e^2m^2z - 100a^4b^2c^3e^2m^2z + 24a^3b^3c^3g^2k^2z + 4a^3b^2c^4h^2j^2z - 4a^2b^5c^2g^2k^2z + 4a^2b^3c^4f^2l^2z \\
&+ 76a^3b^3c^3e^2l^2z - 32a^2b^5c^2e^2l^2z + 20a^2b^2c^5e^2l^2z + 12a^3b^2c^4g^2j^2z + 8a^2b^3c^4g^2j^2z - 4a^2b^4c^3g^2j^2z + 52a^3b^2c^4e^2k^2z \\
&- 28a^2b^4c^3e^2k^2z - 4a^2b^2c^5f^2j^2z - 24a^2b^3c^4e^2j^2z - 4a^2b^3c^4g^2h^2z - 20a^2b^2c^5e^2h^2z + 20a^5b^2c^2l^2z + 4a^3b^3c^3j^2z \\
&- 4a^2b^2c^5g^2z - 4a^4b^5l^2m^2z - 16a^6c^3j^2m^2z - 16a^5c^4j^2l^2z + 4a^3b^6j^2m^2z + 16a^5c^4j^2k^2z + 48a^5c^4g^2l^2z - 48a^4c^5g^2l^2z \\
&- 4a^2b^7g^2m^2z + 16a^5c^4e^2m^2z - 16a^4c^5h^2j^2z + 16a^4c^5g^2j^2z - 16a^3c^6e^2l^2z + 4b^5c^4d^2l^2z - 16a^4c^5e^2k^2z + 16a^3c^6f^2j^2z \\
&- 4b^4c^5d^2j^2z - 16a^2c^7d^2j^2z - 4a^4b^4c^2l^2z + 16a^3c^6e^2h^2z - 16a^4b^3c^4j^2z + 16a^2c^7e^2g^2z + 4b^3c^6d^2g^2z - 16a^2c^7e^2f^2z \\
&- 4b^2c^7d^2e^2z + 4a^2b^8e^2m^2z + 16a^2c^8d^2e^2z - 16a^6c^3l^2z + 16a^3c^6g^2z + 4a^5b^2c^2g^2k^2l^2m^2 + 12a^5
\end{aligned}$$

$$\begin{aligned}
& *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*k*l - 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*k*l + 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*
\end{aligned}$$

$$\begin{aligned}
& k*1 + 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*1*m^2 - 2*a^6*b*c*h*k*m^2 - 8*a^4*c^4*f*g*h*1 + 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*1 - 8*a^3*c^5*d*e* \\
& h*1 - 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*1^2 + 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*1 + 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*1 + 2*a^3*b \\
& ^3*c^2*g^2*j*1 + 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*1 + 2*a^4*b^2*c^2*g*j*k^2 + 2*a^4*b^2*c^2*e*k^2*1 - 2*a^3*b^3*c \\
& ^2*g^2*h*m + 2*a^2*b^4*c^2*f^2*j*1 - 10*a^2*b^3*c^3*e^2*j*1 - 8*a^4*b^2*c^2 \\
& *d*k*1^2 + 4*a^4*b^2*c^2*e*j*1^2 + 4*a^3*b^3*c^2*f*h^2*m + 4*a^3*b^3*c^2*e* \\
& j^2*1 + 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*1 + 10*a^2*b^3*c^3*e^2*h*m - 8*a^4*b^2*c^2*f*h*1^2 - 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*1 - 10*a \\
& ^3*b^3*c^2*e*g*1^2 + 10*a^3*b^3*c^2*d*h*1^2 - 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*1 + 4*a^2*b^2*c^4*e^2*g*1 + 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*1 + 18*a^3*b^2*c^3*d*f*1^2 - 12*a^2*b^4*c^2*d*f*1^2 - 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*1^2 + 6*a^3*b^4*c*f^2*m^2 - 2*a^3*b^2*c^3*g^3*1 + 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*1^2 + 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*1^2 + 7*a*b^5*c^2*d^2*1^2 - 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*1*m^2 + 4*a^6*c^2 \\
& *j*k^2*1 + 4*a^6*c^2*h*k^2*m - 4*a^6*c^2*h*k*1^2 - 4*a^6*c^2*f*1^2*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*1*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*1*m^2 - 4*a^5*c^3*h^2*j*1 + 4*a^5*c^3*h*j^ \\
& 2*k + 4*a^5*c^3*g*j^2*1 + 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*1*m^2 - 4*a^5*c^3*g*j*k^2 - 4*a^ \\
& 5*c^3*e*k^2*1 - 4*a^5*c^3*d*k^2*m + 4*a^4*c^4*f^2*j*1 + 4*a^5*c^3*e*j*1^2 + \\
& 4*a^5*c^3*d*k*1^2 + 4*a^4*c^4*f^2*h*m + 2*b^6*c^2*d^2*j*1 - 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*1^2 - 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*1 - 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*1 - 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*1 + 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*1 + 2 \\
& *b^5*c^3*d^2*f*m + 2*a^5*b*c^2*j^3*1 + 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*1 - 4*a^3*c^5*d*f^2*m - 4*a^4*c^4*d*f*1^2 + 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*1 - 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*1 - 2*a^5*b^2*c*g*1^3 + 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*1^3 - 6*a^2*b*c^5*e^3*1 - 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*1^3 + 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*1 + 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
\end{aligned}$$

$$\begin{aligned}
& *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 \\
& 2*m^2 + 4*a^4*b^2*c^2*g^2*1^2 - 14*a^3*b^3*c^2*e^2*m^2 + 5*a^3*b^3*c^2*f^2* \\
& 1^2 - 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*1 \\
& ^2 + 6*a^2*b^4*c^2*e^2*1^2 + 4*a^3*b^2*c^3*f^2*k^2 - 14*a^2*b^3*c^3*d^2*1^2 \\
& + 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*1^2*m - 4*a^7*c*j*1*m^2 + 2*b^7*c*d^2*k*m + 2*a^6*b*c*k^3*m + 2*a \\
& ^6*b*c*j*1^3 + 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*1^2 - a^5*b*c^2*j^2*k^2 - a^4*b^3*c*h^2*1^2 - a^3*b^4*c*g^2*1^2 - a^4* \\
& b*c^3*h^2*j^2 - a^2*b^5*c*f^2*1^2 - 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*1^2 - 2*a^6*c^2*j^2*1^2 - 6*a^6*c^2*h^2*m^2 - a*b^6*c*e^2*1^2 - 6*a^ \\
& 5*c^3*g^2*1^2 - 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*1^2 - 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*1^3 + 4*a^4*c^4*g^3*1 - 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*1^2* \\
& m^2 - b^7*c*d^2*1^2 - 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*1^4 - \\
& 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*1 - 16*a*c^8*e + 32*a*b*c^7*g - 36*a*b^2*c^ \\
& 6*j + 44*a*b^3*c^5*1 - 48*a^2*b*c^6*1))/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*1*z^3 - 144*a^2*b^4*c^5 \\
& *1*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*1*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*1*z^3 + 256*a^3*c^8*g*z^3 - 96*a^4*b*c^5*j*1*z^2 + 8*a*b^7*c^2*j*1*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*1*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*1*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*1*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*1*z^2 - 72* \\
& a^2*b^5*c^3*j*1*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*1*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*1*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*1*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*1*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*1^2*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*1^2*z^2 - 132*a^3*b^4*c^3*1^2*z^2 + 40*a^2*b^6*c \\
& ^2*1^2*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*
\end{aligned}$$

$$\begin{aligned}
& 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 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 \\
& 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 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
\end{aligned}$$

$$\begin{aligned}
& z + 16a^3c^6g^3z + 4a^5b^2c^*g^*k^*l^*m + 12a^5b^*c^2g^*j^*k^*m + 12a^5b^*c^2e^*k^*l^*m - 4a^5b^*c^2h^*j^*k^*l - 4a^5b^*c^2f^*j^*l^*m - 4a^4b^3c^*g^*j^*k^*m - 4a^4b^3c^*e^*k^*l^*m - 4a^4b^3c^*g^*h^*l^*m + 4a^3b^4c^*e^*j^*k^*m - 4a^3b^4c^*f^*h^*k^*m + 12a^4b^*c^3d^*j^*k^*l - 20a^4b^*c^3e^*g^*k^*m + 12a^4b^*c^3f^*h^*j^*l + 12a^4b^*c^3e^*h^*j^*m + 12a^4b^*c^3d^*h^*k^*m - 4a^4b^*c^3g^*h^*j^*k - 4a^4b^*c^3f^*g^*k^*l - 4a^4b^*c^3f^*g^*j^*m - 4a^4b^*c^3e^*h^*k^*l - 4a^4b^*c^3e^*f^*l^*m - 4a^4b^*c^3d^*g^*l^*m - 4a^2b^5c^*e^*g^*k^*m + 4a^2b^5c^*d^*h^*k^*m - 20a^3b^*c^4d^*f^*j^*l - 4a^3b^*c^4e^*f^*j^*k - 4a^3b^*c^4d^*g^*j^*k - 4a^3b^*c^4d^*e^*k^*l - 4a^3b^*c^4d^*e^*j^*m - 4a^*b^5c^2d^*f^*j^*l + 12a^3b^*c^4e^*g^*h^*k + 12a^3b^*c^4e^*f^*g^*m + 12a^3b^*c^4d^*g^*h^*l + 12a^3b^*c^4d^*f^*h^*m - 4a^3b^*c^4f^*g^*h^*j - 4a^3b^*c^4e^*f^*h^*l + 4a^*b^5c^2d^*f^*h^*m - 4a^*b^4c^3d^*f^*h^*k + 4a^*b^4c^3d^*f^*g^*l + 12a^2b^*c^5d^*f^*g^*j + 12a^2b^*c^5d^*e^*f^*l - 4a^2b^*c^5d^*e^*h^*j - 4a^2b^*c^5d^*e^*g^*k - 4a^*b^3c^4d^*f^*g^*j - 4a^*b^3c^4d^*e^*f^*l - 4a^2b^*c^5e^*f^*g^*h + 4a^*b^2c^5d^*e^*f^*j - 4a^6b^*c^j^*k^*l^*m - 4a^*b^6c^d^*f^*k^*m - 4a^*b^c^6d^*e^*f^*g - 16a^4b^2c^2e^*j^*k^*m + 4a^4b^2c^2f^*j^*k^*l + 4a^4b^2c^2d^*j^*l^*m + 12a^4b^2c^2f^*h^*k^*m + 4a^4b^2c^2g^*h^*j^*m + 4a^4b^2c^2e^*h^*l^*m - 4a^3b^3c^2d^*j^*k^*l + 20a^3b^3c^2e^*g^*k^*m - 16a^3b^3c^2d^*h^*k^*m - 4a^3b^3c^2f^*h^*j^*l - 4a^3b^3c^2e^*h^*j^*m - 40a^3b^2c^3d^*f^*k^*m + 24a^2b^4c^2d^*f^*k^*m - 16a^3b^2c^3d^*h^*j^*l + 12a^3b^2c^3e^*g^*j^*l + 4a^3b^2c^3e^*h^*j^*k + 4a^3b^2c^3e^*f^*j^*m + 4a^3b^2c^3d^*g^*k^*l - 4a^2b^4c^2e^*g^*j^*l + 4a^2b^4c^2d^*h^*j^*l - 16a^3b^2c^3e^*g^*h^*m + 4a^3b^2c^3f^*g^*h^*l + 4a^2b^4c^2e^*g^*h^*m + 20a^2b^3c^3d^*f^*j^*l - 16a^2b^3c^3d^*f^*h^*m - 4a^2b^3c^3e^*g^*h^*k - 4a^2b^3c^3e^*f^*g^*m - 4a^2b^3c^3d^*g^*h^*l - 16a^2b^2c^4d^*f^*g^*l + 12a^2b^2c^4d^*f^*h^*k + 4a^2b^2c^4e^*f^*g^*k + 4a^2b^2c^4d^*d^*g^*h^*j + 4a^2b^2c^4d^*e^*h^*l + 4a^2b^2c^4d^*e^*g^*m + 2a^5b^2c^*j^2k^*m - 4a^5b^2c^*h^*k^2m - 2a^5b^2c^*h^2k^*m + 2a^4b^3c^*h^2k^*m + 2a^5b^2c^*h^*k^*l^2 + 2a^5b^2c^*f^*l^2m - 2a^5b^2c^*h^*j^2m + 2a^3b^4c^*g^2k^*m + 14a^4b^*c^3f^2k^*m - 10a^5b^*c^2f^*k^2m - 8a^5b^2c^*g^*j^*m^2 - 8a^5b^2c^*e^*l^*m^2 + 4a^5b^2c^*f^*k^*m^2 + 4a^4b^3c^*f^*k^2m - 2a^5b^*c^2g^*k^2l + 2a^2b^5c^*f^2k^*m + 6a^5b^*c^2f^*k^*l^2 + 6a^5b^*c^2d^*l^2m - 2a^5b^*c^2g^*j^*l^2 + 2a^4b^3c^*g^*j^*l^2 - 2a^4b^3c^*f^*k^*l^2 - 2a^4b^3c^*d^*l^2m - 2a^4b^*c^3g^2j^*l - 14a^*b^5c^2d^2k^*m - 10a^5b^*c^2e^*j^*m^2 + 10a^4b^3c^*e^*j^*m^2 - 10a^3b^*c^4d^2k^*m - 6a^4b^3c^*d^*k^*m^2 + 6a^4b^*c^3g^2h^*m - 4a^3b^4c^*d^*k^2m - 2a^5b^*c^2d^*k^*m^2 + 14a^5b^*c^2f^*h^*m^2 + 14a^3b^*c^4e^2j^*l - 10a^4b^3c^*f^*h^*m^2 - 10a^4b^*c^3f^*h^2m - 10a^4b^*c^3e^*j^2l - 2a^4b^*c^3g^*h^2l - 2a^4b^*c^3f^*j^2k - 2a^4b^*c^3d^*j^2m - 2a^3b^4c^*e^*j^*l^2 + 2a^3b^4c^*d^*k^*l^2 + 2a^*b^5c^2e^2j^*l - 12a^*b^4c^3d^2j^*l - 10a^3b^*c^4e^2h^*m + 6a^4b^*c^3e^*j^*k^2 + 2a^3b^4c^*f^*h^*l^2 - 2a^*b^5c^2e^2h^*m - 12a^3b^4c^*e^*g^*m^2 + 12a^3b^4c^*d^*h^*m^2 + 12a^*b^4c^3d^2h^*m + 6a^3b^*c^4f^2g^*l - 2a^4b^*c^3f^*h^*k^2 - 2a^3b^*c^4f^2h^*k + 14a^4b^*c^3e^*g^*l^2 - 10a^4b^*c^3d^*h^*l^2 - 10a^3b^*c^4e^*g^2l - 2a^3b^*c^4f^*g^2k - 2a^3b^*c^4d^*g^2m + 2a^2b^5c^*e^*g^*l^2 - 2a^2b^5c^*d^*h^*l^2 + 2a^*b^4c^3e^2h^*k - 2a^*b^4c^3e^2g^*l + 2a^*b^4c^3e^2f^*m - 14a^2b^5c^*d^*f^*m^2 + 14a^2b^*c^5d^2h^*k - 10a^4b^*c^3d^*f^*m^2 - 10a^3b^*c^4d^*h^2k - 10a^2b^*c^5d^2g^*l - 10a^*b^3c^4d^2h^*k + 10a^*b^3c^4d^2g^*l - 6a^*b^3c^4d^2f^*m - 4a^*b^4c^3d^*f^2m - 2a^3b^*c^4e^*h^2j - 2a^2b^*c^5d^2f^*m + 6a^3b^*c^4d^*h^*j^2 + 6a^2b^*c^5e^2f^*k + 6a^2b^*c^5d^*e^2m - 2a^3b^*c^4e^*g^*j^2 - 2a^2b^*c^5e^2g^*j + 2a^*b^3c^4e^2g^*j - 2a^*b^3c^4e^2f^*k - 2a^*b^3c^4d^*e^2m + 14a^3b^*c^4d^*f^*k^2 - 10a^2b^*c^5d^*f^2k - 8a^*b^2c^5d^2g^*j - 8a^*b^2c^5d^2e^*l + 4a^*b^3c^4d^*f^2k + 4a^*b^2c^5d^2f^*k - 2a^2b^*c^5e^*f^2j + 2a^*b^5c^2d^*f^*k^2 + 2a^*b^4c^3d^*f^*j^2 + 2a^*b^2c^5d^*e^2k - 2a^2b^*c^5d^*g^2h + 2a^*b^2c^5e^2f^*h - 4a^*b^2c^5d^*f^2h - 2a^2b^*c^5d^*f^*h^2 + 2a^*b^3c^4d^*f^*h^2 + 2a^*b^2c^5d^*f^*g^2 + 8a^6c^2h^*j^*l^*m - 8a^6c^2g^*k^*l^*m - 8a^5c^3f^*j^*k^*l + 8a^5c^3e^*j^*k^*m - 8a^5c^3d^*j^*l^*m + 8a^5c^3g^*h^*k^*l - 8a^5c^3g^*h^*j^*m - 8a^5c^3f^*h^*k^*m + 8a^5c^3f^*g^*l^*m - 8a^5c^3e^*h^*l^*m - 2a^6b^*c^h^*l^2m + 8a^4c^4f^*g^*j^*k - 8a^4c^4e^*h^*j^*k - 8a^4c^4e^*g^*j^*l + 8a^4c^4e^*f^*k^*l - 8a
\end{aligned}$$

$$\begin{aligned}
& ^4c^4efj^m + 8a^4c^4d^4h^j * l - 8a^4c^4d^4g^k * l + 8a^4c^4d^4g^j * m \\
& + 8a^4c^4d^4f^k * m + 8a^4c^4d^4e^l * m + 6a^6b^c * g^l * m^2 - 2a^6b^c * h^k \\
& * m^2 - 8a^4c^4f^4g^h * l + 8a^4c^4e^4g^h * m + 2a^6b^c * e^2 * k * m + 8a^3c^5 \\
& d^4e^j * k + 8a^3c^5e^4f^h * j - 8a^3c^5e^4f^g * k - 8a^3c^5d^4g^h * j - 8a \\
& ^3c^5d^4f^h * k + 8a^3c^5d^4f^g * l - 8a^3c^5d^4e^h * l - 8a^3c^5d^4e^g * m \\
& - 8a^2c^6d^4e^4f^j + 8a^2c^6d^4e^4g^h + 2a^6b^c * d^4f^l^2 + 6a^6b^c * d^2 \\
& * e^j - 2a^6b^c * d^2 * f^h - 2a^6b^c * d^2 * e^2 * h - 8a^4b^2c^2 * g^2 * k * m - 10a \\
& ^3b^3c^2 * f^2 * k * m + 2a^4b^2c^2 * h^2 * j * l + 18a^3b^2c^3 * e^2 * k * m - 12a^ \\
& ^2b^4c^2 * e^2 * k * m - 4a^4b^2c^2 * g^2 * j^2 * l + 2a^3b^3c^2 * g^2 * j * l + 28a^2 * \\
& b^3c^3 * d^2 * k * m + 14a^4b^2c^2 * d^4k^2 * m - 8a^3b^2c^3 * f^2 * j * l + 2a^4b^2 \\
& c^2 * g^2 * j * k^2 + 2a^4b^2c^2 * e^4k^2 * l - 2a^3b^3c^2 * g^2 * h * m + 2a^2b^4c^2 \\
& f^2 * j * l - 10a^2b^3c^3 * e^2 * j * l - 8a^4b^2c^2 * d^4k^l^2 + 4a^4b^2c^2 \\
& e^4j^l^2 + 4a^3b^3c^2 * f^4h^2 * m + 4a^3b^3c^2 * e^4j^2 * l + 4a^3b^2c^3 * f^4 \\
& h * m - 2a^2b^4c^2 * f^2 * h * m + 18a^2b^2c^4 * d^2 * j * l + 10a^2b^3c^3 * e^2 \\
& h * m - 8a^4b^2c^2 * f^4h^l^2 - 2a^3b^3c^2 * e^4j * k^2 + 2a^3b^2c^3 * g^2 * h * \\
& k + 2a^3b^2c^3 * f^4g^2 * m - 22a^4b^2c^2 * d^4h * m^2 - 22a^2b^2c^4 * d^2 * h * m \\
& + 18a^4b^2c^2 * e^4g * m^2 + 16a^3b^2c^3 * d^4h^2 * m - 4a^3b^2c^3 * f^4h^2 * k \\
& - 4a^2b^4c^2 * d^4h^2 * m + 2a^3b^3c^2 * f^4h * k^2 + 2a^3b^2c^3 * d^4j^2 * k + 2 \\
& a^2b^3c^3 * f^2 * h * k - 2a^2b^3c^3 * f^2 * g * l - 10a^3b^3c^2 * e^4g * l^2 + 10a \\
& ^3b^3c^2 * d^4h * l^2 - 8a^2b^2c^4 * e^2 * h * k - 8a^2b^2c^4 * e^2 * f * m + 4a^2 \\
& b^3c^3 * e^4g^2 * l + 4a^2b^2c^4 * e^2 * g * l + 2a^3b^2c^3 * f^4h * j^2 + 28a^3b \\
& ^3c^2 * d^4f * m^2 + 14a^2b^2c^4 * d^4f^2 * m - 8a^3b^2c^3 * e^4g * k^2 + 4a^3b^2 \\
& c^3 * d^4h * k^2 + 4a^2b^3c^3 * d^4h^2 * k + 2a^2b^4c^2 * e^4g * k^2 - 2a^2b^4c^2 \\
& d^4h * k^2 + 2a^2b^2c^4 * f^2 * g * j + 2a^2b^2c^4 * e^4f^2 * l + 18a^3b^2c^3 * \\
& d^4f^l^2 - 12a^2b^4c^2 * d^4f^l^2 - 4a^2b^2c^4 * e^4g^2 * j + 2a^2b^3c^3 * e^4 \\
& g * j^2 - 2a^2b^3c^3 * d^4h * j^2 - 10a^2b^3c^3 * d^4f * k^2 - 8a^2b^2c^4 * d^4f * \\
& j^2 + 2a^2b^2c^4 * e^4g * h^2 + 4a^5b^2c^h^2 * m^2 - 2a^4b^2c^2 * h^3 * m - 5 \\
& a^5b^c^2 * g^2 * m^2 + 5a^4b^3c^g^2 * m^2 + 3a^5b^c^2 * h^2 * l^2 + 6a^3b^4c^ \\
& c^f^2 * m^2 - 2a^3b^2c^3 * g^3 * l + 2a^2b^3c^3 * f^3 * m + 7a^4b^c^3 * e^2 * m^2 \\
& + 7a^2b^5c^e^2 * m^2 - 5a^4b^c^3 * f^2 * l^2 + 3a^4b^c^3 * g^2 * k^2 - 2a^4b^2 \\
& c^2 * f^4k^3 - 2a^2b^2c^4 * f^3 * k + 7a^3b^c^4 * d^2 * l^2 + 7a^5b^5c^2 * d^2 \\
& l^2 - 5a^3b^c^4 * e^2 * k^2 + 3a^3b^c^4 * f^2 * j^2 + 6a^4b^4c^3 * d^2 * k^2 + 2a \\
& ^3b^3c^2 * d^4k^3 - 2a^3b^2c^3 * e^4j^3 - 5a^2b^c^5 * d^2 * j^2 + 5a^5b^3c^4 \\
& d^2 * j^2 + 3a^2b^c^5 * e^2 * h^2 + 4a^4b^2c^5 * d^2 * h^2 - 2a^2b^2c^4 * d^4h^3 \\
& - 4a^6c^2 * j^2 * k * m + 2a^6b^2 * j * l * m^2 + 4a^6c^2 * j * k^2 * l + 4a^6c^2 * h * k \\
& ^2 * m - 4a^6c^2 * h * k * l^2 - 4a^6c^2 * f^l^2 * m + 4a^5c^3 * g^2 * k * m + 2a^5b^ \\
& ^3 * h * k * m^2 - 2a^5b^3 * g^l * m^2 + 4a^6c^2 * g^2 * j * m^2 + 4a^6c^2 * f^k * m^2 + 4a \\
& ^6c^2 * e^l * m^2 - 4a^5c^3 * h^2 * j * l + 4a^5c^3 * h * j^2 * k + 4a^5c^3 * g^2 * j^2 * l \\
& + 4a^5c^3 * f^2 * j^2 * m - 4a^4c^4 * e^2 * k * m + 2a^4b^4 * g^2 * j * m^2 - 2a^4b^4 * f^k \\
& * m^2 + 2a^4b^4 * e^l * m^2 - 4a^5c^3 * g^2 * j * k^2 - 4a^5c^3 * e^4k^2 * l - 4a^5c^ \\
& ^3 * d^4k^2 * m + 4a^4c^4 * f^2 * j * l + 4a^5c^3 * e^4j^l^2 + 4a^5c^3 * d^4k^l^2 + 4a \\
& ^4c^4 * f^2 * h * m + 2b^6c^2 * d^2 * j * l - 2a^3b^5 * e^4j * m^2 + 2a^3b^5 * d^4k * m^2 \\
& + 4a^5c^3 * f^4h^l^2 - 4a^4c^4 * g^2 * h * k - 4a^4c^4 * f^4g^2 * m - 4a^3c^5 * d^2 \\
& * j * l - 2b^6c^2 * d^2 * h * m + 2a^3b^5 * f^4h * m^2 + 12a^5c^3 * d^4h * m^2 - 12a^4c^ \\
& ^4 * d^4h^2 * m + 12a^3c^5 * d^2 * h * m - 4a^5c^3 * e^4g * m^2 + 4a^4c^4 * g^4h^2 * j + \\
& 4a^4c^4 * f^4h^2 * k + 4a^4c^4 * e^4h^2 * l - 4a^4c^4 * d^4j^2 * k + 3a^6b^c * j^2 * m \\
& ^2 - 4a^4c^4 * f^4h * j^2 + 4a^3c^5 * e^2 * h * k + 4a^3c^5 * e^2 * g * l + 4a^3c^5 * \\
& e^2 * f * m + 2b^5c^3 * d^2 * h * k - 2b^5c^3 * d^2 * g * l + 2b^5c^3 * d^2 * f * m + 2a^5 \\
& b^c^2 * j^3 * l + 2a^2b^6 * e^4g * m^2 - 2a^2b^6 * d^4h * m^2 + 4a^4c^4 * e^4g * k^2 + \\
& 4a^4c^4 * d^4h * k^2 - 4a^3c^5 * f^2 * g * j - 4a^3c^5 * e^4f^2 * l - 4a^3c^5 * d^4f^2 \\
& * m - 4a^4c^4 * d^4f^l^2 + 4a^3c^5 * e^4g^2 * j + 4a^3c^5 * d^4g^2 * k + 2b^4c^4 * \\
& d^2 * g^2 * j - 2b^4c^4 * d^2 * f * k + 2b^4c^4 * d^2 * e^l - 6a^3b^c^4 * f^3 * m + 4a^3 \\
& c^5 * f^4g^2 * h + 4a^2c^6 * d^2 * g^2 * j + 4a^2c^6 * d^2 * f * k + 4a^2c^6 * d^2 * e^l - \\
& 2a^5b^2c^g^l^3 + 2a^5b^c^2 * h * k^3 + 2a^4b^c^3 * h^3 * k - 4a^3c^5 * e^4g * h \\
& ^2 + 4a^3c^5 * d^4f * j^2 - 4a^2c^6 * d^4e^2 * k - 2b^3c^5 * d^2 * e^j + 8a^5b^2 * \\
& c^d * m^3 + 8a^6b^c * d^2 * m^2 + 8a^6b^2c^5 * d^3 * m - 6a^5b^c^2 * e^l^3 - 6a^2 \\
& b^c^5 * e^3 * l - 4a^2c^6 * e^2 * f * h + 2b^3c^5 * d^2 * f * h + 2a^4b^3c^e^l^3 + \\
& 2a^4b^c^3 * g^2 * j^3 + 2a^3b^c^4 * g^3 * j + 2a^6b^3c^4 * e^3 * l + 4a^2c^6 * e^4f^2 \\
& * g + 4a^2c^6 * d^4f^2 * h - 6a^4b^c^3 * d^4k^3 - 4a^2c^6 * d^4f * g^2 + 2b^2c^6 *
\end{aligned}$$

$$\begin{aligned}
& 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) * 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
\end{aligned}$$

$$\begin{aligned}
& - 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^ \\
& 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)*\text{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 -
\end{aligned}$$

$$\begin{aligned}
& 64a^3b^5c^5ehk^2z + 64a^3b^5c^5eg^2l^2z - 64a^3b^5c^5ef^2m^2z + 32a^3b^5c^5fg^2k^2z - 32a^3b^5c^5d^2h^2l^2z + 32a^3b^5c^5d^2g^2m^2z - 8a^4b^5c^5ehk^2z + 8a^4b^5c^5eg^2l^2z - 8a^4b^5c^5ef^2m^2z - 8a^4b^4c^4eg^2j^2z + 8a^4b^4c^4ef^2k^2z - 8a^4b^4c^4d^2f^2l^2z + 8a^4b^4c^4d^2em^2z - 32a^2b^5c^6d^2f^2j^2z + 32a^2b^5c^6d^2ek^2z + 8a^4b^3c^5d^2f^2j^2z - 8a^4b^3c^5d^2ek^2z + 32a^2b^5c^6d^2ef^2h^2z - 8a^4b^3c^5ef^2h^2z - 8a^4b^2c^6d^2f^2g^2z + 8a^4b^2c^6d^2eh^2z - 8a^4b^7c^5ek^2m^2z - 40a^5b^2c^2k^2l^2m^2z + 48a^4b^3c^2j^2k^2m^2z - 8a^4b^3c^2h^2l^2m^2z + 104a^4b^2c^3g^2k^2m^2z - 56a^3b^4c^2g^2k^2m^2z - 40a^4b^2c^3h^2j^2m^2z + 8a^4b^2c^3h^2k^2l^2z + 8a^4b^2c^3f^2l^2m^2z + 8a^3b^4c^2h^2j^2m^2z - 152a^3b^3c^3ek^2m^2z + 64a^2b^5c^2ek^2m^2z - 40a^3b^3c^3g^2j^2l^2z - 8a^3b^3c^3h^2j^2k^2z - 8a^3b^3c^3f^2j^2m^2z + 8a^2b^5c^2g^2j^2l^2z + 48a^3b^3c^3g^2h^2m^2z - 8a^2b^5c^2g^2h^2m^2z - 104a^3b^2c^4ef^2j^2l^2z + 56a^2b^4c^3ef^2j^2l^2z + 8a^3b^2c^4f^2j^2k^2z - 8a^3b^2c^4d^2k^2l^2z + 8a^3b^2c^4d^2j^2m^2z + 104a^3b^2c^4ef^2h^2m^2z - 56a^2b^4c^3ef^2h^2m^2z - 40a^3b^2c^4g^2h^2k^2z - 40a^3b^2c^4f^2g^2m^2z - 8a^3b^2c^4f^2h^2l^2z + 8a^2b^4c^3g^2h^2k^2z + 8a^2b^4c^3f^2g^2m^2z + 48a^2b^3c^4ef^2h^2k^2z - 48a^2b^3c^4eg^2l^2z + 48a^2b^3c^4ef^2m^2z - 8a^2b^3c^4f^2g^2k^2z + 8a^2b^3c^4d^2h^2l^2z - 8a^2b^3c^4d^2g^2m^2z + 40a^2b^2c^5eg^2j^2z - 40a^2b^2c^5ef^2k^2z + 40a^2b^2c^5d^2f^2l^2z - 40a^2b^2c^5d^2em^2z - 8a^2b^2c^5d^2h^2j^2z + 8a^2b^2c^5d^2g^2k^2z + 8a^2b^2c^5f^2g^2h^2z + 8a^4b^4c^2k^2l^2m^2z - 64a^5b^3c^3j^2k^2m^2z - 8a^3b^5c^3j^2k^2m^2z - 32a^6b^3c^2l^2m^2z + 24a^5b^3c^2l^2m^2z - 28a^4b^4c^2j^2m^2z + 16a^5b^3c^3k^2l^2z + 4a^3b^5c^2j^2l^2z + 48a^5b^3c^3g^2m^2z + 32a^3b^5c^3g^2m^2z - 4a^2b^6c^3g^2l^2z - 36a^2b^6c^3em^2z - 32a^4b^3c^4g^2k^2z - 16a^3b^5c^5f^2l^2z - 48a^4b^3c^4ef^2l^2z - 32a^3b^5c^5g^2j^2z - 4a^4b^4c^4ef^2l^2z + 32a^2b^5c^6d^2l^2z - 24a^4b^3c^5d^2l^2z + 4a^4b^6c^2ek^2z + 32a^3b^5c^5ef^2j^2z + 16a^3b^5c^5g^2h^2z - 16a^2b^5c^6ef^2j^2z + 4a^4b^5c^3ef^2j^2z + 4a^4b^3c^5ef^2j^2z + 20a^4b^2c^6d^2j^2z + 4a^4b^4c^4ef^2h^2z - 16a^2b^5c^6ef^2g^2z + 4a^4b^3c^5ef^2g^2z - 4a^4b^2c^6ef^2g^2z + 4a^4b^2c^6ef^2f^2z + 32a^6c^3k^2l^2m^2z - 32a^5c^4h^2k^2l^2z + 32a^5c^4h^2j^2m^2z - 32a^5c^4g^2k^2m^2z - 32a^5c^4f^2l^2m^2z - 32a^4c^5f^2j^2k^2z + 32a^4c^5ef^2j^2l^2z + 32a^4c^5d^2k^2l^2z - 32a^4c^5d^2j^2m^2z + 32a^4c^5g^2h^2k^2z + 32a^4c^5f^2h^2l^2z + 32a^4c^5f^2g^2m^2z - 32a^4c^5ef^2h^2m^2z - 32a^3c^6ef^2g^2j^2z + 32a^3c^6ef^2k^2z + 32a^3c^6d^2h^2j^2z - 32a^3c^6d^2g^2k^2z - 32a^3c^6d^2f^2l^2z + 32a^3c^6d^2em^2z - 32a^3c^6f^2g^2h^2z + 4a^4b^7c^5ef^2l^2z + 32a^2c^7d^2f^2g^2z - 32a^2c^7d^2ef^2h^2z - 16a^4b^3c^2k^2l^2z + 36a^4b^2c^3j^2l^2z - 16a^4b^3c^2j^2l^2z - 8a^3b^4c^2j^2l^2z - 20a^4b^2c^3j^2k^2z + 4a^3b^4c^2j^2k^2z - 76a^4b^3c^2g^2m^2z - 60a^4b^2c^3g^2l^2z + 44a^3b^2c^4g^2l^2z + 28a^3b^4c^2g^2l^2z - 8a^2b^4c^3g^2l^2z + 104a^3b^4c^2em^2z - 100a^4b^2c^3em^2z + 24a^3b^3c^3g^2k^2z + 4a^3b^2c^4h^2j^2z - 4a^2b^5c^2g^2k^2z + 4a^2b^3c^4f^2l^2z + 76a^3b^3c^3ef^2l^2z - 32a^2b^5c^2ef^2l^2z + 20a^2b^2c^5ef^2l^2z + 12a^3b^2c^4g^2j^2z + 8a^2b^3c^4g^2j^2z - 4a^2b^4c^3g^2j^2z + 52a^3b^2c^4ef^2k^2z - 28a^2b^4c^3ef^2k^2z - 4a^2b^2c^5ef^2j^2z - 24a^2b^3c^4ef^2j^2z - 4a^2b^3c^4g^2h^2z - 20a^2b^2c^5ef^2h^2z + 20a^5b^2c^2l^3z + 4a^3b^3c^3j^3z - 4a^2b^2c^5g^3z - 4a^4b^5l^2m^2z - 16a^6c^3j^2m^2z - 16a^5c^4j^2l^2z + 4a^3b^6j^2m^2z + 16a^5c^4j^2k^2z + 48a^5c^4g^2l^2z - 48a^4c^5g^2l^2z - 4a^2b^7g^2m^2z + 16a^5c^4em^2z - 16a^4c^5h^2j^2z + 16a^4c^5g^2j^2z - 16a^3c^6ef^2l^2z + 4b^5c^4d^2l^2z - 16a^4c^5ef^2k^2z + 16a^3c^6f^2j^2z - 4b^4c^5d^2j^2z - 16a^2c^7d^2j^2z - 4a^4b^4c^2l^3z + 16a^3c^6ef^2h^2z - 16a^4b^3c^4j^3z + 16a^2c^7ef^2g^2z + 4b^3c^6d^2g^2z - 16a^2c^7ef^2z - 4b^2c^7d^2ez + 4a^4b^8em^2z + 16a^4c^8d^2ez - 16a^6c^3l^3z + 16a^3c^6g^3z + 4a^5b^2c^3g^2k^2l^2m^2z + 12a^5b^2c^2g^2j^2k^2m^2z + 12a^5b^2c^2ef^2k^2l^2m^2z - 4a^5b^2c^2h^2j^2k^2l^2m^2z - 4a^5b^2c^2f^2j^2l^2m^2z - 4a^4b^3c^3g^2j^2k^2m^2z - 4a^4b^3c^3ef^2k^2l^2m^2z - 4a^5b^2c^2g^2h^2l^2m^2z + 4a^3b^4c^3ef^2j^2k^2m^2z - 4a^3b^4c^3f^2h^2k^2m^2z + 12a^4b^3c^3d^2j^2k^2l^2m^2z - 20a^4b^3c^3ef^2g^2k^2m^2z + 12a^4b^3c^3f^2h^2j^2l^2m^2z + 12a^4b^3c^3ef^2h^2j^2m^2z + 12
\end{aligned}$$

$$\begin{aligned}
& a^4 b^3 c^3 d^2 h^2 k^2 m - 4 a^4 b^3 c^3 g^2 h^2 j^2 k - 4 a^4 b^3 c^3 f^2 g^2 k^2 l - 4 a^4 b^3 c^3 f^2 g^2 j^2 m - 4 a^4 b^3 c^3 e^2 h^2 k^2 l - 4 a^4 b^3 c^3 e^2 f^2 l^2 m - 4 a^4 b^3 c^3 d^2 g^2 l^2 m \\
& - 4 a^2 b^5 c^5 e^2 g^2 k^2 m + 4 a^2 b^5 c^5 d^2 h^2 k^2 m - 20 a^3 b^3 c^4 d^2 f^2 j^2 l - 4 a^3 b^3 c^4 e^2 f^2 j^2 k - 4 a^3 b^3 c^4 d^2 g^2 j^2 k - 4 a^3 b^3 c^4 d^2 e^2 k^2 l - 4 a^3 b^3 c^4 d^2 e^2 j^2 m - 4 a^2 b^5 c^2 d^2 f^2 j^2 l + 12 a^3 b^3 c^4 e^2 g^2 h^2 k + 12 a^3 b^3 c^4 e^2 f^2 g^2 m + 12 a^3 b^3 c^4 d^2 g^2 h^2 l + 12 a^3 b^3 c^4 d^2 f^2 h^2 m - 4 a^3 b^3 c^4 f^2 g^2 h^2 j - 4 a^3 b^3 c^4 e^2 f^2 h^2 l + 4 a^2 b^5 c^2 d^2 f^2 h^2 m - 4 a^2 b^4 c^3 d^2 f^2 h^2 k + 4 a^2 b^4 c^3 d^2 f^2 g^2 l + 12 a^2 b^3 c^5 d^2 f^2 g^2 j + 12 a^2 b^3 c^5 d^2 e^2 f^2 l - 4 a^2 b^3 c^5 d^2 e^2 h^2 j - 4 a^2 b^3 c^5 d^2 e^2 g^2 k - 4 a^2 b^3 c^4 d^2 f^2 g^2 j - 4 a^2 b^3 c^4 d^2 e^2 f^2 l - 4 a^2 b^3 c^5 e^2 f^2 g^2 h + 4 a^2 b^2 c^5 d^2 e^2 f^2 j - 4 a^6 b^2 c^2 j^2 k^2 l^2 m - 4 a^2 b^6 c^2 d^2 f^2 k^2 m - 4 a^2 b^3 c^6 d^2 e^2 f^2 g - 16 a^4 b^2 c^2 e^2 j^2 k^2 m + 4 a^4 b^2 c^2 f^2 j^2 k^2 l + 4 a^4 b^2 c^2 d^2 j^2 l^2 m + 12 a^4 b^2 c^2 f^2 h^2 k^2 m + 4 a^4 b^2 c^2 g^2 h^2 j^2 m + 4 a^4 b^2 c^2 e^2 h^2 l^2 m - 4 a^3 b^3 c^2 d^2 j^2 k^2 l + 20 a^3 b^3 c^2 e^2 g^2 k^2 m - 16 a^3 b^3 c^2 d^2 h^2 k^2 m - 4 a^3 b^3 c^2 f^2 h^2 j^2 l - 4 a^3 b^3 c^2 e^2 h^2 j^2 m - 40 a^3 b^2 c^3 d^2 f^2 k^2 m + 24 a^2 b^4 c^2 d^2 f^2 k^2 m - 16 a^3 b^2 c^3 d^2 h^2 j^2 l + 12 a^3 b^2 c^3 e^2 g^2 j^2 l + 4 a^3 b^2 c^3 e^2 h^2 j^2 k + 4 a^3 b^2 c^3 e^2 f^2 j^2 m + 4 a^3 b^2 c^3 d^2 g^2 k^2 l - 4 a^2 b^4 c^2 e^2 g^2 j^2 l + 4 a^2 b^4 c^2 d^2 h^2 j^2 l - 16 a^3 b^2 c^3 e^2 g^2 h^2 m + 4 a^3 b^2 c^3 f^2 g^2 h^2 l + 4 a^2 b^4 c^2 e^2 g^2 h^2 m + 20 a^2 b^3 c^3 d^2 f^2 j^2 l - 16 a^2 b^3 c^3 d^2 f^2 h^2 m - 4 a^2 b^3 c^3 e^2 g^2 h^2 k - 4 a^2 b^3 c^3 e^2 f^2 g^2 m - 4 a^2 b^3 c^3 d^2 g^2 h^2 l - 16 a^2 b^2 c^4 d^2 f^2 g^2 l + 12 a^2 b^2 c^4 d^2 f^2 h^2 k + 4 a^2 b^2 c^4 e^2 f^2 g^2 k + 4 a^2 b^2 c^4 d^2 g^2 h^2 j + 4 a^2 b^2 c^4 d^2 e^2 h^2 l + 4 a^2 b^2 c^4 d^2 e^2 g^2 m + 2 a^5 b^2 c^2 j^2 k^2 m - 4 a^5 b^2 c^2 h^2 k^2 m - 2 a^5 b^2 c^2 h^2 j^2 k^2 m + 2 a^4 b^3 c^2 h^2 k^2 m + 2 a^5 b^2 c^2 h^2 k^2 l^2 + 2 a^5 b^2 c^2 f^2 l^2 m - 2 a^5 b^2 c^2 h^2 j^2 m + 2 a^3 b^4 c^2 g^2 k^2 m + 14 a^4 b^3 c^3 f^2 k^2 m - 10 a^5 b^2 c^2 f^2 k^2 m - 8 a^5 b^2 c^2 g^2 j^2 m^2 - 8 a^5 b^2 c^2 e^2 l^2 m^2 + 4 a^5 b^2 c^2 f^2 k^2 m^2 + 4 a^4 b^3 c^2 f^2 k^2 m - 2 a^5 b^2 c^2 g^2 k^2 l + 2 a^2 b^5 c^2 f^2 k^2 m + 6 a^5 b^2 c^2 f^2 k^2 l^2 + 6 a^5 b^2 c^2 d^2 l^2 m - 2 a^5 b^2 c^2 g^2 j^2 l^2 + 2 a^4 b^3 c^2 g^2 j^2 l^2 - 2 a^4 b^3 c^2 f^2 k^2 l^2 - 2 a^4 b^3 c^2 d^2 l^2 m - 2 a^4 b^3 c^3 g^2 j^2 l - 14 a^2 b^5 c^2 d^2 k^2 m - 10 a^5 b^2 c^2 e^2 j^2 m^2 + 10 a^4 b^3 c^2 e^2 j^2 m^2 - 10 a^3 b^3 c^4 d^2 k^2 m - 6 a^4 b^3 c^2 d^2 k^2 m^2 + 6 a^4 b^3 c^3 g^2 h^2 m - 4 a^3 b^4 c^2 d^2 k^2 m - 2 a^5 b^2 c^2 d^2 k^2 m^2 + 14 a^5 b^2 c^2 f^2 h^2 m^2 + 14 a^3 b^3 c^4 e^2 j^2 l - 10 a^4 b^3 c^2 f^2 h^2 m^2 - 10 a^4 b^3 c^3 f^2 h^2 m - 10 a^4 b^3 c^3 e^2 j^2 l - 2 a^4 b^3 c^3 g^2 h^2 l - 2 a^4 b^3 c^3 f^2 j^2 k - 2 a^4 b^3 c^3 d^2 j^2 m - 2 a^3 b^4 c^2 e^2 j^2 l^2 + 2 a^3 b^4 c^2 d^2 k^2 l^2 + 2 a^2 b^5 c^2 e^2 j^2 l - 12 a^2 b^4 c^3 d^2 j^2 l - 10 a^3 b^3 c^4 e^2 h^2 m + 6 a^4 b^3 c^3 e^2 j^2 k^2 + 2 a^3 b^4 c^2 f^2 h^2 l^2 - 2 a^2 b^5 c^2 e^2 h^2 m - 12 a^3 b^4 c^2 e^2 g^2 m^2 + 12 a^3 b^4 c^2 d^2 h^2 m^2 + 12 a^2 b^4 c^3 d^2 h^2 m + 6 a^3 b^3 c^4 f^2 g^2 l - 2 a^4 b^3 c^3 f^2 h^2 k^2 - 2 a^3 b^3 c^4 f^2 h^2 k + 14 a^4 b^3 c^3 e^2 g^2 l^2 - 10 a^4 b^3 c^3 d^2 h^2 l^2 - 10 a^3 b^3 c^4 e^2 g^2 l - 2 a^3 b^3 c^4 f^2 g^2 k - 2 a^3 b^3 c^4 d^2 g^2 m + 2 a^2 b^5 c^2 e^2 g^2 l^2 - 2 a^2 b^5 c^2 d^2 h^2 l^2 + 2 a^2 b^4 c^3 e^2 h^2 k - 2 a^2 b^4 c^3 e^2 g^2 l + 2 a^2 b^4 c^3 e^2 f^2 m - 14 a^2 b^5 c^2 d^2 f^2 m^2 + 14 a^2 b^3 c^5 d^2 h^2 k - 10 a^4 b^3 c^3 d^2 f^2 m^2 - 10 a^3 b^3 c^4 d^2 h^2 k - 10 a^2 b^3 c^5 d^2 g^2 l - 10 a^2 b^3 c^4 d^2 h^2 k + 10 a^2 b^3 c^4 d^2 d^2 g^2 l - 6 a^2 b^3 c^4 d^2 f^2 m - 4 a^2 b^4 c^3 d^2 f^2 m - 2 a^3 b^3 c^4 e^2 h^2 j - 2 a^2 b^3 c^5 d^2 f^2 m + 6 a^3 b^3 c^4 d^2 h^2 j^2 + 6 a^2 b^3 c^5 e^2 f^2 k + 6 a^2 b^3 c^5 d^2 e^2 m - 2 a^3 b^3 c^4 e^2 g^2 j^2 - 2 a^2 b^3 c^5 e^2 g^2 j + 2 a^2 b^3 c^4 e^2 g^2 j - 2 a^2 b^3 c^4 e^2 f^2 k - 2 a^2 b^3 c^4 d^2 e^2 m + 14 a^3 b^3 c^4 d^2 f^2 k^2 - 10 a^2 b^3 c^5 d^2 f^2 k - 8 a^2 b^2 c^5 d^2 g^2 j - 8 a^2 b^2 c^5 d^2 e^2 l + 4 a^2 b^3 c^4 d^2 f^2 k + 4 a^2 b^2 c^5 d^2 f^2 k - 2 a^2 b^3 c^5 e^2 f^2 j + 2 a^2 b^5 c^2 d^2 f^2 k^2 + 2 a^2 b^4 c^3 d^2 f^2 j^2 + 2 a^2 b^2 c^5 d^2 e^2 k - 2 a^2 b^3 c^5 d^2 g^2 h + 2 a^2 b^2 c^5 e^2 f^2 h - 4 a^2 b^2 c^5 d^2 f^2 h - 2 a^2 b^3 c^5 d^2 f^2 h^2 + 2 a^2 b^3 c^4 d^2 f^2 h^2 + 2 a^2 b^2 c^5 d^2 f^2 g^2 + 8 a^6 c^2 h^2 j^2 l^2 m - 8 a^6 c^2 g^2 k^2 l^2 m - 8 a^5 c^3 f^2 j^2 k^2 l + 8 a^5 c^3 e^2 j^2 k^2 m - 8 a^5 c^3 d^2 j^2 l^2 m + 8 a^5 c^3 g^2 h^2 k^2 l - 8 a^5 c^3 g^2 h^2 j^2 m - 8 a^5 c^3 f^2 h^2 k^2 m + 8 a^5 c^3 f^2 g^2 l^2 m - 8 a^5 c^3 e^2 h^2 l^2 m - 2 a^6 b^2 c^2 h^2 l^2 m + 8 a^4 c^4 f^2 g^2 j^2 k - 8 a^4 c^4 e^2 h^2 j^2 k - 8 a^4 c^4 e^2 g^2 j^2 l + 8 a^4 c^4 e^2 f^2 k^2 l - 8 a^4 c^4 e^2 f^2 j^2 m + 8 a^4 c^4 d^2 h^2 j^2 l - 8 a^4 c^4 d^2 g^2 k^2 l + 8 a^4 c^4 d^2 g^2 j^2 m + 8 a^4 c^4 d^2 f^2 k^2 m + 8 a^4 c^4 d^2 e^2 l^2 m + 6 a^6 b^2 c^2 g^2 l^2 m^2 - 2 a^6 b^2 c^2 h^2 k^2 m^2 - 8 a^4 c^4 f^2 g^2 h^2 l + 8 a^4 c^4 e^2 g^2 h^2 m + 2 a^2 b^6 c^2 e^2 k^2 m + 8 a^3 c^5 d^2 e^2 j^2 k + 8 a^3 c^5 e^2 f^2 h^2 j - 8 a^3 c^5 e^2 f^2 g^2 k - 8 a^3 c^5 d^2 g^2 h^2 j - 8 a^3 c^5 d^2 f^2 h^2 k + 8 a^3 c^5 d^2 f^2 g^2 l - 8
\end{aligned}$$

$$\begin{aligned}
& a^3c^5deh^1 - 8a^3c^5degm - 8a^2c^6dehf^j + 8a^2c^6degh \\
& + 2ab^6cdf^1^2 + 6ab^6cd^2ej - 2ab^6cd^2fh - 2ab^6cde^2h \\
& - 8a^4b^2c^2g^2k^m - 10a^3b^3c^2f^2k^m + 2a^4b^2c^2h^2j^1 \\
& + 18a^3b^2c^3e^2k^m - 12a^2b^4c^2e^2k^m - 4a^4b^2c^2g^2j^2 \\
& *1 + 2a^3b^3c^2g^2j^1 + 28a^2b^3c^3d^2k^m + 14a^4b^2c^2dk^2m \\
& - 8a^3b^2c^3f^2j^1 + 2a^4b^2c^2g^2jk^2 + 2a^4b^2c^2ek^2l - \\
& 2a^3b^3c^2g^2hm + 2a^2b^4c^2f^2j^1 - 10a^2b^3c^3e^2j^1 - 8 \\
& a^4b^2c^2dk^1^2 + 4a^4b^2c^2ej^1^2 + 4a^3b^3c^2fh^2m + 4a^3 \\
& b^3c^2ej^2^1 + 4a^3b^2c^3f^2hm - 2a^2b^4c^2f^2hm + 18a^2b^2 \\
& c^4d^2j^1 + 10a^2b^3c^3e^2hm - 8a^4b^2c^2fh^1^2 - 2a^3b^3 \\
& c^2ej^k^2 + 2a^3b^2c^3g^2hk + 2a^3b^2c^3fg^2m - 22a^4b^2c^2 \\
& dh^m^2 - 22a^2b^2c^4d^2hm + 18a^4b^2c^2eg^m^2 + 16a^3b^2c^3 \\
& dh^2m - 4a^3b^2c^3fh^2k - 4a^2b^4c^2dh^2m + 2a^3b^3c^2 \\
& fh^k^2 + 2a^3b^2c^3dj^2k + 2a^2b^3c^3f^2hk - 2a^2b^3c^3f^2 \\
& g^1 - 10a^3b^3c^2eg^1^2 + 10a^3b^3c^2dh^1^2 - 8a^2b^2c^4e^2 \\
& hk - 8a^2b^2c^4e^2fm + 4a^2b^3c^3eg^2^1 + 4a^2b^2c^4e^2g^* \\
& l + 2a^3b^2c^3fh^j^2 + 28a^3b^3c^2df^m^2 + 14a^2b^2c^4df^2m \\
& - 8a^3b^2c^3eg^k^2 + 4a^3b^2c^3dh^k^2 + 4a^2b^3c^3dh^2k + \\
& 2a^2b^4c^2eg^k^2 - 2a^2b^4c^2dh^k^2 + 2a^2b^2c^4f^2g^j + 2a \\
& ^2b^2c^4ef^2^1 + 18a^3b^2c^3df^1^2 - 12a^2b^4c^2df^1^2 - 4a^2 \\
& b^2c^4eg^2j + 2a^2b^3c^3eg^j^2 - 2a^2b^3c^3d^*hj^2 - 10a^2b^3 \\
& c^3df^k^2 - 8a^2b^2c^4df^j^2 + 2a^2b^2c^4eg^h^2 + 4a^5b^2 \\
& *ch^2m^2 - 2a^4b^2c^2h^3m - 5a^5b^2c^2g^2m^2 + 5a^4b^3c^2g^2m^2 \\
& + 3a^5b^2c^2h^2l^2 + 6a^3b^4c^2f^2m^2 - 2a^3b^2c^3g^3^1 + 2a^2 \\
& *b^3c^3f^3m + 7a^4b^3c^3e^2m^2 + 7a^2b^5c^2e^2m^2 - 5a^4b^3c^3f^ \\
& 2^1^2 + 3a^4b^3c^3g^2k^2 - 2a^4b^2c^2f^k^3 - 2a^2b^2c^4f^3k + 7 \\
& a^3b^3c^4d^2l^2 + 7a^4b^5c^2d^2l^2 - 5a^3b^3c^4e^2k^2 + 3a^3b^3c^ \\
& 4f^2j^2 + 6ab^4c^3d^2k^2 + 2a^3b^3c^2dk^3 - 2a^3b^2c^3ej^3 \\
& - 5a^2b^3c^5d^2j^2 + 5ab^3c^4d^2j^2 + 3a^2b^3c^5e^2h^2 + 4ab^2 \\
& c^5d^2h^2 - 2a^2b^2c^4d^*h^3 - 4a^6c^2j^2k^m + 2a^6b^2j^1m^2 \\
& + 4a^6c^2j^k^2l + 4a^6c^2hk^2m - 4a^6c^2hk^1^2 - 4a^6c^2f^* \\
& l^2m + 4a^5c^3g^2k^m + 2a^5b^3h^k^m^2 - 2a^5b^3g^1m^2 + 4a^6c^ \\
& ^2g^j^m^2 + 4a^6c^2f^k^m^2 + 4a^6c^2e^1m^2 - 4a^5c^3h^2j^1 + 4 \\
& a^5c^3h^j^2k + 4a^5c^3g^j^2^1 + 4a^5c^3f^j^2m - 4a^4c^4e^2k^m \\
& + 2a^4b^4g^j^m^2 - 2a^4b^4f^k^m^2 + 2a^4b^4e^1m^2 - 4a^5c^3g^* \\
& j^k^2 - 4a^5c^3ek^2^1 - 4a^5c^3dk^2m + 4a^4c^4f^2j^1 + 4a^5c^ \\
& ^3ej^1^2 + 4a^5c^3dk^1^2 + 4a^4c^4f^2hm + 2b^6c^2d^2j^1 - 2 \\
& a^3b^5ej^m^2 + 2a^3b^5dk^m^2 + 4a^5c^3fh^1^2 - 4a^4c^4g^2hk \\
& - 4a^4c^4fg^2m - 4a^3c^5d^2j^1 - 2b^6c^2d^2hm + 2a^3b^5f^* \\
& hm^2 + 12a^5c^3d^*hm^2 - 12a^4c^4d^*h^2m + 12a^3c^5d^2hm - 4a^ \\
& 5c^3eg^m^2 + 4a^4c^4g^*h^2j + 4a^4c^4fh^2k + 4a^4c^4eh^2l - \\
& 4a^4c^4dj^2k + 3a^6b^3c^j^2m^2 - 4a^4c^4fh^j^2 + 4a^3c^5e^2 \\
& hk + 4a^3c^5e^2g^1 + 4a^3c^5e^2fm + 2b^5c^3d^2hk - 2b^5c^3 \\
& *d^2g^1 + 2b^5c^3d^2fm + 2a^5b^2c^2j^3^1 + 2a^2b^6eg^m^2 - 2a^ \\
& 2b^6d^*hm^2 + 4a^4c^4eg^k^2 + 4a^4c^4d^*hk^2 - 4a^3c^5f^2g^j - \\
& 4a^3c^5ef^2^1 - 4a^3c^5df^2m - 4a^4c^4df^1^2 + 4a^3c^5eg^ \\
& 2j + 4a^3c^5dg^2k + 2b^4c^4d^2g^j - 2b^4c^4d^2fk + 2b^4c^4 \\
& *d^2e^1 - 6a^3b^3c^4f^3m + 4a^3c^5fg^2h + 4a^2c^6d^2g^j + 4a^ \\
& 2c^6d^2fk + 4a^2c^6d^2e^1 - 2a^5b^2c^2g^1^3 + 2a^5b^2c^2hk^3 + \\
& 2a^4b^3c^3h^3k - 4a^3c^5eg^h^2 + 4a^3c^5df^j^2 - 4a^2c^6de^ \\
& 2k - 2b^3c^5d^2ej + 8a^5b^2c^2dm^3 + 8ab^6cd^2m^2 + 8ab^2c^ \\
& ^5d^3m - 6a^5b^2c^2e^1^3 - 6a^2b^3c^5e^3^1 - 4a^2c^6e^2fh + 2b^ \\
& 3c^5d^2fh + 2a^4b^3c^2e^1^3 + 2a^4b^3c^3g^j^3 + 2a^3b^3c^4g^3j + \\
& 2ab^3c^4e^3^1 + 4a^2c^6ef^2g + 4a^2c^6df^2h - 6a^4b^3c^3d^* \\
& k^3 - 4a^2c^6df^g^2 + 2b^2c^6d^2eg - 2ab^2c^5e^3j + 2a^3b^3c^ \\
& ^4fh^3 + 2a^2b^3c^5f^3h + 2a^2b^3c^5eg^3 + 3ab^3c^6d^2g^2 - 9a^ \\
& 4b^2c^2f^2m^2 + 4a^4b^2c^2g^2l^2 - 14a^3b^3c^2e^2m^2 + 5a^3b^ \\
& ^3c^2f^2l^2 - 20a^2b^4c^2d^2m^2 + 16a^3b^2c^3d^2m^2 - 9a^3b^ \\
& ^2c^3e^2l^2 + 6a^2b^4c^2e^2l^2 + 4a^3b^2c^3f^2k^2 - 14a^2b^3
\end{aligned}$$


```

*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
```

$$3.26 \quad \int \frac{d+ex}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=94

$$\frac{dx(17-5x^2)}{72(x^4-5x^2+4)} + \frac{19}{432}d \tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}d \tanh^{-1}(x) + \frac{1}{27}e \log(1-x^2) - \frac{1}{27}e \log(4-x^2) + \frac{e(5-2x^2)}{18(x^4-5x^2+4)}$$

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}

$$\frac{dx(17-5x^2)}{72(x^4-5x^2+4)} + \frac{19}{432}d \tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}d \tanh^{-1}(x) + \frac{e(5-2x^2)}{18(x^4-5x^2+4)} + \frac{1}{27}e \log(1-x^2) - \frac{1}{27}e \log(4-x^2)$$

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] && !MatchQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[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] && NeQ[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

$$\begin{aligned}
 \int \frac{d + ex}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{d}{(4 - 5x^2 + x^4)^2} dx + \int \frac{ex}{(4 - 5x^2 + x^4)^2} dx \\
 &= d \int \frac{1}{(4 - 5x^2 + x^4)^2} dx + e \int \frac{x}{(4 - 5x^2 + x^4)^2} dx \\
 &= \frac{dx(17 - 5x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72}d \int \frac{-1 + 5x^2}{4 - 5x^2 + x^4} dx + \frac{1}{2}e \operatorname{Subst} \left(\int \frac{1}{(4 - 5x + x^2)^2} dx, x, x^2 \right) \\
 &= \frac{dx(17 - 5x^2)}{72(4 - 5x^2 + x^4)} + \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{1}{54}d \int \frac{1}{-1 + x^2} dx - \frac{1}{216}(19d) \int \frac{1}{-4 + x^2} dx \\
 &= \frac{dx(17 - 5x^2)}{72(4 - 5x^2 + x^4)} + \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{19}{432}d \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54}d \tanh^{-1}(x) - \frac{1}{27}e \operatorname{Subst} \left(\int \frac{1}{-4 + x^2} dx, x, x^2 \right) \\
 &= \frac{dx(17 - 5x^2)}{72(4 - 5x^2 + x^4)} + \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{19}{432}d \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54}d \tanh^{-1}(x) + \frac{1}{27}e \operatorname{Subst} \left(\int \frac{1}{-4 + x^2} dx, x, x^2 \right)
 \end{aligned}$$

Mathematica [A] time = 0.05, size = 90, normalized size = 0.96

$$\frac{1}{864} \left(\frac{12(dx(17 - 5x^2) + e(20 - 8x^2))}{x^4 - 5x^2 + 4} + 8(d + 4e) \log(1 - x) - (19d + 32e) \log(2 - x) - 8(d - 4e) \log(x + 1) + (19d - 32e) \log(x + 2) \right)$$

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)*Log[1 - x] - (19*d + 32*e)*Log[2 - x] - 8*(d - 4*e)*Log[1 + x] + (19*d - 32*e)*Log[2 + x])/864

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x)/(4 - 5*x^2 + x^4)^2, x]

fricas [B] time = 1.47, size = 169, normalized size = 1.80

$$\frac{60dx^3 + 96ex^2 - 204dx - ((19d - 32e)x^4 - 5(19d - 32e)x^2 + 76d - 128e)\log(x + 2) + 8((d - 4e)x^4 - 5(d - 4e)x^2 + 4d - 16e)\log(x + 1) - 8((d + 4e)x^4 - 5(d + 4e)x^2 + 4d + 16e)\log(x - 1) + ((19d + 32e)x^4 - 5(19d + 32e)x^2 + 76d + 128e)\log(x - 2) - 240e}{864(x^4 - 5x^2 + 4)}$$

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

$$\frac{1}{864}(19d - 32e)\log(|x + 2|) - \frac{1}{108}(d - 4e)\log(|x + 1|) + \frac{1}{108}(d + 4e)\log(|x - 1|) - \frac{1}{864}(19d + 32e)\log(|x - 2|) - \frac{5dx^3 + 8x^2e - 17dx - 20e}{72(x^4 - 5x^2 + 4)}$$

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)) + 1/108*(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

$$\frac{19d\ln(x+2)}{864} - \frac{19d\ln(x-2)}{864} + \frac{d\ln(x-1)}{108} - \frac{d\ln(x+1)}{108} - \frac{e\ln(x+2)}{27} - \frac{e\ln(x-2)}{27} + \frac{e\ln(x-1)}{27} + \frac{e\ln(x+1)}{27} - \frac{d}{144(x-2)} - \frac{d}{36(x+1)} - \frac{d}{36(x-1)} - \frac{d}{144(x+2)} - \frac{e}{72(x-2)} + \frac{e}{36x+36} - \frac{e}{36(x-1)} + \frac{e}{72x+144}$$

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

$$\frac{1}{864}(19d - 32e)\log(x + 2) - \frac{1}{108}(d - 4e)\log(x + 1) + \frac{1}{108}(d + 4e)\log(x - 1) - \frac{1}{864}(19d + 32e)\log(x - 2) - \frac{5dx^3 + 8x^2e - 17dx - 20e}{72(x^4 - 5x^2 + 4)}$$

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

$$\ln(x-1) \left(\frac{d}{108} + \frac{e}{27} \right) - \ln(x+1) \left(\frac{d}{108} - \frac{e}{27} \right) - \ln(x-2) \left(\frac{19d}{864} + \frac{e}{27} \right) + \ln(x+2) \left(\frac{19d}{864} - \frac{e}{27} \right) + \frac{-\frac{5dx^3}{72} - \frac{ex^2}{9} + \frac{17dx}{72} + \frac{5e}{18}}{x^4 - 5x^2 + 4}$$

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

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 - 665280*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 - 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 + 665280*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 + (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 + 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 - (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 - 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)

$$3.27 \quad \int \frac{d+ex+fx^2}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=115

$$\frac{x(-x^2(5d+8f)+17d+20f)}{72(x^4-5x^2+4)} + \frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}(d+7f)\tanh^{-1}(x) + \frac{1}{27}e\log(1-x^2) - \frac{1}{27}e\log(4-x^2)$$

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}

$$\frac{x(x^2(-5d+8f)+17d+20f)}{72(x^4-5x^2+4)} + \frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}(d+7f)\tanh^{-1}(x) + \frac{e(5-2x^2)}{18(x^4-5x^2+4)} + \frac{1}{27}e\log(1-x^2) - \frac{1}{27}e\log(4-x^2)$$

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)*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] && !MatchQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[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

$$\begin{aligned} \int \frac{d + ex + fx^2}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{ex}{(4 - 5x^2 + x^4)^2} dx + \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^2} dx \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + (5d + 8f)x^2}{4 - 5x^2 + x^4} dx + e \int \frac{x}{(4 - 5x^2 + x^4)^2} dx \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(4 - 5x + x^2)^2} dx, x, x^2 \right) - \frac{1}{54}(-d - 7f) \\ &= \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432}(19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54}(-d - 7f) \\ &= \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432}(19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54}(-d - 7f) \\ &= \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432}(19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54}(-d - 7f) \end{aligned}$$

Mathematica [A] time = 0.08, size = 112, normalized size = 0.97

$$\frac{1}{864} \left(\frac{12(-5dx^3 + 17dx + e(20 - 8x^2) - 8fx^3 + 20fx)}{x^4 - 5x^2 + 4} + 8 \log(1 - x)(d + 4e + 7f) - \log(2 - x)(19d + 32e + 52f) - 8 \log(x + 1)(d - 4e + 7f) + \log(x + 2)(19d - 32e + 52f) \right)$$

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
```

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4)^2, x]

fricas [B] time = 1.80, size = 217, normalized size = 1.89

$$\frac{12(5d + 8f)x^2 + 96e^2 - 12(17d + 20f)x - ((19d - 32e + 52f)^4 - 5(19d - 32e + 52f)^2 + 76d - 128e + 208f)\log(x + 2) + 8((d - 4e + 7f)^4 - 5(d - 4e + 7f)^2 + 4d - 16e + 28f)\log(x + 1) - 8((d + 4e + 7f)^4 - 5(d + 4e + 7f)^2 + 4d + 16e + 28f)\log(x - 1) + ((19d + 32e + 52f)^4 - 5(19d + 32e + 52f)^2 + 76d + 128e + 208f)\log(x - 2) - 240e}{864(x^4 - 5x^2 + 4)}$$

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

$$\frac{1}{864}(19d + 52f - 32e)\log(|x + 2|) - \frac{1}{108}(d + 7f - 4e)\log(|x + 1|) + \frac{1}{108}(d + 7f + 4e)\log(|x - 1|) - \frac{1}{864}(19d + 52f + 32e)\log(|x - 2|) - \frac{5dx^3 + 8fx^3 + 8x^2e - 17dx - 20fx - 20e}{72(x^4 - 5x^2 + 4)}$$

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 - 20*e)/(x^4 - 5*x^2 + 4)

maple [A] time = 0.02, size = 182, normalized size = 1.58

$$\frac{19d \ln(x+2)}{864} - \frac{19d \ln(x-2)}{864} + \frac{d \ln(x-1)}{108} - \frac{d \ln(x+1)}{108} - \frac{e \ln(x+2)}{27} - \frac{e \ln(x-2)}{27} + \frac{e \ln(x-1)}{27} + \frac{e \ln(x+1)}{27} + \frac{13f \ln(x+2)}{216} - \frac{13f \ln(x-2)}{216} + \frac{7f \ln(x-1)}{108} - \frac{7f \ln(x+1)}{108} - \frac{d}{144(x-2)} - \frac{d}{36(x+1)} - \frac{d}{36(x-1)} - \frac{d}{144(x+2)} - \frac{e}{72(x-2)} + \frac{e}{36(x+1)} - \frac{e}{36(x-1)} + \frac{e}{72(x+2)} - \frac{f}{36(x-2)} - \frac{f}{36(x+1)} - \frac{f}{36(x-1)} - \frac{f}{36(x+2)}$$

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

$$\frac{1}{864}(19d - 32e + 52f)\log(x + 2) - \frac{1}{108}(d - 4e + 7f)\log(x + 1) + \frac{1}{108}(d + 4e + 7f)\log(x - 1) - \frac{1}{864}(19d + 32e + 52f)\log(x - 2) - \frac{(5d + 8f)x^3 + 8ex^2 - (17d + 20f)x - 20e}{72(x^4 - 5x^2 + 4)}$$

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

$$\ln(x-1)\left(\frac{d}{108} + \frac{e}{27} + \frac{7f}{108}\right) - \ln(x+1)\left(\frac{d}{108} - \frac{e}{27} + \frac{7f}{108}\right) - \ln(x-2)\left(\frac{19d}{864} + \frac{e}{27} + \frac{13f}{216}\right) + \ln(x+2)\left(\frac{19d}{864} - \frac{e}{27} + \frac{13f}{216}\right) + \frac{\left(-\frac{5d}{72} - \frac{f}{9}\right)x^3 - \frac{ex^2}{9} + \left(\frac{17d}{72} + \frac{5f}{18}\right)x + \frac{5e}{18}}{x^4 - 5x^2 + 4}$$

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] $\log(x - 1)*(d/108 + e/27 + (7*f)/108) - \log(x + 1)*(d/108 - e/27 + (7*f)/108) - \log(x - 2)*((19*d)/864 + e/27 + (13*f)/216) + \log(x + 2)*((19*d)/864 - e/27 + (13*f)/216) + ((5*e)/18 - x^3*((5*d)/72 + f/9) - (e*x^2)/9 + x*((17*d)/72 + (5*f)/18))/(x^4 - 5*x^2 + 4)$

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 - 4e + 7f)*\log(x + (-6006260*d**5*e + 2341251*d**5*(d - 4e + 7f) - 246016240*d**4*e*f + 31626180*d**4*f*(d - 4e + 7f) - 18247680*d**3*e**3 + 24099840*d**3*e**2*(d - 4e + 7f) - 2758371200*d**3*e*f**2 + 7387904*d**3*e*(d - 4e + 7f)**2 + 171122976*d**3*f**2*(d - 4e + 7f) - 665280*d**3*(d - 4e + 7f)**3 + 298598400*d**2*e**3*f + 369487872*d**2*e**2*f*(d - 4e + 7f) - 13192256000*d**2*e*f**3 + 90885120*d**2*e*f*(d - 4e + 7f)**2 + 441486720*d**2*f**3*(d - 4e + 7f) - 5536512*d**2*f*(d - 4e + 7f)**3 + 587202560*d*e**5 - 12582912*d*e**4*(d - 4e + 7f) + 1353646080*d*e**3*f**2 - 36700160*d*e**3*(d - 4e + 7f)**2 + 1448755200*d*e**2*f**2*(d - 4e + 7f) + 786432*d*e**2*(d - 4e + 7f)**3 - 28282393600*d*e*f**4 + 362729472*d*e*f**2*(d - 4e + 7f)**2 + 399575808*d*f**4*(d - 4e + 7f) - 10368000*d*f**2*(d - 4e + 7f)**3 + 2751463424*e**5*f + 251658240*e**4*f*(d - 4e + 7f) - 530841600*e**3*f**3 - 171966464*e**3*f*(d - 4e + 7f)**2 + 1935212544*e**2*f**3*(d - 4e + 7f) - 15728640*e**2*f*(d - 4e + 7f)**3 - 21886889984*e*f**5 + 483737600*e*f**3*(d - 4e + 7f)**2 - 212474880*f**5*(d - 4e + 7f) + 4534272*f**3*(d - 4e + 7f)**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 - 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 + 4e + 7f)*\log(x + (-6006260*d**5*e - 2341251*d**5*(d + 4e + 7f) - 246016240*d**4*e*f - 31626180*d**4*f*(d + 4e + 7f) - 18247680*d**3*e**3 - 24099840*d**3*e**2*(d + 4e + 7f) - 2758371200*d**3*e*f**2 + 7387904*d**3*e*(d + 4e + 7f)**2 - 171122976*d**3*f**2*(d + 4e + 7f) + 665280*d**3*(d + 4e + 7f)**3 + 298598400*d**2*e**3*f - 369487872*d**2*e**2*f*(d + 4e + 7f) - 13192256000*d**2*e*f**3 + 90885120*d**2*e*f*(d + 4e + 7f)**2 - 441486720*d**2*f**3*(d + 4e + 7f) + 5536512*d**2*f*(d + 4e + 7f)**3 + 587202560*d*e**5 + 12582912*d*e**4*(d + 4e + 7f) + 1353646080*d*e**3*f**2 - 36700160*d*e**3*(d + 4e + 7f)**2 - 1448755200*d*e**2*f**2*(d + 4e + 7f) - 786432*d*e**2*(d + 4e + 7f)**3 - 28282393600*d*e*f**4 + 362729472*d*e*f**2*(d + 4e + 7f)**2 - 399575808*d*f**4*(d + 4e + 7f) + 10368000*d*f**2*(d + 4e + 7f)**3 + 2751463424*e**5*f - 251658240*e**4*f*(d + 4e + 7f) - 530841600*e**3*f**3 - 171966464*e**3*f*(d + 4e + 7f)**2 - 1935212544*e**2*f**3*(d + 4e + 7f) + 15728640*e**2*f*(d + 4e + 7f)**3 - 21886889984*e*f**5 + 483737600*e*f**3*(d + 4e + 7f)**2 + 212474880*f**5*(d + 4e + 7f) - 4534272*f**3*(d + 4e + 7f)**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$

$$\begin{aligned}
& *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)
\end{aligned}$$

$$3.28 \quad \int \frac{d+ex+fx^2+gx^3}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=138

$$\frac{x(-x^2(5d+8f)+17d+20f)}{72(x^4-5x^2+4)} + \frac{1}{432}(19d+52f) \tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}(d+7f) \tanh^{-1}(x) + \frac{1}{54}(2e+5g) \log(1-x^2)$$

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}

$$\frac{x(x^2(-5d+8f)+17d+20f)}{72(x^4-5x^2+4)} + \frac{1}{432}(19d+52f) \tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}(d+7f) \tanh^{-1}(x) + \frac{x^2(-2e+5g)+5e+8g}{18(x^4-5x^2+4)} + \frac{1}{54}(2e+5g) \log(1-x^2) - \frac{1}{54}(2e+5g) \log(4-x^2)$$

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)*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] && NeQ[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_Symbol]
:> 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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^2} dx + \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^2} dx \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + (5d + 8f)x^2}{4 - 5x^2 + x^4} dx + \frac{1}{2} \text{Subst} \left(\int \frac{1}{4 - 5x^2 + x^4} dx \right) \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} - \frac{1}{54}(-d - 7f) \int \frac{1}{-1 + x^2} dx \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{1}{432}(19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{1}{432}(19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) \end{aligned}$$

Mathematica [A] time = 0.05, size = 134, normalized size = 0.97

$$\frac{1}{864} \left(\frac{12(-5dx^3 + 17dx + e(20 - 8x^2) - 8fx^3 + 20fx - 4g(5x^2 - 8))}{x^4 - 5x^2 + 4} + 8 \log(1 - x)(d + 4e + 7f + 10g) - \log(2 - x)(19d + 32e + 52f + 80g) - 8 \log(x + 1)(d - 4e + 7f - 10g) + \log(x + 2)(19d - 32e + 52f - 80g) \right)$$

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
```

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

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

Verification is not applicable to the result.

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

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

fricas [B] time = 2.86, size = 262, normalized size = 1.90

$$\frac{12(5d+8f)^2+8(2e+5g)^2-12(7d+20f)g-5(19d-32e+52f-80g)^2+76d+128e+208f-320g}{864(x^4-5x^2+4)^2} \log(x+2) + 8((d-4e+7f-10g)^2-5(d-4e+7f-10g)^2+4d+16e+28f-40g) \log(x+1) - 8((d+4e+7f+10g)^2-5(d+4e+7f+10g)^2+4d+16e+28f+40g) \log(x-1) - 5(19d+32e+52f+80g)^2+76d+128e+208f+320g \log(x-2) - 240e - 384g$$

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]
$$-1/864*(12*(5*d + 8*f)*x^3 + 48*(2*e + 5*g)*x^2 - 12*(17*d + 20*f)*x - ((19*d - 32*e + 52*f - 80*g)*x^4 - 5*(19*d - 32*e + 52*f - 80*g)*x^2 + 76*d - 128*e + 208*f - 320*g)*\log(x + 2) + 8*((d - 4*e + 7*f - 10*g)*x^4 - 5*(d - 4*e + 7*f - 10*g)*x^2 + 4*d - 16*e + 28*f - 40*g)*\log(x + 1) - 8*((d + 4*e + 7*f + 10*g)*x^4 - 5*(d + 4*e + 7*f + 10*g)*x^2 + 4*d + 16*e + 28*f + 40*g)*\log(x - 1) + ((19*d + 32*e + 52*f + 80*g)*x^4 - 5*(19*d + 32*e + 52*f + 80*g)*x^2 + 76*d + 128*e + 208*f + 320*g)*\log(x - 2) - 240*e - 384*g)/(x^4 - 5*x^2 + 4)$$

giac [A] time = 0.25, size = 136, normalized size = 0.99

$$\frac{1}{864}(19d+52f-80g-32e)\log(x+2) - \frac{1}{108}(d+7f-10g-4e)\log(x+1) + \frac{1}{108}(d+7f+10g+4e)\log(x-1) - \frac{1}{864}(19d+52f+80g+32e)\log(x-2) - \frac{5dx^3+8fx^2+20gx+8x^2e-17dx-20fx-32g-20e}{72(x^4-5x^2+4)}$$

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]
$$1/864*(19*d + 52*f - 80*g - 32*e)*\log(\text{abs}(x + 2)) - 1/108*(d + 7*f - 10*g - 4*e)*\log(\text{abs}(x + 1)) + 1/108*(d + 7*f + 10*g + 4*e)*\log(\text{abs}(x - 1)) - 1/864*(19*d + 52*f + 80*g + 32*e)*\log(\text{abs}(x - 2)) - 1/72*(5*d*x^3 + 8*f*x^3 + 20*g*x^2 + 8*x^2*e - 17*d*x - 20*f*x - 32*g - 20*e)/(x^4 - 5*x^2 + 4)$$

maple [A] time = 0.02, size = 242, normalized size = 1.75

$$\frac{5\ln(x-1)}{864} - \frac{5\ln(x+2)}{864} - \frac{5\ln(x-2)}{864} + \frac{5\ln(x+1)}{864} + \frac{19\ln(x+2)}{864} - \frac{1}{27}e\ln(x+2) + \frac{1}{27}e\ln(x-1) + \frac{1}{108}d\ln(x-1) + \frac{1}{27}e\ln(x+1) - \frac{1}{108}d\ln(x+1) - \frac{19}{864}d\ln(x-2) - \frac{1}{27}e\ln(x-2) - \frac{13}{216}f\ln(x-2) - \frac{7}{108}f\ln(x+1) + \frac{7}{108}f\ln(x-1) + \frac{13}{216}f\ln(x+2) + \frac{1}{18}(x+2)*g + \frac{1}{36}(x+1)*g - \frac{1}{36}(x-1)*g - \frac{1}{18}(x-2)*g - \frac{1}{144}(x+2)*d + \frac{1}{72}(x+2)*e - \frac{1}{144}(x-2)*d - \frac{1}{72}(x-2)*e - \frac{1}{36}(x+1)*d + \frac{1}{36}(x+1)*e - \frac{1}{36}(x-1)*d - \frac{1}{36}(x-1)*e - \frac{1}{36}(x-1)*f - \frac{1}{36}(x+2)*f - \frac{1}{36}(x-2)*f - \frac{1}{36}(x+1)*f$$

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

$$\frac{1}{864}(19d-32e+52f-80g)\log(x+2) - \frac{1}{108}(d-4e+7f-10g)\log(x+1) + \frac{1}{108}(d+4e+7f+10g)\log(x-1) - \frac{1}{864}(19d+32e+52f+80g)\log(x-2) - \frac{(5d+8f)x^3+4(2e+5g)x^2-(17d+20f)x-20e-32g}{72(x^4-5x^2+4)}$$

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

$$\ln(x-1)\left(\frac{d}{108} + \frac{e}{27} + \frac{7f}{108} + \frac{5g}{54}\right) - \ln(x+1)\left(\frac{d}{108} - \frac{e}{27} + \frac{7f}{108} - \frac{5g}{54}\right) - \ln(x-2)\left(\frac{19d}{864} + \frac{e}{27} + \frac{13f}{216} + \frac{5g}{54}\right) + \ln(x+2)\left(\frac{19d}{864} - \frac{e}{27} + \frac{13f}{216} - \frac{5g}{54}\right) + \frac{\left(\frac{5d-f}{72} - \frac{f}{9}\right)x^3 + \left(-\frac{e}{9} - \frac{5g}{18}\right)x^2 + \left(\frac{17d}{72} + \frac{5f}{18}\right)x + \frac{5e}{18} + \frac{4g}{9}}{x^4 - 5x^2 + 4}$$

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

$$3.29 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=150

$$\frac{x \left(- \left(x^2(5d + 8f + 20h) \right) + 17d + 20f + 32h \right)}{72(x^4 - 5x^2 + 4)} + \frac{1}{432} \tanh^{-1} \left(\frac{x}{2} \right) (19d + 52f + 112h) - \frac{1}{54} \tanh^{-1}(x)(d + 7f + 13h) +$$

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}

$$\frac{x(x^2(-5d+8f+20h)+17d+20f+32h)}{72(x^4-5x^2+4)} + \frac{1}{432} \tanh^{-1}\left(\frac{x}{2}\right)(19d+52f+112h) - \frac{1}{54} \tanh^{-1}(x)(d+7f+13h) + \frac{x^2(-2e+5g)+5e+8g}{18(x^4-5x^2+4)} + \frac{1}{54}(2e+5g)\log(1-x^2) - \frac{1}{54}(2e+5g)\log(4-x^2)$$

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] - 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] && NeQ[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]] /; 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

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

$$= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + 32h + (5d + 8f + 20h)x^2}{4 - 5x^2 + x^4} dx$$

$$= \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{18}(-2e - 5g)$$

$$= \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432}(19d - 32e - 52f - 80g + 112h)$$

$$= \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432}(19d - 32e - 52f - 80g + 112h)$$

Mathematica [A] time = 0.07, size = 159, normalized size = 1.06

$$\frac{1}{864} \left(\frac{12(x(d(5x^2-17) + 4f(2x^2-5) + 4h(5x^2-8)) + 4e(2x^2-5) + 4g(5x^2-8))}{x^4 - 5x^2 + 4} + 8 \log(1-x)(d + 4e + 7f + 10g + 13h) - \log(2-x)(19d + 32e + 52f + 80g + 112h) - 8 \log(x+1)(d - 4e + 7f - 10g + 13h) + \log(x+2)(19d - 32e + 52f - 80g + 112h) \right)$$

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
```


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

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

Verification is not applicable to the result.

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

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

fricas [B] time = 5.98, size = 304, normalized size = 2.03

1024*x^4 + 2032*x^3 + 480*x^2 - 1024*x + 1024) * (19*d + 52*f - 80*g + 112*h - 32*e) * log(x + 2) - 1/108 * (d + 7*f - 10*g + 13*h - 4*e) * log(x + 1) + 1/108 * (d + 7*f + 10*g + 13*h + 4*e) * log(x - 1) - 1/864 * (19*d + 52*f + 80*g + 112*h + 32*e) * log(x - 2) - 5*d^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)

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

1/864 * (19*d + 52*f - 80*g + 112*h - 32*e) * log(x + 2) - 1/108 * (d + 7*f - 10*g + 13*h - 4*e) * log(x + 1) + 1/108 * (d + 7*f + 10*g + 13*h + 4*e) * log(x - 1) - 1/864 * (19*d + 52*f + 80*g + 112*h + 32*e) * log(x - 2) - 5*d^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)

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

1024*x^4 + 2032*x^3 + 480*x^2 - 1024*x + 1024) * (19*d + 52*f - 80*g + 112*h - 32*e) * log(x + 2) - 1/108 * (d + 7*f - 10*g + 13*h - 4*e) * log(x + 1) + 1/108 * (d + 7*f + 10*g + 13*h + 4*e) * log(x - 1) - 1/864 * (19*d + 52*f + 80*g + 112*h + 32*e) * log(x - 2) - 5*d^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)

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)+13/216*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

$$\frac{1}{864}(19d - 32e + 52f - 80g + 112h)\log(x+2) - \frac{1}{108}(d - 4e + 7f - 10g + 13h)\log(x+1) + \frac{1}{108}(d + 4e + 7f + 10g + 13h)\log(x-1) - \frac{1}{864}(19d + 32e + 52f + 80g + 112h)\log(x-2) - \frac{(5d + 8f + 20h)x^3 + 4(2e + 5g)x^2 - (17d + 20f + 32h)x - 20e - 32g}{72(x^4 - 5x^2 + 4)}$$

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

$$\frac{\left(\frac{-5d}{72} - \frac{f}{9} - \frac{5h}{18}\right)x^3 + \left(\frac{-e}{9} - \frac{5g}{18}\right)x^2 + \left(\frac{17d}{72} + \frac{7f}{18} + \frac{4h}{9}\right)x + \frac{5e}{18} + \frac{4g}{9}}{x^4 - 5x^2 + 4} + \ln(x-1)\left(\frac{d}{108} + \frac{e}{27} + \frac{7f}{108} + \frac{5g}{54} + \frac{13h}{108}\right) - \ln(x+1)\left(\frac{d}{108} - \frac{e}{27} + \frac{7f}{108} - \frac{5g}{54} + \frac{13h}{108}\right) - \ln(x-2)\left(\frac{19d}{864} + \frac{e}{27} + \frac{13f}{216} + \frac{5g}{54} + \frac{7h}{54}\right) + \ln(x+2)\left(\frac{19d}{864} - \frac{e}{27} + \frac{13f}{216} - \frac{5g}{54} + \frac{7h}{54}\right)$$

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/108 + 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

$$3.30 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=162

$$\frac{x \left(- \left(x^2(5d + 8f + 20h) \right) + 17d + 20f + 32h \right)}{72(x^4 - 5x^2 + 4)} + \frac{1}{432} \tanh^{-1} \left(\frac{x}{2} \right) (19d + 52f + 112h) - \frac{1}{54} \tanh^{-1}(x)(d + 7f + 13h) +$$

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}

$$\frac{x(x^2(-5d+8f+20h)+17d+20f+32h)}{72(x^4-5x^2+4)} + \frac{1}{432} \tanh^{-1}\left(\frac{x}{2}\right)(19d+52f+112h) - \frac{1}{54} \tanh^{-1}(x)(d+7f+13h) + \frac{x^2(-2e+5g+17i)+5e+8g+20i}{18(x^4-5x^2+4)} + \frac{1}{54} \log(1-x^2)(2e+5g+8i) - \frac{1}{54} \log(4-x^2)(2e+5g+8i)$$

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] && !MatchQ[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] && NeQ[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[Pq, 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[PolynomialRemainder[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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 30x^5}{(4 - 5x^2 + x^4)^2} dx = \int \frac{x(e + gx^2 + 30x^4)}{(4 - 5x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^2} dx$$

$$= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + 32h + (5d + 8f + 20h)x^2}{4 - 5x^2 + x^4} dx$$

$$= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)}$$

$$= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)}$$

$$= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)}$$

$$= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)}$$

Mathematica [A] time = 0.09, size = 185, normalized size = 1.14

$\frac{-5d^3 + 17dx - 8cx^2 + 20e - 8fx^3 + 20gx^2 + 32g - 20hx^3 + 320x - 68h^2 + 80i}{72(4^2 - 5x^2 + 4)} + \frac{1}{108} \log(1 - z)(d + 4e + 7f + 10g + 13h + 16i) + \frac{1}{864} \log(2 - z)(-19d - 32e - 52f - 80g - 112h - 128i) + \frac{1}{108} \log(x + 1)(-d + 4e - 7f + 10g - 13h + 16i) + \frac{1}{864} \log(x + 2)(19d - 32e + 52f - 80g + 112h - 128i)$

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 - 112*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

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

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

Verification is not applicable to the result.

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

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

fricas [B] time = 29.57, size = 346, normalized size = 2.14

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="fricas")

[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

$$\frac{1}{864}(19d + 52f - 80g + 112h - 128i - 32e)\log(x + 2) - \frac{1}{108}(d + 7f - 10g + 13h - 16i - 4e)\log(x + 1) + \frac{1}{108}(d + 7f + 10g + 13h + 16i + 4e)\log(x - 1) - \frac{1}{864}(19d + 52f + 80g + 112h + 128i + 32e)\log(x - 2) - \frac{5d^3 + 8f^3 + 20h^3 + 20g^2 + 68ix^2 + 8x^2e - 17dx - 20fx - 32gx - 80i - 20e}{72(x^4 - 5x^2 + 4)}$$

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)^2,x, algorithm="giac")

[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

.....

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*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)
)+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

$$\frac{1}{864}(19d - 32e + 52f - 80g + 112h - 128i) \log(x + 2) - \frac{1}{108}(d - 4e + 7f - 10g + 13h - 16i) \log(x + 1) + \frac{1}{108}(d + 4e + 7f + 10g + 13h + 16i) \log(x - 1) - \frac{1}{864}(19d + 32e + 52f + 80g + 112h + 128i) \log(x - 2) - \frac{(5d + 8f + 20h)x^2 + 4(2e + 5g + 17i)x - (17d + 20f + 32h)x - 20e - 32g - 80i}{72(x^4 - 5x^2 + 4)}$$

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)^2,x, algorithm="maxima")
[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 + 13*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

$$\left(\frac{5d}{72} - \frac{f}{9} - \frac{5h}{18}\right)x^3 + \left(\frac{e}{9} - \frac{5g}{18} - \frac{17i}{18}\right)x^2 + \left(\frac{17d}{72} + \frac{5f}{18} + \frac{4h}{9}\right)x + \frac{5e}{18} + \frac{5g}{9} + \frac{10i}{9} + \ln(x-1) \left(\frac{d}{108} + \frac{e}{27} + \frac{7f}{108} + \frac{5g}{54} + \frac{13h}{108} + \frac{4i}{27}\right) - \ln(x+1) \left(\frac{d}{108} - \frac{e}{27} + \frac{7f}{108} - \frac{5g}{54} + \frac{13h}{108} - \frac{4i}{27}\right) - \ln(x-2) \left(\frac{19d}{864} + \frac{e}{27} + \frac{13f}{216} + \frac{5g}{54} + \frac{7h}{54} + \frac{4i}{27}\right) + \ln(x+2) \left(\frac{19d}{864} - \frac{e}{27} + \frac{13f}{216} - \frac{5g}{54} + \frac{7h}{54} - \frac{4i}{27}\right)$$

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)/54 - (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
```

$$3.31 \quad \int \frac{d+ex}{(1+x^2+x^4)^2} dx$$

Optimal. Leaf size=140

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

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}

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

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[In
t[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

$$\begin{aligned} \int \frac{d + ex}{(1 + x^2 + x^4)^2} dx &= \int \frac{d}{(1 + x^2 + x^4)^2} dx + \int \frac{ex}{(1 + x^2 + x^4)^2} dx \\ &= d \int \frac{1}{(1 + x^2 + x^4)^2} dx + e \int \frac{x}{(1 + x^2 + x^4)^2} dx \\ &= \frac{dx(1 - x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6}d \int \frac{5 - x^2}{1 + x^2 + x^4} dx + \frac{1}{2}e \operatorname{Subst} \left(\int \frac{1}{(1 + x + x^2)^2} dx, x, x^2 \right) \\ &= \frac{dx(1 - x^2)}{6(1 + x^2 + x^4)} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{1}{12}d \int \frac{5 - 6x}{1 - x + x^2} dx + \frac{1}{12}d \int \frac{5 + 6x}{1 + x + x^2} dx + \frac{1}{3}e \operatorname{Subst} \left(\int \frac{1}{(1 + x + x^2)^2} dx, x, x^2 \right) \\ &= \frac{dx(1 - x^2)}{6(1 + x^2 + x^4)} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6}d \int \frac{1}{1 - x + x^2} dx + \frac{1}{6}d \int \frac{1}{1 + x + x^2} dx - \frac{1}{4}d \int \frac{1}{1 + x^2} dx \\ &= \frac{dx(1 - x^2)}{6(1 + x^2 + x^4)} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{2e \tan^{-1} \left(\frac{1 + 2x^2}{\sqrt{3}} \right)}{3\sqrt{3}} - \frac{1}{4}d \log(1 - x + x^2) + \frac{1}{4}d \log(1 + x + x^2) \\ &= \frac{dx(1 - x^2)}{6(1 + x^2 + x^4)} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} - \frac{d \tan^{-1} \left(\frac{1 - 2x}{\sqrt{3}} \right)}{3\sqrt{3}} + \frac{d \tan^{-1} \left(\frac{1 + 2x}{\sqrt{3}} \right)}{3\sqrt{3}} + \frac{2e \tan^{-1} \left(\frac{1 + 2x^2}{\sqrt{3}} \right)}{3\sqrt{3}} \end{aligned}$$

Mathematica [C] time = 0.49, size = 146, normalized size = 1.04

$$\frac{d(x-x^3)+2ex^2+e}{6(x^4+x^2+1)} - \frac{(\sqrt{3}-11i)d \tan^{-1}\left(\frac{1}{2}(\sqrt{3}-i)x\right)}{6\sqrt{6+6i\sqrt{3}}} - \frac{(\sqrt{3}+11i)d \tan^{-1}\left(\frac{1}{2}(\sqrt{3}+i)x\right)}{6\sqrt{6-6i\sqrt{3}}} - \frac{2e \tan^{-1}\left(\frac{\sqrt{3}}{2x^2+1}\right)}{3\sqrt{3}}$$

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*ArcTan[(-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[Sqrt[3]/(1 + 2*x^2)])/(3*Sqrt[3])

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

$$\int \frac{d + ex}{(1 + x^2 + x^4)^2} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x)/(1 + x^2 + x^4)^2, x]

fricas [A] time = 1.49, size = 154, normalized size = 1.10

$$\frac{6dx^3 - 12ex^2 - 4\sqrt{3}(d-2e)x^4 + (d-2e)x^2 + d-2e \arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) - 4\sqrt{3}(d+2e)x^4 + (d+2e)x^2 + d+2e \arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) - 6dx - 9(dx^4 + dx^2 + d)\log(x^2 + x + 1) + 9(dx^4 + dx^2 + d)\log(x^2 - x + 1) - 6e}{36(x^4 + x^2 + 1)}$$

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

$$\frac{1}{9}\sqrt{3}(d-2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{9}\sqrt{3}(d+2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{4}d\log(x^2+x+1) - \frac{1}{4}d\log(x^2-x+1) - \frac{dx^3-2x^2e-dx-e}{6(x^4+x^2+1)}$$

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

$$\frac{\sqrt{3}d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9} + \frac{\sqrt{3}d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9} - \frac{d \ln(x^2-x+1)}{4} + \frac{d \ln(x^2+x+1)}{4} - \frac{2\sqrt{3}e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9} + \frac{2\sqrt{3}e \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9} + \frac{-\frac{2d}{3} + \frac{e}{3} + \left(\frac{d}{3} - \frac{e}{3}\right)x}{4x^2+4x+4} - \frac{-\frac{2d}{3} - \frac{e}{3} + \left(\frac{d}{3} - \frac{e}{3}\right)x}{4(x^2-x+1)}$$

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

$((1/3*d-1/3*e)*x-2/3*d-1/3*e)/(x^2-x+1)-1/4*d*\ln(x^2-x+1)+1/9*3^{(1/2)}*d*\arctan(1/3*(2*x-1)*3^{(1/2)})+2/9*3^{(1/2)}*e*\arctan(1/3*(2*x-1)*3^{(1/2)})$

maxima [A] time = 2.42, size = 96, normalized size = 0.69

$$\frac{1}{9}\sqrt{3}(d-2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)+\frac{1}{9}\sqrt{3}(d+2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{1}{4}d\log(x^2+x+1)-\frac{1}{4}d\log(x^2-x+1)-\frac{dx^3-2ex^2-dx-e}{6(x^4+x^2+1)}$$

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

$$\frac{\frac{dx^3}{6}+\frac{ex^2}{3}+\frac{dx}{6}+\frac{e}{6}-\ln\left(x-\frac{1}{2}-\frac{\sqrt{3}i}{2}\right)\left(\frac{d}{4}+\frac{\sqrt{3}d1i}{18}+\frac{\sqrt{3}e1i}{9}\right)+\ln\left(x+\frac{1}{2}-\frac{\sqrt{3}i}{2}\right)\left(\frac{d}{4}-\frac{\sqrt{3}d1i}{18}+\frac{\sqrt{3}e1i}{9}\right)+\ln\left(x-\frac{1}{2}+\frac{\sqrt{3}i}{2}\right)\left(-\frac{d}{4}+\frac{\sqrt{3}d1i}{18}+\frac{\sqrt{3}e1i}{9}\right)+\ln\left(x+\frac{1}{2}+\frac{\sqrt{3}i}{2}\right)\left(\frac{d}{4}+\frac{\sqrt{3}d1i}{18}-\frac{\sqrt{3}e1i}{9}\right)}{x^4+x^2+1}$$

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] $(-d/4 - \sqrt{3}*I*(d+2*e)/18)*\log(x + (-10309*d**4*e + 1026*d**4*(-d/4 - \sqrt{3}*I*(d+2*e)/18) - 7200*d**2*e**3 - 31536*d**2*e**2*(-d/4 - \sqrt{3}*I*(d+2*e)/18) + 108432*d**2*e*(-d/4 - \sqrt{3}*I*(d+2*e)/18)**2 + 163296*d**2*(-d/4 - \sqrt{3}*I*(d+2*e)/18)**3 + 1792*e**5 + 11520*e**4*(-d/4 - \sqrt{3}*I*(d+2*e)/18) + 48384*e**3*(-d/4 - \sqrt{3}*I*(d+2*e)/18)**2 + 311040*e**2*(-d/4 - \sqrt{3}*I*(d+2*e)/18)**3)/(3348*d**5 - 11408*d**3*e**2 - 7936*d*e**4) + (-d/4 + \sqrt{3}*I*(d+2*e)/18)*\log(x + (-10309*d**4*e + 1026*d**4*(-d/4 + \sqrt{3}*I*(d+2*e)/18) - 7200*d**2*e**3 - 31536*d**2*e**2*(-d/4 + \sqrt{3}*I*(d+2*e)/18) + 108432*d**2*e*(-d/4 + \sqrt{3}*I*(d+2*e)/18)**2 + 163296*d**2*(-d/4 + \sqrt{3}*I*(d+2*e)/18)**3 + 1792*e**5 + 11520*e**4*(-d/4 + \sqrt{3}*I*(d+2*e)/18) + 48384*e**3*(-d/4 + \sqrt{3}*I*(d+2*e)/18)**2 + 311040*e**2*(-d/4 + \sqrt{3}*I*(d+2*e)/18)**3)/(3348*d**5 - 11408*d**3*e**2 - 7936*d*e**4) + (d/4 - \sqrt{3}*I*(d-2*e)/18)*\log(x + (-10309*d**4*e + 1026*d**4*(d/4 - \sqrt{3}*I*(d-2*e)/18) - 7200*d**2*e**3 - 31536*d**2*e**2*(d/4 - \sqrt{3}*I*(d-2*e)/18) + 108432*d**2*e*(d/4 - \sqrt{3}*I*(d-2*e)/18)**2 + 163296*d**2*(d/4 - \sqrt{3}*I*(d-2*e)/18)**3 + 1792*e**5 + 11520*e**4*(d/4 - \sqrt{3}*I*(d-2*e)/18) + 48384*e**3*(d/4 - \sqrt{3}*I*(d-2*e)/18)**2 + 311040*e**2*(d/4 - \sqrt{3}*I*(d-2*e)/18)**3)/(3348*d**5 - 11408*d**3*e**2 - 7936*d*e**4) + (d/4 + \sqrt{3}*I*(d-2*e)/18)*\log(x + (-10309*d**4*e + 1026*d**4*(d/4 + \sqrt{3}*I*(d-2*e)/18) - 7200*d**2*e**3 - 31536*d**2*e**2*(d/4 + \sqrt{3}*I*(d-2*e)/18) + 108432*d**2*e*(d/4 + \sqrt{3}*I*(d-2*e)/18)**2 + 163296*d**2*(d/4 + \sqrt{3}*I*(d-2*e)/18)**3 + 1792*e**5 + 11520*e**4*(d/4 + \sqrt{3}*I*(d-2*e)/18) + 48384*e**3*(d/4 + \sqrt{3}*I*(d-2*e)/18)**2 + 311040*e**2*(d/4 + \sqrt{3}*I*(d-2*e)/18)**3)/(3348*d**5 - 11408*d**3*e**2 - 7936*d*e**4) + (-d*x**3 + d*x + 2*e*x**2 + e)/(6*x**4 + 6*x**2 + 6)$

$$3.32 \quad \int \frac{d+ex+fx^2}{(1+x^2+x^4)^2} dx$$

Optimal. Leaf size=165

$$-\frac{1}{8}(2d-f)\log(x^2-x+1)+\frac{1}{8}(2d-f)\log(x^2+x+1)+\frac{x(-x^2(d-2f)+d+f)}{6(x^4+x^2+1)}-\frac{(4d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}+(4d+f)\tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)$$

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}

$$\frac{x(x^2-(d-2f)+d+f)}{6(x^4+x^2+1)}-\frac{1}{8}(2d-f)\log(x^2-x+1)+\frac{1}{8}(2d-f)\log(x^2+x+1)-\frac{(4d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}+\frac{(4d+f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{12\sqrt{3}}+\frac{e(2x^2+1)}{6(x^4+x^2+1)}+\frac{2e\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

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] && !MatchQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] := Simp[(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] := Dist[(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_Symbol] := 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

$$\begin{aligned} \int \frac{d + ex + fx^2}{(1 + x^2 + x^4)^2} dx &= \int \frac{ex}{(1 + x^2 + x^4)^2} dx + \int \frac{d + fx^2}{(1 + x^2 + x^4)^2} dx \\ &= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + (-d + 2f)x^2}{1 + x^2 + x^4} dx + e \int \frac{x}{(1 + x^2 + x^4)^2} dx \\ &= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{12} \int \frac{5d - f - (6d - 3f)x}{1 - x + x^2} dx + \frac{1}{12} \int \frac{5d - f + (6d - 3f)x}{1 + x + x^2} dx + \\ &= \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{3} e \operatorname{Subst} \left(\int \frac{1}{1 + x + x^2} dx, x, x^2 \right) + \frac{1}{8} (2d - f) \log(1 - x + x^2) \\ &= \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} - \frac{1}{8} (2d - f) \log(1 - x + x^2) + \frac{1}{8} (2d - f) \log(1 + x + x^2) \\ &= \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} - \frac{(4d + f) \tan^{-1} \left(\frac{1 - 2x}{\sqrt{3}} \right)}{12\sqrt{3}} + \frac{(4d + f) \tan^{-1} \left(\frac{1 + 2x}{\sqrt{3}} \right)}{12\sqrt{3}} \end{aligned}$$

Mathematica [C] time = 0.42, size = 186, normalized size = 1.13

$$\frac{1}{36} \left(\frac{6(x(-dx^2 + d + 2fx^2 + f) + 2ex^2 + e)}{x^4 + x^2 + 1} - \frac{((\sqrt{3} - 11i)d - 2(\sqrt{3} - 2i)f) \tan^{-1}\left(\frac{1}{2}(\sqrt{3} - i)x\right)}{\sqrt{\frac{1}{6}(1 + i\sqrt{3})}} - \frac{((\sqrt{3} + 11i)d - 2(\sqrt{3} + 2i)f) \tan^{-1}\left(\frac{1}{2}(\sqrt{3} + i)x\right)}{\sqrt{\frac{1}{6}(1 - i\sqrt{3})}} - 8\sqrt{3}e \tan^{-1}\left(\frac{\sqrt{3}}{2x^2 + 1}\right) \right)$$

Warning: Unable to verify antiderivative.

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

[Out] $((6*(e + 2*e*x^2 + x*(d + f - d*x^2 + 2*f*x^2)))/(1 + x^2 + x^4) - (((-11*I + \text{Sqrt}[3])*d - 2*(-2*I + \text{Sqrt}[3])*f)*\text{ArcTan}[((-I + \text{Sqrt}[3])*x)/2])/ \text{Sqrt}[(1 + I*\text{Sqrt}[3])/6] - (((11*I + \text{Sqrt}[3])*d - 2*(2*I + \text{Sqrt}[3])*f)*\text{ArcTan}[(I + \text{Sqrt}[3])*x)/2])/ \text{Sqrt}[(1 - I*\text{Sqrt}[3])/6] - 8*\text{Sqrt}[3]*e*\text{ArcTan}[\text{Sqrt}[3]/(1 + 2*x^2)])/36$

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2)/(1 + x^2 + x^4)^2, x]

fricas [A] time = 1.59, size = 212, normalized size = 1.28

$$\frac{12(d-2f)^2 - 24ae^2 - 2\sqrt{3}((4d-8e+f)x^4 + (4d-8e+f)^2 + 4d-8e+f) \arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) - 2\sqrt{3}((4d+8e+f)x^4 + (4d+8e+f)^2 + 4d+8e+f) \arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) - 12(d+f)x - 9((2d-f)x^4 + (2d-f)x^2 + 2d-f) \log(x^2+x+1) + 9((2d-f)x^4 + (2d-f)x^2 + 2d-f) \log(x^2-x+1) - 12e}{72(x^4+x^2+1)}$$

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] $-1/72*(12*(d - 2*f)*x^3 - 24*e*x^2 - 2*\text{sqrt}(3)*((4*d - 8*e + f)*x^4 + (4*d - 8*e + f)*x^2 + 4*d - 8*e + f)*\arctan(1/3*\text{sqrt}(3)*(2*x + 1)) - 2*\text{sqrt}(3)*((4*d + 8*e + f)*x^4 + (4*d + 8*e + f)*x^2 + 4*d + 8*e + f)*\arctan(1/3*\text{sqrt}(3)*(2*x - 1)) - 12*(d + f)*x - 9*((2*d - f)*x^4 + (2*d - f)*x^2 + 2*d - f)*\log(x^2 + x + 1) + 9*((2*d - f)*x^4 + (2*d - f)*x^2 + 2*d - f)*\log(x^2 - x + 1) - 12*e)/(x^4 + x^2 + 1)$

giac [A] time = 0.23, size = 128, normalized size = 0.78

$$\frac{1}{36} \sqrt{3} (4d + f - 8e) \arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{36} \sqrt{3} (4d + f + 8e) \arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{8} (2d-f) \log(x^2+x+1) - \frac{1}{8} (2d-f) \log(x^2-x+1) - \frac{dx^3 - 2fx^3 - 2x^2e - dx - fx - e}{6(x^4+x^2+1)}$$

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] $1/36*\text{sqrt}(3)*(4*d + f - 8*e)*\arctan(1/3*\text{sqrt}(3)*(2*x + 1)) + 1/36*\text{sqrt}(3)*(4*d + f + 8*e)*\arctan(1/3*\text{sqrt}(3)*(2*x - 1)) + 1/8*(2*d - f)*\log(x^2 + x + 1) - 1/8*(2*d - f)*\log(x^2 - x + 1) - 1/6*(d*x^3 - 2*f*x^3 - 2*x^2*e - d*x - f*x - e)/(x^4 + x^2 + 1)$

maple [A] time = 0.01, size = 214, normalized size = 1.30

$$\frac{\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right) + \sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right) + d \ln(x^2-x+1) + d \ln(x^2+x+1) - \frac{2\sqrt{3} e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right) + 2\sqrt{3} e \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right) + \sqrt{3} f \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right) + \sqrt{3} f \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{36} + f \ln(x^2-x+1) + f \ln(x^2+x+1) + \frac{2d}{3} + \frac{f}{3} + \left(\frac{d}{3} - \frac{e}{3} + \frac{2f}{3}\right)x - \frac{2d}{3} - \frac{f}{3} + \left(\frac{d}{3} - \frac{e}{3} - \frac{2f}{3}\right)x}{4(x^4+x^2+1)}$$

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

$$\frac{1}{36}\sqrt{3}(4d-8e+f)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)+\frac{1}{36}\sqrt{3}(4d+8e+f)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{1}{8}(2d-f)\log(x^2+x+1)-\frac{1}{8}(2d-f)\log(x^2-x+1)-\frac{(d-2f)x^3-2ex^2-(d+f)x-e}{6(x^4+x^2+1)}$$

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

$$\left(\frac{d-f}{6}\right)\frac{x^3+\frac{d+e}{2}x+\frac{e}{2}}{x^4+x^2+1}-\ln\left(x-\frac{\sqrt{3}i}{2}\right)\left(\frac{d-f}{4}-\frac{f}{8}+\frac{\sqrt{3}d1i}{18}+\frac{\sqrt{3}e1i}{9}+\frac{\sqrt{3}f1i}{72}\right)-\ln\left(x+\frac{\sqrt{3}i}{2}\right)\left(\frac{d-f}{4}-\frac{f}{8}+\frac{\sqrt{3}d1i}{18}-\frac{\sqrt{3}e1i}{9}+\frac{\sqrt{3}f1i}{72}\right)+\ln\left(x-\frac{\sqrt{3}i}{2}\right)\left(\frac{d}{8}-\frac{d}{4}+\frac{\sqrt{3}d1i}{18}+\frac{\sqrt{3}e1i}{9}+\frac{\sqrt{3}f1i}{72}\right)+\ln\left(x+\frac{\sqrt{3}i}{2}\right)\left(\frac{d}{8}-\frac{d}{4}+\frac{\sqrt{3}d1i}{18}-\frac{\sqrt{3}e1i}{9}+\frac{\sqrt{3}f1i}{72}\right)$$

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
```

$$\begin{aligned}
& + 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}) + (-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} + 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 + \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} + 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} + 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 - \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*
\end{aligned}$$

$$\begin{aligned}
& *3e^{**2}f + 5400d^{**3}f^{**3} - 126976d^{**2}e^{**4} - 278400d^{**2}e^{**2}f^{**2} - 4131d^{**2}f^{**4} + 102400d^{**4}ef + 93568d^{**2}e^{**2}f^{**3} + 81d^{**5}f^{**5} - 28672e^{**4}f^{**2} - 11648e^{**2}f^{**4} + 189f^{**6}) + (d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) \cdot \log(x + (-164944d^{**5}e + 16416d^{**5}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) + 336520d^{**4}ef + 200664d^{**4}f(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) - 115200d^{**3}e^{**3} - 504576d^{**3}e^{**2}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) - 272380d^{**3}ef^{**2} + 1734912d^{**3}e(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72)^{**2} - 229500d^{**3}f^{**2}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) + 2612736d^{**3}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72)^{**3} + 51840d^{**2}e^{**3}f + 881280d^{**2}e^{**2}f(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) + 119420d^{**2}ef^{**3} - 2477952d^{**2}ef(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72)^{**2} + 50436d^{**2}f^{**3}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) - 2519424d^{**2}f(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72)^{**3} + 28672d^{**5} + 184320d^{**4}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) + 8640d^{**3}f^{**2} + 774144d^{**3}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72)^{**2} - 409536d^{**2}f^{**2}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) + 4976640d^{**2}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72)^{**3} - 31040d^{**4}ef^{**4} + 1270080d^{**2}ef^{**2}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72)^{**2} + 14040d^{**4}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) + 139968d^{**2}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72)^{**3} - 20480e^{**5}f - 36864e^{**4}f(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) - 2880e^{**3}f^{**3} - 552960e^{**3}f(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72)^{**2} + 70848e^{**2}f^{**3}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) - 995328e^{**2}f(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72)^{**3} + 3956ef^{**5} - 209088ef^{**3}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72)^{**2} - 3996f^{**5}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72) + 233280f^{**3}(d/4 - f/8 + \sqrt{3})I(4d - 8e + f)/72)^{**3})/(53568d^{**6} - 69984d^{**5}f - 182528d^{**4}e^{**2} + 23652d^{**4}f^{**2} + 377344d^{**3}e^{**2}f + 5400d^{**3}f^{**3} - 126976d^{**2}e^{**4} - 278400d^{**2}e^{**2}f^{**2} - 4131d^{**2}f^{**4} + 102400d^{**4}ef + 93568d^{**2}e^{**2}f^{**3} + 81d^{**5}f^{**5} - 28672e^{**4}f^{**2} - 11648e^{**2}f^{**4} + 189f^{**6}) + (2e^{**x} + e + x^{**3}(-d + 2f) + x(d + f))/(6x^{**4} + 6x^{**2} + 6)
\end{aligned}$$

$$3.33 \quad \int \frac{d+ex+fx^2+gx^3}{(1+x^2+x^4)^2} dx$$

Optimal. Leaf size=179

$$-\frac{1}{8}(2d-f)\log(x^2-x+1)+\frac{1}{8}(2d-f)\log(x^2+x+1)+\frac{x(-x^2(d-2f)+d+f)}{6(x^4+x^2+1)}-\frac{(4d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}+\frac{(4d+f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{12\sqrt{3}}+\frac{x^2(2e-g)+e-2g}{6(x^4+x^2+1)}+\frac{(2e-g)\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

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}

$$\frac{x(x^2(-d-2f)+d+f)}{6(x^4+x^2+1)}-\frac{1}{8}(2d-f)\log(x^2-x+1)+\frac{1}{8}(2d-f)\log(x^2+x+1)-\frac{(4d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}+\frac{(4d+f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{12\sqrt{3}}+\frac{x^2(2e-g)+e-2g}{6(x^4+x^2+1)}+\frac{(2e-g)\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

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[Int[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] :> Simp[(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] :> Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(1 + x^2 + x^4)^2} dx &= \int \frac{d + fx^2}{(1 + x^2 + x^4)^2} dx + \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^2} dx \\
&= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + (-d + 2f)x^2}{1 + x^2 + x^4} dx + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(1 + x + x^2)^2} dx \right) \\
&= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{1}{12} \int \frac{5d - f - (6d - 3f)x}{1 - x + x^2} dx + \frac{1}{12} \int \frac{e + gx}{(1 + x + x^2)^2} dx \\
&= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{1}{8}(2d - f) \int \frac{1 + 2x}{1 + x + x^2} dx + \frac{1}{8}(-2d + f) \int \frac{1 - 2x}{1 + x + x^2} dx \\
&= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{(2e - g) \tan^{-1} \left(\frac{1 + 2x}{\sqrt{3}} \right)}{3\sqrt{3}} - \frac{1}{8}(2d - f) \log \left(\frac{1 + 2x}{1 + x + x^2} \right) \\
&= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} - \frac{(4d + f) \tan^{-1} \left(\frac{1 - 2x}{\sqrt{3}} \right)}{12\sqrt{3}} + \frac{(4d + f) \tan^{-1} \left(\frac{1 + 2x}{\sqrt{3}} \right)}{12\sqrt{3}}
\end{aligned}$$

Mathematica [C] time = 0.43, size = 200, normalized size = 1.12

$$\frac{1}{36} \left(\frac{6(x(-dx^2 + d + 2fx^2 + f) + 2ex^2 + e - g(x^2 + 2))}{x^4 + x^2 + 1} - \frac{((\sqrt{3} - 11i)d - 2(\sqrt{3} - 2i)f) \tan^{-1} \left(\frac{1}{2}(\sqrt{3} - i)x \right)}{\sqrt[4]{6}(1 + i\sqrt{3})} - \frac{((\sqrt{3} + 11i)d - 2(\sqrt{3} + 2i)f) \tan^{-1} \left(\frac{1}{2}(\sqrt{3} + i)x \right)}{\sqrt[4]{6}(1 - i\sqrt{3})} - 4\sqrt{3}(2e - g) \tan^{-1} \left(\frac{\sqrt{3}}{2x^2 + 1} \right) \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^2,x]

[Out]
$$\frac{((6*(e + 2*e*x^2 - g*(2 + x^2) + x*(d + f - d*x^2 + 2*f*x^2)))/(1 + x^2 + x^4) - (((-11*I + \sqrt{3})*d - 2*(-2*I + \sqrt{3})*f)*\text{ArcTan}[((-I + \sqrt{3})*x)/2])/ \sqrt{(1 + I*\sqrt{3})/6} - (((11*I + \sqrt{3})*d - 2*(2*I + \sqrt{3})*f)*\text{ArcTan}[(I + \sqrt{3})*x]/2))/ \sqrt{(1 - I*\sqrt{3})/6} - 4*\sqrt{3}*(2*e - g)*\text{ArcTan}[\sqrt{3}/(1 + 2*x^2)])/36$$

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

$$\int \frac{d + ex + fx^2 + gx^3}{(1 + x^2 + x^4)^2} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^2,x]

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^2, x]

fricas [A] time = 2.03, size = 239, normalized size = 1.34

$$\frac{12(d-2f)^2-12(2e-g)^2-2\sqrt{3}(4d-8e+f+4g)^2+(4d-8e+f+4g)^2+4d-8e+f+4g\arctan\left(\frac{1}{\sqrt{3}}(2x+1)\right)-2\sqrt{3}(4d+8e+f-4g)^2+(4d+8e+f-4g)^2+4d+8e+f-4g\arctan\left(\frac{1}{\sqrt{3}}(2x-1)\right)-12(dx+f)x-9(2d-f)^2+(2d-f)^2+2d-f\log(x^2+x+1)+9(2d-f)^2+(2d-f)^2\log(x^2-x+1)-12e+24g}{72(x^2+x^2+1)}$$

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

$$\frac{1}{36}\sqrt{3}(4d+f+4g-8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)+\frac{1}{36}\sqrt{3}(4d+f-4g+8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{1}{8}(2d-f)\log(x^2+x+1)-\frac{1}{8}(2d-f)\log(x^2-x+1)-\frac{dx^3-2fx^2+gx^2-2x^2e-dx-fx+2g-e}{6(x^2+x^2+1)}$$

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]
$$1/36*\sqrt{3}*(4*d + f + 4*g - 8*e)*\arctan(1/3*\sqrt{3}*(2*x + 1)) + 1/36*\sqrt{3}*(4*d + f - 4*g + 8*e)*\arctan(1/3*\sqrt{3}*(2*x - 1)) + 1/8*(2*d - f)*\log(x^2 + x + 1) - 1/8*(2*d - f)*\log(x^2 - x + 1) - 1/6*(d*x^3 - 2*f*x^3 + g*x^2 - 2*x^2*e - d*x - f*x + 2*g - e)/(x^4 + x^2 + 1)$$

maple [A] time = 0.02, size = 260, normalized size = 1.45

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

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)+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

$$\frac{1}{36}\sqrt{3}(4d-8e+f+4g)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)+\frac{1}{36}\sqrt{3}(4d+8e+f-4g)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{1}{8}(2d-f)\log(x^2+x+1)-\frac{1}{8}(2d-f)\log(x^2-x+1)-\frac{(d-2f)x^3-(2e-g)x^2-(d+f)x-e+2g}{6(x^4+x^2+1)}$$

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*sqrt(3)*(4*d + 8*e + f - 4*g)*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 - 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

$$\frac{(f-g)x^3+(f+g)x^2+ex+d}{x^4+x^2+1}\ln\left(\frac{1}{2}, \frac{\sqrt{3}i}{2}\right)\left(\frac{d}{8}, \frac{\sqrt{3}d}{18}, \frac{\sqrt{3}e}{9}, \frac{\sqrt{3}f}{72}, \frac{\sqrt{3}g}{18}\right)\ln\left(\frac{1}{2}, \frac{\sqrt{3}i}{2}\right)\left(\frac{d}{8}, \frac{\sqrt{3}d}{18}, \frac{\sqrt{3}e}{9}, \frac{\sqrt{3}f}{72}, \frac{\sqrt{3}g}{18}\right)+\ln\left(-\frac{1}{2}, \frac{\sqrt{3}i}{2}\right)\left(\frac{d}{8}, \frac{\sqrt{3}d}{18}, \frac{\sqrt{3}e}{9}, \frac{\sqrt{3}f}{72}, \frac{\sqrt{3}g}{18}\right)+\ln\left(-\frac{1}{2}, \frac{\sqrt{3}i}{2}\right)\left(\frac{d}{8}, \frac{\sqrt{3}d}{18}, \frac{\sqrt{3}e}{9}, \frac{\sqrt{3}f}{72}, \frac{\sqrt{3}g}{18}\right)$$

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

$$3.34 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{(1+x^2+x^4)^2} dx$$

Optimal. Leaf size=187

$$-\frac{1}{8} \log(x^2 - x + 1)(2d - f + h) + \frac{1}{8} \log(x^2 + x + 1)(2d - f + h) + \frac{x(-x^2(d - 2f + h) + d + f - 2h)}{6(x^4 + x^2 + 1)} - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{1}$$

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}

$$\frac{x(x^2-(d-2f+h)+d+f-2h)}{6(x^4+x^2+1)} - \frac{1}{8} \log(x^2-x+1)(2d-f+h) + \frac{1}{8} \log(x^2+x+1)(2d-f+h) - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(4d+f+h)}{12\sqrt{3}} + \frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(4d+f+h)}{12\sqrt{3}} + \frac{x^2(2e-g)+e-2g}{6(x^4+x^2+1)} + \frac{(2e-g)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

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[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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]] /; 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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3 + hx^4}{(1 + x^2 + x^4)^2} dx &= \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^2} dx \\ &= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx + \frac{1}{2} \\ &= \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{12} \int \frac{5d - f + 2h - (d - 2f + h)x^2}{1 - x^2} dx \\ &= \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{3}(-2e + g) \operatorname{Subst}\left(\int \frac{1}{1 - u^2} du, x, \sqrt{1 + x^2 + x^4}\right) \\ &= \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{(2e - g) \tan^{-1}\left(\frac{1 + 2x^2}{\sqrt{3}}\right)}{3\sqrt{3}} \\ &= \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} - \frac{(4d + f + h) \tan^{-1}\left(\frac{1 + 2x^2}{\sqrt{3}}\right)}{12\sqrt{3}} \end{aligned}$$

Mathematica [C] time = 0.61, size = 234, normalized size = 1.25

$$\frac{1}{36} \left(\frac{6(x(d(x^2-1) - f(2x^2+1) + h(x^2+2)) - e(2x^2+1) + g(x^2+2))}{x^4 + x^2 + 1} \operatorname{atan}^{-1}\left(\frac{\frac{1}{2}(\sqrt{3}-i)x}{\sqrt{\frac{1}{2}(1+i\sqrt{3})}}\right) \frac{\tan^{-1}\left(\frac{\frac{1}{2}(\sqrt{3}-i)x}{\sqrt{\frac{1}{2}(1+i\sqrt{3})}}\right)}{\sqrt{\frac{1}{2}(1+i\sqrt{3})}} - \frac{\tan^{-1}\left(\frac{\frac{1}{2}(\sqrt{3}+i)x}{\sqrt{\frac{1}{2}(1-i\sqrt{3})}}\right)}{\sqrt{\frac{1}{2}(1-i\sqrt{3})}} - 4\sqrt{3}(2e-g) \operatorname{atan}^{-1}\left(\frac{\sqrt{3}}{2x^2+1}\right) \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^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[Sqrt[3]/(1 + 2*x^2)]/36

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(1 + x^2 + x^4)^2} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^2,x]

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^2, x]

fricas [A] time = 5.91, size = 255, normalized size = 1.36

$\frac{12(d-2f+h)^2-12(d-g)^2-2\sqrt{3}((4d-8e+f+4g+h)^2+(4d-8e+f+4g+h)^2+4d-8e+f+4g+h)\arctan(\frac{1}{\sqrt{3}}(2x+1))-2\sqrt{3}((4d+8e+f-4g+h)^2+(4d+8e+f-4g+h)^2+4d+8e+f-4g+h)\arctan(\frac{1}{\sqrt{3}}(2x-1))-12(d+f-2h)-9((2d-f+h)^2+(2d-f+h)^2+2d-f+h)\log(x^2+x+1)+9((2d-f+h)^2+(2d-f+h)^2+2d-f+h)\log(x^2-x+1)-12e+24g}{72(x^4+x^2+1)}$

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+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)*arctan(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

$\frac{1}{36}\sqrt{3}(4d+f+4g+h-8e)\arctan(\frac{1}{3}\sqrt{3}(2x+1))+\frac{1}{36}\sqrt{3}(4d+f-4g+h+8e)\arctan(\frac{1}{3}\sqrt{3}(2x-1))+\frac{1}{8}(2d-f+h)\log(x^2+x+1)-\frac{1}{8}(2d-f+h)\log(x^2-x+1)-\frac{dx^3-2fx^3+hx^3+gx^2-2x^2e-dx-fx+2hx+2g-e}{6(x^4+x^2+1)}$

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+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

$\frac{\sqrt{3}\arctan(\frac{2x+1}{\sqrt{3}})+\sqrt{3}\arctan(\frac{2x-1}{\sqrt{3}})+\ln(x^2+x+1)+\ln(x^2-x+1)+\frac{2\sqrt{3}\arctan(\frac{2x+1}{\sqrt{3}})+2\sqrt{3}\arctan(\frac{2x-1}{\sqrt{3}})+\sqrt{3}\arctan(\frac{2x+1}{\sqrt{3}})+\sqrt{3}\arctan(\frac{2x-1}{\sqrt{3}})+\ln(x^2+x+1)+\ln(x^2-x+1)+\sqrt{3}\arctan(\frac{2x+1}{\sqrt{3}})+\sqrt{3}\arctan(\frac{2x-1}{\sqrt{3}})+\sqrt{3}\arctan(\frac{2x+1}{\sqrt{3}})+\sqrt{3}\arctan(\frac{2x-1}{\sqrt{3}})+\ln(x^2+x+1)+\ln(x^2-x+1)+\frac{2x^3-2fx^3+hx^3+gx^2-2x^2e-dx-fx+2hx+2g-e}{6(x^4+x^2+1)}}{4(x^4+x^2+1)}$

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*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

$$\begin{aligned} & \sqrt[3]{3} \arctan\left(\frac{1}{3}\sqrt[3]{3}(2x+1)\right) + \frac{1}{9}\sqrt[3]{3} g \arctan\left(\frac{1}{3}\sqrt[3]{3}(2x+1)\right) + \frac{1}{36}\sqrt[3]{3} h \arctan\left(\frac{1}{3}\sqrt[3]{3}(2x+1)\right) \\ & - \frac{1}{4} \left(\frac{1}{3}d - \frac{2}{3}f - \frac{1}{3}g - \frac{1}{3}e + \frac{1}{3}h \right) \frac{x - \frac{2}{3}d + \frac{1}{3}f + \frac{2}{3}g - \frac{1}{3}e + \frac{1}{3}h}{(x^2 - x + 1)} \\ & - \frac{1}{4}d \ln(x^2 - x + 1) + \frac{1}{8}f \ln(x^2 - x + 1) - \frac{1}{8}h \ln(x^2 - x + 1) \\ & + \frac{1}{9}\sqrt[3]{3} d \arctan\left(\frac{1}{3}\sqrt[3]{3}(2x-1)\right) + \frac{2}{9}\sqrt[3]{3} e \arctan\left(\frac{1}{3}\sqrt[3]{3}(2x-1)\right) \\ & + \frac{1}{36}\sqrt[3]{3} f \arctan\left(\frac{1}{3}\sqrt[3]{3}(2x-1)\right) - \frac{1}{9}\sqrt[3]{3} g \arctan\left(\frac{1}{3}\sqrt[3]{3}(2x-1)\right) \\ & + \frac{1}{36}\sqrt[3]{3} h \arctan\left(\frac{1}{3}\sqrt[3]{3}(2x-1)\right) \end{aligned}$$

maxima [A] time = 2.95, size = 143, normalized size = 0.76

$$\frac{1}{36}\sqrt{3}(4d-8e+f+4g+h)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{36}\sqrt{3}(4d+8e+f-4g+h)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{8}(2d-f+h)\log(x^2+x+1) - \frac{1}{8}(2d-f+h)\log(x^2-x+1) - \frac{(d-2f+h)x^3 - (2e-g)x^2 - (d+f-2h)x - e + 2g}{6(x^4+x^2+1)}$$

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+x^2+1)^2,x, algorithm="maxima")

[Out] $\frac{1}{36}\sqrt{3}(4d-8e+f+4g+h)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{36}\sqrt{3}(4d+8e+f-4g+h)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{8}(2d-f+h)\log(x^2+x+1) - \frac{1}{8}(2d-f+h)\log(x^2-x+1) - \frac{1}{6}\left(\frac{(d-2f+h)x^3 - (2e-g)x^2 - (d+f-2h)x - e + 2g}{x^4+x^2+1}\right)$

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] $\frac{(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*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) * (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*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) * (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)$

$$\begin{aligned}
& i)/18 - (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72 + (3^{(1/2)}*g*1i)/18 + (3^{(1/2)} \\
& *h*1i)/72) + \log(120*d*e + 153*d*f - 60*d*g - 24*e*f - 135*d*h + 48*e*h + 1 \\
& 2*f*g + 81*f*h - 24*g*h + 3^{(1/2)}*d^2*90i + 3^{(1/2)}*f^2*9i + 3^{(1/2)}*h^2*18 \\
& i + 198*d^2*x + 36*f^2*x + 45*h^2*x - 126*d^2 - 45*f^2 - 36*h^2 + 3^{(1/2)}*d \\
& *e*56i - 3^{(1/2)}*d*f*63i - 3^{(1/2)}*d*g*28i - 3^{(1/2)}*e*f*40i + 3^{(1/2)}*d*h* \\
& 81i + 3^{(1/2)}*e*h*32i + 3^{(1/2)}*f*g*20i - 3^{(1/2)}*f*h*27i - 3^{(1/2)}*g*h*16i \\
& + 24*d*e*x - 171*d*f*x - 12*d*g*x - 48*e*f*x + 189*d*h*x + 24*e*h*x + 24*f \\
& *g*x - 81*f*h*x - 12*g*h*x + 3^{(1/2)}*d^2*x*18i + 3^{(1/2)}*f^2*x*18i + 3^{(1/2)} \\
&)*h^2*x*9i - 3^{(1/2)}*d*f*x*45i + 3^{(1/2)}*d*g*x*44i + 3^{(1/2)}*e*f*x*32i + 3^{(1/2)} \\
& (1/2)*d*h*x*27i - 3^{(1/2)}*e*h*x*40i - 3^{(1/2)}*f*g*x*16i - 3^{(1/2)}*f*h*x*27i \\
& + 3^{(1/2)}*g*h*x*20i - 3^{(1/2)}*d*e*x*88i)*(f/8 - d/4 - h/8 + (3^{(1/2)}*d*1i) \\
& /18 + (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72 - (3^{(1/2)}*g*1i)/18 + (3^{(1/2)}*h \\
& *1i)/72)
\end{aligned}$$

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

$$3.35 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(1+x^2+x^4)^2} dx$$

Optimal. Leaf size=194

$$-\frac{1}{8} \log(x^2 - x + 1)(2d - f + h) + \frac{1}{8} \log(x^2 + x + 1)(2d - f + h) + \frac{x(-x^2(d - 2f + h) + d + f - 2h)}{6(x^4 + x^2 + 1)} - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}$$

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}

$$\frac{x(x^2(-d-2f+h)+d+f-2h)}{6(x^4+x^2+1)} - \frac{1}{8} \log(x^2-x+1)(2d-f+h) + \frac{1}{8} \log(x^2+x+1)(2d-f+h) - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(4d+f+h)}{12\sqrt{3}} + \frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(4d+f+h)}{12\sqrt{3}} + \frac{x^2(2e-g-i)+e-2g+i}{6(x^4+x^2+1)} + \frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(2e-g+2i)}{3\sqrt{3}}$$

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)/Sqrt[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] && !MatchQ[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[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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 +

$(d - e*q)*x)/(q + r*x + x^2), x], x]] /; \text{FreeQ}\{a, b, c, d, e\}, x\} \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{NeQ}[c*d^2 - b*d*e + a*e^2, 0] \&\& \text{NegQ}[b^2 - 4*a*c]$

Rule 1660

$\text{Int}[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^{(p_)}, x_Symbol] :> \text{With}\{Q = \text{PolynomialQuotient}[Pq, a + b*x + c*x^2, x], f = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x + c*x^2, x], x, 0], g = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x + c*x^2, x], x, 1]\}, \text{Simp}[(b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^{(p + 1)} / ((p + 1)*(b^2 - 4*a*c)), x] + \text{Dist}[1 / ((p + 1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x + c*x^2)^{(p + 1)} * \text{ExpandToSum}[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(2*c*f - b*g), x], x], x]] /; \text{FreeQ}\{a, b, c\}, x\} \&\& \text{PolyQ}[Pq, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1]$

Rule 1663

$\text{Int}[(Pq_)*(x_)^{(m_.)}*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^{(p_)}, x_Symbol] :> \text{Dist}[1/2, \text{Subst}[\text{Int}[x^{((m - 1)/2)} * \text{SubstFor}[x^2, Pq, x]*(a + b*x + c*x^2)^p, x], x, x^2], x] /; \text{FreeQ}\{a, b, c, p\}, x\} \&\& \text{PolyQ}[Pq, x^2] \&\& \text{IntegerQ}[(m - 1)/2]$

Rule 1673

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

Rule 1678

$\text{Int}[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^{(p_)}, x_Symbol] :> \text{With}\{d = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x^2 + c*x^4, x], x, 0], e = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x^2 + c*x^4, x], x, 2]\}, \text{Simp}[(x*(a + b*x^2 + c*x^4)^{(p + 1)}*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)) / (2*a*(p + 1)*(b^2 - 4*a*c)), x] + \text{Dist}[1 / (2*a*(p + 1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x^2 + c*x^4)^{(p + 1)} * \text{ExpandToSum}[2*a*(p + 1)*(b^2 - 4*a*c)*\text{PolynomialQuotient}[Pq, a + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; \text{FreeQ}\{a, b, c\}, x\} \&\& \text{PolyQ}[Pq, x^2] \&\& \text{Expon}[Pq, x^2] > 1 \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1]$

Rubi steps

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 35x^5}{(1 + x^2 + x^4)^2} dx = \int \frac{x(e + gx^2 + 35x^4)}{(1 + x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^2} dx$$

$$= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4}$$

$$= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{12}$$

$$= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6}$$

$$= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} - \frac{1}{8}$$

$$= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} - \frac{4d}{8}$$

Mathematica [C] time = 0.66, size = 243, normalized size = 1.25

$$\frac{1}{36} \left(\frac{6(-dx^3 + dx + 2ex^2 + e + 2fx^3 + fx - g(x^2 + 2) - hx^3 - 2hx - ix^2 + i)}{x^4 + x^2 + 1} - \frac{\tan^{-1}\left(\frac{1}{2}(\sqrt{3} - i)x\right)((\sqrt{3} - 11i)d - 2(\sqrt{3} - 2i)f + (\sqrt{3} - 5i)h)}{\sqrt{\frac{1}{2}(1 + i\sqrt{3})}} - \frac{\tan^{-1}\left(\frac{1}{2}(\sqrt{3} + i)x\right)((\sqrt{3} + 11i)d - 2(\sqrt{3} + 2i)f + (\sqrt{3} + 5i)h)}{\sqrt{\frac{1}{2}(1 - i\sqrt{3})}} - 4\sqrt{3} \tan^{-1}\left(\frac{\sqrt{3}}{2x^2 + 1}\right)(2e - g + 2i) \right)$$

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[(-1 + 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[(1 + 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
```

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + ix^5}{(1 + x^2 + x^4)^2} dx$$

Verification is not applicable to the result.

```
[In] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4)^2,x]
```

```
[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4)^2, x]
```

fricas [A] time = 23.83, size = 279, normalized size = 1.44

$$\frac{12(d - 2f + h)^2 - 12(2e - g - i)^2 - 2\sqrt{3}((4d - 8e + f + 4g + h - 8i)^2 + (4d - 8e + f + 4g + h - 8i)^2 + 4d - 8e + f + 4g + h - 8i) \arctan\left(\frac{1}{\sqrt{3}}(2x + 1)\right) - 2\sqrt{3}((4d + 8e + f - 4g + h + 8i)^2 + (4d + 8e + f - 4g + h + 8i)^2 + 4d + 8e + f - 4g + h + 8i) \arctan\left(\frac{1}{\sqrt{3}}(2x - 1)\right) - 12(e + f - 2i)(2d - f + h)^2 + (2d - f + h)^2 + 2d - f + h \log\left(\frac{2x + 1}{2x - 1}\right) + (2d - f + h)^2 + (2d - f + h)^2 + 2d - f + h \log\left(\frac{2x - 1}{2x + 1}\right) - 12e - 24g - 12i}{2(1 + x^2 + x^4)}$$

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+x^2+1)^2,x, algorithm="fricas")
```

```
[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
```

$$+ f + 4*g + h - 8*i)*\arctan(1/3*\sqrt{3}*(2*x + 1)) - 2*\sqrt{3}*((4*d + 8*e + f - 4*g + h + 8*i)*x^4 + (4*d + 8*e + f - 4*g + h + 8*i)*x^2 + 4*d + 8*e + f - 4*g + h + 8*i)*\arctan(1/3*\sqrt{3}*(2*x - 1)) - 12*(d + f - 2*h)*x - 9*((2*d - f + h)*x^4 + (2*d - f + h)*x^2 + 2*d - f + h)*\log(x^2 + x + 1) + 9*((2*d - f + h)*x^4 + (2*d - f + h)*x^2 + 2*d - f + h)*\log(x^2 - x + 1) - 12*e + 24*g - 12*i)/(x^4 + x^2 + 1)$$

giac [A] time = 0.31, size = 169, normalized size = 0.87

$$\frac{1}{36}\sqrt{3}(4d+f+4g+h-8i-e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{36}\sqrt{3}(4d+f-4g+h+8i+8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{8}(2d-f+h)\log(x^2+x+1) - \frac{1}{8}(2d-f+h)\log(x^2-x+1) - \frac{dx^3-2fx^2+hx^3+gx^2+ix^2-2x^2e-dx-fx+2hx+2g-i-e}{6(x^4+x^2+1)}$$

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

$$\frac{1}{36}\sqrt{3}(4d+f+4g+h-8i-e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{36}\sqrt{3}(4d+f-4g+h+8i+8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{8}(2d-f+h)\log(x^2+x+1) - \frac{1}{8}(2d-f+h)\log(x^2-x+1) - \frac{dx^3-2fx^2+hx^3+gx^2+ix^2-2x^2e-dx-fx+2hx+2g-i-e}{6(x^4+x^2+1)}$$

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*arctan(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

$$\frac{1}{36}\sqrt{3}(4d-8e+f+4g+h-8i)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{36}\sqrt{3}(4d+8e+f-4g+h+8i)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{8}(2d-f+h)\log(x^2+x+1) - \frac{1}{8}(2d-f+h)\log(x^2-x+1) - \frac{(d-2f+h)x^3-(2e-g-i)x^2-(d+f-2h)x-e+2g-i}{6(x^4+x^2+1)}$$

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="maxima")

[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
```

$$3.36 \quad \int \frac{d+ex}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=330

$$\frac{dx(-2ac + b^2 + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}d(b\sqrt{b^2 - 4ac} - 12ac + b^2)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right)}{2\sqrt{2}a(b^2 - 4ac)^{3/2}\sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{\sqrt{c}d(-b\sqrt{b^2 - 4ac} - 12ac + b^2)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b + \sqrt{b^2 - 4ac}}}\right)}{2\sqrt{2}a(b^2 - 4ac)^{3/2}\sqrt{b + \sqrt{b^2 - 4ac}}}$$

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}

$$\frac{dx(-2ac + b^2 + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}d(b\sqrt{b^2 - 4ac} - 12ac + b^2)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right)}{2\sqrt{2}a(b^2 - 4ac)^{3/2}\sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{\sqrt{c}d(-b\sqrt{b^2 - 4ac} - 12ac + b^2)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b + \sqrt{b^2 - 4ac}}}\right)}{2\sqrt{2}a(b^2 - 4ac)^{3/2}\sqrt{b + \sqrt{b^2 - 4ac}}} - \frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{2ce \tanh^{-1}\left(\frac{b + 2cx^2}{\sqrt{b^2 - 4ac}}\right)}{(b^2 - 4ac)^{3/2}}$$

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 + 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] && !MatchQ[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] && (GtQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] && NeQ[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

$$\begin{aligned} \int \frac{d + ex}{(a + bx^2 + cx^4)^2} dx &= \int \frac{d}{(a + bx^2 + cx^4)^2} dx + \int \frac{ex}{(a + bx^2 + cx^4)^2} dx \\ &= d \int \frac{1}{(a + bx^2 + cx^4)^2} dx + e \int \frac{x}{(a + bx^2 + cx^4)^2} dx \\ &= \frac{dx(b^2 - 2ac + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{d \int \frac{b^2 - 2ac - 2(b^2 - 4ac) - bcx^2}{a + bx^2 + cx^4} dx}{2a(b^2 - 4ac)} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(a + bx + cx^2)^2} dx, x, x^2 \right) \\ &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{dx(b^2 - 2ac + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{c(b^2 - 12ac - b\sqrt{b^2 - 4ac})}{4a^2} \\ &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{dx(b^2 - 2ac + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(b^2 - 12ac + b\sqrt{b^2 - 4ac})}{2\sqrt{2}a(b^2 - 4ac)} \\ &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{dx(b^2 - 2ac + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(b^2 - 12ac + b\sqrt{b^2 - 4ac})}{2\sqrt{2}a(b^2 - 4ac)} \end{aligned}$$

Mathematica [A] time = 0.76, size = 341, normalized size = 1.03

$$\frac{1}{4} \left(\frac{2abe + 4acx(d + ex) - 2bdx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} + \frac{\sqrt{2}\sqrt{c}d(b\sqrt{b^2 - 4ac} - 12ac + b^2)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right)}{a(b^2 - 4ac)^{3/2}\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\sqrt{2}\sqrt{c}d(b\sqrt{b^2 - 4ac} + 12ac - b^2)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b^2 - 4ac + b}}\right)}{a(b^2 - 4ac)^{3/2}\sqrt{b^2 - 4ac + b}} - \frac{4ce\log(\sqrt{b^2 - 4ac} - b - 2cx^2)}{(b^2 - 4ac)^{3/2}} + \frac{4ce\log(\sqrt{b^2 - 4ac} + b + 2cx^2)}{(b^2 - 4ac)^{3/2}} \right)$$

Antiderivative was successfully verified.

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

[Out] $((2*a*b*e + 4*a*c*x*(d + e*x) - 2*b*d*x*(b + c*x^2))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)) + (\text{Sqrt}[2]*\text{Sqrt}[c]*(b^2 - 12*a*c + b*\text{Sqrt}[b^2 - 4*a*c]))*d*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^(3/2)*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + (\text{Sqrt}[2]*\text{Sqrt}[c]*(-b^2 + 12*a*c + b*\text{Sqrt}[b^2 - 4*a*c]))*d*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^(3/2)*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) - (4*c*e*\text{Log}[-b + \text{Sqrt}[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(3/2) + (4*c*e*\text{Log}[b + \text{Sqrt}[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(3/2))/4$

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

$$\int \frac{d + ex}{(a + bx^2 + cx^4)^2} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x)/(a + b*x^2 + c*x^4)^2, x]

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] $1/2*(b*c*d*x^3 - 2*a*c*x^2*e + b^2*d*x - 2*a*c*d*x - a*b*e)/((c*x^4 + b*x^2 + a)*(a*b^2 - 4*a^2*c)) + 1/16*((2*b^3*c^2 - 8*a*b*c^3 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*b^3 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a*b*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*b^2*c - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b^2 - 4*a^2*c)^2*d + 2*(\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a*b^6 - 14*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b^4*c - 2*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a*b^5*c - 2*a*b^6*c + 64*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b^2*c^2 + 20*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a*b^4*c^2 + 28*a^2*b^4*c^2 - 96*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^4*c^3 - 48*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b*c^3 - 10*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 128*a^3*b^2*c^3 + 24*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^3*c^4 + 192*a^4*c^4 + 2*(b^2 - 4*a*c)*a*b^4*c - 20*(b^2 - 4*a*c)*a^2*b^2*c^2 + 48*(b^2 - 4*a*c)*a^3*c^3)*d*\text{abs}(a*b^2 - 4*a^2*c) + (2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b$

$$\begin{aligned}
&^3c^4 - 384a^5b^5c^5 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&ac)a^2b^7 + 20\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^3b^5c + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^2b^6c - 112\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^4b^3c^2 - 32\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^3b^4c^2 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^2 \\
&b^5c^2 + 192\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^5 \\
&b^5c^3 + 96\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^4 \\
&b^2c^3 + 16\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^3 \\
&b^3c^3 - 48\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^4 \\
&b^4c^4 - 2(b^2 - 4ac)a^2b^5c^2 + 32(b^2 - 4ac)a^3b^3c^3 - 96(b^2 \\
&- 4ac)a^4b^4c^4)d*\arctan(2\sqrt{1/2}*x/\sqrt{(a^3b^3 - 4a^2b^2c + \sqrt{2} \\
&\sqrt{(a^3b^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)*(a^2b^2c - 4a^2c^2))})/(a^2 \\
&b^2c - 4a^2c^2)))/((a^3b^6 - 12a^4b^4c - 2a^3b^5c + 48a^5b^2c^2 \\
&+ 16a^4b^3c^2 + a^3b^4c^2 - 64a^6c^3 - 32a^5b^3c^3 - 8a^4b^2c^3 \\
&+ 16a^5c^4)*\text{abs}(a^2b^2 - 4a^2c)*\text{abs}(c)) - 1/16*((2b^3c^2 - 8a^2b^3c^3 \\
&- \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}})*b^3 + 4\sqrt{2} \\
&)\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}})*a^2b^2c - \sqrt{2}\sqrt{b^2 - 4ac} \\
&)\sqrt{bc - \sqrt{b^2 - 4ac}})*b^2c^2 - 2(b^2 - 4ac)*b^2c^2*(a^2b^2 - \\
&4a^2c)^2*d - 2(\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})*a^2b^6 - 14\sqrt{2} \\
&)\sqrt{bc - \sqrt{b^2 - 4ac}})*a^2b^4c - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
&)*a^2b^5c + 2a^2b^6c + 64\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
&)*a^3b^2c^2 + 20\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})*a^2b^3c^2 + \\
&\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})*a^2b^4c^2 - 28a^2b^4c^2 - 96\sqrt{2} \\
&)\sqrt{bc - \sqrt{b^2 - 4ac}})*a^4c^3 - 48\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
&)*a^3b^3c^3 - 10\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})*a^2b^2 \\
&c^3 + 128a^3b^2c^3 + 24\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})*a^3c^4 \\
&- 192a^4c^4 - 2(b^2 - 4ac)*a^2b^4c + 20(b^2 - 4ac)*a^2b^2c^2 - \\
&48(b^2 - 4ac)*a^3c^3)*d*\text{abs}(a^2b^2 - 4a^2c) + (2a^2b^7c^2 - 40a^3 \\
&b^5c^3 + 224a^4b^3c^4 - 384a^5b^5c^5 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc \\
&- \sqrt{b^2 - 4ac}})*a^2b^7 + 20\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc \\
&- \sqrt{b^2 - 4ac}})*a^3b^5c + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \\
&\sqrt{b^2 - 4ac}})*a^2b^6c - 112\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \\
&\sqrt{b^2 - 4ac}})*a^4b^3c^2 - 32\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \\
&\sqrt{b^2 - 4ac}})*a^3b^4c^2 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{2} \\
&\sqrt{(b^2 - 4ac)})*a^2b^5c^2 + 192\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{2} \\
&\sqrt{(b^2 - 4ac)})*a^5b^3c^3 + 96\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{2} \\
&\sqrt{(b^2 - 4ac)})*a^4b^2c^3 + 16\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{2} \\
&\sqrt{(b^2 - 4ac)})*a^3b^3c^3 - 48\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{2} \\
&\sqrt{(b^2 - 4ac)})*a^4b^4c^4 - 2(b^2 - 4ac)*a^2b^5c^2 + 32(b^2 - 4ac)* \\
&a^3b^3c^3 - 96(b^2 - 4ac)*a^4b^4c^4)d*\arctan(2\sqrt{1/2}*x/\sqrt{(a^3b^3 - 4a^2b^2c - \sqrt{2} \\
&\sqrt{(a^3b^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)*(a^2b^2c - 4a^2c^2))})/(a^2 \\
&b^2c - 4a^2c^2)))/((a^3b^6 - 12a^4b^4c - 2a^3b^5c + 48a^5b^2c^2 + 16a^4b^3c^2 \\
&+ a^3b^4c^2 - 64a^6c^3 - 32a^5b^3c^3 - 8a^4b^2c^3 + 16a^5c^4)*\text{abs}(a^2b^2 - 4a^2c)*\text{abs}(c)) - 1/4*((b^3 \\
&c^2 - 4a^2b^3c^3 - 2b^2c^3 + b^4c^4 + (b^2c^2 - 4a^2c^3 - 2b^2c^3 + c^4) \\
&)\sqrt{b^2 - 4ac})*\text{abs}(a^2b^2 - 4a^2c)*e - (a^2b^5c^2 - 8a^2b^3c^3 - 2 \\
&a^2b^4c^3 + 16a^3b^4c^4 + 8a^2b^2c^4 + a^2b^3c^4 - 4a^2b^5c^5 + (a^2b^4 \\
&c^2 - 4a^2b^2c^3 - 2a^2b^3c^3 + a^2b^2c^4)*\sqrt{b^2 - 4ac})*e)*\log(\\
&x^2 + 1/2*(a^3b^3 - 4a^2b^2c + \sqrt{2}\sqrt{(a^3b^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c) \\
&)*(a^2b^2c - 4a^2c^2)))/(a^2b^2c - 4a^2c^2)))/((a^2b^4 - 8a^2b^2c \\
&- 2a^2b^3c + 16a^3c^2 + 8a^2b^2c^2 + a^2b^2c^2 - 4a^2c^3)*c^2*\text{abs}(a^2 \\
&b^2 - 4a^2c)) - 1/4*((b^3c^2 - 4a^2b^3c^3 - 2b^2c^3 + b^4c^4 - (b^2c^2 \\
&- 4a^2c^3 - 2b^2c^3 + c^4)*\sqrt{b^2 - 4ac})*\text{abs}(a^2b^2 - 4a^2c)*e - (a^2 \\
&>b^5c^2 - 8a^2b^3c^3 - 2a^2b^4c^3 + 16a^3b^4c^4 + 8a^2b^2c^4 + a^2b^3 \\
&c^4 - 4a^2b^5c^5 - (a^2b^4c^2 - 4a^2b^2c^3 - 2a^2b^3c^3 + a^2b^2c^4)* \\
&\sqrt{b^2 - 4ac})*e)*\log(x^2 + 1/2*(a^3b^3 - 4a^2b^2c - \sqrt{2}\sqrt{(a^3b^3 - 4a^2 \\
&b^2c)^2 - 4(a^2b^2 - 4a^3c)*(a^2b^2c - 4a^2c^2)))/(a^2b^2c - 4a^2c^2))
\end{aligned}$$

$\wedge 2) / ((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(a*b^2 - 4*a^2*c))$

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] $\text{int}((e*x+d)/(c*x^4+b*x^2+a)^2, x)$

[Out] $c/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{1/2}/c)*d*x*(-4*a*c+b^2)^{1/2}/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{1/2}/c)/a*d*x*b^2*(-4*a*c+b^2)^{1/2}-c/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{1/2}/c)*d*x*b+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{1/2}/c)/a*d*x*b^3+2*c/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{1/2}/c)*e*a-1/2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{1/2}/c)*e*b^2+c/(4*a*c-b^2)^2*e*(-4*a*c+b^2)^{1/2}*ln(2*c*x^2+b+(-4*a*c+b^2)^{1/2})+3*c^2/(4*a*c-b^2)^2*(1/2)/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*arctan(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*(-4*a*c+b^2)^{1/2}*d-1/4*c/(4*a*c-b^2)^2/a*2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*arctan(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*(-4*a*c+b^2)^{1/2}*b^2*d-c^2/(4*a*c-b^2)^2*(1/2)/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*arctan(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*b*d+1/4*c/(4*a*c-b^2)^2/a*2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*arctan(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*b^3*d-c/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{1/2}/c)*d*x*(-4*a*c+b^2)^{1/2}+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{1/2}/c)/a*d*x*b^2*(-4*a*c+b^2)^{1/2}-c/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{1/2}/c)*d*x*b+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{1/2}/c)/a*d*x*b^3+2*c/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{1/2}/c)*e*a-1/2/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{1/2}/c)*e*b^2-c/(4*a*c-b^2)^2*e*(-4*a*c+b^2)^{1/2}*ln(-2*c*x^2-b+(-4*a*c+b^2)^{1/2})+3*c^2/(4*a*c-b^2)^2*(1/2)/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*arctanh(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*(-4*a*c+b^2)^{1/2}*d-1/4*c/(4*a*c-b^2)^2/a*2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*arctanh(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*(-4*a*c+b^2)^{1/2}*b^2*d+c^2/(4*a*c-b^2)^2*(1/2)/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*arctanh(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*b*d-1/4*c/(4*a*c-b^2)^2/a*2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*arctanh(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*b^3*d$

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] $\text{integrate}((e*x+d)/(c*x^4+b*x^2+a)^2, x, \text{algorithm}="maxima")$

[Out] $1/2*(b*c*d*x^3 - 2*a*c*e*x^2 - a*b*e + (b^2 - 2*a*c)*d*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)*x^2) + 1/2*\text{integrate}((b*c*d*x^2 - 4*a*c*e*x + (b^2 - 6*a*c)*d)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c)$

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] $\text{int}((d + e*x)/(a + b*x^2 + c*x^4)^2, x)$

[Out] $((b*e)/(2*(4*a*c - b^2)) + (c*e*x^2)/(4*a*c - b^2) + (d*x*(2*a*c - b^2))/(2*a*(4*a*c - b^2)) - (b*c*d*x^3)/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4) + \text{symsum}(\log((5*b^3*c^4*d^3 - 96*a^2*c^5*d*e^2 - 36*a*b*c^5*d^3 + 16*a*b^2*c^4*d*e^2)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - \text{root}(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 -$

$$\begin{aligned}
& 61440a^5b^8c^2z^4 + 6144a^4b^{10}cz^4 - 1048576a^9c^6z^4 - 256a^3b^{12}z^4 + 61440a^5b^8c^5d^2z^2 + 432a^9b^9cd^2z^2 + 24576a^5b^2c^4e^2z^2 - 6144a^4b^4c^3e^2z^2 + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4d^2z^2 + 24064a^3b^5c^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32768a^6c^5e^2z^2 - 16b^{11}d^2z^2 - 672a^6b^6c^2d^2ez - 15872a^3b^2c^4d^2ez + 4992a^2b^4c^3d^2ez + 18432a^4c^5d^2ez + 32b^8cd^2ez - 960a^2b^8c^4d^2e^2 + 240a^3b^3c^3d^2e^2 - 16b^5c^2d^2e^2 + 360a^2b^2c^4d^4 - 256a^3c^4e^4 - 25b^4c^3d^4 - 1296a^2c^5d^4, z, k) \cdot (\text{root}(1572864a^8b^2c^5z^4 - 983040a^7b^4c^4z^4 + 327680a^6b^6c^3z^4 - 61440a^5b^8c^2z^4 + 6144a^4b^{10}cz^4 - 1048576a^9c^6z^4 - 256a^3b^{12}z^4 + 61440a^5b^8c^5d^2z^2 + 432a^9b^9cd^2z^2 + 24576a^5b^2c^4e^2z^2 - 6144a^4b^4c^3e^2z^2 + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4d^2z^2 + 24064a^3b^5c^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32768a^6c^5e^2z^2 - 16b^{11}d^2z^2 - 672a^6b^6c^2d^2ez - 15872a^3b^2c^4d^2ez + 4992a^2b^4c^3d^2ez + 18432a^4c^5d^2ez + 32b^8cd^2ez - 960a^2b^8c^4d^2e^2 + 240a^3b^3c^3d^2e^2 - 16b^5c^2d^2e^2 + 360a^2b^2c^4d^4 - 256a^3c^4e^4 - 25b^4c^3d^4 - 1296a^2c^5d^4, z, k) \cdot ((x(1024a^5c^6e - 16a^2b^6c^3e + 192a^3b^4c^4e - 768a^4b^2c^5e)) / (2(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) - (6144a^5c^6d - 288a^2b^6c^3d + 1920a^3b^4c^4d - 5632a^4b^2c^5d + 16a^2b^8c^2d) / (8(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) + (\text{root}(1572864a^8b^2c^5z^4 - 983040a^7b^4c^4z^4 + 327680a^6b^6c^3z^4 - 61440a^5b^8c^2z^4 + 6144a^4b^{10}cz^4 - 1048576a^9c^6z^4 - 256a^3b^{12}z^4 + 61440a^5b^8c^5d^2z^2 + 432a^9b^9cd^2z^2 + 24576a^5b^2c^4e^2z^2 - 6144a^4b^4c^3e^2z^2 + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4d^2z^2 + 24064a^3b^5c^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32768a^6c^5e^2z^2 - 16b^{11}d^2z^2 - 672a^6b^6c^2d^2ez - 15872a^3b^2c^4d^2ez + 4992a^2b^4c^3d^2ez + 18432a^4c^5d^2ez + 32b^8cd^2ez - 960a^2b^8c^4d^2e^2 + 240a^3b^3c^3d^2e^2 - 16b^5c^2d^2e^2 + 360a^2b^2c^4d^4 - 256a^3c^4e^4 - 25b^4c^3d^4 - 1296a^2c^5d^4, z, k) \cdot x(4096a^6b^6c^6 + 16a^2b^9c^2 - 256a^3b^7c^3 + 1536a^4b^5c^4 - 4096a^5b^3c^5)) / (2(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2))) + (32a^2b^5c^3d^2e + 1024a^3b^6c^5d^2e - 384a^2b^3c^4d^2e) / (8(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) - (x(288a^3c^6d^2 - b^6c^3d^2 + 18a^2b^4c^4d^2 - 64a^3b^6c^5e^2 - 128a^2b^2c^5d^2 + 16a^2b^3c^4e^2)) / (2(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2))) - (x(16a^2c^5e^3 - b^3c^4d^2e + 12a^2b^5d^2e)) / (2(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2))) \cdot \text{root}(1572864a^8b^2c^5z^4 - 983040a^7b^4c^4z^4 + 327680a^6b^6c^3z^4 - 61440a^5b^8c^2z^4 + 6144a^4b^{10}cz^4 - 1048576a^9c^6z^4 - 256a^3b^{12}z^4 + 61440a^5b^8c^5d^2z^2 + 432a^9b^9cd^2z^2 + 24576a^5b^2c^4e^2z^2 - 6144a^4b^4c^3e^2z^2 + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4d^2z^2 + 24064a^3b^5c^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32768a^6c^5e^2z^2 - 16b^{11}d^2z^2 - 672a^6b^6c^2d^2ez - 15872a^3b^2c^4d^2ez + 4992a^2b^4c^3d^2ez + 18432a^4c^5d^2ez + 32b^8cd^2ez - 960a^2b^8c^4d^2e^2 + 240a^3b^3c^3d^2e^2 - 16b^5c^2d^2e^2 + 360a^2b^2c^4d^4 - 256a^3c^4e^4 - 25b^4c^3d^4 - 1296a^2c^5d^4, z, k), k, 1, 4)
\end{aligned}$$

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

$$3.37 \quad \int \frac{d+ex+fx^2}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=368

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c}\left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c}\left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}\right)}{2\sqrt{2}a(b^2-4ac)}$$

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}

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c}\left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c}\left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b^2-4ac+b}}\right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b^2-4ac+b}} - \frac{e(b+2cx^2)}{2(b^2-4ac)(a+bx^2+cx^4)} + \frac{2ce\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{(b^2-4ac)^{3/2}}$$

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 + 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*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] && !MatchQ[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] && (GtQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] && NeQ[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_Symbol] := 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

$$\begin{aligned} \int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^2} dx &= \int \frac{ex}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^2} dx \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \int \frac{-b^2d + 6acd - abf - c(bd - 2af)x^2}{a + bx^2 + cx^4} dx + e \int \frac{1}{(a + bx^2 + cx^4)^2} dx \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(a + bx + cx^2)^2} dx, x, x^2 \right) + \frac{1}{2} e \int \frac{1}{(a + bx^2 + cx^4)^2} dx \\ &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2ac)}{2a(b^2 - 4ac)} \\ &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2ac)}{2a(b^2 - 4ac)} \\ &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2ac)}{2a(b^2 - 4ac)} \end{aligned}$$

Mathematica [A] time = 1.17, size = 398, normalized size = 1.08

$$\frac{\frac{2b(e+f)x + 4acx(d+x(e+fx)) - 2bdx(b+cx^2)}{a(4ac-b^2)(a+bx^2+cx^4)} + \frac{\sqrt{2}\sqrt{c}\left(b\left(d\sqrt{b^2-4ac}+4af\right) - 2a\left(f\sqrt{b^2-4ac}+6cd\right) + b^2d\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}}{\sqrt{b^2-4ac}}\right)}{a(b^2-4ac)^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{2}\sqrt{c}\left(bd\sqrt{b^2-4ac} - 2af\sqrt{b^2-4ac} - 4abf + 12acd + b^2(-d)\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}}{\sqrt{b^2-4ac}}\right)}{a(b^2-4ac)^{3/2}\sqrt{b^2-4ac}+b} - \frac{4cx\log\left(\sqrt{b^2-4ac}-b-2cx^2\right)}{(b^2-4ac)^{3/2}} - \frac{4cx\log\left(\sqrt{b^2-4ac}+b+2cx^2\right)}{(b^2-4ac)^{3/2}}}{4}$$

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

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

$$\int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^2} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4)^2, x]

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*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)*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)

$$\begin{aligned}
& - 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 + \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 \\
& \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})*s \\
& \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})*s \\
& \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{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{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{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{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{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 \\
& \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{2} \\
& *\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{2} \\
& *\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{2} \\
& *\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{2} \\
& *\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{2} \\
& *\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 \\
& \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^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*\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^
\end{aligned}$$

$$\begin{aligned}
& 2 + \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2 b^3 c^2 - 16 a^3 b^3 c^2 - \\
& 4 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3 b^2 c^3 + 32 a^4 b^2 c^3 - 2 (b^2 - \\
& 4ac) a^2 b^3 c + 8 (b^2 - 4ac) a^3 b^2 c^2) f \operatorname{abs}(a^2 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^2 c^5 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2 b^7 + 20 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3 b^5 c + 2 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2 b^6 c - 112 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4 b^3 c^2 - 32 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3 b^4 c^2 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2 b^5 c^2 + 192 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^5 b^2 c^3 + 96 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4 b^2 c^3 + 16 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3 b^3 c^3 - 48 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4 b^2 c^4 - 2 (b^2 - 4ac) a^2 b^5 c^2 + 32 (b^2 - 4ac) a^3 b^3 c^3 - 96 (b^2 - 4ac) a^4 b^2 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 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3 b^6 + 8 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4 b^4 c + 2 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3 b^5 c - 16 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^5 b^2 c^2 - 8 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4 b^3 c^2 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3 b^4 c^2 + 4 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4 b^2 c^3 - 2 (b^2 - 4ac) a^3 b^4 c^2 + 8 (b^2 - 4ac) a^4 b^2 c^3) f) \operatorname{arctan}(2 \sqrt{1/2} x / \sqrt{(a^2 b^3 - 4 a^2 b^2 c - \sqrt{(a^2 b^3 - 4 a^2 b^2 c)^2 - 4 (a^2 b^2 - 4 a^3 c) (a^2 b^2 c - 4 a^2 c^2)})}) / (a^2 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^2 c^3 - 8 a^4 b^2 c^3 + 16 a^5 c^4) \operatorname{abs}(a^2 b^2 - 4 a^2 c) \operatorname{abs}(c)) - 1/4 ((b^3 c^2 - 4 a b^2 c^3 - 2 b^2 c^3 + b^2 c^4 + (b^2 c^2 - 4 a c^3 - 2 b^2 c^3 + c^4) \sqrt{b^2 - 4ac}) \operatorname{abs}(a^2 b^2 - 4 a^2 c) e - (a^2 b^5 c^2 - 8 a^2 b^3 c^3 - 2 a^2 b^4 c^3 + 16 a^3 b^2 c^4 + 8 a^2 b^2 c^4 + a^2 b^3 c^4 - 4 a^2 b^2 c^5 + (a^2 b^4 c^2 - 4 a^2 b^2 c^3 - 2 a^2 b^3 c^3 + a^2 b^2 c^4) \sqrt{b^2 - 4ac}) e) \log(x^2 + 1/2 (a^2 b^3 - 4 a^2 b^2 c + \sqrt{(a^2 b^3 - 4 a^2 b^2 c)^2 - 4 (a^2 b^2 - 4 a^3 c) (a^2 b^2 c - 4 a^2 c^2)})) / (a^2 b^2 c - 4 a^2 c^2)) / ((a^2 b^4 - 8 a^2 b^2 c - 2 a^2 b^3 c + 16 a^3 c^2 + 8 a^2 b^2 c^2 + a^2 b^2 c^2 - 4 a^2 c^3) c^2 \operatorname{abs}(a^2 b^2 - 4 a^2 c)) - 1/4 ((b^3 c^2 - 4 a b^2 c^3 - 2 b^2 c^3 + b^2 c^4 - (b^2 c^2 - 4 a c^3 - 2 b^2 c^3 + c^4) \sqrt{b^2 - 4ac}) \operatorname{abs}(a^2 b^2 - 4 a^2 c) e - (a^2 b^5 c^2 - 8 a^2 b^3 c^3 - 2 a^2 b^4 c^3 + 16 a^3 b^2 c^4 + 8 a^2 b^2 c^4 + a^2 b^3 c^4 - 4 a^2 b^2 c^5 - (a^2 b^4 c^2 - 4 a^2 b^2 c^3 - 2 a^2 b^3 c^3 + a^2 b^2 c^4) \sqrt{b^2 - 4ac}) e) \log(x^2 + 1/2 (a^2 b^3 - 4 a^2 b^2 c - \sqrt{(a^2 b^3 - 4 a^2 b^2 c)^2 - 4 (a^2 b^2 - 4 a^3 c) (a^2 b^2 c - 4 a^2 c^2)})) / (a^2 b^2 c - 4 a^2 c^2)) / ((a^2 b^4 - 8 a^2 b^2 c - 2 a^2 b^3 c + 16 a^3 c^2 + 8 a^2 b^2 c^2 + 16 a^3 c^2 + 8 a^2 b^2 c^2 + a^2 b^2 c^2 - 4 a^2 c^3) c^2 \operatorname{abs}(a^2 b^2 - 4 a^2 c))
\end{aligned}$$

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] $\operatorname{int}((f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x)$

[Out] $-1/4/(4ac-b^2)^2 2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}(-4ac+b^2)^{1/2}/a^2 c^2 d \operatorname{arctan}(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2} c x) - 1/4 c/(4ac-b^2)^2/a^2 2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} c x) * (-4ac+b^2)^{1/2} b^2 d - 1/2/(4ac-b^2)^2/(x^2+1/2 b/c+1/2(-4ac+b^2)^{1/2}/c) b^2 e - 1/2/(4ac-b^2)^2/(x^2+1/2 b/c-1/2(-4ac+b^2)^{1/2}/c) b^2 e - c/(4ac-b^2)^2 2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} c x) * (-4ac+b^2)^{1/2} b f - c/(4ac-b^2)^2 2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctan}(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2} c x) * (-4ac+b^2)^{1/2}$

$$\begin{aligned} &) * 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)} * \operatorname{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)} * \operatorname{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)} * \operatorname{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)} * \operatorname{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)} * \operatorname{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 * \operatorname{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 * \operatorname{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)} * \operatorname{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)} * \operatorname{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 * \operatorname{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 \end{aligned}$$

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]
$$-1/2 * (2 * a * c * e * x^2 - (b * c * d - 2 * a * c * f) * x^3 + a * b * e + (a * b * f - (b^2 - 2 * a * c) * d) * x) / ((a * b^2 * c - 4 * a^2 * c^2) * x^4 + a^2 * b^2 - 4 * a^3 * c + (a * b^3 - 4 * a^2 * b * c) * x^2) - 1/2 * \operatorname{integrate}((4 * a * c * e * x - a * b * f - (b * c * d - 2 * a * c * f) * x^2 - (b^2 - 6 * a * c) * d) / (c * x^4 + b * x^2 + a), x) / (a * b^2 - 4 * a^2 * c)$$

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]
$$\operatorname{symsum}(\log((5 * b^3 * c^4 * d^3 + 8 * a^3 * c^4 * f^3 - 96 * a^2 * c^5 * d * e^2 + 72 * a^2 * c^5 * d^2 * f - 3 * b^4 * c^3 * d^2 * f + 6 * a^2 * b^2 * c^3 * f^3 - 36 * a * b * c^5 * d^3 + 16 * a * b^2 * c^4 * d * e^2 + 18 * a * b^2 * c^4 * d^2 * f + 3 * a * b^3 * c^3 * d * f^2 - 60 * a^2 * b * c^4 * d * f^2 + 16 * a^2 * b * c^4 * e^2 * f) / (8 * (a^2 * b^6 - 64 * a^5 * c^3 - 12 * a^3 * b^4 * c + 48 * a^4 * b^2 * c^2)) - \operatorname{root}(1572864 * a^8 * b^2 * c^5 * z^4 - 983040 * a^7 * b^4 * c^4 * z^4 + 327680 * a^6 * b^6 * c^3 * z^4 - 61440 * a^5 * b^8 * c^2 * z^4 + 6144 * a^4 * b^{10} * c * z^4 - 1048576 * a^9 * c^6 * z^4 - 256 * a^3 * b^{12} * z^4 + 576 * a^2 * b^8 * c * d * f * z^2 + 24576 * a^5 * b^2 * c^4 * d * f * z^2 - 3072 * a^3 * b^6 * c^2 * d * f * z^2 + 2048 * a^4 * b^4 * c^3 * d * f * z^2 + 12288 * a^6 * b * c^4 * f^2 * z^2 + 61440 * a^5 * b * c^5 * d^2 * z^2 - 49152 * a^6 * c^5 * d * f * z^2 + 432 * a * b^9 * c * d^2 * z^2 - 81$$

$$\begin{aligned}
& 92a^5b^3c^3f^2z^2 + 1536a^4b^5c^2f^2z^2 + 24576a^5b^2c^4e^2z^2 - 6144a^4b^4c^3e^2z^2 + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4 \\
& *d^2z^2 + 24064a^3b^5c^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32a^2b^10d^2fz^2 - 32768a^6c^5e^2z^2 - 16a^2b^9f^2z^2 - 16b^11d^2z^2 - 4 \\
& 096a^4b^3c^4d^2e^2fz + 64a^2b^7c^4d^2e^2fz + 3072a^3b^3c^3d^2e^2fz - 768 \\
& a^2b^5c^2d^2e^2fz + 32a^2b^6c^2e^2fz - 672a^2b^6c^2d^2e^2fz + 1536a^4b^2c^3e^2fz - 384a^3b^4c^2e^2fz - 15872a^3b^2c^4d^2e^2fz + \\
& 4992a^2b^4c^3d^2e^2fz - 2048a^5c^4e^2fz + 18432a^4c^5d^2e^2fz + 32b^8c^4d^2e^2fz - 32a^2b^4c^2d^2e^2fz + 192a^2b^2c^3d^2e^2fz - 192a^3 \\
& *b^3c^3e^2f^2 + 198a^2b^4c^2d^2f^2 + 144a^2b^3c^2d^2f^3 - 960a^2b^3c^4d^2e^2f + 240a^2b^3c^3d^2e^2f + 768a^3c^4d^2e^2f + 2016a^2b^3c^4d^3 \\
& *f - 496a^2b^3c^3d^3f + 224a^3b^3c^3d^2f^3 - 16a^2b^3c^2e^2f^2 - 960a^2b^2c^3d^2f^2 - 18a^2b^5c^4d^2f^3 - 288a^3c^4d^2f^2 - 16b^5 \\
& *c^2d^2e^2 - 24a^3b^2c^2d^3f + 30b^5c^2d^3f - 9b^6c^4d^2f^2 - 9a^2b^4c^4f^4 + 360a^2b^2c^4d^4 - 16a^4c^3f^4 - 256a^3c^4e^4 - 25b^4 \\
& *c^3d^4 - 1296a^2c^5d^4, z, k) * ((32a^2b^5c^3d^2e - 512a^4c^5e^2f + 1024a^3b^3c^5d^2e - 384a^2b^3c^4d^2e + 32a^2b^4c^3e^2f) / (8(a^2b^6 \\
& - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2))) + \text{root}(1572864a^8b^2c^5z^4 - 983040a^7b^4c^4z^4 + 327680a^6b^6c^3z^4 - 61440a^5b^8c^2z^4 \\
& + 6144a^4b^10c^2z^4 - 1048576a^9c^6z^4 - 256a^3b^12z^4 + 576a^2b^8c^4d^2fz^2 + 24576a^5b^2c^4d^2fz^2 - 3072a^3b^6c^2d^2fz^2 + 204 \\
& 8a^4b^4c^3d^2fz^2 + 12288a^6b^3c^4f^2z^2 + 61440a^5b^3c^5d^2z^2 - 49152a^6c^5d^2fz^2 + 432a^2b^9c^4d^2z^2 - 8192a^5b^3c^3f^2z^2 + 1 \\
& 536a^4b^5c^2f^2z^2 + 24576a^5b^2c^4e^2z^2 - 6144a^4b^4c^3e^2z^2 + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4d^2z^2 + 24064a^3b^5c^3d^2z^2 \\
& - 4608a^2b^7c^2d^2z^2 - 32a^2b^10d^2fz^2 - 32768a^6c^5e^2z^2 - 16a^2b^9f^2z^2 - 16b^11d^2z^2 - 4096a^4b^3c^4d^2e^2fz + 64 \\
& a^2b^7c^4d^2e^2fz + 3072a^3b^3c^3d^2e^2fz - 768a^2b^5c^2d^2e^2fz + 32a^2b^6c^2e^2fz - 672a^2b^6c^2d^2e^2fz + 1536a^4b^2c^3e^2fz - 384a^3 \\
& b^4c^2e^2fz - 15872a^3b^2c^4d^2e^2fz + 4992a^2b^4c^3d^2e^2fz - 2048a^5c^4e^2fz + 18432a^4c^5d^2e^2fz + 32b^8c^4d^2e^2fz - 32a^2b^4c^2d^2e^2fz \\
& + 192a^2b^2c^3d^2e^2fz - 192a^3b^3c^3e^2f^2 + 198a^2b^4c^2d^2f^2 + 144a^2b^3c^2d^2f^3 - 960a^2b^3c^4d^2e^2f + 240a^2b^3c^3d^2e^2f + 768a^3c^4d^2e^2f \\
& + 2016a^2b^3c^4d^3f - 496a^2b^3c^3d^3f + 224a^3b^3c^3d^2f^3 - 16a^2b^3c^2e^2f^2 - 960a^2b^2c^3d^2f^2 - 18a^2b^5c^4d^2f^3 - 288a^3c^4d^2f^2 - 16b^5 \\
& *c^2d^2e^2 - 24a^3b^2c^2d^3f + 30b^5c^2d^3f - 9b^6c^4d^2f^2 - 9a^2b^4c^4f^4 + 360a^2b^2c^4d^4 - 16a^4c^3f^4 - 256a^3c^4e^4 - 25b^4c^3d^4 - 1296a^2c^5 \\
& d^4, z, k) * ((x * (1024a^5c^6e - 16a^2b^6c^3e + 192a^3b^4c^4e - 768a^4b^2c^5e)) / (2(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2))) \\
& - (6144a^5c^6d - 288a^2b^6c^3d + 1920a^3b^4c^4d - 5632a^4b^2c^5d + 16a^2b^7c^2f - 192a^3b^5c^3f + 768a^4b^3c^4f + 16a^2b^8c^2d - 1024a^5b^3c^5f) / (8(a^2b^6 \\
& - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2))) + (\text{root}(1572864a^8b^2c^5z^4 - 983040a^7b^4c^4z^4 + 327680a^6b^6c^3z^4 - 61440a^5b^8c^2z^4 + 6144a^4b^10c^2z^4 \\
& - 1048576a^9c^6z^4 - 256a^3b^12z^4 + 576a^2b^8c^4d^2fz^2 + 24576a^5b^2c^4d^2fz^2 - 3072a^3b^6c^2d^2fz^2 + 2048a^4b^4c^3d^2fz^2 + 12288a^6b^3c^4f^2z^2 \\
& + 61440a^5b^3c^5d^2z^2 - 49152a^6c^5d^2fz^2 + 432a^2b^9c^4d^2z^2 - 8192a^5b^3c^3f^2z^2 + 1536a^4b^5c^2f^2z^2 + 24576a^5b^2c^4e^2z^2 - 6144a^4b^4c^3e^2z^2 \\
& + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4d^2z^2 + 24064a^3b^5c^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32a^2b^10d^2fz^2 - 32768a^6c^5e^2z^2 - 16a^2b^9f^2z^2 - 16b^11 \\
& d^2z^2 - 4096a^4b^3c^4d^2e^2fz + 64a^2b^7c^4d^2e^2fz + 3072a^3b^3c^3d^2e^2fz - 768a^2b^5c^2d^2e^2fz + 32a^2b^6c^2e^2fz - 672a^2b^6c^2d^2e^2fz + 1536a^4b^2c^3e^2fz \\
& - 384a^3b^4c^2e^2fz - 15872a^3b^2c^4d^2e^2fz + 4992a^2b^4c^3d^2e^2fz - 2048a^5c^4e^2fz + 18432a^4c^5d^2e^2fz + 32b^8c^4d^2e^2fz - 32a^2b^4c^2d^2e^2fz \\
& + 192a^2b^2c^3d^2e^2fz - 192a^3b^3c^3e^2f^2 + 198a^2b^4c^2d^2f^2 + 144a^2b^3c^2d^2f^3 - 960a^2b^3c^4d^2e^2f + 240a^2b^3c^3d^2e^2f + 768a^3c^4d^2e^2f + 20
\end{aligned}$$

$$\begin{aligned}
& 16a^2b^3c^4d^3f - 496a^3b^3c^3d^3f + 224a^3b^3c^3d^3f^3 - 16a^2b^3 \\
& c^2e^2f^2 - 960a^2b^2c^3d^2f^2 - 18a^5b^5c^3d^3f - 288a^3c^4d^2 \\
& f^2 - 16b^5c^2d^2e^2 - 24a^3b^2c^2f^4 + 30b^5c^2d^3f - 9b^6c \\
& d^2f^2 - 9a^2b^4cf^4 + 360a^2b^2c^4d^4 - 16a^4c^3f^4 - 256a^3c \\
& ^4e^4 - 25b^4c^3d^4 - 1296a^2c^5d^4, z, k) * x * (4096a^6b^6c^6 + 16a^2 \\
& b^9c^2 - 256a^3b^7c^3 + 1536a^4b^5c^4 - 4096a^5b^3c^5) / (2(a^2 \\
& b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) + (x(b^6c^3d^2 - 28 \\
& 8a^3c^6d^2 + 32a^4c^5f^2 - 18a^3b^4c^4d^2 + 64a^3b^3c^5e^2 + 128a \\
& ^2b^2c^5d^2 - 16a^2b^3c^4e^2 + 10a^2b^4c^3f^2 - 48a^3b^2c^4f \\
& f^2 + 2ab^5c^3d^3f + 160a^3b^3c^5d^3f - 48a^2b^3c^4d^3f) / (2(a^2b^6 \\
& - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) - (x(16a^2c^5e^3 - b^3 \\
& c^4d^2e + 12ab^3c^5d^2e - 24a^2c^5d^2ef + 8a^2b^3c^4e^2f - 2a \\
& b^2c^4d^2ef)) / (2(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) \\
&) * \text{root}(1572864a^8b^2c^5z^4 - 983040a^7b^4c^4z^4 + 327680a^6b^6c^3 \\
& z^4 - 61440a^5b^8c^2z^4 + 6144a^4b^10c^2z^4 - 1048576a^9c^6z^4 - \\
& 256a^3b^12z^4 + 576a^2b^8c^3d^3fz^2 + 24576a^5b^2c^4d^3fz^2 - 307 \\
& 2a^3b^6c^2d^3fz^2 + 2048a^4b^4c^3d^3fz^2 + 12288a^6b^3c^4f^2z^2 \\
& + 61440a^5b^3c^5d^2z^2 - 49152a^6c^5d^3fz^2 + 432a^3b^9c^4d^2z^2 - 8 \\
& 192a^5b^3c^3f^2z^2 + 1536a^4b^5c^2f^2z^2 + 24576a^5b^2c^4e^2z^2 \\
& z^2 - 6144a^4b^4c^3e^2z^2 + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4 \\
& d^2z^2 + 24064a^3b^5c^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32ab^1 \\
& 0d^3fz^2 - 32768a^6c^5e^2z^2 - 16a^2b^9f^2z^2 - 16b^11d^2z^2 - \\
& 4096a^4b^3c^4d^2efz + 64a^3b^7c^3d^2efz + 3072a^3b^3c^3d^2efz - 76 \\
& 8a^2b^5c^2d^2efz + 32a^2b^6c^2ef^2z - 672a^3b^6c^2d^2e^2z + 1536 \\
& a^4b^2c^3ef^2z - 384a^3b^4c^2ef^2z - 15872a^3b^2c^4d^2e^2z \\
& + 4992a^2b^4c^3d^2e^2z - 2048a^5c^4ef^2z + 18432a^4c^5d^2e^2z + \\
& 32b^8c^3d^2e^2z - 32a^3b^4c^2d^2ef + 192a^2b^2c^3d^2ef - 192a^3 \\
& b^3c^3e^2f^2 + 198a^3b^4c^2d^2f^2 + 144a^2b^3c^2d^3f^3 - 960a^2b \\
& c^4d^2e^2 + 240a^3b^3c^3d^2e^2 + 768a^3c^4d^2e^2f + 2016a^2b^3c^4 \\
& d^3f - 496a^3b^3c^3d^3f + 224a^3b^3c^3d^3f^3 - 16a^2b^3c^2e^2f^2 \\
& - 960a^2b^2c^3d^2f^2 - 18a^5b^5c^3d^3f - 288a^3c^4d^2f^2 - 16b^5 \\
& c^2d^2e^2 - 24a^3b^2c^2f^4 + 30b^5c^2d^3f - 9b^6c^2d^2f^2 - 9 \\
& a^2b^4cf^4 + 360a^2b^2c^4d^4 - 16a^4c^3f^4 - 256a^3c^4e^4 - 25b \\
& b^4c^3d^4 - 1296a^2c^5d^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)
\end{aligned}$$

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

$$3.38 \quad \int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=386

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c} \left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} - 2af + bd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c} \left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} \right)}{2\sqrt{2}a(b^2-4ac)}$$

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}

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c} \left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} - 2af + bd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c} \left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} - 2af + bd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b^2-4ac+b}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b^2-4ac+b}} - \frac{-2ag+x^2(2ce-bg)+bc}{2(b^2-4ac)(a+bx^2+cx^4)} + \frac{(2ce-bg)\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{(b^2-4ac)^{3/2}}$$

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] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] && NeQ[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_Symbol] := 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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^2} dx &= \int \frac{d + fx^2}{(a + bx^2 + cx^4)^2} dx + \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^2} dx \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(a + bx + cx^2)^2} dx, x, x^2 \right) - \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{c(bd - 2af)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} \end{aligned}$$

Mathematica [A] time = 1.30, size = 421, normalized size = 1.09

$$\frac{1}{4} \left(\frac{-4a^2g + 2ab(e + x(f - g^2)) + 4ac(d + x(e + fs)) - 2bfx(b + cx^2)}{a(4ac - b^2)(e + bx^2 + cx^4)} + \frac{\sqrt{2}\sqrt{c}(b(d\sqrt{b^2 - 4ac} + 4af) - 2a(\sqrt{b^2 - 4ac} + 6cd) + b^2d)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}}{\sqrt{b^2 - 4ac}}\right)}{a(b^2 - 4ac)^{3/2}\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\sqrt{2}\sqrt{c}(b(d\sqrt{b^2 - 4ac} - 2af\sqrt{b^2 - 4ac} - 4abf + 12acd + b^2(-d))\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}}{\sqrt{b^2 - 4ac}}\right)}{a(b^2 - 4ac)^{3/2}\sqrt{b^2 - 4ac} + b} + \frac{2(bg - 2ce)\log(\sqrt{b^2 - 4ac} - b - 2cx^2)}{(b^2 - 4ac)^{3/2}} - \frac{2(bg - 2ce)\log(\sqrt{b^2 - 4ac} + b + 2cx^2)}{(b^2 - 4ac)^{3/2}} \right)$$

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]
$$\frac{((-4a^2g - 2b*d*x*(b + c*x^2) + 4a*c*x*(d + x*(e + f*x)) + 2a*b*(e + x*(f - g*x)))/(a*(-b^2 + 4a*c)*(a + b*x^2 + c*x^4)) + (\sqrt{2}*\sqrt{c}*(b^2*d + b*(\sqrt{b^2 - 4a*c})*d + 4a*f) - 2a*(6*c*d + \sqrt{b^2 - 4a*c}*f))*\text{ArcTan}[(\sqrt{2}*\sqrt{c}*x)/\sqrt{b - \sqrt{b^2 - 4a*c}}]}{(a*(b^2 - 4a*c))^{3/2}*\sqrt{b - \sqrt{b^2 - 4a*c}}} + (\sqrt{2}*\sqrt{c}*(-(b^2*d) + 12a*c*d + b*\sqrt{b^2 - 4a*c}*d - 4a*b*f - 2a*\sqrt{b^2 - 4a*c}*f))*\text{ArcTan}[(\sqrt{2}*\sqrt{c}*x)/\sqrt{b + \sqrt{b^2 - 4a*c}}]}{(a*(b^2 - 4a*c))^{3/2}*\sqrt{b + \sqrt{b^2 - 4a*c}}} + (2*(-2*c*e + b*g)*\text{Log}[-b + \sqrt{b^2 - 4a*c} - 2*c*x^2])/((b^2 - 4a*c)^{3/2}) - (2*(-2*c*e + b*g)*\text{Log}[b + \sqrt{b^2 - 4a*c} + 2*c*x^2])/((b^2 - 4a*c)^{3/2})/4$$

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

$$\int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^2} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^2, x]

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]
$$\frac{1}{2}*(b*c*d*x^3 - 2*a*c*f*x^3 + a*b*g*x^2 - 2*a*c*x^2*e + b^2*d*x - 2*a*c*d*x - a*b*f*x + 2*a^2*g - a*b*e)/((c*x^4 + b*x^2 + a)*(a*b^2 - 4*a^2*c)) + \frac{1}{16}*((2*b^3*c^2 - 8*a*b*c^3 - \sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}})*c)*b^3 + 4*\sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*b*c + 2*\sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*b^2*c - \sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*b*c^2 - 2*(b^2 - 4a*c)*b*c^2)*(a*b^2 - 4a^2*c)^2*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - \sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*b^2 + 4*\sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^2*c + 2*\sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*b*c - \sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*c^2 - 2*(b^2 - 4a*c)*a*c^2)*(a*b^2 - 4a^2*c)^2*f + 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*b^6 - 14*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^2*b^4*c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*b^5*c - 2*a*b^6*c + 64*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^3*b^2*c^2 + 20*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^2*b^3*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*b^4*c^2 + 28*a^2*b^4*c^2 - 96*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^4*c^3 - 48*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^3*b*c^3 - 10*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^2*b^2*c^3 - 128*a^3*b^2*c^3 + 24*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^3*c^4 + 192*a^4*c^4 + 2*(b^2 - 4a*c)*a*b^4*c - 20*(b^2 - 4a*c)*a^2*b^2*c^2 + 48*(b^2 - 4a*c)*a^3*c^3)*d*abs(a*b^2 - 4a^2*c) + 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^2*c^2$$

$$\begin{aligned}
&^2 - 4*a*c)*c)*a^2*b^5 - 8*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^3* \\
&c - 2*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^4*c - 2*a^2*b^5*c + 16* \\
&\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^4*b*c^2 + 8*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sq} \\
&\text{rt}(b^2 - 4*a*c))*c)*a^3*b^2*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^ \\
&2*b^3*c^2 + 16*a^3*b^3*c^2 - 4*\text{sqrt}(2)*\text{sqrt}(b*c + \text{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*\text{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 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c) \\
&)*c)*a^2*b^7 + 20*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)* \\
&a^3*b^5*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^2 \\
&*b^6*c - 112*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^4* \\
&b^3*c^2 - 32*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^3* \\
&b^4*c^2 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^5 \\
&*c^2 + 192*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^5*b* \\
&c^3 + 96*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^4*b^2* \\
&c^3 + 16*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^3* \\
&c^3 - 48*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{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 - \\
&\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^6 + 8*\text{sqrt}(\\
&2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^4*b^4*c + 2*\text{sqrt}(2)* \\
&\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^5*c - 16*\text{sqrt}(2)*\text{sq} \\
&\text{rt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^5*b^2*c^2 - 8*\text{sqrt}(2)*\text{sq} \\
&\text{rt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^4*b^3*c^2 - \text{sqrt}(2)*\text{sqrt}(b \\
&^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^4*c^2 + 4*\text{sqrt}(2)*\text{sqrt}(b^ \\
&2 - 4*a*c)*\text{sqrt}(b*c + \text{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)*\text{arctan}(2*\text{sqrt}(1/2)*x/\text{sqrt}((a*b^ \\
&3 - 4*a^2*b*c + \text{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)*\text{abs}(a*b^2 - 4*a^2*c)*\text{abs}(c)) - 1/16*((2* \\
&b^3*c^2 - 8*a*b*c^3 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c) \\
&)*c)*b^3 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a*b* \\
&c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*b^2*c - \text{sq} \\
&\text{rt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{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 - \text{sqrt}(2)*\text{sq} \\
&\text{rt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a*b^2 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - \\
&4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c) \\
&*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a*b*c - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c \\
&- \text{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*(\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a*b^6 - 14*\text{sqrt}(2)*\text{sqrt}(b*c \\
&- \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^4*c - 2*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c) \\
&)*a*b^5*c + 2*a*b^6*c + 64*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^2* \\
&c^2 + 20*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^3*c^2 + \text{sqrt}(2)*\text{sqrt} \\
&(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a*b^4*c^2 - 28*a^2*b^4*c^2 - 96*\text{sqrt}(2)*\text{sqrt}(b* \\
&c - \text{sqrt}(b^2 - 4*a*c))*c)*a^4*c^3 - 48*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))* \\
&c)*a^3*b*c^3 - 10*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^2*c^3 + 128 \\
&*a^3*b^2*c^3 + 24*\text{sqrt}(2)*\text{sqrt}(b*c - \text{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*\text{abs}(a*b^2 - 4*a^2*c) - 2*(\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4* \\
&a*c))*c)*a^2*b^5 - 8*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^3*c - 2*s \\
&\text{qrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^4*c + 2*a^2*b^5*c + 16*\text{sqrt}(2) \\
&*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^4*b*c^2 + 8*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 \\
&- 4*a*c))*c)*a^3*b^2*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^3*c \\
&^2 - 16*a^3*b^3*c^2 - 4*\text{sqrt}(2)*\text{sqrt}(b*c - \text{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*\text{ab} \\
&\text{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 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2 \\
&*b^7 + 20*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^5
\end{aligned}$$

```

*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]
$$-1/4/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}/a*b^2*c*d*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})c)^{(1/2)}*c*x)-1/4*c/(4*a*c-b^2)^2/a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})c)^{(1/2)}*arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*d-1/2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*b^2*e-1/2/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*b^2*e-c/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})c)^{(1/2)}*arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})c)^{(1/2)}*c*x)*$$

$(-4ac+b^2)^{1/2}bf-1/(4ac-b^2)^2 \cdot 2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot (-4ac+b^2)^{1/2} \cdot b \cdot c \cdot f \cdot \arctan(2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot c \cdot x) - 2c^2 / (4ac-b^2)^2 \cdot a \cdot 2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot \arctanh(2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot c \cdot x) \cdot f + 1/2 \cdot c / (4ac-b^2)^2 \cdot 2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot \arctanh(2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot c \cdot x) \cdot b^2 \cdot f + 2 / (4ac-b^2)^2 \cdot 2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot a \cdot c^2 \cdot f \cdot \arctan(2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot c \cdot x) - 1/2 / (4ac-b^2)^2 \cdot 2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot b^2 \cdot c \cdot f \cdot \arctan(2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot c \cdot x) + 2 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c + 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot a \cdot c \cdot f \cdot x + 2 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c - 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot a \cdot c \cdot f \cdot x - 1/4 \cdot c / (4ac-b^2)^2 \cdot a \cdot 2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot \arctanh(2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot c \cdot x) \cdot b^3 \cdot d - 1/2 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c - 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot b^2 \cdot f \cdot x + 1/2 / (4ac-b^2)^2 \cdot \ln(-2 \cdot c \cdot x^2 - b + (-4ac+b^2)^{1/2}) \cdot (-4ac+b^2)^{1/2} \cdot b \cdot g + 1 / (4ac-b^2)^2 \cdot (-4ac+b^2)^{1/2} \cdot c \cdot e \cdot \ln(2 \cdot c \cdot x^2 + b + (-4ac+b^2)^{1/2}) + 2 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c - 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot a \cdot c \cdot e - 1 / (4ac-b^2)^2 \cdot (-4ac+b^2)^{1/2} \cdot c \cdot e \cdot \ln(-2 \cdot c \cdot x^2 - b + (-4ac+b^2)^{1/2}) - 1/4 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c + 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot (-4ac+b^2)^{1/2} / a \cdot b^2 \cdot d \cdot x + 3 / (4ac-b^2)^2 \cdot 2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot (-4ac+b^2)^{1/2} \cdot c^2 \cdot d \cdot \arctan(2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot c \cdot x) - 1 / (4ac-b^2)^2 \cdot 2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot b \cdot c^2 \cdot d \cdot \arctan(2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot c \cdot x) + 1/4 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c - 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot (-4ac+b^2)^{1/2} / a \cdot b^2 \cdot d \cdot x + 3 \cdot c^2 / (4ac-b^2)^2 \cdot 2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot \arctanh(2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot c \cdot x) \cdot (-4ac+b^2)^{1/2} \cdot d + c^2 / (4ac-b^2)^2 \cdot 2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot \arctanh(2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot c \cdot x) \cdot b \cdot d + 1/4 / (4ac-b^2)^2 \cdot 2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} / a \cdot b^3 \cdot c \cdot d \cdot \arctan(2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot c \cdot x) + 2 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c + 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot a \cdot c \cdot e - 1/2 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c + 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot b^2 \cdot f \cdot x + 1/4 \cdot c / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c + 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot b^3 \cdot g + 1/4 \cdot c / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c - 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot b^3 \cdot g - 1 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c + 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot (-4ac+b^2)^{1/2} \cdot a \cdot g - 1 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c - 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot a \cdot b \cdot g - 1/2 / (4ac-b^2)^2 \cdot \ln(2 \cdot c \cdot x^2 + b + (-4ac+b^2)^{1/2}) \cdot (-4ac+b^2)^{1/2} \cdot b \cdot g + 1 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c - 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot (-4ac+b^2)^{1/2} \cdot a \cdot g - 1 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c - 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot a \cdot b \cdot g + 1/4 \cdot c / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c + 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot (-4ac+b^2)^{1/2} \cdot b^2 \cdot g - 1/4 \cdot c / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c - 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot (-4ac+b^2)^{1/2} \cdot b^2 \cdot g + 1 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c + 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot (-4ac+b^2)^{1/2} \cdot c \cdot d \cdot x - 1 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c + 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot b \cdot c \cdot d \cdot x + 1/4 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c + 1/2 \cdot (-4ac+b^2)^{1/2} / c) / a \cdot b^3 \cdot d \cdot x - 1 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c - 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot (-4ac+b^2)^{1/2} \cdot c \cdot d \cdot x - 1 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c - 1/2 \cdot (-4ac+b^2)^{1/2} / c) \cdot b \cdot c \cdot d \cdot x + 1/4 / (4ac-b^2)^2 \cdot (x^2 + 1/2 \cdot b/c - 1/2 \cdot (-4ac+b^2)^{1/2} / c) / a \cdot b^3 \cdot d \cdot x$

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

$$\frac{(bcd - 2acf)x^3 - abe + 2a^2g - (2ace - abg)x^2 - (abf - (b^2 - 2ac)d)x}{2((ab^2c - 4a^2c^2)x^4 + a^2b^2 - 4a^3c + (ab^3 - 4a^2bc)x^2)} - \int \frac{abf + (bcd - 2acf)x^2 + (b^2 - 6ac)d - 2(ace - abg)x}{cx^4 + bx^2 + a} dx$$

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)^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] $\text{int}((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^2, x)$

[Out] $\text{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)) - \text{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 - 6140*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)*(\text{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$

$$\begin{aligned}
& 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 \\
& 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)) + (\text{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 + 122 \\
& 88 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 + 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 * (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^
\end{aligned}$$

$$\begin{aligned} & \left. \begin{aligned} & \frac{5b^3c^5}{(4(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2))} - \\ & (512a^4c^5ef - 32ab^5c^3d^2e - 1024a^3b^2c^5d^2e + 16ab^6c^2d^2g \\ & - 256a^4b^2c^4f^2g + 384a^2b^3c^4d^2e - 192a^2b^4c^3d^2g - 32a^2b^4c^3e^2f \\ & + 512a^3b^2c^4d^2g + 16a^2b^5c^2f^2g) / (8(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) + \\ & (x(2b^6c^3d^2 - 576a^3c^6d^2 + 64a^4c^5f^2 - 36ab^4c^4d^2 + 128a^3b^2c^5e^2 + 256a^2b^2c^5d^2 \\ & - 32a^2b^3c^4e^2 + 20a^2b^4c^3f^2 - 96a^3b^2c^4f^2 - 8a^2b^5c^2g^2 + 32a^3b^3c^3g^2 + 4ab^5c^3d^2f \\ & + 320a^3b^2c^5d^2f - 96a^2b^3c^4d^2f + 32a^2b^4c^3e^2g - 128a^3b^2c^4e^2g) / (4(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) - \\ & (x(32a^2c^5e^3 - 2b^3c^4d^2e + b^4c^3d^2g - 4a^2b^3c^2g^3 + 24ab^2c^5d^2e - 48a^2c^5d^2ef - 12ab^2c^4d^2g \\ & + 16a^2b^2c^4ef^2 - 48a^2b^2c^4e^2g + 24a^2b^2c^3ef^2g - 8a^2b^2c^3f^2g - 4ab^2c^4d^2ef + 2ab^3c^3d^2fg \\ & + 24a^2b^2c^4d^2fg) / (4(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2))) \cdot \text{root}(1572864a^8b^2c^5z^4 - 983040a^7b^4c^4z^4 + 327680a^6b^6c^3z^4 \\ & - 61440a^5b^8c^2z^4 + 6144a^4b^{10}c^2z^4 - 1048576a^9c^6z^4 - 256a^3b^{12}z^4 + 32768a^6b^2c^4efgz^2 - 512a^3b^7c^2efgz^2 + 576a^2b^8c^2d^2fz^2 \\ & - 24576a^5b^3c^3efgz^2 + 6144a^4b^5c^2efgz^2 + 24576a^5b^2c^4d^2fz^2 - 3072a^3b^6c^2d^2fz^2 + 2048a^4b^4c^3d^2fz^2 \\ & - 1536a^4b^6c^2gz^2 + 12288a^6b^2c^4f^2z^2 + 61440a^5b^2c^5d^2z^2 - 49152a^6c^5d^2fz^2 + 432ab^9c^2d^2z^2 - 8192a^6b^2c^3g^2z^2 \\ & + 6144a^5b^4c^2g^2z^2 - 8192a^5b^3c^3f^2z^2 + 1536a^4b^5c^2f^2z^2 + 24576a^5b^2c^4e^2z^2 - 6144a^4b^4c^3e^2z^2 + 512a^3b^6c^2e^2z^2 \\ & - 61440a^4b^3c^4d^2z^2 + 24064a^3b^5c^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32ab^{10}d^2fz^2 + 128a^3b^8g^2z^2 - 32768a^6c^5e^2z^2 \\ & - 16a^2b^9f^2z^2 - 16b^{11}d^2z^2 + 384a^2b^6c^2d^2fgz - 4096a^4b^2c^4d^2efz + 64ab^7c^2d^2efz + 2048a^4b^2c^3d^2fgz \\ & - 1536a^3b^4c^2d^2fgz + 3072a^3b^3c^3d^2efz - 768a^2b^5c^2d^2efz + 1024a^5b^2c^3f^2gz + 192a^3b^5c^2f^2gz - 9216a^4b^2c^4d^2gz \\ & + 32a^2b^6c^2ef^2z - 672ab^6c^2d^2ez + 336ab^7c^2d^2gz - 768a^4b^3c^2f^2gz + 7936a^3b^3c^3d^2gz - 2496a^2b^5c^2d^2gz \\ & + 1536a^4b^2c^3ef^2z - 384a^3b^4c^2ef^2z - 15872a^3b^2c^4d^2ez + 4992a^2b^4c^3d^2ez - 32ab^8d^2fgz - 16a^2b^7f^2gz \\ & - 2048a^5c^4ef^2z + 18432a^4c^5d^2ez + 32b^8c^2d^2ez - 16b^9d^2gz - 768a^3b^2c^3d^2efg + 32ab^5c^2d^2efg - 192a^2b^3c^2d^2efg \\ & + 16a^2b^4c^2ef^2g + 48a^2b^4c^2d^2fg^2 - 240ab^4c^2d^2eg - 32ab^4c^2d^2ef + 192a^3b^2c^2ef^2g + 192a^3b^2c^2d^2fg^2 \\ & + 960a^2b^2c^3d^2efg + 192a^2b^2c^3d^2ef - 48a^3b^3c^2f^2g^2 - 192a^3b^2c^3e^2f^2 + 198ab^4c^2d^2f^2 + 144a^2b^3c^2d^2f^3 \\ & - 960a^2b^2c^4d^2e^2 + 240ab^3c^3d^2e^2 + 768a^3c^4d^2ef + 512a^3b^2c^3e^3g + 128a^3b^3c^2efg^3 + 60ab^5c^2d^2g^2 + 2016a^2b^2c^4d^3f \\ & - 496ab^3c^3d^3f + 224a^3b^2c^3d^2f^3 - 384a^3b^2c^2e^2g^2 - 240a^2b^3c^2d^2g^2 - 16a^2b^3c^2e^2f^2 - 960a^2b^2c^3d^2f^2 \\ & + 16b^6c^2d^2efg - 8ab^6d^2fg^2 - 18ab^5c^2d^2f^3 - 4a^2b^5f^2g^2 - 288a^3c^4d^2f^2 - 16b^5c^2d^2e^2 - 24a^3b^2c^2f^4 \\ & + 30b^5c^2d^3f - 9b^6c^2d^2f^2 - 9a^2b^4c^2f^4 + 360ab^2c^4d^4 - 4b^7d^2g^2 - 16a^4c^3f^4 - 16a^3b^4g^4 - 256a^3c^4e^4 - 25b^4c^3d^4 \\ & - 1296a^2c^5d^4, z, k), k, 1, 4) + ((b^2e - 2a^2g) / (2(4a^2c - b^2))) + (x^2(2c^2e - b^2g)) / (2(4a^2c - b^2)) + (x(2a^2cd - b^2d + ab^2f)) / (2a^2(4a^2c - b^2)) - (cx^3(b^2d - 2a^2f)) / (2a^2(4a^2c - b^2)) \\ & / (a + bx^2 + cx^4) \end{aligned} \right. \end{aligned}$$

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

$$3.39 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=439

$$\frac{x(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right) \left(\frac{b^2(cd - ah) + 4abcf - 4ac(ah + 3cd)}{\sqrt{b^2 - 4ac}} + abh - 2a\right)}{2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b - \sqrt{b^2 - 4ac}}}$$

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, number of rules / integrand size = 0.229, Rules used = {1673, 1678, 1166, 205, 1247, 638, 618, 206}

$$\frac{x(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right) \left(\frac{b^2(cd - ah) + 4abcf - 4ac(ah + 3cd)}{\sqrt{b^2 - 4ac}} + abh - 2acf + bcd\right)}{2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b + \sqrt{b^2 - 4ac}}}\right) \left(\frac{b^2(cd - ah) + 4abcf - 4ac(ah + 3cd)}{\sqrt{b^2 - 4ac}} + abh - 2acf + bcd\right)}{2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b + \sqrt{b^2 - 4ac}}} - \frac{-2ag + x^2(2ce - bg) + be}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{(2ce - bg)\tanh^{-1}\left(\frac{bx + a}{\sqrt{b^2 - 4ac}}\right)}{(b^2 - 4ac)^{3/2}}$$

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] $-(b*e - 2*a*g + (2*c*e - b*g)*x^2)/(2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (x*(b^2*d - a*b*f - 2*a*(c*d - a*h) + (b*c*d - 2*a*c*f + a*b*h)*x^2))/(2*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + ((b*c*d - 2*a*c*f + a*b*h + (4*a*b*c*f + b^2*(c*d - a*h) - 4*a*c*(3*c*d + a*h))/\text{Sqrt}[b^2 - 4*a*c])*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]])]/(2*\text{Sqrt}[2]*a*\text{Sqrt}[c]*(b^2 - 4*a*c)*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + ((b*c*d - 2*a*c*f + a*b*h - (4*a*b*c*f + b^2*(c*d - a*h) - 4*a*c*(3*c*d + a*h))/\text{Sqrt}[b^2 - 4*a*c])*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]])]/(2*\text{Sqrt}[2]*a*\text{Sqrt}[c]*(b^2 - 4*a*c)*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) + ((2*c*e - b*g)*\text{ArcTanh}[(b + 2*c*x^2)/\text{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^{(3/2)}$

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] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[Int[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] && NeQ[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[PolynomialRemainder[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]] /; 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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(a + bx^2 + cx^4)^2} dx = \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^2} dx$$

$$= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx^2}{(a + bx + cx^2)^2} dx, x, x^2 \right)$$

$$= -\frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= -\frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= -\frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}$$

Mathematica [A] time = 1.88, size = 489, normalized size = 1.11

$$\frac{\frac{1}{2} \left(\frac{-4d^2(g + hx) + 2d(e + 2f - 2(g + hx)) + 4a(cd + 2e + f) - 2b(d(b + 2c))}{a^2(4c - b)^2(a + bx^2 + cx^4)} \sqrt{2} \tan^{-1} \left(\frac{d + ex}{\sqrt{a^2 - 4ac}} \right) \right) \left((a^2 \sqrt{b^2 - 4ac} + ab \sqrt{b^2 - 4ac} + 4ac f) - 2c \left(\sqrt{b^2 - 4ac} + 2ab + 4c \right) + f^2 (d - ab) \right) + \sqrt{2} \tan^{-1} \left(\frac{d + ex}{\sqrt{a^2 - 4ac}} \right) \left((a^2 \sqrt{b^2 - 4ac} + ab \sqrt{b^2 - 4ac} + 4ac f) + 2c \left(-\sqrt{b^2 - 4ac} + 2ab + 4c \right) + f^2 (d - ab) \right)}{a^2 \sqrt{(b^2 - 4ac)^3} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{2d(b - 2c) \log(\sqrt{b^2 - 4ac} - b - 2cx) - 2(b - 2c) \log(\sqrt{b^2 - 4ac} + b + 2cx)}{(b^2 - 4ac)^{3/2}}$$

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)^2,x]

[Out]
$$\frac{((-4*a^2*(g + h*x) - 2*b*d*x*(b + c*x^2) + 4*a*c*x*(d + x*(e + f*x)) + 2*a*b*(e + x*(f - x*(g + h*x))))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)) + (\text{Sqrt}[2]*(b^2*(c*d - a*h) - 2*a*c*(6*c*d + \text{Sqrt}[b^2 - 4*a*c]*f + 2*a*h) + b*(c*\text{Sqrt}[b^2 - 4*a*c]*d + 4*a*c*f + a*\text{Sqrt}[b^2 - 4*a*c]*h))*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]])]/(a*\text{Sqrt}[c]*(b^2 - 4*a*c)^{(3/2)}*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + (\text{Sqrt}[2]*(b^2*(-c*d) + a*h) + 2*a*c*(6*c*d - \text{Sqrt}[b^2 - 4*a*c]*f + 2*a*h) + b*(c*\text{Sqrt}[b^2 - 4*a*c]*d - 4*a*c*f + a*\text{Sqrt}[b^2 - 4*a*c]*h))*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]])]/(a*\text{Sqrt}[c]*(b^2 - 4*a*c)^{(3/2)}*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) + (2*(-2*c*e + b*g)*\text{Log}[-b + \text{Sqrt}[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^{(3/2)} - (2*(-2*c*e + b*g)*\text{Log}[b + \text{Sqrt}[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^{(3/2)}/4$$

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(a + bx^2 + cx^4)^2} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^2, x]

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]
$$\frac{1}{2}*(b*c*d*x^3 - 2*a*c*f*x^3 + a*b*h*x^3 + a*b*g*x^2 - 2*a*c*x^2*e + b^2*d*x - 2*a*c*d*x - a*b*f*x + 2*a^2*h*x + 2*a^2*g - a*b*e)/((c*x^4 + b*x^2 + a)*(a*b^2 - 4*a^2*c)) + \frac{1}{16}*((2*b^3*c^3 - 8*a*b*c^4 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^3*c + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b*c^2 + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^2*c^2 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b*c^3 - 2*(b^2 - 4*a*c)*b*c^3)*(a*b^2 - 4*a^2*c)^2*d - 2*(2*a*b^2*c^3 - 8*a^2*c^4 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^2*c + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^2*c^2 + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b*c^2 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*c^3 - 2*(b^2 - 4*a*c)*a*c^3)*(a*b^2 - 4*a^2*c)^2*f + (2*a*b^3*c^2 - 8*a^2*b*c^3 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^3 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*b*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^2*c - \text{sqrt}(2)*\text{sqrt}(b^2 -$$

$$\begin{aligned}
& 4*a*c)*\text{sqrt}(b*c + \text{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*(\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a*b^6*c \\
& - 14*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b^4*c^2 - 2*\text{sqrt}(2)*\text{sqrt}(b \\
& *c + \text{sqrt}(b^2 - 4*a*c)*c)*a*b^5*c^2 - 2*a*b^6*c^2 + 64*\text{sqrt}(2)*\text{sqrt}(b*c + s \\
& \text{qrt}(b^2 - 4*a*c)*c)*a^3*b^2*c^3 + 20*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c \\
&)*a^2*b^3*c^3 + \text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a*b^4*c^3 + 28*a^2* \\
& b^4*c^3 - 96*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^4*c^4 - 48*\text{sqrt}(2)*s \\
& \text{qrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b*c^4 - 10*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - \\
& 4*a*c)*c)*a^2*b^2*c^4 - 128*a^3*b^2*c^4 + 24*\text{sqrt}(2)*\text{sqrt}(b*c + \text{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*\text{abs}(a*b^2 - 4*a^2*c) + 2*(sq \\
& \text{rt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b^5*c - 8*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt} \\
& (b^2 - 4*a*c)*c)*a^3*b^3*c^2 - 2*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^ \\
& 2*b^4*c^2 - 2*a^2*b^5*c^2 + 16*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^4* \\
& b*c^3 + 8*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b^2*c^3 + \text{sqrt}(2)*sq \\
& \text{rt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b^3*c^3 + 16*a^3*b^3*c^3 - 4*\text{sqrt}(2)*\text{sqrt}(\\
& b*c + \text{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*\text{abs}(a*b^2 - 4*a^2*c) - 4*(\text{sqrt}(2)*sq \\
& \text{rt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b^4*c - 8*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4* \\
& a*c)*c)*a^4*b^2*c^2 - 2*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b^3*c^2 \\
& - 2*a^3*b^4*c^2 + 16*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^5*c^3 + 8*s \\
& \text{qrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^4*b*c^3 + \text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(\\
& b^2 - 4*a*c)*c)*a^3*b^2*c^3 + 16*a^4*b^2*c^3 - 4*\text{sqrt}(2)*\text{sqrt}(b*c + \text{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*\text{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 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + sq \\
& \text{rt}(b^2 - 4*a*c)*c)*a^2*b^7*c + 20*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(\\
& b^2 - 4*a*c)*c)*a^3*b^5*c^2 + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b \\
& ^2 - 4*a*c)*c)*a^2*b^6*c^2 - 112*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(\\
& b^2 - 4*a*c)*c)*a^4*b^3*c^3 - 32*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(\\
& b^2 - 4*a*c)*c)*a^3*b^4*c^3 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 \\
& - 4*a*c)*c)*a^2*b^5*c^3 + 192*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^ \\
& 2 - 4*a*c)*c)*a^5*b*c^4 + 96*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 \\
& - 4*a*c)*c)*a^4*b^2*c^4 + 16*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 \\
& - 4*a*c)*c)*a^3*b^3*c^4 - 48*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{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 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)* \\
& c)*a^3*b^6*c + 8*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)* \\
& a^4*b^4*c^2 + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a \\
& ^3*b^5*c^2 - 16*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a \\
& ^5*b^2*c^3 - 8*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^ \\
& 4*b^3*c^3 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b \\
& ^4*c^3 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{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 - \text{sqrt}(2)*\text{sqrt}(\\
& b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b^7 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - \\
& 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^4*b^5*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4* \\
& a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b^6*c + 16*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a* \\
& c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^5*b^3*c^2 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)* \\
& \text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b^5*c^2 - 64*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)* \\
& \text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^6*b*c^3 - 32*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*sq \\
& \text{rt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^5*b^2*c^3 + 16*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*sq \\
& \text{rt}(b*c + \text{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)*\text{arctan}(2*\text{sqrt}(1/2)*x/\text{sqrt}((a*b^3 - 4*a^2*b*c + \\
& \text{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)*\text{abs}(a*b^2 - 4*a^2*c)*\text{abs}(c)) - 1/16*((2*b^3*c^3 -
\end{aligned}$$

$$\begin{aligned}
& 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 - \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}*\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})*\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})*\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})*\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}
\end{aligned}$$

```

*c)*a^3*b^7 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a
^4*b^5*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^3*
b^6*c + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^5*b^
3*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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))*a^6*b*c^3
- 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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))*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] $\text{int}((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2, x)$

[Out] $\frac{1}{4} \sqrt{\frac{1}{4ac-b^2}} \sqrt{\frac{1}{2}} \left((b+(-4ac+b^2)^{1/2})c \right)^{1/2} \arctan\left(\frac{2^{1/2}}{(b+(-4ac+b^2)^{1/2})c} \right) \sqrt{\frac{1}{2}} \sqrt{cx} \left((-4ac+b^2)^{1/2} b^2 h + \frac{1}{4} \sqrt{\frac{1}{4ac-b^2}} \sqrt{\frac{1}{2}} \left((-b+(-4ac+b^2)^{1/2})c \right)^{1/2} \arctanh\left(\frac{2^{1/2}}{(-b+(-4ac+b^2)^{1/2})c} \right) \sqrt{\frac{1}{2}} \sqrt{cx} \left((-4ac+b^2)^{1/2} b^2 h + (-1/2/a)(ab^2h-2ac^2f+bc^2d) \right) / \sqrt{\frac{1}{4ac-b^2}} \sqrt{\frac{1}{2}} (bg-2c^2e) / \sqrt{\frac{1}{4ac-b^2}} \sqrt{\frac{1}{2}} (2a^2h-ab^2f-2ac^2d+b^2d) / a / \sqrt{\frac{1}{4ac-b^2}} \sqrt{\frac{1}{2}} (2ag-be) / \sqrt{\frac{1}{4ac-b^2}} \right) / \left((cx^4+bx^2+a) - \frac{1}{4} \sqrt{\frac{1}{4ac-b^2}} \sqrt{\frac{1}{2}} \left((b+(-4ac+b^2)^{1/2})c \right)^{1/2} \left((-4ac+b^2)^{1/2} / a b^2 c^2 d \arctan\left(\frac{2^{1/2}}{(b+(-4ac+b^2)^{1/2})c} \right) \sqrt{\frac{1}{2}} \sqrt{cx} \right) - \frac{1}{4} c / \sqrt{\frac{1}{4ac-b^2}} \sqrt{\frac{1}{2}} \left((-b+(-4ac+b^2)^{1/2})c \right)^{1/2} \arctanh\left(\frac{2^{1/2}}{(-b+(-4ac+b^2)^{1/2})c} \right) \sqrt{\frac{1}{2}} \sqrt{cx} \left((-4ac+b^2)^{1/2} b^2 d - c / \sqrt{\frac{1}{4ac-b^2}} \sqrt{\frac{1}{2}} \left((-b+(-4ac+b^2)^{1/2})c \right)^{1/2} \arctanh\left(\frac{2^{1/2}}{(-b+(-4ac+b^2)^{1/2})c} \right) \sqrt{\frac{1}{2}} \sqrt{cx} \left((-4ac+b^2)^{1/2} b^2 f - 1 / \sqrt{\frac{1}{4ac-b^2}} \sqrt{\frac{1}{2}} \left((b+(-4ac+b^2)^{1/2})c \right)^{1/2} \left((-4ac+b^2)^{1/2} b^2 c^2 f \arctan\left(\frac{2^{1/2}}{(b+(-4ac+b^2)^{1/2})c} \right) \sqrt{\frac{1}{2}} \sqrt{cx} \right) - 2c^2 / \sqrt{\frac{1}{4ac-b^2}} \sqrt{\frac{1}{2}} \left((-b+(-4ac+b^2)^{1/2})c \right)^{1/2} \arctanh\left(\frac{2^{1/2}}{(-b+(-4ac+b^2)^{1/2})c} \right) \sqrt{\frac{1}{2}} \sqrt{cx} \right) f + \frac{1}{2} c / \sqrt{\frac{1}{4ac-b^2}} \sqrt{\frac{1}{2}} \left((-b+(-4ac+b^2)^{1/2})c \right)^{1/2} \arctanh\left(\frac{2^{1/2}}{(-b+(-4ac+b^2)^{1/2})c} \right) \sqrt{\frac{1}{2}} \sqrt{cx} \right) \right)$

$$\frac{1}{2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x * b^2 * f + 2 / (4ac - b^2)^{2 * 2^{1/2}} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * a * c^2 * f * \arctan(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) - 1/2 / (4ac - b^2)^{2 * 2^{1/2}} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * b^2 * c * f * \arctan(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) - 1/4 * c / (4ac - b^2)^{2/a * 2^{1/2}} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) * b^3 * d + a / (4ac - b^2)^{2 * c * 2^{1/2}} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) * b * h + 1/2 / (4ac - b^2)^{2 * (-4ac + b^2)^{1/2}} * b * g * \ln(-2 * c * x^2 - b + (-4ac + b^2)^{1/2}) + 1 / (4ac - b^2)^{2 * (-4ac + b^2)^{1/2}} * c * e * \ln(2 * c * x^2 + b + (-4ac + b^2)^{1/2}) - 1 / (4ac - b^2)^{2 * (-4ac + b^2)^{1/2}} * c * e * \ln(-2 * c * x^2 - b + (-4ac + b^2)^{1/2}) + 3 / (4ac - b^2)^{2 * 2^{1/2}} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * (-4ac + b^2)^{1/2} * c^2 * d * \arctan(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) - 1 / (4ac - b^2)^{2 * 2^{1/2}} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * b * c^2 * d * \arctan(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) + 3 * c^2 / (4ac - b^2)^{2 * 2^{1/2}} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) * (-4ac + b^2)^{1/2} * d + c^2 / (4ac - b^2)^{2 * 2^{1/2}} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) * b * d + 1/4 / (4ac - b^2)^{2 * 2^{1/2}} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} / a * b^3 * c * d * \arctan(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) - 1/4 / (4ac - b^2)^{2 * 2^{1/2}} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) * b^3 * h - 1/2 / (4ac - b^2)^{2 * (-4ac + b^2)^{1/2}} * b * g * \ln(2 * c * x^2 + b + (-4ac + b^2)^{1/2}) + a / (4ac - b^2)^{2 * c * 2^{1/2}} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \arctan(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) * (-4ac + b^2)^{1/2} * h - a / (4ac - b^2)^{2 * c * 2^{1/2}} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \arctan(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) * b * h + a / (4ac - b^2)^{2 * c * 2^{1/2}} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * c * x) * (-4ac + b^2)^{1/2} * h + 1/4 / (4ac - b^2)^{2 * 2^{1/2}} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \arctan(2^{1/2} / ((b + (-4ac + 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] $\frac{1}{2} * ((b * c * d - 2 * a * c * f + a * b * h) * x^3 - a * b * e + 2 * a^2 * g - (2 * a * c * e - a * b * g) * x^2 - (a * b * f - 2 * a^2 * h - (b^2 - 2 * a * c) * d) * x) / ((a * b^2 * c - 4 * a^2 * c^2) * x^4 + a^2 * b^2 - 4 * a^3 * c + (a * b^3 - 4 * a^2 * b * c) * x^2) + 1/2 * \int ((a * b * f - 2 * a^2 * h + (b * c * d - 2 * a * c * f + a * b * h) * x^2 + (b^2 - 6 * a * c) * d - 2 * (2 * a * c * e - a * b * g) * x) / (c * x^4 + b * x^2 + a), x) / (a * b^2 - 4 * a^2 * c)$

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] $((b * e - 2 * a * g) / (2 * (4 * a * c - b^2)) + (x^2 * (2 * c * e - b * g)) / (2 * (4 * a * c - b^2)) - (x * (b^2 * d + 2 * a^2 * h - 2 * a * c * d - a * b * f)) / (2 * a * (4 * a * c - b^2)) - (x^3 * (b * c * d - 2 * a * c * f + a * b * h)) / (2 * a * (4 * a * c - b^2))) / (a + b * x^2 + c * x^4) + \operatorname{symsum}(\log((5 * b^3 * c^4 * d^3 + 8 * a^3 * c^4 * f^3 - 96 * a^2 * c^5 * d * e^2 + 72 * a^2 * c^5 * d^2 * f - 3 * a^3 * b^3 * c * h^3 - 4 * a^4 * b * c^2 * h^3 - 3 * b^4 * c^3 * d^2 * f - 32 * a^3 * c^4 * e^2 * h + b^5 * c^2 * d^2 * h + 8 * a^4 * c^3 * f * h^2 + 6 * a^2 * b^2 * c^3 * f^3 - 36 * a * b * c^5 * d^3 + a * b^5 * c * d * h^2 + 48 * a^3 * c^4 * d * f * h + 16 * a * b^2 * c^4 * d * e^2 + 18 * a * b^2 * c^4 * d^2 * f + 3 * a * b^3 * c^3 * d * f^2 - 60 * a^2 * b * c^4 * d * f^2 + 4 * a * b^4 * c^2 * d * g^2 + 16 * a^2 * b * c^4 * e^2 * f - a * b^3 * c^3 * d^2 * h - 60 * a^2 * b * c^4 * d^2 * h - 28 * a^3 * b * c^3 * d * h^2 + a^2 * b^4 * c * f * h^2 - 28 * a^3 * b * c^3 * f^2 * h - 24 * a^2 * b^2 * c^3 * d * g^2 - 9 * a^2 * b^3 * c^2 * d * h^2 + 4 * a^2 * b^3 * c^2 * f * g^2 - 5 * a^2 * b^3 * c^2 * f^2 * h + 18 * a^3 * b^2 * c^2 * f * h^2 - 8 * a^3 * b^2 * c^2 * g^2$

$$\begin{aligned}
& *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)) - \text{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
\end{aligned}$$

$$\begin{aligned}
& ^6c^2d^3h + 6a^3b^5f^3h^3 - 1728a^3c^5d^3h - 192a^5c^3d^3h^3 - 4 \\
& *b^7c^2d^2g^2 + 30b^5c^3d^3f + 6a^2b^6d^3h^3 - 24a^5b^2c^3h^4 - 16 \\
& *a^3b^4c^2g^4 + 360a^3b^2c^5d^4 - 16a^6c^2h^4 - 9a^4b^4h^4 - 16a^4 \\
& c^4f^4 - 256a^3c^5e^4 - 25b^4c^4d^4 - 1296a^2c^6d^4 - a^2b^6f \\
& ^2h^2 - b^8d^2h^2, z, k) * (\text{root}(1572864a^8b^2c^6z^4 - 983040a^7b^4c \\
& ^5z^4 + 327680a^6b^6c^4z^4 - 61440a^5b^8c^3z^4 + 6144a^4b^10c^ \\
& ^2z^4 - 256a^3b^12c^z^4 - 1048576a^9c^7z^4 + 192a^3b^8c^3f^3h^2z^2 + \\
& 57344a^6b^3c^5d^3h^2z^2 + 32768a^6b^3c^5e^3g^2z^2 + 96a^2b^9c^3d^3h^2z^2 - \\
& 32a^3b^10c^3d^3f^2z^2 + 6144a^5b^4c^3f^3h^2z^2 - 2048a^4b^6c^2f^3h^2z^2 - \\
& 49152a^5b^3c^4d^3h^2z^2 - 24576a^5b^3c^4e^3g^2z^2 + 15360a^4b^5c^3d \\
& ^3h^2z^2 + 6144a^4b^5c^3e^3g^2z^2 - 2048a^3b^7c^2d^3h^2z^2 - 512a^3b^7 \\
& *c^2e^3g^2z^2 + 24576a^5b^2c^5d^3f^2z^2 - 3072a^3b^6c^3d^3f^2z^2 + 2048a \\
& ^4b^4c^4d^3f^2z^2 + 576a^2b^8c^2d^3f^2z^2 + 12288a^7b^3c^4h^2z^2 + 1 \\
& 28a^3b^8c^2g^2z^2 + 12288a^6b^3c^5f^2z^2 - 16a^2b^9c^3f^2z^2 + 614 \\
& 40a^5b^3c^6d^2z^2 + 432a^3b^9c^2d^2z^2 - 16384a^7c^5f^3h^2z^2 - 4915 \\
& 2a^6c^6d^3f^2z^2 - 8192a^6b^3c^3h^2z^2 + 1536a^5b^5c^2h^2z^2 - 8 \\
& 192a^6b^2c^4g^2z^2 + 6144a^5b^4c^3g^2z^2 - 1536a^4b^6c^2g^2z \\
& ^2 - 8192a^5b^3c^4f^2z^2 + 1536a^4b^5c^3f^2z^2 + 24576a^5b^2c^ \\
& ^5e^2z^2 - 6144a^4b^4c^4e^2z^2 + 512a^3b^6c^3e^2z^2 - 61440a^4b \\
& ^3c^5d^2z^2 + 24064a^3b^5c^4d^2z^2 - 4608a^2b^7c^3d^2z^2 - 16 \\
& *a^3b^9h^2z^2 - 32768a^6c^6e^2z^2 - 16b^11c^2d^2z^2 - 6144a^5b^3c \\
& ^4d^3g^3h^2z + 96a^2b^7c^3d^3g^3h^2z - 4096a^4b^3c^5d^3e^3f^2z + 64a^3b^7c^2d \\
& ^3e^3f^2z - 32a^3b^8c^3d^3f^3g^2z + 4608a^4b^3c^3d^3g^3h^2z - 1152a^3b^5c^2d \\
& ^3g^3h^2z - 9216a^4b^2c^4d^3e^3h^2z + 2304a^3b^4c^3d^3e^3h^2z + 2048a^4b^2 \\
& *c^4d^3f^3g^2z - 1536a^3b^4c^3d^3f^3g^2z + 384a^2b^6c^2d^3f^3g^2z - 192a^2 \\
& *b^6c^2d^3e^3h^2z + 3072a^3b^3c^4d^3e^3f^2z - 768a^2b^5c^3d^3e^3f^2z - 102 \\
& 4a^6b^3c^3g^3h^2z - 192a^4b^5c^3g^3h^2z + 1024a^5b^3c^4f^2g^2z - 32a \\
& ^3b^6c^3e^3h^2z - 16a^2b^7c^3f^2g^2z - 9216a^4b^3c^5d^2g^2z + 336a^3b^ \\
& ^7c^2d^2g^2z - 672a^3b^6c^3d^2e^3z + 12288a^5c^5d^3e^3h^2z + 768a^5b^3 \\
& *c^2g^3h^2z - 1536a^5b^2c^3e^3h^2z - 768a^4b^3c^3f^2g^2z + 384a^4 \\
& *b^4c^2e^3h^2z + 192a^3b^5c^2f^2g^2z + 7936a^3b^3c^4d^2g^2z - 249 \\
& 6a^2b^5c^3d^2g^2z + 1536a^4b^2c^4e^3f^2z - 384a^3b^4c^3e^3f^2z \\
& + 32a^2b^6c^2e^3f^2z - 15872a^3b^2c^5d^2e^3z + 4992a^2b^4c^4d^2 \\
& *e^3z + 16a^3b^7g^3h^2z + 2048a^6c^4e^3h^2z - 2048a^5c^5e^3f^2z + 3 \\
& 2b^8c^2d^2e^3z + 18432a^4c^6d^2e^3z - 16b^9c^3d^2g^2z - 256a^4b^3c^ \\
& ^3e^3f^3g^2h - 768a^3b^3c^4d^3e^3f^3g - 32a^3b^5c^2d^3e^3f^3g - 192a^3b^3c^2 \\
& *e^3f^3g^2h + 896a^3b^2c^3d^3e^3g^2h - 96a^2b^4c^2d^3e^3g^2h - 192a^2b^3c^ \\
& ^3d^3e^3f^3g + 48a^3b^4c^3f^3g^2h + 16a^3b^4c^3e^3g^2h^2 + 24a^2b^5c^3d^3g^ \\
& ^2h + 2208a^3b^3c^4d^2f^3h + 800a^4b^3c^3d^3f^3h^2 - 102a^3b^5c^2d^2f^3 \\
& h - 30a^2b^5c^3d^3f^3h^2 - 896a^3b^3c^4d^3e^2h - 240a^3b^4c^3d^2e^3g - \\
& 32a^3b^4c^3d^3e^2f + 12a^3b^6c^3d^3f^2h - 8a^3b^6c^3d^3f^2g^2 + 64a^4b^2c \\
& ^2f^3g^2h + 192a^4b^2c^2e^3g^2h^2 - 224a^3b^3c^2d^3g^2h + 192a^3b^ \\
& ^2c^3e^2f^3h - 864a^3b^2c^3d^3f^2h + 336a^3b^3c^2d^3f^3h^2 + 192a^ \\
& ^3b^2c^3e^3f^2g + 144a^2b^3c^3d^2f^3h + 16a^2b^4c^2e^3f^2g - 12a \\
& ^2b^4c^2d^3f^2h + 192a^3b^2c^3d^3f^3g^2 + 96a^2b^3c^3d^3e^2h + 48a \\
& ^2b^4c^2d^3f^3g^2 + 960a^2b^2c^4d^2e^3g + 192a^2b^2c^4d^3e^2f - 4 \\
& 8a^4b^3c^3g^2h^2 + 80a^3b^3c^2f^3h - 42a^3b^4c^3f^2h^2 - 192a^4 \\
& *b^3c^3e^2h^2 - 4a^2b^5c^3f^2g^2 - 192a^4b^2c^2d^3h^3 - 192a^2b^2c \\
& ^4d^3h + 128a^3b^3c^2e^3g^3 - 192a^3b^3c^4e^2f^2 + 60a^3b^5c^2d^ \\
& ^2g^2 + 198a^3b^4c^3d^2f^2 + 144a^2b^3c^3d^3f^3 - 960a^2b^3c^5d^2e \\
& ^2 + 240a^3b^3c^4d^2e^2 + 256a^4c^4e^2f^3h - 192a^4c^4d^3f^2h + 16 \\
& *b^6c^2d^2e^3g + 96a^5b^3c^2f^3h^3 + 96a^4b^3c^3f^3h + 80a^4b^3c^3f \\
& ^3h^3 + 6a^2b^5c^3f^3h + 768a^3c^5d^3e^2f + 512a^3b^3c^4e^3g + 132a \\
& *b^4c^3d^3h - 28a^3b^4c^3d^3h^3 + 12a^3b^6c^3d^2h^2 + 2016a^2b^3c^5d \\
& ^3f - 496a^3b^3c^4d^3f + 224a^3b^3c^4d^3f^3 - 18a^3b^5c^2d^3f^3 - 19 \\
& 2a^4b^2c^2f^2h^2 - 48a^3b^3c^2f^2g^2 - 16a^3b^3c^2e^2h^2 - 4 \\
& 64a^3b^2c^3d^2h^2 - 384a^3b^2c^3e^2g^2 + 42a^2b^4c^2d^2h^2 - \\
& 240a^2b^3c^3d^2g^2 - 16a^2b^3c^3e^2f^2 - 960a^2b^2c^4d^2f^2 \\
& + 6b^7c^3d^2f^3h - 2a^3b^7d^3f^3h^2 - 32a^5c^3f^2h^2 - 4a^3b^5g^2h
\end{aligned}$$

$$\begin{aligned}
&^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
\end{aligned}$$

$$\begin{aligned}
& 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 - 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*(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 + 320*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 - 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 - 1024*a^6*b*c^3*g*h^2*z - 192*a^4*b^5*c*g*h^2*z + 1024*a^5*b
\end{aligned}$$

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*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

$$3.40 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=468

$$\frac{-\left(x^2(-2aci + b^2i - bcg + 2c^2e)\right) - b(ai + ce) + 2acg}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x\left(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d\right)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \dots$$

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, number of rules / integrand size = 0.225, Rules used = {1673, 1678, 1166, 205, 1663, 1660, 12, 618, 206}

$$\frac{x^2(-2aci + b^2i - bcg + 2c^2e) - b(ai + ce) + 2acg}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\tan^{-1}\left(\frac{\sqrt{b} \sqrt{c}}{\sqrt{b^2 - 4ac}}\right) \left(\frac{b^2cd - abh + 4abf - 4a(cd - ah) + bcd}{\sqrt{b^2 - 4ac}} + abh - 2acf + bcd\right)}{2\sqrt{2} \sqrt{c} (b^2 - 4ac) \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{b} \sqrt{c}}{\sqrt{b^2 - 4ac}}\right) \left(-\frac{b^2cd - abh + 4abf - 4a(cd - ah) + bcd}{\sqrt{b^2 - 4ac}} + abh - 2acf + bcd\right)}{2\sqrt{2} \sqrt{c} (b^2 - 4ac) \sqrt{\sqrt{b^2 - 4ac} + b}} + \frac{\tanh^{-1}\left(\frac{bx + 2cx}{\sqrt{b^2 - 4ac}}\right) (2ai - bg + 2cx)}{(b^2 - 4ac)^{3/2}}$$

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))/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]]) + ((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] && !MatchQ[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] && (GtQ[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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
```

$Q[c*d^2 - a*e^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4*a*c]$

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 40x^5}{(a + bx^2 + cx^4)^2} dx = \int \frac{x(e + gx^2 + 40x^4)}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^2} dx$$

$$= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \text{Subst} \left(\int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^2} dx \right)$$

$$= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}$$

Mathematica [A] time = 2.11, size = 524, normalized size = 1.12

$$\frac{\left(\frac{2(d^2b^2 - 2d(e + f)x + g)x^2 + (f^2x^2 + b^2g + h(f - dg + h)) + 2d^2d + h(e + f)x) - hcd(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} \sqrt{2} \tan^{-1} \left(\frac{d + fx^2}{\sqrt{a^2 - 4ac}} \right) \left(\frac{x(\sqrt{a^2 - 4ac} + a\sqrt{b^2 - 4ac} + 4ax)}{\sqrt{c^2(b^2 - 4ac)^2 - \sqrt{b^2 - 4ac}}} \right) - 2a(\sqrt{b^2 - 4ac} + 2ab + 6cd) + 8(ad - ah) \right)}{\sqrt{2} \tan^{-1} \left(\frac{d + fx^2}{\sqrt{a^2 - 4ac}} \right) \left(\frac{x(\sqrt{a^2 - 4ac} + a\sqrt{b^2 - 4ac} - 4ax)}{\sqrt{c^2(b^2 - 4ac)^2 - \sqrt{b^2 - 4ac}}} \right) + 2a(\sqrt{b^2 - 4ac} + 2ab + 6cd) + 8(ad - ah)} \right) + \frac{2b \log(\sqrt{b^2 - 4ac} - b - 2cx^2) - 2a + 8y - 2ay}{(b^2 - 4ac)^2} + \frac{2b \log(\sqrt{b^2 - 4ac} + b + 2cx^2) - 2a - 8y + 2ay}{(b^2 - 4ac)^2}$$

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)^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*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*Sqrt[c]*(b^2 - 4*a*c)^(3/2)*Sqrt[b + Sqrt[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
```

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + ix^5}{(a + bx^2 + cx^4)^2} dx$$

Verification is not applicable to the result.

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

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="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((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 = 0.05, 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] $\frac{1}{4} \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{b^2 h \arctan\left(\frac{2^{1/2}}{(b+(-4ac+b^2)^{1/2})c}\right) + \frac{1}{4} \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{(-b+(-4ac+b^2)^{1/2})c}\right)} \frac{1}{(-b+(-4ac+b^2)^{1/2})c} \frac{1}{c^2 x} (-4ac+b^2)^{1/2} b^2 h + \left(-\frac{1}{2} (ab^2 h - 2ac^2 f + bc^2 d)\right) \frac{1}{(4ac-b^2)} \frac{1}{ax^3} - \frac{1}{2} \frac{1}{(2ac^2 i - b^2 i + bc^2 g - 2c^2 e)} \frac{1}{(4ac-b^2)} \frac{1}{cx^2} - \frac{1}{2} \frac{1}{(2a^2 h - ab^2 f - 2ac^2 d + b^2 d)} \frac{1}{(4ac-b^2)} \frac{1}{ax} + \frac{1}{2} \frac{1}{c} \frac{1}{(ab^2 i - 2ac^2 g + bc^2 e)} \frac{1}{(4ac-b^2)} \frac{1}{(c^4 x^4 + b^2 x^2 + a)} - \frac{1}{4} \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{ab^2 c^2 d \arctan\left(\frac{2^{1/2}}{(b+(-4ac+b^2)^{1/2})c}\right)} \frac{1}{(-b+(-4ac+b^2)^{1/2})c} \frac{1}{c^2 x} - \frac{1}{4} \frac{1}{c} \frac{1}{(4ac-b^2)^2} \frac{1}{a^2} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{(-b+(-4ac+b^2)^{1/2})c}\right)} \frac{1}{(-b+(-4ac+b^2)^{1/2})c} \frac{1}{c^2 x} (-4ac+b^2)^{1/2} b^2 d - c \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{(-b+(-4ac+b^2)^{1/2})c}\right)} \frac{1}{(-b+(-4ac+b^2)^{1/2})c} \frac{1}{c^2 x} (-4ac+b^2)^{1/2} b^2 f - \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{b^2 c^2 f \arctan\left(\frac{2^{1/2}}{(b+(-4ac+b^2)^{1/2})c}\right)} \frac{1}{(-b+(-4ac+b^2)^{1/2})c} \frac{1}{c^2 x} - \frac{2}{(4ac-b^2)^2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{(-b+(-4ac+b^2)^{1/2})c}\right)} \frac{1}{(-b+(-4ac+b^2)^{1/2})c} \frac{1}{c^2 x} (-4ac+b^2)^{1/2} b^2 * f + \frac{2}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{ac^2 f \arctan\left(\frac{2^{1/2}}{(b+(-4ac+b^2)^{1/2})c}\right)} \frac{1}{(-b+(-4ac+b^2)^{1/2})c} \frac{1}{c^2 x} - \frac{1}{2} \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{b^2 c^2 f \arctan\left(\frac{2^{1/2}}{(b+(-4ac+b^2)^{1/2})c}\right)} \frac{1}{(-b+(-4ac+b^2)^{1/2})c} \frac{1}{c^2 x} - \frac{1}{4} \frac{1}{c} \frac{1}{(4ac-b^2)^2} \frac{1}{a^2} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{(-b+(-4ac+b^2)^{1/2})c}\right)} \frac{1}{(-b+(-4ac+b^2)^{1/2})c} \frac{1}{c^2 x} b^3 d + a \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{(-b+(-4ac+b^2)^{1/2})c}\right)} \frac{1}{(-b+(-4ac+b^2)^{1/2})c} \frac{1}{c^2 x} b^2 h + \frac{1}{2} \frac{1}{(4ac-b^2)^2} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{b^2 g \ln(-2cx^2 - b + (-4ac+b^2)^{1/2})} + \frac{1}{(4ac-b^2)^2} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{c} e \ln(2cx^2 + b + (-4ac+b^2)^{1/2}) - \frac{1}{(4ac-b^2)^2} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{c} e \ln(-2cx^2 - b + (-4ac+b^2)^{1/2}) + \frac{3}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{c^2 d \arctan\left(\frac{2^{1/2}}{(b+(-4ac+b^2)^{1/2})c}\right)} \frac{1}{(-b+(-4ac+b^2)^{1/2})c} \frac{1}{c^2 x} - \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{b^2 c^2 d \arctan\left(\frac{2^{1/2}}{(b+(-4ac+b^2)^{1/2})c}\right)} \frac{1}{(-b+(-4ac+b^2)^{1/2})c} \frac{1}{c^2 x} + \frac{3}{(4ac-b^2)^2}$

$$b^2)^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2}) * c * x * (-4ac + b^2)^{1/2} * d + c^2 / (4ac - b^2)^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2}) * c * x * b * d + 1/4 / (4ac - b^2)^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} / a * b^3 * c * d * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2}) * c * x - 1/4 / (4ac - b^2)^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2}) * c * x * b^3 * h - 1/2 / (4ac - b^2)^{1/2} * (-4ac + b^2)^{1/2} * b * g * \ln(2 * c * x^2 + b + (-4ac + b^2)^{1/2}) + 1 / (4ac - b^2)^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * (-4ac + b^2)^{1/2} * a * c * h * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2}) * c * x - 1 / (4ac - b^2)^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * a * b * c * h * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2}) * c * x + a / (4ac - b^2)^{1/2} * c^2 / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2}) * c * x * (-4ac + b^2)^{1/2} * h + 1/4 / (4ac - b^2)^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * b^3 * h * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2}) * c * x - a / (4ac - b^2)^{1/2} * \ln(-2 * c * x^2 - b + (-4ac + b^2)^{1/2}) * (-4ac + b^2)^{1/2} * i + a / (4ac - b^2)^{1/2} * \ln(2 * c * x^2 + b + (-4ac + b^2)^{1/2}) * (-4ac + b^2)^{1/2} * i$$

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="maxima")

[Out] $-1/2 * (a * b * c * e - 2 * a^2 * c * g + a^2 * b * i - (b * c^2 * d - 2 * a * c^2 * f + a * b * c * h) * x^3 + (2 * a * c^2 * e - a * b * c * g + (a * b^2 - 2 * a^2 * c) * i) * x^2 + (a * b * c * f - 2 * a^2 * c * h - (b^2 * c - 2 * a * c^2) * d) * x) / (a^2 * b^2 * c - 4 * a^3 * c^2 + (a * b^2 * c^2 - 4 * a^2 * c^3) * x^4 + (a * b^3 * c - 4 * a^2 * b * c^2) * x^2) + 1/2 * \operatorname{integrate}((a * b * f - 2 * a^2 * h + (b * c * d - 2 * a * c * f + a * b * h) * x^2 + (b^2 - 6 * a * c) * d - 2 * (2 * a * c * e - a * b * g + 2 * a^2 * i) * x) / (c * x^4 + b * x^2 + a), x) / (a * b^2 - 4 * a^2 * c)$

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) + \operatorname{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 + 16 * 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)) - \operatorname{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$

$$\begin{aligned}
& *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
\end{aligned}$$

$$\begin{aligned}
&^3b^2c^3d^2fg^2 + 96a^2b^3c^3d^2e^2h + 48a^2b^4c^2d^2fg^2 + 960a^2b^2c^4d^2e^2g + 192a^2b^2c^4d^2e^2f - 384a^5b^2c^2g^2i^2 - 192a^5b^2c^2f^2i^2 - 48a^4b^3c^2g^2h^2 - 16a^4b^3c^2f^2i^2 + 80a^3b^3c^2f^3h - 42a^3b^4c^2f^2h^2 - 960a^4b^2c^3d^2i^2 - 192a^4b^2c^3e^2h^2 - 16a^2b^5c^2d^2i^2 - 4a^2b^5c^2f^2g^2 - 192a^4b^2c^2d^2h^3 - 192a^2b^2c^4d^3h + 128a^3b^3c^2e^2g^3 - 192a^3b^2c^4e^2f^2 + 60a^2b^5c^2d^2g^2 + 198a^2b^4c^3d^2f^2 + 144a^2b^3c^3d^2f^3 - 960a^2b^2c^5d^2e^2 + 240a^2b^3c^4d^2e^2 + 256a^6c^2f^2h^2 + 16a^4b^4g^2h^2i + 768a^5c^3d^2f^2i^2 + 256a^4c^4e^2f^2h - 192a^6b^2c^2h^2i^2 - 192a^4c^4d^2f^2h + 128a^4b^3c^2g^3i + 16b^6c^2d^2e^2g + 96a^5b^2c^2f^2h^3 + 96a^4b^2c^3f^3h + 80a^4b^3c^2f^2h^3 + 6a^2b^5c^2f^3h + 768a^3c^5d^2e^2f + 512a^3b^2c^4e^3g + 132a^2b^4c^3d^3h - 28a^3b^4c^2d^3h^3 + 12a^2b^6c^2d^2h^2 + 2016a^2b^2c^5d^3f - 496a^2b^3c^4d^3f + 224a^3b^2c^4d^2f^3 - 18a^2b^5c^2d^2f^3 - 192a^4b^2c^2f^2h^2 + 240a^3b^3c^2d^2i^2 - 48a^3b^3c^2f^2g^2 - 16a^3b^3c^2e^2h^2 - 464a^3b^2c^3d^2h^2 - 384a^3b^2c^3e^2g^2 + 42a^2b^4c^2d^2h^2 - 240a^2b^3c^3d^2g^2 - 16a^2b^3c^3e^2f^2 - 960a^2b^2c^4d^2f^2 + 6b^7c^2d^2f^2h + 512a^6b^2c^2g^2i^3 - 2a^2b^7d^2f^2h^2 - 16a^5b^3h^2i^2 - 1536a^5c^3e^2i^2 - 32a^5c^3f^2h^2 - 4a^3b^5g^2h^2 - 864a^4c^4d^2h^2 - 9b^6c^2d^2f^2 - 288a^3c^5d^2f^2 - 16b^5c^3d^2e^2 - 24a^3b^2c^3f^4 - 9a^2b^4c^2f^4 - 1024a^6c^2e^2i^3 - 1024a^4c^4e^3i - 10b^6c^2d^3h + 6a^3b^5f^2h^3 - 1728a^3c^5d^3h - 192a^5c^3d^2h^3 - 4b^7c^2d^2g^2 + 30b^5c^3d^3f + 6a^2b^6d^2h^3 - 24a^5b^2c^2h^4 - 16a^3b^4c^2g^4 + 360a^2b^2c^5d^4 - 16a^6c^2h^4 - 9a^4b^4h^4 - 16a^4c^4f^4 - 256a^3c^5e^4 - 25b^4c^4d^4 - 1296a^2c^6d^4 - a^2b^6f^2h^2 - 256a^7c^2i^4 - b^8d^2h^2, z, 1) * ((32a^2b^5c^3d^2e - 512a^5c^4f^2i - 512a^4c^5e^2f + 1024a^3b^2c^5d^2e - 16a^2b^6c^2d^2g + 1024a^4b^2c^4d^2i + 512a^4b^2c^4e^2h + 256a^4b^2c^4f^2g + 512a^5b^2c^3h^2i - 384a^2b^3c^4d^2e + 192a^2b^4c^3d^2g + 32a^2b^4c^3e^2f - 512a^3b^2c^4d^2g + 32a^2b^5c^2d^2i - 16a^2b^5c^2f^2g - 384a^3b^3c^3d^2i - 128a^3b^3c^3e^2h + 32a^3b^4c^2f^2i + 64a^3b^4c^2g^2h - 256a^4b^2c^3g^2h - 128a^4b^3c^2h^2i) / (8(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) + \text{root}(1572864a^8b^2c^6z^4 - 983040a^7b^4c^5z^4 + 327680a^6b^6c^4z^4 - 61440a^5b^8c^3z^4 + 6144a^4b^10c^2z^4 - 256a^3b^12c^2z^4 - 1048576a^9c^7z^4 + 32768a^7b^2c^4g^2i^2z^2 - 512a^4b^7c^2g^2i^2z^2 + 192a^3b^8c^2f^2h^2z^2 + 57344a^6b^2c^5d^2h^2z^2 + 32768a^6b^2c^5e^2g^2z^2 + 96a^2b^9c^2d^2h^2z^2 - 32a^2b^10c^2d^2f^2z^2 - 24576a^6b^3c^3g^2i^2z^2 + 6144a^5b^5c^2g^2i^2z^2 + 49152a^6b^2c^4e^2i^2z^2 - 12288a^5b^4c^3e^2i^2z^2 + 6144a^5b^4c^3f^2h^2z^2 - 2048a^4b^6c^2f^2h^2z^2 + 1024a^4b^6c^2e^2i^2z^2 - 49152a^5b^3c^4d^2h^2z^2 - 24576a^5b^3c^4e^2g^2z^2 + 15360a^4b^5c^3d^2h^2z^2 + 6144a^4b^5c^3e^2g^2z^2 - 2048a^3b^7c^2d^2h^2z^2 - 512a^3b^7c^2e^2g^2z^2 + 24576a^5b^2c^5d^2f^2z^2 - 3072a^3b^6c^3d^2f^2z^2 + 2048a^4b^4c^4d^2f^2z^2 + 576a^2b^8c^2d^2f^2z^2 + 512a^5b^6c^2i^2z^2 + 12288a^7b^2c^4h^2z^2 + 128a^3b^8c^2g^2z^2 + 12288a^6b^2c^5f^2z^2 - 16a^2b^9c^2f^2z^2 + 61440a^5b^6c^6d^2z^2 + 432a^2b^9c^2d^2z^2 - 65536a^7c^5e^2i^2z^2 - 16384a^7c^5f^2h^2z^2 - 49152a^6c^6d^2f^2z^2 + 24576a^7b^2c^3i^2z^2 - 6144a^6b^4c^2i^2z^2 - 8192a^6b^3c^3h^2z^2 + 1536a^5b^5c^2h^2z^2 - 8192a^6b^2c^4g^2z^2 + 6144a^5b^4c^3g^2z^2 - 1536a^4b^6c^2g^2z^2 - 8192a^5b^3c^4f^2z^2 + 1536a^4b^5c^3f^2z^2 + 24576a^5b^2c^5e^2z^2 - 6144a^4b^4c^4e^2z^2 + 512a^3b^6c^3e^2z^2 - 61440a^4b^3c^5d^2z^2 + 24064a^3b^5c^4d^2z^2 - 4608a^2b^7c^3d^2z^2 - 32768a^8c^4i^2z^2 - 16a^3b^9h^2z^2 - 32768a^6c^6e^2z^2 - 16b^11c^2d^2z^2 - 192a^3b^6c^2d^2h^2i^2z - 6144a^5b^2c^4d^2g^2h^2z - 4096a^5b^2c^4d^2f^2i^2z + 96a^2b^7c^2d^2g^2h^2z + 64a^2b^7c^2d^2f^2i^2z - 4096a^4b^2c^5d^2e^2f^2z + 64a^2b^7c^2d^2e^2f^2z - 32a^2b^8c^2d^2f^2g^2z - 9216a^5b^2c^3d^2h^2i^2z + 2304a^4b^4c^2d^2h^2i^2z + 4608a^4b^3c^3d^2g^2h^2z + 3072a^4b^3c^3d^2f^2i^2z - 1152a^3b^5c^2d^2g^2h^2z - 768a^3b^5c^2d^2f^2i^2z - 9216a^4b^2c^4d^2e^2h^2z + 2304a^3b^4c^3d^2e^2h^2z + 2048a^4b^2c^4d^2f^2g^2z - 1536a^3b^
\end{aligned}$$

$$\begin{aligned}
& 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^2*i - 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*f*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 - 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^2*i + 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^3*i - 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
\end{aligned}$$

$$\begin{aligned}
& ^5b^2c^4h^4 - 16a^3b^4c^4g^4 + 360ab^2c^5d^4 - 16a^6c^2h^4 - 9a^4b^4h^4 - 16a^4c^4f^4 - 256a^3c^5e^4 - 25b^4c^4d^4 - 1296a^2c^6d^4 - a^2b^6f^2h^2 - 256a^7c^5i^4 - b^8d^2h^2, z, 1) * ((x * (2048a^5c^6e + 2048a^6c^5i - 32a^2b^6c^3e + 384a^3b^4c^4e - 1536a^4b^2c^5e + 16a^2b^7c^2g - 192a^3b^5c^3g + 768a^4b^3c^4g - 32a^3b^6c^2i + 384a^4b^4c^3i - 1536a^5b^2c^4i - 1024a^5b^2c^5g)) / (4 * (a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) - (6144a^5c^6d + 2048a^6c^5h - 288a^2b^6c^3d + 1920a^3b^4c^4d - 5632a^4b^2c^5d + 16a^2b^7c^2f - 192a^3b^5c^3f + 768a^4b^3c^4f - 32a^3b^6c^2h + 384a^4b^4c^3h - 1536a^5b^2c^4h + 16ab^8c^2d - 1024a^5b^2c^5f) / (8 * (a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) + (\text{root}(1572864a^8b^2c^6z^4 - 983040a^7b^4c^5z^4 + 327680a^6b^6c^4z^4 - 61440a^5b^8c^3z^4 + 6144a^4b^10c^2z^4 - 256a^3b^12c^2z^4 - 1048576a^9c^7z^4 + 32768a^7b^4c^5g^2z^2 - 512a^4b^7c^4g^2z^2 + 192a^3b^8c^4f^2z^2 + 57344a^6b^2c^5d^2h^2z^2 + 32768a^6b^2c^5e^2g^2z^2 + 96a^2b^9c^4d^2h^2z^2 - 32a^2b^10c^4d^2f^2z^2 - 24576a^6b^3c^3g^2z^2 + 6144a^5b^5c^2g^2z^2 + 49152a^6b^2c^4e^2z^2 - 12288a^5b^4c^3e^2z^2 + 6144a^5b^4c^3f^2h^2z^2 - 2048a^4b^6c^2f^2h^2z^2 + 1024a^4b^6c^2e^2z^2 - 49152a^5b^3c^4d^2h^2z^2 - 24576a^5b^3c^4e^2g^2z^2 + 15360a^4b^5c^3d^2h^2z^2 + 6144a^4b^5c^3e^2g^2z^2 - 2048a^3b^7c^2d^2h^2z^2 - 512a^3b^7c^2e^2g^2z^2 + 24576a^5b^2c^5d^2f^2z^2 - 3072a^3b^6c^3d^2f^2z^2 + 2048a^4b^4c^4d^2f^2z^2 + 576a^2b^8c^2d^2f^2z^2 + 512a^5b^6c^2i^2z^2 + 12288a^7b^4c^4h^2z^2 + 128a^3b^8c^2g^2z^2 + 12288a^6b^2c^5f^2z^2 - 16a^2b^9c^4f^2z^2 + 61440a^5b^2c^6d^2z^2 + 432a^2b^9c^2d^2z^2 - 65536a^7c^5e^2z^2 - 16384a^7c^5f^2h^2z^2 - 49152a^6c^6d^2f^2z^2 + 24576a^7b^2c^3i^2z^2 - 6144a^6b^4c^2i^2z^2 - 8192a^6b^3c^3h^2z^2 + 1536a^5b^5c^2h^2z^2 - 8192a^6b^2c^4g^2z^2 + 6144a^5b^4c^3g^2z^2 - 1536a^4b^6c^2g^2z^2 - 8192a^5b^3c^4f^2z^2 + 1536a^4b^5c^3f^2z^2 + 24576a^5b^2c^5e^2z^2 - 6144a^4b^4c^4e^2z^2 + 512a^3b^6c^3e^2z^2 - 61440a^4b^3c^5d^2z^2 + 24064a^3b^5c^4d^2z^2 - 4608a^2b^7c^3d^2z^2 - 32768a^8c^4i^2z^2 - 16a^3b^9h^2z^2 - 32768a^6c^6e^2z^2 - 16b^11c^2d^2z^2 - 192a^3b^6c^4d^2h^2z^2 - 6144a^5b^2c^4d^2g^2h^2z^2 - 4096a^5b^2c^4d^2f^2i^2z^2 + 96a^2b^7c^2d^2g^2h^2z^2 + 64a^2b^7c^2d^2f^2i^2z^2 - 4096a^4b^2c^5d^2e^2f^2z^2 + 64a^2b^7c^2d^2e^2f^2z^2 - 32a^2b^8c^2d^2f^2g^2z^2 - 9216a^5b^2c^3d^2h^2i^2z^2 + 2304a^4b^4c^2d^2h^2i^2z^2 + 4608a^4b^3c^3d^2g^2h^2z^2 + 3072a^4b^3c^3d^2f^2i^2z^2 - 1152a^3b^5c^2d^2g^2h^2z^2 - 768a^3b^5c^2d^2f^2i^2z^2 - 9216a^4b^2c^4d^2e^2h^2z^2 + 2304a^3b^4c^3d^2e^2h^2z^2 + 2048a^4b^2c^4d^2f^2g^2z^2 - 1536a^3b^4c^3d^2f^2g^2z^2 + 384a^2b^6c^2d^2f^2g^2z^2 - 192a^2b^6c^2d^2e^2h^2z^2 + 3072a^3b^3c^4d^2e^2f^2z^2 - 768a^2b^5c^3d^2e^2f^2z^2 + 384a^5b^4c^4h^2i^2z^2 - 1024a^6b^2c^3g^2h^2z^2 - 192a^4b^5c^2g^2h^2z^2 + 32a^3b^6c^2f^2i^2z^2 + 1024a^5b^2c^4f^2g^2z^2 - 32a^3b^6c^2e^2h^2z^2 - 16a^2b^7c^2f^2g^2z^2 - 9216a^4b^2c^5d^2g^2z^2 + 336a^2b^7c^2d^2g^2z^2 - 672a^2b^6c^3d^2e^2z^2 + 12288a^6c^4d^2h^2i^2z^2 + 12288a^5c^5d^2e^2h^2z^2 + 32a^2b^8c^2d^2i^2z^2 - 1536a^6b^2c^2h^2i^2z^2 + 1536a^5b^2c^3f^2i^2z^2 + 768a^5b^3c^2g^2h^2z^2 - 384a^4b^4c^2f^2i^2z^2 - 15872a^4b^2c^4d^2i^2z^2 + 4992a^3b^4c^3d^2i^2z^2 - 1536a^5b^2c^3e^2h^2z^2 - 768a^4b^3c^3f^2g^2z^2 - 672a^2b^6c^2d^2i^2z^2 + 384a^4b^4c^2e^2h^2z^2 + 192a^3b^5c^2f^2g^2z^2 + 7936a^3b^3c^4d^2g^2z^2 - 2496a^2b^5c^3d^2g^2z^2 + 1536a^4b^2c^4e^2f^2z^2 - 384a^3b^4c^3e^2f^2z^2 + 32a^2b^6c^2e^2f^2z^2 - 15872a^3b^2c^5d^2e^2z^2 + 4992a^2b^4c^4d^2e^2z^2 + 2048a^7c^3h^2i^2z^2 - 32a^4b^6h^2i^2z^2 - 2048a^6c^4f^2i^2z^2 + 16a^3b^7g^2h^2z^2 + 18432a^5c^5d^2i^2z^2 + 2048a^6c^4e^2h^2z^2 - 2048a^5c^5e^2f^2z^2 + 32b^8c^2d^2e^2z^2 + 18432a^4c^6d^2e^2z^2 - 16b^9c^2d^2g^2z^2 - 256a^5b^2c^2f^2g^2h^2i^2 - 192a^4b^3c^2f^2g^2h^2i^2 - 96a^3b^4c^2d^2g^2h^2i^2 - 1792a^4b^2c^3d^2e^2h^2i^2 - 768a^4b^2c^3d^2f^2g^2i^2 - 256a^4b^2c^3e^2f^2g^2h^2i^2 + 32a^2b^5c^2d^2f^2g^2i^2 - 768a^3b^2c^4d^2e^2f^2g^2 + 32a^2b^5c^2d^2e^2f^2g^2 + 896a^4b^2c^2d^2g^2h^2i^2 + 384a^4b^2c^2e^2f^2h^2i^2 - 192a^3b^3c^2e^2f^2g^2h^2i^2 - 192a^3b^3c^2d^2f^2g^2i^2 + 192a^3b^3c^2d^2e^2h^2i^2 + 896a^3b^2c^3d^2e^2g^2h^2i^2 + 384a^3b^2c^3d^2e^2f^2i^2 - 96a^2b^4c^2d^2e^2g^2h^2i^2 - 64a^2b^4c^2d^2e^2f^2i^2 - 192a^2b^3c^3d^2e^2f^2g^2 + 192a^5b
\end{aligned}$$

$$\begin{aligned}
& ^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^ \\
& 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, 1)*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
\end{aligned}$$

$$\begin{aligned}
& *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))) * \text{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^
\end{aligned}$$

$$\begin{aligned}
& 2*eg - 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, 1), 1, 1, 4)
\end{aligned}$$

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

$$3.41 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=770

$$\frac{x \left(- \left(b^2 (a^2 m + c^2 d) \right) + x^2 \left(-bc \left(-3a^2 m + ach + c^2 d \right) - ab^3 m + ab^2 ck + 2ac^2 (cf - ak) \right) + 2ac \left(a^2 m - ach + c^2 d \right) \right)}{2ac^2 \left(b^2 - 4ac \right) \left(a + bx^2 + cx^4 \right)}$$

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}

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])*ArcTan[(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)/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]]) + ((4*c^3*e - c^2*(2*b*g - 4*a*j) + b^3*l - 6*a*b*c*l)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(2*c^2*(b^2 - 4*a*c)^(3/2)) + (1*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] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] :> Dist[-2, Subst[Int[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] :> Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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] && NeQ[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[Pq, 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[ExpandIntegrand[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[PolynomialRemainder[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]

2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]

Rubi steps

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{(a + bx^2 + cx^4)^2} dx = \int \frac{x(e + gx^2 + jx^4 + lx^6)}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2 + hx^4 + \dots}{(a + bx^2 + cx^4)^2} dx$$

$$= -\frac{x(abc(cf + ak) - b^2(c^2d + a^2m) + 2ac(c^2d - acf))}{2ac^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg - ah))}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= \frac{mx}{c^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg - ah))}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= \frac{mx}{c^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg - ah))}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= \frac{mx}{c^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg - ah))}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

Mathematica [A] time = 5.70, size = 935, normalized size = 1.21

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*(1 + m*x) - b*c^2*d*x*(b + c*x^2) + a*(b^2*c*x^2*(j + k*x) - b^3*x^2*(1 + 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*(1 + m*x) + 2*c^2*(g + x*(h + x*(j + k*x))) - b*c*(j + x*(k + 3*x*(1 + 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]]) - (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]]) + (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 -

$2*a*c*(3*b + 2*\sqrt{b^2 - 4*a*c})*1*\text{Log}[b + \sqrt{b^2 - 4*a*c} + 2*c*x^2]) / (b^2 - 4*a*c)^{(3/2)} / (4*c^{(5/2)})$

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{(a + bx^2 + cx^4)^2} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(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] IntegrateAlgebraic[(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]

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]
$$-3/4/c^2/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^5*m+1/4/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}*b^2*h*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)+1/4/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*h+4*a^2/(4*a*c-b^2)^2*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*1-1/(c*x^4+b*x^2+a)/(4*a*c-b^2)*a*g+1/2/(c*x^4+b*x^2+a)/(4*a*c-b^2)*b*e+4*a^2/(4*a*c-b^2)^2*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*1-1/4/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}/a*b^2*c*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/4*c/(4*a*c-b^2)^2/a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*d+m*x/c^2-c/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b*f-1/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}*b*c*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-2*c^2/(4*a*c-b^2)^2*a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}$$

$$\begin{aligned}
& c^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * f + 1/2 * c / (4a * c - b^2)^{2 * 2^{1/2}} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b^2 * f + 2 / (4ac - b^2)^{2 * 2^{1/2}} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * a * c^2 * f * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) - 1/2 / (4ac - b^2)^{2 * 2^{1/2}} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * b^2 * c * f * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) - 1/4 * c / (4ac - b^2)^2 / a * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b^3 * d + a / (4ac - b^2)^2 * c * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b^3 * h + 1/2 / (4ac - b^2)^2 * (-4ac + b^2)^{1/2} * b * g * \ln(-2 * cx^2 - b + (-4ac + b^2)^{1/2}) + 1 / (4ac - b^2)^2 * (-4ac + b^2)^{1/2} * c * e * \ln(2 * cx^2 + b + (-4ac + b^2)^{1/2}) - 1 / (4ac - b^2)^2 * (-4ac + b^2)^{1/2} * c * e * \ln(-2 * cx^2 - b + (-4ac + b^2)^{1/2}) + c / (cx^4 + b * x^2 + a) / (4ac - b^2) * x * d + 1 / c / (cx^4 + b * x^2 + a) / (4ac - b^2) * a^2 * l - 1 / (cx^4 + b * x^2 + a) * a / (4ac - b^2) * x^3 * k - 1 / (cx^4 + b * x^2 + a) / (4ac - b^2) * x^2 * a * j - 1/2 / (cx^4 + b * x^2 + a) / (4ac - b^2) * x^2 * b * g - 1 / (cx^4 + b * x^2 + a) * a / (4ac - b^2) * x * h - 1/2 / (cx^4 + b * x^2 + a) / (4ac - b^2) * x^3 * b * h + 1/2 / (cx^4 + b * x^2 + a) / (4ac - b^2) * x * b * f + 1/4 / c^2 / (4ac - b^2)^2 * \ln(-2 * cx^2 - b + (-4ac + b^2)^{1/2}) * b^4 * l - a / (4ac - b^2)^2 * \ln(-2 * cx^2 - b + (-4ac + b^2)^{1/2}) * (-4ac + b^2)^{1/2} * j + a / (4ac - b^2)^2 * \ln(2 * cx^2 + b + (-4ac + b^2)^{1/2}) * (-4ac + b^2)^{1/2} * j + 1/4 / c^2 / (4ac - b^2)^2 * \ln(2 * cx^2 + b + (-4ac + b^2)^{1/2}) * b^4 * l + 3 / (4ac - b^2)^2 * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * (-4ac + b^2)^{1/2} * c^2 * d * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) - 1 / (4ac - b^2)^2 * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * b * c^2 * d * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) + 3 * c^2 / (4ac - b^2)^2 * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * (-4ac + b^2)^{1/2} * d + c^2 / (4ac - b^2)^2 * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b * d + 1/4 / (4ac - b^2)^2 * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} / a * b^3 * c * d * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) + 3/2 / c / (cx^4 + b * x^2 + a) * a / (4ac - b^2) * x^3 * b * m - 1/2 * c / (cx^4 + b * x^2 + a) / a / (4ac - b^2) * x^3 * b * d + 3/2 / c / (cx^4 + b * x^2 + a) / (4ac - b^2) * x^2 * a * b * l + 1/2 / c / (cx^4 + b * x^2 + a) * a / (4ac - b^2) * x * b * k - 1/2 / c^2 / (cx^4 + b * x^2 + a) * a / (4ac - b^2) * x * b^2 * m - 5 * a^2 / (4ac - b^2)^2 * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * (-4ac + b^2)^{1/2} * m + 13 * a^2 / (4ac - b^2)^2 * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b * m + 5/2 * a / (4ac - b^2)^2 * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b^2 * k - 13 * a^2 / (4ac - b^2)^2 * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b * m - 5/2 * a / (4ac - b^2)^2 * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b^2 * k - 5 * a^2 / (4ac - b^2)^2 * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * (-4ac + b^2)^{1/2} * m + 3/2 / c * a / (4ac - b^2)^2 * \ln(-2 * cx^2 - b + (-4ac + b^2)^{1/2}) * (-4ac + b^2)^{1/2} * b * l - 6 * c * a^2 / (4ac - b^2)^2 * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * k - 3/2 / c * a / (4ac - b^2)^2 * \ln(2 * cx^2 + b + (-4ac + b^2)^{1/2}) * (-4ac + b^2)^{1/2} * b * l + 6 * c * a^2 / (4ac - b^2)^2 * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * k + 3/4 / c^2 / (4ac - b^2)^2 * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b^5 * m - 1/4 / c / (4ac - b^2)^2 * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b^4 * k + 1/4 / c / (4ac - b^2)^2 * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b^4 * k - 1/4 / (4ac - b^2)^2 * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * b^3 * h - 1/2 / (4ac - b^2)^2 * (-4ac + b^2)^{1/2} * b * g * \ln(2 * cx^2 + b + (-4ac + b^2)^{1/2}) + 19/4 / c * a / (4ac - b^2)^2 * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * (-4ac + b^2)^{1/2} * b^2 * m + 19/4 / c * a / (4ac - b^2)^2 * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) * (-4ac + b^2)^{1/2} * b^2 * m + 1 / (4ac - b^2)^2 * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * (-4ac + b^2)^{1/2} * a * c * h * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx)
\end{aligned}$$

$$\begin{aligned} & \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} - 1/\sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} / ((b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2}) \\ & + a b c^2 \operatorname{arctan}(\sqrt{2} / ((b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2})) + a / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} \\ & - (-b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} \operatorname{arctanh}(\sqrt{2} / ((-b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2})) \\ & + (-4ac + b^2) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} \operatorname{arctan}(\sqrt{2} / ((b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2})) \\ & + h c / (c^2 x^4 + b^2 x^2 + a) / \sqrt{4ac - b^2} x^2 e + c / (c^2 x^4 + b^2 x^2 + a) / \sqrt{4ac - b^2} x^3 f + 1/4 / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} / \\ & ((b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2}) \sqrt{b^3} h \operatorname{arctan}(\sqrt{2} / ((b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2})) \\ & - 25/4 c a / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} / ((-b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2}) \operatorname{arctanh}(\sqrt{2} / ((-b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2})) \\ & + b^3 m + 25/4 c a / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} / ((b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2}) \operatorname{arctan}(\sqrt{2} / ((b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2})) \\ & + b^3 m - 3/4 c^2 / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} / ((-b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2}) \operatorname{arctanh}(\sqrt{2} / ((-b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2})) \\ & + (-4ac + b^2) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} \sqrt{b^4} m - 3/4 c^2 / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} / ((b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2}) \\ & \operatorname{arctan}(\sqrt{2} / ((b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2})) + (-4ac + b^2) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} \sqrt{b^4} m + 1/4 c / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} / \\ & ((-b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2}) \operatorname{arctanh}(\sqrt{2} / ((-b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2})) \\ & + (-4ac + b^2) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} \sqrt{b^3} k - 2a / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} / ((-b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2}) \\ & \operatorname{arctanh}(\sqrt{2} / ((-b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2})) + (-4ac + b^2) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} \sqrt{b^3} k - 2a / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} / \\ & ((b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2}) \operatorname{arctan}(\sqrt{2} / ((b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2})) \\ & + (-4ac + b^2) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} \sqrt{b^4} m + 1/4 c / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} / ((-b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2}) \\ & \operatorname{arctanh}(\sqrt{2} / ((-b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2})) + (-4ac + b^2) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} \sqrt{b^3} k - 1/2 / (c^2 x^4 + b^2 x^2 + a) / a \\ & / \sqrt{4ac - b^2} x^2 b^2 d - 1/2 c^2 / (c^2 x^4 + b^2 x^2 + a) / \sqrt{4ac - b^2} x^2 b^3 l - 1/2 c^2 / (c^2 x^4 + b^2 x^2 + a) / \sqrt{4ac - b^2} x^3 b^3 m - 1/2 c^2 / (c^2 x^4 + b^2 x^2 + a) / \sqrt{4ac - b^2} a \\ & b^2 l + 1/2 c / (c^2 x^4 + b^2 x^2 + a) / \sqrt{4ac - b^2} x^2 b^2 j + 1/c / (c^2 x^4 + b^2 x^2 + a) a^2 / \sqrt{4ac - b^2} x^m + 1/2 c / (c^2 x^4 + b^2 x^2 + a) / \sqrt{4ac - b^2} a b^j + 1/2 c / (c^2 x^4 + b^2 x^2 + a) / \sqrt{4ac - b^2} x^3 b^2 k - 1/4 c^2 / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} \ln(-2 c^2 x^2 - b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} \\ & + b^3 l + 1/4 c^2 / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} \ln(2 c^2 x^2 + b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} + (-4ac + b^2) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} \sqrt{b^3} l - 2/c a / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} \ln(-2 c^2 x^2 - b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} \\ & + b^2 l - 2/c a / \sqrt{4ac - b^2} \sqrt{2} \sqrt{c^2 x^2 - 4ac + b^2} \ln(2 c^2 x^2 + b + \sqrt{4ac - b^2}) \sqrt{c} \sqrt{c^2 x^2 - 4ac + b^2} + b^2 l \end{aligned}$$

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

$\frac{ab^3c - 2ab^2c^2 + a^2bc^2 - (b^2d - 2ac^2 + ab^2c - (ab^2 - 2a^2c^2)) + (ab^3 - 3a^2bc^2)m^2 - (ab^2 - 2a^2c^2)c^2 - (ab^2c^2 - 2ab^2c^2 + ab^2c - (b^2d - 2ac^2) - (ab^2 - 2a^2c^2)m)}{2(ab^2c^2 - 4a^2c^2 + (ab^2c^2 - 4a^2c^2)^2 + (ab^2c^2 - 4a^2c^2)^2)} + \frac{m}{c^2} - \frac{1}{c^2} \frac{ab^3c - 2ab^2c^2 + a^2bc^2 - (b^2d - 2ac^2 + ab^2c - (ab^2 - 2a^2c^2)) + (ab^3 - 3a^2bc^2)m^2 - (ab^2 - 2a^2c^2)c^2 - (ab^2c^2 - 2ab^2c^2 + ab^2c - (b^2d - 2ac^2) - (ab^2 - 2a^2c^2)m)}{2(ab^2c^2 - 4a^2c^2 + (ab^2c^2 - 4a^2c^2)^2 + (ab^2c^2 - 4a^2c^2)^2)} dx$

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]
$$\begin{aligned} & -1/2*(a*b*c^2*e - 2*a^2*c^2*g + a^2*b*c*j - (b*c^3*d - 2*a*c^3*f + a*b*c^2*h - (a*b^2*c - 2*a^2*c^2)*k + (a*b^3 - 3*a^2*b*c)*m)*x^3 + (2*a*c^3*e - a*b*c^2*g + (a*b^2*c - 2*a^2*c^2)*j - (a*b^3 - 3*a^2*b*c)*l)*x^2 - (a^2*b^2 - 2*a^3*c)*l + (a*b*c^2*f - 2*a^2*c^2*h + a^2*b*c*k - (b^2*c^2 - 2*a*c^3)*d - (a^2*b^2 - 2*a^3*c)*m)*x / (a^2*b^2*c^2 - 4*a^3*c^3 + (a*b^2*c^3 - 4*a^2*c^4)*x^4 + (a*b^3*c^2 - 4*a^2*b*c^3)*x^2) + m*x/c^2 - 1/2*integrate(-(a*b*c^2*f - 2*a^2*c^2*h + a^2*b*c*k + 2*(a*b^2*c - 4*a^2*c^2)*l*x^3 + (b*c^3*d - 2*a*c^3*f + a*b*c^2*h + (a*b^2*c - 6*a^2*c^2)*k - (3*a*b^3 - 13*a^2*b*c)*m)*x^2 + (b^2*c^2 - 6*a*c^3)*d - (3*a^2*b^2 - 10*a^3*c)*m - 2*(2*a*c^3*e - a*b*c^2*g + 2*a^2*c^2*j - a^2*b*c*l)*x) / (c*x^4 + b*x^2 + a), x) / (a*b^2*c^2 - 4*a^2*c^3) \end{aligned}$$

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]
$$\operatorname{symsum}(\log(\operatorname{root}(1572864*a^8*b^2*c^10*z^4 - 983040*a^7*b^4*c^9*z^4 + 327680*a^6*b^6*c^8*z^4 - 61440*a^5*b^8*c^7*z^4 + 6144*a^4*b^10*c^6*z^4 - 256*a^3*b^12*c^5*z^4 + 64*a^2*b^14*c^4*z^4 - 8*a*b^16*c^3*z^4 + b^18*c^2*z^4, z)), z) / (a + b*x^2 + c*x^4)$$

$$\begin{aligned}
& ^{12}c^5z^4 - 1048576a^9c^{11}z^4 - 1572864a^8b^2c^8l^1z^3 + 983040a^7 \\
& *b^4c^7l^1z^3 - 327680a^6b^6c^6l^1z^3 + 61440a^5b^8c^5l^1z^3 - 6144* \\
& a^4b^{10}c^4l^1z^3 + 256a^3b^{12}c^3l^1z^3 + 1048576a^9c^9l^1z^3 + 96a^ \\
& 3b^{12}c^kmmz^2 + 98304a^8b^6c^7j^1l^1z^2 + 24576a^8b^6c^7h^1mmz^2 + 1556 \\
& 48a^7b^6c^8d^1mmz^2 + 98304a^7b^6c^8e^1l^1z^2 + 57344a^7b^6c^8f^1k^1z^2 + \\
& 32768a^7b^6c^8g^1j^1z^2 + 57344a^6b^6c^9d^1h^1z^2 + 32768a^6b^6c^9e^1g^1z^2 \\
& - 32a^6b^{10}c^5d^1f^1z^2 - 491520a^8b^2c^6k^1mmz^2 + 358400a^7b^4c^5* \\
& k^1mmz^2 - 129024a^6b^6c^4k^1mmz^2 + 24768a^5b^8c^3k^1mmz^2 - 2432a^4 \\
& *b^{10}c^2k^1mmz^2 - 90112a^7b^3c^6j^1l^1z^2 + 30720a^6b^5c^5j^1l^1z^2 - \\
& 4608a^5b^7c^4j^1l^1z^2 + 256a^4b^9c^3j^1l^1z^2 - 21504a^6b^5c^5h^1m \\
& *z^2 + 9216a^5b^7c^4h^1mmz^2 + 8192a^7b^3c^6h^1mmz^2 - 1568a^4b^9c^ \\
& ^3h^1mmz^2 + 96a^3b^{11}c^2h^1mmz^2 - 172032a^7b^2c^7f^1mmz^2 + 116736* \\
& a^6b^4c^6f^1mmz^2 - 49152a^7b^2c^7g^1l^1z^2 + 45056a^6b^4c^6g^1l^1z^2 \\
& - 35840a^5b^6c^5f^1mmz^2 + 24576a^7b^2c^7h^1k^1z^2 - 15360a^5b^6c^ \\
& 5g^1l^1z^2 + 5184a^4b^8c^4f^1mmz^2 - 3072a^5b^6c^5h^1k^1z^2 + 2304a^4* \\
& b^8c^4g^1l^1z^2 + 2048a^6b^4c^6h^1k^1z^2 + 576a^4b^8c^4h^1k^1z^2 - 288* \\
& a^3b^{10}c^3f^1mmz^2 - 128a^3b^{10}c^3g^1l^1z^2 - 32a^3b^{10}c^3h^1k^1z^2 - \\
& 147456a^6b^3c^7d^1mmz^2 - 90112a^6b^3c^7e^1l^1z^2 + 52224a^5b^5c^6 \\
& *d^1mmz^2 - 49152a^6b^3c^7f^1k^1z^2 + 30720a^5b^5c^6e^1l^1z^2 - 24576a^ \\
& 6b^3c^7g^1j^1z^2 + 15360a^5b^5c^6f^1k^1z^2 - 8192a^4b^7c^5d^1mmz^2 + \\
& 6144a^5b^5c^6g^1j^1z^2 - 4608a^4b^7c^5e^1l^1z^2 - 2048a^4b^7c^5f^1k^ \\
& 1z^2 - 512a^4b^7c^5g^1j^1z^2 + 480a^3b^9c^4d^1mmz^2 + 256a^3b^9c^4e^ \\
& 1l^1z^2 + 96a^3b^9c^4f^1k^1z^2 + 131072a^6b^2c^8d^1k^1z^2 + 49152a^6b^ \\
& 2c^8e^1j^1z^2 - 43008a^5b^4c^7d^1k^1z^2 - 12288a^5b^4c^7e^1j^1z^2 + 614 \\
& 4a^4b^6c^6d^1k^1z^2 + 1024a^4b^6c^6e^1j^1z^2 - 320a^3b^8c^5d^1k^1z^2 \\
& + 6144a^5b^4c^7f^1h^1z^2 - 2048a^4b^6c^6f^1h^1z^2 + 192a^3b^8c^5f^1h^ \\
& 1z^2 - 49152a^5b^3c^8d^1h^1z^2 - 24576a^5b^3c^8e^1g^1z^2 + 15360a^4b^ \\
& 5c^7d^1h^1z^2 + 6144a^4b^5c^7e^1g^1z^2 - 2048a^3b^7c^6d^1h^1z^2 - 512a^ \\
& ^3b^7c^6e^1g^1z^2 + 96a^2b^9c^5d^1h^1z^2 + 24576a^5b^2c^9d^1f^1z^2 - 3 \\
& 072a^3b^6c^7d^1f^1z^2 + 2048a^4b^4c^8d^1f^1z^2 + 576a^2b^8c^6d^1f^1z^ \\
& 2 - 430080a^9b^6c^6m^2z^2 + 3408a^4b^{11}c^m^2z^2 - 64a^3b^{12}c^l^2* \\
& z^2 + 61440a^8b^6c^7k^2z^2 + 12288a^7b^6c^8h^2z^2 + 12288a^6b^6c^9f^ \\
& ^2z^2 + 61440a^5b^6c^{10}d^2z^2 + 432a^6b^9c^6d^2z^2 + 245760a^9c^7* \\
& k^1mmz^2 + 81920a^8c^8f^1mmz^2 - 49152a^8c^8h^1k^1z^2 - 147456a^7c^9d^ \\
& 1k^1z^2 - 65536a^7c^9e^1j^1z^2 - 16384a^7c^9f^1h^1z^2 - 49152a^6c^{10}d^1f^ \\
& 1z^2 + 716800a^8b^3c^5m^2z^2 - 483840a^7b^5c^4m^2z^2 + 170496a^6* \\
& b^7c^3m^2z^2 - 33232a^5b^9c^2m^2z^2 + 516096a^8b^2c^6l^2z^2 - \\
& 288768a^7b^4c^5l^2z^2 + 88576a^6b^6c^4l^2z^2 - 15744a^5b^8c^3* \\
& l^2z^2 + 1536a^4b^{10}c^2l^2z^2 - 61440a^7b^3c^6k^2z^2 + 24064a^6 \\
& *b^5c^5k^2z^2 - 4608a^5b^7c^4k^2z^2 + 432a^4b^9c^3k^2z^2 - 16* \\
& a^3b^{11}c^2k^2z^2 + 24576a^7b^2c^7j^2z^2 - 6144a^6b^4c^6j^2z^2 \\
& + 512a^5b^6c^5j^2z^2 - 8192a^6b^3c^7h^2z^2 + 1536a^5b^5c^6h^ \\
& 2z^2 - 16a^3b^9c^4h^2z^2 - 8192a^6b^2c^8g^2z^2 + 6144a^5b^4c^ \\
& 7g^2z^2 - 1536a^4b^6c^6g^2z^2 + 128a^3b^8c^5g^2z^2 - 8192a^5b^ \\
& ^3c^8f^2z^2 + 1536a^4b^5c^7f^2z^2 - 16a^2b^9c^5f^2z^2 + 24576* \\
& a^5b^2c^9e^2z^2 - 6144a^4b^4c^8e^2z^2 + 512a^3b^6c^7e^2z^2 - \\
& 61440a^4b^3c^9d^2z^2 + 24064a^3b^5c^8d^2z^2 - 4608a^2b^7c^7d^ \\
& 2z^2 - 393216a^9c^7l^2z^2 - 144a^3b^{13}m^2z^2 - 32768a^8c^8j^2z^ \\
& ^2 - 32768a^6c^{10}e^2z^2 - 16b^{11}c^5d^2z^2 + 18432a^8b^6c^5h^1l^1m^ \\
& z - 96a^3b^{10}c^g^1k^1m^z + 90112a^7b^6c^6e^1k^1m^z + 36864a^7b^6c^6f^1j^1m^ \\
& z - 16384a^7b^6c^6g^1j^1l^1z + 14336a^7b^6c^6d^1l^1m^z - 10240a^7b^6c^6f^1k^ \\
& 1l^1z + 4096a^7b^6c^6h^1j^1k^1z + 10240a^7b^6c^6g^1h^1m^z - 47104a^6b^6c^7d^ \\
& 1h^1l^1z + 36864a^6b^6c^7e^1f^1m^z + 30720a^6b^6c^7d^1g^1m^z - 16384a^6b^6c^ \\
& 7e^1g^1l^1z + 6144a^6b^6c^7f^1g^1k^1z + 4096a^6b^6c^7e^1h^1k^1z + 32a^6b^{10}c^3 \\
& *d^1f^1l^1z - 4096a^5b^6c^8d^1f^1j^1z - 6144a^5b^6c^8d^1g^1h^1z - 32a^6b^8c^5d^ \\
& 1f^1g^1z - 4096a^4b^6c^9d^1e^1f^1z + 64a^6b^7c^6d^1e^1f^1z + 110592a^8b^2c^4 \\
& *k^1l^1m^z - 36864a^7b^4c^3k^1l^1m^z + 5376a^6b^6c^2k^1l^1m^z - 79872a^7 \\
& *b^3c^4j^1k^1m^z + 26112a^6b^5c^3j^1k^1m^z - 3712a^5b^7c^2j^1k^1m^z - 1 \\
& 3824a^7b^3c^4h^1l^1m^z + 3456a^6b^5c^3h^1l^1m^z - 288a^5b^7c^2h^1l^1m
\end{aligned}$$

$$\begin{aligned}
& *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 + 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^1*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^1^2*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^1^2*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^1*m*z - 40960*a^8*c^6*f^1*m*z + 24576*a^8*c^6*h*k^1*z - 20480*a^8*c^6*h*j*m*z + 73728*a^7*c^7*d*k^1*z - 61440*a^7*c^7*d*j*m*z + 32768*a^7*c^7*e*j^1*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^1*z - 61440*a^6*c^8*d*e*m*z + 24576*a^6*c^8*d*f^1*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^1^2*z - 15360*a^6*b^5*c^3*j^1^2*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^1^2*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
\end{aligned}$$

$$\begin{aligned}
& - 32a^4b^8c^2jk^2z + 71424a^7b^3c^4g^m^2z - 53184a^6b^5c^3g \\
& *m^2z + 17104a^5b^7c^2g^m^2z + 6912a^6b^3c^5h^2l^1z - 1728a^5b^ \\
& 5c^4h^2l^1z + 144a^4b^7c^3h^2l^1z + 24576a^7b^2c^5g^l^2z - 22528 \\
& *a^6b^4c^4g^l^2z + 7680a^5b^6c^3g^l^2z + 4096a^6b^2c^6g^2l^1z \\
& - 3072a^5b^4c^5g^2l^1z - 1152a^4b^8c^2g^l^2z + 768a^4b^6c^4g^2 \\
& *l^1z - 64a^3b^8c^3g^2l^1z - 142848a^7b^2c^5e^m^2z + 106368a^6b^4 \\
& *c^4e^m^2z - 34208a^5b^6c^3e^m^2z - 7936a^6b^3c^5g^k^2z + 5088a \\
& a^4b^8c^2e^m^2z + 2496a^5b^5c^4g^k^2z - 1536a^6b^2c^6h^2j^z + \\
& 1280a^5b^3c^6f^2l^1z + 384a^5b^4c^5h^2j^z - 336a^4b^7c^3g^k^2 \\
& *z + 192a^4b^5c^5f^2l^1z - 144a^3b^7c^4f^2l^1z - 32a^4b^6c^4h^2 \\
& *j^z + 16a^3b^9c^2g^k^2z + 16a^2b^9c^3f^2l^1z + 45056a^6b^3c^5e \\
& e^l^2z - 15360a^5b^5c^4e^l^2z - 12288a^5b^2c^7e^2l^1z + 3072a^4b \\
& b^4c^6e^2l^1z + 2304a^4b^7c^3e^l^2z - 256a^3b^6c^5e^2l^1z - 128a \\
& a^3b^9c^2e^l^2z + 59136a^4b^3c^7d^2l^1z - 23488a^3b^5c^6d^2l^1z \\
& + 15872a^6b^2c^6e^k^2z - 4992a^5b^4c^5e^k^2z + 4560a^2b^7c^5d \\
& d^2l^1z + 1536a^5b^2c^7f^2j^z + 672a^4b^6c^4e^k^2z - 384a^4b^4c \\
& c^6f^2j^z - 32a^3b^8c^3e^k^2z + 32a^3b^6c^5f^2j^z + 768a^5b^3 \\
& *c^6g^h^2z - 192a^4b^5c^5g^h^2z + 16a^3b^7c^4g^h^2z - 15872a^4 \\
& *b^2c^8d^2j^z + 4992a^3b^4c^7d^2j^z - 672a^2b^6c^6d^2j^z - 153 \\
& 6a^5b^2c^7e^h^2z - 768a^4b^3c^7f^2g^z + 384a^4b^4c^6e^h^2z + \\
& 192a^3b^5c^6f^2g^z - 32a^3b^6c^5e^h^2z - 16a^2b^7c^5f^2g^z \\
& + 7936a^3b^3c^8d^2g^z - 2496a^2b^5c^7d^2g^z + 1536a^4b^2c^8e \\
& f^2z - 384a^3b^4c^7e^f^2z + 32a^2b^6c^6e^f^2z - 15872a^3b^2c^ \\
& 9d^2e^z + 4992a^2b^4c^8d^2e^z - 61440a^8b^2c^4l^3z + 21504a^7b \\
& b^4c^3l^3z - 3328a^6b^6c^2l^3z + 432a^5b^9l^1m^2z + 51200a^9c^ \\
& 5j^m^2z + 16384a^8c^6j^2l^1z - 288a^4b^10j^m^2z - 18432a^8c^6j^ \\
& k^2z + 144a^3b^11g^m^2z + 51200a^8c^6e^m^2z + 2048a^7c^7h^2j^z \\
& + 16384a^6c^8e^2l^1z + 16b^11c^3d^2l^1z - 18432a^7c^7e^k^2z - 20 \\
& 48a^6c^8f^2j^z + 18432a^5c^9d^2j^z + 192a^5b^8c^1l^3z + 2048a^6 \\
& *c^8e^h^2z - 16b^9c^5d^2g^z - 2048a^5c^9e^f^2z + 32b^8c^6d^2e \\
& *z + 18432a^4c^10d^2e^z + 65536a^9c^5l^3z - 11008a^8b^c^3j^k^1m \\
& - 288a^6b^5c^j^k^1m + 144a^5b^6c^g^k^1m - 11008a^7b^c^4e^k^1m \\
& - 5376a^7b^c^4f^j^1m + 3840a^7b^c^4g^j^k^1m - 3328a^7b^c^4h^j^k^1 \\
& - 96a^4b^7c^g^j^k^1m - 2560a^7b^c^4g^h^1m - 36a^3b^8c^f^h^k^1m - 69 \\
& 12a^6b^c^5d^j^k^1 - 7872a^6b^c^5d^h^k^1m - 7680a^6b^c^5d^g^1m - 53 \\
& 76a^6b^c^5e^f^1m + 3840a^6b^c^5e^g^k^1m - 3328a^6b^c^5e^h^k^1 - 15 \\
& 36a^6b^c^5f^g^k^1 + 1280a^6b^c^5f^g^j^m - 768a^6b^c^5g^h^j^k - 768 \\
& *a^6b^c^5f^h^j^1 - 768a^6b^c^5e^h^j^m - 36a^2b^9c^d^h^k^1m - 6912a^ \\
& 5b^c^6d^e^k^1 - 4864a^5b^c^6d^e^j^m - 2304a^5b^c^6d^g^j^k - 1792a^ \\
& 5b^c^6e^f^j^k - 1280a^5b^c^6d^f^j^1 - 4544a^5b^c^6d^f^h^m + 1536a^ \\
& 5b^c^6d^g^h^1 + 1280a^5b^c^6e^f^g^m - 768a^5b^c^6e^g^h^k - 768a^5b \\
& b^c^6e^f^h^1 - 256a^5b^c^6f^g^h^j + 12a^b^9c^2d^f^h^m + 16a^b^8c^3 \\
& *d^f^g^1 - 4a^b^8c^3d^f^h^k - 2304a^4b^c^7d^e^g^k - 1792a^4b^c^7d^ \\
& e^h^j - 1280a^4b^c^7d^e^f^1 - 768a^4b^c^7d^f^g^j - 32a^b^7c^4d^e^f \\
& *l - 256a^4b^c^7e^f^g^h - 768a^3b^c^8d^e^f^g + 32a^b^5c^6d^e^f^g + \\
& 12a^b^10c^d^f^k^1m + 3648a^7b^3c^2j^k^1m + 5504a^7b^2c^3g^k^1m \\
& - 1824a^6b^4c^2g^k^1m + 384a^7b^2c^3h^j^1m - 288a^6b^4c^2h^j^ \\
& l^1m - 4800a^6b^3c^3g^j^k^1m + 3648a^6b^3c^3e^k^1m + 1280a^5b^5c^ \\
& 2g^j^k^1m + 1088a^6b^3c^3f^j^1m + 576a^6b^3c^3h^j^k^1 - 288a^5b^ \\
& 5c^2e^k^1m - 192a^6b^3c^3g^h^1m + 144a^5b^5c^2g^h^1m + 9600a^ \\
& 6b^2c^4e^j^k^1m - 4224a^6b^2c^4d^j^1m - 2560a^5b^4c^3e^j^k^1m + 3 \\
& 84a^6b^2c^4f^j^k^1 + 224a^5b^4c^3d^j^1m + 192a^4b^6c^2e^j^k^1m \\
& - 160a^5b^4c^3f^j^k^1 - 4608a^6b^2c^4f^h^k^1m + 2688a^6b^2c^4f^g \\
& *l^1m + 1664a^6b^2c^4g^h^k^1 - 744a^5b^4c^3f^h^k^1m - 544a^5b^4c^3 \\
& *f^g^1m + 492a^4b^6c^2f^h^k^1m + 416a^5b^4c^3g^h^j^m + 384a^6b^2c \\
& c^4g^h^j^m + 384a^6b^2c^4e^h^1m - 288a^5b^4c^3g^h^k^1 - 288a^5b \\
& ^4c^3e^h^1m - 96a^4b^6c^2g^h^j^m + 2112a^5b^3c^4d^j^k^1 - 160a^ \\
& 4b^5c^3d^j^k^1 + 16992a^5b^3c^4d^h^k^1m - 6252a^4b^5c^3d^h^k^1m - \\
& 4800a^5b^3c^4e^g^k^1m + 2112a^5b^3c^4d^g^1m - 1728a^5b^3c^4f^g^
\end{aligned}$$

$$\begin{aligned}
& 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*
\end{aligned}$$

$$\begin{aligned}
& 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^1 m + 15360 a^7 c^5 d^* j^1 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^1 m + 1920 a^7 c^5 f^* h^* k^* m + 15360 a^6 c^6 d^* e^1 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^1 - 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^1 - 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^1 l^2 - 5568 a^8 b^2 c^2 k^* l^2 m \\
& + 15552 a^8 b^2 c^2 j^1 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^1 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^1 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^1 l^2 - 1424 a^6 b^4 c^2 h^* k^1 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^1 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^1 l^2 m \\
& + 96 a^5 b^5 c^2 h^* j^2 m + 15552 a^7 b^2 c^3 e^1 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^1 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^1 - 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^1 - 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^1 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^1 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^1 - 1032 a^5 b^5 c^2 d^1 l^2 m - 864 a^6 b^3 c^3 f^* k^1 l^2 \\
& - 768 a^5 b^5 c^2 g^* j^1 l^2 + 408 a^5 b^5 c^2 f^* k^1 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^1 + 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^1 - 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^1 \\
& + 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^1 + 13376 a^6 b^2 c^4 d^* k^1 l^2 \\
& - 5136 a^5 b^4 c^3 d^* k^1 l^2 - 3840 a^6 b^2 c^4 e^* j^1 l^2 + 1536 a^5 b^4 c^3 e^* j^1 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^1 l^2 - 768 a^4 b^3 c^5 e^2 j^1 \\
& - 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^1 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^1 - 2448 a^3 b^4 c^5 d^2 j^1 + 624 a^5 b^4 c^3 f^* h^1 l^2 + 576 a^6 b^2 c^4 f^* h^1 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^1 \\
& - 320 a^5 b^2 c^5 f^* g^2 m - 256 a^4 b^6 c^2 f^* h^1 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 + 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^1 - 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^1 \\
& + 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^1 \\
& + 6 a^3 b^7 c^2 f^* h^* k^2
\end{aligned}$$

$$\begin{aligned}
& 2 - 2a^2b^7c^3f^2hk - 9312a^5b^3c^4d^2h^2 + 3288a^4b^5c^3d^2h^2 - 2304a^4b^2c^6e^2g^2 + 1920a^5b^3c^4e^2g^2 + 1728a^4b^2c^6e^2f^2m + 1152a^4b^3c^5e^2g^2 - 768a^4b^5c^3e^2g^2 - 608a^4b^3c^5d^2g^2m - 472a^3b^7c^2d^2h^2 + 384a^3b^4c^5e^2g^2 - 288a^3b^4c^5e^2f^2m - 224a^4b^3c^5f^2g^2k + 192a^5b^2c^5f^2h^2 + 192a^4b^2c^6e^2hk - 192a^3b^5c^4e^2g^2 + 120a^3b^5c^4d^2g^2m + 64a^3b^7c^2e^2g^2 - 32a^3b^4c^5e^2hk + 24a^3b^5c^4f^2g^2k + 9936a^3b^3c^6d^2f^2m + 3786a^4b^5c^3d^2f^2m^2 - 3552a^5b^2c^5d^2hk^2 - 3486a^2b^5c^5d^2f^2m - 3424a^3b^3c^6d^2g^2 - 1868a^3b^7c^2d^2f^2m^2 + 1332a^4b^4c^4d^2hk^2 - 1296a^5b^3c^4d^2f^2m^2 - 1236a^3b^4c^5d^2f^2m + 1224a^2b^5c^5d^2g^2 - 1152a^4b^2c^6d^2f^2m + 960a^5b^2c^5e^2g^2k^2 - 496a^3b^3c^6d^2hk + 462a^2b^6c^4d^2f^2m + 432a^4b^3c^5d^2hk^2 - 240a^4b^4c^4e^2g^2k^2 - 222a^2b^5c^5d^2hk^2 + 192a^4b^2c^6f^2g^2j + 192a^4b^2c^6e^2f^2 - 174a^3b^5c^4d^2hk^2k - 156a^3b^6c^3d^2hk^2 + 48a^3b^4c^5e^2f^2 - 32a^4b^3c^5e^2hk^2j + 16a^3b^6c^3e^2g^2k^2 + 16a^3b^4c^5f^2g^2j - 16a^2b^6c^4e^2f^2 + 12a^2b^7c^3d^2hk^2 + 6a^2b^8c^2d^2hk^2 + 1728a^5b^2c^5d^2f^2 + 1392a^4b^4c^4d^2f^2 - 840a^3b^6c^3d^2f^2 - 768a^4b^2c^6e^2g^2j + 576a^4b^2c^6d^2g^2k + 480a^3b^3c^6d^2e^2m + 144a^2b^8c^2d^2f^2 + 96a^4b^3c^5d^2hk^2 + 96a^3b^3c^6e^2f^2k - 80a^3b^4c^5d^2g^2k + 6848a^3b^2c^7d^2e^2 - 3552a^3b^2c^7d^2f^2k - 2448a^2b^4c^6d^2e^2 + 1332a^2b^4c^6d^2f^2k + 960a^3b^2c^7d^2g^2j - 496a^4b^3c^5d^2f^2k^2 + 432a^3b^3c^6d^2f^2k - 240a^2b^4c^6d^2g^2j - 222a^3b^5c^4d^2f^2k^2 - 174a^2b^5c^5d^2f^2k + 64a^4b^2c^6f^2g^2h + 48a^3b^4c^5f^2g^2h + 42a^2b^7c^3d^2f^2k^2 - 32a^3b^3c^6e^2f^2j - 320a^3b^2c^7d^2e^2k + 192a^4b^2c^6e^2g^2h^2 + 192a^4b^2c^6d^2f^2j^2 - 32a^3b^4c^5d^2f^2j^2 + 16a^3b^4c^5e^2g^2h^2 + 480a^2b^3c^7d^2e^2j - 224a^3b^3c^6d^2g^2h + 192a^3b^2c^7e^2f^2h + 24a^2b^5c^5d^2g^2h - 864a^3b^2c^7d^2f^2h + 336a^3b^3c^6d^2f^2h^2 + 192a^3b^2c^7e^2f^2g + 144a^2b^3c^7d^2f^2h - 30a^2b^5c^5d^2f^2h^2 + 16a^2b^4c^6e^2f^2g - 12a^2b^4c^6d^2f^2h + 192a^3b^2c^7d^2f^2g^2 + 96a^2b^3c^7d^2e^2h + 48a^2b^4c^6d^2f^2g^2 + 960a^2b^2c^8d^2e^2g + 192a^2b^2c^8d^2e^2f - 7680a^9b^2c^2l^2m^2 + 3152a^8b^3c^2l^2m^2 + 2070a^7b^4c^2k^2m^2 - 1840a^7b^3c^2k^3m + 6720a^8b^3c^3j^2m^2 - 3072a^8b^3c^3k^2l^2 + 1680a^6b^5c^3j^2m^2 - 100a^6b^5c^3k^2l^2 - 2176a^7b^3c^2j^2l^3 - 256a^6b^3c^3j^3l - 64a^5b^6c^3j^2l^2 - 12480a^8b^2c^2h^3m^3 + 972a^5b^6c^3h^2m^2 - 960a^7b^3c^4j^2k^2 - 252a^5b^4c^3h^3m - 192a^6b^2c^4h^3m + 54a^4b^6c^2h^3m + 1536a^7b^3c^4h^2l^2 + 420a^4b^7c^2g^2m^2 - 36a^4b^7c^2h^2l^2 - 3072a^7b^2c^3g^2l^3 + 2096a^7b^3c^2f^2m^3 + 1088a^6b^4c^2g^2l^3 - 496a^6b^3c^3hk^3 - 192a^4b^4c^4g^3l + 176a^4b^3c^5f^3m + 144a^5b^3c^4h^3k + 78a^3b^8c^2f^2m^2 + 54a^3b^5c^4f^3m + 32a^3b^6c^3g^3l + 30a^5b^5c^2hk^3 - 18a^4b^5c^3h^3k - 18a^2b^7c^3f^3m - 16a^3b^8c^2g^2l^2 + 6720a^6b^3c^5e^2m^2 - 192a^6b^3c^5h^2j^2 - 4a^2b^9c^2f^2l^2 - 35040a^7b^2c^3d^2m^3 + 14300a^6b^4c^2d^2m^3 - 12000a^3b^2c^7d^3m + 4380a^2b^4c^6d^3m - 2176a^6b^3c^3e^2l^3 - 256a^3b^3c^6e^3l - 192a^6b^2c^4f^2k^3 + 192a^5b^5c^2e^2l^3 - 192a^4b^2c^6f^3k + 132a^5b^4c^3f^2k^3 + 128a^4b^3c^5g^3j - 28a^3b^4c^5f^3k - 10a^4b^6c^2f^2k^3 + 6a^2b^6c^4f^3k + 10752a^5b^3c^6d^2l^2 - 960a^5b^3c^6e^2k^2 - 192a^5b^3c^6f^2j^2 + 108a^6b^9c^2d^2l^2 - 1680a^5b^3c^4d^2k^3 - 1680a^2b^3c^7d^3k + 222a^4b^5c^3d^2k^3 + 30a^6b^8c^3d^2k^2 - 10a^3b^7c^2d^2k^3 - 960a^4b^3c^7d^2j^2 + 80a^4b^3c^5f^2h^3 + 80a^3b^3c^6f^3h + 6a^3b^5c^4f^2h^3 + 6a^2b^5c^5f^3h - 192a^4b^3c^7e^2h^2 - 192a^4b^2c^6d^2h^3 - 192a^2b^2c^8d^3h + 128a^3b^3c^6e^2g^3 - 28a^3b^4c^5d^2h^3 + 12a^6b^6c^5d^2h^2 + 6a^2b^6c^4d^2h^3 - 192a^3b^3c^8e^2f^2 + 60a^6b^5c^6d^2g^2 + 198a^6b^4c^7d^2f^2 + 144a^2b^3c^7d^2f^3 - 960a^2b^3c^9d^2e^2 + 240a^6b^3c^8d^2e^2 + 15360a^9c^3k^2l^2m - 12800a^9c^3j^2l^2m^2 - 3840a^8c^4j^2k^2m + 432a^6b^6j^2l^2m^2 + 4608a^8c^4j^2k^2l + 2880a^8c^4hk^2m +
\end{aligned}$$

$$\begin{aligned}
& 5120a^8c^4f^1l^2m - 3072a^8c^4h^*k^1l^2 + 270a^5b^7h^*k^*m^2 - 216a^5b^7g^*l^*m^2 - 12800a^8c^4e^*l^*m^2 - 4800a^8c^4f^*k^*m^2 - 512a^7c^5h^2j^*l - 3840a^6c^6e^2k^*m - 1280a^7c^5f^*j^2m + 768a^7c^5h^*j^2k \\
& + 144a^4b^8g^*j^*m^2 - 90a^4b^8f^*k^*m^2 + 8640a^7c^5d^*k^2m + 4608a^7c^5e^*k^2l + 512a^6c^6f^2j^*l - 9216a^7c^5d^*k^1l^2 - 4096a^7c^5e^*j^1l^2 + 320a^6c^6f^2h^*m - 90a^3b^9d^*k^*m^2 + 15200a^9b^*c^2k^*m^3 \\
& - 6192a^8b^3c^*k^*m^3 + 5472a^8b^*c^3k^3m - 4608a^5c^7d^2j^*l - 1024a^7c^5f^*h^1l^2 + 150a^6b^5c^*k^3m + 54a^3b^9f^*h^*m^2 + 6b^10c^2d^2h^*m - 14400a^7c^5d^*h^*m^2 + 8640a^5c^7d^2h^*m + 2880a^6c^6d^*h^2m \\
& + 2304a^6c^6d^*j^2k - 512a^6c^6e^*h^2l - 192a^6c^6f^*h^2k + 6144a^8b^*c^3j^*l^3 + 1536a^7b^*c^4j^3l - 1280a^5c^7e^2f^*m + 768a^5c^7e^2h^*k + 256a^6c^6f^*h^*j^2 + 192a^6b^5c^*j^1l^3 + 54a^2b^10d^*h^*m^2 \\
& - 18b^9c^3d^2f^*m + 8b^9c^3d^2g^*l - 2b^9c^3d^2h^*k + 4068a^7b^4c^*h^*m^3 - 1728a^6c^6d^*h^*k^2 + 960a^5c^7d^*f^2m + 512a^5c^7e^*f^2l - 3072a^6c^6d^*f^1l^2 - 16b^8c^4d^2e^*l + 6b^8c^4d^2f^*k - 4608a^4c^8d^2e^*l + 2400a^8b^*c^3f^*m^3 + 2016a^7b^*c^4h^*k^3 - 1728a^4c^8d^2f^*k - 1146a^6b^5c^*f^*m^3 + 224a^6b^*c^5h^3k - 96a^5b^6c^*g^1l^3 + 96a^5b^*c^6f^3m + 2304a^4c^8d^*e^2k + 768a^5c^7d^*f^*j^2 + 6144a^7b^*c^4e^*l^3 - 2280a^5b^6c^*d^*m^3 + 1536a^4b^*c^7e^3l - 616a^*b^6c^5d^3m + 512a^6b^*c^5g^*j^3 + 256a^4c^8e^2f^*h + 240a^*b^10c^d^2m^2 + 6b^7c^5d^2f^*h - 192a^4c^8d^*f^2h + 4320a^6b^*c^5d^*k^3 + 4320a^3b^*c^8d^3k + 222a^*b^5c^6d^3k + 16b^6c^6d^2e^*g + 96a^5b^*c^6f^*h^3 + 96a^4b^*c^7f^3h + 768a^3c^9d^*e^2f + 512a^3b^*c^8e^3g + 132a^*b^4c^7d^3h + 2016a^2b^*c^9d^3f - 496a^*b^3c^8d^3f + 224a^3b^*c^8d^*f^3 - 18a^*b^5c^6d^*f^3 - 3264a^8b^2c^2k^2m^2 - 6160a^7b^3c^2j^2m^2 + 1104a^7b^3c^2k^2l^2 - 1920a^7b^2c^3j^2l^2 + 768a^6b^4c^2j^2l^2 + 3888a^7b^2c^3h^2m^2 - 3510a^6b^4c^2h^2m^2 + 240a^6b^3c^3j^2k^2 - 16a^5b^5c^2j^2k^2 + 1680a^6b^3c^3g^2m^2 - 1648a^6b^3c^3h^2l^2 - 1540a^5b^5c^2g^2m^2 + 444a^5b^5c^2h^2l^2 - 960a^6b^2c^4h^2k^2 - 576a^6b^2c^4f^2m^2 - 512a^6b^2c^4g^2l^2 - 480a^5b^4c^3g^2l^2 + 198a^5b^4c^3h^2k^2 + 192a^4b^6c^2g^2l^2 - 186a^5b^4c^3f^2m^2 - 97a^4b^6c^2f^2m^2 - 9a^4b^6c^2h^2k^2 - 6160a^5b^3c^4e^2m^2 + 1680a^4b^5c^3e^2m^2 - 240a^5b^3c^4g^2k^2 - 240a^5b^3c^4f^2l^2 - 144a^3b^7c^2e^2m^2 + 60a^4b^5c^3g^2k^2 - 36a^4b^5c^3f^2l^2 + 36a^3b^7c^2f^2l^2 - 16a^5b^3c^4h^2j^2 - 4a^3b^7c^2g^2k^2 + 38512a^5b^2c^5d^2m^2 - 32310a^4b^4c^4d^2m^2 + 12720a^3b^6c^3d^2m^2 - 2500a^2b^8c^2d^2m^2 - 1920a^5b^2c^5e^2l^2 + 768a^4b^4c^4e^2l^2 - 464a^5b^2c^5f^2k^2 - 384a^5b^2c^5g^2j^2 - 64a^3b^6c^3e^2l^2 + 42a^4b^4c^4f^2k^2 + 12a^3b^6c^3f^2k^2 - 13104a^4b^3c^5d^2l^2 + 5628a^3b^5c^4d^2l^2 - 1128a^2b^7c^3d^2l^2 + 240a^4b^3c^5e^2k^2 - 16a^4b^3c^5f^2j^2 - 16a^3b^5c^4e^2k^2 - 2880a^4b^2c^6d^2k^2 + 1750a^3b^4c^5d^2k^2 - 345a^2b^6c^4d^2k^2 - 48a^4b^3c^5g^2h^2 - 4a^3b^5c^4g^2h^2 + 240a^3b^3c^6d^2j^2 - 192a^4b^2c^6f^2h^2 - 42a^3b^4c^5f^2h^2 - 16a^2b^5c^5d^2j^2 - 48a^3b^3c^6f^2g^2 - 16a^3b^3c^6e^2h^2 - 4a^2b^5c^5f^2g^2 - 464a^3b^2c^7d^2h^2 - 384a^3b^2c^7e^2g^2 + 42a^2b^4c^6d^2h^2 - 240a^2b^3c^7d^2g^2 - 16a^2b^3c^7e^2f^2 - 960a^2b^2c^8d^2f^2 + 6b^11c^d^2k^*m - 18a^*b^11d^*f^*m^2 - 7200a^9c^3k^2m^2 - 324a^7b^5l^2m^2 - 225a^6b^6k^2m^2 - 2048a^8c^4j^2l^2 - 144a^5b^7j^2m^2 - 2400a^8c^4h^2m^2 - 81a^4b^8h^2m^2 - 800a^7c^5f^2m^2 - 288a^7c^5h^2k^2 - 36a^3b^9g^2m^2 - 9a^2b^10f^2m^2 - 21600a^6c^6d^2m^2 - 2048a^6c^6e^2l^2 - 864a^6c^6f^2k^2 - 2592a^5c^7d^2k^2 - 1536a^5c^7e^2j^2 + 1536a^8b^2c^2l^4 - 32a^5c^7f^2h^2 + 360a^7b^2c^3k^4 - 25a^6b^4c^2k^4 - 864a^4c^8d^2h^2 - 4b^7c^5d^2g^2 - 9b^6c^6d^2f^2 - 288a^3c^9d^2f^2 - 24a^5b^2c^5h^4 - 16b^5c^7d^2e^2 - 9a^4b^4c^4h^4 - 16a^3b^4c^5g^4 - 24a^3b^2c^7f^4 - 9a^2b^4c^6f^4 - a^2b^8c^2f^2k^2 - a^2b^6c^4f^2h^2 + 630a^7b^5k^*m^3 + 8000a^9c^3h^*m^3 + 320a^7c^5h^3m - 378a^6b^6h^*m^3 + 126a^5b^7f^*m^3 + 30b^8c^4d^3m + 240
\end{aligned}$$

$$\begin{aligned}
& 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^10*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 + 512*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 + 1792*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 + 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 + 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 + 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
\end{aligned}$$

$$\begin{aligned}
& + 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*
\end{aligned}$$

$b^6c^5d^5f^1z - 2304a^4b^4c^6e^5f^1kz + 2304a^4b^4c^6d^5h^1jz + 960$
 $a^3b^6c^5d^5e^5mz - 576a^2b^8c^4d^5f^1z + 192a^3b^6c^5e^5f^1kz -$
 $192a^3b^6c^5d^5h^1jz + 3072a^4b^3c^7d^5f^1jz - 768a^3b^5c^6d^5f^1jz$
 $z + 64a^2b^7c^5d^5f^1jz + 4608a^4b^3c^7d^5g^1h^1z - 1152a^3b^5c^6d^5g^1h^1z$
 $+ 96a^2b^7c^5d^5g^1h^1z - 9216a^4b^2c^8d^5e^1h^1z + 2304a^3b^4c^7d^5e^1h^1z$
 $+ 2048a^4b^2c^8d^5f^1g^1z - 1536a^3b^4c^7d^5f^1g^1z + 384a^2b^6c^6d^5f^1g^1z$
 $- 192a^2b^6c^6d^5e^1h^1z + 3072a^3b^3c^8d^5e^1f^1z - 768a^2b^5c^7d^5e^1f^1z$
 $- 288a^5b^8c^5k^1l^1m^1z + 90112a^8b^5c^5j^1k^1m^1z + 192a^4b^9c^5j^1k^1m^1z$
 $+ 138240a^9b^5c^4l^1m^1z - 7344a^6b^7c^5l^1m^1z + 5088a^5b^8c^5j^1m^1z$
 $- 3072a^8b^5c^5k^2l^1z - 49152a^8b^5c^5j^1l^2z - 128a^4b^9c^5j^1l^2z$
 $- 25600a^8b^5c^5g^1m^1z - 9216a^7b^5c^6h^2l^1z - 2544a^4b^9c^5g^1m^1z$
 $+ 64a^3b^10c^5g^1l^2z + 9216a^7b^5c^6g^1k^2z - 3072a^6b^5c^7f^2l^1z$
 $- 288a^3b^10c^5e^1m^1z - 49152a^7b^5c^6e^1l^2z - 58368a^5b^5c^8d^2l^1z$
 $- 432a^4b^9c^4d^2l^1z - 1024a^6b^5c^7g^1h^2z + 32a^4b^8c^5d^2j^1z$
 $+ 1024a^5b^5c^8f^2g^1z - 9216a^4b^5c^9d^2g^1z + 336a^4b^7c^6d^2g^1z$
 $- 672a^4b^6c^7d^2e^1z - 122880a^9c^5k^1l^1m^1z - 40960a^8c^6f^1l^1m^1z$
 $+ 24576a^8c^6h^1k^1l^1z - 20480a^8c^6h^1j^1m^1z + 73728a^7c^7d^5k^1l^1z$
 $- 61440a^7c^7d^5j^1m^1z + 32768a^7c^7e^1j^1l^1z - 12288a^7c^7f^1j^1k^1z$
 $- 20480a^7c^7e^1h^1m^1z + 8192a^7c^7f^1h^1l^1z - 61440a^6c^8d^5e^1m^1z$
 $+ 24576a^6c^8d^5f^1l^1z - 12288a^6c^8e^1f^1k^1z + 12288a^6c^8d^5h^1j^1z$
 $+ 12288a^5c^9d^5e^1h^1z - 131328a^8b^3c^3l^1m^1z + 46656a^7b^5c^2l^1m^1z$
 $- 142848a^8b^2c^4j^1m^1z + 106368a^7b^4c^3j^1m^1z - 34208a^6b^6c^2j^1m^1z$
 $+ 2304a^7b^3c^4k^2l^1z - 576a^6b^5c^3k^2l^1z + 48a^5b^7c^2k^2l^1z$
 $+ 45056a^7b^3c^4j^1l^2z - 15360a^6b^5c^3j^1l^2z - 12288a^7b^2c^5j^2l^1z$
 $+ 3072a^6b^4c^4j^2l^1z + 2304a^5b^7c^2j^1l^2z - 256a^5b^6c^3j^2l^1z$
 $+ 15872a^7b^2c^5j^1k^2z - 4992a^6b^4c^4j^1k^2z + 672a^5b^6c^3j^1k^2z$
 $- 32a^4b^8c^2j^1k^2z + 71424a^7b^3c^4g^1m^1z - 53184a^6b^5c^3g^1m^1z$
 $+ 17104a^5b^7c^2g^1m^1z + 6912a^6b^3c^5h^2l^1z - 1728a^5b^5c^4h^2l^1z$
 $+ 144a^4b^7c^3h^2l^1z + 24576a^7b^2c^5g^1l^2z - 22528a^6b^4c^4g^1l^2z$
 $+ 7680a^5b^6c^3g^1l^2z + 4096a^6b^2c^6g^2l^1z - 3072a^5b^4c^5g^2l^1z$
 $- 1152a^4b^8c^2g^1l^2z + 768a^4b^6c^4g^2l^1z - 64a^3b^8c^3g^2l^1z - 142848a^7b^2c^5e^1m^1z$
 $+ 106368a^6b^4c^4e^1m^1z - 34208a^5b^6c^3e^1m^1z - 7936a^6b^3c^5g^1k^2z$
 $+ 5088a^4b^8c^2e^1m^1z + 2496a^5b^5c^4g^1k^2z - 1536a^6b^2c^6h^2j^1z$
 $+ 1280a^5b^3c^6f^2l^1z + 384a^5b^4c^5h^2j^1z - 336a^4b^7c^3g^1k^2z$
 $+ 192a^4b^5c^5f^2l^1z - 144a^3b^7c^4f^2l^1z - 32a^4b^6c^4h^2j^1z$
 $+ 16a^3b^9c^2g^1k^2z + 16a^2b^9c^3f^2l^1z + 45056a^6b^3c^5e^1l^2z$
 $- 15360a^5b^5c^4e^1l^2z - 12288a^5b^2c^7e^2l^1z + 3072a^4b^4c^6e^2l^1z$
 $+ 2304a^4b^7c^3e^1l^2z - 256a^3b^6c^5e^2l^1z - 128a^3b^9c^2e^1l^2z$
 $+ 59136a^4b^3c^7d^2l^1z - 23488a^3b^5c^6d^2l^1z + 15872a^6b^2c^6e^1k^2z$
 $- 4992a^5b^4c^5e^1k^2z + 4560a^2b^7c^5d^2l^1z + 1536a^5b^2c^7f^2j^1z$
 $+ 672a^4b^6c^4e^1k^2z - 384a^4b^4c^6f^2j^1z - 32a^3b^8c^3e^1k^2z$
 $+ 32a^3b^6c^5f^2j^1z + 768a^5b^3c^6g^1h^2z - 192a^4b^5c^5g^1h^2z$
 $+ 16a^3b^7c^4g^1h^2z - 15872a^4b^2c^8d^2j^1z + 4992a^3b^4c^7d^2j^1z$
 $- 672a^2b^6c^6d^2j^1z - 1536a^5b^2c^7e^1h^2z - 768a^4b^3c^7f^2g^1z$
 $+ 384a^4b^4c^6e^1h^2z + 192a^3b^5c^6f^2g^1z - 32a^3b^6c^5e^1h^2z$
 $- 16a^2b^7c^5f^2g^1z + 7936a^3b^3c^8d^2g^1z - 2496a^2b^5c^7d^2g^1z$
 $+ 1536a^4b^2c^8e^1f^2z - 384a^3b^4c^7e^1f^2z + 32a^2b^6c^6e^1f^2z$
 $- 15872a^3b^2c^9d^2e^1z + 4992a^2b^4c^8d^2e^1z - 61440a^8b^2c^4l^3z$
 $+ 21504a^7b^4c^3l^3z - 3328a^6b^6c^2l^3z + 432a^5b^9l^1m^1z$
 $+ 51200a^9c^5j^1m^1z + 16384a^8c^6j^2l^1z - 288a^4b^10j^1m^1z$
 $- 18432a^8c^6j^1k^2z + 144a^3b^11g^1m^1z + 51200a^8c^6e^1m^1z$
 $+ 2048a^7c^7h^2j^1z + 16384a^6c^8e^2l^1z + 16b^11c^3d^2l^1z$
 $- 18432a^7c^7e^1k^2z - 2048a^6c^8f^2j^1z + 18432a^5c^9d^2j^1z$
 $+ 192a^5b^8c^1l^3z + 2048a^6c^8e^1h^2z - 16b^9c^5d^2g^1z - 2048a^5c^9e^1f^2z$
 $+ 32b^8c^6d^2e^1z + 18432a^4c^10d^2e^1z + 6536a^9c^5l^3z$
 $- 11008a^8b^5c^3j^1k^1l^1m^1z - 288a^6b^5c^3j^1k^1l^1m^1z + 144a^5b^6c^3g^1k^1l^1m^1z$
 $- 11008a^7b^5c^4e^1k^1l^1m^1z - 5376a^7b^5c^4f^1j^1l^1m^1z + 3840a$

$$\begin{aligned}
& ^7b^4c^4g^jkm - 3328a^7b^4c^4h^jkm - 96a^4b^7c^4g^jkm - 2560a^7 \\
& b^4c^4g^hkm - 36a^3b^8c^4f^hkm - 6912a^6b^4c^5d^jkm - 7872a^6b \\
& c^5d^hkm - 7680a^6b^4c^5d^gkm - 5376a^6b^4c^5e^fkm + 3840a^6b \\
& c^5e^gkm - 3328a^6b^4c^5e^hkm - 1536a^6b^4c^5f^gkm + 1280a^6b \\
& c^5f^g^jkm - 768a^6b^4c^5g^h^jkm - 768a^6b^4c^5f^h^jkm - 768a^6b^4c^ \\
& 5e^h^jkm - 36a^2b^9c^4d^hkm - 6912a^5b^4c^6d^ekkm - 4864a^5b^4c^6 \\
& d^ejkm - 2304a^5b^4c^6d^g^jkm - 1792a^5b^4c^6e^f^jkm - 1280a^5b^4c^6 \\
& d^f^jkm - 4544a^5b^4c^6d^f^hkm + 1536a^5b^4c^6d^g^hkm + 1280a^5b^4c^6 \\
& e^f^gkm - 768a^5b^4c^6e^g^hkm - 768a^5b^4c^6e^f^hkm - 256a^5b^4c^6f^g \\
& h^jkm + 12a^4b^9c^2d^f^hkm + 16a^4b^8c^3d^f^gkm - 4a^4b^8c^3d^f^hkm - \\
& 2304a^4b^4c^7d^e^gkm - 1792a^4b^4c^7d^e^h^jkm - 1280a^4b^4c^7d^e^f^jkm - \\
& 768a^4b^4c^7d^f^g^jkm - 32a^4b^7c^4d^e^fkm - 256a^4b^4c^7e^f^g^hkm - 768a^ \\
& 3b^4c^8d^e^f^gkm + 32a^4b^5c^6d^e^f^gkm + 12a^4b^10c^4d^f^kkm + 3648a^7b \\
& ^3c^2j^kkm + 5504a^7b^2c^3g^kkm - 1824a^6b^4c^2g^kkm + 384a^ \\
& 7b^2c^3h^jkm - 288a^6b^4c^2h^jkm - 4800a^6b^3c^3g^jkm + \\
& 3648a^6b^3c^3e^kkm + 1280a^5b^5c^2g^jkm + 1088a^6b^3c^3f^jkm \\
& km + 576a^6b^3c^3h^jkm - 288a^5b^5c^2e^kkm - 192a^6b^3c^3g \\
& h^jkm + 144a^5b^5c^2g^h^jkm + 9600a^6b^2c^4e^jkm - 4224a^6b^2c^ \\
& 4d^jkm - 2560a^5b^4c^3e^jkm + 384a^6b^2c^4f^jkm + 224a^5b^ \\
& 4c^3d^jkm + 192a^4b^6c^2e^jkm - 160a^5b^4c^3f^jkm - 4608a^ \\
& 6b^2c^4f^hkm + 2688a^6b^2c^4f^gkm + 1664a^6b^2c^4g^hkm - \\
& 744a^5b^4c^3f^hkm - 544a^5b^4c^3f^gkm + 492a^4b^6c^2f^hkm \\
& km + 416a^5b^4c^3g^h^jkm + 384a^6b^2c^4g^h^jkm + 384a^6b^2c^4e^h \\
& km - 288a^5b^4c^3g^hkm - 288a^5b^4c^3e^hkm - 96a^4b^6c^2g \\
& h^jkm + 2112a^5b^3c^4d^jkm - 160a^4b^5c^3d^jkm + 16992a^5b^3 \\
& c^4d^hkm - 6252a^4b^5c^3d^hkm - 4800a^5b^3c^4e^gkm + 2112a^ \\
& 5b^3c^4d^gkm - 1728a^5b^3c^4f^g^jkm + 1280a^4b^5c^3e^gkm + \\
& 1088a^5b^3c^4e^fkm - 832a^5b^3c^4e^h^jkm + 816a^3b^7c^2d^hkm \\
& km + 576a^5b^3c^4e^hkm - 448a^5b^3c^4f^h^jkm + 288a^4b^5c^3f^g \\
& ^jkm - 192a^5b^3c^4g^h^jkm - 192a^5b^3c^4f^g^kkm + 192a^4b^5c^3 \\
& e^h^jkm - 112a^4b^5c^3d^gkm + 96a^4b^5c^3f^h^jkm - 96a^3b^7c^2 \\
& e^gkm + 80a^4b^5c^3f^g^kkm + 32a^4b^5c^3g^h^jkm - 11456a^5b^2c^ \\
& 5d^f^kkm + 4992a^5b^2c^5d^h^jkm - 4608a^5b^2c^5e^g^jkm - 4224a^ \\
& 5b^2c^5d^ekkm + 3456a^5b^2c^5e^f^jkm + 3456a^5b^2c^5d^g^kkm + 2 \\
& 432a^5b^2c^5d^g^jkm - 1312a^4b^4c^4d^h^jkm + 1272a^3b^6c^3d^f^k \\
& km - 1056a^4b^4c^4d^g^kkm + 896a^5b^2c^5f^g^jkm + 768a^4b^4c^4e \\
& ^g^jkm - 576a^4b^4c^4e^f^jkm - 480a^4b^4c^4d^g^jkm + 384a^5b^2c^ \\
& 5e^h^jkm + 384a^5b^2c^5e^f^kkm - 232a^2b^8c^2d^f^kkm + 224a^4b^4 \\
& c^4d^ekkm - 160a^4b^4c^4e^f^kkm - 96a^4b^4c^4f^g^jkm + 96a^3b^ \\
& 6c^3d^h^jkm + 80a^3b^6c^3d^g^kkm - 64a^4b^4c^4e^h^jkm - 24a^4b^ \\
& 4c^4d^f^kkm + 416a^4b^4c^4e^g^hkm + 384a^5b^2c^5f^g^hkm + 384a^5 \\
& b^2c^5e^g^hkm + 224a^4b^4c^4f^g^hkm - 96a^3b^6c^3e^g^hkm - 48a^ \\
& 3b^6c^3f^g^hkm + 2112a^4b^3c^5d^ekkm - 960a^4b^3c^5d^f^jkm + 96 \\
& 0a^4b^3c^5d^ejkm + 384a^3b^5c^4d^f^jkm + 320a^4b^3c^5d^g^jkm + \\
& 192a^4b^3c^5e^f^jkm - 160a^3b^5c^4d^ekkm - 32a^2b^7c^3d^f^jkm \\
& + 7392a^4b^3c^5d^f^hkm - 2496a^4b^3c^5d^g^hkm - 1728a^4b^3c^5e \\
& ^f^gkm - 1500a^3b^5c^4d^f^hkm + 656a^3b^5c^4d^g^hkm - 448a^4b^3c^ \\
& 5e^f^hkm + 288a^3b^5c^4e^f^gkm - 192a^4b^3c^5f^g^h^jkm - 192a^4b^ \\
& 3c^5e^g^hkm + 96a^3b^5c^4e^f^hkm - 48a^2b^7c^3d^g^hkm + 32a^3b^ \\
& 5c^4e^g^hkm - 16a^2b^7c^3d^f^hkm - 640a^4b^2c^6d^ejkm + 4992a^4 \\
& b^2c^6d^ehkm - 3584a^4b^2c^6d^f^hkm + 2432a^4b^2c^6d^egkm - 13 \\
& 12a^3b^4c^5d^ehkm + 896a^4b^2c^6e^f^gkm + 896a^4b^2c^6d^g^h^jkm \\
& + 640a^4b^2c^6d^f^gkm + 600a^3b^4c^5d^f^hkm + 480a^3b^4c^5d^f^g \\
& km - 480a^3b^4c^5d^egkm + 384a^4b^2c^6e^f^h^jkm - 192a^2b^6c^4d^ \\
& f^gkm - 96a^3b^4c^5e^f^gkm - 96a^3b^4c^5d^g^h^jkm + 96a^2b^6c^4d^ \\
& ehkm + 12a^2b^6c^4d^f^hkm - 960a^3b^3c^6d^efkm + 384a^2b^5c^5 \\
& d^efkm + 320a^3b^3c^6d^egkm - 192a^3b^3c^6d^f^g^jkm + 192a^3b^3c^ \\
& 6d^eh^jkm + 32a^2b^5c^5d^f^g^jkm - 192a^3b^3c^6e^f^g^hkm + 384a^3b^2 \\
& c^7d^ef^jkm - 64a^2b^4c^6d^ef^jkm + 896a^3b^2c^7d^eg^hkm - 96a^2b^
\end{aligned}$$

$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 - 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 + 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 + 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 + 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 - 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$

$$\begin{aligned}
& - 1088a^6b^2c^4ek^2l + 960a^6b^2c^4g^2jk^2 - 240a^5b^4c^3g^2jk^2 + 192a^5b^2c^5f^2j^2l - 104a^4b^5c^3g^2h^2m - 96a^5b^3c^4g^2h^2m + 48a^5b^4c^3ek^2l + 48a^4b^4c^4f^2j^2l + 24a^3b^7c^2g^2h^2m + 16a^4b^6c^2g^2jk^2 - 16a^3b^6c^3f^2j^2l + 13376a^6b^2c^4dk^2l^2 - 5136a^5b^4c^3dk^2l^2 - 3840a^6b^2c^4e^2j^2l^2 + 1536a^5b^4c^3e^2j^2l^2 + 1392a^5b^3c^4f^2h^2m + 1386a^5b^5c^2f^2h^2m - 768a^5b^3c^4e^2j^2l + 768a^4b^6c^2dk^2l^2 - 768a^4b^3c^5e^2j^2l - 588a^4b^4c^4f^2h^2m - 480a^5b^3c^4g^2h^2l + 480a^5b^3c^4d^2j^2m - 480a^5b^2c^5f^2h^2m - 128a^4b^6c^2e^2j^2l^2 + 100a^3b^6c^3f^2h^2m + 96a^5b^3c^4f^2j^2k + 72a^4b^5c^3g^2h^2l - 54a^4b^5c^3f^2h^2m - 48a^6b^3c^3f^2h^2m - 36a^3b^7c^2f^2h^2m + 6a^2b^8c^2f^2h^2m + 6848a^4b^2c^6d^2j^2l - 2448a^3b^4c^5d^2j^2l + 624a^5b^4c^3f^2h^2l^2 + 576a^6b^2c^4f^2h^2l^2 + 480a^5b^3c^4e^2jk^2 + 432a^4b^4c^4f^2g^2m - 416a^4b^3c^5e^2h^2m + 336a^2b^6c^4d^2j^2l - 320a^5b^2c^5f^2g^2m - 256a^4b^6c^2f^2h^2l^2 + 192a^5b^2c^5g^2h^2k + 96a^3b^5c^4e^2h^2m - 72a^3b^6c^3f^2g^2m + 48a^4b^4c^4g^2h^2k - 32a^4b^5c^3e^2jk^2 - 8a^3b^6c^3g^2h^2k + 24768a^6b^2c^4d^2h^2m - 21108a^5b^4c^3d^2h^2m - 10048a^4b^2c^6d^2h^2m + 7218a^4b^6c^2d^2h^2m - 6720a^6b^2c^4e^2gm^2 + 6160a^5b^4c^3e^2gm^2 - 2592a^5b^2c^5d^2h^2m - 1680a^4b^6c^2e^2gm^2 + 1068a^3b^4c^5d^2h^2m + 960a^5b^2c^5e^2h^2l - 876a^4b^4c^4d^2h^2m - 864a^5b^2c^5f^2h^2k + 546a^2b^6c^4d^2h^2m + 432a^3b^6c^3d^2h^2m + 336a^4b^3c^5f^2h^2k - 320a^5b^2c^5d^2j^2k + 192a^5b^2c^5g^2h^2j + 144a^5b^3c^4f^2h^2k - 144a^4b^4c^4e^2h^2l - 102a^4b^5c^3f^2h^2k - 96a^4b^3c^5f^2g^2l - 36a^2b^8c^2d^2h^2m - 30a^3b^5c^4f^2h^2k - 24a^3b^5c^4f^2g^2l + 16a^4b^4c^4g^2h^2j - 12a^4b^4c^4f^2h^2k + 12a^3b^6c^3f^2h^2k + 8a^2b^7c^3f^2g^2l + 6a^3b^7c^2f^2h^2k - 2a^2b^7c^3f^2h^2k - 9312a^5b^3c^4d^2h^2l^2 + 3288a^4b^5c^3d^2h^2l^2 - 2304a^4b^2c^6e^2g^2l + 1920a^5b^3c^4e^2g^2l^2 + 1728a^4b^2c^6e^2f^2m + 1152a^4b^3c^5e^2g^2l - 768a^4b^5c^3e^2g^2l - 608a^4b^3c^5d^2g^2m - 472a^3b^7c^2d^2h^2l^2 + 384a^3b^4c^5e^2g^2l - 288a^3b^4c^5e^2f^2m - 224a^4b^3c^5f^2g^2k + 192a^5b^2c^5f^2h^2j^2 + 192a^4b^2c^6e^2h^2k - 192a^3b^5c^4e^2g^2l + 120a^3b^5c^4d^2g^2m + 64a^3b^7c^2e^2g^2l - 32a^3b^4c^5e^2h^2k + 24a^3b^5c^4f^2g^2k + 9936a^3b^3c^6d^2f^2m + 3786a^4b^5c^3d^2f^2m - 3552a^5b^2c^5d^2h^2k - 3486a^2b^5c^5d^2f^2m - 3424a^3b^3c^6d^2g^2l - 1868a^3b^7c^2d^2f^2m + 1332a^4b^4c^4d^2h^2k - 1296a^5b^3c^4d^2f^2m - 1236a^3b^4c^5d^2f^2m + 1224a^2b^5c^5d^2g^2l - 1152a^4b^2c^6d^2f^2m + 960a^5b^2c^5e^2g^2k - 496a^3b^3c^6d^2h^2k + 462a^2b^6c^4d^2f^2m + 432a^4b^3c^5d^2h^2k - 240a^4b^4c^4e^2g^2k - 222a^2b^5c^5d^2h^2k + 192a^4b^2c^6f^2g^2j + 192a^4b^2c^6e^2f^2l - 174a^3b^5c^4d^2h^2k - 156a^3b^6c^3d^2h^2k + 48a^3b^4c^5e^2f^2l - 32a^4b^3c^5e^2h^2j + 16a^3b^6c^3e^2g^2k + 16a^3b^4c^5f^2g^2j - 16a^2b^6c^4e^2f^2l + 12a^2b^7c^3d^2h^2k + 6a^2b^8c^2d^2h^2k + 1728a^5b^2c^5d^2f^2l + 1392a^4b^4c^4d^2f^2l - 840a^3b^6c^3d^2f^2l - 768a^4b^2c^6e^2g^2j + 576a^4b^2c^6d^2g^2k + 480a^3b^3c^6d^2e^2m + 144a^2b^8c^2d^2f^2l + 96a^4b^3c^5d^2h^2j^2 + 96a^3b^3c^6e^2f^2k - 80a^3b^4c^5d^2g^2k + 6848a^3b^2c^7d^2e^2l - 3552a^3b^2c^7d^2f^2k - 2448a^2b^4c^6d^2e^2l + 1332a^2b^4c^6d^2f^2k + 960a^3b^2c^7d^2g^2j - 496a^4b^3c^5d^2f^2k + 432a^3b^3c^6d^2f^2k - 240a^2b^4c^6d^2g^2j - 222a^3b^5c^4d^2f^2k - 174a^2b^5c^5d^2f^2k + 64a^4b^2c^6f^2g^2h + 48a^3b^4c^5f^2g^2h + 42a^2b^7c^3d^2f^2k - 32a^3b^3c^6e^2f^2j - 320a^3b^2c^7d^2e^2k + 192a^4b^2c^6e^2g^2h + 192a^4b^2c^6d^2f^2j^2 - 32a^3b^4c^5d^2f^2j^2 + 16a^3b^4c^5e^2g^2h + 480a^2b^3c^7d^2e^2j - 224a^3b^3c^6d^2g^2h + 192a^3b^2c^7e^2f^2h + 24a^2b^5c^5d^2g^2h - 864a^3b^2c^7d^2f^2h + 336a^3b^3c^6d^2f^2h + 192a^3b^2c^7e^2f^2g + 144a^2b^3c^7d^2f^2h - 30a^2b^5c^5d^2f^2h + 16a^2b^4c^6e^2f^2g - 12a^2b^4c^6d^2f^2h + 192a^3b^2c^7d^2f^2g + 96a^2b^3c^7d^2e^2h + 48a^2b^4c^6d^2f^2g + 960a^2b^2c^8d^2e^2g + 192a^2b^2c^8d^2e^2f - 7680a^9b^c^2l
\end{aligned}$$

$$\begin{aligned}
&^2m^2 + 3152a^8b^3c^3l^2m^2 + 2070a^7b^4c^3k^2m^2 - 1840a^7b^3c^2 \\
&k^3m + 6720a^8b^3c^3j^2m^2 - 3072a^8b^3c^3k^2l^2 + 1680a^6b^5c^3j \\
&^2m^2 - 100a^6b^5c^3k^2l^2 - 2176a^7b^3c^2j^3l^3 - 256a^6b^3c^3j \\
&^3l - 64a^5b^6c^3j^2l^2 - 12480a^8b^2c^2h^3m^3 + 972a^5b^6c^3h^2m \\
&^2 - 960a^7b^3c^4j^2k^2 - 252a^5b^4c^3h^3m - 192a^6b^2c^4h^3m \\
&+ 54a^4b^6c^2h^3m + 1536a^7b^3c^4h^2l^2 + 420a^4b^7c^3g^2m^2 - 3 \\
&6a^4b^7c^3h^2l^2 - 3072a^7b^2c^3g^3l^3 + 2096a^7b^3c^2f^3m^3 + 108 \\
&8a^6b^4c^2g^3l^3 - 496a^6b^3c^3h^3k^3 - 192a^4b^4c^4g^3l^3 + 176a \\
&^4b^3c^5f^3m + 144a^5b^3c^4h^3k + 78a^3b^8c^3f^2m^2 + 54a^3b^ \\
&5c^4f^3m + 32a^3b^6c^3g^3l^3 + 30a^5b^5c^2h^3k^3 - 18a^4b^5c^3 \\
&h^3k - 18a^2b^7c^3f^3m - 16a^3b^8c^3g^2l^2 + 6720a^6b^3c^5e^2m^ \\
&2 - 192a^6b^3c^5h^2j^2 - 4a^2b^9c^3f^2l^2 - 35040a^7b^2c^3d^3m^3 + \\
&14300a^6b^4c^2d^3m^3 - 12000a^3b^2c^7d^3m + 4380a^2b^4c^6d^3m \\
&- 2176a^6b^3c^3e^3l^3 - 256a^3b^3c^6e^3l^3 - 192a^6b^2c^4f^3k^3 + \\
&192a^5b^5c^2e^3l^3 - 192a^4b^2c^6f^3k^3 + 132a^5b^4c^3f^3k^3 + 12 \\
&8a^4b^3c^5g^3j - 28a^3b^4c^5f^3k - 10a^4b^6c^2f^3k^3 + 6a^2b^ \\
&^6c^4f^3k + 10752a^5b^3c^6d^2l^2 - 960a^5b^3c^6e^2k^2 - 192a^5b^ \\
&c^6f^2j^2 + 108a^2b^9c^2d^2l^2 - 1680a^5b^3c^4d^3k^3 - 1680a^2b^3 \\
&c^7d^3k + 222a^4b^5c^3d^3k^3 + 30a^2b^8c^3d^2k^2 - 10a^3b^7c^2 \\
&d^3k^3 - 960a^4b^3c^7d^2j^2 + 80a^4b^3c^5f^3h^3 + 80a^3b^3c^6f^3h \\
&+ 6a^3b^5c^4f^3h^3 + 6a^2b^5c^5f^3h - 192a^4b^3c^7e^2h^2 - 192 \\
&a^4b^2c^6d^3h^3 - 192a^2b^2c^8d^3h + 128a^3b^3c^6e^3g^3 - 28a^3b^ \\
&b^4c^5d^3h^3 + 12a^2b^6c^5d^2h^2 + 6a^2b^6c^4d^3h^3 - 192a^3b^3c^8 \\
&e^2f^2 + 60a^2b^5c^6d^2g^2 + 198a^2b^4c^7d^2f^2 + 144a^2b^3c^7d^ \\
&f^3 - 960a^2b^3c^9d^2e^2 + 240a^2b^3c^8d^2e^2 + 15360a^9c^3k^1l^2m \\
&- 12800a^9c^3j^1m^2 - 3840a^8c^4j^2k^3m + 432a^6b^6j^1m^2 + 460 \\
&8a^8c^4j^2k^3l^2 + 2880a^8c^4h^3k^2m + 5120a^8c^4f^1l^2m - 3072a^8c^ \\
&c^4h^3k^1l^2 + 270a^5b^7h^3k^3m^2 - 216a^5b^7g^3l^3m^2 - 12800a^8c^4e^1 \\
&m^2 - 4800a^8c^4f^3k^3m^2 - 512a^7c^5h^2j^3l - 3840a^6c^6e^2k^3m - \\
&1280a^7c^5f^3j^2m + 768a^7c^5h^3j^2k + 144a^4b^8g^3j^3m^2 - 90a^4b^ \\
&^8f^3k^3m^2 + 8640a^7c^5d^3k^2m + 4608a^7c^5e^3k^2l + 512a^6c^6f^2 \\
&j^3l - 9216a^7c^5d^3k^1l^2 - 4096a^7c^5e^3j^3l^2 + 320a^6c^6f^2h^3m - 9 \\
&0a^3b^9d^3k^3m^2 + 15200a^9b^3c^2k^3m^3 - 6192a^8b^3c^3k^3m^3 + 5472a^8 \\
&b^3c^3k^3m - 4608a^5c^7d^2j^3l - 1024a^7c^5f^3h^3l^2 + 150a^6b^5c^3 \\
&k^3m + 54a^3b^9f^3h^3m^2 + 6b^10c^2d^2h^3m - 14400a^7c^5d^3h^3m^2 + 8 \\
&640a^5c^7d^2h^3m + 2880a^6c^6d^3h^2m + 2304a^6c^6d^3j^2k - 512a^6 \\
&c^6e^3h^2l - 192a^6c^6f^3h^2k + 6144a^8b^3c^3j^3l^3 + 1536a^7b^3c^4 \\
&j^3l - 1280a^5c^7e^2f^3m + 768a^5c^7e^2h^3k + 256a^6c^6f^3h^3j^2 + \\
&192a^6b^5c^3j^3l^3 + 54a^2b^10d^3h^3m^2 - 18b^9c^3d^2f^3m + 8b^9c^3 \\
&d^2g^3l - 2b^9c^3d^2h^3k + 4068a^7b^4c^3h^3m^3 - 1728a^6c^6d^3h^3k^2 + \\
&960a^5c^7d^3f^2m + 512a^5c^7e^3f^2l - 3072a^6c^6d^3f^3l^2 - 16b^8c^ \\
&c^4d^2e^3l + 6b^8c^4d^2f^3k - 4608a^4c^8d^2e^3l + 2400a^8b^3c^3f^3m \\
&^3 + 2016a^7b^3c^4h^3k^3 - 1728a^4c^8d^2f^3k - 1146a^6b^5c^3f^3m^3 + 2 \\
&24a^6b^3c^5h^3k - 96a^5b^6c^3g^3l^3 + 96a^5b^3c^6f^3m + 2304a^4c^8 \\
&d^2e^2k + 768a^5c^7d^3f^3j^2 + 6144a^7b^3c^4e^3l^3 - 2280a^5b^6c^3d^3m^ \\
&3 + 1536a^4b^3c^7e^3l - 616a^2b^6c^5d^3m + 512a^6b^3c^5g^3j^3 + 256 \\
&a^4c^8e^2f^3h + 240a^2b^10c^3d^2m^2 + 6b^7c^5d^2f^3h - 192a^4c^8d^ \\
&f^2h + 4320a^6b^3c^5d^3k^3 + 4320a^3b^3c^8d^3k + 222a^2b^5c^6d^3k^3 + \\
&16b^6c^6d^2e^3g + 96a^5b^3c^6f^3h^3 + 96a^4b^3c^7f^3h + 768a^3c^9 \\
&d^2e^2f + 512a^3b^3c^8e^3g + 132a^2b^4c^7d^3h + 2016a^2b^3c^9d^3f \\
&- 496a^2b^3c^8d^3f + 224a^3b^3c^8d^3f^3 - 18a^2b^5c^6d^3f^3 - 3264a^8 \\
&b^2c^2k^2m^2 - 6160a^7b^3c^2j^2m^2 + 1104a^7b^3c^2k^2l^2 - 1 \\
&920a^7b^2c^3j^2l^2 + 768a^6b^4c^2j^2l^2 + 3888a^7b^2c^3h^2m^2 \\
&- 3510a^6b^4c^2h^2m^2 + 240a^6b^3c^3j^2k^2 - 16a^5b^5c^2j^2 \\
&k^2 + 1680a^6b^3c^3g^2m^2 - 1648a^6b^3c^3h^2l^2 - 1540a^5b^5c^ \\
&^2g^2m^2 + 444a^5b^5c^2h^2l^2 - 960a^6b^2c^4h^2k^2 - 576a^6b^ \\
&2c^4f^2m^2 - 512a^6b^2c^4g^2l^2 - 480a^5b^4c^3g^2l^2 + 198a^5 \\
&b^4c^3h^2k^2 + 192a^4b^6c^2g^2l^2 - 186a^5b^4c^3f^2m^2 - 97a \\
&^4b^6c^2f^2m^2 - 9a^4b^6c^2h^2k^2 - 6160a^5b^3c^4e^2m^2 + 168
\end{aligned}$$

$$\begin{aligned}
& 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*
\end{aligned}$$

$h*m*z^2 + 96*a^3*b^{11}*c^2*h*m*z^2 - 172032*a^7*b^2*c^7*f*m*z^2 + 116736*a^6$
 $*b^4*c^6*f*m*z^2 - 49152*a^7*b^2*c^7*g*l*z^2 + 45056*a^6*b^4*c^6*g*l*z^2 -$
 $35840*a^5*b^6*c^5*f*m*z^2 + 24576*a^7*b^2*c^7*h*k*z^2 - 15360*a^5*b^6*c^5*g$
 $*l*z^2 + 5184*a^4*b^8*c^4*f*m*z^2 - 3072*a^5*b^6*c^5*h*k*z^2 + 2304*a^4*b^8$
 $*c^4*g*l*z^2 + 2048*a^6*b^4*c^6*h*k*z^2 + 576*a^4*b^8*c^4*h*k*z^2 - 288*a^3$
 $*b^{10}*c^3*f*m*z^2 - 128*a^3*b^{10}*c^3*g*l*z^2 - 32*a^3*b^{10}*c^3*h*k*z^2 - 14$
 $7456*a^6*b^3*c^7*d*m*z^2 - 90112*a^6*b^3*c^7*e*l*z^2 + 52224*a^5*b^5*c^6*d*$
 $m*z^2 - 49152*a^6*b^3*c^7*f*k*z^2 + 30720*a^5*b^5*c^6*e*l*z^2 - 24576*a^6*b$
 $^3*c^7*g*j*z^2 + 15360*a^5*b^5*c^6*f*k*z^2 - 8192*a^4*b^7*c^5*d*m*z^2 + 614$
 $4*a^5*b^5*c^6*g*j*z^2 - 4608*a^4*b^7*c^5*e*l*z^2 - 2048*a^4*b^7*c^5*f*k*z^2$
 $- 512*a^4*b^7*c^5*g*j*z^2 + 480*a^3*b^9*c^4*d*m*z^2 + 256*a^3*b^9*c^4*e*l*$
 $z^2 + 96*a^3*b^9*c^4*f*k*z^2 + 131072*a^6*b^2*c^8*d*k*z^2 + 49152*a^6*b^2*c$
 $^8*e*j*z^2 - 43008*a^5*b^4*c^7*d*k*z^2 - 12288*a^5*b^4*c^7*e*j*z^2 + 6144*a$
 $^4*b^6*c^6*d*k*z^2 + 1024*a^4*b^6*c^6*e*j*z^2 - 320*a^3*b^8*c^5*d*k*z^2 + 6$
 $144*a^5*b^4*c^7*f*h*z^2 - 2048*a^4*b^6*c^6*f*h*z^2 + 192*a^3*b^8*c^5*f*h*z$
 $^2 - 49152*a^5*b^3*c^8*d*h*z^2 - 24576*a^5*b^3*c^8*e*g*z^2 + 15360*a^4*b^5*c$
 $^7*d*h*z^2 + 6144*a^4*b^5*c^7*e*g*z^2 - 2048*a^3*b^7*c^6*d*h*z^2 - 512*a^3*$
 $b^7*c^6*e*g*z^2 + 96*a^2*b^9*c^5*d*h*z^2 + 24576*a^5*b^2*c^9*d*f*z^2 - 3072$
 $*a^3*b^6*c^7*d*f*z^2 + 2048*a^4*b^4*c^8*d*f*z^2 + 576*a^2*b^8*c^6*d*f*z^2 -$
 $430080*a^9*b*c^6*m^2*z^2 + 3408*a^4*b^{11}*c*m^2*z^2 - 64*a^3*b^{12}*c^1^2*z^2$
 $+ 61440*a^8*b*c^7*k^2*z^2 + 12288*a^7*b*c^8*h^2*z^2 + 12288*a^6*b*c^9*f^2*$
 $z^2 + 61440*a^5*b*c^{10}*d^2*z^2 + 432*a*b^9*c^6*d^2*z^2 + 245760*a^9*c^7*k*m$
 $*z^2 + 81920*a^8*c^8*f*m*z^2 - 49152*a^8*c^8*h*k*z^2 - 147456*a^7*c^9*d*k*z$
 $^2 - 65536*a^7*c^9*e*j*z^2 - 16384*a^7*c^9*f*h*z^2 - 49152*a^6*c^{10}*d*f*z^2$
 $+ 716800*a^8*b^3*c^5*m^2*z^2 - 483840*a^7*b^5*c^4*m^2*z^2 + 170496*a^6*b^7$
 $*c^3*m^2*z^2 - 33232*a^5*b^9*c^2*m^2*z^2 + 516096*a^8*b^2*c^6*l^2*z^2 - 288$
 $768*a^7*b^4*c^5*l^2*z^2 + 88576*a^6*b^6*c^4*l^2*z^2 - 15744*a^5*b^8*c^3*l^2$
 $*z^2 + 1536*a^4*b^{10}*c^2*l^2*z^2 - 61440*a^7*b^3*c^6*k^2*z^2 + 24064*a^6*b^$
 $5*c^5*k^2*z^2 - 4608*a^5*b^7*c^4*k^2*z^2 + 432*a^4*b^9*c^3*k^2*z^2 - 16*a^3$
 $*b^{11}*c^2*k^2*z^2 + 24576*a^7*b^2*c^7*j^2*z^2 - 6144*a^6*b^4*c^6*j^2*z^2 +$
 $512*a^5*b^6*c^5*j^2*z^2 - 8192*a^6*b^3*c^7*h^2*z^2 + 1536*a^5*b^5*c^6*h^2*z$
 $^2 - 16*a^3*b^9*c^4*h^2*z^2 - 8192*a^6*b^2*c^8*g^2*z^2 + 6144*a^5*b^4*c^7*g$
 $^2*z^2 - 1536*a^4*b^6*c^6*g^2*z^2 + 128*a^3*b^8*c^5*g^2*z^2 - 8192*a^5*b^3*$
 $c^8*f^2*z^2 + 1536*a^4*b^5*c^7*f^2*z^2 - 16*a^2*b^9*c^5*f^2*z^2 + 24576*a^5$
 $*b^2*c^9*e^2*z^2 - 6144*a^4*b^4*c^8*e^2*z^2 + 512*a^3*b^6*c^7*e^2*z^2 - 614$
 $40*a^4*b^3*c^9*d^2*z^2 + 24064*a^3*b^5*c^8*d^2*z^2 - 4608*a^2*b^7*c^7*d^2*z$
 $^2 - 393216*a^9*c^7*l^2*z^2 - 144*a^3*b^{13}*m^2*z^2 - 32768*a^8*c^8*j^2*z^2$
 $- 32768*a^6*c^{10}*e^2*z^2 - 16*b^{11}*c^5*d^2*z^2 + 18432*a^8*b*c^5*h^1*m*z -$
 $96*a^3*b^{10}*c*g*k*m*z + 90112*a^7*b*c^6*e*k*m*z + 36864*a^7*b*c^6*f*j*m*z -$
 $16384*a^7*b*c^6*g*j*l*z + 14336*a^7*b*c^6*d*l*m*z - 10240*a^7*b*c^6*f*k*l*$
 $z + 4096*a^7*b*c^6*h*j*k*z + 10240*a^7*b*c^6*g*h*m*z - 47104*a^6*b*c^7*d*h*$
 $l*z + 36864*a^6*b*c^7*e*f*m*z + 30720*a^6*b*c^7*d*g*m*z - 16384*a^6*b*c^7*e$
 $*g*l*z + 6144*a^6*b*c^7*f*g*k*z + 4096*a^6*b*c^7*e*h*k*z + 32*a*b^{10}*c^3*d*$
 $f*l*z - 4096*a^5*b*c^8*d*f*j*z - 6144*a^5*b*c^8*d*g*h*z - 32*a*b^8*c^5*d*f*$
 $g*z - 4096*a^4*b*c^9*d*e*f*z + 64*a*b^7*c^6*d*e*f*z + 110592*a^8*b^2*c^4*k*$
 $l*m*z - 36864*a^7*b^4*c^3*k^1*m*z + 5376*a^6*b^6*c^2*k^1*m*z - 79872*a^7*b^$
 $3*c^4*j*k*m*z + 26112*a^6*b^5*c^3*j*k*m*z - 3712*a^5*b^7*c^2*j*k*m*z - 1382$
 $4*a^7*b^3*c^4*h^1*m*z + 3456*a^6*b^5*c^3*h^1*m*z - 288*a^5*b^7*c^2*h^1*m*z$
 $- 45056*a^7*b^2*c^5*g*k*m*z + 39936*a^6*b^4*c^4*g*k*m*z + 30720*a^7*b^2*c^5$
 $*f^1*m*z - 18432*a^7*b^2*c^5*h*k^1*z - 13056*a^5*b^6*c^3*g*k*m*z - 7680*a^6$
 $*b^4*c^4*f^1*m*z + 5376*a^6*b^4*c^4*h^1*m*z + 4608*a^6*b^4*c^4*h*k^1*z + 30$
 $72*a^7*b^2*c^5*h^1*m*z - 1984*a^5*b^6*c^3*h^1*m*z + 1856*a^4*b^8*c^2*g*k*m*$
 $z + 640*a^5*b^6*c^3*f^1*m*z - 384*a^5*b^6*c^3*h*k^1*z + 192*a^4*b^8*c^2*h^1*$
 $j*m*z - 79872*a^6*b^3*c^5*e*k*m*z - 27648*a^6*b^3*c^5*f^1*j*m*z + 26112*a^5*b^$
 $5*c^4*e*k^1*m*z + 12288*a^6*b^3*c^5*g*j^1*z - 10752*a^6*b^3*c^5*d^1*m*z + 768$
 $0*a^6*b^3*c^5*f^1*k^1*z + 6912*a^5*b^5*c^4*f^1*j*m*z - 3712*a^4*b^7*c^3*e*k^1*m*z$
 $- 3072*a^6*b^3*c^5*h^1*j*k^1*z - 3072*a^5*b^5*c^4*g^1*j^1*z + 2688*a^5*b^5*c^4*d$
 $^1*m*z - 1920*a^5*b^5*c^4*f^1*k^1*z + 768*a^5*b^5*c^4*h^1*j*k^1*z - 576*a^4*b^7*c$
 $^3*f^1*j^1*m*z + 256*a^4*b^7*c^3*d^1*m*z + 192*a^3*b^$

$$\begin{aligned}
& 9c^2ekmz + 160a^4b^7c^3fkk^1z - 64a^4b^7c^3hjk^1z - 2688a^5 \\
& b^5c^4g^h^1z - 1536a^6b^3c^5g^h^1z + 992a^4b^7c^3g^h^1z - 96a^3 \\
& b^9c^2g^h^1z - 65536a^6b^2c^6dk^1z + 46080a^6b^2c^6dj^1z \\
& - 24576a^6b^2c^6ek^1z + 21504a^5b^4c^5dk^1z - 11520a^5b^4c^5 \\
& dj^1z + 9216a^6b^2c^6fjk^1z + 6144a^5b^4c^5ek^1z - 3072a^4b^6 \\
& c^4dk^1z - 2304a^5b^4c^5fjk^1z + 960a^4b^6c^4dj^1z - 512a^4 \\
& b^6c^4ek^1z + 192a^4b^6c^4fjk^1z + 160a^3b^8c^3dk^1z - 18432a^6 \\
& b^2c^6fg^1z + 13824a^5b^4c^5fg^1z + 5376a^5b^4c^5eh^1z - 3456a^4 \\
& b^6c^4fg^1z + 3072a^6b^2c^6eh^1z - 3072a^5b^4c^5fh^1z - 2048a^6 \\
& b^2c^6g^hk^1z - 1984a^4b^6c^4eh^1z + 1536a^5b^4c^5g^hk^1z + 1024a^4 \\
& b^6c^4fh^1z - 384a^4b^6c^4g^hk^1z + 288a^3b^8c^3fg^1z + 192a^3 \\
& b^8c^3eh^1z - 96a^3b^8c^3fh^1z + 32a^3b^8c^3g^hk^1z + 41472a^5 \\
& b^3c^6d^h^1z - 27648a^5b^3c^6ef^1z - 23040a^5b^3c^6dg^1z - 13440a^4 \\
& b^5c^5d^h^1z + 12288a^5b^3c^6efg^1z + 6912a^4b^5c^5ef^1z + 5760a^4 \\
& b^5c^5d^g^1z - 4608a^5b^3c^6fg^1z - 3072a^5b^3c^6eh^1z - 3072a^4 \\
& b^5c^5eg^1z + 1888a^3b^7c^4d^h^1z + 1152a^4b^5c^5fg^1z + 768a^4 \\
& b^5c^5eh^1z - 576a^3b^7c^4ef^1z - 480a^3b^7c^4d^g^1z + 256a^3 \\
& b^7c^4eg^1z - 96a^3b^7c^4fg^1z - 96a^2b^9c^3d^h^1z - 64a^3b^7c^4eh^1 \\
& k^1z + 46080a^5b^2c^7d^e^1z - 11520a^4b^4c^6d^e^1z + 9216a^5 \\
& b^2c^7ef^1z - 9216a^5b^2c^7d^h^1z - 6656a^4b^4c^6d^f^1z - 6144a^5 \\
& b^2c^7d^f^1z + 3456a^3b^6c^5d^f^1z - 2304a^4b^4c^6ef^1z + 2304a^4 \\
& b^4c^6d^h^1z + 960a^3b^6c^5d^e^1z - 576a^2b^8c^4d^f^1z + 192a^3 \\
& b^6c^5ef^1z - 192a^3b^6c^5d^h^1z + 3072a^4b^3c^7d^f^1z - 768a^3 \\
& b^5c^6d^f^1z + 64a^2b^7c^5d^f^1z + 4608a^4b^3c^7d^g^1z - 1152a^3 \\
& b^5c^6d^g^1z + 96a^2b^7c^5d^g^1z - 9216a^4b^2c^8d^e^1z + 2304a^3 \\
& b^4c^7d^e^1z + 2048a^4b^2c^8d^f^1z - 1536a^3b^4c^7d^f^1z + 384a^2 \\
& b^6c^6d^f^1z - 192a^2b^6c^6d^e^1z + 3072a^3b^3c^8d^e^1z - 768a^2 \\
& b^5c^7d^e^1z - 288a^5b^8c^kk^1z + 90112a^8b^c^5jk^1z + 192a^4 \\
& b^9c^5jk^1z + 138240a^9b^c^4l^1z - 7344a^6b^7c^1l^1z + 5088a^5 \\
& b^8c^5j^1z - 3072a^8b^c^5k^2z - 49152a^8b^c^5j^1z - 128a^4 \\
& b^9c^5j^1z - 25600a^8b^c^5g^1z - 9216a^7b^c^6h^2z - 2544a^4 \\
& b^9c^5g^1z + 64a^3b^10c^5g^1z + 9216a^7b^c^6g^1z - 3072a^6 \\
& b^c^7f^2z - 288a^3b^10c^5e^1z - 49152a^7b^c^6e^1z - 58368a^5 \\
& b^c^8d^2z - 432a^9c^4d^2z - 1024a^6b^c^7g^1z + 32a^8c^5d^2j^1z + 1024a^5 \\
& b^c^8f^2g^1z - 9216a^4b^c^9d^2g^1z + 336a^7c^6d^2g^1z - 672a^6 \\
& b^c^7d^2e^1z - 122880a^9c^5k^1z - 40960a^8c^6f^1z + 24576a^8 \\
& c^6h^1z - 20480a^8c^6h^1z + 73728a^7c^7d^k^1z - 61440a^7c^7d^j^1z + 32768a^7 \\
& c^7ek^1z - 12288a^7c^7f^1z - 20480a^7c^7eh^1z + 8192a^7c^7fh^1z - 61440a^6 \\
& c^8d^e^1z + 24576a^6c^8d^f^1z - 12288a^6c^8ef^1z + 12288a^6c^8d^h^1z + 12288a^5 \\
& c^9d^eh^1z - 131328a^8b^3c^3l^1z + 46656a^7b^5c^2l^1z - 142848a^8 \\
& b^2c^4j^1z + 106368a^7b^4c^3j^1z - 34208a^6b^6c^2j^1z + 2304a^7 \\
& b^3c^4k^2z - 576a^6b^5c^3k^2z + 48a^5b^7c^2k^2z + 45056a^7 \\
& b^3c^4j^1z - 15360a^6b^5c^3j^1z - 12288a^7b^2c^5j^2z + 3072a^6 \\
& b^4c^4j^2z + 2304a^5b^7c^2j^1z - 256a^5b^6c^3j^2z + 15872a^7 \\
& b^2c^5jk^2z - 4992a^6b^4c^4jk^2z + 672a^5b^6c^3jk^2z - 32a^4 \\
& b^8c^2jk^2z + 71424a^7b^3c^4g^1z - 53184a^6b^5c^3g^1z + 17104a^5 \\
& b^7c^2g^1z + 6912a^6b^3c^5h^2z - 1728a^5b^5c^4h^2z + 144a^4 \\
& b^7c^3h^2z + 24576a^7b^2c^5g^1z - 22528a^6b^4c^4g^1z + 7680a^5 \\
& b^6c^3g^1z + 4096a^6b^2c^6g^2z - 3072a^5b^4c^5g^2z - 1152a^4 \\
& b^8c^2g^1z + 768a^4b^6c^4g^2z - 64a^3b^8c^3g^2z - 142848a^7 \\
& b^2c^5e^1z + 106368a^6b^4c^4e^1z - 34208a^5b^6c^3e^1z - 7936a^6 \\
& b^3c^5g^1z + 5088a^4b^8c^2e^1z + 2496a^5b^5c^4g^1z - 1536a^6 \\
& b^2c^6h^2j^1z + 1280a^5b^3c^6f^2z + 384a^5b^4c^5h^2j^1z - 336a^4 \\
& b^7c^3g^1z + 192a^4b^5c^5f^2z - 144a^3b^7c^4f^2z - 32a^4 \\
& b^6c^4h^2j^1z + 16a^3b^9c^2g^1z + 16a^2b^9c^3f^2z + 45056a^6 \\
& b^3c^5e^1z
\end{aligned}$$

$^2*z - 15360*a^5*b^5*c^4*e^1^2*z - 12288*a^5*b^2*c^7*e^2*1*z + 3072*a^4*b^4$
 $*c^6*e^2*1*z + 2304*a^4*b^7*c^3*e^1^2*z - 256*a^3*b^6*c^5*e^2*1*z - 128*a^3$
 $*b^9*c^2*e^1^2*z + 59136*a^4*b^3*c^7*d^2*1*z - 23488*a^3*b^5*c^6*d^2*1*z +$
 $15872*a^6*b^2*c^6*e*k^2*z - 4992*a^5*b^4*c^5*e*k^2*z + 4560*a^2*b^7*c^5*d^2$
 $*1*z + 1536*a^5*b^2*c^7*f^2*j*z + 672*a^4*b^6*c^4*e*k^2*z - 384*a^4*b^4*c^6$
 $*f^2*j*z - 32*a^3*b^8*c^3*e*k^2*z + 32*a^3*b^6*c^5*f^2*j*z + 768*a^5*b^3*c^$
 $6*g*h^2*z - 192*a^4*b^5*c^5*g*h^2*z + 16*a^3*b^7*c^4*g*h^2*z - 15872*a^4*b^$
 $2*c^8*d^2*j*z + 4992*a^3*b^4*c^7*d^2*j*z - 672*a^2*b^6*c^6*d^2*j*z - 1536*a$
 $^5*b^2*c^7*e*h^2*z - 768*a^4*b^3*c^7*f^2*g*z + 384*a^4*b^4*c^6*e*h^2*z + 19$
 $2*a^3*b^5*c^6*f^2*g*z - 32*a^3*b^6*c^5*e*h^2*z - 16*a^2*b^7*c^5*f^2*g*z + 7$
 $936*a^3*b^3*c^8*d^2*g*z - 2496*a^2*b^5*c^7*d^2*g*z + 1536*a^4*b^2*c^8*e*f^2$
 $*z - 384*a^3*b^4*c^7*e*f^2*z + 32*a^2*b^6*c^6*e*f^2*z - 15872*a^3*b^2*c^9*d$
 $^2*e*z + 4992*a^2*b^4*c^8*d^2*e*z - 61440*a^8*b^2*c^4*1^3*z + 21504*a^7*b^4$
 $*c^3*1^3*z - 3328*a^6*b^6*c^2*1^3*z + 432*a^5*b^9*1*m^2*z + 51200*a^9*c^5*j$
 $*m^2*z + 16384*a^8*c^6*j^2*1*z - 288*a^4*b^10*j*m^2*z - 18432*a^8*c^6*j*k^2$
 $*z + 144*a^3*b^11*g*m^2*z + 51200*a^8*c^6*e*m^2*z + 2048*a^7*c^7*h^2*j*z +$
 $16384*a^6*c^8*e^2*1*z + 16*b^11*c^3*d^2*1*z - 18432*a^7*c^7*e*k^2*z - 2048*$
 $a^6*c^8*f^2*j*z + 18432*a^5*c^9*d^2*j*z + 192*a^5*b^8*c^1^3*z + 2048*a^6*c^$
 $8*e*h^2*z - 16*b^9*c^5*d^2*g*z - 2048*a^5*c^9*e*f^2*z + 32*b^8*c^6*d^2*e*z$
 $+ 18432*a^4*c^10*d^2*e*z + 65536*a^9*c^5*1^3*z - 11008*a^8*b*c^3*j*k*1*m -$
 $288*a^6*b^5*c*j*k*1*m + 144*a^5*b^6*c*g*k*1*m - 11008*a^7*b*c^4*e*k*1*m - 5$
 $376*a^7*b*c^4*f*j*1*m + 3840*a^7*b*c^4*g*j*k*m - 3328*a^7*b*c^4*h*j*k*1 - 9$
 $6*a^4*b^7*c*g*j*k*m - 2560*a^7*b*c^4*g*h*1*m - 36*a^3*b^8*c*f*h*k*m - 6912*$
 $a^6*b*c^5*d*j*k*1 - 7872*a^6*b*c^5*d*h*k*m - 7680*a^6*b*c^5*d*g*1*m - 5376*$
 $a^6*b*c^5*e*f*1*m + 3840*a^6*b*c^5*e*g*k*m - 3328*a^6*b*c^5*e*h*k*1 - 1536*$
 $a^6*b*c^5*f*g*k*1 + 1280*a^6*b*c^5*f*g*j*m - 768*a^6*b*c^5*g*h*j*k - 768*a^$
 $6*b*c^5*f*h*j*1 - 768*a^6*b*c^5*e*h*j*m - 36*a^2*b^9*c*d*h*k*m - 6912*a^5*b$
 $*c^6*d*e*k*1 - 4864*a^5*b*c^6*d*e*j*m - 2304*a^5*b*c^6*d*g*j*k - 1792*a^5*b$
 $*c^6*e*f*j*k - 1280*a^5*b*c^6*d*f*j*1 - 4544*a^5*b*c^6*d*f*h*m + 1536*a^5*b$
 $*c^6*d*g*h*1 + 1280*a^5*b*c^6*e*f*g*m - 768*a^5*b*c^6*e*g*h*k - 768*a^5*b*c$
 $^6*e*f*h*1 - 256*a^5*b*c^6*f*g*h*j + 12*a*b^9*c^2*d*f*h*m + 16*a*b^8*c^3*d*$
 $f*g*1 - 4*a*b^8*c^3*d*f*h*k - 2304*a^4*b*c^7*d*e*g*k - 1792*a^4*b*c^7*d*e*h$
 $*j - 1280*a^4*b*c^7*d*e*f*1 - 768*a^4*b*c^7*d*f*g*j - 32*a*b^7*c^4*d*e*f*1$
 $- 256*a^4*b*c^7*e*f*g*h - 768*a^3*b*c^8*d*e*f*g + 32*a*b^5*c^6*d*e*f*g + 12$
 $*a*b^10*c*d*f*k*m + 3648*a^7*b^3*c^2*j*k*1*m + 5504*a^7*b^2*c^3*g*k*1*m - 1$
 $824*a^6*b^4*c^2*g*k*1*m + 384*a^7*b^2*c^3*h*j*1*m - 288*a^6*b^4*c^2*h*j*1*m$
 $- 4800*a^6*b^3*c^3*g*j*k*m + 3648*a^6*b^3*c^3*e*k*1*m + 1280*a^5*b^5*c^2*g$
 $*j*k*m + 1088*a^6*b^3*c^3*f*j*1*m + 576*a^6*b^3*c^3*h*j*k*1 - 288*a^5*b^5*c$
 $^2*e*k*1*m - 192*a^6*b^3*c^3*g*h*1*m + 144*a^5*b^5*c^2*g*h*1*m + 9600*a^6*b$
 $^2*c^4*e*j*k*m - 4224*a^6*b^2*c^4*d*j*1*m - 2560*a^5*b^4*c^3*e*j*k*m + 384*$
 $a^6*b^2*c^4*f*j*k*1 + 224*a^5*b^4*c^3*d*j*1*m + 192*a^4*b^6*c^2*e*j*k*m - 1$
 $60*a^5*b^4*c^3*f*j*k*1 - 4608*a^6*b^2*c^4*f*h*k*m + 2688*a^6*b^2*c^4*f*g*1*$
 $m + 1664*a^6*b^2*c^4*g*h*k*1 - 744*a^5*b^4*c^3*f*h*k*m - 544*a^5*b^4*c^3*f*$
 $g*1*m + 492*a^4*b^6*c^2*f*h*k*m + 416*a^5*b^4*c^3*g*h*j*m + 384*a^6*b^2*c^4$
 $*g*h*j*m + 384*a^6*b^2*c^4*e*h*1*m - 288*a^5*b^4*c^3*g*h*k*1 - 288*a^5*b^4*$
 $c^3*e*h*1*m - 96*a^4*b^6*c^2*g*h*j*m + 2112*a^5*b^3*c^4*d*j*k*1 - 160*a^4*b$
 $^5*c^3*d*j*k*1 + 16992*a^5*b^3*c^4*d*h*k*m - 6252*a^4*b^5*c^3*d*h*k*m - 480$
 $0*a^5*b^3*c^4*e*g*k*m + 2112*a^5*b^3*c^4*d*g*1*m - 1728*a^5*b^3*c^4*f*g*j*m$
 $+ 1280*a^4*b^5*c^3*e*g*k*m + 1088*a^5*b^3*c^4*e*f*1*m - 832*a^5*b^3*c^4*e*$
 $h*j*m + 816*a^3*b^7*c^2*d*h*k*m + 576*a^5*b^3*c^4*e*h*k*1 - 448*a^5*b^3*c^4$
 $*f*h*j*1 + 288*a^4*b^5*c^3*f*g*j*m - 192*a^5*b^3*c^4*g*h*j*k - 192*a^5*b^3*$
 $c^4*f*g*k*1 + 192*a^4*b^5*c^3*e*h*j*m - 112*a^4*b^5*c^3*d*g*1*m + 96*a^4*b^$
 $5*c^3*f*h*j*1 - 96*a^3*b^7*c^2*e*g*k*m + 80*a^4*b^5*c^3*f*g*k*1 + 32*a^4*b^$
 $5*c^3*g*h*j*k - 11456*a^5*b^2*c^5*d*f*k*m + 4992*a^5*b^2*c^5*d*h*j*1 - 4608$
 $*a^5*b^2*c^5*e*g*j*1 - 4224*a^5*b^2*c^5*d*e*1*m + 3456*a^5*b^2*c^5*e*f*j*m$
 $+ 3456*a^5*b^2*c^5*d*g*k*1 + 2432*a^5*b^2*c^5*d*g*j*m - 1312*a^4*b^4*c^4*d*$
 $h*j*1 + 1272*a^3*b^6*c^3*d*f*k*m - 1056*a^4*b^4*c^4*d*g*k*1 + 896*a^5*b^2*c$
 $^5*f*g*j*k + 768*a^4*b^4*c^4*e*g*j*1 - 576*a^4*b^4*c^4*e*f*j*m - 480*a^4*b^$
 $4*c^4*d*g*j*m + 384*a^5*b^2*c^5*e*h*j*k + 384*a^5*b^2*c^5*e*f*k*1 - 232*a^2$

$$\begin{aligned}
& *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 - 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^
\end{aligned}$$

$$\begin{aligned}
& 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*k*l^2 - 1424*a^6*b^4*c^2*h*k*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*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*k*l^2 - 5136*a^5*b^4*c^3*d*k*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*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 + 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^
\end{aligned}$$

$$\begin{aligned}
& 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 - 2 \\
& 22*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^1^2*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^1^3 - 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^1^3 - 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^1^3 - 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 + 1 \\
& 28*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^1^2*m - 12800*a^9*c^3*j^1*m^2 - 3840*a^8*c^4*j^2*k \\
& *m + 432*a^6*b^6*j^1*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^1^2*m - 3072*a^8*c^4*h*k^1^2 + 270*a^5*b^7*h*k*m^2 - 216*a^5*b \\
& ^7*g^1*m^2 - 12800*a^8*c^4*e^1*m^2 - 4800*a^8*c^4*f*k*m^2 - 512*a^7*c^5*h^2 \\
& *j^1 - 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^1 - 9216*a^7*c^5*d*k^1^2 - 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^1 - 1024*a^ \\
& 7*c^5*f*h^1^2 + 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^1^3 + 1536*a^7*b*c^4*j^3*l - 1280*a^5*c^7*e^2*f*m + 768*a^5*c^7*e^
\end{aligned}$$

$$\begin{aligned}
& 2*h*k + 256*a^6*c^6*f*h*j^2 + 192*a^6*b^5*c*j^1^3 + 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*1 - 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*1 - \\
& 3072*a^6*c^6*d*f*1^2 - 16*b^8*c^4*d^2*e*1 + 6*b^8*c^4*d^2*f*k - 4608*a^4*c^ \\
& 8*d^2*e*1 + 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*1^3 + 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*1^3 - 2280*a^5*b^6*c*d*m^3 + 1536*a^4*b*c^7*e^3*1 - 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*1^2 - 1920*a^7*b^2*c^3*j^2*1^2 + 768*a^6*b^4*c^2*j^2 \\
& *1^2 + 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*1^2 - 1540*a^5*b^5*c^2*g^2*m^2 + 444*a^5*b^5*c^2*h^2*1^2 - 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*1^2 - 480 \\
& *a^5*b^4*c^3*g^2*1^2 + 198*a^5*b^4*c^3*h^2*k^2 + 192*a^4*b^6*c^2*g^2*1^2 - \\
& 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*1^2 - 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*1^2 + 36*a^3*b^7*c^2*f^2*1^2 - 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*1^2 + 768*a^4*b^4*c^4*e^2*1^2 - 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*1^2 + 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*1^2 + 5628*a^3*b^5*c^4*d^2*1^2 \\
& - 1128*a^2*b^7*c^3*d^2*1^2 + 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*1^2*m^2 - 225*a^6*b^6*k^2*m^2 - 2048* \\
& a^8*c^4*j^2*1^2 - 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*1^2 - 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*1^4 - 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*1^2 + 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*1^4 - 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*1^4 - \\
& 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*
\end{aligned}$$

$$\begin{aligned}
& m^2 - 1600a^7c^5m^2 - 36a^2b^4c^7d^2 + 128a^3b^3c^8e^2 + 128a^5b^2c^6j^2 + 8a^2b^9c^1l^2 + 3072a^6b^2c^5l^2 - 300a^3b^8c^3m^2 + 256a^2b^2c^8d^2 - 32a^2b^3c^7e^2 + 20a^2b^4c^6f^2 - 96a^3b^2c^7f^2 - 8a^2b^5c^5g^2 + 32a^3b^3c^6g^2 + 2a^2b^6c^4h^2 - 4a^3b^4c^5h^2 - 32a^4b^3c^5j^2 + 2a^2b^8c^2k^2 - 40a^3b^6c^3k^2 + 276a^4b^4c^4k^2 - 736a^5b^2c^5k^2 - 136a^3b^7c^2l^2 + 888a^4b^5c^3l^2 - 2656a^5b^3c^4l^2 + 1874a^4b^6c^2m^2 - 5284a^5b^4c^3m^2 + 6144a^6b^2c^4m^2 - 384a^4c^8d^2h + 1920a^5c^7d^2m - 1024a^5c^7e^2l + 384a^5c^7f^2k + 640a^6c^6h^2m - 1024a^6c^6j^2l + 4a^2b^5c^6d^2f + 320a^3b^3c^8d^2f + 64a^4b^2c^7f^2h + 576a^4b^2c^7d^2k + 256a^4b^2c^7e^2j - 1472a^5b^2c^6f^2m + 512a^5b^2c^6g^2l + 64a^5b^2c^6h^2k - 12a^2b^9c^2k^2m - 3776a^6b^2c^5k^2m - 96a^2b^3c^7d^2f + 8a^2b^4c^6d^2h + 32a^2b^4c^6e^2g + 64a^3b^2c^7d^2h - 128a^3b^2c^7e^2g - 12a^2b^5c^5f^2h + 32a^3b^3c^6f^2h + 20a^2b^5c^5d^2k - 224a^3b^3c^6d^2k - 64a^3b^3c^6e^2j - 60a^2b^6c^4d^2m - 12a^2b^6c^4f^2k + 632a^3b^4c^5d^2m - 32a^3b^4c^5e^2l + 152a^3b^4c^5f^2k + 32a^3b^4c^5g^2j - 2048a^4b^2c^6d^2m + 384a^4b^2c^6e^2l - 512a^4b^2c^6f^2k - 128a^4b^2c^6g^2j + 36a^2b^7c^3f^2m + 4a^2b^7c^3h^2k - 396a^3b^5c^4f^2m + 16a^3b^5c^4g^2l - 44a^3b^5c^4h^2k + 1376a^4b^3c^5f^2m - 192a^4b^3c^5g^2l + 96a^4b^3c^5h^2k - 12a^2b^8c^2h^2m + 112a^3b^6c^3h^2m - 248a^4b^4c^4h^2m - 192a^5b^2c^5h^2m - 32a^4b^4c^4j^2l + 384a^5b^2c^5j^2l + 220a^3b^7c^2k^2m - 1436a^4b^5c^3k^2m + 3936a^5b^3c^4k^2m)/(4*(64a^5c^6 - a^2b^6c^3 + 12a^3b^4c^4 - 48a^4b^2c^5))) - (5b^3c^7d^3 + 8a^3c^7f^3 + 216a^6c^4k^3 - 63a^5b^5m^3 - 96a^2c^8d^2e^2 + 72a^2c^8d^2f - 4a^4b^2c^5h^3 - 3b^4c^6d^2f - 32a^3c^7e^2h + b^5c^5d^2h - 96a^4c^6d^2j^2 + 8a^4c^6f^2h^2 + 216a^3c^7d^2k + 573a^6b^3c^3m^3 - 1300a^7b^2c^2m^3 + 384a^5c^5d^2l^2 + b^6c^4d^2k + 72a^4c^6f^2k + 216a^5c^5f^2k^2 + 9a^2b^8f^2m^2 + 160a^4c^6e^2m - 32a^5c^5h^2j^2 - 3b^7c^3d^2m + 24a^5c^5h^2k + 200a^6c^4f^2m^2 - 27a^3b^7h^2m^2 + 128a^6c^4h^2l^2 + 45a^4b^6k^2m^2 + 160a^6c^4j^2m + 600a^7c^3k^2m^2 - 640a^7c^3l^2m + 6a^2b^2c^6f^3 - 3a^3b^3c^4h^3 + 5a^4b^4c^2k^3 - 66a^5b^2c^3k^3 - 36a^2b^9d^3 + 9a^2b^9d^3m^2 + 4a^2b^8c^2d^2l^2 + 48a^3c^7d^2f^2h - 192a^3c^7d^2e^2j - 240a^4c^6d^2f^2m + 144a^4c^6d^2h^2k - 128a^4c^6e^2f^2l - 64a^4c^6e^2h^2j - 80a^5c^5f^2h^2m - 720a^5c^5d^2k^2m + 320a^5c^5e^2j^2m - 384a^5c^5e^2k^2l - 128a^5c^5f^2j^2l - 240a^6c^4h^2k^2m - 384a^6c^4j^2k^2l + 16a^2b^2c^7d^2e^2 + 18a^2b^2c^7d^2f^2 + 3a^2b^3c^6d^2f^2 - 60a^2b^3c^7d^2f^2 + 4a^2b^4c^5d^2g^2 + 16a^2b^3c^7e^2f^2 - a^2b^3c^6d^2h^2 + a^2b^5c^4d^2h^2 - 60a^2b^3c^7d^2h^2 - 28a^3b^3c^6d^2h^2 - 28a^3b^3c^6f^2h^2 - 10a^2b^4c^5d^2k^2 + a^2b^7c^2d^2k^2 - 396a^4b^2c^5d^2k^2 + 16a^3b^2c^6e^2k^2 + 16a^4b^2c^5f^2j^2 + 25a^2b^5c^4d^2m^2 - 159a^2b^7c^2d^2m^2 - 348a^3b^2c^6d^2m + 1460a^5b^2c^4d^2m^2 + 4a^2b^7c^2f^2l^2 + 128a^5b^2c^4f^2l^2 - 78a^3b^6c^2f^2m^2 - 76a^4b^2c^5f^2m^2 - 204a^5b^2c^4h^2k^2 - 12a^3b^6c^2h^2l^2 + 279a^4b^5c^2h^2m^2 - 12a^5b^2c^4h^2m^2 + 16a^5b^2c^4j^2k^2 + 420a^6b^2c^3h^2m^2 + 20a^4b^5c^2k^2l^2 + 512a^6b^2c^3k^2l^2 - 30a^4b^5c^2k^2m - 402a^5b^4c^2k^2m^2 - 924a^6b^2c^3k^2m^2 - 28a^5b^4c^2l^2m - 24a^2b^2c^6d^2g^2 - 9a^2b^3c^5d^2h^2 + 4a^2b^3c^5f^2g^2 - 5a^2b^3c^5f^2h^2 + a^2b^4c^4f^2h^2 + 16a^3b^2c^5d^2j^2 + 18a^3b^2c^5f^2h^2 - 6a^2b^2c^6d^2k^2 - 21a^2b^5c^3d^2k^2 - 8a^3b^2c^5g^2h^2 + 155a^3b^3c^4d^2k^2 - 72a^2b^6c^2d^2l^2 + 436a^3b^4c^3d^2l^2 - 952a^4b^2c^4d^2l^2 + 23a^2b^3c^5d^2m - 5a^2b^4c^4f^2k^2 + a^2b^6c^2f^2k^2 + 26a^3b^2c^5f^2k^2 - 12a^3b^4c^3f^2k^2 + 970a^3b^5c^2d^2m^2 + 2a^4b^2c^4f^2k^2 - 2289a^4b^3c^3d^2m^2 - 48a^3b^2c^5e^2m^2 + 4a^3b^3c^4g^2k^2 - 36a^3b^5c^2f^2l^2 + 52a^4b^3c^3f^2l^2 + 15a^2b^5c^3f^2m - 53a^3b^3c^4f^2m - 6a^3b^4c^3h^2k^2 - 3a^3b^5c^2h^2k^2 + 42a^4b^2c^4h^2k^2 + 51a^4b^3c^3h^2k^2 + 133a^4b^4c^2f^2m^2 + 114a^5b^2c^3f^2m^2 - 12a^3b^4c^3g^2m^2 + 40a^4b^2c^4g^2m^2 + 128a^4b^4c^2h^2l^2 - 360a^5b^2c^3h^2l^2 + 18a^3b^5c^2h^2m - 81a^4b^3c^3h^2m - 801a^5b^3c^2h^2m - 48a^5b^2c^3j^2m - 204a^5b^3c^2
\end{aligned}$$

$$\begin{aligned}
& ^2*k^1^2 + 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*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*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*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*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^1^3 - 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*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^1*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^1^2 + 24*a^3*b^2*c^5*g^2*j \\
& - 88*a^3*b^4*c^3*e^1^2 + 216*a^4*b^2*c^4*e^1^2 - 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* \\
& 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^1^2 - 108*a^4*b^3*c^3*g^1^2 - 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^1^2 - 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*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^1*m - 120*a^5*b*c^4*g
\end{aligned}$$

$$\begin{aligned}
& *k*m + 64*a^5*b*c^4*h*j*m + 56*a^5*b*c^4*h*k*1 - 12*a^3*b^6*c*j*k*m + 18*a^4 \\
& 4*b^5*c*k*1*m + 584*a^6*b*c^3*k*1*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*1 - 10*a^2*b^3*c^5*d*g*k - 12*a^2 \\
& 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*1 + 36*a^2*b^4*c^4 \\
& *e*f*m - 32*a^2*b^4*c^4*e*g*1 + 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*1 - 180*a^3*b^2*c^5*e*f*m + 1 \\
& 76*a^3*b^2*c^5*e*g*1 - 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*1 + 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*1 + 64*a^3*b^3*c^4*e*j*1 - 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*1 \\
& + 4*a^3*b^4*c^3*h*j*k + 104*a^4*b^2*c^4*d*1*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*1 + 176*a^4*b^2*c^4*g*j*1 - 20*a^4*b^2 \\
& ^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*1*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*1 \\
& + 18*a^4*b^4*c^2*h*1*m - 48*a^5*b^2*c^3*h*1*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*1*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 \\
& 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*1*z^3 + 983040*a^7*b^4*c^7*1*z^3 - 327680*a^6*b^6*c^6*1*z^3 + 61440 \\
& *a^5*b^8*c^5*1*z^3 - 6144*a^4*b^10*c^4*1*z^3 + 256*a^3*b^12*c^3*1*z^3 + 104 \\
& 8576*a^9*c^9*1*z^3 + 96*a^3*b^12*c*k*m*z^2 + 98304*a^8*b*c^7*j*1*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*1*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*1*z^2 + 3 \\
& 0720*a^6*b^5*c^5*j*1*z^2 - 4608*a^5*b^7*c^4*j*1*z^2 + 256*a^4*b^9*c^3*j*1*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*1*z^2 + \\
& 45056*a^6*b^4*c^6*g*1*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*1*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*1*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*1*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 \\
& *1*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*1*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*1*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*1*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*1^2*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
\end{aligned}$$

$096a^8b^2c^6l^2z^2 - 288768a^7b^4c^5l^2z^2 + 88576a^6b^6c^4l^2z^2 - 15744a^5b^8c^3l^2z^2 + 1536a^4b^{10}c^2l^2z^2 - 61440a^7b^3c^6k^2z^2 + 24064a^6b^5c^5k^2z^2 - 4608a^5b^7c^4k^2z^2 + 432a^4b^9c^3k^2z^2 - 16a^3b^{11}c^2k^2z^2 + 24576a^7b^2c^7j^2z^2 - 6144a^6b^4c^6j^2z^2 + 512a^5b^6c^5j^2z^2 - 8192a^6b^3c^7h^2z^2 + 1536a^5b^5c^6h^2z^2 - 16a^3b^9c^4h^2z^2 - 8192a^6b^2c^8g^2z^2 + 6144a^5b^4c^7g^2z^2 - 1536a^4b^6c^6g^2z^2 + 128a^3b^8c^5g^2z^2 - 8192a^5b^3c^8f^2z^2 + 1536a^4b^5c^7f^2z^2 - 16a^2b^9c^5f^2z^2 + 24576a^5b^2c^9e^2z^2 - 6144a^4b^4c^8e^2z^2 + 512a^3b^6c^7e^2z^2 - 61440a^4b^3c^9d^2z^2 + 24064a^3b^5c^8d^2z^2 - 4608a^2b^7c^7d^2z^2 - 393216a^9c^7l^2z^2 - 144a^3b^{13}m^2z^2 - 32768a^8c^8j^2z^2 - 32768a^6c^{10}e^2z^2 - 16b^{11}c^5d^2z^2 + 18432a^8b^2c^5h^2l^2m^2z - 96a^3b^{10}c^5g^2k^2m^2z + 90112a^7b^2c^6e^2k^2m^2z + 36864a^7b^2c^6f^2j^2m^2z - 16384a^7b^2c^6g^2j^2l^2z + 14336a^7b^2c^6d^2l^2m^2z - 10240a^7b^2c^6f^2k^2l^2z + 4096a^7b^2c^6h^2j^2k^2z + 10240a^7b^2c^6g^2h^2m^2z - 47104a^6b^2c^7d^2h^2l^2z + 36864a^6b^2c^7e^2f^2m^2z + 30720a^6b^2c^7d^2g^2m^2z - 16384a^6b^2c^7e^2g^2l^2z + 6144a^6b^2c^7f^2g^2k^2z + 4096a^6b^2c^7e^2h^2k^2z + 32a^2b^{10}c^3d^2f^2l^2z - 4096a^5b^2c^8d^2f^2j^2z - 6144a^5b^2c^8d^2g^2h^2z - 32a^2b^8c^5d^2f^2g^2z - 4096a^4b^2c^9d^2e^2f^2z + 64a^2b^7c^6d^2e^2f^2z + 110592a^8b^2c^4k^2l^2m^2z - 36864a^7b^4c^3k^2l^2m^2z + 5376a^6b^6c^2k^2l^2m^2z - 79872a^7b^3c^4j^2k^2m^2z + 26112a^6b^5c^3j^2k^2m^2z - 3712a^5b^7c^2j^2k^2m^2z - 13824a^7b^3c^4h^2l^2m^2z + 3456a^6b^5c^3h^2l^2m^2z - 288a^5b^7c^2h^2l^2m^2z - 45056a^7b^2c^5g^2k^2m^2z + 39936a^6b^4c^4g^2k^2m^2z + 30720a^7b^2c^5f^2l^2m^2z - 18432a^7b^2c^5h^2k^2l^2z - 13056a^5b^6c^3g^2k^2m^2z - 7680a^6b^4c^4f^2l^2m^2z + 5376a^6b^4c^4h^2j^2m^2z + 4608a^6b^4c^4h^2k^2l^2z + 3072a^7b^2c^5h^2j^2m^2z - 1984a^5b^6c^3h^2j^2m^2z + 1856a^4b^8c^2g^2k^2m^2z + 640a^5b^6c^3f^2l^2m^2z - 384a^5b^6c^3h^2k^2l^2z + 192a^4b^8c^2h^2j^2m^2z - 79872a^6b^3c^5e^2k^2m^2z - 27648a^6b^3c^5f^2j^2m^2z + 26112a^5b^5c^4e^2k^2m^2z + 12288a^6b^3c^5g^2j^2l^2z - 10752a^6b^3c^5d^2l^2m^2z + 7680a^6b^3c^5f^2k^2l^2z + 6912a^5b^5c^4f^2j^2m^2z - 3712a^4b^7c^3e^2k^2m^2z - 3072a^6b^3c^5h^2j^2k^2z - 3072a^5b^5c^4g^2j^2l^2z + 2688a^5b^5c^4d^2l^2m^2z - 1920a^5b^5c^4f^2k^2l^2z + 768a^5b^5c^4h^2j^2k^2z - 576a^4b^7c^3f^2j^2m^2z + 256a^4b^7c^3g^2j^2l^2z - 224a^4b^7c^3d^2l^2m^2z + 192a^3b^9c^2e^2k^2m^2z + 160a^4b^7c^3f^2k^2l^2z - 64a^4b^7c^3h^2j^2k^2z - 2688a^5b^5c^4g^2h^2m^2z - 1536a^6b^3c^5g^2h^2m^2z + 992a^4b^7c^3g^2h^2m^2z - 96a^3b^9c^2g^2h^2m^2z - 65536a^6b^2c^6d^2k^2l^2z + 46080a^6b^2c^6d^2j^2m^2z - 24576a^6b^2c^6e^2j^2l^2z + 21504a^5b^4c^5d^2k^2l^2z - 11520a^5b^4c^5d^2j^2m^2z + 9216a^6b^2c^6f^2j^2k^2z + 6144a^5b^4c^5e^2j^2l^2z - 3072a^4b^6c^4d^2k^2l^2z - 2304a^5b^4c^5f^2j^2k^2z + 960a^4b^6c^4d^2j^2m^2z - 512a^4b^6c^4e^2j^2l^2z + 192a^4b^6c^4f^2j^2k^2z + 160a^3b^8c^3d^2k^2l^2z - 18432a^6b^2c^6f^2g^2m^2z + 13824a^5b^4c^5f^2g^2m^2z + 5376a^5b^4c^5e^2h^2m^2z - 3456a^4b^6c^4f^2g^2m^2z + 3072a^6b^2c^6e^2h^2m^2z - 3072a^5b^4c^5f^2h^2l^2z - 2048a^6b^2c^6g^2h^2k^2z - 1984a^4b^6c^4e^2h^2m^2z + 1536a^5b^4c^5g^2h^2k^2z + 1024a^4b^6c^4f^2h^2l^2z - 384a^4b^6c^4g^2h^2k^2z + 288a^3b^8c^3f^2g^2m^2z + 192a^3b^8c^3e^2h^2m^2z - 96a^3b^8c^3f^2h^2l^2z + 32a^3b^8c^3g^2h^2k^2z + 41472a^5b^3c^6d^2h^2l^2z - 27648a^5b^3c^6e^2f^2m^2z - 23040a^5b^3c^6d^2g^2m^2z - 13440a^4b^5c^5d^2h^2l^2z + 12288a^5b^3c^6e^2g^2l^2z + 6912a^4b^5c^5e^2f^2m^2z + 5760a^4b^5c^5d^2g^2m^2z - 4608a^5b^3c^6f^2g^2k^2z - 3072a^5b^3c^6e^2h^2k^2z - 3072a^4b^5c^5e^2g^2l^2z + 1888a^3b^7c^4d^2h^2l^2z + 1152a^4b^5c^5f^2g^2k^2z + 768a^4b^5c^5e^2h^2k^2z - 576a^3b^7c^4e^2f^2m^2z - 480a^3b^7c^4d^2g^2m^2z + 256a^3b^7c^4e^2g^2l^2z - 96a^3b^7c^4f^2g^2k^2z - 96a^2b^9c^3d^2h^2l^2z - 64a^3b^7c^4e^2h^2k^2z + 46080a^5b^2c^7d^2e^2m^2z - 11520a^4b^4c^6d^2e^2m^2z + 9216a^5b^2c^7e^2f^2k^2z - 9216a^5b^2c^7d^2h^2j^2z - 6656a^4b^4c^6d^2f^2l^2z - 6144a^5b^2c^7d^2f^2l^2z + 3456a^3b^6c^5d^2f^2l^2z - 2304a^4b^4c^6e^2f^2k^2z + 2304a^4b^4c^6d^2h^2j^2z + 960a^3b^6c^5d^2e^2m^2z - 576a^2b^8c^4d^2f^2l^2z + 192a^3b^6c^5e^2f^2k^2z - 192a^3b^6c^5d^2h^2j^2z + 3072a^4b^3c^7d^2f^2j^2z - 768a^3b^5c^6d^2f^2j^2z + 64a^2b^7c^5d^2f^2j^2z + 4608a^4b^3c^7d^2g^2h^2z - 1152a^3b^5c^6d^2g^2h^2z + 96a^2b^$

$$\begin{aligned}
& ^7c^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^1^3*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
\end{aligned}$$

$$\begin{aligned}
& 68a^6b^5c^5g^hjk - 768a^6b^5c^5f^hjk - 768a^6b^5c^5e^hjk - 36a^2b^9c^5d^5g^hjk - 6912a^5b^5c^6d^5e^5k - 4864a^5b^5c^6d^5e^5j - 2304a^5b^5c^6d^5g^5j - 1792a^5b^5c^6e^5f^5j - 1280a^5b^5c^6d^5f^5j - 4544a^5b^5c^6d^5f^5h + 1536a^5b^5c^6d^5g^5h + 1280a^5b^5c^6e^5f^5g - 768a^5b^5c^6e^5g^5h - 768a^5b^5c^6e^5f^5h - 256a^5b^5c^6f^5g^5h + 12a^5b^9c^2d^5f^5h + 16a^5b^8c^3d^5f^5g - 4a^5b^8c^3d^5f^5h - 2304a^4b^5c^7d^5e^5g - 1792a^4b^5c^7d^5e^5h - 1280a^4b^5c^7d^5e^5f - 768a^4b^5c^7d^5f^5g - 32a^5b^7c^4d^5e^5f - 256a^4b^5c^7e^5f^5g - 768a^3b^5c^8d^5e^5f + 32a^5b^5c^6d^5e^5f + 12a^5b^10c^5d^5f^5k + 3648a^7b^3c^2j^5k - 5504a^7b^2c^3g^5k - 1824a^6b^4c^2g^5k + 384a^7b^2c^3h^5j - 288a^6b^4c^2h^5j - 4800a^6b^3c^3g^5j - 3648a^6b^3c^3e^5k + 1280a^5b^5c^2g^5j - 1088a^6b^3c^3f^5j + 576a^6b^3c^3h^5j - 288a^5b^5c^2e^5k - 192a^6b^3c^3g^5h + 144a^5b^5c^2g^5h + 9600a^6b^2c^4e^5j - 4224a^6b^2c^4d^5j - 2560a^5b^4c^3e^5j + 384a^6b^2c^4f^5j + 224a^5b^4c^3d^5j + 192a^4b^6c^2e^5j - 160a^5b^4c^3f^5j - 4608a^6b^2c^4f^5h + 2688a^6b^2c^4f^5g + 1664a^6b^2c^4g^5h - 744a^5b^4c^3f^5h - 544a^5b^4c^3f^5g + 492a^4b^6c^2f^5h + 416a^5b^4c^3g^5h + 384a^6b^2c^4g^5h + 384a^6b^2c^4e^5h - 288a^5b^4c^3g^5h - 288a^5b^4c^3e^5h - 96a^4b^6c^2g^5h + 2112a^5b^3c^4d^5j - 160a^4b^5c^3d^5j + 16992a^5b^3c^4d^5h - 6252a^4b^5c^3d^5h - 4800a^5b^3c^4e^5g + 2112a^5b^3c^4d^5g - 1728a^5b^3c^4f^5g + 1280a^4b^5c^3e^5g + 1088a^5b^3c^4e^5f - 832a^5b^3c^4e^5h + 816a^3b^7c^2d^5h + 576a^5b^3c^4e^5h - 448a^5b^3c^4f^5h + 288a^4b^5c^3f^5g - 192a^5b^3c^4g^5h - 192a^5b^3c^4f^5g + 192a^4b^5c^3e^5h - 112a^4b^5c^3d^5g + 96a^4b^5c^3f^5h - 96a^3b^7c^2e^5g + 80a^4b^5c^3f^5g + 32a^4b^5c^3g^5h - 11456a^5b^2c^5d^5f - 4992a^5b^2c^5d^5h - 4608a^5b^2c^5e^5g - 4224a^5b^2c^5d^5e - 3456a^5b^2c^5e^5f + 3456a^5b^2c^5d^5g + 2432a^5b^2c^5d^5g - 1312a^4b^4c^4d^5h + 1272a^3b^6c^3d^5f - 1056a^4b^4c^4d^5g + 896a^5b^2c^5f^5g + 768a^4b^4c^4e^5g - 576a^4b^4c^4e^5f - 480a^4b^4c^4d^5g + 384a^5b^2c^5e^5h + 384a^5b^2c^5e^5f - 232a^2b^8c^2d^5f - 224a^4b^4c^4d^5e - 160a^4b^4c^4e^5f - 96a^4b^4c^4f^5g + 96a^3b^6c^3d^5h + 80a^3b^6c^3d^5g - 64a^4b^4c^4e^5h - 24a^4b^4c^4d^5f + 416a^4b^4c^4e^5g + 384a^5b^2c^5f^5g + 384a^5b^2c^5e^5g + 224a^4b^4c^4f^5g - 96a^3b^6c^3e^5g - 48a^3b^6c^3f^5g + 2112a^4b^3c^5d^5e - 960a^4b^3c^5d^5f + 960a^4b^3c^5d^5e - 384a^3b^5c^4d^5f + 320a^4b^3c^5d^5g + 192a^4b^3c^5e^5f - 160a^3b^5c^4d^5e - 32a^2b^7c^3d^5f + 7392a^4b^3c^5d^5f - 2496a^4b^3c^5d^5g - 1728a^4b^3c^5e^5f - 1500a^3b^5c^4d^5f + 656a^3b^5c^4d^5g - 448a^4b^3c^5e^5f + 288a^3b^5c^4e^5f - 192a^4b^3c^5f^5g - 192a^4b^3c^5e^5g + 96a^3b^5c^4e^5f - 48a^2b^7c^3d^5g + 32a^3b^5c^4e^5g - 16a^2b^7c^3d^5f - 640a^4b^2c^6d^5e - 4992a^4b^2c^6d^5e - 3584a^4b^2c^6d^5f + 2432a^4b^2c^6d^5g - 1312a^3b^4c^5d^5e + 896a^4b^2c^6e^5f + 896a^4b^2c^6d^5g + 640a^4b^2c^6d^5f + 600a^3b^4c^5d^5f + 480a^3b^4c^5d^5g - 480a^3b^4c^5d^5e + 384a^4b^2c^6e^5f - 192a^2b^6c^4d^5f - 96a^3b^4c^5e^5f - 96a^3b^4c^5d^5g + 96a^2b^6c^4d^5e + 12a^2b^6c^4d^5f - 960a^3b^3c^6d^5e - 384a^2b^5c^5d^5e - 320a^3b^3c^6d^5e - 192a^3b^3c^6d^5f + 192a^3b^3c^6d^5h + 32a^2b^5c^5d^5f - 192a^3b^3c^6e^5f + 384a^3b^2c^7d^5e - 64a^2b^4c^6d^5e + 896a^3b^2c^7d^5g - 96a^2b^4c^6d^5g - 192a^2b^3c^7d^5e + 496a^7b^4c^5k - 4752a^7b^4c^5j - 96a^5b^6c^5j - 6144a^8b^3c^5h - 168a^6b^5c^5h - 640a^8b^3c^5g - 2862a^6b^5c^5h - 2376a^6b^5c^5g - 1632a^7b^3c^4h - 480a^8b^3c^5h - 180a^5b^6c^5h + 54a^
\end{aligned}$$

$$\begin{aligned}
& 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 + 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 - 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*
\end{aligned}$$

$$\begin{aligned}
& a^5b^4c^3dk^2l^2 - 3840a^6b^2c^4ej^2l^2 + 1536a^5b^4c^3ej^2l^2 + \\
& 1392a^5b^3c^4f^2h^2m + 1386a^5b^5c^2f^2hm^2 - 768a^5b^3c^4ej^2l^2 + 768a^4b^6c^2dk^2l^2 - 768a^4b^3c^5e^2j^2l^2 - 588a^4b^4c^4f^2hm^2 - 480a^5b^3c^4g^2h^2l^2 + 480a^5b^3c^4dj^2m - 480a^5b^2c^5f^2hm^2 - 128a^4b^6c^2ej^2l^2 + 100a^3b^6c^3f^2hm^2 + 96a^5b^3c^4f^2j^2k + 72a^4b^5c^3g^2h^2l^2 - 54a^4b^5c^3f^2hm^2 - 48a^6b^3c^3f^2hm^2 - 36a^3b^7c^2f^2hm^2 + 6a^2b^8c^2f^2hm^2 + 6848a^4b^2c^6d^2j^2l^2 - 2448a^3b^4c^5d^2j^2l^2 + 624a^5b^4c^3f^2h^2l^2 + 576a^6b^2c^4f^2h^2l^2 + 480a^5b^3c^4ej^2k^2 + 432a^4b^4c^4f^2g^2m - 416a^4b^3c^5e^2hm^2 + 336a^2b^6c^4d^2j^2l^2 - 320a^5b^2c^5f^2g^2m - 256a^4b^6c^2f^2h^2l^2 + 192a^5b^2c^5g^2h^2k + 96a^3b^5c^4e^2hm^2 - 72a^3b^6c^3f^2g^2m + 48a^4b^4c^4g^2h^2k - 32a^4b^5c^3ej^2k^2 - 8a^3b^6c^3g^2h^2k + 24768a^6b^2c^4d^2hm^2 - 21108a^5b^4c^3d^2hm^2 - 10048a^4b^2c^6d^2hm^2 + 7218a^4b^6c^2d^2hm^2 - 6720a^6b^2c^4e^2gm^2 + 6160a^5b^4c^3e^2gm^2 - 2592a^5b^2c^5d^2hm^2 - 1680a^4b^6c^2e^2gm^2 + 1068a^3b^4c^5d^2hm^2 + 960a^5b^2c^5e^2h^2l^2 - 876a^4b^4c^4d^2hm^2 - 864a^5b^2c^5f^2h^2k + 546a^2b^6c^4d^2hm^2 + 432a^3b^6c^3d^2hm^2 + 336a^4b^3c^5f^2h^2k - 320a^5b^2c^5d^2j^2k + 192a^5b^2c^5g^2h^2j + 144a^5b^3c^4f^2h^2k^2 - 144a^4b^4c^4e^2h^2l^2 - 102a^4b^5c^3f^2h^2k^2 - 96a^4b^3c^5f^2g^2l^2 - 36a^2b^8c^2d^2hm^2 - 30a^3b^5c^4f^2h^2k - 24a^3b^5c^4f^2g^2l^2 + 16a^4b^4c^4g^2h^2j - 12a^4b^4c^4f^2h^2k + 12a^3b^6c^3f^2h^2k + 8a^2b^7c^3f^2g^2l^2 + 6a^3b^7c^2f^2h^2k^2 - 2a^2b^7c^3f^2h^2k - 9312a^5b^3c^4d^2hm^2 + 3288a^4b^5c^3d^2hm^2 - 2304a^4b^2c^6e^2g^2l^2 + 1920a^5b^3c^4e^2g^2l^2 + 1728a^4b^2c^6e^2f^2m + 1152a^4b^3c^5e^2g^2l^2 - 768a^4b^5c^3e^2g^2l^2 - 608a^4b^3c^5d^2g^2m - 472a^3b^7c^2d^2hm^2 + 384a^3b^4c^5e^2g^2l^2 - 288a^3b^4c^5e^2f^2m - 224a^4b^3c^5f^2g^2k + 192a^5b^2c^5f^2h^2j^2 + 192a^4b^2c^6e^2h^2k - 192a^3b^5c^4e^2g^2l^2 + 120a^3b^5c^4d^2g^2m + 64a^3b^7c^2e^2g^2l^2 - 32a^3b^4c^5e^2h^2k + 24a^3b^5c^4f^2g^2k + 9936a^3b^3c^6d^2f^2m + 3786a^4b^5c^3d^2f^2m^2 - 3552a^5b^2c^5d^2h^2k^2 - 3486a^2b^5c^5d^2f^2m - 3424a^3b^3c^6d^2g^2l^2 - 1868a^3b^7c^2d^2f^2m^2 + 1332a^4b^4c^4d^2h^2k^2 - 1296a^5b^3c^4d^2f^2m^2 - 1236a^3b^4c^5d^2f^2m + 1224a^2b^5c^5d^2g^2l^2 - 1152a^4b^2c^6d^2f^2m + 960a^5b^2c^5e^2g^2k^2 - 496a^3b^3c^6d^2h^2k + 462a^2b^6c^4d^2f^2m + 432a^4b^3c^5d^2h^2k - 240a^4b^4c^4e^2g^2k^2 - 222a^2b^5c^5d^2h^2k + 192a^4b^2c^6f^2g^2j + 192a^4b^2c^6e^2f^2l^2 - 174a^3b^5c^4d^2h^2k - 156a^3b^6c^3d^2h^2k^2 + 48a^3b^4c^5e^2f^2l^2 - 32a^4b^3c^5e^2h^2j + 16a^3b^6c^3e^2g^2k^2 + 16a^3b^4c^5f^2g^2j - 16a^2b^6c^4e^2f^2l^2 + 12a^2b^7c^3d^2h^2k + 6a^2b^8c^2d^2h^2k^2 + 1728a^5b^2c^5d^2f^2l^2 + 1392a^4b^4c^4d^2f^2l^2 - 840a^3b^6c^3d^2f^2l^2 - 768a^4b^2c^6e^2g^2j + 576a^4b^2c^6d^2g^2k + 480a^3b^3c^6d^2e^2m + 144a^2b^8c^2d^2f^2l^2 + 96a^4b^3c^5d^2h^2j^2 + 96a^3b^3c^6e^2f^2k - 80a^3b^4c^5d^2g^2k + 6848a^3b^2c^7d^2e^2l - 3552a^3b^2c^7d^2f^2k - 2448a^2b^4c^6d^2e^2l + 1332a^2b^4c^6d^2f^2k + 960a^3b^2c^7d^2g^2j - 496a^4b^3c^5d^2f^2k^2 + 432a^3b^3c^6d^2f^2k - 240a^2b^4c^6d^2g^2j - 222a^3b^5c^4d^2f^2k^2 - 174a^2b^5c^5d^2f^2k + 64a^4b^2c^6f^2g^2h + 48a^3b^4c^5f^2g^2h + 42a^2b^7c^3d^2f^2k^2 - 32a^3b^3c^6e^2f^2j - 320a^3b^2c^7d^2e^2k + 192a^4b^2c^6e^2g^2h^2 + 192a^4b^2c^6d^2f^2j^2 - 32a^3b^4c^5d^2f^2j^2 + 16a^3b^4c^5e^2g^2h^2 + 480a^2b^3c^7d^2e^2j - 224a^3b^3c^6d^2g^2h + 192a^3b^2c^7e^2f^2h + 24a^2b^5c^5d^2g^2h - 864a^3b^2c^7d^2f^2h + 336a^3b^3c^6d^2f^2h^2 + 192a^3b^2c^7e^2f^2g + 144a^2b^3c^7d^2f^2h - 30a^2b^5c^5d^2f^2h^2 + 16a^2b^4c^6e^2f^2g - 12a^2b^4c^6d^2f^2h + 192a^3b^2c^7d^2f^2g^2 + 96a^2b^3c^7d^2e^2h + 48a^2b^4c^6d^2f^2g^2 + 960a^2b^2c^8d^2e^2g + 192a^2b^2c^8d^2e^2f - 7680a^9b^2c^2l^2m^2 + 3152a^8b^3c^2l^2m^2 + 2070a^7b^4c^2k^2m^2 - 1840a^7b^3c^2k^3m + 6720a^8b^2c^3j^2m^2 - 3072a^8b^2c^3k^2l^2 + 1680a^6b^5c^2j^2m^2 - 100a^6b^5c^2k^2l^2 - 2176a^7b^3c^2j^2l^3 - 256a^6b^3c^3j^3l - 64a^5b^6c^2j^2l^2 - 12480a^8b^2c^2h^2m^3 + 972a^5b^6c^2h^2m^2 - 960a^7b^2c^2
\end{aligned}$$

$$\begin{aligned}
&^4j^2k^2 - 252a^5b^4c^3h^3m - 192a^6b^2c^4h^3m + 54a^4b^6c^2 \\
&*h^3m + 1536a^7b^2c^4h^2l^2 + 420a^4b^7c^2g^2m^2 - 36a^4b^7c^2h^2* \\
&l^2 - 3072a^7b^2c^3g^1l^3 + 2096a^7b^3c^2f^1m^3 + 1088a^6b^4c^2g^* \\
&l^3 - 496a^6b^3c^3h^2k^3 - 192a^4b^4c^4g^3l + 176a^4b^3c^5f^3m \\
&+ 144a^5b^3c^4h^3k + 78a^3b^8c^2f^2m^2 + 54a^3b^5c^4f^3m + 32 \\
&*a^3b^6c^3g^3l + 30a^5b^5c^2h^2k^3 - 18a^4b^5c^3h^3k - 18a^2b \\
&^7c^3f^3m - 16a^3b^8c^2g^2l^2 + 6720a^6b^2c^5e^2m^2 - 192a^6b^2c^ \\
&5h^2j^2 - 4a^2b^9c^2f^2l^2 - 35040a^7b^2c^3d^2m^3 + 14300a^6b^4c \\
&^2d^2m^3 - 12000a^3b^2c^7d^3m + 4380a^2b^4c^6d^3m - 2176a^6b^3* \\
&c^3e^1l^3 - 256a^3b^3c^6e^3l - 192a^6b^2c^4f^2k^3 + 192a^5b^5c^2 \\
&*e^1l^3 - 192a^4b^2c^6f^3k + 132a^5b^4c^3f^2k^3 + 128a^4b^3c^5g^ \\
&^3j - 28a^3b^4c^5f^3k - 10a^4b^6c^2f^2k^3 + 6a^2b^6c^4f^3k + 1 \\
&0752a^5b^2c^6d^2l^2 - 960a^5b^2c^6e^2k^2 - 192a^5b^2c^6f^2j^2 + 10 \\
&8a^2b^9c^2d^2l^2 - 1680a^5b^3c^4d^2k^3 - 1680a^2b^3c^7d^3k + 222 \\
&*a^4b^5c^3d^2k^3 + 30a^2b^8c^3d^2k^2 - 10a^3b^7c^2d^2k^3 - 960a^4* \\
&b^2c^7d^2j^2 + 80a^4b^3c^5f^2h^3 + 80a^3b^3c^6f^3h + 6a^3b^5c^4 \\
&*f^2h^3 + 6a^2b^5c^5f^3h - 192a^4b^2c^7e^2h^2 - 192a^4b^2c^6d^2h^ \\
&^3 - 192a^2b^2c^8d^3h + 128a^3b^3c^6e^2g^3 - 28a^3b^4c^5d^2h^3 + \\
&12a^2b^6c^5d^2h^2 + 6a^2b^6c^4d^2h^3 - 192a^3b^2c^8e^2f^2 + 60a^2b \\
&^5c^6d^2g^2 + 198a^2b^4c^7d^2f^2 + 144a^2b^3c^7d^2f^3 - 960a^2b^* \\
&c^9d^2e^2 + 240a^2b^3c^8d^2e^2 + 15360a^9c^3k^1l^2m - 12800a^9c^3 \\
&*j^1m^2 - 3840a^8c^4j^2k^m + 432a^6b^6j^1m^2 + 4608a^8c^4j^2k^2* \\
&l + 2880a^8c^4h^2k^2m + 5120a^8c^4f^1l^2m - 3072a^8c^4h^2k^1l^2 + 27 \\
&0a^5b^7h^2k^2m^2 - 216a^5b^7g^1m^2 - 12800a^8c^4e^1m^2 - 4800a^8* \\
&c^4f^2k^2m^2 - 512a^7c^5h^2j^1l - 3840a^6c^6e^2k^2m - 1280a^7c^5f^j \\
&^2m + 768a^7c^5h^2j^2k + 144a^4b^8g^2j^2m^2 - 90a^4b^8f^2k^2m^2 + 864 \\
&0a^7c^5d^2k^2m + 4608a^7c^5e^2k^2l + 512a^6c^6f^2j^1l - 9216a^7c^ \\
&^5d^2k^1l^2 - 4096a^7c^5e^2j^1l^2 + 320a^6c^6f^2h^2m - 90a^3b^9d^2k^2m^ \\
&^2 + 15200a^9b^2c^2k^2m^3 - 6192a^8b^3c^2k^2m^3 + 5472a^8b^3c^3k^3m - 4 \\
&608a^5c^7d^2j^1l - 1024a^7c^5f^2h^1l^2 + 150a^6b^5c^2k^3m + 54a^3b \\
&^9f^2h^2m^2 + 6b^10c^2d^2h^2m - 14400a^7c^5d^2h^2m^2 + 8640a^5c^7d^2* \\
&h^2m + 2880a^6c^6d^2h^2m + 2304a^6c^6d^2j^2k - 512a^6c^6e^2h^2l - 1 \\
&92a^6c^6f^2h^2k + 6144a^8b^2c^3j^1l^3 + 1536a^7b^2c^4j^3l - 1280a^5 \\
&*c^7e^2f^2m + 768a^5c^7e^2h^2k + 256a^6c^6f^2h^2j^2 + 192a^6b^5c^2j^* \\
&l^3 + 54a^2b^10d^2h^2m^2 - 18b^9c^3d^2f^2m + 8b^9c^3d^2g^1l - 2b^9* \\
&c^3d^2h^2k + 4068a^7b^4c^2h^2m^3 - 1728a^6c^6d^2h^2k^2 + 960a^5c^7d^2f \\
&^2m + 512a^5c^7e^2f^2l - 3072a^6c^6d^2f^1l^2 - 16b^8c^4d^2e^1l + 6* \\
&b^8c^4d^2f^2k - 4608a^4c^8d^2e^1l + 2400a^8b^2c^3f^2m^3 + 2016a^7b^* \\
&c^4h^2k^3 - 1728a^4c^8d^2f^2k - 1146a^6b^5c^2f^2m^3 + 224a^6b^2c^5h^3 \\
&*k - 96a^5b^6c^2g^1l^3 + 96a^5b^2c^6f^3m + 2304a^4c^8d^2e^2k + 768a \\
&^5c^7d^2f^2j^2 + 6144a^7b^2c^4e^1l^3 - 2280a^5b^6c^2d^2m^3 + 1536a^4b^2c \\
&^7e^3l - 616a^2b^6c^5d^3m + 512a^6b^2c^5g^2j^3 + 256a^4c^8e^2f^2h \\
&+ 240a^2b^10c^2d^2m^2 + 6b^7c^5d^2f^2h - 192a^4c^8d^2f^2h + 4320a^6 \\
&*b^2c^5d^2k^3 + 4320a^3b^2c^8d^3k + 222a^2b^5c^6d^3k + 16b^6c^6d^2* \\
&e^2g + 96a^5b^2c^6f^2h^3 + 96a^4b^2c^7f^3h + 768a^3c^9d^2e^2f + 512a \\
&^3b^2c^8e^3g + 132a^2b^4c^7d^3h + 2016a^2b^2c^9d^3f - 496a^2b^3c^8 \\
&*d^3f + 224a^3b^2c^8d^2f^3 - 18a^2b^5c^6d^2f^3 - 3264a^8b^2c^2k^2m^ \\
&^2 - 6160a^7b^3c^2j^2m^2 + 1104a^7b^3c^2k^2l^2 - 1920a^7b^2c^3* \\
&j^2l^2 + 768a^6b^4c^2j^2l^2 + 3888a^7b^2c^3h^2m^2 - 3510a^6b^4 \\
&*c^2h^2m^2 + 240a^6b^3c^3j^2k^2 - 16a^5b^5c^2j^2k^2 + 1680a^6* \\
&b^3c^3g^2m^2 - 1648a^6b^3c^3h^2l^2 - 1540a^5b^5c^2g^2m^2 + 444 \\
&*a^5b^5c^2h^2l^2 - 960a^6b^2c^4h^2k^2 - 576a^6b^2c^4f^2m^2 - \\
&512a^6b^2c^4g^2l^2 - 480a^5b^4c^3g^2l^2 + 198a^5b^4c^3h^2k^2 \\
&+ 192a^4b^6c^2g^2l^2 - 186a^5b^4c^3f^2m^2 - 97a^4b^6c^2f^2m^ \\
&^2 - 9a^4b^6c^2h^2k^2 - 6160a^5b^3c^4e^2m^2 + 1680a^4b^5c^3e^ \\
&^2m^2 - 240a^5b^3c^4g^2k^2 - 240a^5b^3c^4f^2l^2 - 144a^3b^7c^2 \\
&*e^2m^2 + 60a^4b^5c^3g^2k^2 - 36a^4b^5c^3f^2l^2 + 36a^3b^7c^2 \\
&*f^2l^2 - 16a^5b^3c^4h^2j^2 - 4a^3b^7c^2g^2k^2 + 38512a^5b^2c \\
&^5d^2m^2 - 32310a^4b^4c^4d^2m^2 + 12720a^3b^6c^3d^2m^2 - 2500a
\end{aligned}$$

$$\begin{aligned}
& ^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 \\
& 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
\end{aligned}$$

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+1*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

$$3.42 \quad \int \frac{d+ex}{(4-5x^2+x^4)^3} dx$$

Optimal. Leaf size=143

$$-\frac{dx(59-35x^2)}{3456(x^4-5x^2+4)} + \frac{dx(17-5x^2)}{144(x^4-5x^2+4)^2} - \frac{313d \tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{13}{648}d \tanh^{-1}(x) - \frac{1}{81}e \log(1-x^2) + \frac{1}{81}e \log(4-x^2)$$

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}

$$-\frac{dx(59-35x^2)}{3456(x^4-5x^2+4)} + \frac{dx(17-5x^2)}{144(x^4-5x^2+4)^2} - \frac{313d \tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{13}{648}d \tanh^{-1}(x) - \frac{e(5-2x^2)}{54(x^4-5x^2+4)} + \frac{e(5-2x^2)}{36(x^4-5x^2+4)^2} - \frac{1}{81}e \log(1-x^2) + \frac{1}{81}e \log(4-x^2)$$

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] && !MatchQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[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

$- 4ac) + b^2c(4p + 7)x^2(a + bx^2 + cx^4)^{p+1}, x] /;$ FreeQ[{a, b, c}, x] && NeQ[b^2 - 4ac, 0] && LtQ[p, -1] && IntegerQ[2p]

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 - 4ac, 2]}, Dist[e/2 + (2cd - b^2e)/(2q), Int[1/(b/2 - q/2 + cx^2), x], x] + Dist[e/2 - (2cd - b^2e)/(2q), Int[1/(b/2 + q/2 + cx^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4ac, 0] && NeQ[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4ac]

Rule 1178

Int[((d_) + (e_)*(x_)^2)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Simp[(x*(a*b*e - d*(b^2 - 2ac) - c*(b*d - 2ae)*x^2)*(a + bx^2 + cx^4)^(p+1))/(2a*(p+1)*(b^2 - 4ac)), x] + Dist[1/(2a*(p+1)*(b^2 - 4ac)), Int[Simp[(2p+3)*d*b^2 - a*b*e - 2a*c*d*(4p+5) + (4p+7)*(d*b - 2ae)*c*x^2, x]*(a + bx^2 + cx^4)^(p+1), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4ac, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && LtQ[p, -1] && IntegerQ[2p]

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

$$\begin{aligned}
\int \frac{d+ex}{(4-5x^2+x^4)^3} dx &= \int \frac{d}{(4-5x^2+x^4)^3} dx + \int \frac{ex}{(4-5x^2+x^4)^3} dx \\
&= d \int \frac{1}{(4-5x^2+x^4)^3} dx + e \int \frac{x}{(4-5x^2+x^4)^3} dx \\
&= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} - \frac{1}{144}d \int \frac{-19+25x^2}{(4-5x^2+x^4)^2} dx + \frac{1}{2}e \operatorname{Subst} \left(\int \frac{1}{(4-5x+x^2)^3} dx, \right. \\
&= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} + \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} - \frac{dx(59-35x^2)}{3456(4-5x^2+x^4)} + \frac{d \int \frac{519+105x^2}{4-5x^2+x^4} dx}{10368} \\
&= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} + \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} - \frac{dx(59-35x^2)}{3456(4-5x^2+x^4)} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)} \\
&= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} + \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} - \frac{dx(59-35x^2)}{3456(4-5x^2+x^4)} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)} \\
&= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} + \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} - \frac{dx(59-35x^2)}{3456(4-5x^2+x^4)} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)}
\end{aligned}$$

Mathematica [A] time = 0.10, size = 128, normalized size = 0.90

$$\frac{288(dx(17-5x^2)+e(20-8x^2))}{(x^4-5x^2+4)^2} + \frac{12(dx(35x^2-59)+64e(2x^2-5))}{x^4-5x^2+4} - 32(13d+16e)\log(1-x) + (313d+512e)\log(2-x) + 32(13d-16e)\log(x+1) + (512e-313d)\log(x+2)$$

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)*Log[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

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

$$\int \frac{d+ex}{(4-5x^2+x^4)^3} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x)/(4 - 5*x^2 + x^4)^3, x]

fricas [B] time = 1.35, size = 307, normalized size = 2.15

$$\frac{420d^2x^7 + 1536de x^6 - 2808d^2x^5 - 11520de x^4 + 3780d^2x^3 + 23040de x^2 + 2064d^2x - ((313d - 512e)x^8 - 10(313d - 512e)x^6 + 33(313d - 512e)x^4 - 10(313d - 512e)x^2 + 33(313d - 512e))}{41472(x^4 - 5x^2 + 4)^3}$$

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 + 23040*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 - 10*(313*d - 512*e)*x^2 + 33*(313*d - 512*e))

$$(313*d - 512*e)*x^4 - 40*(313*d - 512*e)*x^2 + 5008*d - 8192*e)*\log(x + 2) + 32*((13*d - 16*e)*x^8 - 10*(13*d - 16*e)*x^6 + 33*(13*d - 16*e)*x^4 - 40*(13*d - 16*e)*x^2 + 208*d - 256*e)*\log(x + 1) - 32*((13*d + 16*e)*x^8 - 10*(13*d + 16*e)*x^6 + 33*(13*d + 16*e)*x^4 - 40*(13*d + 16*e)*x^2 + 208*d + 256*e)*\log(x - 1) + ((313*d + 512*e)*x^8 - 10*(313*d + 512*e)*x^6 + 33*(313*d + 512*e)*x^4 - 40*(313*d + 512*e)*x^2 + 5008*d + 8192*e)*\log(x - 2) - 9600*e)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)$$

giac [A] time = 0.33, size = 123, normalized size = 0.86

$$-\frac{1}{41472}(313d - 512e)\log(x + 2) + \frac{1}{1296}(13d - 16e)\log(x + 1) - \frac{1}{1296}(13d + 16e)\log(x - 1) + \frac{1}{41472}(313d + 512e)\log(x - 2) + \frac{35dx^7 + 128x^6e - 234dx^5 - 960x^4e + 315dx^3 + 1920x^2e + 172dx - 800e}{3456(x^4 - 5x^2 + 4)^2}$$

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(abs(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

$$\frac{313\ln(x+2)}{41472} + \frac{313\ln(x-2)}{41472} - \frac{13\ln(x-1)}{1296} - \frac{13\ln(x+1)}{1296} + \frac{e\ln(x+2)}{81} + \frac{e\ln(x-2)}{81} - \frac{e\ln(x-1)}{81} - \frac{e\ln(x+1)}{81} + \frac{19d}{6912(x-2)} - \frac{d}{3456(x-2)^2} - \frac{d}{432(x+432)} - \frac{d}{432(x+1)^2} - \frac{d}{432(x-432)} - \frac{d}{432(x-1)^2} + \frac{19d}{6912(x+2)} + \frac{d}{3456(x+2)^2} - \frac{d}{3456(x-2)} - \frac{17e}{1728(x-2)^2} - \frac{e}{144(x+1)} - \frac{e}{432(x+1)^2} - \frac{e}{144(x-1)} - \frac{e}{432(x-1)^2} + \frac{17e}{3456(x+2)} - \frac{e}{1728(x+2)^2}$$

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*ln(x+2)+1/81*e*ln(x+2)+19/6912/(x+2)*d-17/3456/(x+2)*e+1/3456/(x+2)^2*d-1/1728/(x+2)^2*e

maxima [A] time = 1.06, size = 121, normalized size = 0.85

$$-\frac{1}{41472}(313d - 512e)\log(x + 2) + \frac{1}{1296}(13d - 16e)\log(x + 1) - \frac{1}{1296}(13d + 16e)\log(x - 1) + \frac{1}{41472}(313d + 512e)\log(x - 2) + \frac{35dx^7 + 128ex^6 - 234dx^5 - 960ex^4 + 315dx^3 + 1920ex^2 + 172dx - 800e}{3456(x^8 - 10x^6 + 33x^4 - 40x^2 + 16)}$$

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) - 1/1296*(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 + 172*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

$$\ln(x + 1) \left(\frac{13d}{1296} - \frac{e}{81} \right) - \ln(x - 1) \left(\frac{13d}{1296} + \frac{e}{81} \right) + \ln(x - 2) \left(\frac{313d}{41472} + \frac{e}{81} \right) - \ln(x + 2) \left(\frac{313d}{41472} - \frac{e}{81} \right) + \frac{35dx^7 + ex^6 - \frac{13dx^5}{192} - \frac{5ex^4}{18} + \frac{35dx^3}{384} + \frac{5ex^2}{9} + \frac{43dx}{864} - \frac{25e}{108}}{x^8 - 10x^6 + 33x^4 - 40x^2 + 16}$$

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

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) \cdot \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) - 19670950215680*e**3*(13*d - 16*e)**2 - 557272006656*e**2*(13*d - 16*e)**3)/(22941256248261*d**5 - 2312740746035200*d**3*e**2 + 4473912813420544*d*e**4)/1296 - (13*d + 16*e) \cdot \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) - 19670950215680*e**3*(13*d + 16*e)**2 + 557272006656*e**2*(13*d + 16*e)**3)/(22941256248261*d**5 - 2312740746035200*d**3*e**2 + 4473912813420544*d*e**4)/1296 - (313*d - 512*e) \cdot \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*(313*d - 512*e)**3/32 + 5035763255214080*e**5 - 4458176053248*e**4*(313*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 + 4473912813420544*d*e**4)/41472 + (313*d + 512*e) \cdot \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*(313*d + 512*e)**3/32 + 5035763255214080*e**5 + 4458176053248*e**4*(313*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 + 4473912813420544*d*e**4)/41472 + (35*d*x**7 - 234*d*x**5 + 315*d*x**3 + 172*d*x + 128*e*x**6 - 960*e*x**4 + 1920*e*x**2 - 800*e)/(3456*x**8 - 34560*x**6 + 114048*x**4 - 138240*x**2 + 55296)$

$$3.43 \quad \int \frac{d+ex+fx^2}{(4-5x^2+x^4)^3} dx$$

Optimal. Leaf size=175

$$-\frac{x(-35x^2(d+4f)+59d+380f)}{3456(x^4-5x^2+4)} + \frac{x(-(x^2(5d+8f))+17d+20f)}{144(x^4-5x^2+4)^2} - \frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{1}{648}(13d+25f)$$

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}

$$-\frac{x(-35x^2(d+4f)+59d+380f)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-5d+8f))+17d+20f}{144(x^4-5x^2+4)^2} - \frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{1}{648}(13d+25f)\tanh^{-1}(x) - \frac{e(5-2x^2)}{54(x^4-5x^2+4)} + \frac{e(5-2x^2)}{36(x^4-5x^2+4)^2} - \frac{1}{81}e\log(1-x^2) + \frac{1}{81}e\log(4-x^2)$$

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 + 820*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] && !MatchQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[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] - 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

$$\begin{aligned}
\int \frac{d + ex + fx^2}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{ex}{(4 - 5x^2 + x^4)^3} dx + \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 5(5d + 8f)x^2}{(4 - 5x^2 + x^4)^2} dx + e \int \frac{x}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} + \frac{\int \frac{3(173d + 260f) + 105(d + 4f)x^2}{4 - 5x^2 + x^4} dx}{10368} \\
&= \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} \\
&= \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{e(5 - 2x^2)}{54(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456} \\
&= \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{e(5 - 2x^2)}{54(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456} \\
&= \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{e(5 - 2x^2)}{54(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456}
\end{aligned}$$

Mathematica [A] time = 0.13, size = 161, normalized size = 0.92

$$\frac{12(dx(35x^2 - 59) + 64(2x^2 - 5) + 20f(x(7x^2 - 19)))}{x^4 - 5x^2 + 4} + \frac{288(-5dx^3 + 17dx + (20 - 8x^2) - 8fx^3 + 20fx)}{(x^4 - 5x^2 + 4)^2} - 32 \log(1 - x)(13d + 16e + 25f) + \log(2 - x)(313d + 512e + 820f) + 32 \log(x + 1)(13d - 16e + 25f) + \log(x + 2)(-313d + 512e - 820f)$$

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

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4)^3, x]

fricas [B] time = 1.41, size = 389, normalized size = 2.22

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 - 512*e + 820*f)*x^8 - 10*(313*d - 512*e + 820*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) + 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) - 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 + 820*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

$$-\frac{1}{41472} (313d + 820f - 512e) \log(x + 2) + \frac{1}{1296} (13d + 25f - 16e) \log(x + 1) - \frac{1}{1296} (13d + 25f + 16e) \log(x - 1) + \frac{1}{41472} (313d + 820f + 512e) \log(x - 2) + \frac{35d^7 + 140fx^7 + 128x^6e - 234d^5x^5 - 1080fx^5 + 960x^4e + 315d^3x^3 + 2268fx^3 + 1920x^2e + 172dx - 1040fx - 800e}{3456(x^4 - 5x^2 + 4)}$$

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 + 128*x^6*e - 234*d*x^5 - 1080*f*x^5 - 960*x^4*e + 315*d*x^3 + 2268*f*x^3 + 1920*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

$$\frac{35d^7 + 140fx^7 + 128x^6e - 234d^5x^5 - 1080fx^5 + 960x^4e + 315d^3x^3 + 2268fx^3 + 1920x^2e + 172dx - 1040fx - 800e}{3456(x^4 - 5x^2 + 4)^2}$$

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*ln(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

$$-\frac{1}{41472}(313d - 512e + 820f)\log(x+2) + \frac{1}{1296}(13d - 16e + 25f)\log(x+1) - \frac{1}{1296}(13d + 16e + 25f)\log(x-1) + \frac{1}{41472}(313d + 512e + 820f)\log(x-2) + \frac{35(d+4f)x^7 + 128ex^6 - 18(13d+60f)x^5 - 960ex^4 + 63(5d+36f)x^3 + 1920ex^2 + 4(43d-260f)x - 800e}{3456(x^8 - 10x^6 + 33x^4 - 40x^2 + 16)}$$

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)*log(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

$$\ln(x+1)\left(\frac{13d}{1296} - \frac{e}{81} + \frac{25f}{1296}\right) - \ln(x-1)\left(\frac{13d}{1296} + \frac{e}{81} + \frac{25f}{1296}\right) + \ln(x-2)\left(\frac{313d}{41472} + \frac{e}{81} + \frac{205f}{10368}\right) - \ln(x+2)\left(\frac{313d}{41472} - \frac{e}{81} + \frac{205f}{10368}\right) + \frac{\left(\frac{35d}{3456} + \frac{35f}{864}\right)x^7 + \frac{ex^6}{27} + \left(-\frac{13d}{192} - \frac{5f}{16}\right)x^5 - \frac{5ex^4}{18} + \left(\frac{35d}{384} + \frac{21f}{32}\right)x^3 + \frac{5ex^2}{9} + \left(\frac{43d}{864} - \frac{65f}{216}\right)x - \frac{25e}{108}}{x^8 - 10x^6 + 33x^4 - 40x^2 + 16}$$

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) - log(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)/216))/(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) - 13490528680832000*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**
```

$$\begin{aligned}
& 2f^{**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 \\
& **2e^{**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 \\
& **4f^{**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} - 15108264559360000*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 \\
& **2f^{**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 \\
& **3e*(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 \\
& **2e^{**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} - 15108264559360000*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
\end{aligned}$$

$$\begin{aligned}
& 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)
\end{aligned}$$

$$3.44 \quad \int \frac{d+ex+fx^2+gx^3}{(4-5x^2+x^4)^3} dx$$

Optimal. Leaf size=204

$$-\frac{x(-35x^2(d+4f)+59d+380f)}{3456(x^4-5x^2+4)} + \frac{x(-(x^2(5d+8f))+17d+20f)}{144(x^4-5x^2+4)^2} - \frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{1}{648}(13d+25f)$$

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}

$$-\frac{x(-35x^2(d+4f)+59d+380f)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-5d+8f))+17d+20f}{144(x^4-5x^2+4)^2} - \frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{1}{648}(13d+25f)\tanh^{-1}(x) - \frac{(5-2x^2)(2e+5g)}{108(x^4-5x^2+4)} + \frac{x^2(-2e+5g)+5e+8g}{36(x^4-5x^2+4)^2} - \frac{1}{162}(2e+5g)\log(1-x^2) + \frac{1}{162}(2e+5g)\log(4-x^2)$$

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_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^(n_), 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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 616

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(n_), 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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^3} dx + \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^3} dx \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 5(5d + 8f)x^2}{(4 - 5x^2 + x^4)^2} dx + \frac{1}{2} \text{Subst} \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{x(59d + 380f - 35(d + 4e + 8g)x^2)}{3456(4 - 5x^2 + x^4)} \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)(5 - 2x^2)}{108(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4e + 8g)x^2)}{3456(4 - 5x^2 + x^4)} \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)(5 - 2x^2)}{108(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4e + 8g)x^2)}{3456(4 - 5x^2 + x^4)} \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)(5 - 2x^2)}{108(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4e + 8g)x^2)}{3456(4 - 5x^2 + x^4)} \end{aligned}$$

Mathematica [A] time = 0.08, size = 193, normalized size = 0.95

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) + 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 + 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 + 1280*g)*Log[2 + x])/41472

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

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

Verification is not applicable to the result.

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

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

fricas [B] time = 2.61, size = 470, normalized size = 2.30

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*(43*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 + 640*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

$$\frac{1}{41472}(313d + 820f - 1280g - 512e)\log(|x + 2|) + \frac{1}{1296}(13d + 25f - 40g - 16e)\log(|x + 1|) - \frac{1}{1296}(13d + 25f + 40g + 16e)\log(|x - 1|) + \frac{1}{41472}(313d + 820f + 1280g + 512e)\log(|x - 2|) + \frac{35d^2 + 140fd^2 + 320g^2 + 128x^6e - 234d^2 - 1080f^2 - 2400g^4 - 960x^4e + 315d^2 + 2268f^2 + 4800g^2 + 1920x^2e + 172d - 1040f - 2432g - 800e}{3456(e^2 - 5d^2 + 4)}$$

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)*log(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

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $-5/162*g*\ln(x-1)+5/162*g*\ln(x+2)+5/162*g*\ln(x-2)-5/162*g*\ln(x+1)-313/41472*d*\ln(x+2)+1/81*e*\ln(x+2)-1/81*e*\ln(x-1)-13/1296*d*\ln(x-1)-1/81*e*\ln(x+1)+13/1296*d*\ln(x+1)+313/41472*d*\ln(x-2)+1/81*e*\ln(x-2)+205/10368*f*\ln(x-2)+25/1296*f*\ln(x+1)-25/1296*f*\ln(x-1)-205/10368*f*\ln(x+2)-1/432/(x+2)^2*g+1/432/(x-1)^2*g+1/432/(x+1)^2*g-1/432/(x-2)^2*g-1/432/(x+1)^2*d+1/432/(x+1)^2*e+1/432/(x-1)^2*d+1/432/(x-1)^2*e+1/3456/(x+2)^2*d-1/1728/(x+2)^2*e+1/864/(x+2)^2*f+1/432/(x-1)^2*f-1/432/(x+1)^2*f-1/864/(x-2)^2*f-1/3456/(x-2)^2*d-1/1728/(x-2)^2*e-13/864/(x+2)*g-7/432/(x+1)*g+7/432/(x-1)*g+13/864/(x-2)*g+19/6912/(x+2)*d-17/3456/(x+2)*e+19/6912/(x-2)*d+17/3456/(x-2)*e+1/432/(x+1)*d-1/144/(x+1)*e+1/432/(x-1)*d+1/144/(x-1)*e+5/432/(x-1)*f+5/576/(x+2)*f+5/576/(x-2)*f+5/432/(x+1)*f$

maxima [A] time = 1.08, size = 188, normalized size = 0.92

$$\frac{-\frac{1}{41472}(313d-512e+820f-1280g)\log(x+2)+\frac{1}{1296}(13d-16e+25f+40g)\log(x+1)-\frac{1}{1296}(13d+16e+25f+40g)\log(x-1)+\frac{1}{41472}((313d+512e+820f+1280g)\log(x-2)+\frac{35(d+4f)^2+64(2e+5g)^2-18(13d+60f)^2-480(2e+5g)^2+63(5d+36f)^2+960(2e+5g)^2+4(43d-260f)x-800e-2432g}{3456x^8-10x^6+33x^4-40x^2+16})}{x^8-10x^6+33x^4-40x^2+16}$$

Verification of antiderivative is not currently implemented for this CAS.

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

[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

$$\frac{\left(\frac{35d}{3456} + \frac{35f}{864}\right)x^7 + \left(\frac{64}{27} + \frac{5g}{54}\right)x^6 + \left(-\frac{18d}{1296} - \frac{5e}{18} + \frac{25f}{36}\right)x^5 + \left(\frac{35d}{3456} + \frac{21f}{32}\right)x^4 + \left(\frac{5e}{9} + \frac{25g}{18}\right)x^3 + \left(\frac{43d}{864} - \frac{65f}{216} - \frac{25e}{108} - \frac{19g}{27}\right)x^2 - \ln(x-1)\left(\frac{13d}{1296} + \frac{e}{81} + \frac{25f}{1296} + \frac{5g}{162}\right) + \ln(x+1)\left(\frac{13d}{1296} + \frac{e}{81} + \frac{25f}{1296} + \frac{5g}{162}\right) + \ln(x-2)\left(\frac{313d}{41472} + \frac{e}{81} + \frac{205f}{10368} + \frac{5g}{162}\right) - \ln(x+2)\left(\frac{313d}{41472} + \frac{e}{81} + \frac{205f}{10368} + \frac{5g}{162}\right)}{x^8-10x^6+33x^4-40x^2+16}$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $(x^3*((35*d)/384 + (21*f)/32) - (19*g)/27 - x^5*((13*d)/192 + (5*f)/16) - (25*e)/108 + x^7*((35*d)/3456 + (35*f)/864) + x^2*((5*e)/9 + (25*g)/18) - x^4*4*((5*e)/18 + (25*g)/36) + x^6*(e/27 + (5*g)/54) + x*((43*d)/864 - (65*f)/216))/(33*x^4 - 40*x^2 - 10*x^6 + x^8 + 16) - \log(x - 1)*((13*d)/1296 + e/81 + (25*f)/1296 + (5*g)/162) + \log(x + 1)*((13*d)/1296 - e/81 + (25*f)/1296 - (5*g)/162) + \log(x - 2)*((313*d)/41472 + e/81 + (205*f)/10368 + (5*g)/162) - \log(x + 2)*((313*d)/41472 - e/81 + (205*f)/10368 - (5*g)/162)$

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] $\text{integrate}((g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**3,x)$

[Out] Timed out

$$3.45 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{(4-5x^2+x^4)^3} dx$$

Optimal. Leaf size=224

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(-x^2(5d+8f+20h)+17d+20f+32h)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)}{3}$$

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}

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-5d+8f+20h)+17d+20f+32h)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)(313d+820f+1936h)}{20736} + \frac{1}{648} \tanh^{-1}(x)(13d+25f+61h) - \frac{(5-2x^2)(2e+5g)}{108(x^4-5x^2+4)} + \frac{x^2(-2e+5g)+5e+8g}{36(x^4-5x^2+4)^2} - \frac{1}{162}(2e+5g)\log(1-x^2) + \frac{1}{162}(2e+5g)\log(4-x^2)$$

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)*ArcTanh[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_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^(n_), 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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 616

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(n_), 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]] /; 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 32h + 5(5d + 8f + 20h)x^2}{(4 - 5x^2 + x^4)^2} dx \\
&= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{x(59d + 78f + 112h)}{144(4 - 5x^2 + x^4)^2} \\
&= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)x^3}{108(4 - 5x^2 + x^4)^2} \\
&= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)x^3}{108(4 - 5x^2 + x^4)^2} \\
&= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)x^3}{108(4 - 5x^2 + x^4)^2}
\end{aligned}$$

Mathematica [A] time = 0.12, size = 231, normalized size = 1.03

$$\frac{-5d^2 + 17d^2 - 8e^2 + 20e - 8f^2 + 20f - 20g^2 + 32g - 20h^3 + 32h}{144(4 - 5x^2 + x^4)^2} + \frac{35d^2 - 96d + 128e^2 - 320e + 140f^2 - 380f + 320g^2 - 800g + 320h^2 - 848h}{3456(4 - 5x^2 + x^4)^2} + \frac{\log(1 - x)(-13d - 16e - 25f - 40g - 61h)}{1296} + \frac{\log(2 - x)(313d + 512e + 820f + 1280g + 1936h)}{41472} + \frac{\log(x + 1)(13d - 16e + 25f - 40g + 61h)}{1296} + \frac{\log(x + 2)(-313d - 820f + 1280g - 1936h)}{41472}$$

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 - 380*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 + ((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

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

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

Verification is not applicable to the result.

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

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

fricas [B] time = 6.78, size = 544, normalized size = 2.43

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

$$\begin{aligned} &*(2*e + 5*g)*x^2 + 48*(43*d - 260*f - 656*h)*x - ((313*d - 512*e + 820*f - \\ &1280*g + 1936*h)*x^8 - 10*(313*d - 512*e + 820*f - 1280*g + 1936*h)*x^6 + 3 \\ &3*(313*d - 512*e + 820*f - 1280*g + 1936*h)*x^4 - 40*(313*d - 512*e + 820*f \\ &- 1280*g + 1936*h)*x^2 + 5008*d - 8192*e + 13120*f - 20480*g + 30976*h)*\log \\ &g(x + 2) + 32*((13*d - 16*e + 25*f - 40*g + 61*h)*x^8 - 10*(13*d - 16*e + 2 \\ &5*f - 40*g + 61*h)*x^6 + 33*(13*d - 16*e + 25*f - 40*g + 61*h)*x^4 - 40*(13 \\ &*d - 16*e + 25*f - 40*g + 61*h)*x^2 + 208*d - 256*e + 400*f - 640*g + 976*h \\ &)*\log(x + 1) - 32*((13*d + 16*e + 25*f + 40*g + 61*h)*x^8 - 10*(13*d + 16*e \\ &+ 25*f + 40*g + 61*h)*x^6 + 33*(13*d + 16*e + 25*f + 40*g + 61*h)*x^4 - 40 \\ &*(13*d + 16*e + 25*f + 40*g + 61*h)*x^2 + 208*d + 256*e + 400*f + 640*g + 9 \\ &76*h)*\log(x - 1) + ((313*d + 512*e + 820*f + 1280*g + 1936*h)*x^8 - 10*(313 \\ &*d + 512*e + 820*f + 1280*g + 1936*h)*x^6 + 33*(313*d + 512*e + 820*f + 128 \\ &0*g + 1936*h)*x^4 - 40*(313*d + 512*e + 820*f + 1280*g + 1936*h)*x^2 + 5008 \\ &*d + 8192*e + 13120*f + 20480*g + 30976*h)*\log(x - 2) - 9600*e - 29184*g)/(\\ &x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16) \end{aligned}$$

giac [A] time = 0.33, size = 224, normalized size = 1.00

$$\frac{-\frac{1}{4172}(313d + 820f - 1280g + 1936h)\log(x+2) + \frac{1}{1296}(13d + 25f - 40g + 61h)\log(x+1) - \frac{1}{1296}(13d + 25f + 40g + 61h)\log(x-1) + \frac{1}{4172}(313d + 820f + 1280g + 1936h)\log(x-2) + \frac{352d^2 + 140f^2 + 320h^2 + 520g^2 + 128e^2 - 234d^2 - 1080f^2 - 2448h^2 - 2400g^2 - 960e^2 + 2268f^2 + 5040h^2 + 4800g^2 + 1920e^2 + 1728d - 1040f - 2624h - 2432g - 800e}{3456(x^4 - 5x^2 + 4)}}{x^8 - 10x^6 + 33x^4 - 40x^2 + 16}$$

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 + 1936*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

$$\frac{-\frac{1}{4172}(313d + 820f - 1280g + 1936h)\log(x+2) + \frac{1}{1296}(13d + 25f - 40g + 61h)\log(x+1) - \frac{1}{1296}(13d + 25f + 40g + 61h)\log(x-1) + \frac{1}{4172}(313d + 820f + 1280g + 1936h)\log(x-2) + \frac{5(7d^2 + 28f^2 + 64h^2) + 64(2e + 5g)^2 - 18(13d + 60f + 136h)^2 - 480(2e + 5g)^2 + 63(5d + 36f + 80h)^2 + 960(2e + 5g)^2 + 4(41d - 260f - 656h) - 800e - 2432g}{3456(x^4 - 5x^2 + 4)}}{x^4 - 5x^2 + 4}$$

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)+25/1296*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+1/432/(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+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 = 1.06, size = 214, normalized size = 0.96

$$\frac{-\frac{1}{4172}(313d - 512e + 820f - 1280g + 1936h)\log(x+2) + \frac{1}{1296}(13d - 16e + 25f - 40g + 61h)\log(x+1) - \frac{1}{1296}(13d + 16e + 25f + 40g + 61h)\log(x-1) + \frac{1}{4172}(313d + 512e + 820f + 1280g + 1936h)\log(x-2) + \frac{5(7d^2 + 28f^2 + 64h^2) + 64(2e + 5g)^2 - 18(13d + 60f + 136h)^2 - 480(2e + 5g)^2 + 63(5d + 36f + 80h)^2 + 960(2e + 5g)^2 + 4(41d - 260f - 656h) - 800e - 2432g}{3456(x^4 - 5x^2 + 4)}}{x^4 - 5x^2 + 4}$$

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] $-1/41472*(313*d - 512*e + 820*f - 1280*g + 1936*h)*\log(x + 2) + 1/1296*(13*d - 16*e + 25*f - 40*g + 61*h)*\log(x + 1) - 1/1296*(13*d + 16*e + 25*f + 40*g + 61*h)*\log(x - 1) + 1/41472*(313*d + 512*e + 820*f + 1280*g + 1936*h)*\log(x - 2) + 1/3456*(5*(7*d + 28*f + 64*h)*x^7 + 64*(2*e + 5*g)*x^6 - 18*(13*d + 60*f + 136*h)*x^5 - 480*(2*e + 5*g)*x^4 + 63*(5*d + 36*f + 80*h)*x^3 + 960*(2*e + 5*g)*x^2 + 4*(43*d - 260*f - 656*h)*x - 800*e - 2432*g)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)$

mupad [B] time = 0.25, size = 209, normalized size = 0.93

$$\ln(x+1)\left(\frac{13d}{1296} - \frac{e}{81} - \frac{25f}{1296} - \frac{5g}{162} + \frac{61h}{1296}\right) - \ln(x-1)\left(\frac{13d}{1296} - \frac{e}{81} - \frac{25f}{1296} - \frac{5g}{162} + \frac{61h}{1296}\right) - \frac{\left(\frac{25d}{3456} - \frac{25f}{3456} - \frac{5g}{3456}\right)x^7 + \left(\frac{64}{3456} - \frac{18}{3456}\right)x^6 + \left(\frac{63}{3456} - \frac{480}{3456}\right)x^4 + \left(\frac{63}{3456} - \frac{480}{3456}\right)x^3 + \left(\frac{960}{3456} - \frac{4}{3456}\right)x^2 + \left(\frac{4}{3456} - \frac{800}{3456} - \frac{2432}{3456}\right)x - \frac{800}{3456} - \frac{2432}{3456}}{x^8 - 10x^6 + 33x^4 - 40x^2 + 16} + \ln(x-2)\left(\frac{313d}{41472} - \frac{e}{81} + \frac{205f}{10368} + \frac{5g}{162} - \frac{121h}{2592}\right) - \ln(x+2)\left(\frac{313d}{41472} - \frac{e}{81} + \frac{205f}{10368} + \frac{5g}{162} - \frac{121h}{2592}\right)$$

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] $\log(x + 1)*((13*d)/1296 - e/81 + (25*f)/1296 - (5*g)/162 + (61*h)/1296) - \log(x - 1)*((13*d)/1296 + e/81 + (25*f)/1296 + (5*g)/162 + (61*h)/1296) - ((25*e)/108 + (19*g)/27 - x^2*((5*e)/9 + (25*g)/18) + x^4*((5*e)/18 + (25*g)/36) - x^6*(e/27 + (5*g)/54) + x*((65*f)/216 - (43*d)/864 + (41*h)/54) + x^5*((13*d)/192 + (5*f)/16 + (17*h)/24) - x^3*((35*d)/384 + (21*f)/32 + (35*h)/24) - x^7*((35*d)/3456 + (35*f)/864 + (5*h)/54))/(33*x^4 - 40*x^2 - 10*x^6 + x^8 + 16) + \log(x - 2)*((313*d)/41472 + e/81 + (205*f)/10368 + (5*g)/162 + (121*h)/2592) - \log(x + 2)*((313*d)/41472 - e/81 + (205*f)/10368 - (5*g)/162 + (121*h)/2592)$

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

$$3.46 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(4-5x^2+x^4)^3} dx$$

Optimal. Leaf size=239

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(-(x^2(5d+8f+20h))+17d+20f+32h)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)}{144(x^4-5x^2+4)^2}$$

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}

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-5d+8f+20h)+17d+20f+32h)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)(313d+820f+1936h)}{20736} + \frac{1}{648} \frac{\tanh^{-1}(x)(13d+25f+61h)}{(x^4-5x^2+4)} - \frac{(5-2x^2)(2e+5g+11i)}{108(x^4-5x^2+4)} + \frac{x^2(-2e+5g+17i)+5e+8g+20i}{36(x^4-5x^2+4)^2} - \frac{1}{162} \log(1-x^2)(2e+5g+11i) + \frac{1}{162} \log(4-x^2)(2e+5g+11i)$$

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] && !MatchQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 46x^5}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2 + 46x^4)}{(4 - 5x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 32h - (5d + 8f + 20h)x^2}{(4 - 5x^2 + x^4)^2} dx \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)}
\end{aligned}$$

Mathematica [A] time = 0.13, size = 261, normalized size = 1.09

$\frac{-5d^2 + 17d - 8e^2 + 2e - 8f^2 + 20f - 20g^2 + 32g - 20h^2 + 32h - 68i^2 + 8i}{144(4 - 5x^2 + x^4)}$, $\frac{35d^2 - 59d + 128e^2 - 32e + 140f^2 - 30f + 320g^2 - 80g + 320h^2 - 848h + 704i^2 - 1760}{3456(4 - 5x^2 + x^4)}$, $\frac{\log(1 - x) - 13x - 16x^2 - 25x - 40x^3 - 61x - 88i}{1296}$, $\frac{\log(2 - x) + 13x + 16x^2 + 512x + 820f + 1280g + 1936h + 2816i}{4172}$, $\frac{\log(1 + x) + 13x + 16x^2 + 25x - 40x^3 - 61x - 88i}{1296}$, $\frac{\log(2 + x) - 13x - 16x^2 - 512x - 820f - 1280g - 1936h + 2816i}{4172}$

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 - 800*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 + 820*f + 1280*g + 1936*h + 2816*i)*Log[2 - x])/4172 + ((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])/4172

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

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

Verification is not applicable to the result.

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

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

fricas [B] time = 27.05, size = 616, normalized size = 2.58

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="fricas")

[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 - ((313*d - 512*e + 820*f - 1280*g + 1936*h - 2816*i)*x^8 - 10*(313*d - 512*e + 820*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 + 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 - 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 + 40*g + 61*h + 88*i)*x^2 + 208*d + 256*e + 400*f + 640*g + 976*h + 1408*i)*log(x - 1) + ((313*d + 512*e + 820*f + 1280*g + 1936*h + 2816*i)*x^8 - 10*(313*d + 512*e + 820*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) - 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

$\frac{1}{41472}(313d + 512e + 820f + 1280g + 1936h + 2816i)\log(x + 2) + \frac{1}{41472}(313d + 512e + 820f + 1280g + 1936h + 2816i)\log(x + 1) - \frac{1}{41472}(313d + 512e + 820f + 1280g + 1936h + 2816i)\log(x - 1) + \frac{1}{41472}(313d + 512e + 820f + 1280g + 1936h + 2816i)\log(x - 2) - \frac{9600e - 29184g - 61440i}{x^8 - 10x^6 + 33x^4 - 40x^2 + 16}$

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="giac")

[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)) - 1/1296*(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

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)-121/2592*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)+25/1296*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)

$$\begin{aligned} &)^2 * f - 1/864 / (x-2)^2 * f - 1/3456 / (x-2)^2 * d - 1/1728 / (x-2)^2 * e - 1/24 / (x+2) * i - 11/432 \\ &/ (x+1) * i + 11/432 / (x-1) * i + 1/24 / (x-2) * i + 11/432 / (x+2) * h + 1/48 / (x+1) * h + 1/48 / (x-1) \\ &* h + 11/432 / (x-2) * h - 13/864 / (x+2) * g - 7/432 / (x+1) * g + 7/432 / (x-1) * g + 13/864 / (x-2) * g \\ &+ 19/6912 / (x+2) * d - 17/3456 / (x+2) * e + 19/6912 / (x-2) * d + 17/3456 / (x-2) * e + 1/432 / (x+1) \\ &) * d - 1/144 / (x+1) * e + 1/432 / (x-1) * d + 1/144 / (x-1) * e + 5/432 / (x-1) * f + 5/576 / (x+2) * f + 5 \\ &/ 576 / (x-2) * f + 5/432 / (x+1) * f \end{aligned}$$

maxima [A] time = 1.12, size = 238, normalized size = 1.00

$$\frac{1}{41472} (313d - 512e + 820f - 1280g + 1936h - 2816i) \log(x+2) + \frac{1}{1296} (13d - 16e + 25f - 40g + 61h - 88i) \log(x+1) - \frac{1}{1296} (13d + 16e + 25f + 40g + 61h + 88i) \log(x-1) + \frac{1}{41472} (313d + 512e + 820f + 1280g + 1936h + 2816i) \log(x-2) + \frac{1}{3456} (5(7d + 28f + 64h) * x^7 + 64(2e + 5g + 11i) * x^6 - 18(13d + 60f + 136h) * x^5 - 480(2e + 5g + 11i) * x^4 + 63(5d + 36f + 80h) * x^3 + 192(10e + 25g + 52i) * x^2 + 4(43d - 260f - 656h) * x - 800e - 2432g - 5120i) / (x^8 - 10x^6 + 33x^4 - 40x^2 + 16)$$

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="maxima")

[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

$$\ln(x+1) \left(\frac{13d}{1296} \frac{e}{81} + \frac{25f}{1296} \frac{5g}{162} + \frac{61h}{1296} \frac{11i}{162} \right) - \ln(x-1) \left(\frac{13d}{1296} \frac{e}{81} + \frac{25f}{1296} \frac{5g}{162} + \frac{61h}{1296} \frac{11i}{162} \right) + \frac{\left(\frac{313d}{41472} \frac{e}{81} + \frac{25f}{1296} \frac{5g}{162} + \frac{61h}{1296} \frac{11i}{162} \right) x^7 + \left(\frac{64}{3456} (2e + 5g + 11i) \right) x^6 - 18 \left(\frac{13d}{1296} \frac{e}{81} + \frac{25f}{1296} \frac{5g}{162} + \frac{61h}{1296} \frac{11i}{162} \right) x^5 - 480 \left(\frac{2e}{81} + \frac{5g}{162} + \frac{11i}{162} \right) x^4 + 63 \left(\frac{5d}{1296} + \frac{36f}{1296} + \frac{80h}{1296} \right) x^3 + 192 \left(\frac{10e}{1296} + \frac{25g}{1296} + \frac{52i}{1296} \right) x^2 + 4 \left(\frac{43d}{41472} - \frac{260f}{41472} - \frac{656h}{41472} \right) x - \frac{800e}{41472} - \frac{2432g}{41472} - \frac{5120i}{41472}}{x^8 - 10x^6 + 33x^4 - 40x^2 + 16}$$

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]
$$\log(x + 1) * ((13*d)/1296 - e/81 + (25*f)/1296 - (5*g)/162 + (61*h)/1296 - (11*i)/162) - \log(x - 1) * ((13*d)/1296 + e/81 + (25*f)/1296 + (5*g)/162 + (61*h)/1296 + (11*i)/162) - ((25*e)/108 + (19*g)/27 + (40*i)/27 + x * ((65*f)/216 - (43*d)/864 + (41*h)/54) + x^5 * ((13*d)/192 + (5*f)/16 + (17*h)/24) - x^3 * ((35*d)/384 + (21*f)/32 + (35*h)/24) - x^7 * ((35*d)/3456 + (35*f)/864 + (5*h)/54) - x^2 * ((5*e)/9 + (25*g)/18 + (26*i)/9) - x^6 * (e/27 + (5*g)/54 + (11*i)/54) + x^4 * ((5*e)/18 + (25*g)/36 + (55*i)/36) / (33*x^4 - 40*x^2 - 10*x^6 + x^8 + 16) + \log(x - 2) * ((313*d)/41472 + e/81 + (205*f)/10368 + (5*g)/162 + (121*h)/2592 + (11*i)/162) - \log(x + 2) * ((313*d)/41472 - e/81 + (205*f)/10368 - (5*g)/162 + (121*h)/2592 - (11*i)/162)$$

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

$$3.47 \quad \int \frac{d+ex}{(1+x^2+x^4)^3} dx$$

Optimal. Leaf size=185

$$-\frac{9}{32}d \log(x^2 - x + 1) + \frac{9}{32}d \log(x^2 + x + 1) + \frac{dx(2 - 7x^2)}{24(x^4 + x^2 + 1)} + \frac{dx(1 - x^2)}{12(x^4 + x^2 + 1)^2} - \frac{13d \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{13d \tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{48\sqrt{3}}$$

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}

$$\frac{dx(2-7x^2)}{24(x^4+x^2+1)} + \frac{dx(1-x^2)}{12(x^4+x^2+1)^2} - \frac{9}{32}d \log(x^2-x+1) + \frac{9}{32}d \log(x^2+x+1) - \frac{13d \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{13d \tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{e(2x^2+1)}{6(x^4+x^2+1)} + \frac{e(2x^2+1)}{12(x^4+x^2+1)^2} + \frac{2e \tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

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] && !MatchQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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_Symbol] := 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

$$\begin{aligned}
\int \frac{d+ex}{(1+x^2+x^4)^3} dx &= \int \frac{d}{(1+x^2+x^4)^3} dx + \int \frac{ex}{(1+x^2+x^4)^3} dx \\
&= d \int \frac{1}{(1+x^2+x^4)^3} dx + e \int \frac{x}{(1+x^2+x^4)^3} dx \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{1}{12}d \int \frac{11-5x^2}{(1+x^2+x^4)^2} dx + \frac{1}{2}e \operatorname{Subst} \left(\int \frac{1}{(1+x+x^2)^3} dx, x, x^2 \right) \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{1}{72}d \int \frac{60-21x^2}{1+x^2+x^4} dx + \frac{1}{2}e \operatorname{Subst} \left(\int \frac{1}{(1+x+x^2)^3} dx, x, x^2 \right) \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{1}{144}d \int \frac{60-21x^2}{1+x^2+x^4} dx \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{1}{96}(13d) \int \frac{60-21x^2}{1+x^2+x^4} dx \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{2e \tan^{-1} \left(\frac{1-x^2}{\sqrt{3}} \right)}{3\sqrt{3}} \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} - \frac{13d \tan^{-1} \left(\frac{1-x^2}{\sqrt{3}} \right)}{48\sqrt{3}}
\end{aligned}$$

Mathematica [C] time = 0.75, size = 186, normalized size = 1.01

$$\frac{1}{144} \left(\frac{6(dx(2-7x^2) + e(8x^2+4))}{x^4+x^2+1} + \frac{12(d(x-x^3) + 2ex^2 + e)}{(x^4+x^2+1)^2} - \frac{(7\sqrt{3}-47i)d \tan^{-1} \left(\frac{1}{2}(\sqrt{3}-i)x \right)}{\sqrt{\frac{1}{6}(1+i\sqrt{3})}} - \frac{(7\sqrt{3}+47i)d \tan^{-1} \left(\frac{1}{2}(\sqrt{3}+i)x \right)}{\sqrt{\frac{1}{6}(1-i\sqrt{3})}} - 32\sqrt{3}e \tan^{-1} \left(\frac{\sqrt{3}}{2x^2+1} \right) \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x)/(1 + x^2 + x^4)^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 + sqrt[3])*x]/2))/sqrt[(1 + I*sqrt[3])/6] - ((47*I + 7*sqrt[3])*d*ArcTan[(I + sqrt[3])*x]/2))/sqrt[(1 - I*sqrt[3])/6] - 32*sqrt[3]*e*ArcTan[sqrt[3]/(1 + 2*x^2)]/144

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

$$\int \frac{d+ex}{(1+x^2+x^4)^3} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(d + e*x)/(1 + x^2 + x^4)^3, x]

[Out] IntegrateAlgebraic[(d + e*x)/(1 + x^2 + x^4)^3, x]

fricas [A] time = 1.06, size = 278, normalized size = 1.50

$$\frac{84d^2 - 96ex^6 + 60d^2 - 144ex^4 + 84d^2 - 192ex^2 - 2\sqrt{3}(13d - 32ex^2 + 2(13d - 32ex^2 + 3(13d - 32ex^2 + 2(13d - 32ex^2 + 13d - 32ex^2))\operatorname{atan}\left(\frac{\sqrt{3}}{2x^2+1}\right) - 2\sqrt{3}(13d + 32ex^2 + 2(13d + 32ex^2 + 2(13d + 32ex^2 + 13d + 32ex^2))\operatorname{atan}\left(\frac{\sqrt{3}}{2x^2+1}\right) - 48d - 8(d^2 + 2d^2 + 3d^2 + d)\log(x^2 + x + 1) + 8(d^2 + 2d^2 + 3d^2 + d)\log(x^2 - x + 1) - 72x}{288(x^2 + 2x^2 + 3x^2 + 2x^2 + 1)}}{288(x^2 + 2x^2 + 3x^2 + 2x^2 + 1)}$$

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

$$\frac{1}{144}\sqrt{3}(13d-32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{9}{32}d\log(x^2+x+1) - \frac{9}{32}d\log(x^2-x+1) - \frac{7dx^7-8x^6e+5dx^5-12x^4e+7dx^3-16x^2e-4dx-6e}{24(x^4+x^2+1)^2}$$

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

$$\frac{13\sqrt{3}d\arctan\left(\frac{2x+1\sqrt{3}}{3}\right) + 13\sqrt{3}d\arctan\left(\frac{2x-1\sqrt{3}}{3}\right) - 9d\ln(x^2-x+1) + 9d\ln(x^2+x+1) - 2\sqrt{3}e\arctan\left(\frac{2x+1\sqrt{3}}{3}\right) + 2\sqrt{3}e\arctan\left(\frac{2x-1\sqrt{3}}{3}\right) - 6dx^2 + \left(\frac{7d}{3} - \frac{4e}{3}\right)x^3 - 4d + 2e + \left(\frac{20d}{3} + \frac{e}{3}\right)x - 6dx^2 + \left(\frac{7d}{3} - \frac{4e}{3}\right)x^3 - 4d - 2e + \left(\frac{20d}{3} + \frac{e}{3}\right)x}{144} - \frac{7dx^7 - 8x^6e + 5dx^5 - 12x^4e + 7dx^3 - 16x^2e - 4dx - 6e}{16(x^2+x+1)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x+d)/(x^4+x^2+1)^3,x)

[Out]
$$1/16*((-7/3*d-4/3*e)*x^3-6*d*x^2+(-20/3*d+1/3*e)*x-4*d+2*e)/(x^2+x+1)^2+9/32*d*\ln(x^2+x+1)+13/144*3^(1/2)*d*\arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*\arctan(1/3*(2*x+1)*3^(1/2))-1/16*((7/3*d-4/3*e)*x^3-6*d*x^2+(20/3*d+1/3*e)*x-4*d-2*e)/(x^2-x+1)^2-9/32*d*\ln(x^2-x+1)+13/144*3^(1/2)*d*\arctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(1/2)*e*\arctan(1/3*(2*x-1)*3^(1/2))$$

maxima [A] time = 2.55, size = 137, normalized size = 0.74

$$\frac{1}{144}\sqrt{3}(13d-32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{9}{32}d\log(x^2+x+1) - \frac{9}{32}d\log(x^2-x+1) - \frac{7dx^7-8x^6e+5dx^5-12x^4e+7dx^3-16x^2e-4dx-6e}{24(x^4+x^2+1)^2}$$

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

$$\frac{7d^2 + \frac{e^6}{3} - \frac{5d^3}{24} + \frac{e^4}{2} - \frac{7d^3}{24} + \frac{2e^2}{3} + \frac{dx}{6} + \frac{c}{2} - \ln\left(x - \frac{1}{2} - \frac{\sqrt{3}i}{2}\right)\left(\frac{9d}{32} + \frac{\sqrt{3}d13i}{288} + \frac{\sqrt{3}e1i}{9}\right) + \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}i}{2}\right)\left(\frac{9d}{32} - \frac{\sqrt{3}d13i}{288} + \frac{\sqrt{3}e1i}{9}\right) + \ln\left(x - \frac{1}{2} + \frac{\sqrt{3}i}{2}\right)\left(-\frac{9d}{32} + \frac{\sqrt{3}d13i}{288} + \frac{\sqrt{3}e1i}{9}\right) + \ln\left(x + \frac{1}{2} + \frac{\sqrt{3}i}{2}\right)\left(\frac{9d}{32} - \frac{\sqrt{3}d13i}{288} - \frac{\sqrt{3}e1i}{9}\right)}{x^8 + 2x^6 + 3x^4 + 2x^2 + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x)/(x^2 + x^4 + 1)^3,x)

[Out]
$$(e/4 + (d*x)/6 - (7*d*x^3)/24 - (5*d*x^5)/24 - (7*d*x^7)/24 + (2*e*x^2)/3 + (e*x^4)/2 + (e*x^6)/3)/(2*x^2 + 3*x^4 + 2*x^6 + x^8 + 1) - \log(x - (3^(1/2)*1i)/2 - 1/2)*((9*d)/32 + (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9) + \log(x - (3^(1/2)*1i)/2 + 1/2)*((9*d)/32 - (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9)$$

$$+ \log(x + (3^{1/2} * i) / 2 - 1/2) * ((3^{1/2} * d * 13i) / 288 - (9 * d) / 32 + (3^{1/2} * e * i) / 9) + \log(x + (3^{1/2} * i) / 2 + 1/2) * ((9 * d) / 32 + (3^{1/2} * d * 13i) / 288 - (3^{1/2} * e * i) / 9)$$

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 - 334752912*d**4*(-9*d/32 - \sqrt{3}*I*(13*d + 32*e)/288) - 431308800*d**2*e**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*(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)/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)/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)/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)) + (-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)$

$$3.48 \quad \int \frac{d+ex+fx^2}{(1+x^2+x^4)^3} dx$$

Optimal. Leaf size=223

$$-\frac{1}{32}(9d-4f)\log(x^2-x+1)+\frac{1}{32}(9d-4f)\log(x^2+x+1)+\frac{x(-7x^2(d-f)+2d+3f)}{24(x^4+x^2+1)}+\frac{x(-(x^2(d-2f))+d)}{12(x^4+x^2+1)}$$

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}

$$\frac{x(-7x^2(d-f)+2d+3f)}{24(x^4+x^2+1)} + \frac{x(x^2(-d-2f)+d+f)}{12(x^4+x^2+1)^2} - \frac{1}{32}(9d-4f)\log(x^2-x+1) + \frac{1}{32}(9d-4f)\log(x^2+x+1) - \frac{(13d+2f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{(13d+2f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{e(2x^2+1)}{6(x^4+x^2+1)} + \frac{e(2x^2+1)}{12(x^4+x^2+1)^2} + \frac{2e\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

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] && !MatchQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] := Simp[(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] := Dist[1/2,
  Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[
  (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

$$\begin{aligned}
\int \frac{d+ex+fx^2}{(1+x^2+x^4)^3} dx &= \int \frac{ex}{(1+x^2+x^4)^3} dx + \int \frac{d+fx^2}{(1+x^2+x^4)^3} dx \\
&= \frac{x(d+f-(d-2f)x^2)}{12(1+x^2+x^4)^2} + \frac{1}{12} \int \frac{11d-f-5(d-2f)x^2}{(1+x^2+x^4)^2} dx + e \int \frac{x}{(1+x^2+x^4)^3} dx \\
&= \frac{x(d+f-(d-2f)x^2)}{12(1+x^2+x^4)^2} + \frac{x(2d+3f-7(d-f)x^2)}{24(1+x^2+x^4)} + \frac{1}{72} \int \frac{15(4d-f)-21(d-f)x^2}{1+x^2+x^4} dx \\
&= \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{x(d+f-(d-2f)x^2)}{12(1+x^2+x^4)^2} + \frac{x(2d+3f-7(d-f)x^2)}{24(1+x^2+x^4)} + \frac{1}{144} \int \frac{15(4d-f)-21(d-f)x^2}{1+x^2+x^4} dx \\
&= \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{x(d+f-(d-2f)x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{x(2d+3f-7(d-f)x^2)}{24(1+x^2+x^4)} \\
&= \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{x(d+f-(d-2f)x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{x(2d+3f-7(d-f)x^2)}{24(1+x^2+x^4)} \\
&= \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{x(d+f-(d-2f)x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{x(2d+3f-7(d-f)x^2)}{24(1+x^2+x^4)}
\end{aligned}$$

Mathematica [C] time = 0.59, size = 235, normalized size = 1.05

$$\frac{1}{144} \left(\frac{12(x(-dx^2+d+2fx^2+f)+2ex^2+e)}{(x^4+x^2+1)^2} + \frac{6(-7dx^3+2dx+e(8x^2+4)+7fx^3+3fx)}{x^4+x^2+1} - \frac{((7\sqrt{5}-47i)d+(-7\sqrt{5}+17i)f)\tan^{-1}\left(\frac{1}{2}(\sqrt{5}-i)x\right)}{\sqrt[6]{6(1+i\sqrt{5})}} - \frac{((7\sqrt{5}+47i)d-(7\sqrt{5}+17i)f)\tan^{-1}\left(\frac{1}{2}(\sqrt{5}+i)x\right)}{\sqrt[6]{6(1-i\sqrt{5})}} - 32\sqrt{3}e\tan^{-1}\left(\frac{\sqrt{3}}{2x^2+1}\right) \right)$$

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])/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) - 32*sqrt(3)*e*ArcTan[sqrt(3)/(1 + 2*x^2)])/144

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

$$\int \frac{d+ex+fx^2}{(1+x^2+x^4)^3} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(d + e*x + f*x^2)/(1 + x^2 + x^4)^3, x]

[Out] IntegrateAlgebraic[(d + e*x + f*x^2)/(1 + x^2 + x^4)^3, x]

fricas [A] time = 1.15, size = 384, normalized size = 1.72

$\frac{1}{144} \left(\frac{12(x(-dx^2+d+2fx^2+f)+2ex^2+e)}{(x^4+x^2+1)^2} + \frac{6(-7dx^3+2dx+e(8x^2+4)+7fx^3+3fx)}{x^4+x^2+1} - \frac{((7\sqrt{5}-47i)d+(-7\sqrt{5}+17i)f)\tan^{-1}\left(\frac{1}{2}(\sqrt{5}-i)x\right)}{\sqrt[6]{6(1+i\sqrt{5})}} - \frac{((7\sqrt{5}+47i)d-(7\sqrt{5}+17i)f)\tan^{-1}\left(\frac{1}{2}(\sqrt{5}+i)x\right)}{\sqrt[6]{6(1-i\sqrt{5})}} - 32\sqrt{3}e\tan^{-1}\left(\frac{\sqrt{3}}{2x^2+1}\right) \right)$

Verification of antiderivative is not currently implemented for this CAS.

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

$$\frac{1}{144}\sqrt{3}(13d+2f-32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+2f+32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{32}(9d-4f)\log(x^2+x+1) - \frac{1}{32}(9d-4f)\log(x^2-x+1) - \frac{7dx^7-7fx^7-8x^6e+5dx^5-10fx^5-12x^4e+7dx^3-14fx^3-16x^2e-4dx-5fx-6e}{24(x^4+x^2+1)^2}$$

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] $1/144*\sqrt{3}*(13*d + 2*f - 32*e)*\arctan(1/3*\sqrt{3}*(2*x + 1)) + 1/144*\sqrt{3}*(13*d + 2*f + 32*e)*\arctan(1/3*\sqrt{3}*(2*x - 1)) + 1/32*(9*d - 4*f)*\log(x^2 + x + 1) - 1/32*(9*d - 4*f)*\log(x^2 - x + 1) - 1/24*(7*d*x^7 - 7*f*x^7 - 8*x^6*e + 5*d*x^5 - 10*f*x^5 - 12*x^4*e + 7*d*x^3 - 14*f*x^3 - 16*x^2*e - 4*d*x - 5*f*x - 6*e)/(x^4 + x^2 + 1)^2$

maple [A] time = 0.02, size = 264, normalized size = 1.18

$$\frac{13\sqrt{3}d\arctan\left(\frac{2x+d}{3}\right) + 13\sqrt{3}d\arctan\left(\frac{2x-d}{3}\right) + 9d\ln(x^2+x+1) + 9d\ln(x^2-x+1) + 2\sqrt{3}e\arctan\left(\frac{2x+d}{3}\right) + 2\sqrt{3}e\arctan\left(\frac{2x-d}{3}\right) + \sqrt{3}f\arctan\left(\frac{2x+d}{3}\right) + \sqrt{3}f\arctan\left(\frac{2x-d}{3}\right) + f\ln(x^2+x+1) + f\ln(x^2-x+1) + \left(\frac{7d-f}{2}\right)x^7 + (-6d+4f)x^6 + 2d + \frac{e}{2} + \left(\frac{7d-f}{2}\right)x^5 + \left(\frac{7d-f}{2}\right)x^4 + (-6d+4f)x^3 - 4d - 2e + \frac{e}{2} + \left(\frac{7d-f}{2}\right)x^2 + \left(\frac{7d-f}{2}\right)x - 6e}{16(x^4+x^2+1)^2}$$

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

$$\frac{1}{144}\sqrt{3}(13d-32e+2f)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+32e+2f)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{32}(9d-4f)\log(x^2+x+1) - \frac{1}{32}(9d-4f)\log(x^2-x+1) - \frac{7(d-f)x^7-8x^6e+5(d-2f)x^5-12ex^4+7(d-2f)x^3-16ex^2-(4d+5f)x-6e}{24(x^4+2x^2+1)^2}$$

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] $1/144*\sqrt{3}*(13*d - 32*e + 2*f)*\arctan(1/3*\sqrt{3}*(2*x + 1)) + 1/144*\sqrt{3}*(13*d + 32*e + 2*f)*\arctan(1/3*\sqrt{3}*(2*x - 1)) + 1/32*(9*d - 4*f)*\log(x^2 + x + 1) - 1/32*(9*d - 4*f)*\log(x^2 - x + 1) - 1/24*(7*(d - f)*x^7 - 8*e*x^6 + 5*(d - 2*f)*x^5 - 12*e*x^4 + 7*(d - 2*f)*x^3 - 16*e*x^2 - (4*d + 5*f)*x - 6*e)/(x^4 + 2*x^2 + 1)$

mapad [B] time = 1.01, size = 249, normalized size = 1.12

$$\frac{\left(\frac{7d-f}{2}\right)x^7 + \left(\frac{7d-f}{2}\right)x^6 + \left(\frac{7d-f}{2}\right)x^5 + \left(\frac{7d-f}{2}\right)x^4 + \left(\frac{7d-f}{2}\right)x^3 + \left(\frac{7d-f}{2}\right)x^2 + \left(\frac{7d-f}{2}\right)x + \left(\frac{7d-f}{2}\right) - \ln\left(x - \frac{1}{2} + \frac{\sqrt{3}i}{2}\right)\left(\frac{9d-f}{32} + \frac{\sqrt{3}d13i}{288} + \frac{\sqrt{3}e11i}{9} + \frac{\sqrt{3}f11i}{144}\right) - \ln\left(x + \frac{1}{2} + \frac{\sqrt{3}i}{2}\right)\left(\frac{9d-f}{32} + \frac{\sqrt{3}d13i}{288} - \frac{\sqrt{3}e11i}{9} + \frac{\sqrt{3}f11i}{144}\right) + \ln\left(x - \frac{1}{2} - \frac{\sqrt{3}i}{2}\right)\left(\frac{9d-f}{32} - \frac{\sqrt{3}d13i}{288} + \frac{\sqrt{3}e11i}{9} + \frac{\sqrt{3}f11i}{144}\right) + \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}i}{2}\right)\left(\frac{9d-f}{32} - \frac{\sqrt{3}d13i}{288} - \frac{\sqrt{3}e11i}{9} + \frac{\sqrt{3}f11i}{144}\right)}$$

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)/24 - (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*1i)/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 + 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*(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)/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 - 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 - 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 - 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 - 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/
```

$$\begin{aligned}
& 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 + \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 - 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 - 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 * (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) / 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 - 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 - 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 - 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 - 944300160*d**3*f**2*
\end{aligned}$$

$$\begin{aligned}
& (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)
\end{aligned}$$

$$3.49 \quad \int \frac{d+ex+fx^2+gx^3}{(1+x^2+x^4)^3} dx$$

Optimal. Leaf size=243

$$-\frac{1}{32}(9d-4f)\log(x^2-x+1)+\frac{1}{32}(9d-4f)\log(x^2+x+1)+\frac{x(-7x^2(d-f)+2d+3f)}{24(x^4+x^2+1)}+\frac{x(-(x^2(d-2f))+d+)}{12(x^4+x^2+1)^2}$$

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, number of rules / integrand size = 0.385, Rules used = {1673, 1178, 1169, 634, 618, 204, 628, 1247, 638, 614}

$$\frac{x(-7x^2(d-f)+2d+3f)}{24(x^4+x^2+1)}+\frac{x(x^2-(d-2f))+d+f}{12(x^4+x^2+1)^2}-\frac{1}{32}(9d-4f)\log(x^2-x+1)+\frac{1}{32}(9d-4f)\log(x^2+x+1)-\frac{(13d+2f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{48\sqrt{3}}+\frac{(13d+2f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{48\sqrt{3}}+\frac{(2x^2+1)(2e-g)}{12(x^4+x^2+1)}+\frac{x^2(2e-g)+e-2g}{12(x^4+x^2+1)^2}+\frac{(2e-g)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

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)*ArcTan[(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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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_Symbol]
:> 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(1 + x^2 + x^4)^3} dx &= \int \frac{d + fx^2}{(1 + x^2 + x^4)^3} dx + \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^3} dx \\
&= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f - 5(d - 2f)x^2}{(1 + x^2 + x^4)^2} dx + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(1 + x + x^2)} dx \right) \\
&= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} + \frac{1}{72} \int \frac{15d - 5f - 15(d - 2f)x^2}{(1 + x^2 + x^4)^2} dx \\
&= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
&= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
&= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
&= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)}
\end{aligned}$$

Mathematica [C] time = 0.66, size = 259, normalized size = 1.07

$$\frac{1}{144} \left(\frac{12(x(-dx^2 + d + 2fx^2 + f) + 2x^2 + e - g(x^2 + 2))}{(x^2 + x^2 + 1)^2} + \frac{6(-7dx^3 + 2dx + e(8x^2 + 4) + 7fx^2 + 3fx - 2g(2x^2 + 1))}{x^4 + x^2 + 1} - \frac{((7\sqrt{3} - 47)d + (-7\sqrt{3} + 17)f) \tan^{-1}\left(\frac{\sqrt{3}}{2}(\sqrt{3} - i)x\right)}{\sqrt{\frac{1}{2}(1 + i\sqrt{3})}} - \frac{((7\sqrt{3} + 47)d - (7\sqrt{3} + 17)f) \tan^{-1}\left(\frac{\sqrt{3}}{2}(\sqrt{3} + i)x\right)}{\sqrt{\frac{1}{2}(1 - i\sqrt{3})}} - 16\sqrt{3}(2e - g) \tan^{-1}\left(\frac{\sqrt{3}}{2x^2 + 1}\right) \right)$$

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)*ArcTan[((-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

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

$$\int \frac{d + ex + fx^2 + gx^3}{(1 + x^2 + x^4)^3} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^3, x]

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^3, x]

fricas [A] time = 1.75, size = 435, normalized size = 1.79

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] $-1/288*(84*(d - f)*x^7 - 48*(2*e - g)*x^6 + 60*(d - 2*f)*x^5 - 72*(2*e - g)*x^4 + 84*(d - 2*f)*x^3 - 96*(2*e - g)*x^2 - 2*\sqrt{3}*((13*d - 32*e + 2*f + 16*g)*x^8 + 2*(13*d - 32*e + 2*f + 16*g)*x^6 + 3*(13*d - 32*e + 2*f + 16*g)*x^4 + 2*(13*d - 32*e + 2*f + 16*g)*x^2 + 13*d - 32*e + 2*f + 16*g)*\arctan(1/3*\sqrt{3}*(2*x + 1)) - 2*\sqrt{3}*((13*d + 32*e + 2*f - 16*g)*x^8 + 2*(13*d + 32*e + 2*f - 16*g)*x^6 + 3*(13*d + 32*e + 2*f - 16*g)*x^4 + 2*(13*d + 32*e + 2*f - 16*g)*x^2 + 13*d + 32*e + 2*f - 16*g)*\arctan(1/3*\sqrt{3}*(2*x - 1)) - 12*(4*d + 5*f)*x - 9*((9*d - 4*f)*x^8 + 2*(9*d - 4*f)*x^6 + 3*(9*d - 4*f)*x^4 + 2*(9*d - 4*f)*x^2 + 9*d - 4*f)*\log(x^2 + x + 1) + 9*((9*d - 4*f)*x^8 + 2*(9*d - 4*f)*x^6 + 3*(9*d - 4*f)*x^4 + 2*(9*d - 4*f)*x^2 + 9*d - 4*f)*\log(x^2 - x + 1) - 72*e + 72*g)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)$

giac [A] time = 0.38, size = 198, normalized size = 0.81

$$\frac{1}{144}\sqrt{3}(13d+2f+16g-32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+2f-16g+32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{32}(9d-4f)\log(x^2+x+1) - \frac{1}{32}(9d-4f)\log(x^2-x+1) - \frac{7dx^7-7fx^7+4gx^6-8xe+5dx^5-10fe^2+6ge^4-12xe^3+7dx^3-14f^3+8g^2-16x^2e-4dx-5fx+6g-6e}{24(x^4+x^2+1)^2}$$

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

$$\frac{\sqrt{3}\arctan\left(\frac{2x+1}{3}\right) + \sqrt{3}\arctan\left(\frac{2x-1}{3}\right) + \frac{1}{32}\ln(x^2+x+1) - \frac{1}{32}\ln(x^2-x+1) - \frac{7d^2-7f^2+4g^2-8xe+5dx^5-10fe^2+6ge^4-12xe^3+7dx^3-14f^3+8g^2-16x^2e-4dx-5fx+6g-6e}{24(x^4+x^2+1)^2}}{144}$$

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] $1/16*((-7/3*d+7/3*f-4/3*e-1/3*g)*x^3+(-6*d+4*f-2*g)*x^2+(-20/3*d+13/3*f+1/3*e-8/3*g)*x-4*d+4/3*f+2*e-2*g)/(x^2+x+1)^2+9/32*d*\ln(x^2+x+1)-1/8*f*\ln(x^2+x+1)+13/144*3^{(1/2)}*d*\arctan(1/3*(2*x+1)*3^{(1/2)})-2/9*3^{(1/2)}*e*\arctan(1/3*(2*x+1)*3^{(1/2)})+1/72*3^{(1/2)}*f*\arctan(1/3*(2*x+1)*3^{(1/2)})+1/9*3^{(1/2)}*g*\arctan(1/3*(2*x+1)*3^{(1/2)})-1/16*((7/3*d-7/3*f-4/3*e-1/3*g)*x^3+(-6*d+4*f+2*g)*x^2+(20/3*d-13/3*f+1/3*e-8/3*g)*x-4*d+4/3*f-2*e+2*g)/(x^2-x+1)^2-9/32*d*\ln(x^2-x+1)+1/8*f*\ln(x^2-x+1)+13/144*3^{(1/2)}*d*\arctan(1/3*(2*x-1)*3^{(1/2)})+2/9*3^{(1/2)}*e*\arctan(1/3*(2*x-1)*3^{(1/2)})+1/72*3^{(1/2)}*f*\arctan(1/3*(2*x-1)*3^{(1/2)})-1/9*3^{(1/2)}*g*\arctan(1/3*(2*x-1)*3^{(1/2)})$

maxima [A] time = 2.61, size = 200, normalized size = 0.82

$$\frac{1}{144}\sqrt{3}(13d-32e+2f+16g)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+32e+2f-16g)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{32}(9d-4f)\log(x^2+x+1) - \frac{1}{32}(9d-4f)\log(x^2-x+1) - \frac{7(d-f)x^7-4(2e-g)x^6+5(d-2f)x^5-6(2e-g)x^4+7(d-2f)x^3-8(2e-g)x^2-(4d+5f)x-6e+6g}{24(x^4+x^2+1)^2}$$

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

$$\frac{\left(\frac{2x+1}{3}\right)^{\frac{1}{2}}*\left(\frac{2x-1}{3}\right)^{\frac{1}{2}}*\left(\frac{2x+1}{3}\right)^{\frac{1}{2}}*\left(\frac{2x-1}{3}\right)^{\frac{1}{2}}*\left(\frac{2x+1}{3}\right)^{\frac{1}{2}}*\left(\frac{2x-1}{3}\right)^{\frac{1}{2}}*\left(\frac{2x+1}{3}\right)^{\frac{1}{2}}*\left(\frac{2x-1}{3}\right)^{\frac{1}{2}}*\ln\left(\frac{1}{2}\right) + \frac{1}{32}\ln(x^2+x+1) - \frac{1}{32}\ln(x^2-x+1) - \frac{7(d-f)x^7-4(2e-g)x^6+5(d-2f)x^5-6(2e-g)x^4+7(d-2f)x^3-8(2e-g)x^2-(4d+5f)x-6e+6g}{24(x^4+x^2+1)^2}}{144}$$

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
```

$$3.50 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{(1+x^2+x^4)^3} dx$$

Optimal. Leaf size=263

$$-\frac{1}{32} \log(x^2 - x + 1)(9d - 4f + 3h) + \frac{1}{32} \log(x^2 + x + 1)(9d - 4f + 3h) + \frac{x(-x^2(7d - 7f + 4h) + 2d + 3f - h)}{24(x^4 + x^2 + 1)}$$

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}

$$\frac{x(x^2(-7d-7f+4h)+2d+3f-h)}{24(x^4+x^2+1)} + \frac{x(x^2(-d-2f+h)+d+f-2h)}{12(x^4+x^2+1)^2} - \frac{1}{32} \log(x^2-x+1)(9d-4f+3h) + \frac{1}{32} \log(x^2+x+1)(9d-4f+3h) - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(13d+2f+h)}{48\sqrt{3}} + \frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(13d+2f+h)}{48\sqrt{3}} + \frac{(2x^2+1)(2e-g)}{12(x^4+x^2+1)} + \frac{x^2(2e-g)+e-2g}{12(x^4+x^2+1)^2} + \frac{(2e-g)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 618

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

$[2*c*d - b*e, 0] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{!NiceSqrtQ}[b^2 - 4*a*c]$

Rule 638

$\text{Int}[(d_.) + (e_.)*(x_.)*((a_.) + (b_.)*(x_.) + (c_.)*(x_.)^2)^{(p_.)}, x_Symbol]$
 $\text{] } \rightarrow \text{Simp}[(b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^{(p + 1)}/((p + 1)*(b^2 - 4*a*c)), x] - \text{Dist}[(2*p + 3)*(2*c*d - b*e)/((p + 1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x + c*x^2)^{(p + 1)}, x], x] /;$
 $\text{FreeQ}[\{a, b, c, d, e\}, x] \&\& \text{NeQ}[2*c*d - b*e, 0] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1] \&\& \text{NeQ}[p, -3/2]$

Rule 1169

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

Rule 1178

$\text{Int}[(d_.) + (e_.)*(x_.)^2)*((a_.) + (b_.)*(x_.)^2 + (c_.)*(x_.)^4)^{(p_.)}, x_Symbol]$
 $\text{] } \rightarrow \text{Simp}[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 + c*x^4)^{(p + 1)}/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + \text{Dist}[1/(2*a*(p + 1)*(b^2 - 4*a*c)), \text{Int}[\text{Simp}[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^{(p + 1)}, x], x] /;$
 $\text{FreeQ}[\{a, b, c, d, e\}, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{NeQ}[c*d^2 - b*d*e + a*e^2, 0] \&\& \text{LtQ}[p, -1] \&\& \text{IntegerQ}[2*p]$

Rule 1247

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

Rule 1673

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

Rule 1678

$\text{Int}[(Pq_)*((a_.) + (b_.)*(x_.)^2 + (c_.)*(x_.)^4)^{(p_.)}, x_Symbol]$
 $\text{] } \rightarrow \text{With}[\{d = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x^2 + c*x^4, x], x, 0], e = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x^2 + c*x^4, x], x, 2]\}, \text{Simp}[(x*(a + b*x^2 + c*x^4)^{(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)}/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + \text{Dist}[1/(2*a*(p + 1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x^2 + c*x^4)^{(p + 1)*\text{ExpandToSum}[2*a*(p + 1)*(b^2 - 4*a*c)*\text{PolynomialQuotient}[Pq, a + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /;$
 $\text{FreeQ}[\{a, b, c\}, x] \&\& \text{PolyQ}[Pq, x^2] \&\& \text{Expon}[Pq, x^2] > 1 \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1]$

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(1 + x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^3} dx \\
&= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f + 2h - 5(d - 2f + h)x^2}{(1 + x^2 + x^4)^2} dx \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d + 3f - h - (d - 2f + h)x^2)}{24(1 + x^2 + x^4)} \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)}
\end{aligned}$$

Mathematica [C] time = 0.90, size = 303, normalized size = 1.15

$$\frac{1}{144} \left(\frac{6x(7dx^2 - 2d - 7f^2 - 3f + 4hx^2 + h) - 4e(2x^2 + 1) + g(4x^2 + 2)}{x^4 + x^2 + 1} + \frac{12x(-dx^2 + d + 2fx^2 + f - h(x^2 + 2)) + 2ex^2 + e - g(x^2 + 2)}{(x^4 + x^2 + 1)^2} - \frac{\tan^{-1}\left(\frac{x(\sqrt{5} - 1)}{2}\right)((7\sqrt{5} - 47)d + (-7\sqrt{5} + 17)f + 2(2\sqrt{5} - 7)h)}{\sqrt{2}(1 + i\sqrt{5})} - \frac{\tan^{-1}\left(\frac{x(\sqrt{5} + 1)}{2}\right)((7\sqrt{5} + 47)d - (7\sqrt{5} + 17)f + 2(2\sqrt{5} + 7)h)}{\sqrt{2}(1 - i\sqrt{5})} - 16\sqrt{5}(2e - g)\tan^{-1}\left(\frac{\sqrt{5}}{2x^2 + 1}\right) \right)$$

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] $((-6*(-4*e*(1 + 2*x^2) + g*(2 + 4*x^2) + x*(-2*d - 3*f + h + 7*d*x^2 - 7*f*x^2 + 4*h*x^2)))/(1 + x^2 + x^4) + (12*(e + 2*e*x^2 - g*(2 + x^2) + x*(d + f - d*x^2 + 2*f*x^2 - h*(2 + x^2))))/(1 + x^2 + x^4)^2 - (((-47*I + 7*sqrt[3])*d + (17*I - 7*sqrt[3])*f + 2*(-7*I + 2*sqrt[3])*h)*ArcTan[(-I + sqrt[3])*x/2])/sqrt[(1 + I*sqrt[3])/6] - (((47*I + 7*sqrt[3])*d - (17*I + 7*sqrt[3])*f + 2*(7*I + 2*sqrt[3])*h)*ArcTan[(I + sqrt[3])*x/2])/sqrt[(1 - I*sqrt[3])/6] - 16*sqrt[3]*(2*e - g)*ArcTan[sqrt[3]/(1 + 2*x^2)])/144$

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(1 + x^2 + x^4)^3} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^3,x]

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^3, x]

fricas [B] time = 5.14, size = 485, normalized size = 1.84

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

$$\frac{1}{144}\sqrt{3}(13d+2f+16g+h-32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+2f-16g+h+32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{32}(9d-4f+3h)\log(x^2+x+1) - \frac{1}{32}(9d-4f+3h)\log(x^2-x+1) - \frac{7d^2-7f^2+4h^2+4g^2-8e^2+5d^2-10f^2+5h^2+6g^2-12e^2+7d^2-14f^2+7h^2+8g^2-16e^2-4d^2-5f^2+5h^2-6e}{24(x^2+x+1)}$$

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+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

$$\frac{1}{144}\sqrt{3}(13d+2f+16g+h-32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+2f-16g+h+32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{32}(9d-4f+3h)\log(x^2+x+1) - \frac{1}{32}(9d-4f+3h)\log(x^2-x+1) - \frac{(7d-7f+4h)^2-4(2e-g)^2+5(d-2f+h)^2-6(2e-g)^2+7(d-2f+h)^2-8(2e-g)^2-(4d+5f-5h)e-6e+6g}{24(x^2+x+1)}$$

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

$$\frac{1}{144}\sqrt{3}(13d+2f+16g+h)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+2f-16g+h)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{32}(9d-4f+3h)\log(x^2+x+1) - \frac{1}{32}(9d-4f+3h)\log(x^2-x+1) - \frac{(7d-7f+4h)^2-4(2e-g)^2+5(d-2f+h)^2-6(2e-g)^2+7(d-2f+h)^2-8(2e-g)^2-(4d+5f-5h)e-6e+6g}{24(x^2+x+1)}$$

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+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] $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^2 + x^4 + 1)^3, x)$

[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*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 + 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)*(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 + 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*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 + 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)*(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

$$3.51 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(1+x^2+x^4)^3} dx$$

Optimal. Leaf size=269

$$-\frac{1}{32} \log(x^2 - x + 1) (9d - 4f + 3h) + \frac{1}{32} \log(x^2 + x + 1) (9d - 4f + 3h) + \frac{x(-x^2(7d - 7f + 4h) + 2d + 3f - h)}{24(x^4 + x^2 + 1)}$$

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, number of rules used = 0.333, Rules used = {1673, 1678, 1178, 1169, 634, 618, 204, 628, 1663, 1660, 12, 614}

$$\frac{x(x^2(-7d-7f+4h)+2d+3f-h)}{24(x^4+x^2+1)} + \frac{x(x^2(-d-2f+h)+d+f-2h)}{12(x^4+x^2+1)^2} - \frac{1}{32} \log(x^2-x+1)(9d-4f+3h) + \frac{1}{32} \log(x^2+x+1)(9d-4f+3h) - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(13d+2f+h)}{48\sqrt{3}} + \frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(13d+2f+h)}{48\sqrt{3}} + \frac{(2x^2+1)(2e-g+i)}{12(x^4+x^2+1)} + \frac{x^2(2e-g-i)+e-2g+i}{12(x^4+x^2+1)} + \frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(2e-g+i)}{3\sqrt{3}}$$

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)^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] && !MatchQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Dist[-2, Subst[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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_Symbol] := 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[Pq, 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[PolynomialRemainder[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]
```

2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]

Rubi steps

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 51x^5}{(1 + x^2 + x^4)^3} dx = \int \frac{x(e + gx^2 + 51x^4)}{(1 + x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^3} dx$$

$$= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f + 2h - 5(d - 2f + h)x^2}{(1 + x^2 + x^4)^2} dx$$

$$= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \dots$$

$$= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \dots$$

$$= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \dots$$

$$= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \dots$$

$$= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \dots$$

$$= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \dots$$

Mathematica [C] time = 0.98, size = 325, normalized size = 1.21

$$\frac{1}{144} \left(\frac{12(-dx^3 + dx + 2ex^2 + e + 2fx^3 + fx - g(x^2 + 2)) - 6x^3 - 24ex - 6x^2 - 24fx - 6g}{(x^4 + x^2 + 1)^3} + \frac{6(-7dx^3 + 24ex + e(6x^2 + 4) + 7fx^3 + 3fx - 2g(2x^2 + 1) - 48x^3 - 48x + 24)}{x^4 + x^2 + 1} \cdot \frac{\tan^{-1}\left(\frac{x(\sqrt{5} - i)}{\sqrt{2}(1 + i\sqrt{5})}\right) \left((7\sqrt{5} - 47)d + (-7\sqrt{5} + 17)f + 2(2\sqrt{5} - 7)h \right)}{\sqrt{2}(1 + i\sqrt{5})} - \frac{\tan^{-1}\left(\frac{x(\sqrt{5} + i)}{\sqrt{2}(1 - i\sqrt{5})}\right) \left((7\sqrt{5} + 47)d - (7\sqrt{5} + 17)f + 2(2\sqrt{5} + 7)h \right)}{\sqrt{2}(1 - i\sqrt{5})} - 16\sqrt{3} \tan^{-1}\left(\frac{\sqrt{3}}{2x^2 + 1}\right) (2e - g + i) \right) / 144$$

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*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*Sqrt[3])/6] - 16*Sqrt[3]*(2*e - g + i)*ArcTan[Sqrt[3]/(1 + 2*x^2)]/144

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + ix^5}{(1 + x^2 + x^4)^3} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4)^3,x]

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4)^3, x]

fricas [B] time = 24.06, size = 521, normalized size = 1.94

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="fricas")

[Out]
$$\begin{aligned} & -1/288*(12*(7*d - 7*f + 4*h)*x^7 - 48*(2*e - g + i)*x^6 + 60*(d - 2*f + h)*x^5 \\ & - 72*(2*e - g + i)*x^4 + 84*(d - 2*f + h)*x^3 - 48*(4*e - 2*g + i)*x^2 \\ & - 2*\sqrt{3}*((13*d - 32*e + 2*f + 16*g + h - 16*i)*x^8 + 2*(13*d - 32*e + 2*f + 16*g + h - 16*i)*x^6 \\ & + 3*(13*d - 32*e + 2*f + 16*g + h - 16*i)*x^4 + 2*(13*d - 32*e + 2*f + 16*g + h - 16*i)*x^2 \\ & + 13*d - 32*e + 2*f + 16*g + h - 16*i)*\arctan(1/3*\sqrt{3}*(2*x + 1)) - 2*\sqrt{3}*((13*d + 32*e + 2*f - 16*g \\ & + h + 16*i)*x^8 + 2*(13*d + 32*e + 2*f - 16*g + h + 16*i)*x^6 + 3*(13*d + 32*e + 2*f - 16*g \\ & + h + 16*i)*x^4 + 2*(13*d + 32*e + 2*f - 16*g + h + 16*i)*x^2 + 13*d + 32*e + 2*f - 16*g + h + 16*i)*\arctan(1/3*\sqrt{3}*(2*x - 1)) \\ & - 12*(4*d + 5*f - 5*h)*x - 9*((9*d - 4*f + 3*h)*x^8 + 2*(9*d - 4*f + 3*h)*x^6 + 3*(9*d - 4*f + 3*h)*x^4 \\ & + 2*(9*d - 4*f + 3*h)*x^2 + 9*d - 4*f + 3*h)*\log(x^2 + x + 1) + 9*((9*d - 4*f + 3*h)*x^8 + 2*(9*d - 4*f + 3*h)*x^6 \\ & + 3*(9*d - 4*f + 3*h)*x^4 + 2*(9*d - 4*f + 3*h)*x^2 + 9*d - 4*f + 3*h)*\log(x^2 - x + 1) - 72*e + 72*g - 48*i)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1) \end{aligned}$$

giac [A] time = 0.37, size = 255, normalized size = 0.95

$$\frac{1}{144}\sqrt{3}(13d+2f+16g+h-16i-32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+2f-16g+h+16i+32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{32}(9d-4f+3h)\log(x^2+x+1) - \frac{1}{32}(9d-4f+3h)\log(x^2-x+1) - \frac{7d^2-7f^2+4h^2+4g^2-4i^2-8f^2-10f^2+5h^2+6g^2-6i^2-12f^2-24f^2+7h^2+8g^2-4h^2-16f^2-4d^2-5f^2+5h^2+6g^2-4i^2}{24(x^2+1)^2}$$

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]
$$\begin{aligned} & 1/144*\sqrt{3}*(13*d + 2*f + 16*g + h - 16*i - 32*e)*\arctan(1/3*\sqrt{3}*(2*x \\ & + 1)) + 1/144*\sqrt{3}*(13*d + 2*f - 16*g + h + 16*i + 32*e)*\arctan(1/3*\sqrt{3} \\ & *(2*x - 1)) + 1/32*(9*d - 4*f + 3*h)*\log(x^2 + x + 1) - 1/32*(9*d - 4*f \\ & + 3*h)*\log(x^2 - x + 1) - 1/24*(7*d*x^7 - 7*f*x^7 + 4*h*x^7 + 4*g*x^6 - 4* \\ & i*x^6 - 8*x^6*e + 5*d*x^5 - 10*f*x^5 + 5*h*x^5 + 6*g*x^4 - 6*i*x^4 - 12*x^4 \\ & *e + 7*d*x^3 - 14*f*x^3 + 7*h*x^3 + 8*g*x^2 - 4*i*x^2 - 16*x^2*e - 4*d*x - \\ & 5*f*x + 5*h*x + 6*g - 4*i - 6*e)/(x^4 + x^2 + 1)^2 \end{aligned}$$

maple [A] time = 0.02, size = 454, normalized size = 1.69

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]
$$\begin{aligned} & 1/16*((-7/3*d+7/3*f-4/3*h-4/3*e-1/3*g+1/3*i)*x^3+(-6*d+4*f-2*h-2*g+2*i)*x^2 \\ & +(-20/3*d+13/3*f-5/3*h+1/3*e-8/3*g+7/3*i)*x-4*d+4/3*f+2*e-2*g+4/3*i)/(x^2+x \\ & +1)^2+9/32*d*\ln(x^2+x+1)-1/8*f*\ln(x^2+x+1)+3/32*h*\ln(x^2+x+1)+13/144*3^(1/2) \\ &)*d*\arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*\arctan(1/3*(2*x+1)*3^(1/2))+1 \\ & /72*3^(1/2)*f*\arctan(1/3*(2*x+1)*3^(1/2))+1/9*3^(1/2)*g*\arctan(1/3*(2*x+1)* \\ & 3^(1/2))+1/144*3^(1/2)*h*\arctan(1/3*(2*x+1)*3^(1/2))-1/9*3^(1/2)*i*\arctan(1 \\ & /3*(2*x+1)*3^(1/2))-1/16*((7/3*d-7/3*f+4/3*h-4/3*e-1/3*g+1/3*i)*x^3+(-6*d+4 \\ & *f-2*h+2*g-2*i)*x^2+(20/3*d-13/3*f+5/3*h+1/3*e-8/3*g+7/3*i)*x-4*d+4/3*f-2*e \\ & +2*g-4/3*i)/(x^2-x+1)^2-9/32*d*\ln(x^2-x+1)+1/8*f*\ln(x^2-x+1)-3/32*h*\ln(x^2- \\ & x+1)+13/144*3^(1/2)*d*\arctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(1/2)*e*\arctan(1/3* \\ & (2*x-1)*3^(1/2))+1/72*3^(1/2)*f*\arctan(1/3*(2*x-1)*3^(1/2))-1/9*3^(1/2)*g*a \\ & rctan(1/3*(2*x-1)*3^(1/2))+1/144*3^(1/2)*h*\arctan(1/3*(2*x-1)*3^(1/2))+1/9* \\ & 3^(1/2)*i*\arctan(1/3*(2*x-1)*3^(1/2)) \end{aligned}$$

maxima [A] time = 2.12, size = 229, normalized size = 0.85

$$\frac{1}{144}\sqrt{3}(13d-32e+2f+16g+h-16i)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+32e+2f-16g+h+16i)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{32}(9d-4f+3h)\log(x^2+x+1) - \frac{1}{32}(9d-4f+3h)\log(x^2-x+1) - \frac{(7d-7f+4h)^2-4(2e-g+i)^2+5(d-2f+h)^2-6(2e-g+i)^2+7(d-2f+h)^2-4(4d-2g+i)^2-(4d+5f-5h)^2-6e+6g-4i}{24(x^2+2x^2+2x^2+1)}$$

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="maxima")

[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*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 + 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 - 1920*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*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*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*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) + 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*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)

$$\begin{aligned}
& 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)
\end{aligned}$$

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

$$3.52 \quad \int \frac{d+ex}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=474

$$\frac{dx(3bcx^2(b^2-8ac) + (b^2-7ac)(3b^2-4ac))}{8a^2(b^2-4ac)^2(a+bx^2+cx^4)} + \frac{3\sqrt{c}d(56a^2c^2-10ab^2c+b(b^2-8ac)\sqrt{b^2-4ac}+b^4)\tan^{-1}}{8\sqrt{2}a^2(b^2-4ac)^{5/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

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, number of rules / integrand size = 0.500, Rules used = {1673, 12, 1092, 1178, 1166, 205, 1107, 614, 618, 206}

$$\frac{3\sqrt{c}d(56a^2c^2-10ab^2c+b(b^2-8ac)\sqrt{b^2-4ac}+b^4)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{8\sqrt{2}a^2(b^2-4ac)^{5/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{3\sqrt{c}d\left(\frac{56a^2c^2-10ab^2c+b^4}{b^2-4ac}-8abc+b\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b^2-4ac+bx^2}}\right)}{8\sqrt{2}a^2(b^2-4ac)^2\sqrt{b^2-4ac}+b} + \frac{dx(3bcx^2(b^2-8ac)+(b^2-7ac)(3b^2-4ac))}{8a^2(b^2-4ac)^2(a+bx^2+cx^4)} - \frac{6c^2e\tanh^{-1}\left(\frac{bx^2c}{a+bx^2+cx^4}\right)}{(b^2-4ac)^{5/2}} + \frac{dx(-2ac+b^2+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)} + \frac{3cx(b+2cx^2)}{2(b^2-4ac)^2(a+bx^2+cx^4)} - \frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2}$$

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] && !MatchQ[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] && (GtQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 618

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

$x] \&\& \text{NeQ}[b^2 - 4ac, 0]$

Rule 1092

$\text{Int}[(a_ + (b_.)x^2 + (c_.)x^4)^{p_}], x_Symbol] \rightarrow -\text{Simp}[(x(b^2 - 2ac + b^2x^2)(a + bx^2 + cx^4)^{p+1}) / (2a(p+1)(b^2 - 4ac)), x] + \text{Dist}[1 / (2a(p+1)(b^2 - 4ac)), \text{Int}[(b^2 - 2ac + 2(p+1)(b^2 - 4ac) + b^2(4p+7)x^2)(a + bx^2 + cx^4)^{p+1}, x], x] /;$ $\text{FreeQ}\{a, b, c, x\} \&\& \text{NeQ}[b^2 - 4ac, 0] \&\& \text{LtQ}[p, -1] \&\& \text{IntegerQ}[2p]$

Rule 1107

$\text{Int}[(x_)((a_ + (b_.)x^2 + (c_.)x^4)^{p_}), x_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(a + bx + cx^2)^p, x], x, x^2], x] /;$ $\text{FreeQ}\{a, b, c, p\}, x]$

Rule 1166

$\text{Int}[(d_ + (e_.)x^2) / ((a_ + (b_.)x^2 + (c_.)x^4), x_Symbol] \rightarrow \text{With}\{q = \text{Rt}[b^2 - 4ac, 2]\}, \text{Dist}[e/2 + (2cd - b^2e) / (2q), \text{Int}[1 / (b/2 - q/2 + cx^2), x], x] + \text{Dist}[e/2 - (2cd - b^2e) / (2q), \text{Int}[1 / (b/2 + q/2 + cx^2), x], x] /;$ $\text{FreeQ}\{a, b, c, d, e\}, x] \&\& \text{NeQ}[b^2 - 4ac, 0] \&\& \text{NeQ}[c^2d^2 - a^2e^2, 0] \&\& \text{PosQ}[b^2 - 4ac]$

Rule 1178

$\text{Int}[(d_ + (e_.)x^2)((a_ + (b_.)x^2 + (c_.)x^4)^{p_}), x_Symbol] \rightarrow \text{Simp}[(x(ab^2e - d(b^2 - 2ac) - c(bd - 2ae)x^2)(a + bx^2 + cx^4)^{p+1}) / (2a(p+1)(b^2 - 4ac)), x] + \text{Dist}[1 / (2a(p+1)(b^2 - 4ac)), \text{Int}[\text{Simp}[(2p+3)db^2 - ab^2e - 2acd(4p+5) + (4p+7)(db - 2ae)cx^2, x](a + bx^2 + cx^4)^{p+1}, x], x] /;$ $\text{FreeQ}\{a, b, c, d, e\}, x] \&\& \text{NeQ}[b^2 - 4ac, 0] \&\& \text{NeQ}[c^2d^2 - b^2d^2e + a^2e^2, 0] \&\& \text{LtQ}[p, -1] \&\& \text{IntegerQ}[2p]$

Rule 1673

$\text{Int}[(Pq_)((a_ + (b_.)x^2 + (c_.)x^4)^{p_}), x_Symbol] \rightarrow \text{Module}\{q = \text{Expon}[Pq, x], k\}, \text{Int}[\text{Sum}[\text{Coeff}[Pq, x, 2k]x^{2k}, \{k, 0, q/2\}](a + bx^2 + cx^4)^p, x] + \text{Int}[x \text{Sum}[\text{Coeff}[Pq, x, 2k+1]x^{2k}, \{k, 0, (q-1)/2\}](a + bx^2 + cx^4)^p, x] /;$ $\text{FreeQ}\{a, b, c, p\}, x] \&\& \text{PolyQ}[Pq, x] \&\& \text{!PolyQ}[Pq, x^2]$

Rubi steps

$$\begin{aligned}
\int \frac{d+ex}{(a+bx^2+cx^4)^3} dx &= \int \frac{d}{(a+bx^2+cx^4)^3} dx + \int \frac{ex}{(a+bx^2+cx^4)^3} dx \\
&= d \int \frac{1}{(a+bx^2+cx^4)^3} dx + e \int \frac{x}{(a+bx^2+cx^4)^3} dx \\
&= \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} - \frac{d \int \frac{b^2-2ac-4(b^2-4ac)-5bcx^2}{(a+bx^2+cx^4)^2} dx}{4a(b^2-4ac)} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(a+bx^2+cx^4)^3} dx, x, \sqrt{b^2-4ac}x \right) \\
&= -\frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx((b^2-7ac)(3b^2-4ac))}{8a^2(b^2-4ac)^2(a+bx^2+cx^4)} \\
&= -\frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{3ce(b+2cx^2)}{2(b^2-4ac)^2(a+bx^2+cx^4)} \\
&= -\frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{3ce(b+2cx^2)}{2(b^2-4ac)^2(a+bx^2+cx^4)} \\
&= -\frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{3ce(b+2cx^2)}{2(b^2-4ac)^2(a+bx^2+cx^4)}
\end{aligned}$$

Mathematica [A] time = 1.91, size = 488, normalized size = 1.03

$$\frac{1}{16} \left(\frac{8e^2(3b+cx)(d+ex) - 2abdx(25b+24cx^2) + 6b^2dx(b+cx^2)}{a^2(b^2-4ac)^2(a+bx^2+cx^4)} + \frac{3\sqrt{2}\sqrt{c}(56a^2d-10ab^2c-8abc\sqrt{b^2-4ac}+b^2\sqrt{b^2-4ac}+b^3)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b^2-4ac}}\right)}{a^2(b^2-4ac)^{5/2}\sqrt{b^2-4ac}} + \frac{3\sqrt{2}\sqrt{c}d(56a^2d-10ab^2c+8abc\sqrt{b^2-4ac}-b^2\sqrt{b^2-4ac}+b^3)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b^2-4ac}}\right)}{a^2(b^2-4ac)^{5/2}\sqrt{b^2-4ac}+b} + \frac{48c^2\log(\sqrt{b^2-4ac}-b-2cx^2)}{(b^2-4ac)^{3/2}} + \frac{48c^2\log(\sqrt{b^2-4ac}+b+2cx^2)}{(b^2-4ac)^{3/2}} + \frac{4abx+8acx(d+cx)-4bdx(b+cx^2)}{a(4ac-b^2)(a+bx^2+cx^4)} \right)$$

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

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

$$\int \frac{d+ex}{(a+bx^2+cx^4)^3} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(d + e*x)/(a + b*x^2 + c*x^4)^3, x]

[Out] IntegrateAlgebraic[(d + e*x)/(a + b*x^2 + c*x^4)^3, x]

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]
$$\frac{3}{32}(\sqrt{2})\sqrt{bc + \sqrt{b^2 - 4ac}}c)b^8 - 17\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^2b^6c - 2\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}}c)b^7c - 2b^8c + 116\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^2b^4c^2 + 26\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^2b^5c^2 + \sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}}c)b^6c^2 + 34a^2b^6c^2 + 2b^7c^2 - 368\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^3b^2c^3 - 128\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^2b^3c^3 - 13\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^2b^4c^3 - 232a^2b^4c^3 - 30a^2b^5c^3 + 448\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^4c^4 + 224\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^3b^2c^4 + 64\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^2b^2c^4 + 736a^3b^2c^4 + 176a^2b^3c^4 - 112\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^3c^5 - 896a^4c^5 - 352a^3b^2c^5 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)b^7 + 15\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^2b^5c + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)b^6c - 88\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^2b^3c^2 - 22\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^2b^4c^2 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)b^5c^2 + 176\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^3b^2c^3 + 88\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^2b^2c^3 + 11\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^2b^3c^3 - 44\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^2b^4c^3 + 2(b^2 - 4ac)b^6c - 26(b^2 - 4ac)a^2b^4c^2 - 2(b^2 - 4ac)b^5c^2 + 128(b^2 - 4ac)a^2b^2c^3 + 22(b^2 - 4ac)a^2b^3c^3 - 224(b^2 - 4ac)a^3c^4 - 88(b^2 - 4ac)a^2b^2c^4) * \arctan\left(\frac{2\sqrt{1/2}x/\sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2 + \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2)^2 - 4(a^3b^4 - 8a^4b^2c + 16a^5c^2)}(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3))}}{(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3)}\right) / ((a^3b^8 - 16a^4b^6c - 2a^3b^7c + 96a^5b^4c^2 + 24a^4b^5c^2 + a^3b^6c^2 - 256a^6b^2c^3 - 96a^5b^3c^3 - 12a^4b^4c^3 + 256a^7c^4 + 128a^6b^2c^4 + 48a^5b^2c^4 - 64a^6c^5) * \text{abs}(c)) + \frac{3}{32}(\sqrt{2})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^8 - 17\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^6c - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^7c + 2b^8c + 116\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^4c^2 + 26\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^5c^2 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^6c^2 - 34a^2b^6c^2 - 2b^7c^2 - 368\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^2c^3 - 128\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^3c^3 - 13\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^4c^3 + 232a^2b^4c^3 + 30a^2b^5c^3 + 448\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^4c^4 + 224\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^2c^4 + 64\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^2c^4 - 736a^3b^2c^4 - 176a^2b^3c^4 - 112\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3c^5 + 896a^4c^5 + 352a^3b^2c^5 + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^7 - 15\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^5c - 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)$$

$$\begin{aligned}
& - \sqrt{b^2 - 4ac} * c * b^6 * c + 88 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b * c - \sqrt{b^2 - 4ac}} \\
& (b^2 - 4ac) * c * a^2 * b^3 * c^2 + 22 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b * c - \sqrt{b^2 - 4ac}} \\
& (b^2 - 4ac) * c * a * b^4 * c^2 + \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b * c - \sqrt{b^2 - 4ac}} \\
& (b^2 - 4ac) * c * b^5 * c^2 - 176 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b * c - \sqrt{b^2 - 4ac}} \\
& (b^2 - 4ac) * c * a^3 * b * c^3 - 88 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b * c - \sqrt{b^2 - 4ac}} \\
& (b^2 - 4ac) * c * a^2 * b^2 * c^3 - 11 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b * c - \sqrt{b^2 - 4ac}} \\
& (b^2 - 4ac) * c * a * b^3 * c^3 + 44 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b * c - \sqrt{b^2 - 4ac}} \\
& (b^2 - 4ac) * c * a^2 * b * c^4 - 2 * (b^2 - 4ac) * b^6 * c + 26 * (b^2 - 4ac) * a * b^4 * c^2 + 2 * (b^2 - 4ac) * b^5 * c^2 \\
& - 128 * (b^2 - 4ac) * a^2 * b^2 * c^3 - 22 * (b^2 - 4ac) * a * b^3 * c^3 + 224 * (b^2 - 4ac) * a^3 * c^4 + 88 * (b^2 - 4ac) * 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) * \text{abs}(c)) - 3 * (b^2 * c^4 - 4 * a * c^5 - 2 * b * c^5 + c^6) * \sqrt{b^2 - 4ac} * 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 - 4ac} * 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 + 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)
\end{aligned}$$

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] $\text{int}((e*x+d)/(c*x^4+b*x^2+a)^3, x)$

[Out] $3/16*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^4*d-15/8*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a^2*(1/2)/((b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*d+3/16*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^4*d-15/8*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a^2*(1/2)/((-b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*d+3/16*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*c*x)*b^5*d-15/8*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2/a*d*x^3*(-4*a*c+b^2)^{(1/2)}*b^2+9/4*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a^2*(1/2)/((b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*c*x)*b^3*d-3/16*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})^2)*c^{(1/2)}*c*x)*b^5*d+15/8*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2/a*d*x^3*(-4$

$$\begin{aligned}
& *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)}*\operatorname{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)}*\operatorname{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)}*\operatorname{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)}* \\
& \operatorname{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)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2) \\
&)*c*x)*b*d
\end{aligned}$$

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

$$\frac{24 a^2 c^3 e x^6 + 36 a^2 b c^2 e x^4 + 3 (b^3 c^2 - 8 a b c^3) d x^2 + (6 b^4 c - 49 a b^2 c^2 + 28 a^2 c^3) d x^3 + (3 b^5 - 20 a b^3 c - 4 a^2 b c^2) d x^4 + 8 (a^2 b^2 c + 5 a^3 c^2) e x^2 + (5 a b^4 - 37 a^2 b^2 c + 44 a^3 c^2) d x - 2 (a^2 b^3 - 10 a^3 b c) e - 3 \int \frac{16 a^2 c^2 x + (b^3 c - 8 a b c^2) d x^2 + (b^4 c - 49 a b^2 c^2 + 28 a^2 c^3) d x^3 + (3 b^5 - 20 a b^3 c - 4 a^2 b c^2) d x^4 + 8 (a^2 b^2 c + 5 a^3 c^2) e x^2 + (5 a b^4 - 37 a^2 b^2 c + 44 a^3 c^2) d x - 2 (a^2 b^3 - 10 a^3 b c) e}{8 (a^2 b^4 c^2 - 8 a^3 b^2 c^3 + 16 a^4 c^4) x^8 + a^4 b^4 - 8 a^5 b^2 c + 16 a^6 c^2 + 2 (a^2 b^5 c - 8 a^3 b^3 c^2 + 16 a^4 b c^3) x^6 + (a^2 b^6 - 6 a^3 b^4 c + 32 a^5 c^3) x^4 + 2 (a^3 b^5 - 8 a^4 b^3 c + 16 a^5 b c^2) x^2} dx}{8 (a^2 b^4 - 8 a^3 b^2 c + 16 a^4 c^2)}$$

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 + 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 + 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 - 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 + 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 + 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 + 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 + 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 - 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 + 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)*

$$\begin{aligned}
& ((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 - 2949120*a^6*b^6*c^6*d + 7798784*a^7*b^4*c^7*d - 11534336*a^8*b^2*c^8*d))/(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)) + (\text{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 + 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 + 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 - 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 + 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*(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 + 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*(225792*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 - 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))/(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))*\text{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 + 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 + 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
\end{aligned}$$

```
*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

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} + \frac{\sqrt{c} \left(-\frac{52a^2bcf + 168a^2c^2d + \dots}{\sqrt{b^2 - 4ac}} \right)}{\dots}$$

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, number of rules / integrand size = 0.360, Rules used = {1673, 1178, 1166, 205, 12, 1107, 614, 618, 206}

$$\frac{c \sqrt{c} (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} + \frac{\sqrt{c} \left(-\frac{52a^2bcf + 168a^2c^2d + \dots}{\sqrt{b^2 - 4ac}} \right)}{\dots}$$

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] && !MatchQ[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] && (GtQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] && NeQ[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_Symbol] := 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

$$\begin{aligned}
 \int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^3} dx &= \int \frac{ex}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx \\
 &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{\int \frac{-3b^2d + 14acd - abf - 5c(bd - 2af)x^2}{(a + bx^2 + cx^4)^2} dx}{4a(b^2 - 4ac)} + e \int \frac{1}{(a + bx^2 + cx^4)^3} dx \\
 &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3b^4d - 25ab^2cd + 28a^2c^2d + ab^3f + 8a^2bcf)}{8a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3b^4d - 25ab^2cd + 28a^2c^2d + ab^3f + 8a^2bcf)}{8a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3ce(b + 2cx^2)}{2(b^2 - 4ac)^2} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3ce(b + 2cx^2)}{2(b^2 - 4ac)^2} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3ce(b + 2cx^2)}{2(b^2 - 4ac)^2}
 \end{aligned}$$

Mathematica [A] time = 3.61, size = 625, normalized size = 1.01

$$\left[\frac{e x (b^2 d - 2 a c d - a b f + c (b d - 2 a f) x^2)}{4 a (b^2 - 4 a c) (a + b x^2 + c x^4)^2} - \frac{\int \frac{-3 b^2 d + 14 a c d - a b f - 5 c (b d - 2 a f) x^2}{(a + b x^2 + c x^4)^2} dx}{4 a (b^2 - 4 a c)} + e \int \frac{1}{(a + b x^2 + c x^4)^3} dx \right]$$

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]]) + (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]]) + (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

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

$$\int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^3} dx$$

Verification is not applicable to the result.

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

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

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))*b^8 - 17*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b^6
*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^7*c - 2*b^8*c + 116*sqrt(2
)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*b^4*c^2 + 26*sqrt(2)*sqrt(b*c + sqrt(
b^2 - 4*a*c))*a*b^5*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*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))*a
^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*b^3*c^3 - 13*s
qrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*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))*a^4*c^4 + 224*sqrt(2)*
sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3*b*c^4 + 64*sqrt(2)*sqrt(b*c + sqrt(b^2
- 4*a*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))*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))*b^7 + 15*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b^5*c + 2*sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^6*c - 88*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c + sqrt(b^2 - 4*a*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))*a*b^4*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*s
qrt(b*c + sqrt(b^2 - 4*a*c))*b^5*c^2 + 176*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c + sqrt(b^2 - 4*a*c))*a^3*b*c^3 + 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*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))*a*b^3*c^3 - 44*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
+ sqrt(b^2 - 4*a*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))*a*b^7 - 24*sqrt(2)*sqrt(
b*c + sqrt(b^2 - 4*a*c))*a^2*b^5*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*
c))*a*b^6*c - 2*a*b^7*c + 144*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3
```

$$\begin{aligned}
& *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{2} \\
& (b^2 - 4*a*c)*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^3 + 18*\sqrt{2}*\sqrt{2} \\
& (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{2} \\
& (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{2} \\
& (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)*\text{abs}(c)) \\
& + 1/32*(3*(\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^8 - 17*\sqrt{2}*\sqrt{2} \\
& (b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^6*c - 2*\sqrt{2}*\sqrt{2}*(b*c - \sqrt{b^2 - 4*a*c}} \\
& *c)*b^7*c + 2*b^8*c + 116*\sqrt{2}*\sqrt{2}*(b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^4*c^ \\
& 2 + 26*\sqrt{2}*\sqrt{2}*(b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^5*c^2 + \sqrt{2}*\sqrt{2} \\
& (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{2} \\
& (b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^2*c^3 - 128*\sqrt{2}*\sqrt{2}*(b*c - \sqrt{b^2 \\
& - 4*a*c}}*c)*a^2*b^3*c^3 - 13*\sqrt{2}*\sqrt{2}*(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{2}*(b*c - \sqrt{b^2 - 4 \\
& *a*c}}*c)*a^4*c^4 + 224*\sqrt{2}*\sqrt{2}*(b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^4 + \\
& 64*\sqrt{2}*\sqrt{2}*(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{2}*(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{2}*(b^2 - 4*a*c)*\sqrt{b*c - \sqrt{b^2 - \\
& 4*a*c}}*c)*b^7 - 15*\sqrt{2}*\sqrt{2}*(b^2 - 4*a*c)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& *c)*a*b^5*c - 2*\sqrt{2}*\sqrt{2}*(b^2 - 4*a*c)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^6 \\
& *c + 88*\sqrt{2}*\sqrt{2}*(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{2}*(b^2 - 4*a*c)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^4*c^2 \\
& + \sqrt{2}*\sqrt{2}*(b^2 - 4*a*c)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^5*c^2 - 176* \\
& \sqrt{2}*\sqrt{2}*(b^2 - 4*a*c)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^3 - 88*\sqrt{2} \\
& *\sqrt{2}*(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{2}*(b^2 - 4*a*c)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^3*c^3 + 44*\sqrt{2} \\
& *\sqrt{2}*(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{2}*(b*c - \sqrt{b^2 - 4*a \\
& *c}}*c)*a*b^7 - 24*\sqrt{2}*\sqrt{2}*(b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^5*c - 2*\sqrt{2} \\
& *\sqrt{2}*(b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^6*c + 2*a*b^7*c + 144*\sqrt{2}*\sqrt{2} \\
& (b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^3*c^2 + 40*\sqrt{2}*\sqrt{2}*(b*c - \sqrt{b^2 - \\
& 4*a*c}}*c)*a^2*b^4*c^2 + \sqrt{2}*\sqrt{2}*(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{2}*(b*c - \sqrt{b^2 - 4*a*c}}*c) \\
& *a^4*b*c^3 - 128*\sqrt{2}*\sqrt{2}*(b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^2*c^3 - 20*\sqrt{2} \\
& *\sqrt{2}*(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{2}*(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{2}*(b^2 - 4*a*c)*\sqrt{b*c \\
& - \sqrt{b^2 - 4*a*c}}*c)*a*b^6 - 22*\sqrt{2}*\sqrt{2}*(b^2 - 4*a*c)*\sqrt{b*c - \sqrt{b^2 \\
& - 4*a*c}}*c)*a^2*b^4*c - 2*\sqrt{2}*\sqrt{2}*(b^2 - 4*a*c)*\sqrt{b*c - \sqrt{b^2}
\end{aligned}$$

$$2 - 4ac)c)ab^5c + 32\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) a^3b^2c^2 + 36\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) a^2b^3c^2 + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) ab^4c^2 + 160\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) a^4c^3 + 80\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) a^3b^2c^3 - 18\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) a^2b^2c^3 - 40\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) a^3c^4 - 2(b^2 - 4ac)ab^5c + 40(b^2 - 4ac)a^2b^3c^2 + 2(b^2 - 4ac)ab^4c^2 - 128(b^2 - 4ac)a^3b^2c^3 - 36(b^2 - 4ac)a^2b^2c^3 - 80(b^2 - 4ac)a^3c^4) f) \arctan(2\sqrt{1/2}x/\sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2 - \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2)^2 - 4(a^3b^4 - 8a^4b^2c + 16a^5c^2)(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3)})/(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3)))/(a^3b^8 - 16a^4b^6c - 2a^3b^7c + 96a^5b^4c^2 + 24a^4b^5c^2 + a^3b^6c^2 - 256a^6b^2c^3 - 96a^5b^3c^3 - 12a^4b^4c^3 + 256a^7c^4 + 128a^6b^2c^4 + 48a^5b^2c^4 - 64a^6c^5) \operatorname{abs}(c)) + 1/8(3b^3c^2dx^7 - 24ab^2c^3dx^7 + ab^2c^2fx^7 + 20a^2c^3fx^7 + 24a^2c^3x^6e + 6b^4cdx^5 - 49ab^2c^2dx^5 + 28a^2c^3dx^5 + 2ab^3cfx^5 + 28a^2b^2c^2fx^5 + 36a^2b^2c^2x^4e + 3b^5dx^3 - 20ab^3cdx^3 - 4a^2b^2c^2dx^3 + ab^4fx^3 + 5a^2b^2c^2fx^3 + 36a^3c^2fx^3 + 8a^2b^2c^2x^2e + 40a^3c^2x^2e + 5ab^4dx - 37a^2b^2cdx + 44a^3c^2dx - a^2b^3fx + 16a^3b^2c^2fx - 2a^2b^3e + 20a^3b^2c^2e)/(a^2b^4 - 8a^3b^2c + 16a^4c^2)(cx^4 + bx^2 + a)^2)$$

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] $1/8(24a^2c^3eex^6 + 36a^2b^2c^2eex^4 + (3(b^3c^2 - 8ab^2c^3)d + (ab^2c^2 + 20a^2c^3)f)x^7 + ((6b^4c - 49ab^2c^2 + 28a^2c^3)d + 2(ab^3c + 14a^2b^2c^2)f)x^5 + 8(a^2b^2c + 5a^3c^2)eex^2 + ((3b^5 - 20ab^3c - 4a^2b^2c^2)d + (ab^4 + 5a^2b^2c + 36a^3c^2)f)x^3 - 2(a^2b^3 - 10a^3b^2c)e + ((5ab^4 - 37a^2b^2c + 44a^3c^2)d - (a^2b^3 - 16a^3b^2c)f)x) / ((a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)x^8 + a^4b^4 - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4b^2c^3)x^6 + (a^2b^6 - 6a^3b^4c + 32a^5c^3)x^4 + 2(a^3b^5 - 8a^4b^3c + 16a^5b^2c^2)x^2) + 1/8 \int (48a^2c^2eex + (3(b^3c - 8ab^2c^2)d + (ab^2c + 20a^2c^2)f)x^2 + 3(b^4 - 9ab^2c + 28a^2c^2)d + (ab^3 - 16a^2b^2c)f) / (cx^4 + bx^2 + a), x) / (a^2b^4 - 8a^3b^2c + 16a^4c^2)$

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] $((x^2(5a^2c^2e + b^2c^2e))/(b^4 + 16a^2c^2 - 8ab^2c) - (b^3e - 10ab^2c^2e)/(4(b^4 + 16a^2c^2 - 8ab^2c))) + (x^5(28a^2c^3d + 6b^4cd$

$$\begin{aligned}
& + 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) + \text{symsum}(\log(\text{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 - 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 + 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 + 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 - 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 - 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 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k) * (\text{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 - 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 + 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 + 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 - 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 - 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 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)
\end{aligned}$$

$$\begin{aligned}
& ^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^8c^9d^2z^2 \\
& - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a \\
& *b^17c^d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2 \\
& *z^2 + 477102080a^9b^3c^7f^2z^2 - 174325760a^8b^5c^6f^2z^2 - 1887 \\
& 43680a^7b^6c^6e^2z^2 + 146165760a^4b^11c^4d^2z^2 + 11206656a^7b \\
& ^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 \\
& - 2600960a^5b^11c^3f^2z^2 + 291840a^4b^13c^2f^2z^2 - 19860480a^ \\
& 3b^13c^3d^2z^2 - 1179648a^5b^10c^4e^2z^2 + 1771776a^2b^15c^2d^ \\
& 2z^2 + 1536a*b^18d*f*z^2 + 1207959552a^10c^9e^2z^2 + 256a^2b^17f^ \\
& 2z^2 + 2304b^19d^2z^2 + 169869312a^7b^8c^8d*e*f*z + 9216a*b^13c^2d \\
& *e*f*z - 221773824a^6b^3c^7d*e*f*z + 117964800a^5b^5c^6d*e*f*z - 32 \\
& 440320a^4b^7c^5d*e*f*z + 4792320a^3b^9c^4d*e*f*z - 350208a^2b^11c \\
& ^3d*e*f*z - 428544a*b^12c^3d^2e*z + 1022754816a^6b^2c^8d^2e*z - \\
& 642318336a^5b^4c^7d^2e*z + 223395840a^4b^6c^6d^2e*z - 50724864a^ \\
& 7b^2c^7e*f^2z + 26542080a^6b^4c^6e*f^2z - 46725120a^3b^8c^5d^2 \\
& *e*z - 7127040a^5b^6c^5e*f^2z + 1013760a^4b^8c^4e*f^2z - 69120a^ \\
& 3b^10c^3e*f^2z + 1536a^2b^12c^2e*f^2z + 5930496a^2b^10c^4d^2e \\
& *z - 693633024a^7c^9d^2e*z + 39321600a^8c^8e*f^2z + 13824b^14c^2* \\
& d^2e*z + 13824a*b^8c^4d*e^2f - 7741440a^4b^2c^7d*e^2f + 2903040a \\
& ^3b^4c^6d*e^2f - 387072a^2b^6c^5d*e^2f + 37310976a^3b^3c^7d^3* \\
& f + 3870720a^5b^8c^7e^2f^2 + 34836480a^4b^6c^8d^2e^2 - 8068032a^2b^ \\
& 5c^6d^3f - 5623296a^4b^3c^6d*f^3 + 1737792a^3b^5c^5d*f^3 - 26019 \\
& 0a*b^8c^4d^2f^2 - 211680a^2b^7c^4d*f^3 - 435456a*b^7c^5d^2e^2 - \\
& 75188736a^4b^8c^8d^3f - 15482880a^5c^8d*e^2f - 4262400a^5b^8c^7d* \\
& f^3 + 852768a*b^7c^5d^3f + 7350a*b^9c^3d*f^3 + 35525376a^4b^2c^7* \\
& d^2f^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2 \\
& *b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f \\
& ^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 + 11025b^1 \\
& 0c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 20736b^9c^4d^2e^2 + 492800a^ \\
& 5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b \\
& ^8c^3f^4 - 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 - 39690b^9 \\
& *c^4d^3f - 734832a*b^6c^6d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f \\
& ^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k)*((768a^2b^14c^2*d - \\
& 22020096a^9c^9d - 22272a^3b^12c^3d + 282624a^4b^10c^4d - 2027520 \\
& *a^5b^8c^5d + 8847360a^6b^6c^6d - 23396352a^7b^4c^7d + 34603008* \\
& a^8b^2c^8d + 256a^3b^13c^2f - 9216a^4b^11c^3f + 122880a^5b^9c \\
& ^4f - 819200a^6b^7c^5f + 2949120a^7b^5c^6f - 5505024a^8b^3c^7f \\
& + 4194304a^9b^8c^8f)/(512*(a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 24 \\
& 0a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + \\
& (x*(786432a^9c^9e - 768a^4b^10c^4e + 15360a^5b^8c^5e - 122880a^ \\
& 6b^6c^6e + 491520a^7b^4c^7e - 983040a^8b^2c^8e))/(32*(a^4b^12 + \\
& 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840* \\
& a^8b^4c^4 - 6144a^9b^2c^5)) + (root(56371445760a^11b^8c^6z^4 - 503 \\
& 316480a^8b^14c^3z^4 + 47185920a^7b^16c^2z^4 - 171798691840a^14b^2 \\
& *c^9z^4 + 193273528320a^13b^4c^8z^4 - 128849018880a^12b^6c^7z^4 - \\
& 16911433728a^10b^10c^5z^4 + 3523215360a^9b^12c^4z^4 - 2621440a^6b \\
& ^18c^z^4 + 68719476736a^15c^10z^4 + 65536a^5b^20z^4 - 73728a^2b^16 \\
& *c*d*f*z^2 - 1321205760a^9b^2c^8d*f*z^2 + 732168192a^7b^6c^6d*f*z^2 \\
& - 366280704a^6b^8c^5d*f*z^2 - 330301440a^8b^4c^7d*f*z^2 + 96583680 \\
& *a^5b^10c^4d*f*z^2 - 15175680a^4b^12c^3d*f*z^2 + 1428480a^3b^14c^ \\
& 2d*f*z^2 - 440401920a^10b^8c^8f^2z^2 + 1761607680a^10c^9d*f*z^2 - 14 \\
& 080a^3b^15c^f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^ \\
& 7c^6d^2z^2 - 3963617280a^9b^8c^9d^2z^2 - 1509949440a^9b^2c^8e^2z \\
& ^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a*b^17c^d^2z^2 + 754974720a^ \\
& 8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f \\
& ^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 14 \\
& 6165760a^4b^11c^4d^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b \\
& ^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^11c^3f^2z^ \\
& 2 + 291840a^4b^13c^2f^2z^2 - 19860480a^3b^13c^3d^2z^2 - 1179648a
\end{aligned}$$

$$\begin{aligned}
& ^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^*b^{18}d^*f^*z^2 + \\
& 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 16 \\
& 9869312a^7b^*c^8d^*e^*f^*z + 9216a^*b^{13}c^2d^*e^*f^*z - 221773824a^6b^3c^7 \\
& *d^*e^*f^*z + 117964800a^5b^5c^6d^*e^*f^*z - 32440320a^4b^7c^5d^*e^*f^*z + 4 \\
& 792320a^3b^9c^4d^*e^*f^*z - 350208a^2b^{11}c^3d^*e^*f^*z - 428544a^*b^{12}c^ \\
& 3d^2e^*z + 1022754816a^6b^2c^8d^2e^*z - 642318336a^5b^4c^7d^2e^*z \\
& + 223395840a^4b^6c^6d^2e^*z - 50724864a^7b^2c^7e^*f^2z + 26542080a \\
& ^6b^4c^6e^*f^2z - 46725120a^3b^8c^5d^2e^*z - 7127040a^5b^6c^5e^*f \\
& ^2z + 1013760a^4b^8c^4e^*f^2z - 69120a^3b^{10}c^3e^*f^2z + 1536a^2* \\
& b^{12}c^2e^*f^2z + 5930496a^2b^{10}c^4d^2e^*z - 693633024a^7c^9d^2e^*z \\
& + 39321600a^8c^8e^*f^2z + 13824b^{14}c^2d^2e^*z + 13824a^*b^8c^4d^*e^ \\
& 2f - 7741440a^4b^2c^7d^*e^2f + 2903040a^3b^4c^6d^*e^2f - 387072a^ \\
& 2b^6c^5d^*e^2f + 37310976a^3b^3c^7d^3f + 3870720a^5b^*c^7e^2f^2 \\
& + 34836480a^4b^*c^8d^2e^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3* \\
& c^6d^*f^3 + 1737792a^3b^5c^5d^*f^3 - 260190a^*b^8c^4d^2f^2 - 211680a \\
& ^2b^7c^4d^*f^3 - 435456a^*b^7c^5d^2e^2 - 75188736a^4b^*c^8d^3f - 15 \\
& 482880a^5c^8d^*e^2f - 4262400a^5b^*c^7d^*f^3 + 852768a^*b^7c^5d^3f + \\
& 7350a^*b^9c^3d^*f^3 + 35525376a^4b^2c^7d^2f^2 + 645120a^4b^3c^6e \\
& ^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^ \\
& 3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2* \\
& e^2 + 3919104a^2b^5c^6d^2e^2 + 11025b^{10}c^3d^2f^2 + 5644800a^5c^ \\
& 8d^2f^2 + 20736b^9c^4d^2e^2 + 492800a^5b^2c^6f^4 + 351456a^4b^4 \\
& *c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2* \\
& c^8d^4 + 6446304a^2b^4c^7d^4 - 39690b^9c^4d^3f - 734832a^*b^6c^6* \\
& d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 357 \\
& 21b^8c^5d^4, z, k) * x * (4194304a^{11}b^*c^9 - 256a^4b^{15}c^2 + 7168a^5b \\
& ^{13}c^3 - 86016a^6b^{11}c^4 + 573440a^7b^9c^5 - 2293760a^8b^7c^6 + 5 \\
& 505024a^9b^5c^7 - 7340032a^{10}b^3c^8) / (32 * (a^4b^{12} + 4096a^{10}c^6 - \\
& 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 61 \\
& 44a^9b^2c^5)) + (3244032a^6b^*c^8d^*e - 983040a^7c^8e^*f + 4608a^2* \\
& b^9c^4d^*e - 87552a^3b^7c^5d^*e + 681984a^4b^5c^6d^*e - 2433024a^5* \\
& b^3c^7d^*e + 1536a^3b^8c^4e^*f - 39936a^4b^6c^5e^*f + 184320a^5b^4 \\
& *c^6e^*f + 49152a^6b^2c^7e^*f) / (512 * (a^4b^{12} + 4096a^{10}c^6 - 24a^5b \\
& ^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^ \\
& 2c^5)) - (x * (225792a^6c^9d^2 + 9b^{12}c^3d^2 - 12800a^7c^8f^2 - 252 \\
& *a^*b^{10}c^4d^2 - 36864a^6b^*c^8e^2 + 3114a^2b^8c^5d^2 - 21312a^3b^ \\
& 6c^6d^2 + 88128a^4b^4c^7d^2 - 211968a^5b^2c^8d^2 - 2304a^4b^5c \\
& ^6e^2 + 18432a^5b^3c^7e^2 + a^2b^{10}c^3f^2 - 42a^3b^8c^4f^2 + 17 \\
& 60a^4b^6c^5f^2 - 13120a^5b^4c^6f^2 + 29952a^6b^2c^7f^2 + 6a^*b^ \\
& 11c^3d^*f - 109056a^6b^*c^8d^*f - 210a^2b^9c^4d^*f + 2496a^3b^7c^5* \\
& d^*f - 18240a^4b^5c^6d^*f + 72192a^5b^3c^7d^*f) / (32 * (a^4b^{12} + 4096* \\
& a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^ \\
& 4c^4 - 6144a^9b^2c^5)) - (567b^7c^5d^3 + 8000a^5c^7f^3 - 10368a \\
& *b^5c^6d^3 - 169344a^3b^*c^8d^3 - 193536a^4c^8d^*e^2 + 141120a^4c^8 \\
& *d^2f - 315b^8c^4d^2f + 67824a^2b^3c^7d^3 - 35a^2b^6c^4f^3 - 8 \\
& 4a^3b^4c^5f^3 + 12720a^4b^2c^6f^3 + 6237a^*b^6c^5d^2f - 210a^*b^ \\
& 7c^4d^*f^2 - 116160a^4b^*c^7d^*f^2 + 36864a^4b^*c^7e^2f - 6912a^2b^4 \\
& *c^6d^*e^2 + 62208a^3b^2c^7d^*e^2 - 42372a^2b^4c^6d^2f + 1764a^2b \\
& ^5c^5d^*f^2 + 96048a^3b^2c^7d^2f + 4608a^3b^3c^6d^*f^2 - 2304a^3* \\
& b^3c^6e^2f) / (512 * (a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8 \\
& *c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (x * (6912* \\
& a^4c^8e^3 - 27b^7c^5d^2e - 10080a^4c^8d^*e^*f + 486a^*b^5c^6d^2e \\
& + 12096a^3b^*c^8d^2e + 3120a^4b^*c^7e^*f^2 - 3672a^2b^3c^7d^2e - 3 \\
& *a^2b^5c^5e^*f^2 + 96a^3b^3c^6e^*f^2 - 18a^*b^6c^5d^*e^*f + 450a^2b^ \\
& 4c^6d^*e^*f - 2448a^3b^2c^7d^*e^*f) / (32 * (a^4b^{12} + 4096a^{10}c^6 - 24a \\
& ^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^ \\
& 9b^2c^5)) * root(56371445760a^{11}b^8c^6z^4 - 503316480a^8b^{14}c^3z^4 \\
& + 47185920a^7b^{16}c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320 \\
& *a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c
\end{aligned}$$

$$\begin{aligned}
&^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}cz^4 + 68719476736 \\
&a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - 73728a^2b^{16}c^4d^2z^2 - 1321205760 \\
&a^9b^2c^8d^2z^2 + 732168192a^7b^6c^6d^2z^2 - 366280704a^6b^8c^5 \\
&d^2z^2 - 330301440a^8b^4c^7d^2z^2 + 96583680a^5b^{10}c^4d^2z^2 - \\
&15175680a^4b^{12}c^3d^2z^2 + 1428480a^3b^{14}c^2d^2z^2 - 440401920a \\
&^{10}b^c^8f^2z^2 + 1761607680a^{10}c^9d^2z^2 - 14080a^3b^{15}c^2z^2 \\
&+ 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617 \\
&280a^9b^c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7b^5 \\
&c^7d^2z^2 - 94464a^ab^{17}c^d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730 \\
&054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 174325760a^8b \\
&b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^ \\
&2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 235929 \\
&60a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2 \\
&f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1 \\
&771776a^2b^{15}c^2d^2z^2 + 1536a^ab^{18}d^2z^2 + 1207959552a^{10}c^9e^2 \\
&z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^c^8d^e^f \\
&^*z + 9216a^ab^{13}c^2d^e^fz - 221773824a^6b^3c^7d^e^fz + 117964800a^ \\
&5b^5c^6d^e^fz - 32440320a^4b^7c^5d^e^fz + 4792320a^3b^9c^4d^e^f \\
&fz - 350208a^2b^{11}c^3d^e^fz - 428544a^ab^{12}c^3d^2e^z + 1022754816a \\
&a^6b^2c^8d^2e^z - 642318336a^5b^4c^7d^2e^z + 223395840a^4b^6c^6 \\
&d^2e^z - 50724864a^7b^2c^7e^f^2z + 26542080a^6b^4c^6e^f^2z - 46 \\
&725120a^3b^8c^5d^2e^z - 7127040a^5b^6c^5e^f^2z + 1013760a^4b^8c \\
&c^4e^f^2z - 69120a^3b^{10}c^3e^f^2z + 1536a^2b^{12}c^2e^f^2z + 5930 \\
&496a^2b^{10}c^4d^2e^z - 693633024a^7c^9d^2e^z + 39321600a^8c^8e^f \\
&^2z + 13824b^{14}c^2d^2e^z + 13824a^ab^8c^4d^e^2f - 7741440a^4b^2c \\
&^7d^e^2f + 2903040a^3b^4c^6d^e^2f - 387072a^2b^6c^5d^e^2f + 373 \\
&10976a^3b^3c^7d^3f + 3870720a^5b^c^7e^2f^2 + 34836480a^4b^c^8d^ \\
&2e^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^f^3 + 1737792a^3 \\
&b^5c^5d^f^3 - 260190a^ab^8c^4d^2f^2 - 211680a^2b^7c^4d^f^3 - 4354 \\
&56a^ab^7c^5d^2e^2 - 75188736a^4b^c^8d^3f - 15482880a^5c^8d^e^2f \\
&- 4262400a^5b^c^7d^f^3 + 852768a^ab^7c^5d^3f + 7350a^ab^9c^3d^f^3 + \\
&35525376a^4b^2c^7d^2f^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c \\
&c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 287 \\
&0784a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c \\
&^6d^2e^2 + 11025b^{10}c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 20736b^9c \\
&^4d^2e^2 + 492800a^5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^ \\
&6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2c^8d^4 + 6446304a^2b \\
&^4c^7d^4 - 39690b^9c^4d^3f - 734832a^ab^6c^6d^4 + 49787136a^4c^9 \\
&d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k), \\
&k, 1, 4)
\end{aligned}$$

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
$$\int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=646

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} + \frac{\sqrt{c} \left(-\frac{52a^2bcf + 168a^2c^2d + \dots}{\sqrt{b^2 - 4ac}} \right)}{\dots}$$

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, number of rules / integrand size = 0.300, Rules used = {1673, 1178, 1166, 205, 1247, 638, 614, 618, 206}

$$\frac{c \sqrt{c} (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d}{8a^2 (b^2 - 4ac)^2 \sqrt{b^2 - 4ac}} + \frac{\sqrt{c} \left(-\frac{52a^2bcf + 168a^2c^2d + \dots}{\sqrt{b^2 - 4ac}} \right)}{4a \sqrt{c} (b^2 - 4ac) \sqrt{b^2 - 4ac}} + \frac{3(b + 2cx) \sqrt{c}}{4(b^2 - 4ac) \sqrt{b^2 - 4ac}} - \frac{2ap + 2(b^2 - 4ac)}{4(b^2 - 4ac) \sqrt{b^2 - 4ac}} + \frac{3d(b^2 - 4ac) \operatorname{arctanh} \left(\frac{b + 2cx}{\sqrt{b^2 - 4ac}} \right)}{(b^2 - 4ac)^{5/2}}$$

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] && (GtQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]
```

Rule 618

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

$x]$ && NeQ[$b^2 - 4ac$, 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] && NeQ[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_Symbol] :> 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^3} dx &= \int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx + \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(a + bx + cx^2)^3} dx, x, x^2 \right) - \frac{\int \frac{e + gx}{(a + bx + cx^2)^3} dx}{2} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3b^4d - 2b^3e - 2b^2e^2 - 2b^2e^2 - 2b^2e^2 - 2b^2e^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - b^2e^2 - b^2e^2 - b^2e^2 - b^2e^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - b^2e^2 - b^2e^2 - b^2e^2 - b^2e^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - b^2e^2 - b^2e^2 - b^2e^2 - b^2e^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2}
\end{aligned}$$

Mathematica [A] time = 4.29, size = 661, normalized size = 1.02

(\int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^3} dx) = \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - b^2e^2 - b^2e^2 - b^2e^2 - b^2e^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2}

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

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

$$\int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^3} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^3, x]
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]
$$\frac{1}{32} \cdot (3 \cdot (\sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot b^8 - 17 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a \cdot b^6 \cdot c - 2 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot b^7 \cdot c - 2 \cdot b^8 \cdot c + 116 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^2 \cdot b^4 \cdot c^2 + 26 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a \cdot b^5 \cdot c^2 + \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot b^6 \cdot c^2 + 34 \cdot a \cdot b^6 \cdot c^2 + 2 \cdot b^7 \cdot c^2 - 368 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^3 \cdot b^2 \cdot c^3 - 128 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^2 \cdot b^3 \cdot c^3 - 13 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a \cdot b^4 \cdot c^3 - 232 \cdot a^2 \cdot b^4 \cdot c^3 - 30 \cdot a \cdot b^5 \cdot c^3 + 448 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^4 \cdot c^4 + 224 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^3 \cdot b \cdot c^4 + 64 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^2 \cdot b^2 \cdot c^4 + 736 \cdot a^3 \cdot b^2 \cdot c^4 + 176 \cdot a^2 \cdot b^3 \cdot c^4 - 112 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^3 \cdot c^5 - 896 \cdot a^4 \cdot c^5 - 352 \cdot a^3 \cdot b \cdot c^5 - \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot b^7 + 15 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a \cdot b^5 \cdot c + 2 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot b^6 \cdot c - 88 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^2 \cdot b^3 \cdot c^2 - 22 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a \cdot b^4 \cdot c^2 - \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot b^5 \cdot c^2 + 176 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^3 \cdot b \cdot c^3 + 88 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^2 \cdot b^2 \cdot c^3 + 11 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a \cdot b^3 \cdot c^3 - 44 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^2 \cdot b \cdot c^4 + 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot b^6 \cdot c - 26 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a \cdot b^4 \cdot c^2 - 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot b^5 \cdot c^2 + 128 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a^2 \cdot b^2 \cdot c^3 + 22 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a \cdot b^3 \cdot c^3 - 224 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a^3 \cdot c^4 - 88 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a^2 \cdot b \cdot c^4) \cdot d + (\sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a \cdot b^7 - 24 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^2 \cdot b^5 \cdot c - 2 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a \cdot b^6 \cdot c - 2 \cdot a \cdot b^7 \cdot c + 144 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^3 \cdot b^3 \cdot c^2 + 40 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^2 \cdot b^4 \cdot c^2 + \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a \cdot b^5 \cdot c^2 + 48 \cdot a^2 \cdot b^5 \cdot c^2 + 2 \cdot a \cdot b^6 \cdot c^2 - 256 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^4 \cdot b \cdot c^3 - 128 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^3 \cdot b^2 \cdot c^3 - 20 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^2 \cdot b^3 \cdot c^3 - 288 \cdot a^3 \cdot b^3 \cdot c^3 - 44 \cdot a^2 \cdot b^4 \cdot c^3 + 64 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^3 \cdot b \cdot c^4 + 512 \cdot a^4 \cdot b \cdot c^4 + 64 \cdot a^3 \cdot b^2 \cdot c^4 + 320 \cdot a^4 \cdot c^5 - \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a \cdot b^6 + 22 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^2 \cdot b^4 \cdot c + 2 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a \cdot b^5 \cdot c - 32 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^3 \cdot b^2 \cdot c^2 - 36 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^2 \cdot b^3 \cdot c^2 - \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a \cdot b^4 \cdot c^2 - 160 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^4 \cdot c^3 - 80 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^3 \cdot b \cdot c^3 + 18 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^2 \cdot b^2 \cdot c^3 + 40 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot a^3 \cdot c^4 + 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a \cdot b^5 \cdot c - 40 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a^2 \cdot b^3 \cdot c^2 - 2 \cdot (b^2 - 4 \cdot a \cdot c)$$

$$\begin{aligned}
& a^3c^3 + 36(b^2 - 4ac)a^2b^2c^3 + 80(b^2 - 4ac)a^3c^4) * f) * \arctan(2\sqrt{1/2} * x / \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2 + \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2)^2 - 4(a^3b^4 - 8a^4b^2c + 16a^5c^2)} * (a^2b^4c - 8a^3b^2c^2 + 16a^4c^3))}) / ((a^3b^8 - 16a^4b^6c - 2a^3b^7c + 96a^5b^4c^2 + 24a^4b^5c^2 + a^3b^6c^2 - 256a^6b^2c^3 - 96a^5b^3c^3 - 12a^4b^4c^3 + 256a^7c^4 + 128a^6b^2c^4 + 48a^5b^2c^4 - 64a^6c^5) * \text{abs}(c)) + 1/32 * (3 * (\sqrt{2} * \sqrt{b^2 - 4ac}) * c) * b^8 - 17 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^6c - 2 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * b^7c + 2 * b^8c + 116 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^4c^2 + 26 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^5c^2 + \sqrt{2} * \sqrt{b^2 - 4ac} * c) * b^6c^2 - 34 * a^2b^6c^2 - 2 * b^7c^2 - 368 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^3b^2c^3 - 128 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^3c^3 - 13 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^4c^3 + 232 * a^2b^4c^3 + 30 * a^2b^5c^3 + 448 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^4c^4 + 224 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^3b^2c^4 + 64 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^2c^4 - 736 * a^3b^2c^4 - 176 * a^2b^3c^4 - 112 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^3c^5 + 896 * a^4c^5 + 352 * a^3b^2c^5 + \sqrt{2} * \sqrt{b^2 - 4ac} * c) * \sqrt{b^2 - 4ac} * b^7 - 15 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} * c) * a^2b^5c - 2 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} * c) * b^6c + 88 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} * c) * a^2b^3c^2 + 22 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} * c) * a^2b^4c^2 + \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} * c) * b^5c^2 - 176 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} * c) * a^3b^2c^3 - 88 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} * c) * a^2b^2c^3 - 11 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} * c) * a^2b^3c^3 + 44 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} * c) * a^2b^4c^3 - 2 * (b^2 - 4ac) * b^6c + 26 * (b^2 - 4ac) * a^2b^4c^2 + 2 * (b^2 - 4ac) * b^5c^2 - 128 * (b^2 - 4ac) * a^2b^2c^3 - 22 * (b^2 - 4ac) * a^2b^3c^3 + 224 * (b^2 - 4ac) * a^3c^4 + 88 * (b^2 - 4ac) * a^2b^2c^4) * d + (\sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^5c - 2 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^6c + 2 * a^2b^7c + 144 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^3b^3c^2 + 40 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^4c^2 + \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^5c^2 - 48 * a^2b^5c^2 - 2 * a^2b^6c^2 - 256 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^4b^2c^3 - 128 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^3b^2c^3 - 20 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^3c^3 + 288 * a^3b^3c^3 + 44 * a^2b^4c^3 + 64 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^3b^2c^4 - 512 * a^4b^2c^4 - 64 * a^3b^2c^4 - 320 * a^4c^5 + \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^6 - 22 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^4c - 2 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^5c + 32 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^3b^2c^2 + 36 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^3c^2 + \sqrt{2} * \sqrt{b^2 - 4ac} * c) * a^2b^4c^2 + 160 * \sqrt{2} * \sqrt{b^2 - 4ac} * c) * \sqrt{b^2 - 4ac} * c) * a^4c^3 + 80 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} * c) * a^3b^2c^3 - 18 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} * c) * a^2b^2c^3 - 40 * \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} * c) * a^3c^4 - 2 * (b^2 - 4ac) * a^2b^5c + 40 * (b^2 - 4ac) * a^2b^3c^2 + 2 * (b^2 - 4ac) * a^2b^4c^2 - 128 * (b^2 - 4ac) * a^3b^2c^3 - 36 * (b^2 - 4ac) * a^2b^2c^3 - 80 * (b^2 - 4ac) * a^3c^4) * f) * \arctan(2\sqrt{1/2} * x / \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2 - \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2)^2 - 4(a^3b^4 - 8a^4b^2c + 16a^5c^2)} * (a^2b^4c - 8a^3b^2c^2 + 16a^4c^3))}) / ((a^3b^8 - 16a^4b^6c - 2a^3b^7c + 96a^5b^4c^2 + 24a^4b^5c^2 + a^3b^6c^2 - 256a^6b^2c^3 - 96a^5b^3c^3 - 12a^4b^4c^3 + 256a^7c^4 + 128a^6b^2c^4 + 48a^5b^2c^4 - 64a^6c^5) * \text{abs}(c)) + 3/2 * ((b^3c^3 - 4a^2b^2c^4 - 2b^2c^4 + b^2c^5) * \sqrt{b^2 - 4ac}) * g - 2 * (b^2c^4 - 4a^2c^4
\end{aligned}$$

$$5 - 2*b*c^5 + c^6)*\text{sqrt}(b^2 - 4*a*c)*e)*\log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + \text{sqrt}((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^2) - 3/2*((b^3*c^3 - 4*a*b*c^4 - 2*b^2*c^4 + b*c^5)*\text{sqrt}(b^2 - 4*a*c)*g - 2*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*\text{sqrt}(b^2 - 4*a*c)*e)*\log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - \text{sqrt}((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^2) + 1/8*(3*b^3*c^2*d*x^7 - 24*a*b*c^3*d*x^7 + a*b^2*c^2*f*x^7 + 20*a^2*c^3*f*x^7 - 12*a^2*b*c^2*g*x^6 + 24*a^2*c^3*x^6*e + 6*b^4*c*d*x^5 - 49*a*b^2*c^2*d*x^5 + 28*a^2*c^3*d*x^5 + 2*a*b^3*c*f*x^5 + 28*a^2*b*c^2*f*x^5 - 18*a^2*b^2*c*g*x^4 + 36*a^2*b*c^2*x^4*e + 3*b^5*d*x^3 - 20*a*b^3*c*d*x^3 - 4*a^2*b*c^2*d*x^3 + a*b^4*f*x^3 + 5*a^2*b^2*c*f*x^3 + 36*a^3*c^2*f*x^3 - 4*a^2*b^3*g*x^2 - 20*a^3*b*c*g*x^2 + 8*a^2*b^2*c*x^2*e + 40*a^3*c^2*x^2*e + 5*a*b^4*d*x - 37*a^2*b^2*c*d*x + 44*a^3*c^2*d*x - a^2*b^3*f*x + 16*a^3*b*c*f*x - 2*a^3*b^2*g - 16*a^4*c*g - 2*a^2*b^3*e + 20*a^3*b*c*e)/((a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)*(c*x^4 + b*x^2 + a)^2)$$

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] $\text{int}((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x)$

[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] $\text{integrate}((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, \text{algorithm}="maxima")$

[Out] $1/8*((3*(b^3*c^2 - 8*a*b*c^3)*d + (a*b^2*c^2 + 20*a^2*c^3)*f)*x^7 + 12*(2*a^2*c^3*e - a^2*b*c^2*g)*x^6 + ((6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3)*d + 2*(a*b^3*c + 14*a^2*b*c^2)*f)*x^5 + 18*(2*a^2*b*c^2*e - a^2*b^2*c*g)*x^4 + ((3*b^5 - 20*a*b^3*c - 4*a^2*b*c^2)*d + (a*b^4 + 5*a^2*b^2*c + 36*a^3*c^2)*f)*x^3 + 4*(2*(a^2*b^2*c + 5*a^3*c^2)*e - (a^2*b^3 + 5*a^3*b*c)*g)*x^2 - 2*(a^2*b^3 - 10*a^3*b*c)*e - 2*(a^3*b^2 + 8*a^4*c)*g + ((5*a*b^4 - 37*a^2*b^2*c + 44*a^3*c^2)*d - (a^2*b^3 - 16*a^3*b*c)*f)*x)/((a^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4)*x^8 + a^4*b^4 - 8*a^5*b^2*c + 16*a^6*c^2 + 2*(a^2*b^5*c - 8*a^3*b^3*c^2 + 16*a^4*b*c^3)*x^6 + (a^2*b^6 - 6*a^3*b^4*c + 32*a^5*c^3)*x^4 + 2*(a^3*b^5 - 8*a^4*b^3*c + 16*a^5*b*c^2)*x^2) + 1/8*\text{integrate}(((3*(b^3*c - 8*a*b*c^2)*d + (a*b^2*c + 20*a^2*c^2)*f)*x^2 + 3*(b^4 - 9*a*b^2*c + 28*a^2*c^2)*d + (a*b^3 - 16*a^2*b*c)*f + 24*(2*a^2*c^2*e - a^2*b*c*g)*x)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)$

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] $\text{int}((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^3,x)$

[Out] $\text{symsum}(\log((x*(13824*a^4*c^8*e^3 - 54*b^7*c^5*d^2*e + 27*b^8*c^4*d^2*g - 1728*a^4*b^3*c^5*g^3 - 20160*a^4*c^8*d*e*f + 972*a*b^5*c^6*d^2*e + 24192*a^3*$

$$\begin{aligned}
& b^8c^8d^2e - 486a^6b^6c^5d^2g + 6240a^4b^6c^7ef^2 - 20736a^4b^6c^7e^2g - 7344a^2b^3c^7d^2e + 3672a^2b^4c^6d^2g - 6a^2b^5c^5ef^2 \\
& - 12096a^3b^2c^7d^2g + 192a^3b^3c^6ef^2 + 10368a^4b^2c^6efg^2 + 3a^2b^6c^4f^2g - 96a^3b^4c^5f^2g - 3120a^4b^2c^6f^2g - \\
& 36a^6b^6c^5d^2ef + 18a^6b^7c^4d^2fg + 10080a^4b^6c^7d^2fg + 900a^2b^4c^6d^2ef - 4896a^3b^2c^7d^2ef - 450a^2b^5c^5d^2fg + 2448a^3b^3c^6d^2fg) \\
& / (64(a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) - \text{root}(56371 \\
& 445760a^{11}b^8c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128 \\
& 849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^3z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 \\
& - 73728a^2b^{16}c^4d^2fz^2 + 1509949440a^9b^3c^7efgz^2 - 1321205760a^9b^2c^8d^2fz^2 - 754974720a^8b^5c^6efgz^2 + 732168192a^7b^6c^6d^2fz^2 \\
& - 366280704a^6b^8c^5d^2fz^2 - 330301440a^8b^4c^7d^2fz^2 + 188743680a^7b^7c^5efgz^2 + 96583680a^5b^{10}c^4d^2fz^2 - 23592960a^6b^9c^4efgz^2 \\
& + 1179648a^5b^{11}c^3efgz^2 - 15175680a^4b^{12}c^3d^2fz^2 + 1428480a^3b^{14}c^2d^2fz^2 - 1207959552a^{10}b^8c^8efgz^2 - 440401920a^{10}b^6c^8f^2z^2 \\
& + 1761607680a^{10}c^9d^2fz^2 - 14080a^3b^{15}c^f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^6c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 \\
& - 5400428544a^7b^5c^7d^2z^2 - 94464a^6b^{17}c^d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 \\
& - 377487360a^9b^4c^6g^2z^2 + 301989888a^{10}b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 \\
& + 146165760a^4b^{11}c^4d^2z^2 - 47185920a^7b^8c^4g^2z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294912a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 \\
& + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 \\
& - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^6b^{18}d^2fz^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^17f^2z^2 + 2304b^{19}d^2z^2 \\
& + 169869312a^7b^6c^8d^2efz + 9216a^6b^{13}c^2d^2efz - 4608a^6b^{14}c^d^2fgz - 221773824a^6b^3c^7d^2efz + 110886912a^6b^4c^6d^2fgz \\
& - 84934656a^7b^2c^7d^2fgz + 117964800a^5b^5c^6d^2efz - 58982400a^5b^6c^5d^2fgz + 16220160a^4b^8c^4d^2fgz - 2396160a^3b^{10}c^3d^2fgz \\
& + 175104a^2b^{12}c^2d^2fgz - 32440320a^4b^7c^5d^2efz + 4792320a^3b^9c^4d^2efz - 350208a^2b^{11}c^3d^2efz + 346816512a^7b^6c^8d^2gz \\
& - 19660800a^8b^6c^7f^2gz - 768a^2b^{13}c^f^2gz + 214272a^6b^{13}c^2d^2gz - 428544a^6b^{12}c^3d^2ez + 1022754816a^6b^2c^8d^2ez - 642318336a^5b^4c^7d^2ez \\
& - 511377408a^6b^3c^7d^2gz + 321159168a^5b^5c^6d^2gz + 223395840a^4b^6c^6d^2ez - 111697920a^4b^7c^5d^2gz + 25362432a^7b^3c^6f^2gz \\
& - 50724864a^7b^2c^7ef^2gz - 13271040a^6b^5c^5f^2gz + 3563520a^5b^7c^4f^2gz - 506880a^4b^9c^3f^2gz + 34560a^3b^{11}c^2f^2gz + 26542080a^6b^4c^6ef^2gz \\
& + 23362560a^3b^9c^4d^2gz - 46725120a^3b^8c^5d^2ez - 7127040a^5b^6c^5ef^2gz - 2965248a^2b^{11}c^3d^2gz + 1013760a^4b^8c^4ef^2gz \\
& - 69120a^3b^{10}c^3ef^2gz + 1536a^2b^{12}c^2ef^2gz + 5930496a^2b^{10}c^4d^2ez - 693633024a^7c^9d^2ez + 39321600a^8c^8ef^2gz \\
& + 13824b^{14}c^2d^2ez - 6912b^{15}c^d^2gz + 15482880a^5b^6c^7d^2efg - 13824a^6b^9c^3d^2efg + 7741440a^4b^3c^6d^2efg - 2903040a^3b^5c^5d^2efg \\
& + 387072a^2b^7c^4d^2efg + 3456a^6b^{10}c^2d^2fg^2 + 435456a^6b^8c^4d^2efg + 13824a^6b^8c^4d^2ef - 3870720a^5b^2c^6ef^2gz \\
& - 34836480a^4b^2c^7d^2efg - 645120a^4b^4c^5ef^2gz + 80640a^3b^6c^4ef^2gz - 2304a^2b^8c^3ef^2gz - 3870720a^5b^2c^6d^2fg^2 \\
& - 1935360a^4b^4c^5d^2fg^2 + 725760a^3b^6c^4d^2fg^2 + 17418240a^3b^4c^6d^2efg - 96768a^2b^8c^3d^2fg^2 - 3919104a^2b^6c^5d^2efg \\
& - 7741440a^4b^2c^7d^2ef + 2903040a^3b^4c^6d^2ef - 3870720a^2b^6c^5d^2ef + 37310976a^3b^3c^7d^3f - 2654208a^5b^3c^5efg^3 \\
& + 3870720a^5b^6c^7ef^2f^2 + 34836480a^4b^6c^8d^2ef^2 - 108864a^6b^8c^8d^2ef^2
\end{aligned}$$

$$\begin{aligned}
& ^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^3f^3 + 17 \\
& 37792a^3b^5c^5d^3f^3 - 260190a^2b^8c^4d^2f^2 - 211680a^2b^7c^4d^2f \\
& ^3 - 435456a^2b^7c^5d^2e^2 - 20736b^10c^3d^2e^2g - 75188736a^4b^3c^8 \\
& *d^3f - 15482880a^5c^8d^2e^2f - 10616832a^5b^3c^7e^3g - 4262400a^5 \\
& b^3c^7d^3f^3 + 852768a^2b^7c^5d^3f + 7350a^2b^9c^3d^3f^3 + 967680a^5b^ \\
& 3c^5f^2g^2 + 161280a^4b^5c^4f^2g^2 - 20160a^3b^7c^3f^2g^2 + 57 \\
& 6a^2b^9c^2f^2g^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c^7 \\
& d^2f^2 + 8709120a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 97977 \\
& 6a^2b^7c^4d^2g^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2 \\
& f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2 \\
& *b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e \\
& ^2 + 5184b^11c^2d^2g^2 + 11025b^10c^3d^2f^2 + 5644800a^5c^8d^2f \\
& ^2 + 20736b^9c^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^ \\
& 4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - \\
& 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 - 39690b^9c^4d^3f - \\
& 734832a^2b^6c^6d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416 \\
& *a^5c^8e^4 + 35721b^8c^5d^4, z, k) * ((983040a^7c^8e^2f - 3244032a^6 \\
& b^3c^8d^2e - 491520a^7b^3c^7f^2g - 4608a^2b^9c^4d^2e + 87552a^3b^7c^5 \\
& *d^2e - 681984a^4b^5c^6d^2e + 2433024a^5b^3c^7d^2e + 2304a^2b^10c^3 \\
& *d^2g - 43776a^3b^8c^4d^2g - 1536a^3b^8c^4e^2f + 340992a^4b^6c^5d^2 \\
& g + 39936a^4b^6c^5e^2f - 1216512a^5b^4c^6d^2g - 184320a^5b^4c^6e^2 \\
& f + 1622016a^6b^2c^7d^2g - 49152a^6b^2c^7e^2f + 768a^3b^9c^3f^2g - \\
& 19968a^4b^7c^4f^2g + 92160a^5b^5c^5f^2g + 24576a^6b^3c^6f^2g) / (51 \\
& 2(a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 - 1280a^7b^6 \\
& c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5) - \text{root}(56371445760a^11b^8c \\
& ^6z^4 - 503316480a^8b^14c^3z^4 + 47185920a^7b^16c^2z^4 - 171798691 \\
& 840a^14b^2c^9z^4 + 193273528320a^13b^4c^8z^4 - 128849018880a^12b^6 \\
& c^7z^4 - 16911433728a^10b^10c^5z^4 + 3523215360a^9b^12c^4z^4 - 2 \\
& 621440a^6b^18c^3z^4 + 68719476736a^15c^10z^4 + 65536a^5b^20z^4 - 73 \\
& 728a^2b^16c^4d^2f^2z^2 + 1509949440a^9b^3c^7e^2g^2z^2 - 1321205760a^9b^ \\
& 2c^8d^2f^2z^2 - 754974720a^8b^5c^6e^2g^2z^2 + 732168192a^7b^6c^6d^2f^2z \\
& ^2 - 366280704a^6b^8c^5d^2f^2z^2 - 330301440a^8b^4c^7d^2f^2z^2 + 188743 \\
& 680a^7b^7c^5e^2g^2z^2 + 96583680a^5b^10c^4d^2f^2z^2 - 23592960a^6b^9c \\
& ^4e^2g^2z^2 + 1179648a^5b^11c^3e^2g^2z^2 - 15175680a^4b^12c^3d^2f^2z^2 \\
& + 1428480a^3b^14c^2d^2f^2z^2 - 1207959552a^10b^3c^8e^2g^2z^2 - 440401920 \\
& a^10b^3c^8f^2z^2 + 1761607680a^10c^9d^2f^2z^2 - 14080a^3b^15c^3f^2z^2 \\
& + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 396361 \\
& 7280a^9b^3c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7b^ \\
& 5c^7d^2z^2 - 94464a^2b^17c^4d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 73 \\
& 0054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 377487360a^9 \\
& *b^4c^6g^2z^2 + 301989888a^10b^2c^7g^2z^2 + 188743680a^8b^6c^5g \\
& ^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 14 \\
& 6165760a^4b^11c^4d^2z^2 - 47185920a^7b^8c^4g^2z^2 + 5898240a^6b \\
& ^10c^3g^2z^2 - 294912a^5b^12c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 \\
& + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^ \\
& 5b^11c^3f^2z^2 + 291840a^4b^13c^2f^2z^2 - 19860480a^3b^13c^3d^ \\
& 2z^2 - 1179648a^5b^10c^4e^2z^2 + 1771776a^2b^15c^2d^2z^2 + 1536 \\
& a^2b^18d^2f^2z^2 + 1207959552a^10c^9e^2z^2 + 256a^2b^17f^2z^2 + 2304 \\
& b^19d^2z^2 + 169869312a^7b^3c^8d^2e^2f^2z + 9216a^2b^13c^2d^2e^2f^2z - 4608 \\
& *a^2b^14c^2d^2f^2g^2z - 221773824a^6b^3c^7d^2e^2f^2z + 110886912a^6b^4c^6d \\
& *f^2g^2z - 84934656a^7b^2c^7d^2f^2g^2z + 117964800a^5b^5c^6d^2e^2f^2z - 589 \\
& 82400a^5b^6c^5d^2f^2g^2z + 16220160a^4b^8c^4d^2f^2g^2z - 2396160a^3b^10 \\
& c^3d^2f^2g^2z + 175104a^2b^12c^2d^2f^2g^2z - 32440320a^4b^7c^5d^2e^2f^2z + \\
& 4792320a^3b^9c^4d^2e^2f^2z - 350208a^2b^11c^3d^2e^2f^2z + 346816512a^7 \\
& b^3c^8d^2g^2z - 19660800a^8b^3c^7f^2g^2z - 768a^2b^13c^3f^2g^2z + 21427 \\
& 2a^2b^13c^2d^2g^2z - 428544a^2b^12c^3d^2e^2z + 1022754816a^6b^2c^8d \\
& ^2e^2z - 642318336a^5b^4c^7d^2e^2z - 511377408a^6b^3c^7d^2g^2z + 32 \\
& 1159168a^5b^5c^6d^2g^2z + 223395840a^4b^6c^6d^2e^2z - 111697920a^4 \\
& *b^7c^5d^2g^2z + 25362432a^7b^3c^6f^2g^2z - 50724864a^7b^2c^7e^2f^2
\end{aligned}$$

$$\begin{aligned}
& 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*d*f*g^2 - 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 + 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)*((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 - 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)) + (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 + 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*
\end{aligned}$$

$$\begin{aligned}
& b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2 \\
& *z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888a^{10}b^2c^7g^2z^2 + 188 \\
& 743680a^8b^6c^5g^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7* \\
& b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 - 47185920a^7b^8c^4g^2 \\
& *z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294912a^5b^{12}c^2g^2z^2 + 1120665 \\
& 6a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5* \\
& e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 1986 \\
& 0480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15} \\
& c^2d^2z^2 + 1536a*b^{18}d*f*z^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2* \\
& b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b*c^8d*e*f*z + 9216a*b^1 \\
& 3c^2d*e*f*z - 4608a*b^{14}c*d*f*g*z - 221773824a^6b^3c^7d*e*f*z + 110 \\
& 886912a^6b^4c^6d*f*g*z - 84934656a^7b^2c^7d*f*g*z + 117964800a^5b \\
& ^5c^6d*e*f*z - 58982400a^5b^6c^5d*f*g*z + 16220160a^4b^8c^4d*f*g* \\
& z - 2396160a^3b^{10}c^3d*f*g*z + 175104a^2b^{12}c^2d*f*g*z - 32440320a \\
& ^4b^7c^5d*e*f*z + 4792320a^3b^9c^4d*e*f*z - 350208a^2b^{11}c^3d*e* \\
& f*z + 346816512a^7b*c^8d^2g*z - 19660800a^8b*c^7f^2g*z - 768a^2b^ \\
& 13c*f^2g*z + 214272a*b^{13}c^2d^2g*z - 428544a*b^{12}c^3d^2e*z + 1022 \\
& 754816a^6b^2c^8d^2e*z - 642318336a^5b^4c^7d^2e*z - 511377408a^6* \\
& b^3c^7d^2g*z + 321159168a^5b^5c^6d^2g*z + 223395840a^4b^6c^6d^2 \\
& *e*z - 111697920a^4b^7c^5d^2g*z + 25362432a^7b^3c^6f^2g*z - 50724 \\
& 864a^7b^2c^7e*f^2z - 13271040a^6b^5c^5f^2g*z + 3563520a^5b^7c^ \\
& 4f^2g*z - 506880a^4b^9c^3f^2g*z + 34560a^3b^{11}c^2f^2g*z + 26542 \\
& 080a^6b^4c^6e*f^2z + 23362560a^3b^9c^4d^2g*z - 46725120a^3b^8c \\
& ^5d^2e*z - 7127040a^5b^6c^5e*f^2z - 2965248a^2b^{11}c^3d^2g*z + 1 \\
& 013760a^4b^8c^4e*f^2z - 69120a^3b^{10}c^3e*f^2z + 1536a^2b^{12}c^2 \\
& *e*f^2z + 5930496a^2b^{10}c^4d^2e*z - 693633024a^7c^9d^2e*z + 39321 \\
& 600a^8c^8e*f^2z + 13824b^{14}c^2d^2e*z - 6912b^{15}c*d^2g*z + 154828 \\
& 80a^5b*c^7d*e*f*g - 13824a*b^9c^3d*e*f*g + 7741440a^4b^3c^6d*e*f* \\
& g - 2903040a^3b^5c^5d*e*f*g + 387072a^2b^7c^4d*e*f*g + 3456a*b^{10} \\
& c^2d*f*g^2 + 435456a*b^8c^4d^2e*g + 13824a*b^8c^4d*e^2f - 3870720* \\
& a^5b^2c^6e*f^2g - 34836480a^4b^2c^7d^2e*g - 645120a^4b^4c^5e*f \\
& ^2g + 80640a^3b^6c^4e*f^2g - 2304a^2b^8c^3e*f^2g - 3870720a^5b \\
& ^2c^6d*f*g^2 - 1935360a^4b^4c^5d*f*g^2 + 725760a^3b^6c^4d*f*g^2 + \\
& 17418240a^3b^4c^6d^2e*g - 96768a^2b^8c^3d*f*g^2 - 3919104a^2b^6 \\
& c^5d^2e*g - 7741440a^4b^2c^7d*e^2f + 2903040a^3b^4c^6d*e^2f - \\
& 387072a^2b^6c^5d*e^2f + 37310976a^3b^3c^7d^3f - 2654208a^5b^3c \\
& ^5e*g^3 + 3870720a^5b*c^7e^2f^2 + 34836480a^4b*c^8d^2e^2 - 108864* \\
& a*b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d*f^3 + \\
& 1737792a^3b^5c^5d*f^3 - 260190a*b^8c^4d^2f^2 - 211680a^2b^7c^4* \\
& d*f^3 - 435456a*b^7c^5d^2e^2 - 20736b^{10}c^3d^2e*g - 75188736a^4b* \\
& c^8d^3f - 15482880a^5c^8d*e^2f - 10616832a^5b*c^7e^3g - 4262400a \\
& ^5b*c^7d*f^3 + 852768a*b^7c^5d^3f + 7350a*b^9c^3d*f^3 + 967680a^5 \\
& *b^3c^5f^2g^2 + 161280a^4b^5c^4f^2g^2 - 20160a^3b^7c^3f^2g^2 + \\
& 576a^2b^9c^2f^2g^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c \\
& ^7d^2f^2 + 8709120a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 97 \\
& 9776a^2b^7c^4d^2g^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e \\
& ^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784* \\
& a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^ \\
& 2e^2 + 5184b^{11}c^2d^2g^2 + 11025b^{10}c^3d^2f^2 + 5644800a^5c^8d^ \\
& 2f^2 + 20736b^9c^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6 \\
& *f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^ \\
& 4 - 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 - 39690b^9c^4d^3* \\
& f - 734832a*b^6c^6d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308 \\
& 416a^5c^8e^4 + 35721b^8c^5d^4, z, k)*x*(8388608a^{11}b*c^9 - 512a^4* \\
& b^{15}c^2 + 14336a^5b^{13}c^3 - 172032a^6b^{11}c^4 + 1146880a^7b^9c^5 - \\
& 4587520a^8b^7c^6 + 11010048a^9b^5c^7 - 14680064a^{10}b^3c^8))/(64*(\\
& a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c \\
& ^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5))) + (x*(451584a^6c^9d^2 + 18b \\
& ^{12}c^3d^2 - 25600a^7c^8f^2 - 504a*b^{10}c^4d^2 - 73728a^6b*c^8e^2
\end{aligned}$$

$$\begin{aligned}
& + 6228a^2b^8c^5d^2 - 42624a^3b^6c^6d^2 + 176256a^4b^4c^7d^2 - 4 \\
& 23936a^5b^2c^8d^2 - 4608a^4b^5c^6e^2 + 36864a^5b^3c^7e^2 + 2a^2 \\
& 2b^{10}c^3f^2 - 84a^3b^8c^4f^2 + 3520a^4b^6c^5f^2 - 26240a^5b^4c^6 \\
& f^2 + 59904a^6b^2c^7f^2 - 1152a^4b^7c^4g^2 + 9216a^5b^5c^5g \\
& ^2 - 18432a^6b^3c^6g^2 + 12a^2b^{11}c^3d^2f - 218112a^6b^8c^8d^2f - 420 \\
& a^2b^9c^4d^2f + 4992a^3b^7c^5d^2f - 36480a^4b^5c^6d^2f + 144384a^5 \\
& b^3c^7d^2f + 4608a^4b^6c^5e^2g - 36864a^5b^4c^6e^2g + 73728a^6b^2 \\
& c^7e^2g)/(64(a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 \\
& - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) - (567b^7c^5 \\
& d^3 + 8000a^5c^7f^3 - 10368a^2b^5c^6d^3 - 169344a^3b^8c^8d^3 - 1935 \\
& 36a^4c^8d^2e^2 + 141120a^4c^8d^2f - 315b^8c^4d^2f + 67824a^2b^3 \\
& c^7d^3 - 35a^2b^6c^4f^3 - 84a^3b^4c^5f^3 + 12720a^4b^2c^6f^3 \\
& + 6237a^2b^6c^5d^2f - 210a^2b^7c^4d^2f - 116160a^4b^7c^7d^2f + 368 \\
& 64a^4b^7c^7e^2f - 6912a^2b^4c^6d^2e^2 + 62208a^3b^2c^7d^2e^2 - 423 \\
& 72a^2b^4c^6d^2f + 1764a^2b^5c^5d^2f^2 + 96048a^3b^2c^7d^2f + 4 \\
& 608a^3b^3c^6d^2f^2 - 1728a^2b^6c^4d^2g^2 - 2304a^3b^3c^6e^2f + 1 \\
& 5552a^3b^4c^5d^2g^2 - 48384a^4b^2c^6d^2g^2 - 576a^3b^5c^4f^2g^2 + \\
& 9216a^4b^3c^5f^2g^2 + 193536a^4b^7c^7d^2e^2g + 6912a^2b^5c^5d^2e^2g - \\
& 62208a^3b^3c^6d^2e^2g + 2304a^3b^4c^5e^2f^2g - 36864a^4b^2c^6e^2f^2g) \\
& / (512(a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7 \\
& b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) * \text{root}(56371445760a^{11}b^8 \\
& c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798 \\
& 691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12} \\
& b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 \\
& - 2621440a^6b^{18}c^2z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - \\
& 73728a^2b^{16}c^2d^2f^2z^2 + 1509949440a^9b^3c^7e^2g^2z^2 - 1321205760a^9 \\
& b^2c^8d^2f^2z^2 - 754974720a^8b^5c^6e^2g^2z^2 + 732168192a^7b^6c^6d^2 \\
& f^2z^2 - 366280704a^6b^8c^5d^2f^2z^2 - 330301440a^8b^4c^7d^2f^2z^2 + 188 \\
& 743680a^7b^7c^5e^2g^2z^2 + 96583680a^5b^{10}c^4d^2f^2z^2 - 23592960a^6b^9 \\
& c^4e^2g^2z^2 + 1179648a^5b^{11}c^3e^2g^2z^2 - 15175680a^4b^{12}c^3d^2f^2z^2 \\
& + 1428480a^3b^{14}c^2d^2f^2z^2 - 1207959552a^{10}b^8c^8e^2g^2z^2 - 4404019 \\
& 20a^{10}b^8c^8f^2z^2 + 1761607680a^{10}c^9d^2f^2z^2 - 14080a^3b^{15}c^3f^2z^2 \\
& + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 396 \\
& 3617280a^9b^9c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7 \\
& b^5c^7d^2z^2 - 94464a^2b^{17}c^2d^2z^2 + 754974720a^8b^4c^7e^2z^2 - \\
& 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 377487360a^9 \\
& b^4c^6g^2z^2 + 301989888a^{10}b^2c^7g^2z^2 + 188743680a^8b^6c^5 \\
& g^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + \\
& 146165760a^4b^{11}c^4d^2z^2 - 47185920a^7b^8c^4g^2z^2 + 5898240a^6 \\
& b^{10}c^3g^2z^2 - 294912a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2 \\
& z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960 \\
& a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3 \\
& d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 15 \\
& 36a^2b^{18}d^2f^2z^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 23 \\
& 04b^{19}d^2z^2 + 169869312a^7b^8c^8d^2e^2f^2z + 9216a^2b^{13}c^2d^2e^2f^2z - 4 \\
& 608a^2b^{14}c^2d^2f^2g^2z - 221773824a^6b^3c^7d^2e^2f^2z + 110886912a^6b^4c^6 \\
& d^2f^2g^2z - 84934656a^7b^2c^7d^2f^2g^2z + 117964800a^5b^5c^6d^2e^2f^2z - \\
& 58982400a^5b^6c^5d^2f^2g^2z + 16220160a^4b^8c^4d^2f^2g^2z - 2396160a^3b^8 \\
& c^3d^2f^2g^2z + 175104a^2b^{12}c^2d^2f^2g^2z - 32440320a^4b^7c^5d^2e^2f^2z \\
& z + 4792320a^3b^9c^4d^2e^2f^2z - 350208a^2b^{11}c^3d^2e^2f^2z + 346816512a^7 \\
& b^8c^8d^2g^2z - 19660800a^8b^8c^7f^2g^2z - 768a^2b^{13}c^3f^2g^2z + 21 \\
& 4272a^2b^{13}c^2d^2g^2z - 428544a^2b^{12}c^3d^2e^2z + 1022754816a^6b^2c^8 \\
& d^2e^2z - 642318336a^5b^4c^7d^2e^2z - 511377408a^6b^3c^7d^2g^2z + \\
& 321159168a^5b^5c^6d^2g^2z + 223395840a^4b^6c^6d^2e^2z - 111697920a^4 \\
& b^7c^5d^2g^2z + 25362432a^7b^3c^6f^2g^2z - 50724864a^7b^2c^7e^2 \\
& f^2z - 13271040a^6b^5c^5f^2g^2z + 3563520a^5b^7c^4f^2g^2z - 50688 \\
& 0a^4b^9c^3f^2g^2z + 34560a^3b^{11}c^2f^2g^2z + 26542080a^6b^4c^6e^2 \\
& f^2z + 23362560a^3b^9c^4d^2g^2z - 46725120a^3b^8c^5d^2e^2z - 7127 \\
& 040a^5b^6c^5e^2f^2z - 2965248a^2b^{11}c^3d^2g^2z + 1013760a^4b^8c^
\end{aligned}$$

$$\begin{aligned}
& 4*ef^2*z - 69120*a^3*b^10*c^3*ef^2*z + 1536*a^2*b^12*c^2*ef^2*z + 593049 \\
& 6*a^2*b^10*c^4*d^2*ez - 693633024*a^7*c^9*d^2*ez + 39321600*a^8*c^8*ef^2 \\
& *z + 13824*b^14*c^2*d^2*ez - 6912*b^15*c*d^2*g*z + 15482880*a^5*b*c^7*d*ef \\
& *fg - 13824*a*b^9*c^3*d*ef*fg + 7741440*a^4*b^3*c^6*d*ef*fg - 2903040*a^3*b \\
& ^5*c^5*d*ef*fg + 387072*a^2*b^7*c^4*d*ef*fg + 3456*a*b^10*c^2*d*fg^2 + 435 \\
& 456*a*b^8*c^4*d^2*eg + 13824*a*b^8*c^4*d*ef^2*f - 3870720*a^5*b^2*c^6*ef^2 \\
& *g - 34836480*a^4*b^2*c^7*d^2*eg - 645120*a^4*b^4*c^5*ef^2*g + 80640*a^3* \\
& b^6*c^4*ef^2*g - 2304*a^2*b^8*c^3*ef^2*g - 3870720*a^5*b^2*c^6*d*fg^2 - \\
& 1935360*a^4*b^4*c^5*d*fg^2 + 725760*a^3*b^6*c^4*d*fg^2 + 17418240*a^3*b^4 \\
& *c^6*d^2*eg - 96768*a^2*b^8*c^3*d*fg^2 - 3919104*a^2*b^6*c^5*d^2*eg - 77 \\
& 41440*a^4*b^2*c^7*d*ef^2*f + 2903040*a^3*b^4*c^6*d*ef^2*f - 387072*a^2*b^6*c^ \\
& 5*d*ef^2*f + 37310976*a^3*b^3*c^7*d^3*f - 2654208*a^5*b^3*c^5*eg^3 + 387072 \\
& 0*a^5*b*c^7*ef^2*f^2 + 34836480*a^4*b*c^8*d^2*ef^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*ef^3 + 1737792*a^3*b^5* \\
& c^5*d*ef^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*ef^3 - 435456*a* \\
& b^7*c^5*d^2*ef^2 - 20736*b^10*c^3*d^2*eg - 75188736*a^4*b*c^8*d^3*f - 15482 \\
& 880*a^5*c^8*d*ef^2*f - 10616832*a^5*b*c^7*ef^3*g - 4262400*a^5*b*c^7*d*ef^3 + \\
& 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*ef^3 + 967680*a^5*b^3*c^5*ef^2*g^2 \\
& + 161280*a^4*b^5*c^4*ef^2*g^2 - 20160*a^3*b^7*c^3*ef^2*g^2 + 576*a^2*b^9*c^2* \\
& f^2*g^2 + 7962624*a^5*b^2*c^6*ef^2*g^2 + 35525376*a^4*b^2*c^7*d^2*ef^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*ef^2*f^2 - 80640*a^3*b^5*c^5*ef^2*f^2 + 2304*a^2 \\
& *b^7*c^4*ef^2*f^2 - 15269184*a^3*b^4*c^6*d^2*ef^2 + 2870784*a^2*b^6*c^5*d^2*ef \\
& ^2 - 17418240*a^3*b^3*c^7*d^2*ef^2 + 3919104*a^2*b^5*c^6*d^2*ef^2 + 5184*b^11 \\
& *c^2*d^2*g^2 + 11025*b^10*c^3*d^2*ef^2 + 5644800*a^5*c^8*d^2*ef^2 + 20736*b^9 \\
& *c^4*d^2*ef^2 + 331776*a^5*b^4*c^4*ef^4 + 492800*a^5*b^2*c^6*ef^4 + 351456*a^4 \\
& *b^4*c^5*ef^4 - 43120*a^3*b^6*c^4*ef^4 + 1225*a^2*b^8*c^3*ef^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*ef^4 + 5308416*a^5*c^8*ef^4 + \\
& 35721*b^8*c^5*d^4, z, k), k, 1, 4) + ((9*x^4*(2*b*c^2*ef - b^2*c*fg))/(4*(b^ \\
& 4 + 16*a^2*c^2 - 8*a*b^2*c)) - (x^2*(b^3*fg - 10*a*c^2*ef - 2*b^2*c*ef + 5*a*b \\
& *c*fg))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (b^3*ef + a*b^2*fg + 8*a^2*c*fg - \\
& 10*a*b*c*ef)/(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*ef - b*fg))/(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)
\end{aligned}$$

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
$$\int \frac{d+ex+fx^2+gx^3+hx^4}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=679

$$\frac{x \left(cx^2 \left(20a^2cf + ab^2f - 12ab(ah + 2cd) + 3b^3d \right) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d \right)}{8a^2 \left(b^2 - 4ac \right)^2 \left(a + bx^2 + cx^4 \right)}$$

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}

$$\frac{x \left(\frac{20a^2cf + ab^2f - 12ab(ah + 2cd) + 3b^3d}{b^2 - 4ac} + \frac{8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d}{b^2 - 4ac} \right)}{8a^2 \left(b^2 - 4ac \right)^2 \sqrt{a + bx^2 + cx^4}}$$

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[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
```

$x]$ && NeQ[$b^2 - 4ac$, 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] && NeQ[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_Symbol] :> 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[PolynomialRemainder[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))/((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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(a + bx^2 + cx^4)^3} dx &= \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx^2}{(a + bx + cx^2)^3} dx \right) \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}
\end{aligned}$$

Mathematica [A] time = 6.55, size = 845, normalized size = 1.24

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]
$$\begin{aligned}
& -1/4*(-(a*b*e) + 2*a^2*g + b^2*d*x - 2*a*c*d*x - a*b*f*x + 2*a^2*h*x - 2*a*c*e*x^2 + a*b*g*x^2 + b*c*d*x^3 - 2*a*c*f*x^3 + a*b*h*x^3)/(a*(-b^2 + 4*a*c) \\
&)*(a + b*x^2 + c*x^4)^2) + (12*a^2*b*c*e - 6*a^2*b^2*g + 3*b^4*d*x - 25*a*b^2*c*d*x + 28*a^2*c^2*d*x + a*b^3*f*x + 8*a^2*b*c*f*x - 7*a^2*b^2*h*x + 4*a^3*c*h*x + 24*a^2*c^2*e*x^2 - 12*a^2*b*c*g*x^2 + 3*b^3*c*d*x^3 - 24*a*b*c^2*d*x^3 + a*b^2*c*f*x^3 + 20*a^2*c^2*f*x^3 - 12*a^2*b*c*h*x^3)/(8*a^2*(-b^2 + 4*a*c)^2*(a + b*x^2 + c*x^4)) + (Sqrt[c]*(3*b^4*d - 30*a*b^2*c*d + 168*a^2*c^2*d + 3*b^3*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c*Sqrt[b^2 - 4*a*c]*d + a*b^3*f - 52*a^2*b*c*f + a*b^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c*Sqrt[b^2 - 4*a*c]*f + 18*a^2*b^2*h + 24*a^3*c*h - 12*a^2*b*Sqrt[b^2 - 4*a*c]*h)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[c]*(-3*b^4*d + 30*a*b^2*c*d - 168*a^2*c^2*d + 3*b^3*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c*Sqrt[b^2 - 4*a*c]*d - a*b^3*f + 52*a^2*b*c*f + a*b^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c*Sqrt[b^2 - 4*a*c]*f - 18*a^2*b^2*h - 24*a^3*c*h - 12*a^2*b*Sqrt[b^2 - 4*a*c]*h)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + (3*c*(2*c*e - b*g)*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2)) - (3*c*(2*c*e - b*g)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2))
\end{aligned}$$

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(a + bx^2 + cx^4)^3} dx$$

Verification is not applicable to the result.

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

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

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))*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))*a^2*b^4*c^2 +
26*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b^5*c^2 + sqrt(2)*sqrt(b*c +
sqrt(b^2 - 4*a*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))*a^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 -
4*a*c))*a^2*b^3*c^3 - 13*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*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))*a^4*c^4 + 224*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3*b*c^4 + 64*
sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*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))*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))*b^7 + 15*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a
*b^5*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^6*c
- 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*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))*a*b^4*c^2 -
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^5*c^2 + 176*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3*b*c^3 + 88*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*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))*a*b^3*c^3 - 44*sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*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)
)*a*b^7 - 24*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*b^5*c - 2*sqrt(2)
)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b^6*c - 2*a*b^7*c + 144*sqrt(2)*sqrt(b*
c + sqrt(b^2 - 4*a*c))*a^3*b^3*c^2 + 40*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a
*c))*a^2*b^4*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*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))*a^
4*b*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3*b^2*c^3 - 20*sqrt
(2)*sqrt(b*c + sqrt(b^2 - 4*a*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))*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))*a*b^6 + 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^
2 - 4*a*c))*a^2*b^4*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 -
4*a*c))*a*b^5*c - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
```

$$\begin{aligned}
& *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)*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 + sq \\
& rt(b^2 - 4*a*c)}*c)*a^2*b^3*c^2 - 12*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + sq \\
& rt(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 - sq \\
& rt(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 \\
& \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 + 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}*\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 - s \\
& \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
\end{aligned}$$

$$\begin{aligned}
&^3 - 128\sqrt{2}\sqrt{b^2 - 4ac}c^3 - 20\sqrt{2}\sqrt{b^2 - 4ac}c^2 + 288a^3b^3c^3 + 44a^2b^4c^3 + 64\sqrt{2}\sqrt{b^2 - 4ac}c^4 - 512a^4b^4c^4 - \\
&64a^3b^2c^4 - 320a^4c^5 + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^6 - 22\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^5 - 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^4 + 32\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^3 \\
&+ 36\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^2 + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c + 160\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^4 + 80\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^3 - 18\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^2 \\
&- 40\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c + 2(b^2 - 4ac)a^2b^3c^2 + 2(b^2 - 4ac)a^2b^4c^2 - 128(b^2 - 4ac)a^3b^3c^3 - 36(b^2 - 4ac)a^2b^2c^3 - 80(b^2 - 4ac)a^3c^4 \\
&+ 3(\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^6 - 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^5 + 2a^2b^6c - 16\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^4 + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^3 \\
&- 8a^3b^4c^2 - 2a^2b^5c^2 + 64\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^3 - 32a^4b^2c^3 - 16a^3b^3c^3 - 16\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^4 + 128a^5c^4 + 96a^4b^4c^4 + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^5 \\
&+ 8\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^4 - 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^3 - 48\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^2 - 24\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c \\
&- 4a^2b^3c^2 + 12\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{b^2 - 4ac}c^3 - 2(b^2 - 4ac)a^2b^4c + 2(b^2 - 4ac)a^2b^3c^2 + 32(b^2 - 4ac)a^4c^3 + 24(b^2 - 4ac)a^3b^3c^3) \arctan(2\sqrt{1/2}x/\sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2 - \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2)^2 - 4(a^3b^4 - 8a^4b^2c + 16a^5c^2)(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3))})/(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3)))/((a^3b^8 - 16a^4b^6c - 2a^3b^7c + 96a^5b^4c^2 + 24a^4b^5c^2 + a^3b^6c^2 - 256a^6b^2c^3 - 96a^5b^3c^3 - 12a^4b^4c^3 + 256a^7c^4 + 128a^6b^2c^4 + 48a^5b^2c^4 - 64a^6c^5) \operatorname{abs}(c)) + 3/2((b^3c^3 - 4ab^4c - 2b^2c^4 + b^5c^5) \sqrt{b^2 - 4ac})g - 2(b^2c^4 - 4ac^5 - 2b^2c^5 + c^6) \sqrt{b^2 - 4ac})e \log(x^2 + 1/2(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2 + \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2)^2 - 4(a^3b^4 - 8a^4b^2c + 16a^5c^2)(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3))})/(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3))/((b^8 - 16ab^6c - 2b^7c + 96a^2b^4c^2 + 24ab^5c^2 + b^6c^2 - 256a^3b^2c^3 - 96a^2b^3c^3 - 12ab^4c^3 + 256a^4c^4 + 128a^3b^4c^4 + 48a^2b^2c^4 - 64a^3c^5) c^2) - 3/2((b^3c^3 - 4ab^4c - 2b^2c^4 + b^5c^5) \sqrt{b^2 - 4ac})g - 2(b^2c^4 - 4ac^5 - 2b^2c^5 + c^6) \sqrt{b^2 - 4ac})e \log(x^2 + 1/2(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2 + \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2)^2 - 4(a^3b^4 - 8a^4b^2c + 16a^5c^2)(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3))})/(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3))/((b^8 - 16ab^6c - 2b^7c + 96a^2b^4c^2 + 24ab^5c^2 + b^6c^2 - 256a^3b^2c^3 - 96a^2b^3c^3 - 12ab^4c^3 + 256a^4c^4 + 128a^3b^4c^4 + 48a^2b^2c^4 - 64a^3c^5) c^2) + 1/8(3b^3c^2d^7x^7 - 24ab^3c^3d^7x^7 + ab^2c^2f^7x^7 + 20a^2c^3f^7x^7 - 12a^2b^2c^2h^7x^7 - 12a^2b^2c^2g^6x^6 + 24a^2c^3x^6e + 6b^4cd^5x^5 - 49ab^2c^2d^5x^5 + 28a^2c^3d^5x^5 + 2ab^3cf^5x^5 + 28a^2b^2c^2f^5x^5 - 19a^2b^2c^2h^5x^5 + 4a^3c^2h^5x^5 - 18a^2b^2c^2g^4x^4 + 36a^2b^2c^2x^4e + 3b^5d^3x^3 - 20ab^3cd^3x^3 - 4a^2b^2c^2d^3x^3 + ab^4f^3x^3 + 5a^2b^2c^2f^3x^3 + 36a^3c^2f^3x^3 - 5a^2b^3h^3x^3 - 16a^3b^3c^2h^3x^3 - 4a^2b^3g^2x^2 - 20a^3b^3c^2g^2x^2 + 8a^2b^2c^2x^2e + 40a^3c^2x^2e + 5ab^4d^4x - 37a^2b^2c^2d^4x + 44a^3
\end{aligned}$$

$$\frac{c^2dx - a^2b^3fx + 16a^3b^2cfx - 3a^3b^2hx - 12a^4cfx - 2a^3b^2g - 16a^4cg - 2a^2b^3e + 20a^3b^2ce}{(a^2b^4 - 8a^3b^2c + 16a^4c^2)(cx^4 + bx^2 + a)^2}$$

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]
$$\begin{aligned} & -15/2/a/(16a^2c^2-8ab^2c+b^4)c^2/(16ac-4b^2)^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \arctanh(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) \\ & *(-4ac+b^2)^{1/2}b^2d+3/4/a^2/(16a^2c^2-8ab^2c+b^4)c/(16ac-4b^2)^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2} \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) \\ & *(-4ac+b^2)^{1/2}b^4d+3/4/a^2/(16a^2c^2-8ab^2c+b^4)c/(16ac-4b^2)^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \arctanh(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) \\ & *(-4ac+b^2)^{1/2}b^4d+1/4/a/(16a^2c^2-8ab^2c+b^4)c/(16ac-4b^2)^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \arctanh(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) \\ & *(-4ac+b^2)^{1/2}b^3f+1/4/a/(16a^2c^2-8ab^2c+b^4)c/(16ac-4b^2)^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2} \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) \\ & *(-4ac+b^2)^{1/2}b^3f-15/2/a/(16a^2c^2-8ab^2c+b^4)c^2/(16ac-4b^2)^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2} \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) \\ & *(-4ac+b^2)^{1/2}b^2d+(-1/8c^2(12a^2bh-20a^2cf-ab^2f+24abc^2d-3b^3d)/a^2/(16a^2c^2-8ab^2c+b^4)x^7-3/2c^2(bg-2ce)/(16a^2c^2-8ab^2c+b^4)x^6+1/8/a^2c(4a^3ch-19a^2b^2h+28a^2b^2cf+28a^2c^2d+2ab^3f-49ab^2cd+6b^4d)/(16a^2c^2-8ab^2c+b^4)x^5-9/4b^2c(bg-2ce)/(16a^2c^2-8ab^2c+b^4)x^4-1/8(16a^3b^2ch-36a^3c^2f+5a^2b^3h-5a^2b^2cf+4a^2b^2c^2d-ab^4f+20ab^3cd-3b^5d)/a^2/(16a^2c^2-8ab^2c+b^4)x^3-1/2(5ac+b^2)(bg-2ce)/(16a^2c^2-8ab^2c+b^4)x^2-1/8(12a^3ch+3a^2b^2h-16a^2b^2cf-44a^2c^2d+ab^3f+37ab^2cd-5b^4d)/(16a^2c^2-8ab^2c+b^4)/ax-1/4(8a^2cg+ab^2g-10abc^2e+b^3e)/(16a^2c^2-8ab^2c+b^4))/(cx^4+bx^2+a)^2-4/(16a^2c^2-8ab^2c+b^4)c^2/(16ac-4b^2)^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2} \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) *b^2f-24/(16a^2c^2-8ab^2c+b^4)c^3/(16ac-4b^2)^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2} \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) *bd+4/(16a^2c^2-8ab^2c+b^4)c^2/(16ac-4b^2)^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \arctanh(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) *b^2f+24/(16a^2c^2-8ab^2c+b^4)c^3/(16ac-4b^2)^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \arctanh(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) *bd+3/(16a^2c^2-8ab^2c+b^4)c/(16ac-4b^2)^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2} \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) *b^3h+20a/(16a^2c^2-8ab^2c+b^4)c^3/(16ac-4b^2)^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2} \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) *f-20a/(16a^2c^2-8ab^2c+b^4)c^3/(16ac-4b^2)^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \arctanh(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) *f-3/(16a^2c^2-8ab^2c+b^4)c/(16ac-4b^2)^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \arctanh(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) *b^3h+42/(16a^2c^2-8ab^2c+b^4)c^3/(16ac-4b^2)^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \arctanh(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) *(-4ac+b^2)^{1/2}d+42/(16a^2c^2-8ab^2c+b^4)c^3/(16ac-4b^2)^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2} \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) *(-4ac+b^2)^{1/2}d+6/(16a^2c^2-8ab^2c+b^4)c/(16ac-4b^2)^{1/2} \ln(-2cx^2-b+(-4ac+b^2)^{1/2}) *(-4ac+b^2)^{1/2}bg-6/(16a^2c^2-8ab^2c+b^4)c/(16ac-4b^2)^{1/2} \ln(2cx^2+b+(-4ac+b^2)^{1/2}) *(-4ac+b^2)^{1/2}bg-12a/(16a^2c^2-8ab^2c+b^4)c^2/(16ac-4b^2)^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2} \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) *bh+9/a/(16a^2c^2-8ab^2c+b^4)c^2/(16ac-4b^2)^{1/2} \end{aligned}$$

$$2^{(1/2)} / ((b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \arctan(2^{(1/2)} / ((b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * b^3 d - 9/a / (16a^2 c^2 - 8ab^2 c + b^4) * c^2 / (16ac - 4b^2) * 2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * b^3 d - 1/4/a / (16a^2 c^2 - 8ab^2 c + b^4) * c / (16ac - 4b^2) * 2^{(1/2)} / ((b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \arctan(2^{(1/2)} / ((b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * b^4 f + 3/4/a^2 / (16a^2 c^2 - 8ab^2 c + b^4) * c / (16ac - 4b^2) * 2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * b^5 d - 13 / (16a^2 c^2 - 8ab^2 c + b^4) * c^2 / (16ac - 4b^2) * 2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * (-4ac + b^2)^{(1/2)} * b f + 9/2 / (16a^2 c^2 - 8ab^2 c + b^4) * c / (16ac - 4b^2) * 2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * (-4ac + b^2)^{(1/2)} * b^2 h + 9/2 / (16a^2 c^2 - 8ab^2 c + b^4) * c / (16ac - 4b^2) * 2^{(1/2)} / ((b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \arctan(2^{(1/2)} / ((b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * (-4ac + b^2)^{(1/2)} * b^2 h - 13 / (16a^2 c^2 - 8ab^2 c + b^4) * c^2 / (16ac - 4b^2) * 2^{(1/2)} / ((b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \arctan(2^{(1/2)} / ((b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * (-4ac + b^2)^{(1/2)} * b f - 3/4/a^2 / (16a^2 c^2 - 8ab^2 c + b^4) * c / (16ac - 4b^2) * 2^{(1/2)} / ((b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \arctan(2^{(1/2)} / ((b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * b^5 d + 1/4/a / (16a^2 c^2 - 8ab^2 c + b^4) * c / (16ac - 4b^2) * 2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * b^4 f + 6a / (16a^2 c^2 - 8ab^2 c + b^4) * c^2 / (16ac - 4b^2) * 2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * (-4ac + b^2)^{(1/2)} * h + 12a / (16a^2 c^2 - 8ab^2 c + b^4) * c^2 / (16ac - 4b^2) * 2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * b h + 6a / (16a^2 c^2 - 8ab^2 c + b^4) * c^2 / (16ac - 4b^2) * 2^{(1/2)} / ((b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} \arctan(2^{(1/2)} / ((b + (-4ac + b^2)^{(1/2)})c)^{(1/2)} * cx) * (-4ac + b^2)^{(1/2)} * h - 12 / (16a^2 c^2 - 8ab^2 c + b^4) * c^2 / (16ac - 4b^2) * \ln(-2cx^2 - b + (-4ac + b^2)^{(1/2)}) * (-4ac + b^2)^{(1/2)} * e + 12 / (16a^2 c^2 - 8ab^2 c + b^4) * c^2 / (16ac - 4b^2) * \ln(2cx^2 + b + (-4ac + b^2)^{(1/2)}) * (-4ac + 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]
$$-1/8 * ((12a^2 b c^2 h - 3(b^3 c^2 - 8ab^2 c^3) * d - (ab^2 c^2 + 20a^2 c^3) * f) * x^7 - 12(2a^2 c^3 e - a^2 b c^2 g) * x^6 - ((6b^4 c - 49ab^2 c^2 + 28a^2 c^3) * d + 2(ab^3 c + 14a^2 b c^2) * f - (19a^2 b^2 c - 4a^3 c^2) * h) * x^5 - 18(2a^2 b c^2 e - a^2 b^2 c g) * x^4 - ((3b^5 - 20ab^3 c - 4a^2 b c^2) * d + (ab^4 + 5a^2 b^2 c + 36a^3 c^2) * f - (5a^2 b^3 + 16a^3 b c) * h) * x^3 - 4(2(a^2 b^2 c + 5a^3 c^2) * e - (a^2 b^3 + 5a^3 b c) * g) * x^2 + 2(a^2 b^3 - 10a^3 b c) * e + 2(a^3 b^2 + 8a^4 c) * g - ((5ab^4 - 37a^2 b^2 c + 44a^3 c^2) * d - (a^2 b^3 - 16a^3 b c) * f - 3(a^3 b^2 + 4a^4 c) * h) * x) / ((a^2 b^4 c^2 - 8a^3 b^2 c^3 + 16a^4 c^4) * x^8 + a^4 b^4 - 8a^5 b^2 c + 16a^6 c^2 + 2(a^2 b^5 c - 8a^3 b^3 c^2 + 16a^4 b c^3) * x^6 + (a^2 b^6 - 6a^3 b^4 c + 32a^5 c^3) * x^4 + 2(a^3 b^5 - 8a^4 b^3 c + 16a^5 b c^2) * x^2) - 1/8 * integrate(((12a^2 b c^2 h - 3(b^3 c - 8ab^2 c^2) * d - (ab^2 c + 20a^2 c^2) * f) * x^2 - 3(b^4 - 9ab^2 c + 28a^2 c^2) * d - (ab^3 - 16a^2 b c) * f - 3(a^2 b^2 + 4a^3 c) * h - 24(2a^2 c^2 e - a^2 b c g) * x) / (c*x^4 + b*x^2 + a), x) / (a^2 b^4 - 8a^3 b^2 c + 16a^4 c^2)$$

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]
$$\left(\frac{(9x^4(2b^2c^2e - b^2c^2g))}{4(b^4 + 16a^2c^2 - 8ab^2c)} - (x^2(b^3g - 10a^2c^2e - 2b^2c^2e + 5ab^2c^2g))}{2(b^4 + 16a^2c^2 - 8ab^2c)} - (b^3e + ab^2g + 8a^2c^2g - 10ab^2c^2e)}{4(b^4 + 16a^2c^2 - 8ab^2c)} \right) + \frac{(x^5(28a^2c^3d + 4a^3c^2h + 6b^4c^2d + 2ab^3c^2f - 49ab^2c^2d + 28a^2b^2c^2f - 19a^2b^2c^2h))}{(8a^2(b^4 + 16a^2c^2 - 8ab^2c))} + \frac{(x^3(3b^5d + 36a^3c^2f - 5a^2b^3h + ab^4f - 20ab^3c^2d - 16a^3b^2c^2h - 4a^2b^2c^2d + 5a^2b^2c^2f))}{(8a^2(b^4 + 16a^2c^2 - 8ab^2c))} - \frac{(x(3a^2b^2h - 44a^2c^2d - 5b^4d + ab^3f + 12a^3c^2h + 37ab^2c^2d - 16a^2b^2c^2f))}{(8a(b^4 + 16a^2c^2 - 8ab^2c))} + \frac{(3c^2x^6(2c^2e - bg))}{2(b^4 + 16a^2c^2 - 8ab^2c)} + \frac{(cx^7(20a^2c^2f + 3b^3c^2d - 24ab^2c^2d + ab^2c^2f - 12a^2b^2c^2h))}{(8a^2(b^4 + 16a^2c^2 - 8ab^2c))} \Big/ (x^4(2ac + b^2) + a^2 + c^2x^8 + 2ab^2x^2 + 2b^2cx^6) + \text{symsum}(\log((10368ab^5c^6d^3 - 8000a^5c^7f^3 - 567b^7c^5d^3 + 169344a^3b^2c^8d^3 + 193536a^4c^8d^2e^2 - 141120a^4c^8d^2f + 1728a^6b^2c^5h^3 + 315b^8c^4d^2f + 27648a^5c^7e^2h - 135b^9c^3d^2h - 2880a^6c^6f^2h^2 - 67824a^2b^3c^7d^3 + 35a^2b^6c^4f^3 + 84a^3b^4c^5f^3 - 12720a^4b^2c^6f^3 + 540a^4b^5c^3h^3 + 4320a^5b^3c^4h^3 - 40320a^5c^7d^2fh - 6237ab^6c^5d^2f + 210ab^7c^4d^2f^2 + 116160a^4b^2c^7d^2f^2 - 36864a^4b^2c^7e^2f + 2430ab^7c^4d^2h + 133056a^4b^2c^7d^2h + 27648a^5b^2c^6d^2h^2 + 26880a^5b^2c^6f^2h + 6912a^2b^4c^6d^2e^2 - 62208a^3b^2c^7d^2e^2 + 42372a^2b^4c^6d^2f - 1764a^2b^5c^5d^2f^2 - 96048a^3b^2c^7d^2f - 4608a^3b^3c^6d^2f^2 + 1728a^2b^6c^4d^2g^2 + 2304a^3b^3c^6e^2f - 15552a^3b^4c^5d^2g^2 + 48384a^4b^2c^6d^2g^2 - 13716a^2b^5c^5d^2h + 405a^2b^7c^3d^2h^2 + 12096a^3b^3c^6d^2h - 5400a^3b^5c^4d^2h^2 + 28944a^4b^3c^5d^2h^2 + 576a^3b^5c^4f^2g^2 + 6912a^4b^2c^6e^2h - 9216a^4b^3c^5f^2g^2 - 15a^2b^7c^3f^2h - 360a^3b^5c^4f^2h + 135a^3b^6c^3f^2h^2 + 15696a^4b^3c^5f^2h - 5580a^4b^4c^4f^2h^2 - 20592a^5b^2c^5f^2h^2 + 1728a^4b^4c^4g^2h + 6912a^5b^2c^5g^2h - 193536a^4b^2c^7d^2e^2g - 90ab^8c^3d^2fh - 27648a^5b^2c^6e^2gh - 6912a^2b^5c^5d^2e^2g + 62208a^3b^3c^6d^2e^2g - 270a^2b^6c^4d^2fh + 16056a^3b^4c^5d^2fh - 2304a^3b^4c^5e^2fg - 127008a^4b^2c^6d^2fh + 36864a^4b^2c^6e^2fg - 6912a^4b^3c^5e^2gh)) / (512(a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) - \text{root}(56371445760a^11b^8c^6z^4 - 503316480a^8b^14c^3z^4 + 47185920a^7b^16c^2z^4 - 171798691840a^14b^2c^9z^4 + 193273528320a^13b^4c^8z^4 - 128849018880a^12b^6c^7z^4 - 16911433728a^10b^10c^5z^4 + 3523215360a^9b^12c^4z^4 - 2621440a^6b^18c^3z^4 + 68719476736a^15c^10z^4 + 65536a^5b^20z^4 - 46080a^4b^14c^2f^2h^2z^2 - 105984a^3b^15c^2d^2h^2z^2 - 73728a^2b^16c^2d^2f^2z^2 + 2548039680a^9b^3c^7d^2h^2z^2 + 1509949440a^9b^3c^7e^2g^2z^2 - 1401421824a^8b^5c^6d^2h^2z^2 - 1321205760a^9b^2c^8d^2f^2z^2 - 754974720a^8b^5c^6e^2g^2z^2 + 732168192a^7b^6c^6d^2f^2z^2 - 456130560a^9b^4c^6f^2h^2z^2 + 390463488a^7b^7c^5d^2h^2z^2 - 366280704a^6b^8c^5d^2f^2z^2 - 330301440a^8b^4c^7d^2f^2z^2 + 254017536a^8b^6c^5f^2h^2z^2 - 1887436800a^10b^2c^8d^2h^2z^2 + 188743680a^10b^2c^7f^2h^2z^2 + 188743680a^7b^7c^5e^2g^2z^2 - 61931520a^7b^8c^4f^2h^2z^2 + 96583680a^5b^10c^4d^2f^2z^2 - 51609600a^6b^9c^4d^2h^2z^2 + 614000a^6b^10c^3f^2h^2z^2 + 61440a^5b^12c^2f^2h^2z^2 - 23592960a^6b^9c^4e^2g^2z^2 + 1179648a^5b^11c^3e^2g^2z^2 + 829440a^4b^13c^2d^2h^2z^2 + 368640a^5b^11c^3d^2h^2z^2 - 15175680a^4b^12c^3d^2f^2z^2 + 1428480a^3b^14c^2d^2f^2z^2 - 1207959552a^10b^2c^8e^2g^2z^2 - 440401920a^10b^2c^8f^2z^2 - 188743680a^11b^2c^7h^2z^2 + 1761607680a^10c^9d^2f^2z^2 + 46080a^5b^13c^2h^2z^2 - 14080a^3b^15c^2f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^2c^9d^2z^2 - 150994940a^9b^2c^8e^2z^2 + 251658240a^11c^8f^2h^2z^2 + 1536a^3b^16f^2h^2z^2 + 4608a^2b^17d^2h^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^b^17c^2d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888a^10b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^10b^3c^6$$

$$\begin{aligned}
& *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 + 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 + 120795952*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 + 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 \\
& 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 \\
& 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 \\
& 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 - 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 + 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
\end{aligned}$$

$$\begin{aligned}
& ^5e*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)) - \text{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*
\end{aligned}$$

$$\begin{aligned}
& d*hz^2 + 1509949440*a^9*b^3*c^7*eg*hz^2 - 1401421824*a^8*b^5*c^6*d*hz^2 - \\
& 1321205760*a^9*b^2*c^8*d*f*hz^2 - 754974720*a^8*b^5*c^6*eg*hz^2 + 732168192 \\
& *a^7*b^6*c^6*d*f*hz^2 - 456130560*a^9*b^4*c^6*f*h*hz^2 + 390463488*a^7*b^7*c^ \\
& 5*d*hz^2 - 366280704*a^6*b^8*c^5*d*f*hz^2 - 330301440*a^8*b^4*c^7*d*f*hz^2 + \\
& 254017536*a^8*b^6*c^5*f*h*hz^2 - 1887436800*a^10*b*c^8*d*hz^2 + 188743680* \\
& a^10*b^2*c^7*f*h*hz^2 + 188743680*a^7*b^7*c^5*eg*hz^2 - 61931520*a^7*b^8*c^4 \\
& *f*h*hz^2 + 96583680*a^5*b^10*c^4*d*f*hz^2 - 51609600*a^6*b^9*c^4*d*hz^2 + 6 \\
& 144000*a^6*b^10*c^3*f*h*hz^2 + 61440*a^5*b^12*c^2*f*h*hz^2 - 23592960*a^6*b^9 \\
& *c^4*eg*hz^2 + 1179648*a^5*b^11*c^3*eg*hz^2 + 829440*a^4*b^13*c^2*d*hz^2 + \\
& 368640*a^5*b^11*c^3*d*hz^2 - 15175680*a^4*b^12*c^3*d*f*hz^2 + 1428480*a^3* \\
& b^14*c^2*d*f*hz^2 - 1207959552*a^10*b*c^8*eg*hz^2 - 440401920*a^10*b*c^8*f^2 \\
& *hz^2 - 188743680*a^11*b*c^7*h^2*hz^2 + 1761607680*a^10*c^9*d*f*hz^2 + 46080*a \\
& ^5*b^13*c^h^2*hz^2 - 14080*a^3*b^15*c^f^2*hz^2 + 6936330240*a^8*b^3*c^8*d^2*hz \\
& ^2 + 2464874496*a^6*b^7*c^6*d^2*hz^2 - 3963617280*a^9*b*c^9*d^2*hz^2 - 150994 \\
& 9440*a^9*b^2*c^8*e^2*hz^2 + 251658240*a^11*c^8*f*h*hz^2 + 1536*a^3*b^16*f*h*hz \\
& ^2 + 4608*a^2*b^17*d*hz^2 - 5400428544*a^7*b^5*c^7*d^2*hz^2 - 94464*a*b^17* \\
& c*d^2*hz^2 + 754974720*a^8*b^4*c^7*e^2*hz^2 - 730054656*a^5*b^9*c^5*d^2*hz^2 + \\
& 477102080*a^9*b^3*c^7*f^2*hz^2 - 377487360*a^9*b^4*c^6*g^2*hz^2 + 301989888* \\
& a^10*b^2*c^7*g^2*hz^2 + 188743680*a^8*b^6*c^5*g^2*hz^2 + 141557760*a^10*b^3*c \\
& ^6*h^2*hz^2 - 174325760*a^8*b^5*c^6*f^2*hz^2 - 188743680*a^7*b^6*c^6*e^2*hz^2 \\
& + 146165760*a^4*b^11*c^4*d^2*hz^2 - 47185920*a^7*b^8*c^4*g^2*hz^2 - 26542080* \\
& a^8*b^7*c^4*h^2*hz^2 + 9584640*a^7*b^9*c^3*h^2*hz^2 - 2359296*a^9*b^5*c^5*h^2 \\
& *hz^2 - 1290240*a^6*b^11*c^2*h^2*hz^2 + 5898240*a^6*b^10*c^3*g^2*hz^2 - 294912 \\
& *a^5*b^12*c^2*g^2*hz^2 + 11206656*a^7*b^7*c^5*f^2*hz^2 + 8929280*a^6*b^9*c^4* \\
& f^2*hz^2 + 23592960*a^6*b^8*c^5*e^2*hz^2 - 2600960*a^5*b^11*c^3*f^2*hz^2 + 291 \\
& 840*a^4*b^13*c^2*f^2*hz^2 - 19860480*a^3*b^13*c^3*d^2*hz^2 - 1179648*a^5*b^10 \\
& *c^4*e^2*hz^2 + 1771776*a^2*b^15*c^2*d^2*hz^2 + 1536*a*b^18*d*f*hz^2 + 1207959 \\
& 552*a^10*c^9*e^2*hz^2 + 2304*a^4*b^15*h^2*hz^2 + 256*a^2*b^17*f^2*hz^2 + 2304* \\
& b^19*d^2*hz^2 + 169869312*a^7*b*c^8*d*e*f*hz + 99090432*a^8*b*c^7*d*g*h*hz - 4 \\
& 608*a^3*b^12*c*f*g*h*hz - 9437184*a^8*b*c^7*e*f*h*hz - 13824*a^2*b^13*c*d*g*h \\
& *hz + 9216*a*b^13*c^2*d*e*f*hz - 4608*a*b^14*c*d*f*g*hz + 219414528*a^7*b^2*c^ \\
& 7*d*e*h*hz - 221773824*a^6*b^3*c^7*d*e*f*hz - 109707264*a^7*b^3*c^6*d*g*h*hz + \\
& 110886912*a^6*b^4*c^6*d*f*g*hz - 88473600*a^6*b^4*c^6*d*e*h*hz - 84934656*a^ \\
& 7*b^2*c^7*d*f*g*hz + 117964800*a^5*b^5*c^6*d*e*f*hz + 44236800*a^6*b^5*c^5*d* \\
& g*h*hz - 5898240*a^7*b^4*c^5*f*g*h*hz + 4718592*a^8*b^2*c^6*f*g*h*hz + 2949120 \\
& *a^6*b^6*c^4*f*g*h*hz - 737280*a^5*b^8*c^3*f*g*h*hz + 92160*a^4*b^10*c^2*f*g* \\
& h*hz - 58982400*a^5*b^6*c^5*d*f*g*hz + 11796480*a^7*b^3*c^6*e*f*h*hz - 6635520 \\
& *a^5*b^7*c^4*d*g*h*hz - 5898240*a^6*b^5*c^5*e*f*h*hz + 1474560*a^5*b^7*c^4*e* \\
& f*h*hz - 276480*a^4*b^9*c^3*d*g*h*hz - 184320*a^4*b^9*c^3*e*f*h*hz + 179712*a^ \\
& 3*b^11*c^2*d*g*h*hz + 9216*a^3*b^11*c^2*e*f*h*hz + 16220160*a^4*b^8*c^4*d*f*g \\
& *hz + 13271040*a^5*b^6*c^5*d*e*h*hz - 2396160*a^3*b^10*c^3*d*f*g*hz + 552960*a \\
& ^4*b^8*c^4*d*e*h*hz - 359424*a^3*b^10*c^3*d*e*h*hz + 175104*a^2*b^12*c^2*d*f* \\
& g*hz + 27648*a^2*b^12*c^2*d*e*h*hz - 32440320*a^4*b^7*c^5*d*e*f*hz + 4792320*a \\
& ^3*b^9*c^4*d*e*f*hz - 350208*a^2*b^11*c^3*d*e*f*hz + 346816512*a^7*b*c^8*d^2* \\
& g*hz + 7077888*a^9*b*c^6*g*h^2*hz - 6912*a^4*b^11*c*g*h^2*hz - 19660800*a^8*b* \\
& c^7*f^2*g*hz - 768*a^2*b^13*c*f^2*g*hz + 214272*a*b^13*c^2*d^2*g*hz - 428544*a \\
& *b^12*c^3*d^2*e*hz - 198180864*a^8*c^8*d*e*h*hz + 1022754816*a^6*b^2*c^8*d^2* \\
& e*hz - 642318336*a^5*b^4*c^7*d^2*e*hz - 511377408*a^6*b^3*c^7*d^2*g*hz + 32115 \\
& 9168*a^5*b^5*c^6*d^2*g*hz + 223395840*a^4*b^6*c^6*d^2*e*hz - 111697920*a^4*b^ \\
& 7*c^5*d^2*g*hz - 8847360*a^8*b^3*c^5*g*h^2*hz + 4423680*a^7*b^5*c^4*g*h^2*hz - \\
& 1105920*a^6*b^7*c^3*g*h^2*hz + 138240*a^5*b^9*c^2*g*h^2*hz + 25362432*a^7*b^ \\
& 3*c^6*f^2*g*hz + 17694720*a^8*b^2*c^6*e*h^2*hz - 50724864*a^7*b^2*c^7*e*f^2*hz \\
& - 13271040*a^6*b^5*c^5*f^2*g*hz - 8847360*a^7*b^4*c^5*e*h^2*hz + 3563520*a^5 \\
& *b^7*c^4*f^2*g*hz + 2211840*a^6*b^6*c^4*e*h^2*hz - 506880*a^4*b^9*c^3*f^2*g*hz \\
& - 276480*a^5*b^8*c^3*e*h^2*hz + 34560*a^3*b^11*c^2*f^2*g*hz + 13824*a^4*b^10 \\
& *c^2*e*h^2*hz + 26542080*a^6*b^4*c^6*e*f^2*hz + 23362560*a^3*b^9*c^4*d^2*g*hz \\
& - 46725120*a^3*b^8*c^5*d^2*e*hz - 7127040*a^5*b^6*c^5*e*f^2*hz - 2965248*a^2* \\
& b^11*c^3*d^2*g*hz + 1013760*a^4*b^8*c^4*e*f^2*hz - 69120*a^3*b^10*c^3*e*f^2*hz \\
& + 1536*a^2*b^12*c^2*e*f^2*hz + 5930496*a^2*b^10*c^4*d^2*e*hz - 693633024*a^7
\end{aligned}$$

$$\begin{aligned}
& *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
\end{aligned}$$

$$\begin{aligned}
& 0608a^7c^6d^3h^3 - 39690b^9c^4d^3f + 2025a^4b^8c^4h^4 - 734832a^6b^6c^6d^4 + 20736a^8c^5h^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + \\
& 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k) * ((768a^2b^14c^2d - 3145728a^10c^8h - 22020096a^9c^9d - 22272a^3b^12c^3d + 282624a^4b^10c^4d - 2027520a^5b^8c^5d + 8847360a^6b^6c^6d - 23396352a^7b^4c^7d + 34603008a^8b^2c^8d + 256a^3b^13c^2f - 9216a^4b^11c^3f + \\
& 122880a^5b^9c^4f - 819200a^6b^7c^5f + 2949120a^7b^5c^6f - 5505024a^8b^3c^7f + 768a^4b^12c^2h - 12288a^5b^10c^3h + 61440a^6b^8c^4h - 983040a^8b^4c^6h + 3145728a^9b^2c^7h + 4194304a^9b^3c^8f) / (512(a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (x * (1572864a^9c^9e - 1536a^4b^10c^4e + 30720a^5b^8c^5e - 245760a^6b^6c^6e + 983040a^7b^4c^7e - 1966080a^8b^2c^8e + 768a^4b^11c^3g - 15360a^5b^9c^4g + 122880a^6b^7c^5g - 491520a^7b^5c^6g + 983040a^8b^3c^7g - 786432a^9b^3c^8g)) / (64(a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + \\
& (\text{root}(56371445760a^{11}b^8c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^2z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - 46080a^4b^{14}c^2f^2h^2 - 105984a^3b^{15}c^2d^2h^2 - 73728a^2b^{16}c^2d^2f^2z^2 + 2548039680a^9b^3c^7d^2h^2z^2 + 1509949440a^9b^3c^7e^2g^2z^2 - 1401421824a^8b^5c^6d^2h^2z^2 - 1321205760a^9b^2c^8d^2f^2z^2 - 754974720a^8b^5c^6e^2g^2z^2 + 732168192a^7b^6c^6d^2f^2z^2 - 456130560a^9b^4c^6f^2h^2z^2 + 390463488a^7b^7c^5d^2h^2z^2 - 366280704a^6b^8c^5d^2f^2z^2 - 330301440a^8b^4c^7d^2f^2z^2 + 254017536a^8b^6c^5f^2h^2z^2 - 188743680a^{10}b^3c^8d^2h^2z^2 + 188743680a^{10}b^2c^7f^2h^2z^2 + 188743680a^7b^7c^5e^2g^2z^2 - 61931520a^7b^8c^4f^2h^2z^2 + 96583680a^5b^{10}c^4d^2f^2z^2 - 51609600a^6b^9c^4d^2h^2z^2 + 6144000a^6b^{10}c^3f^2h^2z^2 + 61440a^5b^{12}c^2f^2h^2z^2 - 23592960a^6b^9c^4e^2g^2z^2 + 1179648a^5b^{11}c^3e^2g^2z^2 + 829440a^4b^{13}c^2d^2h^2z^2 + 368640a^5b^{11}c^3d^2h^2z^2 - 15175680a^4b^{12}c^3d^2f^2z^2 + 1428480a^3b^{14}c^2d^2f^2z^2 - 1207959552a^{10}b^3c^8e^2g^2z^2 - 440401920a^{10}b^3c^8f^2z^2 - 188743680a^{11}b^3c^7h^2z^2 + 1761607680a^{10}c^9d^2f^2z^2 + 46080a^5b^{13}c^2h^2z^2 - 14080a^3b^{15}c^2f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^3c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 + 251658240a^{11}c^8f^2h^2z^2 + 1536a^3b^{16}f^2h^2z^2 + 4608a^2b^{17}d^2h^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^3b^{17}c^2d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888a^{10}b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^{10}b^3c^6h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 - 47185920a^7b^8c^4g^2z^2 - 26542080a^8b^7c^4h^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2z^2 - 1290240a^6b^{11}c^2h^2z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294912a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^3b^{18}d^2f^2z^2 + 1207959552a^{10}c^9e^2z^2 + 2304a^4b^{15}h^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^3c^8d^2e^2f^2z + 99090432a^8b^3c^7d^2g^2h^2z - 4608a^3b^{12}c^2f^2g^2h^2z - 9437184a^8b^3c^7e^2f^2h^2z - 13824a^2b^{13}c^2d^2g^2h^2z + 9216a^3b^{13}c^2d^2e^2f^2z - 4608a^3b^{14}c^2d^2f^2g^2z + 219414528a^7b^2c^7d^2e^2h^2z - 221773824a^6b^3c^7d^2e^2f^2z - 109707264a^7b^3c^6d^2g^2h^2z + 110886912a^6b^4c^6d^2f^2g^2z - 88473600a^6b^4c^6d^2e^2h^2z - 84934656a^7b^2c^7d^2f^2g^2z + 117964800a^5b^5c^6d^2e^2f^2z + 44236800a^6b^5c^5d^2g^2h^2z - 5898240a^7b^4c^5f^2g^2h^2z + 4718592a^8b^2c^6f^2g^2h^2z + 2949120a^6b^6c^4f^2g^2h^2z - 737280a^5b^8c^3f^2g^2h^2z + 92160a^4b^{10}c^2f^2g^2h^2z - 58982400a^5b^6c^5d^2f^2g^2z + 11796480a^7b^3c^6e^2f^2h^2z - 6635520a^5b^7c^4d^2g^2h^2
\end{aligned}$$

$$\begin{aligned}
& *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 \\
& *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
\end{aligned}$$

$$\begin{aligned}
& ^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
\end{aligned}$$

$73528320a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{11}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^3z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - 46080a^4b^{14}c^3f^2h^2z^2 - 105984a^3b^{15}c^2d^2h^2z^2 - 73728a^2b^{16}c^2d^2f^2z^2 + 2548039680a^9b^3c^7e^2g^2z^2 - 1401421824a^8b^5c^6d^2h^2z^2 - 1321205760a^9b^2c^8d^2f^2z^2 - 754974720a^8b^5c^6e^2g^2z^2 + 732168192a^7b^6c^6d^2f^2z^2 - 456130560a^9b^4c^6f^2h^2z^2 + 390463488a^7b^7c^5d^2h^2z^2 - 366280704a^6b^8c^5d^2f^2z^2 - 330301440a^8b^4c^7d^2f^2z^2 + 254017536a^8b^6c^5f^2h^2z^2 - 1887436800a^{10}b^2c^8d^2h^2z^2 + 188743680a^{10}b^2c^7f^2h^2z^2 + 188743680a^7b^7c^5e^2g^2z^2 - 61931520a^7b^8c^4f^2h^2z^2 + 96583680a^5b^{10}c^4d^2f^2z^2 - 51609600a^6b^9c^4d^2h^2z^2 + 6144000a^6b^{10}c^3f^2h^2z^2 + 61440a^5b^{12}c^2f^2h^2z^2 - 23592960a^6b^9c^4e^2g^2z^2 + 1179648a^5b^{11}c^3e^2g^2z^2 + 829440a^4b^{13}c^2d^2h^2z^2 + 368640a^5b^{11}c^3d^2h^2z^2 - 15175680a^4b^{12}c^3d^2f^2z^2 + 1428480a^3b^{14}c^2d^2f^2z^2 - 1207959552a^{10}b^2c^8e^2g^2z^2 - 440401920a^{10}b^2c^8f^2z^2 - 188743680a^{11}b^2c^7h^2z^2 + 1761607680a^{10}c^9d^2f^2z^2 + 46080a^5b^{13}c^2h^2z^2 - 14080a^3b^{15}c^2f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^2c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 + 251658240a^{11}c^8f^2h^2z^2 + 1536a^3b^{16}f^2h^2z^2 + 4608a^2b^{17}d^2h^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^2b^{17}c^2d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888a^{10}b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^{10}b^3c^6h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 - 47185920a^7b^8c^4g^2z^2 - 26542080a^8b^7c^4h^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2z^2 - 1290240a^6b^{11}c^2h^2z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294912a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^10c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^2b^{18}d^2f^2z^2 + 1207959552a^{10}c^9e^2z^2 + 2304a^4b^{15}h^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^2c^8d^2e^2f^2z^2 + 99090432a^8b^2c^7d^2g^2h^2z^2 - 4608a^3b^{12}c^2f^2g^2h^2z^2 - 9437184a^8b^2c^7e^2f^2h^2z^2 - 13824a^2b^{13}c^2d^2g^2h^2z^2 + 9216a^2b^{13}c^2d^2e^2f^2z^2 - 4608a^2b^{14}c^2d^2f^2g^2z^2 + 219414528a^7b^2c^7d^2e^2h^2z^2 - 221773824a^6b^3c^7d^2e^2f^2z^2 - 109707264a^7b^3c^6d^2g^2h^2z^2 + 110886912a^6b^4c^6d^2f^2g^2z^2 - 88473600a^6b^4c^6d^2e^2h^2z^2 - 84934656a^7b^2c^7d^2f^2g^2z^2 + 117964800a^5b^5c^6d^2e^2f^2z^2 + 44236800a^6b^5c^5d^2g^2h^2z^2 - 5898240a^7b^4c^5f^2g^2h^2z^2 + 4718592a^8b^2c^6f^2g^2h^2z^2 + 2949120a^6b^6c^4f^2g^2h^2z^2 - 737280a^5b^8c^3f^2g^2h^2z^2 + 92160a^4b^{10}c^2f^2g^2h^2z^2 - 58982400a^5b^6c^5d^2f^2g^2z^2 + 11796480a^7b^3c^6e^2f^2h^2z^2 - 6635520a^5b^7c^4d^2g^2h^2z^2 - 5898240a^6b^5c^5e^2f^2h^2z^2 + 1474560a^5b^7c^4e^2f^2h^2z^2 - 276480a^4b^9c^3d^2g^2h^2z^2 - 184320a^4b^9c^3e^2f^2h^2z^2 + 179712a^3b^{11}c^2d^2g^2h^2z^2 + 9216a^3b^{11}c^2e^2f^2h^2z^2 + 16220160a^4b^8c^4d^2f^2g^2z^2 + 13271040a^5b^6c^5d^2e^2h^2z^2 - 2396160a^3b^{10}c^3d^2f^2g^2z^2 + 552960a^4b^8c^4d^2e^2h^2z^2 - 359424a^3b^{10}c^3d^2e^2h^2z^2 + 175104a^2b^{12}c^2d^2f^2g^2z^2 + 27648a^2b^{12}c^2d^2e^2h^2z^2 - 32440320a^4b^7c^5d^2e^2f^2z^2 + 4792320a^3b^9c^4d^2e^2f^2z^2 - 350208a^2b^{11}c^3d^2e^2f^2z^2 + 346816512a^7b^2c^8d^2g^2z^2 + 7077888a^9b^2c^6g^2h^2z^2 - 6912a^4b^{11}c^2g^2h^2z^2 - 19660800a^8b^2c^7f^2g^2z^2 - 768a^2b^{13}c^2f^2g^2z^2 + 214272a^2b^{13}c^2d^2g^2z^2 - 428544a^2b^{12}c^3d^2e^2z^2 - 198180864a^8c^8d^2e^2h^2z^2 + 1022754816a^6b^2c^8d^2e^2z^2 - 642318336a^5b^4c^7d^2e^2z^2 - 511377408a^6b^3c^7d^2g^2z^2 + 321159168a^5b^5c^6d^2g^2z^2 + 223395840a^4b^6c^6d^2e^2z^2 - 111697920a^4b^7c^5d^2g^2z^2 - 8847360a^8b^3c^5g^2h^2z^2 + 4423680a^7b^5c^4g^2h^2z^2 - 1105920a^6b^7c^3g^2h^2z^2 + 138240a^5b^9c^2g^2h^2z^2 + 25362432a^7b^3c^6f^2g^2z^2 + 17694720a^8b^2c^6e^2h^2z^2 - 50724864a^7b^2c^7e^2f^2z^2 - 13271040a^6b^5c^5f^2g^2z^2 - 8847360a^7b^4c^5e^2h^2z^2 + 3563520a^5b^7c^4f^2g^2z^2 + 2211840a^6b^6c^4e^2h^2z^2 - 506880a^4b^9c^3f^2g^2z^2 - 276480a^5b^8c^3e^2h^2z^2 + 34560a^3b^{11}c^2f^2g^2z^2 + 13824a^4b^11$

$$\begin{aligned}
& 0*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 + 15482 \\
& 880*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 - 59 \\
& 85792*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 + 34 \\
& 56*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 + 1 \\
& 46880*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 - 35424 \\
& 0*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 - 265420 \\
& 8*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 + 173 \\
& 7792*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 + 1 \\
& 264320*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*
\end{aligned}$$

```

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
```

$$3.56 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=728

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

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}

$$\frac{\sqrt{c} \sqrt{2a^2f + a^2f^2 - 12abcf + 2ab^2f + 4a^2cd + 2ab^3d - a^2(7ah + 25cd) + 3b^4d}}{8a^2(b^2 - 4ac)^2 \sqrt{a + bx^2 + cx^4}} + \frac{\sqrt{c} \tan^{-1} \left(\frac{\sqrt{2a^2f + a^2f^2 - 12abcf + 2ab^2f + 4a^2cd + 2ab^3d - a^2(7ah + 25cd) + 3b^4d}}{\sqrt{a + bx^2 + cx^4}} \right)}{8a^2(b^2 - 4ac)^2 \sqrt{a + bx^2 + cx^4}} + \frac{\sqrt{c} \tan^{-1} \left(\frac{\sqrt{2a^2f + a^2f^2 - 12abcf + 2ab^2f + 4a^2cd + 2ab^3d - a^2(7ah + 25cd) + 3b^4d}}{\sqrt{a + bx^2 + cx^4}} \right)}{8a^2(b^2 - 4ac)^2 \sqrt{a + bx^2 + cx^4}} + \frac{\sqrt{c} \tan^{-1} \left(\frac{\sqrt{2a^2f + a^2f^2 - 12abcf + 2ab^2f + 4a^2cd + 2ab^3d - a^2(7ah + 25cd) + 3b^4d}}{\sqrt{a + bx^2 + cx^4}} \right)}{8a^2(b^2 - 4ac)^2 \sqrt{a + bx^2 + cx^4}} + \frac{\sqrt{c} \tan^{-1} \left(\frac{\sqrt{2a^2f + a^2f^2 - 12abcf + 2ab^2f + 4a^2cd + 2ab^3d - a^2(7ah + 25cd) + 3b^4d}}{\sqrt{a + bx^2 + cx^4}} \right)}{8a^2(b^2 - 4ac)^2 \sqrt{a + bx^2 + cx^4}} + \frac{\sqrt{c} \tan^{-1} \left(\frac{\sqrt{2a^2f + a^2f^2 - 12abcf + 2ab^2f + 4a^2cd + 2ab^3d - a^2(7ah + 25cd) + 3b^4d}}{\sqrt{a + bx^2 + cx^4}} \right)}{8a^2(b^2 - 4ac)^2 \sqrt{a + bx^2 + cx^4}} + \frac{\sqrt{c} \tan^{-1} \left(\frac{\sqrt{2a^2f + a^2f^2 - 12abcf + 2ab^2f + 4a^2cd + 2ab^3d - a^2(7ah + 25cd) + 3b^4d}}{\sqrt{a + bx^2 + cx^4}} \right)}{8a^2(b^2 - 4ac)^2 \sqrt{a + bx^2 + cx^4}} + \frac{\sqrt{c} \tan^{-1} \left(\frac{\sqrt{2a^2f + a^2f^2 - 12abcf + 2ab^2f + 4a^2cd + 2ab^3d - a^2(7ah + 25cd) + 3b^4d}}{\sqrt{a + bx^2 + cx^4}} \right)}{8a^2(b^2 - 4ac)^2 \sqrt{a + bx^2 + cx^4}} + \frac{\sqrt{c} \tan^{-1} \left(\frac{\sqrt{2a^2f + a^2f^2 - 12abcf + 2ab^2f + 4a^2cd + 2ab^3d - a^2(7ah + 25cd) + 3b^4d}}{\sqrt{a + bx^2 + cx^4}} \right)}{8a^2(b^2 - 4ac)^2 \sqrt{a + bx^2 + cx^4}} + \frac{\sqrt{c} \tan^{-1} \left(\frac{\sqrt{2a^2f + a^2f^2 - 12abcf + 2ab^2f + 4a^2cd + 2ab^3d - a^2(7ah + 25cd) + 3b^4d}}{\sqrt{a + bx^2 + cx^4}} \right)}{8a^2(b^2 - 4ac)^2 \sqrt{a + bx^2 + cx^4}}$$

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*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]]) - ((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] && !MatchQ[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] && (GtQ[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] /; FreeQ[{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[Int[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] && NeQ[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_Symbol] := 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[Pq, 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[PolynomialRemainder[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[(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]

$x^4)^{(p+1)} \cdot \text{ExpandToSum}[2*a*(p+1)*(b^2 - 4*a*c)*\text{PolynomialQuotient}[Pq, a + b*x^2 + c*x^4, x] + b^2*d*(2*p+3) - 2*a*c*d*(4*p+5) - a*b*e + c*(4*p+7)*(b*d - 2*a*e)*x^2, x], x], x]] /; \text{FreeQ}\{a, b, c\}, x \&\& \text{PolyQ}[Pq, x^2] \&\& \text{Expon}[Pq, x^2] > 1 \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1]$

Rubi steps

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3 + hx^4 + 56x^5}{(a + bx^2 + cx^4)^3} dx &= \int \frac{x(e + gx^2 + 56x^4)}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^3} dx \\ &= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{1}{2} \text{Subst} \left(\int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^3} dx \right) \\ &= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\ &= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\ &= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\ &= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\ &= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \end{aligned}$$

Mathematica [A] time = 6.67, size = 980, normalized size = 1.35

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] $(a*b*c*e - 2*a^2*c*g + a^2*b*i - b^2*c*d*x + 2*a*c^2*d*x + a*b*c*f*x - 2*a^2*c*h*x + 2*a*c^2*e*x^2 - a*b*c*g*x^2 + a*b^2*i*x^2 - 2*a^2*c*i*x^2 - b*c^2*d*x^3 + 2*a*c^2*f*x^3 - a*b*c*h*x^3)/(4*a*c*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (12*a^2*b*c^2*e - 6*a^2*b^2*c*g + 2*a^2*b^3*i + 4*a^3*b*c*i + 3*b^4*c*d*x - 25*a*b^2*c^2*d*x + 28*a^2*c^3*d*x + a*b^3*c*f*x + 8*a^2*b*c^2*f*x - 7*a^2*b^2*c*h*x + 4*a^3*c^2*h*x + 24*a^2*c^3*e*x^2 - 12*a^2*b*c^2*g*x^2 + 4*a^2*b^2*c*i*x^2 + 8*a^3*c^2*i*x^2 + 3*b^3*c^2*d*x^3 - 24*a*b*c^3*d*x^3 + a*b^2*c^2*f*x^3 + 20*a^2*c^3*f*x^3 - 12*a^2*b*c^2*h*x^3)/(8*a^2*c*(-b^2 + 4*a*c)^2*(a + b*x^2 + c*x^4)) + (\text{Sqrt}[c]*(3*b^4*d - 30*a*b^2*c*d + 168*a^2*c^2*d + 3*b^3*\text{Sqrt}[b^2 - 4*a*c]*d - 24*a*b*c*\text{Sqrt}[b^2 - 4*a*c]*d + a*b^3*$

```
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))
```

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + ix^5}{(a + bx^2 + cx^4)^3} dx$$

Verification is not applicable to the result.

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

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="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((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 = 0.06, 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

$$\begin{aligned}
& \frac{1}{\sqrt{-b+(-4ac+b^2)^{1/2}}} \sqrt{c} \sqrt{x} (-4ac+b^2)^{1/2} b^{4d+1/4} / \\
& a / (16a^2c^2-8ab^2c+b^4) c / (16ac-4b^2) \sqrt{2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) (-4ac+b^2)^{1/2} b^3 f + 1/4 a / (16a^2c^2-8ab^2c+b^4) c / (16ac-4b^2) \sqrt{2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) (-4ac+b^2)^{1/2} b^3 f - 15/2 a / (16a^2c^2-8ab^2c+b^4) c^2 / (16ac-4b^2) \sqrt{2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) (-4ac+b^2)^{1/2} b^2 d - 4a / (16a^2c^2-8ab^2c+b^4) c / (16ac-4b^2) \ln(-2cx^2-b+(-4ac+b^2)^{1/2}) (-4ac+b^2)^{1/2} i + 4a / (16a^2c^2-8ab^2c+b^4) c / (16ac-4b^2) \ln(2cx^2+b+(-4ac+b^2)^{1/2}) (-4ac+b^2)^{1/2} i + (-1/8c^2(12a^2bh-20a^2cf-ab^2f+24abc d-3b^3d) / a^2 / (16a^2c^2-8ab^2c+b^4) x^7 + 1/2c(2aci+b^2i-3bcg+6c^2e) / (16a^2c^2-8ab^2c+b^4) x^6 + 1/8a^2c(4a^3ch-19a^2bh+28a^2bcf+28a^2c^2d+2ab^3f-49ab^2cd+6b^4d) / (16a^2c^2-8ab^2c+b^4) x^5 + 3/4bc(2aci+b^2i-3bcg+6c^2e) / (16a^2c^2-8ab^2c+b^4) x^4 - 1/8(16a^3bh-36a^3c^2f+5a^2b^3h-5a^2b^2cf+4a^2bc^2d-ab^4f+20ab^3cd-3b^5d) / a^2 / (16a^2c^2-8ab^2c+b^4) x^3 - 1/2(2a^2ci-5ab^2i+5abcg-10ac^2e+b^3g-2b^2ce) / (16a^2c^2-8ab^2c+b^4) x^2 - 1/8(12a^3ch+3a^2bh-16a^2bcf-44a^2c^2d+ab^3f+37ab^2cd-5b^4d) / (16a^2c^2-8ab^2c+b^4) / ax + 1/4(6a^2bi-8a^2cga-b^2bg+10abcge-b^3e) / (16a^2c^2-8ab^2c+b^4) / (cx^4+bx^2+a)^2 - 4 / (16a^2c^2-8ab^2c+b^4) c^2 / (16ac-4b^2) \sqrt{2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^2 f - 24 / (16a^2c^2-8ab^2c+b^4) c^3 / (16ac-4b^2) \sqrt{2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^2 f + 24 / (16a^2c^2-8ab^2c+b^4) c^3 / (16ac-4b^2) \sqrt{2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^2 f + 24 / (16a^2c^2-8ab^2c+b^4) c^3 / (16ac-4b^2) \sqrt{2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^2 d + 3 / (16a^2c^2-8ab^2c+b^4) c / (16ac-4b^2) \sqrt{2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^3 h + 20a / (16a^2c^2-8ab^2c+b^4) c^3 / (16ac-4b^2) \sqrt{2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^3 h - 20a / (16a^2c^2-8ab^2c+b^4) c^3 / (16ac-4b^2) \sqrt{2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^3 h - 3 / (16a^2c^2-8ab^2c+b^4) c / (16ac-4b^2) \sqrt{2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^3 h + 42 / (16a^2c^2-8ab^2c+b^4) c^3 / (16ac-4b^2) \sqrt{2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) (-4ac+b^2)^{1/2} d + 42 / (16a^2c^2-8ab^2c+b^4) c^3 / (16ac-4b^2) \sqrt{2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) (-4ac+b^2)^{1/2} d + 6 / (16a^2c^2-8ab^2c+b^4) c / (16ac-4b^2) \ln(-2cx^2-b+(-4ac+b^2)^{1/2}) (-4ac+b^2)^{1/2} b^3 g - 6 / (16a^2c^2-8ab^2c+b^4) c / (16ac-4b^2) \ln(2cx^2+b+(-4ac+b^2)^{1/2}) (-4ac+b^2)^{1/2} b^3 g - 12a / (16a^2c^2-8ab^2c+b^4) c^2 / (16ac-4b^2) \sqrt{2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^3 h + 9a / (16a^2c^2-8ab^2c+b^4) c^2 / (16ac-4b^2) \sqrt{2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^3 d - 9a / (16a^2c^2-8ab^2c+b^4) c^2 / (16ac-4b^2) \sqrt{2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^3 d - 1/4 a / (16a^2c^2-8ab^2c+b^4) c / (16ac-4b^2) \sqrt{2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^4 f + 3/4 a^2 / (16a^2c^2-8ab^2c+b^4) c / (16ac-4b^2) \sqrt{2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) b^5 d - 13 / (16a^2c^2-8ab^2c+b^4) c^2 / (16ac-4b^2) \sqrt{2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) (-4ac+b^2)^{1/2} b^2 f + 9/2 / (16a^2c^2-8ab^2c+b^4) c / (16ac-4b^2) \sqrt{2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) \sqrt{c}) \sqrt{x}) (-4ac+b^2)^{1/2} b^2 h + 9/2 / (16a^2c^2-8
\end{aligned}$$

```

*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^2*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*

```

$$\begin{aligned}
& (6c^2e + b^2i - 3b^*c^*g + 2a^*c^*i))/(2*(b^4 + 16a^2c^2 - 8a^*b^2*c)) + \\
& (x^3*(3b^5*d + 36a^3c^2*f - 5a^2*b^3*h + a*b^4*f - 20a^*b^3*c^*d - 16a^ \\
& ^3*b^*c^*h - 4a^2*b^*c^2*d + 5a^2*b^2*c*f))/(8a^2*(b^4 + 16a^2c^2 - 8a^*b^2*c)) - (x*(3a^2*b^2*h - 44a^2*c^2*d - 5b^4*d + a*b^3*f + 12a^3*c^*h + \\
& 37a^*b^2*c^*d - 16a^2*b^*c^*f))/(8a^*(b^4 + 16a^2c^2 - 8a^*b^2*c)) + (c*x^7 \\
& *(20a^2c^2*f + 3b^3c^*d - 24a^*b^*c^2*d + a*b^2*c*f - 12a^2*b^*c^*h))/(8a^ \\
& ^2*(b^4 + 16a^2c^2 - 8a^*b^2*c)))/(x^4*(2a^*c + b^2) + a^2 + c^2*x^8 + 2* \\
& a*b*x^2 + 2b^*c*x^6) + \text{symsum}(\log((10368a^*b^5*c^6*d^3 - 8000a^5*c^7*f^3 - \\
& 567b^7*c^5*d^3 + 169344a^3*b^*c^8*d^3 + 193536a^4*c^8*d^*e^2 - 141120a^4 \\
& *c^8*d^2*f + 1728a^6*b^*c^5*h^3 + 315b^8*c^4*d^2*f + 27648a^5*c^7*e^2*h + \\
& 21504a^6*c^6*d^*i^2 - 135b^9*c^3*d^2*h - 2880a^6*c^6*f^*h^2 + 3072a^7*c^ \\
& 5*h^*i^2 - 67824a^2*b^3*c^7*d^3 + 35a^2*b^6*c^4*f^3 + 84a^3*b^4*c^5*f^3 - \\
& 12720a^4*b^2*c^6*f^3 + 540a^4*b^5*c^3*h^3 + 4320a^5*b^3*c^4*h^3 + 12902 \\
& 4a^5*c^7*d^*e^*i - 40320a^5*c^7*d^*f^*h + 18432a^6*c^6*e^*h^*i - 6237a^*b^6*c^ \\
& 5*d^2*f + 210a^*b^7*c^4*d^*f^2 + 116160a^4*b^*c^7*d^*f^2 - 36864a^4*b^*c^7*e^ \\
& 2*f + 2430a^*b^7*c^4*d^2*h + 133056a^4*b^*c^7*d^2*h + 27648a^5*b^*c^6*d^*h^2 \\
& + 26880a^5*b^*c^6*f^2*h - 4096a^6*b^*c^5*f^*i^2 + 6912a^2*b^4*c^6*d^*e^2 - \\
& 62208a^3*b^2*c^7*d^*e^2 + 42372a^2*b^4*c^6*d^2*f - 1764a^2*b^5*c^5*d^*f^2 \\
& - 96048a^3*b^2*c^7*d^2*f - 4608a^3*b^3*c^6*d^*f^2 + 1728a^2*b^6*c^4*d^*g^2 \\
& + 2304a^3*b^3*c^6*e^2*f - 15552a^3*b^4*c^5*d^*g^2 + 48384a^4*b^2*c^6*d^*g \\
& ^2 - 13716a^2*b^5*c^5*d^2*h + 405a^2*b^7*c^3*d^*h^2 + 12096a^3*b^3*c^6*d^ \\
& 2*h - 5400a^3*b^5*c^4*d^*h^2 + 28944a^4*b^3*c^5*d^*h^2 + 192a^2*b^8*c^2*d^* \\
& i^2 + 576a^3*b^5*c^4*f^*g^2 - 960a^3*b^6*c^3*d^*i^2 + 6912a^4*b^2*c^6*e^2* \\
& h - 9216a^4*b^3*c^5*f^*g^2 - 768a^4*b^4*c^4*d^*i^2 + 14592a^5*b^2*c^5*d^*i^ \\
& 2 - 15a^2*b^7*c^3*f^2*h - 360a^3*b^5*c^4*f^2*h + 135a^3*b^6*c^3*f^*h^2 + \\
& 15696a^4*b^3*c^5*f^2*h - 5580a^4*b^4*c^4*f^*h^2 - 20592a^5*b^2*c^5*f^*h^2 \\
& + 64a^3*b^7*c^2*f^*i^2 + 1728a^4*b^4*c^4*g^2*h - 768a^4*b^5*c^3*f^*i^2 + 6 \\
& 912a^5*b^2*c^5*g^2*h - 3840a^5*b^3*c^4*f^*i^2 + 192a^4*b^6*c^2*h^*i^2 + 15 \\
& 36a^5*b^4*c^3*h^*i^2 + 3840a^6*b^2*c^4*h^*i^2 - 193536a^4*b^*c^7*d^*e^*g - 90 \\
& *a^*b^8*c^3*d^*f^*h - 64512a^5*b^*c^6*d^*g^*i - 24576a^5*b^*c^6*e^*f^*i - 27648a^ \\
& 5*b^*c^6*e^*g^*h - 9216a^6*b^*c^5*g^*h^*i - 6912a^2*b^5*c^5*d^*e^*g + 62208a^3*b^ \\
& ^3*c^6*d^*e^*g + 2304a^2*b^6*c^4*d^*e^*i - 270a^2*b^6*c^4*d^*f^*h - 16128a^3*b^ \\
& ^4*c^5*d^*e^*i + 16056a^3*b^4*c^5*d^*f^*h - 2304a^3*b^4*c^5*e^*f^*g + 23040a^4 \\
& *b^2*c^6*d^*e^*i - 127008a^4*b^2*c^6*d^*f^*h + 36864a^4*b^2*c^6*e^*f^*g - 1152* \\
& a^2*b^7*c^3*d^*g^*i + 8064a^3*b^5*c^4*d^*g^*i + 768a^3*b^5*c^4*e^*f^*i - 11520* \\
& a^4*b^3*c^5*d^*g^*i - 10752a^4*b^3*c^5*e^*f^*i - 6912a^4*b^3*c^5*e^*g^*h - 384* \\
& a^3*b^6*c^3*f^*g^*i + 2304a^4*b^4*c^4*e^*h^*i + 5376a^4*b^4*c^4*f^*g^*i + 13824 \\
& *a^5*b^2*c^5*e^*h^*i + 12288a^5*b^2*c^5*f^*g^*i - 1152a^4*b^5*c^3*g^*h^*i - 691 \\
& 2a^5*b^3*c^4*g^*h^*i)/(512*(a^4*b^12 + 4096a^10*c^6 - 24a^5*b^10*c + 240a^ \\
& ^6*b^8*c^2 - 1280a^7*b^6*c^3 + 3840a^8*b^4*c^4 - 6144a^9*b^2*c^5)) + \text{roo} \\
& \text{t}(56371445760a^11*b^8*c^6*z^4 - 503316480a^8*b^14*c^3*z^4 + 47185920a^7* \\
& b^16*c^2*z^4 - 171798691840a^14*b^2*c^9*z^4 + 193273528320a^13*b^4*c^8*z^ \\
& 4 - 128849018880a^12*b^6*c^7*z^4 - 16911433728a^10*b^10*c^5*z^4 + 3523215 \\
& 360a^9*b^12*c^4*z^4 - 2621440a^6*b^18*c^*z^4 + 68719476736a^15*c^10*z^4 + \\
& 65536a^5*b^20*z^4 + 196608a^5*b^13*c^*g^*i*z^2 - 46080a^4*b^14*c^*f^*h^*z^2 \\
& - 105984a^3*b^15*c^*d^*h^*z^2 - 73728a^2*b^16*c^*d^*f^*z^2 + 2548039680a^9*b^3 \\
& *c^7*d^*h^*z^2 + 1509949440a^9*b^3*c^7*e^*g^*z^2 - 1401421824a^8*b^5*c^6*d^*h^* \\
& z^2 - 1321205760a^9*b^2*c^8*d^*f^*z^2 - 754974720a^8*b^5*c^6*e^*g^*z^2 + 7321 \\
& 68192a^7*b^6*c^6*d^*f^*z^2 - 603979776a^10*b^2*c^7*e^*i^*z^2 - 456130560a^9* \\
& b^4*c^6*f^*h^*z^2 + 390463488a^7*b^7*c^5*d^*h^*z^2 + 301989888a^10*b^3*c^6*g^* \\
& i^*z^2 - 366280704a^6*b^8*c^5*d^*f^*z^2 - 330301440a^8*b^4*c^7*d^*f^*z^2 + 254 \\
& 017536a^8*b^6*c^5*f^*h^*z^2 - 1887436800a^10*b^*c^8*d^*h^*z^2 + 188743680a^10 \\
& *b^2*c^7*f^*h^*z^2 + 188743680a^7*b^7*c^5*e^*g^*z^2 + 125829120a^8*b^6*c^5*e^* \\
& i^*z^2 - 62914560a^8*b^7*c^4*g^*i^*z^2 - 61931520a^7*b^8*c^4*f^*h^*z^2 + 23592 \\
& 960a^7*b^9*c^3*g^*i^*z^2 - 47185920a^7*b^8*c^4*e^*i^*z^2 - 3538944a^6*b^11*c^ \\
& ^2*g^*i^*z^2 + 96583680a^5*b^10*c^4*d^*f^*z^2 - 51609600a^6*b^9*c^4*d^*h^*z^2 + \\
& 7077888a^6*b^10*c^3*e^*i^*z^2 + 6144000a^6*b^10*c^3*f^*h^*z^2 - 393216a^5*b^ \\
& ^12*c^2*e^*i^*z^2 + 61440a^5*b^12*c^2*f^*h^*z^2 - 23592960a^6*b^9*c^4*e^*g^*z^2 \\
& + 1179648a^5*b^11*c^3*e^*g^*z^2 + 829440a^4*b^13*c^2*d^*h^*z^2 + 368640a^5*
\end{aligned}$$

$b^{11}c^3d^2h^2z^2 - 15175680a^4b^{12}c^3d^2f^2z^2 + 1428480a^3b^{14}c^2d^2f^2z^2 - 1207959552a^{10}b^8c^8e^2g^2z^2 - 402653184a^{11}b^7c^7g^2i^2z^2 - 440401920a^{10}b^8c^8f^2z^2 - 188743680a^{11}b^7c^7h^2z^2 + 1761607680a^{10}c^9d^2f^2z^2 + 524288a^6b^{12}c^2i^2z^2 + 46080a^5b^{13}c^2h^2z^2 - 14080a^3b^{15}c^2f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^8c^9d^2z^2 + 805306368a^{11}c^8e^2i^2z^2 - 1509949440a^9b^2c^8e^2z^2 + 251658240a^{11}c^8f^2h^2z^2 + 1536a^3b^{16}f^2h^2z^2 + 4608a^2b^{17}d^2h^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^8b^{17}c^2d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888a^{10}b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^{10}b^3c^6h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 - 50331648a^{10}b^4c^5i^2z^2 - 33554432a^{11}b^2c^6i^2z^2 + 20971520a^9b^6c^4i^2z^2 - 47185920a^7b^8c^4g^2z^2 - 26542080a^8b^7c^4h^2z^2 - 2752512a^7b^{10}c^2i^2z^2 + 2621440a^8b^8c^3i^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2z^2 - 1290240a^6b^{11}c^2h^2z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294912a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^8b^{18}d^2f^2z^2 + 1207959552a^{10}c^9e^2z^2 + 134217728a^{12}c^7i^2z^2 - 32768a^5b^{14}i^2z^2 + 2304a^4b^{15}h^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^8c^8d^2e^2f^2z^2 + 99090432a^8b^7c^7d^2g^2h^2z^2 - 3145728a^9b^6c^6f^2h^2i^2z^2 - 27648a^4b^{11}c^2f^2h^2i^2z^2 + 56623104a^8b^7c^7d^2f^2i^2z^2 - 50688a^3b^{12}c^2d^2h^2i^2z^2 - 4608a^3b^{12}c^2f^2g^2h^2i^2z^2 - 9437184a^8b^7c^7e^2f^2h^2i^2z^2 - 55296a^2b^{13}c^2d^2f^2i^2z^2 - 13824a^2b^{13}c^2d^2g^2h^2i^2z^2 + 9216a^8b^{13}c^2d^2e^2f^2z^2 - 4608a^8b^{14}c^2d^2f^2g^2z^2 + 219414528a^7b^2c^7d^2e^2h^2z^2 - 221773824a^6b^3c^7d^2e^2f^2z^2 - 109707264a^7b^3c^6d^2g^2h^2z^2 + 110886912a^6b^4c^6d^2f^2g^2z^2 + 40108032a^8b^2c^6d^2h^2i^2z^2 + 2359296a^8b^3c^5f^2h^2i^2z^2 - 491520a^6b^7c^3f^2h^2i^2z^2 + 184320a^5b^9c^2f^2h^2i^2z^2 - 88473600a^6b^4c^6d^2e^2h^2z^2 - 84934656a^7b^2c^7d^2f^2g^2z^2 + 117964800a^5b^5c^6d^2e^2f^2z^2 - 45613056a^7b^3c^6d^2f^2i^2z^2 + 44236800a^6b^5c^5d^2g^2h^2z^2 - 10321920a^6b^6c^4d^2h^2i^2z^2 + 7077888a^7b^4c^5d^2h^2i^2z^2 - 5898240a^7b^4c^5f^2g^2h^2z^2 + 4718592a^8b^2c^6f^2g^2h^2z^2 + 2949120a^6b^6c^4f^2g^2h^2z^2 + 2396160a^5b^8c^3d^2h^2i^2z^2 - 737280a^5b^8c^3f^2g^2h^2z^2 + 92160a^4b^{10}c^2f^2g^2h^2z^2 - 27648a^4b^{10}c^2d^2h^2i^2z^2 - 58982400a^5b^6c^5d^2f^2g^2z^2 + 11796480a^7b^3c^6e^2f^2h^2z^2 + 8847360a^5b^7c^4d^2f^2i^2z^2 - 6635520a^5b^7c^4d^2g^2h^2z^2 - 5898240a^6b^5c^5e^2f^2h^2z^2 - 3809280a^4b^9c^3d^2f^2i^2z^2 + 2359296a^6b^5c^5d^2f^2i^2z^2 + 1474560a^5b^7c^4e^2f^2h^2z^2 + 681984a^3b^{11}c^2d^2f^2i^2z^2 - 276480a^4b^9c^3d^2g^2h^2z^2 - 184320a^4b^9c^3e^2f^2h^2z^2 + 179712a^3b^{11}c^2d^2g^2h^2z^2 + 9216a^3b^{11}c^2e^2f^2h^2z^2 + 16220160a^4b^8c^4d^2f^2g^2z^2 + 13271040a^5b^6c^5d^2e^2h^2z^2 - 2396160a^3b^{10}c^3d^2f^2g^2z^2 + 552960a^4b^8c^4d^2e^2h^2z^2 - 359424a^3b^{10}c^3d^2e^2h^2z^2 + 175104a^2b^{12}c^2d^2f^2g^2z^2 + 27648a^2b^{12}c^2d^2e^2h^2z^2 - 32440320a^4b^7c^5d^2e^2f^2z^2 + 4792320a^3b^9c^4d^2e^2f^2z^2 - 350208a^2b^{11}c^3d^2e^2f^2z^2 + 346816512a^7b^8c^8d^2g^2z^2 - 41472a^5b^{10}c^2h^2i^2z^2 + 7077888a^9b^7c^6g^2h^2z^2 - 11008a^3b^{12}c^2f^2i^2z^2 - 6912a^4b^{11}c^2g^2h^2z^2 - 19660800a^8b^7c^7f^2g^2z^2 - 768a^2b^{13}c^2f^2g^2z^2 + 214272a^8b^{13}c^2d^2g^2z^2 - 428544a^8b^{12}c^3d^2e^2z^2 - 198180864a^8c^8d^2e^2h^2z^2 - 66060288a^9c^7d^2h^2i^2z^2 + 1536a^3b^{13}f^2h^2i^2z^2 + 4608a^2b^{14}d^2h^2i^2z^2 - 66816a^8b^{14}c^2d^2i^2z^2 + 1022754816a^6b^2c^8d^2e^2z^2 - 642318336a^5b^4c^7d^2e^2z^2 - 511377408a^6b^3c^7d^2g^2z^2 + 321159168a^5b^5c^6d^2g^2z^2 + 225312768a^7b^2c^7d^2i^2z^2 + 223395840a^4b^6c^6d^2e^2z^2 - 111697920a^4b^7c^5d^2g^2z^2 + 3538944a^9b^2c^5h^2i^2z^2 - 737280a^7b^6c^3h^2i^2z^2 + 276480a^6b^8c^2h^2i^2z^2 - 10354688a^8b^2c^6f^2i^2z^2 - 43646976a^6b^4c^6d^2i^2z^2 - 8847360a^8b^3c^5g^2h^2z^2 + 4423680a^7b^5c^4g^2h^2z^2 + 2048000a^6b^6c^4f^2i^2z^2 - 1105920a^6b^7c^3g^2h^2z^2 - 849920a^5b^8c^3f^2i^2z^2 + 393216a^7b^4c^5f^2i^2z^2 + 145920a^4b^{10}c^2f^2i^2z^2 + 138240a^5b^9c^2g^2h^2z^2 - 32587776a^5b^6c^5d^2z^2$

$$\begin{aligned}
&^2i*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
\end{aligned}$$

$$\begin{aligned}
& 200a^2b^7c^4d^2f^2h - 1414080a^3b^6c^4d^2f^2h - 34836480a^4b^2c^7d^2e^2g + 1016064a^2b^7c^4d^2e^2i - 645120a^4b^4c^5e^2f^2g + 3067 \\
& 20a^3b^7c^3d^2f^2h^2 + 197820a^2b^8c^3d^2f^2h + 146880a^4b^5c^4d^2f^2h^2 + 80640a^3b^6c^4e^2f^2g - 55350a^2b^9c^2d^2f^2h^2 - 2304a^2b^8 \\
& c^3e^2f^2g - 3870720a^5b^2c^6d^2f^2g^2 - 1935360a^4b^4c^5d^2f^2g^2 - 1658880a^4b^3c^6d^2e^2h + 725760a^3b^6c^4d^2f^2g^2 + 17418240a^3b^4 \\
& c^6d^2e^2g - 124416a^3b^5c^5d^2e^2h - 96768a^2b^8c^3d^2f^2g^2 + 41472a^2b^7c^4d^2e^2h - 3919104a^2b^6c^5d^2e^2g - 7741440a^4b^2c^7 \\
& d^2e^2f + 2903040a^3b^4c^6d^2e^2f - 387072a^2b^6c^5d^2e^2f + 184320a^8b^3c^4h^2i^2 + 25344a^5b^7c^3h^2i^2 - 884736a^6b^3c^4g^3i - 589824a^7b^3c^3g^3i^3 - 442368a^5b^5c^3g^3i - 294912a^6b^5c^2g^3i^3 + 430080a^7b^3c^5f^2i^2 - 1984a^3b^9c^2f^2i^2 + 3538944a^5b^2c^6e^3i - 1648128a^5b^3c^5f^3h + 1179648a^7b^2c^4e^3i - 898560a^6b^3c^4f^3h^3 + 589824a^6b^4c^3e^3i - 354240a^5b^5c^3f^3h^3 - 354240a^4b^5c^4f^3h + 98304a^5b^6c^2e^3i + 43680a^3b^7c^3f^3h - 21600a^4b^7c^2f^3h^3 - 1050a^2b^9c^2f^3h + 225a^2b^10c^2f^2h^2 + 3870720a^6b^3c^6d^2i^2 + 1658880a^6b^3c^6e^2h^2 + 16547328a^4b^2c^7d^3h - 12306816a^3b^4c^6d^3h + 37310976a^3b^3c^7d^3f + 3037824a^2b^6c^5d^3h - 2654208a^5b^3c^5e^2g^3 + 1949184a^6b^2c^5d^3h^3 + 1296000a^5b^4c^4d^3h - 155520a^4b^6c^3d^3h - 40500a^6b^10c^2d^2h^2 - 8100a^3b^8c^2d^3h + 3870720a^5b^3c^7e^2f^2 + 34836480a^4b^3c^8d^2e^2 - 108864a^6b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^2f^3 + 1737792a^3b^5c^5d^2f^3 - 260190a^6b^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 - 435456a^6b^7c^5d^2e^2 - 245760a^8c^5f^2h^2i^2 + 384a^3b^10f^2h^2i^2 + 1152a^2b^11d^2h^2i^2 - 2211840a^6c^7e^2f^2h - 1720320a^7c^6d^2f^2i^2 - 9450b^11c^2d^2f^2h + 6912b^11c^2d^2e^2i + 1612800a^6c^7d^2f^2h - 393216a^8b^3c^4g^3i - 49152a^5b^7c^3g^3i - 20736b^10c^3d^2e^2g - 75188736a^4b^3c^8d^3f - 883200a^6b^3c^6f^3h - 317952a^7b^3c^5f^3h + 1350a^3b^9c^2f^3h - 15482880a^5c^8d^2e^2f - 9792a^6b^11c^3d^2i^2 - 10616832a^5b^3c^7e^3g - 345060a^6b^8c^4d^3h + 4050a^2b^10c^3d^3h - 4262400a^5b^3c^7d^2f^3 + 852768a^6b^7c^5d^3f + 7350a^6b^9c^3d^2f^3 + 276480a^7b^3c^3h^2i^2 + 140544a^6b^5c^2h^2i^2 + 884736a^7b^2c^4g^2i^2 + 884736a^6b^4c^3g^2i^2 + 221184a^5b^6c^2g^2i^2 + 501760a^6b^3c^4f^2i^2 + 414720a^6b^3c^4g^2h^2 + 207360a^5b^5c^3g^2h^2 + 170240a^5b^5c^3f^2i^2 + 9216a^4b^7c^2f^2i^2 + 5184a^4b^7c^2g^2h^2 + 3538944a^6b^2c^5e^2i^2 + 1684224a^6b^2c^5f^2h^2 + 1264320a^5b^4c^4f^2h^2 + 884736a^5b^4c^4e^2i^2 + 126720a^4b^6c^3f^2h^2 - 13950a^3b^8c^2f^2h^2 + 1935360a^5b^3c^5d^2i^2 + 967680a^5b^3c^5f^2g^2 + 829440a^5b^3c^5e^2h^2 - 532224a^4b^5c^4d^2i^2 + 161280a^4b^5c^4f^2g^2 - 96768a^3b^7c^3d^2i^2 + 62784a^2b^9c^2d^2i^2 + 20736a^4b^5c^4e^2h^2 - 20160a^3b^7c^3f^2g^2 + 576a^2b^9c^2f^2g^2 + 11487744a^5b^2c^6d^2h^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c^7d^2f^2 - 1412640a^3b^6c^4d^2h^2 + 461376a^4b^4c^5d^2h^2 + 375030a^2b^8c^3d^2h^2 + 8709120a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 979776a^2b^7c^4d^2g^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 - 3456b^12c^3d^2g^3i + 384a^6b^12d^2f^2i^2 + 576a^4b^9h^2i^2 + 3538944a^7c^6e^2i^2 + 115200a^7c^6f^2h^2 + 64a^2b^11f^2i^2 + 6096384a^6c^7d^2h^2 + 5184b^11c^2d^2g^2 + 131072a^8b^2c^3i^4 + 98304a^7b^4c^2i^4 + 11025b^10c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 142560a^6b^4c^3h^4 + 103680a^7b^2c^4h^4 + 32400a^5b^6c^2h^4 + 20736b^9c^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 + 7077888a^6c^7e^3i + 786432a^8c^5e^3i + 28449792a^5c^8d^3h + 17010b^10c^3d^3h + 2025b^12c^3d^2h^2 + 580608a^7c^6d^3h - 39690b^9c^4d^3f + 32768a^6b^6c^3i^4 + 2025a^4b^8c^3h^4 - 734832a^6b^6c^6d^4 + 576b^13d^2i^2 + 65536a^
\end{aligned}$$

$9c^4i^4 + 20736a^8c^5h^4 + 4096a^5b^8i^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, 1) \cdot (\text{root}(56371445760a^{11}b^8c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}cz^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 + 196608a^5b^{13}c^*g^*i^*z^2 - 46080a^4b^{14}c^*f^*h^*z^2 - 105984a^3b^{15}c^*d^*h^*z^2 - 73728a^2b^{16}c^*d^*f^*z^2 + 2548039680a^9b^3c^7d^*h^*z^2 + 1509949440a^9b^3c^7e^*g^*z^2 - 1401421824a^8b^5c^6d^*h^*z^2 - 1321205760a^9b^2c^8d^*f^*z^2 - 754974720a^8b^5c^6e^*g^*z^2 + 732168192a^7b^6c^6d^*f^*z^2 - 603979776a^{10}b^2c^7e^*i^*z^2 - 456130560a^9b^4c^6f^*h^*z^2 + 390463488a^7b^7c^5d^*h^*z^2 + 301989888a^{10}b^3c^6g^*i^*z^2 - 366280704a^6b^8c^5d^*f^*z^2 - 330301440a^8b^4c^7d^*f^*z^2 + 254017536a^8b^6c^5f^*h^*z^2 - 1887436800a^{10}b^*c^8d^*h^*z^2 + 188743680a^{10}b^2c^7f^*h^*z^2 + 188743680a^7b^7c^5e^*g^*z^2 + 125829120a^8b^6c^5e^*i^*z^2 - 62914560a^8b^7c^4g^*i^*z^2 - 61931520a^7b^8c^4f^*h^*z^2 + 23592960a^7b^9c^3g^*i^*z^2 - 47185920a^7b^8c^4e^*i^*z^2 - 3538944a^6b^{11}c^2g^*i^*z^2 + 96583680a^5b^{10}c^4d^*f^*z^2 - 51609600a^6b^9c^4d^*h^*z^2 + 7077888a^6b^{10}c^3e^*i^*z^2 + 6144000a^6b^{10}c^3f^*h^*z^2 - 393216a^5b^{12}c^2e^*i^*z^2 + 61440a^5b^{12}c^2f^*h^*z^2 - 23592960a^6b^9c^4e^*g^*z^2 + 179648a^5b^{11}c^3e^*g^*z^2 + 829440a^4b^{13}c^2d^*h^*z^2 + 368640a^5b^{11}c^3d^*h^*z^2 - 15175680a^4b^{12}c^3d^*f^*z^2 + 1428480a^3b^{14}c^2d^*f^*z^2 - 1207959552a^{10}b^*c^8e^*g^*z^2 - 402653184a^{11}b^*c^7g^*i^*z^2 - 440401920a^{10}b^*c^8f^2z^2 - 188743680a^{11}b^*c^7h^2z^2 + 1761607680a^{10}c^9d^*f^z^2 + 524288a^6b^{12}c^i^2z^2 + 46080a^5b^{13}c^h^2z^2 - 14080a^3b^{15}c^*f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^*c^9d^2z^2 + 805306368a^{11}c^8e^*i^*z^2 - 1509949440a^9b^2c^8e^2z^2 + 251658240a^{11}c^8f^*h^*z^2 + 1536a^3b^{16}f^*h^*z^2 + 4608a^2b^{17}d^*h^*z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^*b^{17}c^d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888a^{10}b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^{10}b^3c^6h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 - 50331648a^{10}b^4c^5i^2z^2 - 33554432a^{11}b^2c^6i^2z^2 + 20971520a^9b^6c^4i^2z^2 - 47185920a^7b^8c^4g^2z^2 - 26542080a^8b^7c^4h^2z^2 - 2752512a^7b^{10}c^2i^2z^2 + 2621440a^8b^8c^3i^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2z^2 - 1290240a^6b^{11}c^2h^2z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294912a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^*b^{18}d^*f^*z^2 + 1207959552a^{10}c^9e^2z^2 + 134217728a^{12}c^7i^2z^2 - 32768a^5b^{14}i^2z^2 + 2304a^4b^{15}h^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^*c^8d^*e^*f^*z + 99090432a^8b^*c^7d^*g^*h^*z - 3145728a^9b^*c^6f^*h^*i^*z - 27648a^4b^{11}c^*f^*h^*i^*z + 56623104a^8b^*c^7d^*f^*i^*z - 50688a^3b^{12}c^*d^*h^*i^*z - 4608a^3b^{12}c^*f^*g^*h^*z - 9437184a^8b^*c^7e^*f^*h^*z - 55296a^2b^{13}c^*d^*f^*i^*z - 13824a^2b^{13}c^*d^*g^*h^*z + 9216a^*b^{13}c^2d^*e^*f^*z - 4608a^*b^{14}c^*d^*f^*g^*z + 219414528a^7b^2c^7d^*e^*h^*z - 221773824a^6b^3c^7d^*e^*f^*z - 109707264a^7b^3c^6d^*g^*h^*z + 110886912a^6b^4c^6d^*f^*g^*z + 40108032a^8b^2c^6d^*h^*i^*z + 2359296a^8b^3c^5f^*h^*i^*z - 491520a^6b^7c^3f^*h^*i^*z + 184320a^5b^9c^2f^*h^*i^*z - 88473600a^6b^4c^6d^*e^*h^*z - 84934656a^7b^2c^7d^*f^*g^*z + 117964800a^5b^5c^6d^*e^*f^*z - 45613056a^7b^3c^6d^*f^*i^*z + 44236800a^6b^5c^5d^*g^*h^*z - 10321920a^6b^6c^4d^*h^*i^*z + 7077888a^7b^4c^5d^*h^*i^*z - 5898240a^7b^4c^5f^*g^*h^*z + 4718592a^8b^2c^6f^*g^*h^*z + 2949120a^6b^6c^4f^*g^*h^*z + 2396160a^5b^8c^3d^*h^*i^*z - 737280a^5b^8c^3f^*g^*h^*z + 92160a^4b^{10}c^2f^*g^*h^*z - 27648a^4b^{10}c^2d^*h^*i^*z - 58982400a^5b^6c^5d^*f^*g^*z + 11796480a^7b^3c^6e^*f^*h^*z + 8847360a^5b^7c^4d^*f^*i^*z - 6635520a^5b^7c^4d^*g^*h^*z - 5898240$

$a^6b^5c^5efh^2z - 3809280a^4b^9c^3dffi^2z + 2359296a^6b^5c^5dffi^2z + 1474560a^5b^7c^4efh^2z + 681984a^3b^{11}c^2dffi^2z - 276480a^4b^9c^3dgh^2z - 184320a^4b^9c^3efh^2z + 179712a^3b^{11}c^2dgh^2z + 9216a^3b^{11}c^2efh^2z + 16220160a^4b^8c^4dffi^2z + 13271040a^5b^6c^5dfeh^2z - 2396160a^3b^{10}c^3dffi^2z + 552960a^4b^8c^4dfeh^2z - 359424a^3b^{10}c^3dfeh^2z + 175104a^2b^{12}c^2dffi^2z + 27648a^2b^{12}c^2dfeh^2z - 32440320a^4b^7c^5dfeh^2z + 4792320a^3b^9c^4dfeh^2z - 350208a^2b^{11}c^3dfeh^2z + 346816512a^7b^8c^2dffi^2z - 41472a^5b^{10}c^2h^2i^2z + 7077888a^9b^8c^6dgh^2z - 11008a^3b^{12}c^2ffi^2z - 6912a^4b^{11}c^2dgh^2z - 19660800a^8b^8c^7dffi^2z - 768a^2b^{13}c^2dffi^2z + 214272a^2b^{13}c^2dffi^2z - 428544a^2b^{12}c^3dffi^2z - 198180864a^8c^8dfeh^2z - 66060288a^9c^7dfeh^2z + 1536a^3b^{13}dfeh^2z + 4608a^2b^{14}dfeh^2z - 66816a^2b^{14}c^2dffi^2z + 1022754816a^6b^2c^8dffi^2z - 642318336a^5b^4c^7dffi^2z - 511377408a^6b^3c^7dffi^2z + 321159168a^5b^5c^6dffi^2z + 225312768a^7b^2c^7dffi^2z + 223395840a^4b^6c^6dffi^2z - 111697920a^4b^7c^5dffi^2z + 3538944a^9b^2c^5dffi^2z - 737280a^7b^6c^3dffi^2z + 276480a^6b^8c^2dffi^2z - 10354688a^8b^2c^6dffi^2z - 43646976a^6b^4c^6dffi^2z - 8847360a^8b^3c^5dffi^2z + 4423680a^7b^5c^4dffi^2z + 2048000a^6b^6c^4dffi^2z - 1105920a^6b^7c^3dffi^2z - 849920a^5b^8c^3dffi^2z + 393216a^7b^4c^5dffi^2z + 145920a^4b^{10}c^2dffi^2z + 138240a^5b^9c^2dffi^2z - 32587776a^5b^6c^5dffi^2z + 25362432a^7b^3c^6dffi^2z + 21657600a^4b^8c^4dffi^2z + 17694720a^8b^2c^6dfeh^2z - 50724864a^7b^2c^7dfeh^2z - 13271040a^6b^5c^5dffi^2z - 8847360a^7b^4c^5dfeh^2z - 5810688a^3b^{10}c^3dffi^2z + 3563520a^5b^7c^4dffi^2z + 2211840a^6b^6c^4dfeh^2z + 845568a^2b^{12}c^2dffi^2z - 506880a^4b^9c^3dffi^2z - 276480a^5b^8c^3dfeh^2z + 34560a^3b^{11}c^2dffi^2z + 13824a^4b^{10}c^2dfeh^2z + 26542080a^6b^4c^6dfeh^2z + 23362560a^3b^9c^4dffi^2z - 46725120a^3b^8c^5dffi^2z - 7127040a^5b^6c^5dfeh^2z - 2965248a^2b^{11}c^3dffi^2z + 1013760a^4b^8c^4dfeh^2z - 69120a^3b^{10}c^3dfeh^2z + 1536a^2b^{12}c^2dfeh^2z + 5930496a^2b^{10}c^4dffi^2z + 1536a^2b^{15}dffi^2z - 693633024a^7c^9dffi^2z - 231211008a^8c^8dffi^2z - 4718592a^{10}c^6dffi^2z + 2304a^4b^{12}dffi^2z + 13107200a^9c^7dffi^2z + 256a^2b^{14}dffi^2z - 14155776a^9c^7dfeh^2z + 39321600a^8c^8dfeh^2z + 13824b^{14}c^2dffi^2z - 6912b^{15}c^2dffi^2z + 2304b^{16}dffi^2z + 737280a^7b^8c^5dffi^2z - 2304a^3b^9c^4dffi^2z - 6912a^2b^{10}c^4dffi^2z + 11059200a^6b^8c^6dfeh^2z + 5160960a^6b^8c^6dffi^2z + 2211840a^6b^8c^6dfeh^2z + 4608a^2b^{10}c^2dfeh^2z + 15482880a^5b^8c^7dfeh^2z - 13824a^2b^9c^3dfeh^2z - 2304a^2b^{11}c^2dffi^2z + 1843200a^6b^3c^4dffi^2z + 783360a^5b^5c^3dffi^2z + 18432a^4b^7c^2dffi^2z + 5529600a^6b^2c^5dffi^2z - 3686400a^6b^2c^5dfeh^2z - 2211840a^5b^4c^4dffi^2z - 1566720a^5b^4c^4dfeh^2z + 317952a^4b^6c^3dffi^2z - 36864a^4b^6c^3dfeh^2z + 6912a^3b^8c^2dffi^2z + 4608a^3b^8c^2dfeh^2z + 5160960a^5b^3c^5dffi^2z + 4423680a^5b^3c^5dfeh^2z + 4423680a^5b^3c^5dfeh^2z - 635904a^4b^5c^4dfeh^2z - 354816a^3b^7c^3dffi^2z + 322560a^4b^5c^4dffi^2z + 138240a^4b^5c^4dfeh^2z + 59904a^2b^9c^2dffi^2z - 13824a^3b^7c^3dfeh^2z - 13824a^3b^7c^3dfeh^2z + 13824a^2b^9c^2dfeh^2z - 16588800a^5b^2c^6dfeh^2z - 10321920a^5b^2c^6dfeh^2z + 1658880a^4b^4c^5dfeh^2z + 709632a^3b^6c^4dfeh^2z - 645120a^4b^4c^5dfeh^2z + 124416a^3b^6c^4dfeh^2z - 119808a^2b^8c^3dfeh^2z - 41472a^2b^8c^3dfeh^2z + 7741440a^4b^3c^6dfeh^2z - 2903040a^3b^5c^5dfeh^2z + 387072a^2b^7c^4dfeh^2z - 3456a^4b^8c^3dffi^2z - 2304a^4b^8c^3dffi^2z + 1105920a^7b^8c^5dfeh^2z - 384a^2b^{10}c^2dffi^2z - 10616832a^6b^8c^6dffi^2z - 3538944a^7b^8c^5dffi^2z + 1843200a^7b^8c^5dfeh^2z + 1152a^3b^9c^4dfeh^2z - 37062144a^5b^8c^7dffi^2z + 2580480a^6b^8c^6dfeh^2z + 65664a^2b^{10}c^2dffi^2z + 23224320a^5b^8c^7dffi^2z - 9216a^2b^{10}c^2dffi^2z - 5985792a^6b^8c^6dfeh^2z + 206010a^2b^9c^3dffi^2z - 131328a^2b^9c^3dffi^2z - 6300a^2b^{10}c^2dffi^2z + 16588800a^5b^8c^7dfeh^2z + 3456a^2b^{10}c^2dffi^2z + 435456a^2b^8c^4dffi^2z + 13824a^2b^8c^4dfeh^2z - 1474560a^7c^6dfeh^2z - 10321920a^6c^7dfeh^2z + 1$

$$\begin{aligned}
& 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 \\
& 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
\end{aligned}$$

$$\begin{aligned}
& 360a^5b^3c^5d^2i^2 + 967680a^5b^3c^5f^2g^2 + 829440a^5b^3c^5e^2h^2 - 532224a^4b^5c^4d^2i^2 + 161280a^4b^5c^4f^2g^2 - 96768a^4b^5c^4e^2h^2 \\
& - 532224a^4b^5c^4d^2i^2 + 62784a^2b^9c^2d^2i^2 + 20736a^4b^5c^4e^2h^2 - 20160a^3b^7c^3f^2g^2 + 576a^2b^9c^2f^2g^2 + 11487744a^5b^2c^6d^2h^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c^7d^2f^2 - 1412640a^3b^6c^4d^2h^2 + 461376a^4b^4c^5d^2h^2 + 375030a^2b^8c^3d^2h^2 + 8709120a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 979776a^2b^7c^4d^2g^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 - 3456b^12c^d^2g^i + 384a^ab^12d^f^i^2 + 576a^4b^9h^2i^2 + 3538944a^7c^6e^2i^2 + 115200a^7c^6f^2h^2 + 64a^2b^11f^2i^2 + 6096384a^6c^7d^2h^2 + 5184b^11c^2d^2g^2 + 131072a^8b^2c^3i^4 + 98304a^7b^4c^2i^4 + 11025b^10c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 142560a^6b^4c^3h^4 + 103680a^7b^2c^4h^4 + 32400a^5b^6c^2h^4 + 20736b^9c^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 + 7077888a^6c^7e^3i + 786432a^8c^5e^i^3 + 28449792a^5c^8d^3h + 17010b^10c^3d^3h + 2025b^12c^d^2h^2 + 580608a^7c^6d^3h^3 - 39690b^9c^4d^3f + 32768a^6b^6c^i^4 + 2025a^4b^8c^h^4 - 734832a^ab^6c^6d^4 + 576b^13d^2i^2 + 65536a^9c^4i^4 + 20736a^8c^5h^4 + 4096a^5b^8i^4 + 49787136a^4c^9d^4 + 16000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, 1) * ((768a^2b^14c^2d - 3145728a^10c^8h - 22020096a^9c^9d - 22272a^3b^12c^3d + 282624a^4b^10c^4d - 2027520a^5b^8c^5d + 8847360a^6b^6c^6d - 23396352a^7b^4c^7d + 34603008a^8b^2c^8d + 256a^3b^13c^2f - 9216a^4b^11c^3f + 122880a^5b^9c^4f - 819200a^6b^7c^5f + 2949120a^7b^5c^6f - 5505024a^8b^3c^7f + 768a^4b^12c^2h - 12288a^5b^10c^3h + 61440a^6b^8c^4h - 983040a^8b^4c^6h + 3145728a^9b^2c^7h + 4194304a^9b^c^8f) / (512*(a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (x*(1572864a^9c^9e + 524288a^10c^8i - 1536a^4b^10c^4e + 30720a^5b^8c^5e - 245760a^6b^6c^6e + 983040a^7b^4c^7e - 1966080a^8b^2c^8e + 768a^4b^11c^3g - 15360a^5b^9c^4g + 122880a^6b^7c^5g - 491520a^7b^5c^6g + 983040a^8b^3c^7g - 256a^4b^12c^2i + 4608a^5b^10c^3i - 30720a^6b^8c^4i + 81920a^7b^6c^5i - 393216a^9b^2c^7i - 786432a^9b^c^8g) / (64*(a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (root(56371445760a^11b^8c^6z^4 - 503316480a^8b^14c^3z^4 + 47185920a^7b^16c^2z^4 - 171798691840a^14b^2c^9z^4 + 193273528320a^13b^4c^8z^4 - 128849018880a^12b^6c^7z^4 - 16911433728a^10b^10c^5z^4 + 3523215360a^9b^12c^4z^4 - 2621440a^6b^18c^z^4 + 68719476736a^15c^10z^4 + 65536a^5b^20z^4 + 196608a^5b^13c^g^i^z^2 - 46080a^4b^14c^f^h^z^2 - 105984a^3b^15c^d^h^z^2 - 73728a^2b^16c^d^f^z^2 + 2548039680a^9b^3c^7d^h^z^2 + 1509949440a^9b^3c^7e^g^z^2 - 1401421824a^8b^5c^6d^h^z^2 - 1321205760a^9b^2c^8d^f^z^2 - 754974720a^8b^5c^6e^g^z^2 + 732168192a^7b^6c^6d^f^z^2 - 603979776a^10b^2c^7e^i^z^2 - 456130560a^9b^4c^6f^h^z^2 + 390463488a^7b^7c^5d^h^z^2 + 301989888a^10b^3c^6g^i^z^2 - 366280704a^6b^8c^5d^f^z^2 - 330301440a^8b^4c^7d^f^z^2 + 254017536a^8b^6c^5f^h^z^2 - 1887436800a^10b^c^8d^h^z^2 + 188743680a^10b^2c^7f^h^z^2 + 188743680a^7b^7c^5e^g^z^2 + 125829120a^8b^6c^5e^i^z^2 - 62914560a^8b^7c^4g^i^z^2 - 61931520a^7b^8c^4f^h^z^2 + 23592960a^7b^9c^3g^i^z^2 - 47185920a^7b^8c^4e^i^z^2 - 3538944a^6b^11c^2g^i^z^2 + 96583680a^5b^10c^4d^f^z^2 - 51609600a^6b^9c^4d^h^z^2 + 7077888a^6b^10c^3e^i^z^2 + 6144000a^6b^10c^3f^h^z^2 - 393216a^5b^12c^2e^i^z^2 + 61440a^5b^12c^2f^h^z^2 - 23592960a^6b^9c^4e^g^z^2 + 1179648a^5b^11c^3e^g^z^2 + 829440a^4b^13c^2d^h^z^2 + 368640a^5b^11c^3d^h^z^2 - 15175680a^4b^12c^3d^f^z^2 + 1428480a^3b^14c^2d^f^z^2 - 1207959552a^10b^c^8e^g^z^2 - 402653184a^11b^c^7g^i^z^2 - 44040
\end{aligned}$$

$$\begin{aligned}
& 1920a^{10}b^8c^8f^2z^2 - 188743680a^{11}b^7c^7h^2z^2 + 1761607680a^{10}c^9d^8f^2z^2 + 524288a^6b^{12}c^8i^2z^2 + 46080a^5b^{13}c^8h^2z^2 - 14080a^3b^{15}c^8f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^8c^9d^2z^2 + 805306368a^{11}c^8e^8i^2z^2 - 1509949440a^9b^2c^8e^2z^2 + 251658240a^{11}c^8f^8h^2z^2 + 1536a^3b^{16}f^8h^2z^2 + 4608a^2b^{17}d^8h^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^8b^{17}c^8d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888a^{10}b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^{10}b^3c^6h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 - 50331648a^{10}b^4c^5i^2z^2 - 33554432a^{11}b^2c^6i^2z^2 + 20971520a^9b^6c^4i^2z^2 - 47185920a^7b^8c^4g^2z^2 - 26542080a^8b^7c^4h^2z^2 - 2752512a^7b^{10}c^2i^2z^2 + 2621440a^8b^8c^3i^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2z^2 - 1290240a^6b^{11}c^2h^2z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294912a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^8b^{18}d^8f^2z^2 + 1207959552a^{10}c^9e^2z^2 + 134217728a^{12}c^7i^2z^2 - 32768a^5b^{14}i^2z^2 + 2304a^4b^{15}h^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^8c^8d^8e^8f^8z + 99090432a^8b^7c^7d^8g^8h^8z - 3145728a^9b^6c^6f^8h^8i^8z - 27648a^4b^{11}c^8f^8h^8i^8z + 56623104a^8b^7c^7d^8f^8i^8z - 50688a^3b^{12}c^8d^8h^8i^8z - 4608a^3b^{12}c^8f^8g^8h^8z - 9437184a^8b^7c^7e^8f^8h^8z - 55296a^2b^{13}c^8d^8f^8i^8z - 13824a^2b^{13}c^8d^8g^8h^8z + 9216a^8b^{13}c^2d^8e^8f^8z - 4608a^8b^{14}c^8d^8f^8g^8z + 219414528a^7b^2c^7d^8e^8h^8z - 221773824a^6b^3c^7d^8e^8f^8z - 109707264a^7b^3c^6d^8g^8h^8z + 110886912a^6b^4c^6d^8f^8g^8z + 40108032a^8b^2c^6d^8h^8i^8z + 2359296a^8b^3c^5f^8h^8i^8z - 491520a^6b^7c^3f^8h^8i^8z + 184320a^5b^9c^2f^8h^8i^8z - 88473600a^6b^4c^6d^8e^8h^8z - 84934656a^7b^2c^7d^8f^8g^8z + 117964800a^5b^5c^6d^8e^8f^8z - 45613056a^7b^3c^6d^8f^8i^8z + 44236800a^6b^5c^5d^8g^8h^8z - 10321920a^6b^6c^4d^8h^8i^8z + 7077888a^7b^4c^5d^8h^8i^8z - 5898240a^7b^4c^5f^8g^8h^8z + 4718592a^8b^2c^6f^8g^8h^8z + 2949120a^6b^6c^4f^8g^8h^8z + 2396160a^5b^8c^3d^8h^8i^8z - 737280a^5b^8c^3f^8g^8h^8z + 92160a^4b^{10}c^2f^8g^8h^8z - 27648a^4b^{10}c^2d^8h^8i^8z - 58982400a^5b^6c^5d^8f^8g^8z + 11796480a^7b^3c^6e^8f^8h^8z + 8847360a^5b^7c^4d^8f^8i^8z - 6635520a^5b^7c^4d^8g^8h^8z - 5898240a^6b^5c^5e^8f^8h^8z - 3809280a^4b^9c^3d^8f^8i^8z + 2359296a^6b^5c^5d^8f^8i^8z + 1474560a^5b^7c^4e^8f^8h^8z + 681984a^3b^{11}c^2d^8f^8i^8z - 276480a^4b^9c^3d^8g^8h^8z - 184320a^4b^9c^3e^8f^8h^8z + 179712a^3b^{11}c^2d^8g^8h^8z + 9216a^3b^{11}c^2e^8f^8h^8z + 16220160a^4b^8c^4d^8f^8g^8z + 13271040a^5b^6c^5d^8e^8h^8z - 2396160a^3b^{10}c^3d^8f^8g^8z + 552960a^4b^8c^4d^8e^8h^8z - 359424a^3b^{10}c^3d^8e^8h^8z + 175104a^2b^{12}c^2d^8f^8g^8z + 27648a^2b^{12}c^2d^8e^8h^8z - 32440320a^4b^7c^5d^8e^8f^8z + 4792320a^3b^9c^4d^8e^8f^8z - 350208a^2b^{11}c^3d^8e^8f^8z + 346816512a^7b^8c^8d^2g^8z - 41472a^5b^{10}c^8h^2i^8z + 7077888a^9b^6c^6g^8h^2z - 11008a^3b^{12}c^8f^2i^8z - 6912a^4b^{11}c^8g^8h^2z - 19660800a^8b^7c^7f^2g^8z - 768a^2b^{13}c^8f^2g^8z + 214272a^8b^{13}c^2d^2g^8z - 428544a^8b^{12}c^3d^2e^8z - 198180864a^8c^8d^8e^8h^8z - 66060288a^9c^7d^8h^8i^8z + 1536a^3b^{13}f^8h^8i^8z + 4608a^2b^{14}d^8h^8i^8z - 66816a^8b^{14}c^8d^2i^8z + 1022754816a^6b^2c^8d^2e^8z - 642318336a^5b^4c^7d^2e^8z - 511377408a^6b^3c^7d^2g^8z + 321159168a^5b^5c^6d^2g^8z + 225312768a^7b^2c^7d^2i^8z + 223395840a^4b^6c^6d^2e^8z - 111697920a^4b^7c^5d^2g^8z + 3538944a^9b^2c^5h^2i^8z - 737280a^7b^6c^3h^2i^8z + 276480a^6b^8c^2h^2i^8z - 10354688a^8b^2c^6f^2i^8z - 43646976a^6b^4c^6d^2i^8z - 8847360a^8b^3c^5g^8h^2z + 4423680a^7b^5c^4g^8h^2z + 2048000a^6b^6c^4f^2i^8z - 1105920a^6b^7c^3g^8h^2z - 849920a^5b^8c^3f^2i^8z + 393216a^7b^4c^5f^2i^8z + 145920a^4b^{10}c^2f^2i^8z + 138240a^5b^9c^2g^8h^2z - 32587776a^5b^6c^5d^2i^8z + 25362432a^7b^3c^6f^2g^8z + 21657600a^4b^8c^4d^2i^8z + 17694720a^8b^2c^6e^8h^2z - 50724864a^7b^2c^7e^8f^2z - 13271040a^6b^5c^
\end{aligned}$$

$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^a b^{10} c^2 d e^f i + 15482880 a^5 b^c^7 d e^f g - 13824 a^a b^9 c^3 d e^f g - 2304 a^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 + 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 - 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 + 1152 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^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^a b^9 c^3 d^2 f^h - 131328 a^a b^9 c^3 d^2 e^i - 6300 a^a b^{10} c^2 d^f^2 h + 16588800 a^5 b^c^7 d^e^2 h + 3456 a^a b^{10} c^2 d^f^g^2 + 435456 a^a b^8 c^4 d^2 e^g + 13824 a^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^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 - 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 + 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 + 3067$

$$\begin{aligned}
& 20a^3b^7c^3d^2f^2h^2 + 197820a^2b^8c^3d^2f^2h + 146880a^4b^5c^4d^2f^2h^2 + 80640a^3b^6c^4e^2f^2g - 55350a^2b^9c^2d^2f^2h^2 - 2304a^2b^8c^3e^2f^2g - 3870720a^5b^2c^6d^2f^2g^2 - 1935360a^4b^4c^5d^2f^2g^2 - 1658880a^4b^3c^6d^2e^2h + 725760a^3b^6c^4d^2f^2g^2 + 17418240a^3b^4c^6d^2e^2g - 124416a^3b^5c^5d^2e^2h - 96768a^2b^8c^3d^2f^2g^2 + 41472a^2b^7c^4d^2e^2h - 3919104a^2b^6c^5d^2e^2g - 7741440a^4b^2c^7d^2e^2f + 2903040a^3b^4c^6d^2e^2f - 387072a^2b^6c^5d^2e^2f + 184320a^8b^3c^4h^2i^2 + 25344a^5b^7c^3h^2i^2 - 884736a^6b^3c^4g^3i - 589824a^7b^3c^3g^3i^3 - 442368a^5b^5c^3g^3i - 294912a^6b^5c^2g^3i^3 + 430080a^7b^3c^5f^2i^2 - 1984a^3b^9c^3f^2i^2 + 3538944a^5b^2c^6e^3i - 1648128a^5b^3c^5f^3h + 1179648a^7b^2c^4e^3i^3 - 898560a^6b^3c^4f^3h^3 + 589824a^6b^4c^3e^3i^3 - 354240a^5b^5c^3f^3h^3 - 354240a^4b^5c^4f^3h + 98304a^5b^6c^2e^3i^3 + 43680a^3b^7c^3f^3h - 21600a^4b^7c^2f^3h^3 - 1050a^2b^9c^2f^3h + 225a^2b^10c^3f^2h^2 + 3870720a^6b^3c^6d^2i^2 + 1658880a^6b^3c^6e^2h^2 + 16547328a^4b^2c^7d^3h - 12306816a^3b^4c^6d^3h + 37310976a^3b^3c^7d^3f + 3037824a^2b^6c^5d^3h - 2654208a^5b^3c^5e^3g^3 + 1949184a^6b^2c^5d^3h^3 + 1296000a^5b^4c^4d^3h - 155520a^4b^6c^3d^3h - 40500a^6b^10c^2d^2h^2 - 8100a^3b^8c^2d^3h + 3870720a^5b^3c^7e^2f^2 + 34836480a^4b^3c^8d^2e^2 - 108864a^6b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^2f^3 + 1737792a^3b^5c^5d^2f^3 - 260190a^6b^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 - 435456a^6b^7c^5d^2e^2 - 245760a^8c^5f^2h^2i^2 + 384a^3b^10f^2h^2i^2 + 1152a^2b^11d^2h^2i^2 - 2211840a^6c^7e^2f^2h - 1720320a^7c^6d^2f^2i^2 - 9450b^11c^2d^2f^2h + 6912b^11c^2d^2e^2i + 1612800a^6c^7d^2f^2h - 393216a^8b^3c^4g^3i^3 - 49152a^5b^7c^3g^3i^3 - 20736b^10c^3d^2e^2g - 75188736a^4b^3c^8d^3f - 883200a^6b^3c^6f^3h - 317952a^7b^3c^5f^3h^3 + 1350a^3b^9c^3f^3h^3 - 15482880a^5c^8d^2e^2f - 9792a^6b^11c^3d^2i^2 - 10616832a^5b^3c^7e^3g - 345060a^6b^8c^4d^3h + 4050a^2b^10c^3d^3h - 4262400a^5b^3c^7d^2f^3 + 852768a^6b^7c^5d^3f + 7350a^6b^9c^3d^2f^3 + 276480a^7b^3c^3h^2i^2 + 140544a^6b^5c^2h^2i^2 + 884736a^7b^2c^4g^2i^2 + 884736a^6b^4c^3g^2i^2 + 221184a^5b^6c^2g^2i^2 + 501760a^6b^3c^4f^2i^2 + 414720a^6b^3c^4g^2h^2 + 207360a^5b^5c^3g^2h^2 + 170240a^5b^5c^3f^2i^2 + 9216a^4b^7c^2f^2i^2 + 5184a^4b^7c^2g^2h^2 + 3538944a^6b^2c^5e^2i^2 + 1684224a^6b^2c^5f^2h^2 + 1264320a^5b^4c^4f^2h^2 + 884736a^5b^4c^4e^2i^2 + 126720a^4b^6c^3f^2h^2 - 13950a^3b^8c^2f^2h^2 + 1935360a^5b^3c^5d^2i^2 + 967680a^5b^3c^5f^2g^2 + 829440a^5b^3c^5e^2h^2 - 532224a^4b^5c^4d^2i^2 + 161280a^4b^5c^4f^2g^2 - 96768a^3b^7c^3d^2i^2 + 62784a^2b^9c^2d^2i^2 + 20736a^4b^5c^4e^2h^2 - 20160a^3b^7c^3f^2g^2 + 576a^2b^9c^2f^2g^2 + 11487744a^5b^2c^6d^2h^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c^7d^2f^2 - 1412640a^3b^6c^4d^2h^2 + 461376a^4b^4c^5d^2h^2 + 375030a^2b^8c^3d^2h^2 + 8709120a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 979776a^2b^7c^4d^2g^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 - 3456b^12c^3d^2g^3i + 384a^6b^12d^2f^3i^2 + 576a^4b^9h^2i^2 + 3538944a^7c^6e^2i^2 + 115200a^7c^6f^2h^2 + 64a^2b^11f^2i^2 + 6096384a^6c^7d^2h^2 + 5184b^11c^2d^2g^2 + 131072a^8b^2c^3i^4 + 98304a^7b^4c^2i^4 + 11025b^10c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 142560a^6b^4c^3h^4 + 103680a^7b^2c^4h^4 + 32400a^5b^6c^2h^4 + 20736b^9c^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 + 7077888a^6c^7e^3i + 786432a^8c^5e^3i^3 + 28449792a^5c^8d^3h + 17010b^10c^3d^3h + 2025b^12c^3d^2h^2 + 580608a^7c^6d^3h - 39690b^9c^4d^3f + 32768a^6b^6c^3i^4 + 2025a^4b^8c^3h^4 - 734832a^6b^6c^6d^4 + 576b^13d^2i^2 + 65536a^9c^4i^4 + 20736a^8c^5h^4 + 4096a^5b^8i^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, 1) * x * (83886
\end{aligned}$$

$$\begin{aligned}
& 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^
\end{aligned}$$

$$\begin{aligned}
& 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))) * \text{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 + 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 + 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 + 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 + 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 + 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*
\end{aligned}$$

$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 - 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 - 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 + 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 + 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 - 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^2*i + 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 + 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, 1), 1, 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

$$3.57 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=1150

$$\frac{-\frac{lb^4}{c^2} + \frac{jb^3}{c} - \left(3g - \frac{5al}{c}\right)b^2 + 2(3ce + aj)b + 2(jb^2 - 3cgb - 3alb + 6c^2e + 2acj)x^2 - 16a^2l}{4(b^2 - 4ac)^2(cx^4 + bx^2 + a)} + \frac{\left((ma^2 + 3c^2d)b^3 + \dots\right)}{\dots}$$

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}

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]
$$\begin{aligned} & -(b*c*(c*e + a*j) - a*b^2*1 - 2*a*c*(c*g - a*1) + (2*c^3*e - c^2*(b*g + 2*a*j) - b^3*1 + b*c*(b*j + 3*a*1))*x^2)/(4*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) - (x*(a*b*c*(c*f + a*k) - b^2*(c^2*d + a^2*m) + 2*a*c*(c^2*d - a*c*h + a^2*m) + (a*b^2*c*k + 2*a*c^2*(c*f - a*k) - a*b^3*m - b*c*(c^2*d + a*c*h - 3*a^2*m))*x^2))/(4*a*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + ((b^3*j)/c + 2*b*(3*c*e + a*j) - 16*a^2*1 - (b^4*1)/c^2 - b^2*(3*g - (5*a*1)/c) + 2*(6*c^2*e - 3*b*c*g + b^2*j + 2*a*c*j - 3*a*b*1)*x^2)/(4*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (x*(4*a^2*b*c*(2*c*f + a*k) + a*b^3*(c*f + 2*a*k) - a*b^2*(25*c^2*d + 7*a*c*h - 11*a^2*m) + 4*a^2*c*(7*c^2*d + a*c*h - 9*a^2*m) + b^4*(3*c*d - (2*a^2*m)/c) + (a*b^2*c*(c*f + 3*a*k) + 4*a^2*c^2*(5*c*f + 3*a*k) + b^3*(3*c^2*d + a^2*m) - 4*a*b*c*(6*c^2*d + 3*a*c*h + 4*a^2*m))*x^2))/(8*a^2*c*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + ((a*b^2*(c*f + 3*a*k) + 4*a^2*c*(5*c*f + 3*a*k) - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*m) + b^3*(3*c*d + (a^2*m)/c) + (a*b^3*c*(c*f - 3*a*k) - 4*a^2*b*c^2*(13*c*f + 9*a*k) - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*m) + b^4*(3*c^2*d - a^2*m) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*m)))/(c*sqrt[b^2 - 4*a*c]))*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]]]/(8*sqrt[2]*a^2*sqrt[c]*(b^2 - 4*a*c)^2*sqrt[b - sqrt[b^2 - 4*a*c]]) + ((a*b^2*(c*f + 3*a*k) + 4*a^2*c*(5*c*f + 3*a*k) - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*m) + b^3*(3*c*d + (a^2*m)/c) - (a*b^3*c*(c*f - 3*a*k) - 4*a^2*b*c^2*(13*c*f + 9*a*k) - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*m) + b^4*(3*c^2*d - a^2*m) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*m)))/(c*sqrt[b^2 - 4*a*c]))*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]]]/(8*sqrt[2]*a^2*sqrt[c]*(b^2 - 4*a*c)^2*sqrt[b + sqrt[b^2 - 4*a*c]])] - ((6*c^2*e - 3*b*c*g + b^2*j + 2*a*c*j - 3*a*b*1)*ArcTanh[(b + 2*c*x^2)/sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(5/2) \end{aligned}$$

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] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] && NeQ[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[Pq, 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[PolynomialRemainder[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]] /; 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{(a + bx^2 + cx^4)^3} dx &= \int \frac{x(e + gx^2 + jx^4 + lx^6)}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^3} dx \\
&= -\frac{x(abc(cf + ak) - b^2(c^2d + a^2m) + 2ac(c^2d - ac^2))}{4ac^2} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(cg - al) + (2c^3e - c^2(bg - al))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(cg - al) + (2c^3e - c^2(bg - al))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(cg - al) + (2c^3e - c^2(bg - al))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(cg - al) + (2c^3e - c^2(bg - al))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

Mathematica [A] time = 7.48, size = 1590, normalized size = 1.38

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 - 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^

$$3\sqrt{b^2 - 4ac}m - 16a^3bc\sqrt{b^2 - 4ac}m) \operatorname{ArcTan}\left[\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right] / (8\sqrt{2}a^2c^{3/2}(b^2 - 4ac)^{5/2}\sqrt{b - \sqrt{b^2 - 4ac}}) + ((-3b^4c^2d + 30ab^2c^3d - 168a^2c^4d + 3b^3c^2\sqrt{b^2 - 4ac}d - 24a^2bc^3\sqrt{b^2 - 4ac}d - ab^3c^2f + 52a^2b^3c^3f + ab^2c^2\sqrt{b^2 - 4ac}f + 20a^2c^3\sqrt{b^2 - 4ac}f - 18a^2b^2c^2h - 24a^3c^3h - 12a^2b^2c^2\sqrt{b^2 - 4ac}h + 3a^2b^3c^2k + 36a^3bc^2k + 3a^2b^2c\sqrt{b^2 - 4ac}k + 12a^3c^2\sqrt{b^2 - 4ac}k + a^2b^4m - 18a^3b^2c^2m - 40a^4c^2m + a^2b^3\sqrt{b^2 - 4ac}m - 16a^3bc\sqrt{b^2 - 4ac}m) \operatorname{ArcTan}\left[\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b + \sqrt{b^2 - 4ac}}}\right] / (8\sqrt{2}a^2c^{3/2}(b^2 - 4ac)^{5/2}\sqrt{b + \sqrt{b^2 - 4ac}}) + ((6c^2e - 3bc^2g + b^2j + 2ac^2j - 3ab^2l) \operatorname{Log}[-b + \sqrt{b^2 - 4ac} - 2cx^2]) / (2(b^2 - 4ac)^{5/2}) + ((-6c^2e + 3bc^2g - b^2j - 2ac^2j + 3ab^2l) \operatorname{Log}[b + \sqrt{b^2 - 4ac} + 2cx^2]) / (2(b^2 - 4ac)^{5/2})$$

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{(a + bx^2 + cx^4)^3} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(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] IntegrateAlgebraic[(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]

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 - 12*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 + 16*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*integrate((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 - 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 - 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
```

$$\begin{aligned}
& ^5k^mz^2 + 121634816a^{11}b^2c^9f^mz^2 - 115671040a^8b^8c^6f^mz^2 \\
& - 62914560a^9b^7c^6j^1z^2 + 188743680a^{10}b^2c^{10}f^h z^2 - 9437184 \\
& 0a^8b^8c^6g^1z^2 + 6144000a^8b^{10}c^4k^mz^2 - 117964800a^9b^5c^8 \\
& f^kz^2 + 61440a^7b^{12}c^3k^mz^2 - 46080a^6b^{14}c^2k^mz^2 + 23592 \\
& 960a^8b^9c^5j^1z^2 + 188743680a^7b^7c^8e^g z^2 - 37355520a^9b^7c^6 \\
& h^mz^2 + 125829120a^8b^6c^8e^jz^2 + 23101440a^8b^9c^5h^mz^2 \\
& - 3538944a^7b^{11}c^4j^1z^2 + 196608a^6b^{13}c^3j^1z^2 - 4349952a^7b^{11} \\
& c^4h^mz^2 + 337920a^6b^{13}c^3h^mz^2 - 7680a^5b^{15}c^2h^mz^2 \\
& - 62914560a^8b^7c^7g^jz^2 - 26542080a^8b^8c^6h^kz^2 + 17940480a^7 \\
& b^{10}c^5f^mz^2 + 11796480a^7b^{10}c^5g^1z^2 - 37355520a^8b^7c^7f \\
& k^z^2 - 1347584a^6b^{12}c^4f^mz^2 + 68272128a^6b^{10}c^6d^kz^2 - 589 \\
& 824a^6b^{12}c^4g^1z^2 + 552960a^6b^{12}c^4h^kz^2 - 147456a^7b^{10}c^5 \\
& h^kz^2 - 46080a^5b^{14}c^3h^kz^2 + 35840a^5b^{14}c^3f^mz^2 + 23592 \\
& 960a^7b^9c^6g^jz^2 - 23592960a^7b^9c^6e^1z^2 + 23371776a^6b^{11} \\
& c^5d^mz^2 + 23101440a^7b^9c^6f^kz^2 - 47185920a^7b^8c^7e^jz^2 - \\
& 61931520a^7b^8c^7f^h z^2 - 4349952a^6b^{11}c^5f^kz^2 - 3538944a^6b^{11} \\
& c^5g^jz^2 - 1677312a^5b^{13}c^4d^mz^2 + 1179648a^6b^{11}c^5e^1z^2 \\
& + 337920a^5b^{13}c^4f^kz^2 + 196608a^5b^{13}c^4g^jz^2 + 53760a^4b^{15} \\
& c^3d^mz^2 - 7680a^4b^{15}c^3f^kz^2 + 96583680a^5b^{10}c^7d^fz^2 \\
& - 9179136a^5b^{12}c^5d^kz^2 + 7077888a^6b^{10}c^6e^jz^2 - 51609600 \\
& a^6b^9c^7d^h z^2 + 691200a^4b^{14}c^4d^kz^2 - 393216a^5b^{12}c^5e^jz^2 \\
& - 23040a^3b^{16}c^3d^kz^2 + 6144000a^6b^{10}c^6f^h z^2 + 61440a^5b^{12} \\
& c^5f^h z^2 - 46080a^4b^{14}c^4f^h z^2 + 1536a^3b^{16}c^3f^h z^2 \\
& - 23592960a^6b^9c^7e^g z^2 + 1179648a^5b^{11}c^6e^g z^2 + 829440a^4b^{13} \\
& c^5d^h z^2 + 368640a^5b^{11}c^6d^h z^2 - 105984a^3b^{15}c^4d^h z^2 \\
& + 4608a^2b^{17}c^3d^h z^2 - 15175680a^4b^{12}c^6d^fz^2 + 1428480a^3b^{14} \\
& c^5d^fz^2 - 73728a^2b^{16}c^4d^fz^2 + 4108320768a^{10}b^3c^9d^mz^2 \\
& - 1207959552a^{11}b^c^{10}e^1z^2 - 1207959552a^{10}b^c^{11}e^g z^2 - \\
& 578813952a^{12}b^c^9h^mz^2 - 578813952a^{11}b^c^{10}f^kz^2 - 402653184a^{12} \\
& b^c^9j^1z^2 - 402653184a^{11}b^c^{10}g^jz^2 - 440401920a^{10}b^c^{11}f^2z^2 \\
& - 188743680a^{12}b^c^9k^2z^2 - 188743680a^{11}b^c^{10}h^2z^2 + 176 \\
& 1607680a^{10}c^{12}d^fz^2 - 14080a^6b^{15}c^m^2z^2 - 94464a^ab^{17}c^4d^2z^2 \\
& + 6936330240a^8b^3c^{11}d^2z^2 + 2464874496a^6b^7c^9d^2z^2 - 3 \\
& 963617280a^9b^c^{12}d^2z^2 + 1056964608a^{11}c^{11}d^kz^2 + 805306368a^{11} \\
& c^{11}e^jz^2 + 419430400a^{12}c^{10}f^mz^2 + 251658240a^{13}c^9k^mz^2 - \\
& 1509949440a^9b^2c^{11}e^2z^2 + 251658240a^{11}c^{11}f^h z^2 + 150994944a^{12} \\
& c^{10}h^kz^2 - 5400428544a^7b^5c^{10}d^2z^2 + 754974720a^8b^4c^{10}e^2z^2 \\
& - 730054656a^5b^9c^8d^2z^2 + 477102080a^{12}b^3c^7m^2z^2 \\
& - 377487360a^{11}b^4c^7l^2z^2 + 477102080a^9b^3c^{10}f^2z^2 + 3019898 \\
& 88a^{12}b^2c^8l^2z^2 - 377487360a^9b^4c^9g^2z^2 + 301989888a^{10}b^2 \\
& c^{10}g^2z^2 - 174325760a^{11}b^5c^6m^2z^2 + 188743680a^{10}b^6c^6l^2z^2 \\
& + 141557760a^{11}b^3c^8k^2z^2 + 188743680a^8b^6c^8g^2z^2 + 14 \\
& 1557760a^{10}b^3c^9h^2z^2 - 174325760a^8b^5c^9f^2z^2 - 188743680a^7b^6 \\
& c^9e^2z^2 - 47185920a^9b^8c^5l^2z^2 + 11206656a^{10}b^7c^5m^2z^2 \\
& + 8929280a^9b^9c^4m^2z^2 - 2600960a^8b^{11}c^3m^2z^2 + 291840 \\
& a^7b^{13}c^2m^2z^2 - 50331648a^{10}b^4c^8j^2z^2 + 146165760a^4b^{11}c^7 \\
& d^2z^2 - 26542080a^9b^7c^6k^2z^2 + 5898240a^8b^{10}c^4l^2z^2 - \\
& 294912a^7b^{12}c^3l^2z^2 - 33554432a^{11}b^2c^9j^2z^2 + 9584640a^8b^9 \\
& c^5k^2z^2 + 20971520a^9b^6c^7j^2z^2 - 2359296a^{10}b^5c^7k^2z^2 \\
& - 1290240a^7b^{11}c^4k^2z^2 + 46080a^6b^{13}c^3k^2z^2 + 2304a^5b^{15} \\
& c^2k^2z^2 - 2752512a^7b^{10}c^5j^2z^2 + 2621440a^8b^8c^6j^2z^2 \\
& + 524288a^6b^{12}c^4j^2z^2 - 32768a^5b^{14}c^3j^2z^2 - 47185920a^7b^8 \\
& c^7g^2z^2 - 26542080a^8b^7c^7h^2z^2 + 9584640a^7b^9c^6h^2z^2 \\
& - 2359296a^9b^5c^8h^2z^2 - 1290240a^6b^{11}c^5h^2z^2 + 46080a^5b^{13} \\
& c^4h^2z^2 + 2304a^4b^{15}c^3h^2z^2 + 5898240a^6b^{10}c^6g^2z^2 \\
& - 294912a^5b^{12}c^5g^2z^2 + 11206656a^7b^7c^8f^2z^2 + 8929280a^6b^9 \\
& c^7f^2z^2 + 23592960a^6b^8c^8e^2z^2 - 2600960a^5b^{11}c^6f^2z^2 \\
& + 291840a^4b^{13}c^5f^2z^2 - 14080a^3b^{15}c^4f^2z^2 + 256a^2b^{17}c^3 \\
& f^2z^2 - 19860480a^3b^{13}c^6d^2z^2 - 1179648a^5b^{10}c^7e^2z^2
\end{aligned}$$

$$\begin{aligned}
& z^2 + 1771776a^2b^{15}c^5d^2z^2 - 440401920a^{13}b^8c^8m^2z^2 + 1207959 \\
& 552a^{10}c^{12}e^2z^2 + 134217728a^{12}c^{10}j^2z^2 + 256a^5b^{17}m^2z^2 \\
& + 2304b^{19}c^3d^2z^2 - 23592960a^{10}b^8c^8f^*k^*l^*z + 99090432a^9b^8c^9 \\
& d^*h^*l^*z + 9437184a^{10}b^8c^8e^*k^*m^*z + 23592960a^{10}b^8c^8g^*h^*m^*z + 141557 \\
& 760a^8b^8c^{10}d^*e^*k^*z + 47185920a^9b^8c^9d^*j^*k^*z - 23592960a^9b^8c^9f^* \\
& g^*k^*z + 169869312a^7b^8c^{11}d^*e^*f^*z + 99090432a^8b^8c^{10}d^*g^*h^*z - 314572 \\
& 8a^9b^8c^9f^*h^*j^*z + 56623104a^8b^8c^{10}d^*f^*j^*z + 1536a^8b^{15}c^3d^*f^*j^*z \\
& - 9437184a^8b^8c^{10}e^*f^*h^*z - 4608a^8b^{14}c^4d^*f^*g^*z + 9216a^8b^{13}c^5d^* \\
& e^*f^*z + 412876800a^8b^2c^9d^*e^*m^*z - 206438400a^9b^3c^7d^*l^*m^*z + 58 \\
& 98240a^{10}b^4c^5k^*l^*m^*z - 206438400a^8b^3c^8d^*g^*m^*z - 4718592a^{11}b^ \\
& ^2c^6k^*l^*m^*z - 2949120a^9b^6c^4k^*l^*m^*z + 737280a^8b^8c^3k^*l^*m^*z - \\
& 92160a^7b^{10}c^2k^*l^*m^*z + 103219200a^8b^5c^6d^*l^*m^*z - 29491200a^{10} \\
& b^3c^6h^*l^*m^*z - 206438400a^7b^4c^8d^*e^*m^*z - 2359296a^{10}b^3c^6j^*k^* \\
& m^*z + 491520a^8b^7c^4j^*k^*m^*z - 184320a^7b^9c^3j^*k^*m^*z + 27648a^6b^ \\
& b^{11}c^2j^*k^*m^*z + 14745600a^9b^5c^5h^*l^*m^*z - 3686400a^8b^7c^4h^*l^*m^* \\
& z + 460800a^7b^9c^3h^*l^*m^*z - 23040a^6b^{11}c^2h^*l^*m^*z + 88473600a^8 \\
& b^4c^7d^*k^*l^*z + 82575360a^9b^2c^8d^*j^*m^*z + 11796480a^{10}b^2c^7h^*j^* \\
& m^*z + 5898240a^9b^4c^6g^*k^*m^*z - 4718592a^{10}b^2c^7g^*k^*m^*z - 7077888 \\
& 0a^9b^2c^8d^*k^*l^*z - 2949120a^8b^6c^5g^*k^*m^*z - 2457600a^8b^6c^5h^* \\
& j^*m^*z + 921600a^7b^8c^4h^*j^*m^*z + 737280a^7b^8c^4g^*k^*m^*z - 138240a^ \\
& ^6b^{10}c^3h^*j^*m^*z - 92160a^6b^{10}c^3g^*k^*m^*z + 7680a^5b^{12}c^2h^*j^*m^* \\
& z + 4608a^5b^{12}c^2g^*k^*m^*z + 29491200a^9b^3c^7f^*k^*l^*z - 176947200a^ \\
& 7b^3c^9d^*e^*k^*z - 109707264a^8b^3c^8d^*h^*l^*z - 25804800a^7b^7c^5d^* \\
& l^*m^*z + 103219200a^7b^5c^7d^*g^*m^*z + 219414528a^7b^2c^{10}d^*e^*h^*z - 14 \\
& 745600a^8b^5c^6f^*k^*l^*z - 29491200a^9b^3c^7g^*h^*m^*z - 11796480a^9b^ \\
& 3c^7e^*k^*m^*z - 44236800a^7b^6c^6d^*k^*l^*z + 58982400a^9b^2c^8e^*h^*m^*z \\
& + 5898240a^8b^5c^6e^*k^*m^*z + 3686400a^7b^7c^5f^*k^*l^*z + 3225600a^6b^ \\
& b^9c^4d^*l^*m^*z - 1474560a^7b^7c^5e^*k^*m^*z - 460800a^6b^9c^4f^*k^*l^*z \\
& + 184320a^6b^9c^4e^*k^*m^*z - 161280a^5b^{11}c^3d^*l^*m^*z + 23040a^5b^{11} \\
& c^3f^*k^*l^*z - 9216a^5b^{11}c^3e^*k^*m^*z + 14745600a^8b^5c^6g^*h^*m^*z + 1 \\
& 10886912a^7b^4c^8d^*f^*l^*z - 3686400a^7b^7c^5g^*h^*m^*z - 221773824a^6b^ \\
& b^3c^{10}d^*e^*f^*z + 460800a^6b^9c^4g^*h^*m^*z - 17203200a^7b^6c^6d^*j^*m^* \\
& z - 23040a^5b^{11}c^3g^*h^*m^*z - 29491200a^8b^4c^7e^*h^*m^*z - 11796480a^ \\
& 9b^2c^8f^*j^*k^*z + 11059200a^6b^8c^5d^*k^*l^*z + 6451200a^6b^8c^5d^*j^* \\
& m^*z + 88473600a^7b^4c^8d^*g^*k^*z + 2457600a^7b^6c^6f^*j^*k^*z - 35389440 \\
& a^8b^3c^8d^*j^*k^*z - 1382400a^5b^{10}c^4d^*k^*l^*z - 84934656a^8b^2c^9d^* \\
& d^*f^*l^*z - 967680a^5b^{10}c^4d^*j^*m^*z - 921600a^6b^8c^5f^*j^*k^*z + 138240 \\
& a^5b^{10}c^4f^*j^*k^*z + 69120a^4b^{12}c^3d^*k^*l^*z + 53760a^4b^{12}c^3d^*j^* \\
& m^*z - 7680a^4b^{12}c^3f^*j^*k^*z + 44236800a^7b^5c^7d^*h^*l^*z + 7372800a^ \\
& ^7b^6c^6e^*h^*m^*z - 5898240a^8b^4c^7f^*h^*l^*z + 4718592a^9b^2c^8f^*h^* \\
& l^*z - 70778880a^8b^2c^9d^*g^*k^*z + 2949120a^7b^6c^6f^*h^*l^*z - 921600a^ \\
& ^6b^8c^5e^*h^*m^*z - 737280a^6b^8c^5f^*h^*l^*z + 92160a^5b^{10}c^4f^*h^*l^* \\
& z + 46080a^5b^{10}c^4e^*h^*m^*z - 4608a^4b^{12}c^3f^*h^*l^*z + 29491200a^8b^ \\
& ^3c^8f^*g^*k^*z - 109707264a^7b^3c^9d^*g^*h^*z - 25804800a^6b^7c^6d^*g^*m^* \\
& z - 58982400a^8b^2c^9e^*f^*k^*z - 58982400a^6b^6c^7d^*f^*l^*z + 7372800a^ \\
& a^6b^7c^6d^*j^*k^*z + 88473600a^6b^5c^8d^*e^*k^*z - 2764800a^5b^9c^5d^* \\
& j^*k^*z + 51609600a^6b^6c^7d^*e^*m^*z + 414720a^4b^{11}c^4d^*j^*k^*z - 23040a^ \\
& a^3b^{13}c^3d^*j^*k^*z - 14745600a^7b^5c^7f^*g^*k^*z - 44236800a^6b^6c^7d^* \\
& d^*g^*k^*z - 6635520a^6b^7c^6d^*h^*l^*z + 40108032a^8b^2c^9d^*h^*j^*z + 3686 \\
& 400a^6b^7c^6f^*g^*k^*z + 3225600a^5b^9c^5d^*g^*m^*z + 2359296a^8b^3c^8 \\
& f^*h^*j^*z - 491520a^6b^7c^6f^*h^*j^*z - 460800a^5b^9c^5f^*g^*k^*z - 276480 \\
& a^5b^9c^5d^*h^*l^*z + 184320a^5b^9c^5f^*h^*j^*z + 179712a^4b^{11}c^4d^*h^* \\
& l^*z - 161280a^4b^{11}c^4d^*g^*m^*z - 27648a^4b^{11}c^4f^*h^*j^*z + 23040a^4 \\
& b^{11}c^4f^*g^*k^*z - 13824a^3b^{13}c^3d^*h^*l^*z + 1536a^3b^{13}c^3f^*h^*j^*z \\
& + 29491200a^7b^4c^8e^*f^*k^*z + 110886912a^6b^4c^9d^*f^*g^*z + 16220160a^ \\
& ^5b^8c^6d^*f^*l^*z - 45613056a^7b^3c^9d^*f^*j^*z + 11059200a^5b^8c^6d^* \\
& g^*k^*z - 10321920a^6b^6c^7d^*h^*j^*z - 7372800a^6b^6c^7e^*f^*k^*z + 707788 \\
& 8a^7b^4c^8d^*h^*j^*z - 6451200a^5b^8c^6d^*e^*m^*z - 88473600a^6b^4c^9d^* \\
& d^*e^*h^*z + 2396160a^5b^8c^6d^*h^*j^*z - 2396160a^4b^{10}c^5d^*f^*l^*z - 1382
\end{aligned}$$

$400a^4b^{10}c^5d^5g^5k^5z - 84934656a^7b^2c^{10}d^5f^5g^5z + 921600a^5b^8c^6e^5f^5k^5z + 117964800a^5b^5c^9d^5e^5f^5z + 322560a^4b^{10}c^5d^5e^5m^5z + 175104a^3b^{12}c^4d^5f^5l^5z + 69120a^3b^{12}c^4d^5g^5k^5z - 50688a^3b^{12}c^4d^5h^5j^5z - 46080a^4b^{10}c^5e^5f^5k^5z - 27648a^4b^{10}c^5d^5h^5j^5z + 4608a^2b^{14}c^3d^5h^5j^5z - 4608a^2b^{14}c^3d^5f^5l^5z + 44236800a^6b^5c^8d^5g^5h^5z - 5898240a^7b^4c^8f^5g^5h^5z - 22118400a^5b^7c^7d^5e^5k^5z + 4718592a^8b^2c^9f^5g^5h^5z + 2949120a^6b^6c^7f^5g^5h^5z - 737280a^5b^8c^6f^5g^5h^5z + 92160a^4b^{10}c^5f^5g^5h^5z - 4608a^3b^{12}c^4f^5g^5h^5z + 8847360a^5b^7c^7d^5f^5j^5z - 58982400a^5b^6c^8d^5f^5g^5z - 3809280a^4b^9c^6d^5f^5j^5z + 2764800a^4b^9c^6d^5e^5k^5z + 2359296a^6b^5c^8d^5f^5j^5z + 681984a^3b^{11}c^5d^5f^5j^5z - 138240a^3b^{11}c^5d^5e^5k^5z - 55296a^2b^{13}c^4d^5f^5j^5z + 11796480a^7b^3c^9e^5f^5h^5z - 6635520a^5b^7c^7d^5g^5h^5z - 5898240a^6b^5c^8e^5f^5h^5z + 1474560a^5b^7c^7e^5f^5h^5z - 276480a^4b^9c^6d^5g^5h^5z - 184320a^4b^9c^6e^5f^5h^5z + 179712a^3b^{11}c^5d^5g^5h^5z - 13824a^2b^{13}c^4d^5g^5h^5z + 9216a^3b^{11}c^5e^5f^5h^5z + 16220160a^4b^8c^7d^5f^5g^5z + 13271040a^5b^6c^8d^5e^5h^5z - 2396160a^3b^{10}c^6d^5f^5g^5z + 552960a^4b^8c^7d^5e^5h^5z - 359424a^3b^{10}c^6d^5e^5h^5z + 175104a^2b^{12}c^5d^5f^5g^5z + 27648a^2b^{12}c^5d^5e^5h^5z - 32440320a^4b^7c^8d^5e^5f^5z + 4792320a^3b^9c^7d^5e^5f^5z - 350208a^2b^{11}c^6d^5e^5f^5z + 165150720a^{10}b^6c^8d^5l^5m^5z + 4608a^6b^{12}c^5k^5l^5m^5z + 23592960a^{11}b^6c^7h^5l^5m^5z + 3145728a^{11}b^6c^7j^5k^5m^5z - 1536a^5b^{13}c^5j^5k^5m^5z + 165150720a^9b^6c^9d^5g^5m^5z + 346816512a^7b^6c^{11}d^2g^5z + 19660800a^{12}b^6c^6l^5m^2z - 34560a^7b^{11}c^5l^5m^2z - 7077888a^{11}b^6c^7k^2l^5z + 11008a^6b^{12}c^5j^5m^2z + 19660800a^{11}b^6c^7g^5m^2z + 7077888a^{10}b^6c^8h^2l^5z + 768a^5b^{13}c^5g^5m^2z - 19660800a^9b^6c^9f^2l^5z - 7077888a^{10}b^6c^8g^5k^2z - 6912a^6b^{15}c^3d^2l^5z + 7077888a^9b^6c^9g^5h^2z - 19660800a^8b^6c^{10}f^2g^5z - 66816a^6b^{14}c^4d^2j^5z + 214272a^6b^{13}c^5d^2g^5z - 428544a^6b^{12}c^6d^2e^5z - 330301440a^9c^{10}d^5e^5m^5z - 110100480a^{10}c^9d^5j^5m^5z - 15728640a^{11}c^8h^5j^5m^5z - 47185920a^{10}c^9e^5h^5m^5z - 198180864a^8c^{11}d^5e^5h^5z + 15728640a^{10}c^9f^5j^5k^5z - 66060288a^9c^{10}d^5h^5j^5z + 47185920a^9c^{10}e^5f^5k^5z + 1022754816a^6b^2c^{11}d^2e^5z - 642318336a^5b^4c^{10}d^2e^5z - 511377408a^7b^3c^9d^2l^5z - 511377408a^6b^3c^{10}d^2g^5z + 321159168a^6b^5c^8d^2l^5z + 321159168a^5b^5c^9d^2g^5z + 225312768a^7b^2c^{10}d^2j^5z - 25362432a^{11}b^3c^5l^5m^2z + 13271040a^{10}b^5c^4l^5m^2z - 3563520a^9b^7c^3l^5m^2z + 506880a^8b^9c^2l^5m^2z + 10354688a^{11}b^2c^6j^5m^2z + 8847360a^{10}b^3c^6k^2l^5z - 4423680a^9b^5c^5k^2l^5z - 204800a^9b^6c^4j^5m^2z + 1105920a^8b^7c^4k^2l^5z + 849920a^8b^8c^3j^5m^2z - 393216a^{10}b^4c^5j^5m^2z - 145920a^7b^{10}c^2j^5m^2z - 138240a^7b^9c^3k^2l^5z + 6912a^6b^{11}c^2k^2l^5z - 111697920a^5b^7c^7d^2l^5z + 223395840a^4b^6c^9d^2e^5z - 25362432a^{10}b^3c^6g^5m^2z - 3538944a^{10}b^2c^7j^5k^2z + 737280a^8b^6c^5j^5k^2z + 50724864a^{10}b^2c^7e^5m^2z - 276480a^7b^8c^4j^5k^2z + 41472a^6b^{10}c^3j^5k^2z - 2304a^5b^{12}c^2j^5k^2z + 13271040a^9b^5c^5g^5m^2z - 8847360a^9b^3c^7h^2l^5z + 4423680a^8b^5c^6h^2l^5z - 3563520a^8b^7c^4g^5m^2z - 1105920a^7b^7c^5h^2l^5z + 506880a^7b^9c^3g^5m^2z + 138240a^6b^9c^4h^2l^5z - 34560a^6b^{11}c^2g^5m^2z - 6912a^5b^{11}c^3h^2l^5z - 26542080a^9b^4c^6e^5m^2z + 25362432a^8b^3c^8f^2l^5z - 13271040a^7b^5c^7f^2l^5z + 8847360a^9b^3c^7g^5k^2z + 7127040a^8b^6c^5e^5m^2z - 4423680a^8b^5c^6g^5k^2z + 3563520a^6b^7c^6f^2l^5z + 3538944a^9b^2c^8h^2j^5z + 1105920a^7b^7c^5g^5k^2z - 1013760a^7b^8c^4e^5m^2z - 737280a^7b^6c^6h^2j^5z - 506880a^5b^9c^5f^2l^5z + 276480a^6b^8c^5h^2j^5z - 138240a^6b^9c^4g^5k^2z + 69120a^6b^{10}c^3e^5m^2z - 41472a^5b^{10}c^4h^2j^5z + 34560a^4b^{11}c^4f^2l^5z + 6912a^5b^{11}c^3g^5k^2z + 2304a^4b^{12}c^3h^2j^5z - 1536a^5b^{12}c^2e^5m^2z - 768a^3b^{13}c^3f^2l^5z - 111697920a^4b^7c^8d^2g^5z + 23362560a^4b^9c^6d^2l^5z - 17694720a^9b^2c^8e^5k^2z - 10354688a^8b^2c^9f^2j^5z - 43646976a^6b^4c^9d^2j^5z + 8847360a^8b^4c^7e^5k^2z - 2965248a^3b^{11}c^5d^2l^5z - 2211840a^7b^6c^6e^5k^2z + 2048000a^6b^6c^7f^2j^5z - 849920a^5b^8c^6f^2j^5z + 393216a^7b^4c^8f^2j^5z + 276480a^6b^8c^5e^5k^2z + 214$

$$\begin{aligned}
& 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 + 1 \\
& 8432*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 + 420249 \\
& 6*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
\end{aligned}$$

$$\begin{aligned}
& *k*m + 3317760*a^7*b^3*c^6*e*h*k*k*1 + 2801664*a^7*b^3*c^6*e*h*j*m - 2709504* \\
& a^6*b^5*c^5*d*g*1*m + 2543616*a^7*b^3*c^6*f*g*k*k*1 + 2506752*a^7*b^3*c^6*f*g \\
& *j*m + 1843200*a^7*b^3*c^6*f*h*j*1 + 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*k*1 + 783360*a^6*b^5*c^5*f*h*j* \\
& 1 + 691200*a^6*b^5*c^5*g*h*j*k + 665280*a^5*b^7*c^4*d*h*k*k*m + 506880*a^6*b^ \\
& 5*c^5*e*h*j*m + 414720*a^6*b^5*c^5*e*h*k*k*1 - 322560*a^6*b^5*c^5*e*f*1*m + 2 \\
& 41920*a^5*b^7*c^4*d*g*1*m + 138240*a^6*b^5*c^5*e*g*k*k*m - 108540*a^4*b^9*c^3 \\
& *d*h*k*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*k*m - 34560*a^5*b^7*c^4*f*g*k*k*1 - 23040*a^5*b^7*c^4*e*h*j*m + \\
& 18432*a^5*b^7*c^4*f*h*j*1 - 13824*a^5*b^7*c^4*e*g*k*k*m - 2304*a^4*b^9*c^3*f \\
& *h*j*1 + 1296*a^3*b^11*c^2*d*h*k*k*m + 31924224*a^7*b^2*c^7*d*f*k*k*m - 2455142 \\
& 4*a^7*b^2*c^7*d*e*1*m + 10616832*a^7*b^2*c^7*e*g*j*1 - 8183808*a^7*b^2*c^7* \\
& d*g*j*m - 5529600*a^7*b^2*c^7*d*h*j*1 + 5419008*a^6*b^4*c^6*d*e*1*m + 53084 \\
& 16*a^6*b^4*c^6*e*g*j*1 - 5087232*a^7*b^2*c^7*e*f*k*k*1 - 5013504*a^7*b^2*c^7* \\
& e*f*j*m + 4868352*a^6*b^4*c^6*d*f*k*k*m - 4644864*a^7*b^2*c^7*d*g*k*k*1 - 39813 \\
& 12*a^6*b^4*c^6*d*g*k*k*1 - 2654208*a^7*b^2*c^7*e*h*j*k - 2367360*a^5*b^6*c^5* \\
& d*f*k*k*m - 2285568*a^6*b^4*c^6*d*g*j*m - 2211840*a^6*b^4*c^6*d*h*j*1 - 16957 \\
& 44*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*k*1 - 1400832*a^6*b^4*c^6*f*g*j*k - 1382400*a^6*b^4*c^6*e*h*j*k + 10368 \\
& 00*a^5*b^6*c^5*d*g*k*k*1 + 741888*a^5*b^6*c^5*d*g*j*m - 483840*a^5*b^6*c^5*d* \\
& e*1*m + 317952*a^5*b^6*c^5*d*h*j*1 + 268920*a^4*b^8*c^4*d*f*k*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*k*1 - 80640*a^4*b^8*c^4*d*g*j*m + 69120*a^5*b^6*c \\
& ^5*e*f*k*k*1 + 11520*a^4*b^8*c^4*f*g*j*k + 6912*a^4*b^8*c^4*d*h*j*1 - 6912*a^ \\
& 3*b^10*c^3*d*h*j*1 + 6120*a^3*b^10*c^3*d*f*k*k*m - 1368*a^2*b^12*c^2*d*f*k*k*m \\
& - 5087232*a^7*b^2*c^7*e*g*h*m - 2211840*a^6*b^4*c^6*f*g*h*1 - 1658880*a^6*b \\
& ^4*c^6*e*g*h*m - 1105920*a^7*b^2*c^7*f*g*h*1 - 69120*a^5*b^6*c^5*f*g*h*1 + \\
& 69120*a^5*b^6*c^5*e*g*h*m + 6912*a^4*b^8*c^4*f*g*h*1 + 7962624*a^6*b^3*c^7* \\
& d*e*k*k*1 - 22164480*a^6*b^3*c^7*d*f*h*m + 5160960*a^6*b^3*c^7*d*f*j*1 + 4571 \\
& 136*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*k*1 - 1483776*a^5*b^5*c^6*d*e*j*m + 6359 \\
& 04*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*1 + 322560*a^5*b^5*c^6*d*f*j*1 - 276480*a^4*b^7*c^5*d*g*j*k + 207360*a^ \\
& 4*b^7*c^5*d*e*k*k*1 + 161280*a^4*b^7*c^5*d*e*j*m + 59904*a^3*b^9*c^4*d*f*j*1 \\
& + 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*1 + 8294400*a^6*b^3*c^7*d*g*h*1 + 5677056*a^6*b^3*c^7*e*f*g*m + 4423 \\
& 680*a^6*b^3*c^7*e*f*h*1 + 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*1 + 78336 \\
& 0*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*1 - 62208*a^4*b^7*c^5*d*g*h*1 + 20736*a^3*b^9*c^4*d*g*h*1 + \\
& 18432*a^4*b^7*c^5*f*g*h*j - 13824*a^4*b^7*c^5*e*f*h*1 + 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*1 - 7741440*a^6*b^2*c^8*d*f*g*1 + 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*1 - 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*1 - 1566720*a^5*b^4*c^7*e*f* \\
& h*j + 1451520*a^4*b^6*c^6*d*f*g*1 - 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*1 + 124416*a^4*b^6*c^6*d*e*h*1 \\
& + 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*1 - 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*1 \\
& + 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*1 + 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*1 - 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*1 - 354816*a^3*b^7*c^6*d*f*g*j + 3225
\end{aligned}$$

$$\begin{aligned}
& 60a^4b^5c^7d^f*g*j + 207360a^3b^7c^6d^e*g*k + 59904a^2b^9c^5d^f \\
& *g*j - 13824a^3b^7c^6d^e*h*j + 13824a^2b^9c^5d^e*h*j - 13824a^2b^9 \\
& c^5d^e*f*1 + 4423680a^5b^3c^8e^f*g*h + 138240a^4b^5c^7e^f*g*h - \\
& 13824a^3b^7c^6e^f*g*h - 10321920a^5b^2c^9d^e*f*j + 709632a^3b^6c^7 \\
& d^e*f*j - 645120a^4b^4c^8d^e*f*j - 119808a^2b^8c^6d^e*f*j - 1658 \\
& 8800a^5b^2c^9d^e*g*h + 1658880a^4b^4c^8d^e*g*h + 124416a^3b^6c^7 \\
& d^e*g*h - 41472a^2b^8c^6d^e*g*h + 7741440a^4b^3c^9d^e*f*g - 290304 \\
& 0a^3b^5c^8d^e*f*g + 387072a^2b^7c^7d^e*f*g + 3456a^7b^8c^k*k^1^2*m \\
& + 12672a^7b^8c^j*1*m^2 + 384a^5b^10c^j^2*k*m - 1635840a^10b^c^5*h* \\
& k*m^2 - 1009152a^9b^c^6*h^2*k*m + 3690a^6b^9c^h*k*m^2 + 1152a^6b^9c^ \\
& *g*1*m^2 - 540a^5b^10c^h*k^2*m + 54a^4b^11c^h^2*k*m + 565248a^9b^c^ \\
& 6*h*j^2*m - 39771648a^7b^c^8d^2*k*m - 2496000a^8b^c^7f^2*k*m - 154368 \\
& 0a^9b^c^6f*k^2*m + 1980a^5b^10c^f*k*m^2 - 384a^5b^10c^g*j*m^2 - 18 \\
& 0a^4b^11c^f*k^2*m + 6a^2b^13c^f^2*k*m - 10298880a^9b^c^6d^k*m^2 + \\
& 2580480a^9b^c^6e*j*m^2 + 5310a^4b^11c^d*k*m^2 - 1674a^a*b^13c^2*d^2*k \\
& *m - 540a^3b^12c^d*k^2*m - 10616832a^7b^c^8e^2*j*1 - 3538944a^8b^c^ \\
& 7e*j^2*1 + 2727936a^8b^c^7d*j^2*m - 2496000a^9b^c^6f*h*m^2 - 1543680 \\
& a^8b^c^7f*h^2*m + 565248a^8b^c^7f*j^2*k - 270a^4b^11c^f*h*m^2 - 59 \\
& 512320a^6b^c^9d^2*f*m + 5087232a^7b^c^8e^2*h*m + 1105920a^8b^c^7e* \\
& j*k^2 - 3456a^a*b^12c^3*d^2*j*1 - 1635840a^7b^c^8f^2*h*k - 1009152a^8b^ \\
& c^7f*h*k^2 + 10260a^a*b^12c^3*d^2*h*m - 684a^3b^12c^d*h*m^2 - 24675840 \\
& a^6b^c^9d^2*h*k - 15552000a^8b^c^7d^f*m^2 + 24551424a^6b^c^9d^e^2* \\
& m - 3939840a^7b^c^8d^h^2*k + 1105920a^7b^c^8e^h^2*j - 25074a^a*b^11c^ \\
& 4d^2*f*m + 10530a^a*b^11c^4d^2*h*k + 10368a^a*b^11c^4d^2*g*1 + 420a^a*b^1 \\
& 2c^3d^f^2*m - 378a^2b^13c^d^f*m^2 - 10616832a^6b^c^9e^2*g*j + 50872 \\
& 32a^6b^c^9e^2*f*k - 3538944a^7b^c^8e^g*j^2 + 1843200a^7b^c^8d^h*j^ \\
& 2 - 7994880a^6b^c^9d^f^2*k - 4990464a^7b^c^8d^f*k^2 + 2580480a^6b^c^ \\
& 9e^f^2*j + 65664a^a*b^10c^5d^2*g*j - 27972a^a*b^10c^5d^2*f*k - 20736a^a \\
& b^10c^5d^2*e*1 + 1260a^a*b^11c^4d^f^2*k + 54a^a*b^13c^2d^f*k^2 + 232243 \\
& 20a^5b^c^10d^2*e*j - 37062144a^5b^c^10d^2*f*h + 384a^a*b^12c^3d^f*j^ \\
& 2 - 131328a^a*b^9c^6d^2*e*j - 5985792a^6b^c^9d^f*h^2 + 206010a^a*b^9c^6 \\
& d^2*f*h - 6300a^a*b^10c^5d^f^2*h + 1350a^a*b^11c^4d^f*h^2 + 16588800a^5 \\
& b^c^10d^e^2*h + 3456a^a*b^10c^5d^f*g^2 + 435456a^a*b^8c^7d^2*e^g + 1382 \\
& 4a^a*b^8c^7d^e^2*f - 1474560a^9c^7e^j*k*m + 460800a^9c^7f*h*k*m + 32 \\
& 25600a^8c^8d^f*k*m - 2457600a^8c^8e^f*j*m - 884736a^8c^8e^h*j*k - \\
& 6193152a^7c^9d^e*j*k + 1935360a^7c^9d^f*h*k - 1474560a^7c^9e^f*h*j \\
& - 10321920a^6c^10d^e*f*j - 1105920a^9b^4c^3k^1^2*m - 552960a^10b^ \\
& 2c^4k^1^2*m - 34560a^8b^6c^2k^1^2*m - 1290240a^10b^2c^4j*1*m^2 - \\
& 860160a^9b^4c^3j*1*m^2 - 80640a^8b^6c^2j*1*m^2 - 737280a^9b^2c^5 \\
& j^2*k*m - 568320a^8b^4c^4j^2*k*m - 136704a^7b^6c^3j^2*k*m - 2304a^ \\
& 6b^8c^2j^2*k*m + 1271808a^9b^3c^4h*1^2*m - 552960a^9b^2c^5j*k^2 \\
& *1 - 552960a^8b^4c^4j*k^2*1 + 414720a^8b^5c^3h*1^2*m - 145152a^7b^ \\
& 6c^3j*k^2*1 - 17280a^7b^7c^2h*1^2*m - 3456a^6b^8c^2j*k^2*1 - 364 \\
& 0320a^9b^3c^4h*k*m^2 - 2626560a^8b^3c^5h^2*k*m + 2211840a^9b^2c^ \\
& 5h*k^2*m + 2056320a^8b^4c^4h*k^2*m + 1935360a^9b^3c^4g*1*m^2 - 114 \\
& 3360a^8b^5c^3h*k*m^2 - 1097280a^7b^5c^4h^2*k*m + 364608a^7b^6c^3 \\
& h*k^2*m + 322560a^8b^5c^3g*1*m^2 - 56160a^6b^7c^3h^2*k*m - 40320a^ \\
& 7b^7c^2g*1*m^2 + 27936a^7b^7c^2h*k*m^2 - 3780a^6b^8c^2h*k^2*m + \\
& 2970a^5b^9c^2h^2*k*m - 1419264a^8b^4c^4f*1^2*m - 1105920a^7b^4c^ \\
& 5g^2*k*m - 921600a^9b^2c^5f*1^2*m - 829440a^8b^4c^4h*k*1^2 + 7495 \\
& 68a^8b^3c^5h*j^2*m - 552960a^8b^2c^6g^2*k*m - 331776a^9b^2c^5h* \\
& k^1^2 + 317952a^7b^5c^4h*j^2*m - 103680a^7b^6c^3h*k*1^2 + 80640a^7 \\
& b^6c^3f*1^2*m + 38400a^6b^7c^3h*j^2*m - 34560a^6b^6c^4g^2*k*m + \\
& 3456a^5b^8c^3g^2*k*m - 1920a^5b^9c^2h*j^2*m - 5142528a^7b^3c^6f^ \\
& ^2*k*m + 5068800a^9b^2c^5f*k*m^2 - 3870720a^9b^2c^5e*1*m^2 - 375552 \\
& 0a^8b^3c^5f*k^2*m + 3000960a^8b^4c^4f*k*m^2 - 1290240a^9b^2c^5g \\
& *j*m^2 - 1085760a^7b^5c^4f*k^2*m - 959040a^6b^5c^5f^2*k*m - 860160* \\
& a^8b^4c^4g*j*m^2 + 829440a^8b^3c^5g*k^2*1 - 645120a^8b^4c^4e*1*m \\
& ^2 - 552960a^8b^2c^6h^2*j*1 - 552960a^7b^4c^5h^2*j*1 + 414720a^7b
\end{aligned}$$

$$\begin{aligned}
& ^5c^4g^k^2j^1 - 145152a^6b^6c^4h^2j^1 + 103200a^5b^7c^4f^2k^m - \\
& 80640a^7b^6c^3g^j^m^2 + 80640a^7b^6c^3e^1m^2 + 41280a^7b^6c^3f^k^m^2 - 37188a^6b^8c^2f^k^m^2 + 13536a^6b^7c^3f^k^2m + 12672a^6b^8c^2g^j^m^2 + 10368a^6b^7c^3g^k^2j^1 + 5490a^5b^9c^2f^k^2m - 3456a^5b^8c^3h^2j^1 - 2304a^6b^8c^2e^1m^2 + 810a^4b^9c^3f^2k^m - 270a^3b^11c^2f^2k^m + 6137856a^8b^3c^5d^1^2m - 4423680a^7b^2c^7e^2k^m - 2654208a^8b^3c^5g^j^1^2 - 2654208a^7b^3c^6g^2j^1 + 1769472a^8b^2c^6g^j^2j^1 + 1769472a^7b^4c^5g^j^2j^1 - 1354752a^7b^5c^4d^1^2m - 1327104a^7b^5c^4g^j^1^2 - 1327104a^6b^5c^5g^2j^1 + 1271808a^8b^3c^5f^k^1^2 - 1040384a^8b^2c^6f^j^2m - 697344a^7b^4c^5f^j^2m - 516096a^8b^2c^6h^j^2k - 451584a^7b^4c^5h^j^2k + 442368a^6b^6c^4g^j^2j^1 + 414720a^7b^5c^4f^k^1^2 - 138240a^6b^6c^4h^j^2k - 138240a^6b^4c^6e^2k^m - 121856a^6b^6c^4f^j^2m + 120960a^6b^7c^3d^1^2m - 17280a^6b^7c^3f^k^1^2 + 13824a^5b^6c^5e^2k^m - 11520a^5b^8c^3h^j^2k + 8960a^5b^8c^3f^j^2m + 10851840a^8b^2c^6d^k^2m - 10464768a^6b^3c^7d^2k^m - 10275840a^8b^3c^5d^k^m^2 + 7121088a^5b^5c^6d^2k^m + 3127680a^7b^4c^5d^k^2m + 1720320a^8b^3c^5e^j^m^2 - 1658880a^8b^2c^6e^k^2j^1 - 1290240a^7b^2c^7f^2j^1 + 1271808a^7b^3c^6g^2h^m - 1222560a^4b^7c^5d^2k^m + 999360a^7b^5c^4d^k^m^2 - 860160a^6b^4c^6f^2j^1 - 829440a^7b^4c^5e^k^2j^1 - 705024a^6b^6c^4d^k^2m - 552960a^8b^2c^6g^j^k^2 - 552960a^7b^4c^5g^j^k^2 + 414720a^6b^5c^5g^2h^m + 319392a^6b^7c^3d^k^m^2 + 161280a^7b^5c^4e^j^m^2 - 145152a^6b^6c^4g^j^k^2 - 85734a^5b^9c^2d^k^m^2 - 80640a^5b^6c^5f^2j^1 - 25344a^6b^7c^3e^j^m^2 + 23490a^3b^9c^4d^2k^m - 20736a^6b^6c^4e^k^2j^1 - 17280a^5b^7c^4g^2h^m + 14148a^5b^8c^3d^k^2m + 13716a^2b^11c^3d^2k^m + 12690a^4b^10c^2d^k^2m + 12672a^4b^8c^4f^2j^1 - 3456a^5b^8c^3g^j^k^2 + 768a^5b^9c^2e^j^m^2 - 384a^3b^10c^3f^2j^1 + 5308416a^8b^2c^6e^j^1^2 - 5308416a^6b^3c^7e^2j^1 - 5142528a^8b^3c^5f^h^m^2 + 5068800a^7b^2c^7f^2h^m - 3755520a^7b^3c^6f^h^2m - 3538944a^7b^3c^6e^j^2j^1 + 3000960a^6b^4c^6f^2h^m + 2654208a^7b^4c^5e^j^1^2 - 2322432a^8b^2c^6d^k^1^2 + 2125824a^7b^3c^6d^j^2m - 1990656a^7b^4c^5d^k^1^2 - 1085760a^6b^5c^5f^h^2m - 959040a^7b^5c^4f^h^m^2 - 884736a^6b^5c^5e^j^2j^1 + 829440a^7b^3c^6g^h^2j^1 + 749568a^7b^3c^6f^j^2k + 518400a^6b^6c^4d^k^1^2 + 414720a^6b^5c^5g^h^2j^1 + 317952a^6b^5c^5f^j^2k + 133632a^6b^5c^5d^j^2m + 103200a^6b^7c^3f^h^m^2 - 96768a^5b^7c^4d^j^2m - 51840a^5b^8c^3d^k^1^2 + 41280a^5b^6c^5f^2h^m + 38400a^5b^7c^4f^j^2k - 37188a^4b^8c^4f^2h^m + 13536a^5b^7c^4f^h^2m + 13440a^4b^9c^3d^j^2m + 10368a^5b^7c^4g^h^2j^1 + 5490a^4b^9c^3f^h^2m + 1980a^3b^10c^3f^2h^m - 1920a^4b^9c^3f^j^2k + 810a^5b^9c^2f^h^m^2 - 180a^3b^11c^2f^h^2m - 30a^2b^12c^2f^2h^m + 3006720a^6b^2c^8d^2h^m - 11612160a^6b^2c^8d^2j^1 + 1658880a^6b^3c^7e^2h^m + 1596672a^4b^6c^6d^2j^1 - 1419264a^6b^4c^6f^g^2m - 1105920a^7b^4c^5f^h^1^2 + 1105920a^7b^3c^6e^j^k^2 - 921600a^7b^2c^7f^g^2m - 829440a^6b^4c^6g^2h^k - 552960a^8b^2c^6f^h^1^2 - 508032a^3b^8c^5d^2j^1 - 331776a^7b^2c^7g^2h^k + 290304a^6b^5c^5e^j^k^2 - 103680a^5b^6c^5g^2h^k + 80640a^5b^6c^5f^g^2m - 69120a^5b^5c^6e^2h^m + 65664a^2b^10c^4d^2j^1 - 34560a^6b^6c^4f^h^1^2 + 6912a^5b^7c^4e^j^k^2 + 3456a^5b^8c^3f^h^1^2 + 11930112a^8b^2c^6d^h^m^2 + 8432640a^7b^2c^7d^h^2m + 4450176a^7b^4c^5d^h^m^2 + 4337280a^6b^4c^6d^h^2m - 3870720a^8b^2c^6e^g^m^2 - 3640320a^6b^3c^7f^2h^k - 2885760a^5b^4c^7d^2h^m - 2844288a^4b^6c^6d^2h^m - 2626560a^7b^3c^6f^h^k^2 + 2211840a^7b^2c^7f^h^2k + 2056320a^6b^4c^6f^h^2k + 1935360a^6b^3c^7f^2g^1 - 1916928a^7b^2c^7d^j^2k - 1687680a^6b^6c^4d^h^m^2 - 1658880a^7b^2c^7e^h^2j^1 - 1143360a^5b^5c^6f^2h^k - 1097280a^6b^5c^5f^h^k^2 + 1019412a^3b^8c^5d^2h^m - 1007424a^5b^6c^5d^h^2m - 912384a^6b^4c^6d^j^2k - 829440a^6b^4c^6e^h^2j^1 - 645120a^7b^4c^5e^g^m^2 - 552960a^7b^2c^7g^h^2j - 552960a^6b^4c^6g^h^2j + 364608a^5b^6c^5f^h^2k + 322560a^5b^5c^6f^2g^1 + 1
\end{aligned}$$

$$\begin{aligned}
& 97460a^5b^8c^3d^2h^2m^2 - 145152a^5b^6c^5g^2h^2j - 143802a^2b^{10}c^4d^2h^2m + 80640a^6b^6c^4e^2g^2m^2 - 56160a^5b^7c^4f^2h^2k^2 + 51948a^4b^8c^4d^2h^2m - 40320a^4b^7c^5f^2g^2j + 34560a^4b^8c^4d^2j^2k + 27936a^4b^7c^5f^2h^2k - 20736a^5b^6c^5e^2h^2l - 13824a^5b^6c^5d^2j^2k + 10800a^3b^{10}c^3d^2h^2m - 5760a^3b^{10}c^3d^2j^2k - 3780a^4b^8c^4f^2h^2k + 3690a^3b^9c^4f^2h^2k - 3456a^4b^8c^4g^2h^2j + 2970a^4b^9c^3f^2h^2k - 2304a^5b^8c^3e^2g^2m^2 + 1152a^3b^9c^4f^2g^2j - 540a^3b^{10}c^3f^2h^2k - 540a^2b^{12}c^2d^2h^2m - 90a^4b^{10}c^2d^2h^2m - 90a^2b^{11}c^3f^2h^2k + 54a^3b^{11}c^2f^2h^2k + 15925248a^6b^2c^8e^2g^2j - 7962624a^7b^3c^6e^2g^2j^2 - 7962624a^6b^3c^7e^2g^2j + 23385600a^6b^2c^8d^2f^2m + 6137856a^6b^3c^7d^2g^2m - 5677056a^6b^2c^8e^2f^2m + 4147200a^7b^3c^6d^2h^2j^2 - 3317760a^6b^2c^8e^2h^2k - 1354752a^5b^5c^6d^2g^2m + 1271808a^6b^3c^7f^2g^2k - 737280a^7b^2c^7f^2h^2j + 17418240a^5b^3c^8d^2g^2j - 568320a^6b^4c^6f^2h^2j^2 - 414720a^6b^5c^5d^2h^2j^2 + 414720a^5b^5c^6f^2g^2k - 414720a^5b^4c^7e^2h^2k + 322560a^5b^4c^7e^2f^2m - 136704a^5b^6c^5f^2h^2j^2 + 120960a^4b^7c^5d^2g^2m - 31104a^5b^7c^4d^2h^2j^2 - 17280a^4b^7c^5f^2g^2k + 10368a^4b^9c^3d^2h^2j^2 - 2304a^4b^8c^4f^2h^2j^2 + 384a^3b^{10}c^3f^2h^2j^2 + 50042880a^5b^2c^9d^2f^2k - 13271040a^5b^3c^8d^2h^2k - 13149696a^7b^3c^6d^2f^2m + 10906560a^4b^5c^7d^2f^2m - 8709120a^4b^5c^7d^2g^2j - 7418880a^5b^3c^8d^2f^2m + 7133184a^7b^2c^7d^2h^2k^2 - 6428160a^6b^3c^7d^2h^2k + 5593536a^4b^5c^7d^2h^2k - 3870720a^6b^2c^8e^2f^2j + 3369600a^6b^4c^6d^2h^2k + 3148992a^6b^5c^5d^2f^2m^2 - 2985696a^3b^7c^6d^2f^2m + 1959552a^3b^7c^6d^2g^2j - 1658880a^7b^2c^7e^2g^2k^2 - 1505280a^4b^6c^6d^2f^2m - 1290240a^6b^2c^8f^2g^2j - 34836480a^5b^2c^9d^2e^2j + 1105920a^6b^3c^7e^2h^2j - 860160a^5b^4c^7f^2g^2j - 829440a^6b^4c^6e^2g^2k^2 - 692064a^3b^7c^6d^2h^2k - 689472a^5b^5c^6d^2h^2k - 645120a^5b^4c^7e^2f^2j - 388800a^5b^6c^5d^2h^2k + 378954a^2b^9c^5d^2f^2m + 362880a^5b^4c^7d^2f^2m + 296964a^3b^8c^5d^2f^2m + 290304a^5b^5c^6e^2h^2j + 277344a^4b^7c^5d^2h^2k - 217728a^2b^9c^5d^2g^2j - 80640a^4b^6c^6f^2g^2j + 80640a^4b^6c^6e^2f^2j - 77070a^4b^9c^3d^2f^2m - 30240a^5b^7c^4d^2f^2m - 28350a^3b^9c^4d^2h^2k - 26406a^2b^9c^5d^2h^2k - 21060a^4b^8c^4d^2h^2k - 20736a^5b^6c^5e^2g^2k - 19278a^2b^{10}c^4d^2f^2m + 12672a^3b^8c^5f^2g^2j + 10044a^3b^{10}c^3d^2h^2k + 8820a^3b^{11}c^2d^2f^2m + 6912a^4b^7c^5e^2h^2j - 2304a^3b^8c^5e^2f^2j - 1620a^2b^{11}c^3d^2h^2k - 384a^2b^{10}c^4f^2g^2j + 162a^2b^{12}c^2d^2h^2k - 5419008a^5b^3c^8d^2e^2m + 5308416a^6b^2c^8e^2g^2j - 5308416a^5b^3c^8e^2g^2j - 3870720a^7b^2c^7d^2f^2j^2 - 3538944a^6b^3c^7e^2g^2j + 2654208a^5b^4c^7e^2g^2j - 2322432a^6b^2c^8d^2g^2k - 1990656a^5b^4c^7d^2g^2k - 1935360a^6b^4c^6d^2f^2j^2 + 1658880a^6b^3c^7d^2h^2j + 1658880a^5b^3c^8e^2f^2k - 884736a^5b^5c^6e^2g^2j + 725760a^5b^6c^5d^2f^2j + 17418240a^4b^4c^8d^2e^2j + 518400a^4b^6c^6d^2g^2k + 483840a^4b^5c^7d^2e^2m + 262656a^5b^5c^6d^2h^2j - 96768a^4b^8c^4d^2f^2j - 69120a^4b^5c^7e^2f^2k - 55296a^4b^7c^5d^2h^2j - 51840a^3b^8c^5d^2g^2k + 3456a^3b^{10}c^3d^2f^2j + 1152a^3b^9c^4d^2h^2j + 1152a^2b^{11}c^3d^2h^2j - 15431040a^4b^4c^8d^2f^2k - 13248000a^5b^3c^8d^2f^2k - 11612160a^5b^2c^9d^2g^2j - 10063872a^6b^3c^7d^2f^2k - 3919104a^3b^6c^7d^2e^2j + 2554560a^4b^5c^7d^2f^2k + 1720320a^5b^3c^8e^2f^2j + 1596672a^3b^6c^7d^2g^2j + 1518912a^3b^6c^7d^2f^2k - 1105920a^5b^4c^7f^2g^2h + 838080a^5b^5c^6d^2f^2k - 552960a^6b^2c^8f^2g^2h - 508032a^2b^8c^6d^2g^2j + 435456a^2b^8c^6d^2e^2j + 161280a^4b^5c^7e^2f^2j + 116640a^4b^7c^5d^2f^2k + 106812a^2b^8c^6d^2f^2k - 98208a^3b^7c^6d^2f^2k - 34560a^4b^6c^6f^2g^2h - 27270a^3b^9c^4d^2f^2k^2 - 26334a^2b^9c^5d^2f^2k - 25344a^3b^7c^6e^2f^2j + 3456a^3b^8c^5f^2g^2h + 768a^2b^9c^5e^2f^2j - 702a^2b^{11}c^3d^2f^2k - 7962624a^5b^2c^9d^2e^2k - 2580480a^6b^2c^8d^2f^2j + 2073600a^4b^4c^8d^2e^2k - 1658880a^6b^2c^8e^2g^2h - 967680a^5b^4c^7d^2f^2j - 829440a^5b^4c^7e^2g^2h - 207360a^3b^6c^7d^2e^2k + 64512a^4b^6c^6d^2f^2j +
\end{aligned}$$

$39168a^3b^8c^5d^2f^2j^2 - 20736a^4b^6c^6e^2g^2h^2 - 9216a^2b^{10}c^4d^2f^2j^2 - 4423680a^5b^2c^9e^2f^2h + 4147200a^5b^3c^8d^2g^2h - 3193344a^3b^5c^8d^2e^2j + 1016064a^2b^7c^7d^2e^2j - 414720a^4b^5c^7d^2g^2h - 138240a^4b^4c^8e^2f^2h - 31104a^3b^7c^6d^2g^2h + 13824a^3b^6c^7e^2f^2h + 10368a^2b^9c^5d^2g^2h + 15630336a^5b^2c^9d^2f^2h - 14459904a^4b^3c^9d^2f^2h + 9630144a^3b^5c^8d^2f^2h - 8764416a^5b^3c^8d^2f^2h - 3870720a^5b^2c^9e^2f^2g + 2867328a^4b^4c^8d^2f^2h - 2095200a^2b^7c^7d^2f^2h - 1414080a^3b^6c^7d^2f^2h - 34836480a^4b^2c^{10}d^2e^2g - 645120a^4b^4c^8e^2f^2g + 306720a^3b^7c^6d^2f^2h^2 + 197820a^2b^8c^6d^2f^2h + 146880a^4b^5c^7d^2f^2h^2 + 80640a^3b^6c^7e^2f^2g - 55350a^2b^9c^5d^2f^2h^2 - 2304a^2b^8c^6e^2f^2g - 3870720a^5b^2c^9d^2f^2g^2 - 1935360a^4b^4c^8d^2f^2g^2 - 1658880a^4b^3c^9d^2e^2h + 725760a^3b^6c^7d^2f^2g^2 + 17418240a^3b^4c^9d^2e^2g - 124416a^3b^5c^8d^2e^2h - 96768a^2b^8c^6d^2f^2g^2 + 41472a^2b^7c^7d^2e^2h - 3919104a^2b^6c^8d^2e^2g - 7741440a^4b^2c^{10}d^2e^2f + 2903040a^3b^4c^9d^2e^2f - 387072a^2b^6c^8d^2e^2f - 20160a^8b^7c^1^2m^2 - 1648128a^{10}b^3c^3k^3m^3 - 898560a^9b^3c^4k^3m - 354240a^9b^5c^2k^3m^3 - 354240a^8b^5c^3k^3m - 21600a^7b^7c^2k^3m - 13950a^7b^8c^2k^2m^2 + 430080a^{10}b^3c^5j^2m^2 - 1984a^6b^9c^2j^2m^2 - 884736a^9b^3c^4j^3m^3 - 589824a^8b^3c^5j^3m^3 - 442368a^8b^5c^3j^3m^3 - 294912a^7b^5c^4j^3m^3 - 49152a^6b^7c^3j^3m^3 + 1359360a^{10}b^2c^4h^3m^3 + 1173120a^9b^4c^3h^3m^3 + 743040a^7b^4c^5h^3m + 622080a^8b^2c^6h^3m + 184320a^9b^3c^6j^2k^2 + 107136a^6b^6c^4h^3m - 32640a^8b^6c^2h^3m^3 + 540a^5b^8c^3h^3m - 270a^4b^{10}c^2h^3m - 180a^5b^10c^2h^2m^2 - 2293760a^9b^3c^4f^3m^3 - 2293760a^6b^3c^7f^3m + 1327104a^8b^4c^4g^3m^3 + 1327104a^6b^4c^6g^3m^3 - 622080a^8b^3c^5h^3k^3 - 622080a^7b^3c^6h^3k - 326592a^7b^5c^4h^3k^3 - 326592a^6b^5c^5h^3k - 199360a^8b^5c^3f^3m^3 - 199360a^5b^5c^6f^3m + 61920a^7b^7c^2f^3m^3 + 61920a^4b^7c^5f^3m - 38880a^6b^7c^3h^3k^3 - 38880a^5b^7c^4h^3k - 3682a^3b^9c^4f^3m - 810a^5b^9c^2h^3k^3 - 810a^4b^9c^3h^3k - 70a^3b^{12}c^3f^2m^2 + 70a^2b^{11}c^3f^3m + 3870720a^8b^3c^7e^2m^2 + 184320a^8b^3c^7h^2j^2 - 14152320a^4b^4c^8d^3m + 10644480a^5b^2c^9d^3m + 5483520a^9b^2c^5d^3m^3 + 4269888a^3b^6c^7d^3m - 2654208a^8b^3c^5e^3m^3 + 1359360a^6b^2c^8f^3k + 1330560a^8b^4c^4d^3m^3 + 1173120a^5b^4c^7f^3k - 884736a^6b^3c^7g^3j - 826560a^7b^6c^3d^3m^3 + 743040a^7b^4c^5f^3k^3 + 622080a^8b^2c^6f^3k^3 - 607068a^2b^8c^6d^3m - 589824a^7b^3c^6g^3j^3 - 442368a^5b^5c^6g^3j - 294912a^6b^5c^5g^3j^3 + 145188a^6b^8c^2d^3m^3 + 107136a^6b^6c^4f^3k^3 - 49152a^5b^7c^4g^3j^3 - 32640a^4b^6c^6f^3k - 5796a^3b^8c^5f^3k + 540a^5b^8c^3f^3k^3 - 270a^4b^{10}c^2f^3k^3 + 210a^2b^{10}c^4f^3k + 19077120a^4b^3c^9d^3k + 1658880a^7b^3c^8e^2k^2 + 430080a^7b^3c^8f^2j^2 + 3538944a^5b^2c^9e^3j - 2488320a^7b^3c^6d^3k^3 - 2379456a^3b^5c^8d^3k + 1179648a^7b^2c^7e^3j^3 + 589824a^6b^4c^6e^3j^3 + 98304a^5b^6c^5e^3j^3 - 95904a^2b^7c^7d^3k - 57024a^6b^5c^5d^3k^3 + 49248a^5b^7c^4d^3k^3 - 4050a^4b^9c^3d^3k^3 - 810a^3b^{11}c^2d^3k^3 - 486a^3b^{12}c^3d^2k^2 + 3870720a^6b^3c^9d^2j^2 - 1648128a^5b^3c^8f^3h - 898560a^6b^3c^7f^3h^3 - 354240a^5b^5c^6f^3h^3 - 354240a^4b^5c^7f^3h + 43680a^3b^7c^6f^3h - 21600a^4b^7c^5f^3h^3 - 9792a^3b^{11}c^4d^2j^2 + 1350a^3b^9c^4f^3h^3 - 1050a^2b^9c^5f^3h + 1658880a^6b^3c^9e^2h^2 + 16547328a^4b^2c^{10}d^3h - 12306816a^3b^4c^9d^3h + 37310976a^3b^3c^{10}d^3f + 3037824a^2b^6c^8d^3h - 2654208a^5b^3c^8e^3g^3 + 1949184a^6b^2c^8d^3h^3 + 1296000a^5b^4c^7d^3h^3 - 155520a^4b^6c^6d^3h^3 - 40500a^3b^{10}c^5d^2h^2 - 8100a^3b^8c^5d^3h^3 + 4050a^2b^{10}c^4d^3h^3 + 3870720a^5b^3c^{10}e^2f^2 + 34836480a^4b^3c^{11}d^2e^2 - 108864a^3b^9c^6d^2g^2 - 8068032a^2b^5c^9d^3f - 5623296a^4b^3c^9d^2f^3 + 1737792a^3b^5c^8d^2f^3 - 260190a^3b^8c^7d^2f^2 - 211680a^2b^7c^7d^2f^3 - 435456a^3b^7c^8d^2e^2 - 245760a^{10}c^6j^2k^3m - 384a^6b^{10}j^3m^2 + 138240a^{10}c^6h^3k^2m - 90a^5b^{11}h^3k^3m^2 + 384000a^{10}c^6f^3k^3m^2 - 2211840a^8c^8e^2k^3m - 409600a^$

$$\begin{aligned}
& 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 + 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 + 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 + 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 - 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 + 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
\end{aligned}$$

$$\begin{aligned}
& 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 - 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*1^2*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*1^4 + 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 + 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)*(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 + 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*1*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*1*z^2 - 754974720*a^9*b^5*c^8*e*1*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*1*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*1*z^2 - 456130560*a^9*b^4*c^9*f*h*z^2 + 301989888*a^11*b^3*c^8*j*1*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*1*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*1*z^2 + 188743680*a^10*b^2*c^10*f*h*z^2 - 94371840*a^8*b^8*c^6*g*1*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*1*z^2 + 188743680*a^7
\end{aligned}$$

$$\begin{aligned}
& *b^7*c^8*e*g*z^2 - 3735520*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 - 3735520*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
\end{aligned}$$

$c^9 d^j k^k z - 23592960 a^9 b^c^9 f^g k^k z + 169869312 a^7 b^c^{11} d^e f^f z + 99090432 a^8 b^c^{10} d^g h^h z - 3145728 a^9 b^c^9 f^h j^j z + 56623104 a^8 b^c^{10} d^f j^j z + 1536 a^b^{15} c^3 d^f j^j z - 9437184 a^8 b^c^{10} e^f h^h z - 4608 a^b^{14} c^4 d^f g^g z + 9216 a^b^{13} c^5 d^e f^f z + 412876800 a^8 b^2 c^9 d^e m^m z - 206438400 a^9 b^3 c^7 d^l m^m z + 5898240 a^{10} b^4 c^5 k^l m^m z - 206438400 a^8 b^3 c^8 d^g m^m z - 4718592 a^{11} b^2 c^6 k^l m^m z - 2949120 a^9 b^6 c^4 k^l m^m z + 737280 a^8 b^8 c^3 k^l m^m z - 92160 a^7 b^{10} c^2 k^l m^m z + 103219200 a^8 b^5 c^6 d^l m^m z - 29491200 a^{10} b^3 c^6 h^l m^m z - 206438400 a^7 b^4 c^8 d^e m^m z - 2359296 a^{10} b^3 c^6 j^k m^m z + 491520 a^8 b^7 c^4 j^k m^m z - 184320 a^7 b^9 c^3 j^k m^m z + 27648 a^6 b^{11} c^2 j^k m^m z + 14745600 a^9 b^5 c^5 h^l m^m z - 3686400 a^8 b^7 c^4 h^l m^m z + 460800 a^7 b^9 c^3 h^l m^m z - 23040 a^6 b^{11} c^2 h^l m^m z + 88473600 a^8 b^4 c^7 d^k l^l z + 82575360 a^9 b^2 c^8 d^j m^m z + 11796480 a^{10} b^2 c^7 h^j m^m z + 5898240 a^9 b^4 c^6 g^k m^m z - 4718592 a^{10} b^2 c^7 g^k m^m z - 70778880 a^9 b^2 c^8 d^k l^l z - 2949120 a^8 b^6 c^5 g^k m^m z - 2457600 a^8 b^6 c^5 h^j m^m z + 921600 a^7 b^8 c^4 h^j m^m z + 737280 a^7 b^8 c^4 g^k m^m z - 138240 a^6 b^{10} c^3 h^j m^m z - 92160 a^6 b^{10} c^3 g^k m^m z + 7680 a^5 b^{12} c^2 h^j m^m z + 4608 a^5 b^{12} c^2 g^k m^m z + 2949120 a^9 b^3 c^7 f^k l^l z - 176947200 a^7 b^3 c^9 d^e k^k z - 109707264 a^8 b^3 c^8 d^h l^l z - 25804800 a^7 b^7 c^5 d^l m^m z + 103219200 a^7 b^5 c^7 d^g m^m z + 219414528 a^7 b^2 c^{10} d^e h^h z - 14745600 a^8 b^5 c^6 f^k l^l z - 29491200 a^9 b^3 c^7 g^h m^m z - 11796480 a^9 b^3 c^7 e^k m^m z - 44236800 a^7 b^6 c^6 d^k l^l z + 58982400 a^9 b^2 c^8 e^h m^m z + 5898240 a^8 b^5 c^6 e^k m^m z + 3686400 a^7 b^7 c^5 f^k l^l z + 3225600 a^6 b^9 c^4 d^l m^m z - 1474560 a^7 b^7 c^5 e^k m^m z - 460800 a^6 b^9 c^4 f^k l^l z + 184320 a^6 b^9 c^4 e^k m^m z - 161280 a^5 b^{11} c^3 d^l m^m z + 23040 a^5 b^{11} c^3 f^k l^l z - 9216 a^5 b^{11} c^3 e^k m^m z + 14745600 a^8 b^5 c^6 g^h m^m z + 110886912 a^7 b^4 c^8 d^f l^l z - 3686400 a^7 b^7 c^5 g^h m^m z - 221773824 a^6 b^3 c^{10} d^e f^f z + 460800 a^6 b^9 c^4 g^h m^m z - 17203200 a^7 b^6 c^6 d^j m^m z - 23040 a^5 b^{11} c^3 g^h m^m z - 29491200 a^8 b^4 c^7 e^h m^m z - 11796480 a^9 b^2 c^8 f^j k^k z + 11059200 a^6 b^8 c^5 d^k l^l z + 6451200 a^6 b^8 c^5 d^j m^m z + 88473600 a^7 b^4 c^8 d^g k^k z + 2457600 a^7 b^6 c^6 f^j k^k z - 35389440 a^8 b^3 c^8 d^j k^k z - 1382400 a^5 b^{10} c^4 d^k l^l z - 84934656 a^8 b^2 c^9 d^f l^l z - 967680 a^5 b^{10} c^4 d^j m^m z - 921600 a^6 b^8 c^5 f^j k^k z + 138240 a^5 b^{10} c^4 f^j k^k z + 69120 a^4 b^{12} c^3 d^k l^l z + 53760 a^4 b^{12} c^3 d^j m^m z - 7680 a^4 b^{12} c^3 f^j k^k z + 44236800 a^7 b^5 c^7 d^h l^l z + 7372800 a^7 b^6 c^6 e^h m^m z - 5898240 a^8 b^4 c^7 f^h l^l z + 4718592 a^9 b^2 c^8 f^h l^l z - 70778880 a^8 b^2 c^9 d^g k^k z + 2949120 a^7 b^6 c^6 f^h l^l z - 921600 a^6 b^8 c^5 e^h m^m z - 737280 a^6 b^8 c^5 f^h l^l z + 92160 a^5 b^{10} c^4 f^h l^l z + 46080 a^5 b^{10} c^4 e^h m^m z - 4608 a^4 b^{12} c^3 f^h l^l z + 29491200 a^8 b^3 c^8 f^g k^k z - 109707264 a^7 b^3 c^9 d^g h^h z - 25804800 a^6 b^7 c^6 d^g m^m z - 58982400 a^8 b^2 c^9 e^f k^k z - 58982400 a^6 b^6 c^7 d^f l^l z + 7372800 a^6 b^7 c^6 d^j k^k z + 88473600 a^6 b^5 c^8 d^e k^k z - 2764800 a^5 b^9 c^5 d^j k^k z + 51609600 a^6 b^6 c^7 d^e m^m z + 414720 a^4 b^{11} c^4 d^j k^k z - 23040 a^3 b^{13} c^3 d^j k^k z - 14745600 a^7 b^5 c^7 f^g k^k z - 44236800 a^6 b^6 c^7 d^g k^k z - 6635520 a^6 b^7 c^6 d^h l^l z + 40108032 a^8 b^2 c^9 d^h j^j z + 3686400 a^6 b^7 c^6 f^g k^k z + 3225600 a^5 b^9 c^5 d^g m^m z + 2359296 a^8 b^3 c^8 f^h j^j z - 491520 a^6 b^7 c^6 f^h j^j z - 460800 a^5 b^9 c^5 f^g k^k z - 276480 a^5 b^9 c^5 d^h l^l z + 184320 a^5 b^9 c^5 f^h j^j z + 179712 a^4 b^{11} c^4 d^h l^l z - 161280 a^4 b^{11} c^4 d^g m^m z - 27648 a^4 b^{11} c^4 f^h j^j z + 23040 a^4 b^{11} c^4 f^g k^k z - 13824 a^3 b^{13} c^3 d^h l^l z + 1536 a^3 b^{13} c^3 f^h j^j z + 29491200 a^7 b^4 c^8 e^f k^k z + 110886912 a^6 b^4 c^9 d^f g^g z + 16220160 a^5 b^8 c^6 d^f l^l z - 45613056 a^7 b^3 c^9 d^f j^j z + 11059200 a^5 b^8 c^6 d^g k^k z - 10321920 a^6 b^6 c^7 d^h j^j z - 7372800 a^6 b^6 c^7 e^f k^k z + 7077888 a^7 b^4 c^8 d^h j^j z - 6451200 a^5 b^8 c^6 d^e m^m z - 88473600 a^6 b^4 c^9 d^e h^h z + 2396160 a^5 b^8 c^6 d^h j^j z - 2396160 a^4 b^{10} c^5 d^f l^l z - 1382400 a^4 b^{10} c^5 d^g k^k z - 84934656 a^7 b^2 c^{10} d^f g^g z + 921600 a^5 b^8 c^6 e^f k^k z + 117964800 a^5 b^5 c^9 d^e f^f z + 322560 a^4 b^{10} c^5 d^e m^m z + 175104 a^3 b^{12} c^4 d^f l^l z + 69120 a^3 b^{12} c^4 d^g k^k z - 50688 a^3 b^{12} c^4 d^h j^j z - 46080 a^4 b^{10} c^5 e^f k^k z - 27648 a^4 b^{10} c^5 d^h j^j z + 4608 a^2 b^{14} c^3 d^h j^j z - 4608 a^2 b^{14} c^3$

$$\begin{aligned}
& ^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 - 6 \\
& 912*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 + 6912 \\
& 0*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^
\end{aligned}$$

$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 + 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 - 1658880 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 - 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 + 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$

$- 119808a^2b^8c^6d^2ef^2j - 16588800a^5b^2c^9d^2ef^2gh + 1658880a^4b^4c^8d^2ef^2gh + 124416a^3b^6c^7d^2ef^2gh - 41472a^2b^8c^6d^2ef^2gh + 7741440a^4b^3c^9d^2ef^2g - 2903040a^3b^5c^8d^2ef^2g + 387072a^2b^7c^7d^2ef^2g + 3456a^7b^8c^2k^2l^2m + 12672a^7b^8c^2j^2l^2m + 384a^5b^10c^2j^2k^2m - 1635840a^10b^2c^5h^2k^2m - 1009152a^9b^2c^6h^2k^2m + 36900a^6b^9c^2h^2k^2m + 1152a^6b^9c^2g^2l^2m - 540a^5b^10c^2h^2k^2m + 54a^4b^11c^2h^2k^2m + 565248a^9b^2c^6h^2j^2m - 39771648a^7b^2c^8d^2k^2m - 2496000a^8b^2c^7f^2k^2m - 1543680a^9b^2c^6f^2k^2m + 1980a^5b^10c^2f^2k^2m - 384a^5b^10c^2g^2j^2m - 180a^4b^11c^2f^2k^2m + 6a^2b^13c^2f^2k^2m - 10298880a^9b^2c^6d^2k^2m + 2580480a^9b^2c^6e^2j^2m + 5310a^4b^11c^2d^2k^2m - 1674a^2b^13c^2d^2k^2m - 540a^3b^12c^2d^2k^2m - 10616832a^7b^2c^8e^2j^2l - 3538944a^8b^2c^7e^2j^2l + 2727936a^8b^2c^7d^2j^2m - 2496000a^9b^2c^6f^2h^2m - 1543680a^8b^2c^7f^2h^2m + 565248a^8b^2c^7f^2j^2k - 270a^4b^11c^2f^2h^2m - 59512320a^6b^2c^9d^2f^2m + 5087232a^7b^2c^8e^2h^2m + 1105920a^8b^2c^7e^2j^2k - 3456a^2b^12c^3d^2j^2l - 1635840a^7b^2c^8f^2h^2k - 1009152a^8b^2c^7f^2h^2k + 10260a^2b^12c^3d^2h^2m - 684a^3b^12c^2d^2h^2m - 24675840a^6b^2c^9d^2h^2k - 15552000a^8b^2c^7d^2f^2m + 24551424a^6b^2c^9d^2e^2m - 3939840a^7b^2c^8d^2h^2k + 1105920a^7b^2c^8e^2h^2j - 25074a^2b^11c^4d^2f^2m + 10530a^2b^11c^4d^2h^2k + 10368a^2b^11c^4d^2g^2l + 420a^2b^12c^3d^2f^2m - 378a^2b^13c^2d^2f^2m - 10616832a^6b^2c^9e^2g^2j + 5087232a^6b^2c^9e^2f^2k - 3538944a^7b^2c^8e^2g^2j + 1843200a^7b^2c^8d^2h^2j - 7994880a^6b^2c^9d^2f^2k - 4990464a^7b^2c^8d^2f^2k + 2580480a^6b^2c^9e^2f^2j + 65664a^2b^10c^5d^2g^2j - 27972a^2b^10c^5d^2f^2k - 20736a^2b^10c^5d^2e^2l + 1260a^2b^11c^4d^2f^2k + 54a^2b^13c^2d^2f^2k + 23224320a^5b^2c^10d^2e^2j - 37062144a^5b^2c^10d^2f^2h + 384a^2b^12c^3d^2f^2j - 131328a^2b^9c^6d^2e^2j - 5985792a^6b^2c^9d^2f^2h + 206010a^2b^9c^6d^2f^2h - 6300a^2b^10c^5d^2f^2h + 1350a^2b^11c^4d^2f^2h + 16588800a^5b^2c^10d^2e^2h + 3456a^2b^10c^5d^2f^2g^2 + 435456a^2b^8c^7d^2e^2g + 13824a^2b^8c^7d^2e^2f - 1474560a^9c^7e^2j^2k + 460800a^9c^7f^2h^2k + 3225600a^8c^8d^2f^2k - 2457600a^8c^8e^2f^2j - 884736a^8c^8e^2h^2j - 6193152a^7c^9d^2e^2j^2k + 1935360a^7c^9d^2f^2h^2k - 1474560a^7c^9e^2f^2h^2j - 10321920a^6c^10d^2e^2f^2j - 1105920a^9b^4c^3k^2l^2m - 552960a^10b^2c^4k^2l^2m - 34560a^8b^6c^2k^2l^2m - 1290240a^10b^2c^4j^2l^2m - 860160a^9b^4c^3j^2l^2m - 80640a^8b^6c^2j^2l^2m - 737280a^9b^2c^5j^2k^2m - 568320a^8b^4c^4j^2k^2m - 136704a^7b^6c^3j^2k^2m - 2304a^6b^8c^2j^2k^2m + 1271808a^9b^3c^4h^2l^2m - 552960a^9b^2c^5j^2k^2l - 552960a^8b^4c^4j^2k^2l + 414720a^8b^5c^3h^2l^2m - 145152a^7b^6c^3j^2k^2l - 17280a^7b^7c^2h^2l^2m - 3456a^6b^8c^2j^2k^2l - 3640320a^9b^3c^4h^2k^2m - 2626560a^8b^3c^5h^2k^2m + 2211840a^9b^2c^5h^2k^2m + 2056320a^8b^4c^4h^2k^2m + 1935360a^9b^3c^4g^2l^2m - 1143360a^8b^5c^3h^2k^2m - 1097280a^7b^5c^4h^2k^2m + 364608a^7b^6c^3h^2k^2m + 322560a^8b^5c^3g^2l^2m - 56160a^6b^7c^3h^2k^2m - 40320a^7b^7c^2g^2l^2m + 27936a^7b^7c^2h^2k^2m - 3780a^6b^8c^2h^2k^2m + 2970a^5b^9c^2h^2k^2m - 1419264a^8b^4c^4f^2l^2m - 1105920a^7b^4c^5g^2k^2m - 921600a^9b^2c^5f^2l^2m - 829440a^8b^4c^4h^2k^2l + 749568a^8b^3c^5h^2j^2m - 552960a^8b^2c^6g^2k^2m - 331776a^9b^2c^5h^2k^2l + 317952a^7b^5c^4h^2j^2m - 103680a^7b^6c^3h^2k^2l + 80640a^7b^6c^3f^2l^2m + 38400a^6b^7c^3h^2j^2m - 34560a^6b^6c^4g^2k^2m + 3456a^5b^8c^3g^2k^2m - 1920a^5b^9c^2h^2j^2m - 5142528a^7b^3c^6f^2k^2m + 5068800a^9b^2c^5f^2k^2m - 3870720a^9b^2c^5e^2l^2m - 3755520a^8b^3c^5f^2k^2m + 3000960a^8b^4c^4f^2k^2m - 1290240a^9b^2c^5g^2j^2m - 1085760a^7b^5c^4f^2k^2m - 959040a^6b^5c^5f^2k^2m - 860160a^8b^4c^4g^2j^2m + 829440a^8b^3c^5g^2k^2l - 645120a^8b^4c^4e^2l^2m - 552960a^8b^2c^6h^2j^2l - 552960a^7b^4c^5h^2j^2l + 414720a^7b^5c^4g^2k^2l - 145152a^6b^6c^4h^2j^2l + 103200a^5b^7c^4f^2k^2m - 80640a^7b^6c^3g^2j^2m + 80640a^7b^6c^3e^2l^2m + 41280a^7b^6c^3f^2k^2m - 37188a^6b^8c^2f^2k^2m + 13536a^6b^7c^3f^2k^2m + 12672a^6b^8c^2g^2j^2m + 10368a^6b^7c^3g^2k^2l + 5490a^5b^9c^2f^2k^2m - 3456a^5b^8c^3h^2j^2l - 2304a^6b^8c^$

$$\begin{aligned}
& ^2e*1*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*1^2*m - 4423680*a^7*b^2*c^7*e^2*k*m - 2654208*a^8*b^3*c^5*g*j* \\
& 1^2 - 2654208*a^7*b^3*c^6*g^2*j*1 + 1769472*a^8*b^2*c^6*g*j^2*1 + 1769472*a \\
& ^7*b^4*c^5*g*j^2*1 - 1354752*a^7*b^5*c^4*d*1^2*m - 1327104*a^7*b^5*c^4*g*j* \\
& 1^2 - 1327104*a^6*b^5*c^5*g^2*j*1 + 1271808*a^8*b^3*c^5*f*k*1^2 - 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*1 + 414720*a^7*b^ \\
& 5*c^4*f*k*1^2 - 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*1^2*m - 17280*a^6*b^7*c^3* \\
& f*k*1^2 + 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*1 - 1290240*a^7*b^2*c^7*f^2*j*1 + 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* \\
& 1 - 829440*a^7*b^4*c^5*e*k^2*1 - 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*1 - 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*1 - \\
& 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*1 - 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*1 + 53 \\
& 08416*a^8*b^2*c^6*e*j*1^2 - 5308416*a^6*b^3*c^7*e^2*j*1 - 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*1 + 3000960*a^6*b^4*c^6*f^2*h*m + 2654208*a^7*b^4*c \\
& ^5*e*j*1^2 - 2322432*a^8*b^2*c^6*d*k*1^2 + 2125824*a^7*b^3*c^6*d*j^2*m - 19 \\
& 90656*a^7*b^4*c^5*d*k*1^2 - 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*1 + 829440*a^7*b^3*c^6*g*h^2*1 + 74956 \\
& 8*a^7*b^3*c^6*f*j^2*k + 518400*a^6*b^6*c^4*d*k*1^2 + 414720*a^6*b^5*c^5*g*h \\
& ^2*1 + 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*1^2 + \\
& 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*1 + 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*1 + 1658880*a^6*b^3*c^7*e^2*h*m + 1596672*a^4*b^6*c^6*d^2*j*1 - \\
& 1419264*a^6*b^4*c^6*f*g^2*m - 1105920*a^7*b^4*c^5*f*h*1^2 + 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*1^2 - 508032*a^3*b^8*c^5*d^2*j*1 - 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* \\
& 1 - 34560*a^6*b^6*c^4*f*h*1^2 + 6912*a^5*b^7*c^4*e*j*k^2 + 3456*a^5*b^8*c^3 \\
& *f*h*1^2 + 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*1 - 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*1 - 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*1 - 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*1 + 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*1 + 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*1 - 13824*a^5*b^6*c^5*d*j^2*k + 10800*a^3*b^10*c^3*d*h^2*m -
\end{aligned}$$

$$\begin{aligned}
& 5760a^3b^{10}c^3d^2j^2k - 3780a^4b^8c^4f^2h^2k + 3690a^3b^9c^4f^2h^2k - 3456a^4b^8c^4g^2h^2j + 2970a^4b^9c^3f^2h^2k - 2304a^5b^8c^3e^2g^2m + 1152a^3b^9c^4f^2g^2m - 540a^3b^{10}c^3f^2h^2k - 540a^2b^{12}c^2d^2h^2m - 90a^4b^{10}c^2d^2h^2m - 90a^2b^{11}c^3f^2h^2k + 54a^3b^{11}c^2f^2h^2k + 15925248a^6b^2c^8e^2g^2m - 7962624a^7b^3c^6e^2g^2m - 7962624a^6b^3c^7e^2g^2m + 23385600a^6b^2c^8d^2f^2m + 6137856a^6b^3c^7d^2g^2m - 5677056a^6b^2c^8e^2f^2m + 4147200a^7b^3c^6d^2h^2m - 3317760a^6b^2c^8e^2h^2k - 1354752a^5b^5c^6d^2g^2m + 1271808a^6b^3c^7f^2g^2k - 737280a^7b^2c^7f^2h^2j + 17418240a^5b^3c^8d^2g^2m - 568320a^6b^4c^6f^2h^2j - 414720a^6b^5c^5d^2h^2m + 414720a^5b^5c^6f^2g^2k - 414720a^5b^4c^7e^2h^2k + 322560a^5b^4c^7e^2f^2m - 136704a^5b^6c^5f^2h^2j + 120960a^4b^7c^5d^2g^2m - 31104a^5b^7c^4d^2h^2m - 17280a^4b^7c^5f^2g^2k + 10368a^4b^9c^3d^2h^2m - 2304a^4b^8c^4f^2h^2j + 384a^3b^{10}c^3f^2h^2j + 50042880a^5b^2c^9d^2f^2k - 13271040a^5b^3c^8d^2h^2k - 13149696a^7b^3c^6d^2f^2m + 10906560a^4b^5c^7d^2f^2m - 8709120a^4b^5c^7d^2g^2m - 7418880a^5b^3c^8d^2f^2m + 7133184a^7b^2c^7d^2h^2k - 6428160a^6b^3c^7d^2h^2k + 5593536a^4b^5c^7d^2h^2k - 3870720a^6b^2c^8e^2f^2m + 3369600a^6b^4c^6d^2h^2k + 3148992a^6b^5c^5d^2f^2m - 2985696a^3b^7c^6d^2f^2m + 1959552a^3b^7c^6d^2g^2m - 1658880a^7b^2c^7e^2g^2k - 1505280a^4b^6c^6d^2f^2m - 1290240a^6b^2c^8f^2g^2j - 34836480a^5b^2c^9d^2e^2m + 1105920a^6b^3c^7e^2h^2j - 860160a^5b^4c^7f^2g^2j - 829440a^6b^4c^6e^2g^2k - 692064a^3b^7c^6d^2h^2k - 689472a^5b^5c^6d^2h^2k - 645120a^5b^4c^7e^2f^2m - 388800a^5b^6c^5d^2h^2k + 378954a^2b^9c^5d^2f^2m + 362880a^5b^4c^7d^2f^2m + 296964a^3b^8c^5d^2f^2m + 290304a^5b^5c^6e^2h^2j + 277344a^4b^7c^5d^2h^2k - 217728a^2b^9c^5d^2g^2m - 80640a^4b^6c^6f^2g^2j + 80640a^4b^6c^6e^2f^2m - 77070a^4b^9c^3d^2f^2m - 30240a^5b^7c^4d^2f^2m - 28350a^3b^9c^4d^2h^2k - 26406a^2b^9c^5d^2h^2k - 21060a^4b^8c^4d^2h^2k - 20736a^5b^6c^5e^2g^2k - 19278a^2b^{10}c^4d^2f^2m + 12672a^3b^8c^5f^2g^2j + 10044a^3b^{10}c^3d^2h^2k + 8820a^3b^{11}c^2d^2f^2m + 6912a^4b^7c^5e^2h^2j - 2304a^3b^8c^5e^2f^2m - 1620a^2b^{11}c^3d^2h^2k - 384a^2b^{10}c^4f^2g^2j + 162a^2b^{12}c^2d^2h^2k - 5419008a^5b^3c^8d^2e^2m + 5308416a^6b^2c^8e^2g^2j - 5308416a^5b^3c^8e^2g^2j - 3870720a^7b^2c^7d^2f^2m - 3538944a^6b^3c^7e^2g^2j + 2654208a^5b^4c^7e^2g^2j - 2322432a^6b^2c^8d^2g^2k - 1990656a^5b^4c^7d^2g^2k - 1935360a^6b^4c^6d^2f^2m + 1658880a^6b^3c^7d^2h^2j + 1658880a^5b^3c^8e^2f^2k - 884736a^5b^5c^6e^2g^2j + 725760a^5b^6c^5d^2f^2m + 17418240a^4b^4c^8d^2e^2m + 518400a^4b^6c^6d^2g^2k + 483840a^4b^5c^7d^2e^2m + 262656a^5b^5c^6d^2h^2j - 96768a^4b^8c^4d^2f^2m - 69120a^4b^5c^7e^2f^2k - 55296a^4b^7c^5d^2h^2j - 51840a^3b^8c^5d^2g^2k + 3456a^3b^{10}c^3d^2f^2m + 1152a^3b^9c^4d^2h^2j + 1152a^2b^{11}c^3d^2h^2j - 15431040a^4b^4c^8d^2f^2k - 13248000a^5b^3c^8d^2f^2k - 11612160a^5b^2c^9d^2g^2j - 10063872a^6b^3c^7d^2f^2k - 3919104a^3b^6c^7d^2e^2m + 2554560a^4b^5c^7d^2f^2k + 1720320a^5b^3c^8e^2f^2j + 1596672a^3b^6c^7d^2g^2j + 1518912a^3b^6c^7d^2f^2k - 1105920a^5b^4c^7f^2g^2h + 838080a^5b^5c^6d^2f^2k - 552960a^6b^2c^8f^2g^2h - 508032a^2b^8c^6d^2g^2j + 435456a^2b^8c^6d^2e^2m + 161280a^4b^5c^7e^2f^2j + 116640a^4b^7c^5d^2f^2k + 106812a^2b^8c^6d^2f^2k - 98208a^3b^7c^6d^2f^2k - 34560a^4b^6c^6f^2g^2h - 27270a^3b^9c^4d^2f^2k - 26334a^2b^9c^5d^2f^2k - 25344a^3b^7c^6e^2f^2j + 3456a^3b^8c^5f^2g^2h + 768a^2b^9c^5e^2f^2j - 702a^2b^{11}c^3d^2f^2k - 7962624a^5b^2c^9d^2e^2k - 2580480a^6b^2c^8d^2f^2j + 2073600a^4b^4c^8d^2e^2k - 1658880a^6b^2c^8e^2g^2h - 967680a^5b^4c^7d^2f^2j - 829440a^5b^4c^7e^2g^2h - 207360a^3b^6c^7d^2e^2k + 64512a^4b^6c^6d^2f^2j + 39168a^3b^8c^5d^2f^2j - 20736a^4b^6c^6e^2g^2h - 9216a^2b^{10}c^4d^2f^2j - 4423680a^5b^2c^9e^2f^2h + 4147200a^5b^3c^8d^2g^2h - 3193344a^3b^5c^8d^2e^2j + 1016064a^2b^7c^7d^2e^2j - 414720a^4b^5c^7d^2g^2h - 138240a^4b^4c^8e^2f^2h - 31104a^3b^7c^6d^2g^2h + 13824a^3b^6c^7e^2f^2h + 10368a^2b^9c^5d^2g^2m
\end{aligned}$$

$$\begin{aligned}
&^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^1^2*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^1^3 - 589824*a^8*b^3*c^5*j^3 \\
&*l - 442368*a^8*b^5*c^3*j^1^3 - 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^1^3 + 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^1^3 + 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^1*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*
\end{aligned}$$

$a^8c^8d^2h^2m - 1032192a^8c^8d^2j^2k + 138240a^8c^8f^2h^2k - 368640$
 $0a^7c^9e^2f^2m - 1327104a^7c^9e^2h^2k - 393216a^9b^2c^6j^3l - 2457$
 $60a^8c^8f^2h^2j^2 - 810b^13c^3d^2h^2k + 630b^13c^3d^2f^2m + 18a^2b$
 $^14d^2h^2m^2 + 2688000a^7c^9d^2f^2m + 580608a^8c^8d^2h^2k^2 - 5796a^7b$
 $^8c^2h^2m^3 - 3456b^12c^4d^2g^2j + 1890b^12c^4d^2f^2k + 6773760a^6c^$
 $10d^2f^2k - 1344000a^10b^2c^5f^2m^3 - 1344000a^7b^2c^8f^3m - 207360a^$
 $9b^2c^6h^2k^3 - 207360a^8b^2c^7h^3k - 3682a^6b^9c^2f^2m^3 - 9289728a^6$
 $c^10d^2e^2k - 1720320a^7c^9d^2f^2j^2 - 50803200a^5b^2c^10d^3k + 6912*$
 $b^11c^5d^2e^2j - 10616832a^6b^2c^9e^3l - 2211840a^6c^10e^2f^2h - 39$
 $3216a^8b^2c^7g^2j^3 + 43416a^2b^10c^5d^3m - 9576a^5b^10c^2d^3m^3 - 945$
 $0b^11c^5d^2f^2h - 504a^2b^14c^2d^2m^2 + 1612800a^6c^10d^2f^2h - 1036$
 $800a^8b^2c^7d^2k^3 + 45198a^2b^9c^6d^3k - 20736b^10c^6d^2e^2g - 7518$
 $8736a^4b^2c^11d^3f - 883200a^6b^2c^9f^3h - 317952a^7b^2c^8f^2h^3 - 1$
 $5482880a^5c^11d^2e^2f - 10616832a^5b^2c^10e^3g - 345060a^2b^8c^7d^3$
 $h - 4262400a^5b^2c^10d^2f^3 + 852768a^2b^7c^8d^3f + 7350a^2b^9c^6d^2f$
 $^3 + 967680a^10b^3c^3l^2m^2 + 161280a^9b^5c^2l^2m^2 + 1684224a^1$
 $0b^2c^4k^2m^2 + 1264320a^9b^4c^3k^2m^2 + 126720a^8b^6c^2k^2m^$
 $2 + 501760a^9b^3c^4j^2m^2 + 414720a^9b^3c^4k^2l^2 + 207360a^8b^$
 $5c^3k^2l^2 + 170240a^8b^5c^3j^2m^2 + 9216a^7b^7c^2j^2m^2 + 518$
 $4a^7b^7c^2k^2l^2 + 884736a^9b^2c^5j^2l^2 + 884736a^8b^4c^4j^2$
 $l^2 + 221184a^7b^6c^3j^2l^2 + 1419840a^8b^4c^4h^2m^2 + 1387008a^$
 $9b^2c^5h^2m^2 + 276480a^8b^3c^5j^2k^2 + 140544a^7b^5c^4j^2k^$
 $2 + 84960a^7b^6c^3h^2m^2 + 25344a^6b^7c^3j^2k^2 - 8010a^6b^8c^$
 $2h^2m^2 + 576a^5b^9c^2j^2k^2 + 967680a^8b^3c^5g^2m^2 + 414720a^$
 $8b^3c^5h^2l^2 + 207360a^7b^5c^4h^2l^2 + 161280a^7b^5c^4g^2m^$
 $2 - 20160a^6b^7c^3g^2m^2 + 5184a^6b^7c^3h^2l^2 + 576a^5b^9c^2*$
 $g^2m^2 + 3808000a^8b^2c^6f^2m^2 + 1990656a^7b^4c^5g^2l^2 + 16437$
 $12a^7b^4c^5f^2m^2 + 803520a^7b^4c^5h^2k^2 + 725760a^8b^2c^6h^$
 $2k^2 + 207360a^6b^6c^4h^2k^2 - 125440a^6b^6c^4f^2m^2 - 13790a^5$
 $b^8c^3f^2m^2 + 10530a^5b^8c^3h^2k^2 + 1785a^4b^10c^2f^2m^2 +$
 $81a^4b^10c^2h^2k^2 + 18427392a^7b^2c^7d^2m^2 + 967680a^7b^3c^6$
 $f^2l^2 + 645120a^7b^3c^6e^2m^2 + 414720a^7b^3c^6g^2k^2 + 276480$
 $a^7b^3c^6h^2j^2 + 207360a^6b^5c^5g^2k^2 + 161280a^6b^5c^5f^2*$
 $l^2 + 140544a^6b^5c^5h^2j^2 - 80640a^6b^5c^5e^2m^2 + 25344a^5b^$
 $7c^4h^2j^2 - 20160a^5b^7c^4f^2l^2 + 5184a^5b^7c^4g^2k^2 + 2304$
 $a^5b^7c^4e^2m^2 + 576a^4b^9c^3h^2j^2 + 576a^4b^9c^3f^2l^2 +$
 $7962624a^7b^2c^7e^2l^2 - 4148928a^6b^4c^6d^2m^2 + 1419840a^6b^4$
 $c^6f^2k^2 + 1387008a^7b^2c^7f^2k^2 - 1183392a^5b^6c^5d^2m^2 +$
 $884736a^7b^2c^7g^2j^2 + 884736a^6b^4c^6g^2j^2 + 645750a^4b^8c^$
 $4d^2m^2 + 221184a^5b^6c^5g^2j^2 - 115920a^3b^10c^3d^2m^2 + 8496$
 $0a^5b^6c^5f^2k^2 + 10836a^2b^12c^2d^2m^2 - 8010a^4b^8c^4f^2k^$
 $^2 - 180a^3b^10c^3f^2k^2 + 9a^2b^12c^2f^2k^2 + 8709120a^6b^3c^$
 $7d^2l^2 - 4354560a^5b^5c^6d^2l^2 + 979776a^4b^7c^5d^2l^2 + 8294$
 $40a^6b^3c^7e^2k^2 + 17480448a^6b^2c^8d^2k^2 + 501760a^6b^3c^7*$
 $f^2j^2 + 170240a^5b^5c^6f^2j^2 - 108864a^3b^9c^4d^2l^2 + 20736a^$
 $5b^5c^6e^2k^2 + 9216a^4b^7c^5f^2j^2 + 5184a^2b^11c^3d^2l^2 -$
 $1984a^3b^9c^4f^2j^2 + 64a^2b^11c^3f^2j^2 + 3538944a^6b^2c^8e^$
 $^2j^2 - 3302208a^5b^4c^7d^2k^2 + 884736a^5b^4c^7e^2j^2 + 414720*$
 $a^6b^3c^7g^2h^2 + 207360a^5b^5c^6g^2h^2 - 103680a^4b^6c^6d^2k^$
 $^2 + 101250a^3b^8c^5d^2k^2 - 5751a^2b^10c^4d^2k^2 + 5184a^4b^7*$
 $c^5g^2h^2 + 1935360a^5b^3c^8d^2j^2 + 1684224a^6b^2c^8f^2h^2 + 1$
 $264320a^5b^4c^7f^2h^2 - 532224a^4b^5c^7d^2j^2 + 126720a^4b^6c^$
 $6f^2h^2 - 96768a^3b^7c^6d^2j^2 + 62784a^2b^9c^5d^2j^2 - 13950a^$
 $3b^8c^5f^2h^2 + 225a^2b^10c^4f^2h^2 + 967680a^5b^3c^8f^2g^2$
 $+ 829440a^5b^3c^8e^2h^2 + 161280a^4b^5c^7f^2g^2 + 20736a^4b^5c^$
 $7e^2h^2 - 20160a^3b^7c^6f^2g^2 + 576a^2b^9c^5f^2g^2 + 11487744$
 $a^5b^2c^9d^2h^2 + 7962624a^5b^2c^9e^2g^2 + 35525376a^4b^2c^10*$
 $d^2f^2 - 1412640a^3b^6c^7d^2h^2 + 461376a^4b^4c^8d^2h^2 + 375030$
 $a^2b^8c^6d^2h^2 + 8709120a^4b^3c^9d^2g^2 - 4354560a^3b^5c^8d^$

$$\begin{aligned}
& 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*
\end{aligned}$$

$$\begin{aligned}
& z^2 - 581959680a^{10}b^4c^8f^mz^2 + 732168192a^7b^6c^9d^fz^2 + 5347 \\
& 73760a^{11}b^3c^8h^mz^2 - 456130560a^{11}b^4c^7k^mz^2 - 603979776a^1 \\
& 0b^2c^{10}e^jz^2 + 534773760a^{10}b^3c^9f^kz^2 + 384040960a^9b^6c^7 \\
& f^mz^2 + 377487360a^9b^6c^7g^l^1z^2 - 456130560a^9b^4c^9f^h^mz^2 + \\
& 301989888a^{11}b^3c^8j^l^1z^2 - 415236096a^{10}b^2c^{10}d^k^mz^2 + 25401753 \\
& 6a^{10}b^6c^6k^mz^2 - 330301440a^{10}b^4c^8h^k^mz^2 + 390463488a^7b^7 \\
& c^8d^h^mz^2 + 188743680a^{12}b^2c^8k^mz^2 + 301989888a^{10}b^3c^9g^j^* \\
& z^2 - 297861120a^7b^8c^7d^k^mz^2 - 366280704a^6b^8c^8d^f^mz^2 + 18874 \\
& 3680a^{11}b^2c^9h^k^mz^2 - 330301440a^8b^4c^{10}d^f^mz^2 + 254017536a^8* \\
& b^6c^8f^h^mz^2 - 1887436800a^{10}b^c^{11}d^h^mz^2 + 188743680a^8b^7c^7e* \\
& l^1z^2 + 153354240a^9b^6c^7h^k^mz^2 - 185303040a^7b^9c^6d^m^mz^2 - 117 \\
& 964800a^{10}b^5c^7h^m^mz^2 - 61931520a^9b^8c^5k^m^mz^2 + 121634816a^{11} \\
& b^2c^9f^m^mz^2 - 115671040a^8b^8c^6f^m^mz^2 - 62914560a^9b^7c^6j^*l^1 \\
& z^2 + 188743680a^{10}b^2c^{10}f^h^mz^2 - 94371840a^8b^8c^6g^l^1z^2 + 614 \\
& 4000a^8b^{10}c^4k^m^mz^2 - 117964800a^9b^5c^8f^k^mz^2 + 61440a^7b^{12}* \\
& c^3k^m^mz^2 - 46080a^6b^{14}c^2k^m^mz^2 + 23592960a^8b^9c^5j^*l^1z^2 + 1 \\
& 88743680a^7b^7c^8e^g^mz^2 - 37355520a^9b^7c^6h^m^mz^2 + 125829120a^8 \\
& b^6c^8e^j^mz^2 + 23101440a^8b^9c^5h^m^mz^2 - 3538944a^7b^{11}c^4j^*l^1 \\
& z^2 + 196608a^6b^{13}c^3j^*l^1z^2 - 4349952a^7b^{11}c^4h^m^mz^2 + 337920a \\
& ^6b^{13}c^3h^m^mz^2 - 7680a^5b^{15}c^2h^m^mz^2 - 62914560a^8b^7c^7g^j^* \\
& z^2 - 26542080a^8b^8c^6h^k^mz^2 + 17940480a^7b^{10}c^5f^m^mz^2 + 117964 \\
& 80a^7b^{10}c^5g^l^1z^2 - 37355520a^8b^7c^7f^k^mz^2 - 1347584a^6b^{12}c^4 \\
& f^m^mz^2 + 68272128a^6b^{10}c^6d^k^mz^2 - 589824a^6b^{12}c^4g^l^1z^2 + \\
& 552960a^6b^{12}c^4h^k^mz^2 - 147456a^7b^{10}c^5h^k^mz^2 - 46080a^5b^{14}* \\
& c^3h^k^mz^2 + 35840a^5b^{14}c^3f^m^mz^2 + 23592960a^7b^9c^6g^j^*z^2 - 2 \\
& 3592960a^7b^9c^6e^l^1z^2 + 23371776a^6b^{11}c^5d^m^mz^2 + 23101440a^7* \\
& b^9c^6f^k^mz^2 - 47185920a^7b^8c^7e^j^mz^2 - 61931520a^7b^8c^7f^h^mz^2 \\
& - 4349952a^6b^{11}c^5f^k^mz^2 - 3538944a^6b^{11}c^5g^j^*z^2 - 1677312* \\
& a^5b^{13}c^4d^m^mz^2 + 1179648a^6b^{11}c^5e^l^1z^2 + 337920a^5b^{13}c^4f^* \\
& k^mz^2 + 196608a^5b^{13}c^4g^j^*z^2 + 53760a^4b^{15}c^3d^m^mz^2 - 7680a^4 \\
& b^{15}c^3f^k^mz^2 + 96583680a^5b^{10}c^7d^f^mz^2 - 9179136a^5b^{12}c^5d^* \\
& k^mz^2 + 7077888a^6b^{10}c^6e^j^mz^2 - 51609600a^6b^9c^7d^h^mz^2 + 6912 \\
& 00a^4b^{14}c^4d^k^mz^2 - 393216a^5b^{12}c^5e^j^mz^2 - 23040a^3b^{16}c^3* \\
& d^k^mz^2 + 6144000a^6b^{10}c^6f^h^mz^2 + 61440a^5b^{12}c^5f^h^mz^2 - 46080 \\
& a^4b^{14}c^4f^h^mz^2 + 1536a^3b^{16}c^3f^h^mz^2 - 23592960a^6b^9c^7e* \\
& g^mz^2 + 1179648a^5b^{11}c^6e^g^mz^2 + 829440a^4b^{13}c^5d^h^mz^2 + 368640 \\
& a^5b^{11}c^6d^h^mz^2 - 105984a^3b^{15}c^4d^h^mz^2 + 4608a^2b^{17}c^3d^h^* \\
& z^2 - 15175680a^4b^{12}c^6d^f^mz^2 + 1428480a^3b^{14}c^5d^f^mz^2 - 73728 \\
& a^2b^{16}c^4d^f^mz^2 + 4108320768a^{10}b^3c^9d^m^mz^2 - 1207959552a^{11}b \\
& c^{10}e^l^1z^2 - 1207959552a^{10}b^c^{11}e^g^mz^2 - 578813952a^{12}b^c^9h^m^mz^2 \\
& - 578813952a^{11}b^c^{10}f^k^mz^2 - 402653184a^{12}b^c^9j^*l^1z^2 - 4026531 \\
& 84a^{11}b^c^{10}g^j^*z^2 - 440401920a^{10}b^c^{11}f^2z^2 - 188743680a^{12}b^c^9 \\
& k^2z^2 - 188743680a^{11}b^c^{10}h^2z^2 + 1761607680a^{10}c^{12}d^f^mz^2 - \\
& 14080a^6b^{15}c^m^2z^2 - 94464a^ab^{17}c^4d^2z^2 + 6936330240a^8b^3c^c \\
& ^{11}d^2z^2 + 2464874496a^6b^7c^9d^2z^2 - 3963617280a^9b^c^{12}d^2z^2 \\
& + 1056964608a^{11}c^{11}d^k^mz^2 + 805306368a^{11}c^{11}e^j^mz^2 + 419430400* \\
& a^{12}c^{10}f^m^mz^2 + 251658240a^{13}c^9k^m^mz^2 - 1509949440a^9b^2c^{11}e^ \\
& 2z^2 + 251658240a^{11}c^{11}f^h^mz^2 + 150994944a^{12}c^{10}h^k^mz^2 - 5400428 \\
& 544a^7b^5c^{10}d^2z^2 + 754974720a^8b^4c^{10}e^2z^2 - 730054656a^5b \\
& ^9c^8d^2z^2 + 477102080a^{12}b^3c^7m^2z^2 - 377487360a^{11}b^4c^7l^1 \\
& 2z^2 + 477102080a^9b^3c^{10}f^2z^2 + 301989888a^{12}b^2c^8l^12z^2 - 3 \\
& 77487360a^9b^4c^9g^2z^2 + 301989888a^{10}b^2c^{10}g^2z^2 - 174325760* \\
& a^{11}b^5c^6m^2z^2 + 188743680a^{10}b^6c^6l^12z^2 + 141557760a^{11}b^3* \\
& c^8k^2z^2 + 188743680a^8b^6c^8g^2z^2 + 141557760a^{10}b^3c^9h^2z^2 \\
& - 174325760a^8b^5c^9f^2z^2 - 188743680a^7b^6c^9e^2z^2 - 4718592 \\
& 0a^9b^8c^5l^12z^2 + 11206656a^{10}b^7c^5m^2z^2 + 8929280a^9b^9c^4 \\
& m^2z^2 - 2600960a^8b^{11}c^3m^2z^2 + 291840a^7b^{13}c^2m^2z^2 - 503 \\
& 31648a^{10}b^4c^8j^2z^2 + 146165760a^4b^{11}c^7d^2z^2 - 26542080a^9* \\
& b^7c^6k^2z^2 + 5898240a^8b^{10}c^4l^12z^2 - 294912a^7b^{12}c^3l^12z^2
\end{aligned}$$

$$\begin{aligned}
& 2 - 33554432a^{11}b^2c^9j^2z^2 + 9584640a^8b^9c^5k^2z^2 + 20971520a^9b^6c^7j^2z^2 - 2359296a^{10}b^5c^7k^2z^2 - 1290240a^7b^{11}c^4k^2z^2 + 46080a^6b^{13}c^3k^2z^2 + 2304a^5b^{15}c^2k^2z^2 - 2752512a^7b^{10}c^5j^2z^2 + 2621440a^8b^8c^6j^2z^2 + 524288a^6b^{12}c^4j^2z^2 - 32768a^5b^{14}c^3j^2z^2 - 47185920a^7b^8c^7g^2z^2 - 26542080a^8b^7c^7h^2z^2 + 9584640a^7b^9c^6h^2z^2 - 2359296a^9b^5c^8h^2z^2 - 1290240a^6b^{11}c^5h^2z^2 + 46080a^5b^{13}c^4h^2z^2 + 2304a^4b^{15}c^3h^2z^2 + 5898240a^6b^{10}c^6g^2z^2 - 294912a^5b^{12}c^5g^2z^2 + 11206656a^7b^7c^8f^2z^2 + 8929280a^6b^9c^7f^2z^2 + 23592960a^6b^8c^8e^2z^2 - 2600960a^5b^{11}c^6f^2z^2 + 291840a^4b^{13}c^5f^2z^2 - 14080a^3b^{15}c^4f^2z^2 + 256a^2b^{17}c^3f^2z^2 - 19860480a^3b^{13}c^6d^2z^2 - 1179648a^5b^{10}c^7e^2z^2 + 1771776a^2b^{15}c^5d^2z^2 - 440401920a^{13}b^3c^8m^2z^2 + 1207959552a^{10}c^{12}e^2z^2 + 134217728a^{12}c^{10}j^2z^2 + 256a^5b^{17}m^2z^2 + 2304b^{19}c^3d^2z^2 - 23592960a^{10}b^3c^8f^*k^*l^*z + 99090432a^9b^3c^9d^*h^*l^*z + 9437184a^{10}b^3c^8e^*k^*m^*z + 23592960a^{10}b^3c^8g^*h^*m^*z + 141557760a^8b^3c^{10}d^*e^*k^*z + 47185920a^9b^3c^9d^*j^*k^*z - 23592960a^9b^3c^9f^*g^*k^*z + 169869312a^7b^3c^{11}d^*e^*f^*z + 99090432a^8b^3c^{10}d^*g^*h^*z - 3145728a^9b^3c^9f^*h^*j^*z + 56623104a^8b^3c^{10}d^*f^*j^*z + 1536a^3b^{15}c^3d^*f^*j^*z - 9437184a^8b^3c^{10}e^*f^*h^*z - 4608a^3b^{14}c^4d^*f^*g^*z + 9216a^3b^{13}c^5d^*e^*f^*z + 412876800a^8b^2c^9d^*e^*m^*z - 206438400a^9b^3c^7d^*l^*m^*z + 5898240a^{10}b^4c^5k^*l^*m^*z - 206438400a^8b^3c^8d^*g^*m^*z - 4718592a^{11}b^2c^6k^*l^*m^*z - 2949120a^9b^6c^4k^*l^*m^*z + 737280a^8b^8c^3k^*l^*m^*z - 92160a^7b^{10}c^2k^*l^*m^*z + 103219200a^8b^5c^6d^*l^*m^*z - 29491200a^{10}b^3c^6h^*l^*m^*z - 206438400a^7b^4c^8d^*e^*m^*z - 2359296a^{10}b^3c^6j^*k^*m^*z + 491520a^8b^7c^4j^*k^*m^*z - 184320a^7b^9c^3j^*k^*m^*z + 27648a^6b^{11}c^2j^*k^*m^*z + 14745600a^9b^5c^5h^*l^*m^*z - 3686400a^8b^7c^4h^*l^*m^*z + 460800a^7b^9c^3h^*l^*m^*z - 23040a^6b^{11}c^2h^*l^*m^*z + 88473600a^8b^4c^7d^*k^*l^*z + 82575360a^9b^2c^8d^*j^*m^*z + 11796480a^{10}b^2c^7h^*j^*m^*z + 5898240a^9b^4c^6g^*k^*m^*z - 4718592a^{10}b^2c^7g^*k^*m^*z - 70778880a^9b^2c^8d^*k^*l^*z - 2949120a^8b^6c^5g^*k^*m^*z - 2457600a^8b^6c^5h^*j^*m^*z + 921600a^7b^8c^4h^*j^*m^*z + 737280a^7b^8c^4g^*k^*m^*z - 138240a^6b^{10}c^3h^*j^*m^*z - 92160a^6b^{10}c^3g^*k^*m^*z + 7680a^5b^{12}c^2h^*j^*m^*z + 4608a^5b^{12}c^2g^*k^*m^*z + 29491200a^9b^3c^7f^*k^*l^*z - 176947200a^7b^3c^9d^*e^*k^*z - 109707264a^8b^3c^8d^*h^*l^*z - 25804800a^7b^7c^5d^*l^*m^*z + 103219200a^7b^5c^7d^*g^*m^*z + 219414528a^7b^2c^{10}d^*e^*h^*z - 14745600a^8b^5c^6f^*k^*l^*z - 29491200a^9b^3c^7g^*h^*m^*z - 11796480a^9b^3c^7e^*k^*m^*z - 44236800a^7b^6c^6d^*k^*l^*z + 58982400a^9b^2c^8e^*h^*m^*z + 5898240a^8b^5c^6e^*k^*m^*z + 3686400a^7b^7c^5f^*k^*l^*z + 3225600a^6b^9c^4d^*l^*m^*z - 1474560a^7b^7c^5e^*k^*m^*z - 460800a^6b^9c^4f^*k^*l^*z + 184320a^6b^9c^4e^*k^*m^*z - 161280a^5b^{11}c^3d^*l^*m^*z + 23040a^5b^{11}c^3f^*k^*l^*z - 9216a^5b^{11}c^3e^*k^*m^*z + 14745600a^8b^5c^6g^*h^*m^*z + 110886912a^7b^4c^8d^*f^*l^*z - 3686400a^7b^7c^5g^*h^*m^*z - 221773824a^6b^3c^{10}d^*e^*f^*z + 460800a^6b^9c^4g^*h^*m^*z - 17203200a^7b^6c^6d^*j^*m^*z - 23040a^5b^{11}c^3g^*h^*m^*z - 29491200a^8b^4c^7e^*h^*m^*z - 11796480a^9b^2c^8f^*j^*k^*z + 11059200a^6b^8c^5d^*k^*l^*z + 6451200a^6b^8c^5d^*j^*m^*z + 88473600a^7b^4c^8d^*g^*k^*z + 2457600a^7b^6c^6f^*j^*k^*z - 35389440a^8b^3c^8d^*j^*k^*z - 1382400a^5b^{10}c^4d^*k^*l^*z - 84934656a^8b^2c^9d^*f^*l^*z - 967680a^5b^{10}c^4d^*j^*m^*z - 921600a^6b^8c^5f^*j^*k^*z + 138240a^5b^{10}c^4f^*j^*k^*z + 69120a^4b^{12}c^3d^*k^*l^*z + 53760a^4b^{12}c^3d^*j^*m^*z - 7680a^4b^{12}c^3f^*j^*k^*z + 44236800a^7b^5c^7d^*h^*l^*z + 7372800a^7b^6c^6e^*h^*m^*z - 5898240a^8b^4c^7f^*h^*l^*z + 4718592a^9b^2c^8f^*h^*l^*z - 70778880a^8b^2c^9d^*g^*k^*z + 2949120a^7b^6c^6f^*h^*l^*z - 921600a^6b^8c^5e^*h^*m^*z - 737280a^6b^8c^5f^*h^*l^*z + 92160a^5b^{10}c^4f^*h^*l^*z + 46080a^5b^{10}c^4e^*h^*m^*z - 4608a^4b^{12}c^3f^*h^*l^*z + 29491200a^8b^3c^8f^*g^*k^*z - 109707264a^7b^3c^9d^*g^*h^*z - 25804800a^6b^7c^6d^*g^*m^*z - 58982400a^8b^2c^9e^*f^*k^*z - 58982400a^6b^6c^7d^*f^*l^*z + 7372800a^6b^7c^6d^*j^*k^*z + 88473600a^6b^5c^8d^*e^*k^*z - 2764800a^5b^9c^5d^*j^*k^*z + 51609600a^6b^6c^7d^*e^*m^*z + 414720a^4b^{11}c^4d^*j^*k^*z - 23040a^3b^{13}c^3d^*j^*k^*z - 1474
\end{aligned}$$

$5600a^7b^5c^7f^*g^*k^*z - 44236800a^6b^6c^7d^*g^*k^*z - 6635520a^6b^7c^6d^*h^*l^*z + 40108032a^8b^2c^9d^*h^*j^*z + 3686400a^6b^7c^6f^*g^*k^*z + 3225600a^5b^9c^5d^*g^*m^*z + 2359296a^8b^3c^8f^*h^*j^*z - 491520a^6b^7c^6f^*h^*j^*z - 460800a^5b^9c^5f^*g^*k^*z - 276480a^5b^9c^5d^*h^*l^*z + 184320a^5b^9c^5f^*h^*j^*z + 179712a^4b^11c^4d^*h^*l^*z - 161280a^4b^11c^4d^*g^*m^*z - 27648a^4b^11c^4f^*h^*j^*z + 23040a^4b^11c^4f^*g^*k^*z - 13824a^3b^13c^3d^*h^*l^*z + 1536a^3b^13c^3f^*h^*j^*z + 29491200a^7b^4c^8e^*f^*k^*z + 110886912a^6b^4c^9d^*f^*g^*z + 16220160a^5b^8c^6d^*f^*l^*z - 45613056a^7b^3c^9d^*f^*j^*z + 11059200a^5b^8c^6d^*g^*k^*z - 10321920a^6b^6c^7d^*h^*j^*z - 7372800a^6b^6c^7e^*f^*k^*z + 7077888a^7b^4c^8d^*h^*j^*z - 6451200a^5b^8c^6d^*e^*m^*z - 88473600a^6b^4c^9d^*e^*h^*z + 2396160a^5b^8c^6d^*h^*j^*z - 2396160a^4b^10c^5d^*f^*l^*z - 1382400a^4b^10c^5d^*g^*k^*z - 84934656a^7b^2c^10d^*f^*g^*z + 921600a^5b^8c^6e^*f^*k^*z + 117964800a^5b^5c^9d^*e^*f^*z + 322560a^4b^10c^5d^*e^*m^*z + 175104a^3b^12c^4d^*f^*l^*z + 69120a^3b^12c^4d^*g^*k^*z - 50688a^3b^12c^4d^*h^*j^*z - 46080a^4b^10c^5e^*f^*k^*z - 27648a^4b^10c^5d^*h^*j^*z + 4608a^2b^14c^3d^*h^*j^*z - 4608a^2b^14c^3d^*f^*l^*z + 44236800a^6b^5c^8d^*g^*h^*z - 5898240a^7b^4c^8f^*g^*h^*z - 22118400a^5b^7c^7d^*e^*k^*z + 4718592a^8b^2c^9f^*g^*h^*z + 2949120a^6b^6c^7f^*g^*h^*z - 737280a^5b^8c^6f^*g^*h^*z + 92160a^4b^10c^5f^*g^*h^*z - 4608a^3b^12c^4f^*g^*h^*z + 8847360a^5b^7c^7d^*f^*j^*z - 5898240a^5b^6c^8d^*f^*g^*z - 3809280a^4b^9c^6d^*f^*j^*z + 2764800a^4b^9c^6d^*e^*k^*z + 2359296a^6b^5c^8d^*f^*j^*z + 681984a^3b^11c^5d^*f^*j^*z - 138240a^3b^11c^5d^*e^*k^*z - 55296a^2b^13c^4d^*f^*j^*z + 11796480a^7b^3c^9e^*f^*h^*z - 6635520a^5b^7c^7d^*g^*h^*z - 5898240a^6b^5c^8e^*f^*h^*z + 1474560a^5b^7c^7e^*f^*h^*z - 276480a^4b^9c^6d^*g^*h^*z - 184320a^4b^9c^6e^*f^*h^*z + 179712a^3b^11c^5d^*g^*h^*z - 13824a^2b^13c^4d^*g^*h^*z + 9216a^3b^11c^5e^*f^*h^*z + 16220160a^4b^8c^7d^*f^*g^*z + 13271040a^5b^6c^8d^*e^*h^*z - 2396160a^3b^10c^6d^*f^*g^*z + 552960a^4b^8c^7d^*e^*h^*z - 359424a^3b^10c^6d^*e^*h^*z + 175104a^2b^12c^5d^*f^*g^*z + 27648a^2b^12c^5d^*e^*h^*z - 32440320a^4b^7c^8d^*e^*f^*z + 4792320a^3b^9c^7d^*e^*f^*z - 350208a^2b^11c^6d^*e^*f^*z + 165150720a^10b^*c^8d^*l^*m^*z + 4608a^6b^12c^*k^*l^*m^*z + 23592960a^11b^*c^7h^*l^*m^*z + 3145728a^11b^*c^7j^*k^*m^*z - 1536a^5b^13c^*j^*k^*m^*z + 165150720a^9b^*c^9d^*g^*m^*z + 346816512a^7b^*c^11d^2g^*z + 19660800a^12b^*c^6l^*m^2z - 34560a^7b^11c^*l^*m^2z - 7077888a^11b^*c^7k^2l^*z + 11008a^6b^12c^*j^*m^2z + 19660800a^11b^*c^7g^*m^2z + 7077888a^10b^*c^8h^2l^*z + 768a^5b^13c^*g^*m^2z - 19660800a^9b^*c^9f^2l^*z - 7077888a^10b^*c^8g^*k^2z - 6912a^*b^15c^3d^2l^*z + 7077888a^9b^*c^9g^*h^2z - 19660800a^8b^*c^10f^2g^*z - 66816a^*b^14c^4d^2j^*z + 214272a^*b^13c^5d^2g^*z - 428544a^*b^12c^6d^2e^*z - 330301440a^9c^10d^*e^*m^*z - 110100480a^10c^9d^*j^*m^*z - 15728640a^11c^8h^*j^*m^*z - 47185920a^10c^9e^*h^*m^*z - 198180864a^8c^11d^*e^*h^*z + 15728640a^10c^9f^*j^*k^*z - 66060288a^9c^10d^*h^*j^*z + 47185920a^9c^10e^*f^*k^*z + 1022754816a^6b^2c^11d^2e^*z - 642318336a^5b^4c^10d^2e^*z - 511377408a^7b^3c^9d^2l^*z - 511377408a^6b^3c^10d^2g^*z + 321159168a^6b^5c^8d^2l^*z + 321159168a^5b^5c^9d^2g^*z + 225312768a^7b^2c^10d^2j^*z - 25362432a^11b^3c^5l^*m^2z + 13271040a^10b^5c^4l^*m^2z - 3563520a^9b^7c^3l^*m^2z + 506880a^8b^9c^2l^*m^2z + 10354688a^11b^2c^6j^*m^2z + 8847360a^10b^3c^6k^2l^*z - 4423680a^9b^5c^5k^2l^*z - 2048000a^9b^6c^4j^*m^2z + 1105920a^8b^7c^4k^2l^*z + 849920a^8b^8c^3j^*m^2z - 393216a^10b^4c^5j^*m^2z - 145920a^7b^10c^2j^*m^2z - 138240a^7b^9c^3k^2l^*z + 6912a^6b^11c^2k^2l^*z - 111697920a^5b^7c^7d^2l^*z + 223395840a^4b^6c^9d^2e^*z - 25362432a^10b^3c^6g^*m^2z - 3538944a^10b^2c^7j^*k^2z + 737280a^8b^6c^5j^*k^2z + 50724864a^10b^2c^7e^*m^2z - 276480a^7b^8c^4j^*k^2z + 41472a^6b^10c^3j^*k^2z - 2304a^5b^12c^2j^*k^2z + 13271040a^9b^5c^5g^*m^2z - 8847360a^9b^3c^7h^2l^*z + 4423680a^8b^5c^6h^2l^*z - 3563520a^8b^7c^4g^*m^2z - 1105920a^7b^7c^5h^2l^*z + 506880a^7b^9c^3g^*m^2z + 138240a^6b^9c^4h^2l^*z - 34560a^6b^11c^2g^*m^2z - 6912a^5b^11c^3h^2l^*z - 26542080a^9b^4c^6e^*m^2z + 25362432a^8b^3c^8f^2l^*z - 13271040a^7b^5c^7f^2l^*z + 8847360a^9b^3c^$

$$\begin{aligned}
& 7g^2k^2z + 7127040a^8b^6c^5emm^2z - 4423680a^8b^5c^6g^2k^2z + 356 \\
& 3520a^6b^7c^6f^2l^2z + 3538944a^9b^2c^8h^2j^2z + 1105920a^7b^7c^ \\
& 5g^2k^2z - 1013760a^7b^8c^4emm^2z - 737280a^7b^6c^6h^2j^2z - 5068 \\
& 80a^5b^9c^5f^2l^2z + 276480a^6b^8c^5h^2j^2z - 138240a^6b^9c^4g^2k^ \\
& k^2z + 69120a^6b^10c^3emm^2z - 41472a^5b^10c^4h^2j^2z + 34560a^4 \\
& b^11c^4f^2l^2z + 6912a^5b^11c^3g^2k^2z + 2304a^4b^12c^3h^2j^2z - \\
& 1536a^5b^12c^2emm^2z - 768a^3b^13c^3f^2l^2z - 111697920a^4b^7c^ \\
& ^8d^2gz + 23362560a^4b^9c^6d^2l^2z - 17694720a^9b^2c^8eek^2z - \\
& 10354688a^8b^2c^9f^2j^2z - 43646976a^6b^4c^9d^2j^2z + 8847360a^8b^ \\
& ^4c^7eek^2z - 2965248a^3b^11c^5d^2l^2z - 2211840a^7b^6c^6eek^2z \\
& + 2048000a^6b^6c^7f^2j^2z - 849920a^5b^8c^6f^2j^2z + 393216a^7b^ \\
& 4c^8f^2j^2z + 276480a^6b^8c^5eek^2z + 214272a^2b^13c^4d^2l^2z + \\
& 145920a^4b^10c^5f^2j^2z - 13824a^5b^10c^4eek^2z - 11008a^3b^12c^ \\
& ^4f^2j^2z + 256a^2b^14c^3f^2j^2z - 32587776a^5b^6c^8d^2j^2z - 8847 \\
& 360a^8b^3c^8g^2h^2z + 21657600a^4b^8c^7d^2j^2z + 4423680a^7b^5c^ \\
& 7g^2h^2z - 1105920a^6b^7c^6g^2h^2z + 138240a^5b^9c^5g^2h^2z - 6912 \\
& a^4b^11c^4g^2h^2z + 25362432a^7b^3c^9f^2gz - 5810688a^3b^10c^6 \\
& d^2j^2z + 17694720a^8b^2c^9eek^2z + 845568a^2b^12c^5d^2j^2z - 507 \\
& 24864a^7b^2c^10eef^2z - 13271040a^6b^5c^8f^2gz - 8847360a^7b^4 \\
& c^8eek^2z + 3563520a^5b^7c^7f^2gz + 2211840a^6b^6c^7eek^2z - \\
& 506880a^4b^9c^6f^2gz - 276480a^5b^8c^6eek^2z + 34560a^3b^11c^ \\
& 5f^2gz + 13824a^4b^10c^5eek^2z - 768a^2b^13c^4f^2gz + 2654208 \\
& 0a^6b^4c^9eef^2z + 23362560a^3b^9c^7d^2gz - 46725120a^3b^8c^8 \\
& d^2eek^2z - 7127040a^5b^6c^8eef^2z - 2965248a^2b^11c^6d^2gz + 101 \\
& 3760a^4b^8c^7eef^2z - 69120a^3b^10c^6eef^2z + 1536a^2b^12c^5e \\
& ef^2z + 5930496a^2b^10c^7d^2eek^2z + 346816512a^8b^c^10d^2l^2z - 6936 \\
& 33024a^7c^12d^2eek^2z - 231211008a^8c^11d^2j^2z + 768a^6b^13l^2m^2z \\
& - 13107200a^12c^7j^2m^2z - 256a^5b^14j^2m^2z + 4718592a^11c^8j^2k^2 \\
& z - 39321600a^11c^8emm^2z - 4718592a^10c^9h^2j^2z + 14155776a^10c^ \\
& ^9eek^2z + 13107200a^9c^10f^2j^2z + 2304b^16c^3d^2j^2z - 14155776a^ \\
& ^9c^10eek^2z + 39321600a^8c^11eef^2z - 6912b^15c^4d^2gz + 13824 \\
& b^14c^5d^2eek^2z + 737280a^10b^c^5j^2k^2l^2m - 2304a^6b^9c^j^2k^2l^2m + 22 \\
& 11840a^9b^c^6eek^2l^2m + 1228800a^9b^c^6f^2j^2l^2m + 737280a^9b^c^6g^2j^2 \\
& k^2m + 442368a^9b^c^6h^2j^2k^2l^2m + 36a^3b^12c^f^2h^2k^2m + 3096576a^8b^c^7 \\
& d^2j^2k^2l^2m - 12745728a^8b^c^7d^2h^2k^2m + 3686400a^8b^c^7eef^2l^2m + 3391488 \\
& a^8b^c^7eek^2j^2m + 2211840a^8b^c^7eeg^2k^2m + 1327104a^8b^c^7eek^2k^2l^2m + \\
& 1228800a^8b^c^7f^2g^2j^2m + 737280a^8b^c^7f^2h^2j^2l^2m + 442368a^8b^c^7g^2 \\
& h^2j^2k^2l^2m + 108a^2b^13c^d^2h^2k^2m + 16367616a^7b^c^8d^2eek^2j^2m + 9289728a^7b^ \\
& c^8d^2eek^2l^2m + 5160960a^7b^c^8d^2f^2j^2l^2m + 3391488a^7b^c^8eef^2j^2k^2l^2m + 3096 \\
& 576a^7b^c^8d^2g^2j^2k^2l^2m - 19307520a^7b^c^8d^2f^2h^2m + 3686400a^7b^c^8eef^2 \\
& g^2m + 2211840a^7b^c^8eef^2h^2l^2m + 1327104a^7b^c^8eeg^2h^2k^2l^2m + 737280a^7b^c^ \\
& ^8f^2g^2h^2j^2k^2l^2m - 180a^b^13c^2d^2f^2h^2m - 540a^b^12c^3d^2f^2h^2k^2l^2m + 15482880a^ \\
& ^6b^c^9d^2eef^2l^2m + 11059200a^6b^c^9d^2eek^2h^2j^2l^2m + 9289728a^6b^c^9d^2eeg^2k^2l^2m + \\
& 5160960a^6b^c^9d^2f^2g^2j^2k^2l^2m - 2304a^b^11c^4d^2f^2g^2j^2k^2l^2m + 2211840a^6b^c^9eef^2 \\
& g^2h^2l^2m + 4608a^b^10c^5d^2eef^2j^2k^2l^2m + 15482880a^5b^c^10d^2eef^2g^2l^2m - 13824a^b^9c^ \\
& ^6d^2eef^2g^2l^2m + 36a^b^14c^d^2f^2k^2m + 1843200a^9b^3c^4j^2k^2l^2m + 783360a^ \\
& ^8b^5c^3j^2k^2l^2m + 18432a^7b^7c^2j^2k^2l^2m - 2211840a^8b^4c^4g^2k^2l^2m \\
& - 1695744a^9b^2c^5h^2j^2l^2m - 1400832a^8b^4c^4h^2j^2l^2m - 1105920a^9b^ \\
& b^2c^5g^2k^2l^2m - 253440a^7b^6c^3h^2j^2l^2m - 69120a^7b^6c^3g^2k^2l^2m + \\
& 11520a^6b^8c^2h^2j^2l^2m + 6912a^6b^8c^2g^2k^2l^2m + 4423680a^8b^3c^5 \\
& eek^2l^2m + 2506752a^8b^3c^5f^2j^2l^2m + 1843200a^8b^3c^5g^2j^2k^2m + 13271 \\
& 04a^8b^3c^5h^2j^2k^2l^2m + 838656a^7b^5c^4f^2j^2l^2m + 783360a^7b^5c^4g^2 \\
& j^2k^2m + 691200a^7b^5c^4h^2j^2k^2l^2m + 138240a^7b^5c^4eek^2l^2m + 69120a^6 \\
& b^7c^3h^2j^2k^2l^2m - 53760a^6b^7c^3f^2j^2l^2m + 18432a^6b^7c^3g^2j^2k^2m - \\
& 13824a^6b^7c^3eek^2l^2m - 2304a^5b^9c^2g^2j^2k^2m + 2543616a^8b^3c^5 \\
& g^2h^2l^2m + 829440a^7b^5c^4g^2h^2l^2m - 34560a^6b^7c^3g^2h^2l^2m - 8183808 \\
& a^8b^2c^6d^2j^2l^2m - 3686400a^8b^2c^6eek^2j^2k^2m - 2285568a^7b^4c^5d^2j^ \\
& ^2l^2m - 1695744a^8b^2c^6f^2j^2k^2l^2m - 1566720a^7b^4c^5eek^2j^2k^2m - 1400832 \\
& a^7b^4c^5f^2j^2k^2l^2m + 741888a^6b^6c^4d^2j^2l^2m - 253440a^6b^6c^4f^2j^2k^2l^2m
\end{aligned}$$

$*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 + 670032*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 - 387072$

$$\begin{aligned}
& 0*a^5*b^4*c^7*d*f*g*1 - 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*1 - 1566720*a^5*b^4*c^7*e*f*h*j + 1451520*a^4*b^6*c^6*d \\
& *f*g*1 - 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*1 + 124416*a^4*b^6*c^6*d*e*h*1 + 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*1 - 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*1 + 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*1 + 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*1 \\
& - 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*1 - 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*1 + 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*1^2*m + 12672*a^7*b^8*c*j*1*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*1*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*1 - 3538944*a^8*b*c^7*e*j^2*1 + 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*1 - 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*1 + 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*1 + 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*1^2*m - 552960*a^10*b^2*c^4*k*1^2*m - 34560*a^8*b \\
& ^6*c^2*k*1^2*m - 1290240*a^10*b^2*c^4*j*1*m^2 - 860160*a^9*b^4*c^3*j*1*m^2 \\
& - 80640*a^8*b^6*c^2*j*1*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*1^2*m - 552960*a^9*b^2*c^5*j*k^2*1 - 552960*a^8*b^4*c^4*j*k \\
& ^2*1 + 414720*a^8*b^5*c^3*h*1^2*m - 145152*a^7*b^6*c^3*j*k^2*1 - 17280*a^7* \\
& b^7*c^2*h*1^2*m - 3456*a^6*b^8*c^2*j*k^2*1 - 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*1*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*1*m^2 - 56160*a^6*b^7*c^3*h^2*k*m - 40320*a^7*b^7*c^2*g*1*m^2 + 27936*
\end{aligned}$$

$$\begin{aligned}
& 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^1 l^2 m - 1105920 a^7 b^4 c^5 g^2 k m - 921600 a^9 b^2 \\
& c^5 f^1 l^2 m - 829440 a^8 b^4 c^4 h k^1 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^1 l^2 + 317952 a^7 b^5 c^4 h \\
& j^2 m - 103680 a^7 b^6 c^3 h k^1 l^2 + 80640 a^7 b^6 c^3 f^1 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^1 k m^2 - 3870720 a^9 b^2 c^5 e^1 m^2 - 3755520 a^8 b^3 c^5 f^1 k^2 m + 300 \\
& 0960 a^8 b^4 c^4 f^1 k m^2 - 1290240 a^9 b^2 c^5 g^1 j m^2 - 1085760 a^7 b^5 c^ \\
& 4 f^1 k^2 m - 959040 a^6 b^5 c^5 f^2 k m - 860160 a^8 b^4 c^4 g^1 j m^2 + 82944 \\
& 0 a^8 b^3 c^5 g^1 k^2 m - 645120 a^8 b^4 c^4 e^1 m^2 - 552960 a^8 b^2 c^6 h^2 \\
& j^1 - 552960 a^7 b^4 c^5 h^2 j^1 + 414720 a^7 b^5 c^4 g^1 k^2 m - 145152 a^6 \\
& b^6 c^4 h^2 j^1 + 103200 a^5 b^7 c^4 f^2 k m - 80640 a^7 b^6 c^3 g^1 j m^2 + \\
& 80640 a^7 b^6 c^3 e^1 m^2 + 41280 a^7 b^6 c^3 f^1 k m^2 - 37188 a^6 b^8 c^2 f^ \\
& 1 k m^2 + 13536 a^6 b^7 c^3 f^1 k^2 m + 12672 a^6 b^8 c^2 g^1 j m^2 + 10368 a^6 \\
& b^7 c^3 g^1 k^2 m + 5490 a^5 b^9 c^2 f^1 k^2 m - 3456 a^5 b^8 c^3 h^2 j^1 - 23 \\
& 04 a^6 b^8 c^2 e^1 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^1 l^2 m - 4423680 a^7 b^2 c^7 e^2 k m - 2654208 a^8 b^ \\
& 3 c^5 g^1 j^1 l^2 - 2654208 a^7 b^3 c^6 g^2 j^1 + 1769472 a^8 b^2 c^6 g^1 j^2 m \\
& + 1769472 a^7 b^4 c^5 g^1 j^2 m - 1354752 a^7 b^5 c^4 d^1 l^2 m - 1327104 a^7 b^ \\
& 5 c^4 g^1 j^1 l^2 - 1327104 a^6 b^5 c^5 g^2 j^1 + 1271808 a^8 b^3 c^5 f^1 k^1 l^2 \\
& - 1040384 a^8 b^2 c^6 f^1 j^2 m - 697344 a^7 b^4 c^5 f^1 j^2 m - 516096 a^8 b^ \\
& 2 c^6 h^1 j^2 k - 451584 a^7 b^4 c^5 h^1 j^2 k + 442368 a^6 b^6 c^4 g^1 j^2 m + 4 \\
& 14720 a^7 b^5 c^4 f^1 k^1 l^2 - 138240 a^6 b^6 c^4 h^1 j^2 k - 138240 a^6 b^4 c^6 \\
& e^2 k m - 121856 a^6 b^6 c^4 f^1 j^2 m + 120960 a^6 b^7 c^3 d^1 l^2 m - 17280 a^ \\
& 6 b^7 c^3 f^1 k^1 l^2 + 13824 a^5 b^6 c^5 e^2 k m - 11520 a^5 b^8 c^3 h^1 j^2 k \\
& + 8960 a^5 b^8 c^3 f^1 j^2 m + 10851840 a^8 b^2 c^6 d^1 k^2 m - 10464768 a^6 b^ \\
& 3 c^7 d^2 k m - 10275840 a^8 b^3 c^5 d^1 k m^2 + 7121088 a^5 b^5 c^6 d^2 k m \\
& + 3127680 a^7 b^4 c^5 d^1 k^2 m + 1720320 a^8 b^3 c^5 e^1 j m^2 - 1658880 a^8 b^ \\
& 2 c^6 e^1 k^2 m - 1290240 a^7 b^2 c^7 f^2 j^1 + 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^1 k m^2 - 860160 a^6 b^ \\
& 4 c^6 f^2 j^1 - 829440 a^7 b^4 c^5 e^1 k^2 m - 705024 a^6 b^6 c^4 d^1 k^2 m - 5 \\
& 52960 a^8 b^2 c^6 g^1 j^1 k^2 - 552960 a^7 b^4 c^5 g^1 j^1 k^2 + 414720 a^6 b^5 c^5 \\
& g^2 h m + 319392 a^6 b^7 c^3 d^1 k m^2 + 161280 a^7 b^5 c^4 e^1 j m^2 - 145152 \\
& a^6 b^6 c^4 g^1 j^1 k^2 - 85734 a^5 b^9 c^2 d^1 k m^2 - 80640 a^5 b^6 c^5 f^2 j^1 \\
& l - 25344 a^6 b^7 c^3 e^1 j m^2 + 23490 a^3 b^9 c^4 d^2 k m - 20736 a^6 b^6 c^ \\
& 4 e^1 k^2 m - 17280 a^5 b^7 c^4 g^2 h m + 14148 a^5 b^8 c^3 d^1 k^2 m + 13716 a^ \\
& 2 b^11 c^3 d^2 k m + 12690 a^4 b^10 c^2 d^1 k^2 m + 12672 a^4 b^8 c^4 f^2 j^ \\
& 1 - 3456 a^5 b^8 c^3 g^1 j^1 k^2 + 768 a^5 b^9 c^2 e^1 j m^2 - 384 a^3 b^10 c^3 f^ \\
& 2 j^1 + 5308416 a^8 b^2 c^6 e^1 j^1 l^2 - 5308416 a^6 b^3 c^7 e^2 j^1 - 51425 \\
& 28 a^8 b^3 c^5 f^1 h m^2 + 5068800 a^7 b^2 c^7 f^2 h m - 3755520 a^7 b^3 c^6 f^ \\
& 1 h^2 m - 3538944 a^7 b^3 c^6 e^1 j^2 m + 3000960 a^6 b^4 c^6 f^2 h m + 26542 \\
& 08 a^7 b^4 c^5 e^1 j^1 l^2 - 2322432 a^8 b^2 c^6 d^1 k^1 l^2 + 2125824 a^7 b^3 c^6 d^ \\
& 1 j^2 m - 1990656 a^7 b^4 c^5 d^1 k^1 l^2 - 1085760 a^6 b^5 c^5 f^1 h^2 m - 95904 \\
& 0 a^7 b^5 c^4 f^1 h m^2 - 884736 a^6 b^5 c^5 e^1 j^2 m + 829440 a^7 b^3 c^6 g^1 h^ \\
& 2 m + 749568 a^7 b^3 c^6 f^1 j^2 k + 518400 a^6 b^6 c^4 d^1 k^1 l^2 + 414720 a^6 \\
& b^5 c^5 g^1 h^2 m + 317952 a^6 b^5 c^5 f^1 j^2 k + 133632 a^6 b^5 c^5 d^1 j^2 m \\
& + 103200 a^6 b^7 c^3 f^1 h m^2 - 96768 a^5 b^7 c^4 d^1 j^2 m - 51840 a^5 b^8 c^ \\
& 3 d^1 k^1 l^2 + 41280 a^5 b^6 c^5 f^2 h m + 38400 a^5 b^7 c^4 f^1 j^2 k - 37188 a^ \\
& 4 b^8 c^4 f^2 h m + 13536 a^5 b^7 c^4 f^1 h^2 m + 13440 a^4 b^9 c^3 d^1 j^2 m \\
& + 10368 a^5 b^7 c^4 g^1 h^2 m + 5490 a^4 b^9 c^3 f^1 h^2 m + 1980 a^3 b^10 c^3 f^ \\
& 2 h m - 1920 a^4 b^9 c^3 f^1 j^2 k + 810 a^5 b^9 c^2 f^1 h m^2 - 180 a^3 b^11 \\
& c^2 f^1 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^1 + 1658880 a^6 b^3 c^7 e^2 h m + 1596672 a^4 b^6 c^ \\
& 6 d^2 j^1 - 1419264 a^6 b^4 c^6 f^1 g^2 m - 1105920 a^7 b^4 c^5 f^1 h^1 l^2 + 11 \\
& 05920 a^7 b^3 c^6 e^1 j^1 k^2 - 921600 a^7 b^2 c^7 f^1 g^2 m - 829440 a^6 b^4 c^6 \\
& g^2 h k - 552960 a^8 b^2 c^6 f^1 h^1 l^2 - 508032 a^3 b^8 c^5 d^2 j^1 - 331776 \\
& a^7 b^2 c^7 g^2 h k + 290304 a^6 b^5 c^5 e^1 j^1 k^2 - 103680 a^5 b^6 c^5 g^2 h \\
& k + 80640 a^5 b^6 c^5 f^1 g^2 m - 69120 a^5 b^5 c^6 e^2 h m + 65664 a^2 b^1
\end{aligned}$$

$$\begin{aligned}
& 0*c^4*d^2*j*1 - 34560*a^6*b^6*c^4*f*h*1^2 + 6912*a^5*b^7*c^4*e*j*k^2 + 3456 \\
& *a^5*b^8*c^3*f*h*1^2 + 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*1 - 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*1 - 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*1 - 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*1 + 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*1 + 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*1 - 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*1 - 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*1 - 7962624*a \\
& ^7*b^3*c^6*e*g*1^2 - 7962624*a^6*b^3*c^7*e*g^2*1 + 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*1^2 - 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*1 - 568320*a^6*b^4*c^6*f*h*j^2 - 414720*a^6*b^5*c^5*d*h*1 \\
& ^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*1^2 - 17280*a^4*b^7*c^5*f*g^2*k + 10368*a^4*b^9*c^3*d \\
& *h*1^2 - 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*1 - 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*1 + 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*1 - 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*1 + 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*1 - 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*1 - 80640*a^4*b^6*c^6*f^2*g*j + 80640*a^4*b^6*c^6*e*f^2*1 - 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*1 - 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*1 \\
& ^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*1 \\
& ^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*1^2 + 17418240*a^4*b^4*c^8*d^2*e* \\
& 1 + 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*1^2 - 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* \\
& 1^2 + 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*
\end{aligned}$$

$j - 10063872a^6b^3c^7d^2fk^2 - 3919104a^3b^6c^7d^2e^1 + 2554560a^4b^5c^7d^2fk + 1720320a^5b^3c^8e^2f^2j + 1596672a^3b^6c^7d^2g^2j + 1518912a^3b^6c^7d^2fk - 1105920a^5b^4c^7fg^2h + 838080a^5b^5c^6d^2fk^2 - 552960a^6b^2c^8fg^2h - 508032a^2b^8c^6d^2g^2j + 435456a^2b^8c^6d^2e^1 + 161280a^4b^5c^7e^2f^2j + 116640a^4b^7c^5d^2fk^2 + 106812a^2b^8c^6d^2fk - 98208a^3b^7c^6d^2fk - 34560a^4b^6c^6fg^2h - 27270a^3b^9c^4d^2fk^2 - 26334a^2b^9c^5d^2fk - 25344a^3b^7c^6e^2f^2j + 3456a^3b^8c^5fg^2h + 768a^2b^9c^5e^2f^2j - 702a^2b^11c^3d^2fk^2 - 7962624a^5b^2c^9d^2e^2k - 2580480a^6b^2c^8d^2f^2j + 2073600a^4b^4c^8d^2e^2k - 1658880a^6b^2c^8e^2g^2h - 967680a^5b^4c^7d^2f^2j - 829440a^5b^4c^7e^2g^2h - 207360a^3b^6c^7d^2e^2k + 64512a^4b^6c^6d^2f^2j + 39168a^3b^8c^5d^2f^2j - 20736a^4b^6c^6e^2g^2h - 9216a^2b^10c^4d^2f^2j - 4423680a^5b^2c^9e^2fh + 4147200a^5b^3c^8d^2g^2h - 3193344a^3b^5c^8d^2e^2j + 1016064a^2b^7c^7d^2e^2j - 414720a^4b^5c^7d^2g^2h - 138240a^4b^4c^8e^2fh - 31104a^3b^7c^6d^2g^2h + 13824a^3b^6c^7e^2fh + 10368a^2b^9c^5d^2g^2h + 15630336a^5b^2c^9d^2f^2h - 14459904a^4b^3c^9d^2fh + 9630144a^3b^5c^8d^2fh - 8764416a^5b^3c^8d^2fh - 3870720a^5b^2c^9e^2fg + 2867328a^4b^4c^8d^2fh - 2095200a^2b^7c^7d^2fh - 1414080a^3b^6c^7d^2fh - 34836480a^4b^2c^10d^2eg - 645120a^4b^4c^8e^2fg + 306720a^3b^7c^6d^2fh + 197820a^2b^8c^6d^2fh + 146880a^4b^5c^7d^2fh + 80640a^3b^6c^7e^2fg - 55350a^2b^9c^5d^2fh - 2304a^2b^8c^6e^2fg - 3870720a^5b^2c^9d^2fg^2 - 1935360a^4b^4c^8d^2fg^2 - 1658880a^4b^3c^9d^2e^2h + 725760a^3b^6c^7d^2fg^2 + 17418240a^3b^4c^9d^2eg - 124416a^3b^5c^8d^2e^2h - 96768a^2b^8c^6d^2fg^2 + 41472a^2b^7c^7d^2e^2h - 3919104a^2b^6c^8d^2eg - 7741440a^4b^2c^10d^2e^2f + 2903040a^3b^4c^9d^2e^2f - 387072a^2b^6c^8d^2e^2f - 20160a^8b^7c^12m^2 - 1648128a^10b^3c^3k^3m^3 - 898560a^9b^3c^4k^3m - 354240a^9b^5c^2k^3m^3 - 354240a^8b^5c^3k^3m - 21600a^7b^7c^2k^3m - 13950a^7b^8c^2k^2m^2 + 430080a^10b^3c^5j^2m^2 - 1984a^6b^9c^2j^2m^2 - 884736a^9b^3c^4j^2m^2 - 589824a^8b^3c^5j^3m^1 - 442368a^8b^5c^3j^3m^1 - 294912a^7b^5c^4j^3m^1 - 49152a^6b^7c^3j^3m^1 + 1359360a^10b^2c^4h^3m^3 + 1173120a^9b^4c^3h^3m^3 + 743040a^7b^4c^5h^3m + 622080a^8b^2c^6h^3m + 184320a^9b^3c^6j^2k^2 + 107136a^6b^6c^4h^3m - 32640a^8b^6c^2h^3m + 540a^5b^8c^3h^3m - 270a^4b^10c^2h^3m - 180a^5b^10c^2h^2m^2 - 2293760a^9b^3c^4f^3m - 2293760a^6b^3c^7f^3m + 1327104a^8b^4c^4g^3m + 1327104a^6b^4c^6g^3m - 622080a^8b^3c^5h^3k^3 - 622080a^7b^3c^6h^3k - 326592a^7b^5c^4h^3k - 326592a^6b^5c^5h^3k - 199360a^8b^5c^3f^3m - 199360a^5b^5c^6f^3m + 61920a^7b^7c^2f^3m + 61920a^4b^7c^5f^3m - 38880a^6b^7c^3h^3k - 38880a^5b^7c^4h^3k - 3682a^3b^9c^4f^3m - 810a^5b^9c^2h^3k - 810a^4b^9c^3h^3k - 70a^3b^12c^2f^2m^2 + 70a^2b^11c^3f^3m + 3870720a^8b^3c^7e^2m^2 + 184320a^8b^3c^7h^2j^2 - 14152320a^4b^4c^8d^3m + 10644480a^5b^2c^9d^3m + 5483520a^9b^2c^5d^3m + 4269888a^3b^6c^7d^3m - 2654208a^8b^3c^5e^1m + 1359360a^6b^2c^8f^3k + 1330560a^8b^4c^4d^3m + 1173120a^5b^4c^7f^3k - 884736a^6b^3c^7g^3j - 826560a^7b^6c^3d^3m + 743040a^7b^4c^5f^3k + 622080a^8b^2c^6f^3k - 607068a^2b^8c^6d^3m - 589824a^7b^3c^6g^3j - 442368a^5b^5c^6g^3j - 294912a^6b^5c^5g^3j + 145188a^6b^8c^2d^3m + 107136a^6b^6c^4f^3k - 49152a^5b^7c^4g^3j - 32640a^4b^6c^6f^3k - 5796a^3b^8c^5f^3k + 540a^5b^8c^3f^3k - 270a^4b^10c^2f^3k + 210a^2b^10c^4f^3k + 19077120a^4b^3c^9d^3k + 1658880a^7b^3c^8e^2k^2 + 430080a^7b^3c^8f^2j^2 + 3538944a^5b^2c^9e^3j - 2488320a^7b^3c^6d^3k - 2379456a^3b^5c^8d^3k + 1179648a^7b^2c^7e^3j + 589824a^6b^4c^6e^3j + 98304a^5b^6c^5e^3j - 95904a^2b^7c^7d^3k - 57024a^6b^5c^5d^3k + 49248a^5b^7c^4d^3k - 4050a^4b^9c^3d^3k - 810a^3b^11c^2d^3k - 486a^3b^12c^3d^2k^2 + 3870720a^6b^3c^9d^2j^2 - 1648128a^5b^3c^8f^3h - 898560a^6b^3c^7f^3h - 354240a^5b^5c^6f^3h - 354240a^4b^5c^7f^3h$

$$\begin{aligned}
& + 43680a^3b^7c^6f^3h - 21600a^4b^7c^5f^3h^3 - 9792a^5b^7c^4d^2j \\
& \quad ^2 + 1350a^3b^9c^4f^3h^3 - 1050a^2b^9c^5f^3h + 1658880a^6b^9c^2h^2 + 16547328a^4b^2c^10d^3h - 12306816a^3b^4c^9d^3h + 37310976 \\
& \quad *a^3b^3c^10d^3f + 3037824a^2b^6c^8d^3h - 2654208a^5b^3c^8e^3g^3 \\
& \quad + 1949184a^6b^2c^8d^3h^3 + 1296000a^5b^4c^7d^3h^3 - 155520a^4b^6c^6d^3h^3 - 40500a^5b^10c^5d^2h^2 - 8100a^3b^8c^5d^3h^3 + 4050a^2b^1 \\
& \quad 0c^4d^3h^3 + 3870720a^5b^9c^10e^2f^2 + 34836480a^4b^9c^11d^2e^2 - 10 \\
& \quad 8864a^5b^9c^6d^2g^2 - 8068032a^2b^5c^9d^3f - 5623296a^4b^3c^9d^3 \\
& \quad f^3 + 1737792a^3b^5c^8d^3f^3 - 260190a^5b^8c^7d^2f^2 - 211680a^2b^7 \\
& \quad *c^7d^3f^3 - 435456a^5b^7c^8d^2e^2 - 245760a^10c^6j^2k^3m - 384a^6b^ \\
& \quad ^10j^1l^2m^2 + 138240a^10c^6h^2k^2m - 90a^5b^11h^2k^2m^2 + 384000a^10c^ \\
& \quad ^6f^2k^2m^2 - 2211840a^8c^8e^2k^3m - 409600a^9c^7f^2j^2m - 147456a^9c^ \\
& \quad ^7h^2j^2k - 30a^4b^12f^2k^2m^2 + 967680a^9c^7d^2k^2m + 384000a^8c^8 \\
& \quad *f^2h^2m - 90a^3b^13d^2k^2m^2 + 20321280a^7c^9d^2h^2m - 883200a^11b^9c^ \\
& \quad ^4k^2m^3 - 317952a^10b^9c^5k^3m + 43680a^8b^7c^2k^3m^3 + 1350a^6b^9c^ \\
& \quad *k^3m - 270b^14c^2d^2h^2m + 6a^3b^13f^2h^2m^2 + 4838400a^9c^7d^2h^2m^ \\
& \quad 2 + 2903040a^8c^8d^2h^2m - 1032192a^8c^8d^2j^2k + 138240a^8c^8f^2h^ \\
& \quad 2k - 3686400a^7c^9e^2f^2m - 1327104a^7c^9e^2h^2k - 393216a^9b^9c^6 \\
& \quad j^3l - 245760a^8c^8f^2h^2j^2 - 810b^13c^3d^2h^2k + 630b^13c^3d^2f^2 \\
& \quad m + 18a^2b^14d^2h^2m^2 + 2688000a^7c^9d^2f^2m + 580608a^8c^8d^2h^2k^2 \\
& \quad - 5796a^7b^8c^2h^2m^3 - 3456b^12c^4d^2g^2j + 1890b^12c^4d^2f^2k + 67 \\
& \quad 73760a^6c^10d^2f^2k - 1344000a^10b^9c^5f^2m^3 - 1344000a^7b^9c^8f^3m \\
& \quad - 207360a^9b^9c^6h^2k^3 - 207360a^8b^9c^7h^3k - 3682a^6b^9c^2f^2m^3 - \\
& \quad 9289728a^6c^10d^2e^2k - 1720320a^7c^9d^2f^2j^2 - 50803200a^5b^9c^10d^ \\
& \quad ^3k + 6912b^11c^5d^2e^2j - 10616832a^6b^9c^9e^3l - 2211840a^6c^10e^ \\
& \quad ^2f^2h - 393216a^8b^9c^7g^2j^3 + 43416a^5b^10c^5d^3m - 9576a^5b^10c^ \\
& \quad *d^3m^3 - 9450b^11c^5d^2f^2h - 504a^5b^14c^2d^2m^2 + 1612800a^6c^10d^ \\
& \quad f^2h - 1036800a^8b^9c^7d^2k^3 + 45198a^5b^9c^6d^3k - 20736b^10c^6d^ \\
& \quad 2e^2g - 75188736a^4b^9c^11d^3f - 883200a^6b^9c^9f^3h - 317952a^7b^9c^ \\
& \quad ^8f^2h^3 - 15482880a^5c^11d^2e^2f - 10616832a^5b^9c^10e^3g - 345060a^ \\
& \quad *b^8c^7d^3h - 4262400a^5b^9c^10d^2f^3 + 852768a^5b^7c^8d^3f + 7350a^ \\
& \quad *b^9c^6d^2f^3 + 967680a^10b^3c^3l^2m^2 + 161280a^9b^5c^2l^2m^2 + \\
& \quad 1684224a^10b^2c^4k^2m^2 + 1264320a^9b^4c^3k^2m^2 + 126720a^8b^ \\
& \quad 6c^2k^2m^2 + 501760a^9b^3c^4j^2m^2 + 414720a^9b^3c^4k^2l^2 + 2 \\
& \quad 07360a^8b^5c^3k^2l^2 + 170240a^8b^5c^3j^2m^2 + 9216a^7b^7c^2j^ \\
& \quad ^2m^2 + 5184a^7b^7c^2k^2l^2 + 884736a^9b^2c^5j^2l^2 + 884736a^8 \\
& \quad *b^4c^4j^2l^2 + 221184a^7b^6c^3j^2l^2 + 1419840a^8b^4c^4h^2m^2 \\
& \quad + 1387008a^9b^2c^5h^2m^2 + 276480a^8b^3c^5j^2k^2 + 140544a^7b^ \\
& \quad 5c^4j^2k^2 + 84960a^7b^6c^3h^2m^2 + 25344a^6b^7c^3j^2k^2 - 801 \\
& \quad 0a^6b^8c^2h^2m^2 + 576a^5b^9c^2j^2k^2 + 967680a^8b^3c^5g^2m^ \\
& \quad 2 + 414720a^8b^3c^5h^2l^2 + 207360a^7b^5c^4h^2l^2 + 161280a^7b^ \\
& \quad 5c^4g^2m^2 - 20160a^6b^7c^3g^2m^2 + 5184a^6b^7c^3h^2l^2 + 576a^ \\
& \quad ^5b^9c^2g^2m^2 + 3808000a^8b^2c^6f^2m^2 + 1990656a^7b^4c^5g^2 \\
& \quad *l^2 + 1643712a^7b^4c^5f^2m^2 + 803520a^7b^4c^5h^2k^2 + 725760a^ \\
& \quad 8b^2c^6h^2k^2 + 207360a^6b^6c^4h^2k^2 - 125440a^6b^6c^4f^2m^2 \\
& \quad - 13790a^5b^8c^3f^2m^2 + 10530a^5b^8c^3h^2k^2 + 1785a^4b^10c^ \\
& \quad 2f^2m^2 + 81a^4b^10c^2h^2k^2 + 18427392a^7b^2c^7d^2m^2 + 967680 \\
& \quad *a^7b^3c^6f^2l^2 + 645120a^7b^3c^6e^2m^2 + 414720a^7b^3c^6g^2k^ \\
& \quad ^2 + 276480a^7b^3c^6h^2j^2 + 207360a^6b^5c^5g^2k^2 + 161280a^6b^ \\
& \quad ^5c^5f^2l^2 + 140544a^6b^5c^5h^2j^2 - 80640a^6b^5c^5e^2m^2 + \\
& \quad 25344a^5b^7c^4h^2j^2 - 20160a^5b^7c^4f^2l^2 + 5184a^5b^7c^4g^ \\
& \quad 2k^2 + 2304a^5b^7c^4e^2m^2 + 576a^4b^9c^3h^2j^2 + 576a^4b^9c^ \\
& \quad 3f^2l^2 + 7962624a^7b^2c^7e^2l^2 - 4148928a^6b^4c^6d^2m^2 + 141 \\
& \quad 9840a^6b^4c^6f^2k^2 + 1387008a^7b^2c^7f^2k^2 - 1183392a^5b^6c^ \\
& \quad 5d^2m^2 + 884736a^7b^2c^7g^2j^2 + 884736a^6b^4c^6g^2j^2 + 64575 \\
& \quad 0a^4b^8c^4d^2m^2 + 221184a^5b^6c^5g^2j^2 - 115920a^3b^10c^3d^ \\
& \quad 2m^2 + 84960a^5b^6c^5f^2k^2 + 10836a^2b^12c^2d^2m^2 - 8010a^4b^ \\
& \quad ^8c^4f^2k^2 - 180a^3b^10c^3f^2k^2 + 9a^2b^12c^2f^2k^2 + 870912 \\
& \quad 0a^6b^3c^7d^2l^2 - 4354560a^5b^5c^6d^2l^2 + 979776a^4b^7c^5d^
\end{aligned}$$

$$\begin{aligned}
& 2*1^2 + 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*1 \\
& ^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*1^2 - 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*1^2*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*1^4 + 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 \\
& *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*1 - 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*1 - 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 +
\end{aligned}$$

$$\begin{aligned}
& 178176a^5b^5c^6d^*j + 270336a^6b^3c^7d^*j + 2304a^4b^8c^4g^*h + 9 \\
& 216a^5b^6c^5g^*h - 184320a^6b^4c^6g^*h + 442368a^7b^2c^7g^*h + 230 \\
& 4a^3b^10c^3d^*l - 256a^3b^10c^3f^*j - 43776a^4b^8c^4d^*l + 6144a^4 \\
& 4b^8c^4f^*j + 340992a^5b^6c^5d^*l + 27648a^5b^6c^5e^*k - 17408a^5b^6 \\
& b^6c^5f^*j - 1216512a^6b^4c^6d^*l - 184320a^6b^4c^6e^*k - 69632a^6b^4 \\
& b^4c^6f^*j + 1622016a^7b^2c^7d^*l + 147456a^7b^2c^7e^*k + 147456a^7 \\
& *b^2c^7f^*j + 768a^4b^9c^3f^*l - 768a^4b^9c^3h^*j + 1536a^5b^7c^4 \\
& *e^*m - 19968a^5b^7c^4f^*l - 13824a^5b^7c^4g^*k - 4608a^5b^7c^4h^*j \\
& - 92160a^6b^5c^5e^*m + 92160a^6b^5c^5f^*l + 92160a^6b^5c^5g^*k + \\
& 55296a^6b^5c^5h^*j + 663552a^7b^3c^6e^*m + 24576a^7b^3c^6f^*l - 73 \\
& 728a^7b^3c^6g^*k - 24576a^7b^3c^6h^*j - 768a^5b^8c^3g^*m + 2304a^5 \\
& 5b^8c^3h^*l + 46080a^6b^6c^4g^*m + 9216a^6b^6c^4h^*l - 331776a^7b^4 \\
& ^4c^5g^*m - 184320a^7b^4c^5h^*l + 638976a^8b^2c^6g^*m + 442368a^8b^2 \\
& ^2c^6h^*l + 4608a^5b^8c^3j^*k - 21504a^6b^6c^4j^*k - 36864a^7b^4c^5 \\
& ^5j^*k + 147456a^8b^2c^6j^*k + 256a^5b^9c^2j^*m - 14848a^6b^7c^3j^* \\
& *m - 13824a^6b^7c^3k^*l + 79872a^7b^5c^4j^*m + 92160a^7b^5c^4k^*l \\
& + 8192a^8b^3c^5j^*m - 73728a^8b^3c^5k^*l - 768a^6b^8c^2l^*m + 4608 \\
& 0a^7b^6c^3l^*m - 331776a^8b^4c^4l^*m + 638976a^9b^2c^5l^*m)/(512*(\\
& 4096a^10c^7 + a^4b^12c - 24a^5b^10c^2 + 240a^6b^8c^3 - 1280a^7b^6 \\
& ^6c^4 + 3840a^8b^4c^5 - 6144a^9b^2c^6)) + (x*(25600a^7c^9f^2 - 18 \\
& *b^12c^4d^2 - 451584a^6c^10d^2 - 9216a^8c^8h^2 + 9216a^9c^7k^2 - \\
& 2a^4b^12m^2 - 25600a^10c^6m^2 + 504a*b^10c^5d^2 + 73728a^6b*c^9 \\
& *e^2 + 8192a^8b*c^7j^2 + 88a^5b^10c^m^2 - 6228a^2b^8c^6d^2 + 4262 \\
& 4a^3b^6c^7d^2 - 176256a^4b^4c^8d^2 + 423936a^5b^2c^9d^2 + 4608* \\
& a^4b^5c^7e^2 - 36864a^5b^3c^8e^2 - 2a^2b^10c^4f^2 + 84a^3b^8c^5 \\
& ^5f^2 - 3520a^4b^6c^6f^2 + 26240a^5b^4c^7f^2 - 59904a^6b^2c^8f^2 \\
& ^2 + 1152a^4b^7c^5g^2 - 9216a^5b^5c^6g^2 + 18432a^6b^3c^7g^2 - \\
& 468a^4b^8c^4h^2 + 3456a^5b^6c^5h^2 - 5760a^6b^4c^6h^2 + 128a^4 \\
& *b^9c^3j^2 - 512a^5b^7c^4j^2 - 1536a^6b^5c^5j^2 + 4096a^7b^3c^6 \\
& ^6j^2 - 18a^4b^10c^2k^2 - 108a^5b^8c^3k^2 + 576a^6b^6c^4k^2 + 5 \\
& 760a^7b^4c^5k^2 - 23040a^8b^2c^6k^2 + 1152a^6b^7c^3l^2 - 9216a^7 \\
& ^7b^5c^4l^2 + 18432a^8b^3c^5l^2 - 1236a^6b^8c^2m^2 + 5760a^7b^6 \\
& ^6c^3m^2 - 8320a^8b^4c^4m^2 + 6144a^9b^2c^5m^2 - 129024a^7c^9d* \\
& h - 215040a^8c^8d^*m + 30720a^8c^8f^*k - 30720a^9c^7h^*m - 12a*b^11 \\
& ^11c^4d^*f + 218112a^6b*c^9d^*f + 9216a^7b*c^8f^*h + 156672a^7b*c^8d^*k \\
& + 49152a^7b*c^8e^*j + 25600a^8b*c^7f^*m + 9216a^8b*c^7h^*k - 12a^4b \\
& ^11c^k^*m + 21504a^9b*c^6k^*m + 420a^2b^9c^5d^*f - 4992a^3b^7c^6d^* \\
& f + 36480a^4b^5c^7d^*f - 144384a^5b^3c^8d^*f - 36a^2b^10c^4d^*h + \\
& 360a^3b^8c^5d^*h - 3456a^4b^6c^6d^*h - 4608a^4b^6c^6e^*g + 11520a^5 \\
& ^5b^4c^7d^*h + 36864a^5b^4c^7e^*g + 27648a^6b^2c^8d^*h - 73728a^6b^2 \\
& ^2c^8e^*g - 12a^3b^9c^4f^*h + 2304a^4b^7c^5f^*h - 17280a^5b^5c^6 \\
& ^6f^*h + 30720a^6b^3c^7f^*h + 180a^3b^9c^4d^*k - 2304a^4b^7c^5d^*k + \\
& 1536a^4b^7c^5e^*j + 19584a^5b^5c^6d^*k - 9216a^5b^5c^6e^*j - 9216 \\
& 0a^6b^3c^7d^*k - 168a^4b^8c^4d^*m - 360a^4b^8c^4f^*k - 768a^4b^8 \\
& ^8c^4g^*j + 768a^5b^6c^5d^*m - 4608a^5b^6c^5e^*l - 768a^5b^6c^5f^*k \\
& + 4608a^5b^6c^5g^*j - 11520a^6b^4c^6d^*m + 36864a^6b^4c^6e^*l + 2 \\
& 5344a^6b^4c^6f^*k + 98304a^7b^2c^7d^*m - 73728a^7b^2c^7e^*l - 7372 \\
& 8a^7b^2c^7f^*k - 24576a^7b^2c^7g^*j - 140a^4b^9c^3f^*m + 180a^4b^9 \\
& ^9c^3h^*k + 3584a^5b^7c^4f^*m + 2304a^5b^7c^4g^*l - 20352a^6b^5c^5 \\
& ^5f^*m - 18432a^6b^5c^5g^*l - 8064a^6b^5c^5h^*k + 26624a^7b^3c^6f^* \\
& m + 36864a^7b^3c^6g^*l + 18432a^7b^3c^6h^*k + 60a^4b^10c^2h^*m - 1 \\
& 560a^5b^8c^3h^*m + 8832a^6b^6c^4h^*m - 13056a^7b^4c^5h^*m + 3072a^8 \\
& ^8b^2c^6h^*m - 768a^5b^8c^3j^*l + 4608a^6b^6c^4j^*l - 24576a^8b^2 \\
& ^2c^6j^*l + 228a^5b^9c^2k^*m + 384a^6b^7c^3k^*m - 9600a^7b^5c^4k^*m \\
& + 15360a^8b^3c^5k^*m))/(64*(4096a^10c^7 + a^4b^12c - 24a^5b^10c^2 \\
& + 240a^6b^8c^3 - 1280a^7b^6c^4 + 3840a^8b^4c^5 - 6144a^9b^2c^6)) \\
& + (35a^6b^7m^3 - 8000a^5c^8f^3 - 1728a^8c^5k^3 - 567b^7c^6d^3 \\
& + 10368a*b^5c^7d^3 + 169344a^3b*c^9d^3 + 193536a^4c^9d^e^2 - 1 \\
& 41120a^4c^9d^2f + 1728a^6b*c^6h^3 + 315b^8c^5d^2f + 27648a^5c^
\end{aligned}$$

$$\begin{aligned}
& 8e^{2h} - 135b^9c^4d^2h + 21504a^6c^7d^2j^2 - 2880a^6c^7f^2h^2 - 84 \\
& 672a^5c^8d^2k - 1176a^7b^5c^3m^3 + 6400a^9b^3c^3m^3 + 3a^2b^{11}d^* \\
& m^2 + 27b^{10}c^3d^2k - 14400a^6c^7f^2k - 8640a^7c^6f^2k^2 + a^3b^ \\
& 10f^2m^2 + 46080a^6c^7e^2m + 3072a^7c^6h^2j^2 + 9b^{11}c^2d^2m - 17 \\
& 28a^7c^6h^2k - 8000a^8c^5f^2m^2 + 3a^4b^9h^2m^2 - 15a^5b^8k^2m^2 \\
& + 5120a^8c^5j^2m - 4800a^9c^4k^2m^2 - 67824a^2b^3c^8d^3 + 35a^2* \\
& b^6c^5f^3 + 84a^3b^4c^6f^3 - 12720a^4b^2c^7f^3 + 540a^4b^5c^4* \\
& h^3 + 4320a^5b^3c^5h^3 - 135a^5b^6c^2k^3 - 1620a^6b^4c^3k^3 - 4 \\
& 752a^7b^2c^4k^3 + 9456a^8b^3c^2m^3 - 40320a^5c^8d^2f^2h + 129024a^ \\
& ^5c^8d^2e^2j - 67200a^6c^7d^2f^2m - 24192a^6c^7d^2h^2k + 18432a^6c^7e^* \\
& h^2j - 9600a^7c^6f^2h^2m - 40320a^7c^6d^2k^2m + 30720a^7c^6e^2j^2m - 5760 \\
& *a^8c^5h^2k^2m - 6237a^2b^6c^6d^2f + 210a^2b^7c^5d^2f^2 + 116160a^4b^* \\
& c^8d^2f^2 - 36864a^4b^3c^8e^2f + 2430a^2b^7c^5d^2h + 133056a^4b^3c^8 \\
& *d^2h + 27648a^5b^3c^7d^2h^2 + 26880a^5b^3c^7f^2h^2 - 297a^2b^8c^4d^2* \\
& k + 46656a^6b^3c^6d^2k^2 - 27648a^5b^3c^7e^2k - 4096a^6b^3c^6f^2j^2 - \\
& 324a^2b^9c^3d^2m - 132a^3b^9c^3d^2m^2 + 193536a^5b^3c^7d^2m + 63360* \\
& a^7b^3c^5d^2m^2 - 51a^4b^8c^3f^2m^2 + 40000a^6b^3c^6f^2m + 10368a^7b^* \\
& c^5h^2k^2 - 78a^5b^7c^3h^2m^2 + 8064a^7b^3c^5h^2m - 3072a^7b^3c^5j^2* \\
& k + 12480a^8b^3c^4h^2m^2 - 90a^5b^7c^3k^2m + 705a^6b^6c^3k^2m^2 + 1555 \\
& 2a^8b^3c^4k^2m + 6912a^2b^4c^7d^2e^2 - 62208a^3b^2c^8d^2e^2 + 4237 \\
& 2a^2b^4c^7d^2f - 1764a^2b^5c^6d^2f^2 - 96048a^3b^2c^8d^2f - 46 \\
& 08a^3b^3c^7d^2f^2 + 1728a^2b^6c^5d^2g^2 + 2304a^3b^3c^7e^2f - 15 \\
& 552a^3b^4c^6d^2g^2 + 48384a^4b^2c^7d^2g^2 - 13716a^2b^5c^6d^2h + \\
& 405a^2b^7c^4d^2h^2 + 12096a^3b^3c^7d^2h - 5400a^3b^5c^5d^2h^2 + \\
& 28944a^4b^3c^6d^2h^2 + 576a^3b^5c^5f^2g^2 + 6912a^4b^2c^7e^2h - \\
& 9216a^4b^3c^6f^2g^2 - 15a^2b^7c^4f^2h + 192a^2b^8c^3d^2j^2 - 36 \\
& 0a^3b^5c^5f^2h - 960a^3b^6c^4d^2j^2 + 135a^3b^6c^4f^2h + 15696 \\
& *a^4b^3c^6f^2h - 768a^4b^4c^5d^2j^2 - 5580a^4b^4c^5f^2h + 14592 \\
& *a^5b^2c^6d^2j^2 - 20592a^5b^2c^6f^2h^2 - 999a^2b^6c^5d^2k + 27a^ \\
& ^2b^9c^2d^2k^2 + 23004a^3b^4c^6d^2k - 108a^3b^7c^3d^2k^2 - 84240* \\
& a^4b^2c^7d^2k + 1728a^4b^4c^5g^2h - 1404a^4b^5c^4d^2k^2 + 6912* \\
& a^5b^2c^6g^2h + 14688a^5b^3c^5d^2k^2 + 64a^3b^7c^3f^2j^2 - 768a^ \\
& ^4b^5c^4f^2j^2 + 1728a^4b^6c^3d^2l^2 - 3840a^5b^3c^5f^2j^2 - 15552a^ \\
& ^5b^4c^4d^2l^2 + 48384a^6b^2c^5d^2l^2 + 3717a^2b^7c^4d^2m + 3a^2 \\
& *b^8c^3f^2k - 15192a^3b^5c^5d^2m + 135a^3b^6c^4f^2k + 9a^3b^ \\
& 8c^2f^2k^2 - 7920a^4b^3c^6d^2m - 2988a^4b^4c^5f^2k - 99a^4b^6* \\
& c^3f^2k^2 + 2079a^4b^7c^2d^2m^2 - 28272a^5b^2c^6f^2k - 4500a^5b^4 \\
& *c^4f^2k^2 - 14448a^5b^5c^3d^2m^2 - 20304a^6b^2c^5f^2k^2 + 37104a^6* \\
& b^3c^4d^2m^2 + 192a^4b^6c^3h^2j^2 + 2304a^5b^2c^6e^2m - 6912a^5b^ \\
& ^3c^5g^2k + 1536a^5b^4c^4h^2j^2 + 576a^5b^5c^3f^2l^2 + 3840a^6b^ \\
& ^2c^5h^2j^2 - 9216a^6b^3c^4f^2l^2 + a^2b^9c^2f^2m + 20a^3b^7c^3f^ \\
& ^2m - 1596a^4b^5c^4f^2m - 243a^4b^6c^3h^2k + 27a^4b^7c^2h^2k^ \\
& ^2 + 16736a^5b^3c^5f^2m - 5940a^5b^4c^4h^2k + 1728a^5b^5c^3h^2k^ \\
& ^2 + 875a^5b^6c^2f^2m^2 - 13392a^6b^2c^5h^2k + 10800a^6b^3c^4h^* \\
& k^2 - 2716a^6b^4c^3f^2m^2 - 39600a^7b^2c^4f^2m^2 + 576a^5b^4c^4g^ \\
& ^2m + 11520a^6b^2c^5g^2m + 1728a^6b^4c^3h^2l^2 + 6912a^7b^2c^4h^ \\
& *l^2 - 81a^4b^7c^2h^2m + 720a^5b^5c^3h^2m - 768a^5b^5c^3j^2k \\
& + 17136a^6b^3c^4h^2m - 3072a^6b^3c^4j^2k - 900a^6b^5c^2h^2m^2 \\
& + 22272a^7b^3c^3h^2m^2 + 64a^5b^6c^2j^2m + 1536a^6b^4c^3j^2m \\
& + 5376a^7b^2c^4j^2m - 6912a^7b^3c^3k^2l^2 + 1260a^6b^5c^2k^2m \\
& + 13248a^7b^3c^3k^2m - 6084a^7b^4c^2k^2m - 26256a^8b^2c^3k^2m^ \\
& ^2 + 576a^7b^4c^2l^2m + 11520a^8b^2c^3l^2m - 193536a^4b^3c^8d^2e^* \\
& g - 90a^2b^8c^4d^2f^2h - 27648a^5b^3c^7e^2g^2h + 18a^2b^9c^3d^2f^2k - 19353 \\
& 6a^5b^3c^7d^2e^2l + 147456a^5b^3c^7d^2f^2k - 64512a^5b^3c^7d^2g^2j - 24576* \\
& a^5b^3c^7e^2f^2j + 6a^2b^{10}c^2d^2f^2m + 84096a^6b^3c^6d^2h^2m - 46080a^6b^* \\
& c^6e^2g^2m - 27648a^6b^3c^6e^2h^2l + 33408a^6b^3c^6f^2h^2k - 9216a^6b^3c^6* \\
& g^2h^2j - 64512a^6b^3c^6d^2j^2l - 18432a^6b^3c^6e^2j^2k + 18a^2b^{10}c^2d^2k^2m \\
& + 6a^3b^9c^2f^2k^2m - 46080a^7b^3c^5e^2l^2m + 49920a^7b^3c^5f^2k^2m - 1536 \\
& 0a^7b^3c^5g^2j^2m - 9216a^7b^3c^5h^2j^2l + 18a^4b^8c^3h^2k^2m - 15360a^8b^
\end{aligned}$$

$$\begin{aligned}
& *c^4*j^1*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^1 + 8064*a^4*b^5*c^4*d*j^1 - 11520*a^5*b^3*c^5*d*j^1 \\
& - 9216*a^5*b^3*c^5*e*j^1*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^1 + 6552*a^5*b^4*c^4*d*k*m + 768*a^5*b^4*c^4*e*j^1*m + \\
& 5376*a^5*b^4*c^4*f*j^1 + 4608*a^5*b^4*c^4*g*j^1*k - 114336*a^6*b^2*c^5*d*k*m \\
& + 16896*a^6*b^2*c^5*e*j^1*m + 27648*a^6*b^2*c^5*e*k^1 + 12288*a^6*b^2*c^5*f*j \\
& *l + 9216*a^6*b^2*c^5*g*j^1*k - 186*a^4*b^7*c^2*f*k*m - 384*a^5*b^5*c^3*g*j^1*m \\
& - 1152*a^5*b^5*c^3*h*j^1 - 2304*a^6*b^3*c^4*e^1*m + 31584*a^6*b^3*c^4*f*k^1 \\
& m - 8448*a^6*b^3*c^4*g*j^1*m - 13824*a^6*b^3*c^4*g*k^1 - 6912*a^6*b^3*c^4*h^1*j \\
& *l + 342*a^5*b^6*c^2*h*k^1*m + 1152*a^6*b^4*c^3*g^1*m - 12600*a^6*b^4*c^3*h^1*k \\
& *m + 23040*a^7*b^2*c^4*g^1*m - 37728*a^7*b^2*c^4*h^1*k^1*m + 4608*a^6*b^4*c^3*j \\
& *k^1 + 9216*a^7*b^2*c^4*j^1*k^1 - 384*a^6*b^5*c^2*j^1*m - 8448*a^7*b^3*c^3*j^1 \\
& *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^1*m^2 - 3*a^5*b^ \\
& 8*l^1*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^1*k - 2880*a^7*c \\
& ^6*e*k^1*m - 1600*a^7*c^6*f*j^1*m - 576*a^7*c^6*h*j^1*k - 960*a^8*c^5*j^1*k^1*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^1*m^2 - 3*a^4*b^8*c*g^1*m^2 + 864*a^7*b*c^5*j^1 \\
& k^2 - 2304*a^7*b*c^5*j^2*l - 32*a^5*b^7*c*j^1*m^2 + 1280*a^8*b*c^4*j^1*m^2 + 10 \\
& 2*a^6*b^6*c^1*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^1^2 + \\
& 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^1*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^1*m^2 - 1296*a^6*b^2*c
\end{aligned}$$

$$\begin{aligned}
&^5g^k^2 + 1488a^6b^3c^4e^m^2 - 5184a^5b^3c^5g^2l - 5184a^6b^3c^4g^l^2 - 648a^5b^4c^4h^2l + 102a^5b^6c^2g^m^2 - 864a^6b^2c^5h^2l - 744a^6b^4c^3g^m^2 - 1920a^7b^2c^4g^m^2 + 9a^4b^7c^2j^k^2 + 162a^5b^5c^3j^k^2 + 720a^6b^3c^4j^k^2 - 576a^5b^5c^3j^2l - 2304a^6b^3c^4j^2l + 1728a^6b^4c^3j^l^2 + 3456a^7b^2c^4j^l^2 - 27a^5b^6c^2k^2l - 432a^6b^4c^3k^2l + 180a^6b^5c^2j^m^2 - 1296a^7b^2c^4k^2l + 1136a^7b^3c^3j^m^2 - 744a^7b^4c^2l^m^2 - 1920a^8b^2c^3l^m^2 - 36a^6b^6c^6d^e^f + 18a^6b^7c^5d^f^g + 15552a^4b^6c^8d^e^h + 10080a^4b^6c^8d^f^g - 6a^6b^8c^4d^f^j + 1440a^5b^6c^7f^g^h + 21888a^5b^6c^7d^e^m + 10080a^5b^6c^7d^f^l + 6048a^5b^6c^7d^g^k + 5184a^5b^6c^7d^h^j + 8064a^5b^6c^7e^f^k - 13824a^5b^6c^7e^g^j + 5184a^6b^6c^6e^h^m + 2400a^6b^6c^6f^g^m + 1440a^6b^6c^6f^h^l + 864a^6b^6c^6g^h^k + 7296a^6b^6c^6d^j^m + 6048a^6b^6c^6d^k^l - 13824a^6b^6c^6e^j^l + 2688a^6b^6c^6f^j^k + 2400a^7b^6c^5f^l^m + 1440a^7b^6c^5g^k^m + 1728a^7b^6c^5h^j^m + 864a^7b^6c^5h^k^l + 6a^4b^8c^3j^k^m - 18a^5b^7c^3k^l^m + 1440a^8b^6c^4k^l^m + 900a^2b^4c^7d^e^f - 4896a^3b^2c^8d^e^f - 108a^2b^5c^6d^e^h - 450a^2b^5c^6d^f^g + 2448a^3b^3c^7d^f^g + 54a^2b^6c^5d^g^h - 36a^3b^4c^6e^f^h - 7776a^4b^2c^7d^g^h - 6048a^4b^2c^7e^f^h + 138a^2b^6c^5d^f^j + 540a^3b^4c^6d^e^k - 516a^3b^4c^6d^f^j - 6048a^4b^2c^7d^e^k - 4992a^4b^2c^7d^f^j + 18a^3b^5c^5f^g^h + 3024a^4b^3c^6f^g^h + 18a^2b^7c^4d^f^l - 18a^2b^7c^4d^h^j - 450a^3b^5c^5d^f^l - 270a^3b^5c^5d^g^k - 36a^3b^5c^5d^h^j - 2016a^4b^3c^6d^e^m + 2448a^4b^3c^6d^f^l + 3024a^4b^3c^6d^g^k + 2592a^4b^3c^6d^h^j + 1440a^4b^3c^6e^f^k - 6912a^4b^3c^6e^g^j + 54a^3b^6c^4d^h^l - 6a^3b^6c^4f^h^j + 1008a^4b^4c^5d^g^m + 420a^4b^4c^5e^f^m - 540a^4b^4c^5e^h^k - 720a^4b^4c^5f^g^k - 1020a^4b^4c^5f^h^j - 10944a^5b^2c^6d^g^m - 7776a^5b^2c^6d^h^l - 7392a^5b^2c^6e^f^m + 20736a^5b^2c^6e^g^l - 4320a^5b^2c^6e^h^k - 4032a^5b^2c^6f^g^k - 2496a^5b^2c^6f^h^j + 90a^3b^6c^4d^j^k - 828a^4b^4c^5d^j^k - 4032a^5b^2c^6d^j^k - 180a^4b^5c^4e^h^m - 210a^4b^5c^4f^g^m + 18a^4b^5c^4f^h^l + 270a^4b^5c^4g^h^k + 2880a^5b^3c^5e^h^m + 3696a^5b^3c^5f^g^m + 3024a^5b^3c^5f^h^l + 2160a^5b^3c^5g^h^k - 336a^4b^5c^4d^j^m - 270a^4b^5c^4d^k^l + 240a^4b^5c^4f^j^k + 2976a^5b^3c^5d^j^m + 3024a^5b^3c^5d^k^l - 6912a^5b^3c^5e^j^l + 1824a^5b^3c^5f^j^k + 90a^4b^6c^3g^h^m - 1440a^5b^4c^4g^h^m - 2592a^6b^2c^5g^h^m + 36a^4b^6c^3e^k^m + 70a^4b^6c^3f^j^m - 90a^4b^6c^3h^j^k + 1008a^5b^4c^4d^l^m - 324a^5b^4c^4e^k^m - 1092a^5b^4c^4f^j^m - 720a^5b^4c^4f^k^l + 3456a^5b^4c^4g^j^l - 900a^5b^4c^4h^j^k - 10944a^6b^2c^5d^l^m - 5472a^6b^2c^5e^k^m - 3264a^6b^2c^5f^j^m - 4032a^6b^2c^5f^k^l + 6912a^6b^2c^5g^j^l - 1728a^6b^2c^5h^j^k - 18a^4b^7c^2g^k^m - 30a^4b^7c^2h^j^m - 210a^5b^5c^3f^l^m + 162a^5b^5c^3g^k^m + 420a^5b^5c^3h^j^m + 270a^5b^5c^3h^k^l + 3696a^6b^3c^4f^l^m + 2736a^6b^3c^4g^k^m + 1824a^6b^3c^4h^j^m + 2160a^6b^3c^4h^k^l + 90a^5b^6c^2h^l^m - 1440a^6b^4c^3h^l^m - 2592a^7b^2c^4h^l^m - 42a^5b^6c^2j^k^m - 1020a^6b^4c^3j^k^m - 2304a^7b^2c^4j^k^m + 162a^6b^5c^2k^l^m + 2736a^7b^3c^3k^l^m)/(64*(4096a^10c^7 + a^4b^12c - 24a^5b^10c^2 + 240a^6b^8c^3 - 1280a^7b^6c^4 + 3840a^8b^4c^5 - 6144a^9b^2c^6)))*root(56371445760a^11b^8c^9z^4 - 503316480a^8b^14c^6z^4 + 47185920a^7b^16c^5z^4 - 2621440a^6b^18c^4z^4 + 65536a^5b^20c^3z^4 - 171798691840a^14b^2c^12z^4 + 193273528320a^13b^4c^11z^4 - 128849018880a^12b^6c^10z^4 - 16911433728a^10b^10c^8z^4 + 3523215360a^9b^12c^7z^4 + 68719476736a^15c^13z^4 + 1536a^5b^16c^k^mz^2 + 1536a^6b^18c^3d^f^z^2 - 2571632640a^9b^5c^8d^m^z^2 + 2548039680a^9b^3c^10d^h^z^2 + 1509949440a^10b^3c^9e^l^z^2 + 1509949440a^9b^3c^10e^g^z^2 - 1401421824a^8b^5c^9d^h^z^2 - 1321205760a^9b^2c^11d^f^z^2 - 2793406464a^11b^c^10d^m^z^2 + 890634240a^8b^7c^7d^m^z^2 - 754974720a^10b^4c^8g^l^z^2 - 754974720a^9b^5c^8e^l^z^2 + 719585280a^8b^6c^8d^k^z^2 - 707788800a^9b^4c^9d^k^z^2 - 754974720a^8b^5c^9e^g^z^2 + 603979776
\end{aligned}$$

$$\begin{aligned}
& a^{11}b^2c^9g^1z^2 - 581959680a^{10}b^4c^8f^1mz^2 + 732168192a^7b^6c^9d^1fz^2 + 534773760a^{11}b^3c^8h^1mz^2 - 456130560a^{11}b^4c^7k^1mz^2 \\
& - 603979776a^{10}b^2c^{10}e^1jz^2 + 534773760a^{10}b^3c^9f^1kz^2 + 384040960a^9b^6c^7f^1mz^2 + 377487360a^9b^6c^7g^1l^1z^2 - 456130560a^9b^4c^9f^1h^1z^2 \\
& + 301989888a^{11}b^3c^8j^1l^1z^2 - 415236096a^{10}b^2c^{10}d^1kz^2 + 254017536a^{10}b^6c^6k^1mz^2 - 330301440a^{10}b^4c^8h^1kz^2 + \\
& 390463488a^7b^7c^8d^1h^1z^2 + 188743680a^{12}b^2c^8k^1mz^2 + 301989888a^{10}b^3c^9g^1jz^2 \\
& - 297861120a^7b^8c^7d^1kz^2 - 366280704a^6b^8c^8d^1fz^2 + 188743680a^{11}b^2c^9h^1kz^2 - 330301440a^8b^4c^{10}d^1fz^2 \\
& + 254017536a^8b^6c^8f^1h^1z^2 - 1887436800a^{10}b^6c^{11}d^1h^1z^2 + 188743680a^8b^7c^7e^1l^1z^2 \\
& + 153354240a^9b^6c^7h^1kz^2 - 185303040a^7b^9c^6d^1mz^2 - 117964800a^{10}b^5c^7h^1mz^2 - 61931520a^9b^8c^5k^1mz^2 \\
& + 121634816a^{11}b^2c^9f^1mz^2 - 115671040a^8b^8c^6f^1mz^2 - 62914560a^9b^7c^6j^1l^1z^2 \\
& + 188743680a^{10}b^2c^{10}f^1h^1z^2 - 94371840a^8b^8c^6g^1l^1z^2 + 6144000a^8b^{10}c^4k^1mz^2 - 117964800a^9b^5c^8f^1kz^2 \\
& + 61440a^7b^{12}c^3k^1mz^2 - 46080a^6b^{14}c^2k^1mz^2 + 23592960a^8b^9c^5j^1l^1z^2 + 188743680a^7b^7c^8e^1gz^2 \\
& - 37355520a^9b^7c^6h^1mz^2 + 125829120a^8b^6c^8e^1jz^2 + 23101440a^8b^9c^5h^1mz^2 - 3538944a^7b^{11}c^4j^1l^1z^2 \\
& + 196608a^6b^{13}c^3j^1l^1z^2 - 4349952a^7b^{11}c^4h^1mz^2 + 337920a^6b^{13}c^3h^1mz^2 - 7680a^5b^{15}c^2h^1mz^2 - 62914560a^8b^7c^7g^1jz^2 \\
& - 26542080a^8b^8c^6h^1kz^2 + 17940480a^7b^{10}c^5f^1mz^2 + 11796480a^7b^{10}c^5g^1l^1z^2 - 37355520a^8b^7c^7f^1kz^2 - 1347584a^6b^{12}c^4f^1mz^2 \\
& + 68272128a^6b^{10}c^6d^1kz^2 - 589824a^6b^{12}c^4g^1l^1z^2 + 552960a^6b^{12}c^4h^1kz^2 - 147456a^7b^{10}c^5h^1kz^2 - 46080a^5b^{14}c^3h^1kz^2 \\
& + 35840a^5b^{14}c^3f^1mz^2 + 23592960a^7b^9c^6g^1jz^2 - 23592960a^7b^9c^6e^1l^1z^2 + 23371776a^6b^{11}c^5d^1mz^2 \\
& + 23101440a^7b^9c^6f^1kz^2 - 47185920a^7b^8c^7e^1jz^2 - 61931520a^7b^8c^7f^1h^1z^2 - 4349952a^6b^{11}c^5f^1kz^2 - 3538944a^6b^{11}c^5g^1jz^2 \\
& - 1677312a^5b^{13}c^4d^1mz^2 + 1179648a^6b^{11}c^5e^1l^1z^2 + 337920a^5b^{13}c^4f^1kz^2 + 196608a^5b^{13}c^4g^1jz^2 + 53760a^4b^{15}c^3d^1mz^2 \\
& - 7680a^4b^{15}c^3f^1kz^2 + 96583680a^5b^{10}c^7d^1fz^2 - 9179136a^5b^{12}c^5d^1kz^2 + 7077888a^6b^{10}c^6e^1jz^2 - 51609600a^6b^9c^7d^1h^1z^2 + 691200a^4b^{14}c^4d^1kz^2 \\
& - 393216a^5b^{12}c^5e^1jz^2 - 23040a^3b^{16}c^3d^1kz^2 + 6144000a^6b^{10}c^6f^1h^1z^2 + 61440a^5b^{12}c^5f^1h^1z^2 - 46080a^4b^{14}c^4f^1h^1z^2 \\
& + 1536a^3b^{16}c^3f^1h^1z^2 - 23592960a^6b^9c^7e^1gz^2 + 1179648a^5b^{11}c^6e^1gz^2 + 829440a^4b^{13}c^5d^1h^1z^2 + 368640a^5b^{11}c^6d^1h^1z^2 \\
& - 105984a^3b^{15}c^4d^1h^1z^2 + 4608a^2b^{17}c^3d^1h^1z^2 - 15175680a^4b^{12}c^6d^1fz^2 + 1428480a^3b^{14}c^5d^1fz^2 - 73728a^2b^{16}c^4d^1fz^2 \\
& + 4108320768a^{10}b^3c^9d^1mz^2 - 1207959552a^{11}b^3c^{10}e^1l^1z^2 - 1207959552a^{10}b^3c^{11}e^1gz^2 - 578813952a^{12}b^3c^9h^1mz^2 \\
& - 578813952a^{11}b^3c^{10}f^1kz^2 - 402653184a^{12}b^3c^9j^1l^1z^2 - 402653184a^{11}b^3c^{10}g^1jz^2 - 440401920a^{10}b^3c^{11}f^2z^2 - 188743680a^{12}b^3c^9k^2z^2 \\
& - 188743680a^{11}b^3c^{10}h^2z^2 + 1761607680a^{10}c^{12}d^1fz^2 - 14080a^6b^{15}c^2m^2z^2 - 94464a^4b^{17}c^4d^2z^2 + 6936330240a^8b^3c^{11}d^2z^2 \\
& + 2464874496a^6b^7c^9d^2z^2 - 3963617280a^9b^3c^{12}d^2z^2 + 1056964608a^{11}c^{11}d^1kz^2 + 805306368a^{11}c^{11}e^1jz^2 + 419430400a^{12}c^{10}f^1mz^2 \\
& + 251658240a^{13}c^9k^1mz^2 - 150994940a^9b^2c^{11}e^2z^2 + 251658240a^{11}c^{11}f^1h^1z^2 + 150994944a^{12}c^{10}h^1kz^2 - 5400428544a^7b^5c^{10}d^2z^2 \\
& + 754974720a^8b^4c^{10}e^2z^2 - 730054656a^5b^9c^8d^2z^2 + 477102080a^{12}b^3c^7m^2z^2 - 377487360a^{11}b^4c^7l^2z^2 + 477102080a^9b^3c^{10}f^2z^2 \\
& + 301989888a^{12}b^2c^8l^2z^2 - 377487360a^9b^4c^9g^2z^2 + 301989888a^{10}b^2c^{10}g^2z^2 - 174325760a^{11}b^5c^6m^2z^2 + 188743680a^{10}b^6c^6l^2z^2 + 141557760a^{10}b^3c^9h^2z^2 \\
& - 174325760a^8b^5c^9f^2z^2 - 188743680a^7b^6c^9e^2z^2 - 47185920a^9b^8c^5l^2z^2 + 11206656a^{10}b^7c^5m^2z^2 + 8929280a^9b^9c^4m^2z^2 - 2600960a^8b^{11}c^3m^2z^2 + 291840a^7b^{13}c^2m^2z^2 - 50331648a^{10}b^4c^8j^2z^2 + 146165760a^4b^{11}c^7d^2z^2 - 26542080a^9b^7c^6k^2z^2 + 5898240a^8b^{10}c^4l^2z^2 - 294912a
\end{aligned}$$

$$\begin{aligned}
& ^7b^{12}c^3l^2z^2 - 33554432a^{11}b^2c^9j^2z^2 + 9584640a^8b^9c^5k^2z^2 + 20971520a^9b^6c^7j^2z^2 - 2359296a^{10}b^5c^7k^2z^2 - 1290 \\
& 240a^7b^{11}c^4k^2z^2 + 46080a^6b^{13}c^3k^2z^2 + 2304a^5b^{15}c^2k^2z^2 - 2752512a^7b^{10}c^5j^2z^2 + 2621440a^8b^8c^6j^2z^2 + 52428 \\
& 8a^6b^{12}c^4j^2z^2 - 32768a^5b^{14}c^3j^2z^2 - 47185920a^7b^8c^7g^2z^2 - 26542080a^8b^7c^7h^2z^2 + 9584640a^7b^9c^6h^2z^2 - 2359 \\
& 296a^9b^5c^8h^2z^2 - 1290240a^6b^{11}c^5h^2z^2 + 46080a^5b^{13}c^4h^2z^2 + 2304a^4b^{15}c^3h^2z^2 + 5898240a^6b^{10}c^6g^2z^2 - 29491 \\
& 2a^5b^{12}c^5g^2z^2 + 11206656a^7b^7c^8f^2z^2 + 8929280a^6b^9c^7f^2z^2 + 23592960a^6b^8c^8e^2z^2 - 2600960a^5b^{11}c^6f^2z^2 + 29 \\
& 1840a^4b^{13}c^5f^2z^2 - 14080a^3b^{15}c^4f^2z^2 + 256a^2b^{17}c^3f^2z^2 - 19860480a^3b^{13}c^6d^2z^2 - 1179648a^5b^{10}c^7e^2z^2 + 177 \\
& 1776a^2b^{15}c^5d^2z^2 - 440401920a^{13}b^3c^8m^2z^2 + 1207959552a^{10}c^{12}e^2z^2 + 134217728a^{12}c^{10}j^2z^2 + 256a^5b^{17}m^2z^2 + 2304b^{19}c^3d^2z^2 - 23592960a^{10}b^3c^8f^2k^2z^2 + 99090432a^9b^3c^9d^2h^2z^2 + \\
& 9437184a^{10}b^3c^8e^2k^2z^2 + 23592960a^{10}b^3c^8g^2h^2z^2 + 141557760a^8b^3c^{10}d^2e^2k^2z^2 + 47185920a^9b^3c^9d^2j^2k^2z^2 - 23592960a^9b^3c^9f^2g^2k^2z^2 + 1 \\
& 69869312a^7b^3c^{11}d^2e^2f^2z^2 + 99090432a^8b^3c^{10}d^2g^2h^2z^2 - 3145728a^9b^3c^9f^2h^2j^2z^2 + 56623104a^8b^3c^{10}d^2f^2j^2z^2 + 1536a^3b^{15}c^3d^2f^2j^2z^2 - 943718 \\
& 4a^8b^3c^{10}e^2f^2h^2z^2 - 4608a^3b^{14}c^4d^2f^2g^2z^2 + 9216a^3b^{13}c^5d^2e^2f^2z^2 + 412876800a^8b^2c^9d^2e^2m^2z^2 - 206438400a^9b^3c^7d^2l^2m^2z^2 + 5898240a^1 \\
& 0b^4c^5k^2l^2m^2z^2 - 206438400a^8b^3c^8d^2g^2m^2z^2 - 4718592a^{11}b^2c^6k^2l^2m^2z^2 - 2949120a^9b^6c^4k^2l^2m^2z^2 + 737280a^8b^8c^3k^2l^2m^2z^2 - 92160a^7b^{10}c^2k^2l^2m^2z^2 + 103219200a^8b^5c^6d^2l^2m^2z^2 - 29491200a^{10}b^3c^6h^2l^2m^2z^2 - 206438400a^7b^4c^8d^2e^2m^2z^2 - 2359296a^{10}b^3c^6j^2k^2m^2z^2 + 49 \\
& 1520a^8b^7c^4j^2k^2m^2z^2 - 184320a^7b^9c^3j^2k^2m^2z^2 + 27648a^6b^{11}c^2j^2k^2m^2z^2 + 14745600a^9b^5c^5h^2l^2m^2z^2 - 3686400a^8b^7c^4h^2l^2m^2z^2 + 4608 \\
& 00a^7b^9c^3h^2l^2m^2z^2 - 23040a^6b^{11}c^2h^2l^2m^2z^2 + 88473600a^8b^4c^7d^2k^2l^2z^2 + 82575360a^9b^2c^8d^2j^2m^2z^2 + 11796480a^{10}b^2c^7h^2j^2m^2z^2 + 58 \\
& 98240a^9b^4c^6g^2k^2m^2z^2 - 4718592a^{10}b^2c^7g^2k^2m^2z^2 - 70778880a^9b^2c^8d^2k^2l^2z^2 - 2949120a^8b^6c^5g^2k^2m^2z^2 - 2457600a^8b^6c^5h^2j^2m^2z^2 + \\
& 921600a^7b^8c^4h^2j^2m^2z^2 + 737280a^7b^8c^4g^2k^2m^2z^2 - 138240a^6b^{10}c^3h^2j^2m^2z^2 - 92160a^6b^{10}c^3g^2k^2m^2z^2 + 7680a^5b^{12}c^2h^2j^2m^2z^2 + 4608a^5b^{12}c^2g^2k^2m^2z^2 + 29491200a^9b^3c^7f^2k^2l^2z^2 - 176947200a^7b^3c^9d^2e^2k^2z^2 - 109707264a^8b^3c^8d^2h^2l^2z^2 - 25804800a^7b^7c^5d^2l^2m^2z^2 + 1 \\
& 03219200a^7b^5c^7d^2g^2m^2z^2 + 219414528a^7b^2c^{10}d^2e^2h^2z^2 - 14745600a^8b^5c^6f^2k^2l^2z^2 - 29491200a^9b^3c^7g^2h^2m^2z^2 - 11796480a^9b^3c^7e^2k^2m^2z^2 - 44236800a^7b^6c^6d^2k^2l^2z^2 + 58982400a^9b^2c^8e^2h^2m^2z^2 + 589824 \\
& 0a^8b^5c^6e^2k^2m^2z^2 + 3686400a^7b^7c^5f^2k^2l^2z^2 + 3225600a^6b^9c^4d^2l^2m^2z^2 - 1474560a^7b^7c^5e^2k^2m^2z^2 - 460800a^6b^9c^4f^2k^2l^2z^2 + 184320a^6b^9c^4e^2k^2m^2z^2 - 161280a^5b^{11}c^3d^2l^2m^2z^2 + 23040a^5b^{11}c^3f^2k^2l^2z^2 - 9216a^5b^{11}c^3e^2k^2m^2z^2 + 14745600a^8b^5c^6g^2h^2m^2z^2 + 110886912a^7b^4c^8d^2f^2l^2z^2 - 3686400a^7b^7c^5g^2h^2m^2z^2 - 221773824a^6b^3c^{10}d^2e^2f^2z^2 + 460800a^6b^9c^4g^2h^2m^2z^2 - 17203200a^7b^6c^6d^2j^2m^2z^2 - 23040a^5b^{11}c^3g^2h^2m^2z^2 - 29491200a^8b^4c^7e^2h^2m^2z^2 - 11796480a^9b^2c^8f^2j^2k^2z^2 + 11059200a^6b^8c^5d^2k^2l^2z^2 + 6451200a^6b^8c^5d^2j^2m^2z^2 + 88473600a^7b^4c^8d^2g^2k^2z^2 + 2457600a^7b^6c^6f^2j^2k^2z^2 - 35389440a^8b^3c^8d^2j^2k^2z^2 - 1382400a^5b^{10}c^4d^2k^2l^2z^2 - 84934656a^8b^2c^9d^2f^2l^2z^2 - 967680a^5b^{10}c^4d^2j^2m^2z^2 - 921600a^6b^8c^5f^2j^2k^2z^2 + 138240a^5b^{10}c^4f^2j^2k^2z^2 + 69120a^4b^{12}c^3d^2k^2l^2z^2 + 53760a^4b^{12}c^3d^2j^2m^2z^2 - 7680a^4b^{12}c^3f^2j^2k^2z^2 + 44236800a^7b^5c^7d^2h^2l^2z^2 + 7372800a^7b^6c^6e^2h^2m^2z^2 - 5898240a^8b^4c^7f^2h^2l^2z^2 + 4718592a^9b^2c^8f^2h^2l^2z^2 - 70778880a^8b^2c^9d^2g^2k^2z^2 + 2949120a^7b^6c^6f^2h^2l^2z^2 - 921600a^6b^8c^5e^2h^2m^2z^2 - 737280a^6b^8c^5f^2h^2l^2z^2 + 92160a^5b^{10}c^4f^2h^2l^2z^2 + 46080a^5b^{10}c^4e^2h^2m^2z^2 - 4608a^4b^{12}c^3f^2h^2l^2z^2 + 29491200a^8b^3c^8f^2g^2k^2z^2 - 109707264a^7b^3c^9d^2g^2h^2z^2 - 25804800a^6b^7c^6d^2g^2m^2z^2 - 58982400a^8b^2c^9e^2f^2k^2z^2 - 58982400a^6b^6c^7d^2f^2l^2z^2 + 7372800a^6b^7c^6d^2j^2k^2z^2 + 88473600a^6b^5c^8d^2e^2k^2z^2 - 2764800a^5b^9c^5d^2j^2k^2z^2 + 51609600a^6b^6c^7d^2e^2m^2z^2 + 414720a^4b^{11}c^4d^2j^2k^2z^2 - 23040a^3b^{13}
\end{aligned}$$

$$\begin{aligned}
& 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 +
\end{aligned}$$

$8847360a^9b^3c^7gk^2z + 7127040a^8b^6c^5em^2z - 4423680a^8b^5c^6gk^2z + 3563520a^6b^7c^6f^2l^2z + 3538944a^9b^2c^8h^2j^2z + 1105920a^7b^7c^5gk^2z - 1013760a^7b^8c^4em^2z - 737280a^7b^6c^6h^2j^2z - 506880a^5b^9c^5f^2l^2z + 276480a^6b^8c^5h^2j^2z - 138240a^6b^9c^4gk^2z + 69120a^6b^10c^3em^2z - 41472a^5b^10c^4h^2j^2z + 34560a^4b^11c^4f^2l^2z + 6912a^5b^11c^3gk^2z + 2304a^4b^12c^3h^2j^2z - 1536a^5b^12c^2em^2z - 768a^3b^13c^3f^2l^2z - 11697920a^4b^7c^8d^2gz + 23362560a^4b^9c^6d^2l^2z - 17694720a^9b^2c^8ek^2z - 10354688a^8b^2c^9f^2j^2z - 43646976a^6b^4c^9d^2j^2z + 8847360a^8b^4c^7ek^2z - 2965248a^3b^11c^5d^2l^2z - 2211840a^7b^6c^6ek^2z + 2048000a^6b^6c^7f^2j^2z - 849920a^5b^8c^6f^2j^2z + 393216a^7b^4c^8f^2j^2z + 276480a^6b^8c^5ek^2z + 214272a^2b^13c^4d^2l^2z + 145920a^4b^10c^5f^2j^2z - 13824a^5b^10c^4ek^2z - 11008a^3b^12c^4f^2j^2z + 256a^2b^14c^3f^2j^2z - 32587776a^5b^6c^8d^2j^2z - 8847360a^8b^3c^8gh^2z + 21657600a^4b^8c^7d^2j^2z + 4423680a^7b^5c^7gh^2z - 1105920a^6b^7c^6gh^2z + 138240a^5b^9c^5gh^2z - 6912a^4b^11c^4gh^2z + 25362432a^7b^3c^9f^2gz - 5810688a^3b^10c^6d^2j^2z + 17694720a^8b^2c^9eh^2z + 845568a^2b^12c^5d^2j^2z - 50724864a^7b^2c^10ef^2z - 13271040a^6b^5c^8f^2gz - 8847360a^7b^4c^8eh^2z + 3563520a^5b^7c^7f^2gz + 2211840a^6b^6c^7eh^2z - 506880a^4b^9c^6f^2gz - 276480a^5b^8c^6eh^2z + 34560a^3b^11c^5f^2gz + 13824a^4b^10c^5eh^2z - 768a^2b^13c^4f^2gz + 26542080a^6b^4c^9ef^2z + 23362560a^3b^9c^7d^2gz - 46725120a^3b^8c^8d^2ez - 7127040a^5b^6c^8ef^2z - 2965248a^2b^11c^6d^2gz + 1013760a^4b^8c^7ef^2z - 69120a^3b^10c^6ef^2z + 1536a^2b^12c^5ef^2z + 5930496a^2b^10c^7d^2ez + 346816512a^8b^c^10d^2l^2z - 693633024a^7c^12d^2ez - 231211008a^8c^11d^2j^2z + 768a^6b^13l^2m^2z - 13107200a^12c^7j^2m^2z - 256a^5b^14j^2m^2z + 4718592a^11c^8j^2k^2z - 39321600a^11c^8em^2z - 4718592a^10c^9h^2j^2z + 14155776a^10c^9ek^2z + 13107200a^9c^10f^2j^2z + 2304b^16c^3d^2j^2z - 14155776a^9c^10eh^2z + 39321600a^8c^11ef^2z - 6912b^15c^4d^2gz + 13824b^14c^5d^2ez + 737280a^10b^c^5j^2k^2l^2m - 2304a^6b^9c^5j^2k^2l^2m + 2211840a^9b^c^6ek^2l^2m + 1228800a^9b^c^6f^2j^2l^2m + 737280a^9b^c^6g^2j^2k^2m + 442368a^9b^c^6h^2j^2k^2l + 36a^3b^12c^5f^2h^2k^2m + 3096576a^8b^c^7d^2j^2k^2l - 12745728a^8b^c^7d^2h^2k^2m + 3686400a^8b^c^7ef^2l^2m + 3391488a^8b^c^7eh^2j^2m + 2211840a^8b^c^7eg^2k^2m + 1327104a^8b^c^7eh^2k^2l + 1228800a^8b^c^7fg^2j^2m + 737280a^8b^c^7fh^2j^2l + 442368a^8b^c^7gh^2j^2k + 108a^2b^13c^5d^2h^2k^2m + 16367616a^7b^c^8d^2ee^2j^2m + 9289728a^7b^c^8d^2ek^2l + 5160960a^7b^c^8d^2f^2j^2l + 3391488a^7b^c^8ef^2j^2k + 3096576a^7b^c^8d^2g^2j^2k - 19307520a^7b^c^8d^2f^2h^2m + 3686400a^7b^c^8ef^2g^2m + 2211840a^7b^c^8ef^2h^2l + 1327104a^7b^c^8eg^2h^2k + 737280a^7b^c^8fg^2h^2j - 180a^2b^13c^2d^2f^2h^2m - 540a^2b^12c^3d^2f^2h^2k + 15482880a^6b^c^9d^2ef^2l + 11059200a^6b^c^9d^2eh^2j + 9289728a^6b^c^9d^2eg^2k + 5160960a^6b^c^9d^2fg^2j - 2304a^2b^11c^4d^2fg^2j + 2211840a^6b^c^9ef^2gh^2 + 4608a^2b^10c^5d^2ef^2j + 15482880a^5b^c^10d^2ef^2g - 13824a^2b^9c^6d^2ef^2g + 36a^2b^14c^2d^2f^2k^2m + 1843200a^9b^3c^4j^2k^2l^2m + 783360a^8b^5c^3j^2k^2l^2m + 18432a^7b^7c^2j^2k^2l^2m - 2211840a^8b^4c^4g^2k^2l^2m - 1695744a^9b^2c^5h^2j^2l^2m - 1400832a^8b^4c^4h^2j^2l^2m - 1105920a^9b^2c^5g^2k^2l^2m - 253440a^7b^6c^3h^2j^2l^2m - 69120a^7b^6c^3g^2k^2l^2m + 11520a^6b^8c^2h^2j^2l^2m + 6912a^6b^8c^2g^2k^2l^2m + 4423680a^8b^3c^5ek^2l^2m + 2506752a^8b^3c^5f^2j^2l^2m + 1843200a^8b^3c^5g^2j^2k^2m + 1327104a^8b^3c^5h^2j^2k^2l + 838656a^7b^5c^4f^2j^2l^2m + 783360a^7b^5c^4g^2j^2k^2m + 691200a^7b^5c^4h^2j^2k^2l + 138240a^7b^5c^4ek^2l^2m + 69120a^6b^7c^3h^2j^2k^2l - 53760a^6b^7c^3f^2j^2l^2m + 18432a^6b^7c^3g^2j^2k^2m - 13824a^6b^7c^3ek^2l^2m - 2304a^5b^9c^2g^2j^2k^2m + 2543616a^8b^3c^5gh^2l^2m + 829440a^7b^5c^4gh^2l^2m - 34560a^6b^7c^3gh^2l^2m - 8183808a^8b^2c^6d^2j^2l^2m - 3686400a^8b^2c^6ej^2k^2m - 2285568a^7b^4c^5d^2j^2l^2m - 1695744a^8b^2c^6f^2j^2k^2l - 1566720a^7b^4c^5ej^2k^2m - 1400832a^7b^4c^5f^2j^2k^2l + 741888a^6b^6c^4d^2j^2l^2m - 253440$

$a^6 b^6 c^4 f j k^2 l - 80640 a^5 b^8 c^3 d j^2 l^2 m - 36864 a^6 b^6 c^4 e j^2 k^2 m + 11520 a^5 b^8 c^3 f j^2 k^2 l + 4608 a^5 b^8 c^3 e j^2 k^2 m + 6700032 a^8 b^2 c^6 f^2 h^2 k^2 m + 5103360 a^7 b^4 c^5 f^2 h^2 k^2 m - 5087232 a^8 b^2 c^6 e^2 h^2 l^2 m - 2838528 a^7 b^4 c^5 f^2 g^2 l^2 m - 1843200 a^8 b^2 c^6 f^2 g^2 l^2 m - 1695744 a^8 b^2 c^6 g^2 h^2 j^2 m - 1658880 a^7 b^4 c^5 g^2 h^2 k^2 l - 1658880 a^7 b^4 c^5 e^2 h^2 l^2 m - 1400832 a^7 b^4 c^5 g^2 h^2 j^2 m - 663552 a^8 b^2 c^6 g^2 h^2 k^2 l + 483840 a^6 b^6 c^4 f^2 h^2 k^2 m - 253440 a^6 b^6 c^4 g^2 h^2 j^2 m - 207360 a^6 b^6 c^4 g^2 h^2 k^2 l + 161280 a^6 b^6 c^4 f^2 g^2 l^2 m + 69120 a^6 b^6 c^4 e^2 h^2 l^2 m - 50040 a^5 b^8 c^3 f^2 h^2 k^2 m + 11520 a^5 b^8 c^3 g^2 h^2 j^2 m + 180 a^4 b^{10} c^2 f^2 h^2 k^2 m + 4202496 a^7 b^3 c^6 d^2 j^2 k^2 l + 635904 a^6 b^5 c^5 d^2 j^2 k^2 l - 276480 a^5 b^7 c^4 d^2 j^2 k^2 l + 34560 a^4 b^9 c^3 d^2 j^2 k^2 l - 16671744 a^7 b^3 c^6 d^2 h^2 k^2 m + 12275712 a^7 b^3 c^6 d^2 g^2 l^2 m + 5677056 a^7 b^3 c^6 e^2 f^2 l^2 m + 4423680 a^7 b^3 c^6 e^2 g^2 k^2 m + 3317760 a^7 b^3 c^6 e^2 h^2 k^2 l + 2801664 a^7 b^3 c^6 e^2 h^2 j^2 m - 2709504 a^6 b^5 c^5 d^2 g^2 l^2 m + 2543616 a^7 b^3 c^6 f^2 g^2 k^2 l + 2506752 a^7 b^3 c^6 f^2 g^2 j^2 m + 1843200 a^7 b^3 c^6 f^2 h^2 j^2 l + 1327104 a^7 b^3 c^6 g^2 h^2 j^2 k + 838656 a^6 b^5 c^5 f^2 g^2 j^2 m + 829440 a^6 b^5 c^5 f^2 g^2 k^2 l + 783360 a^6 b^5 c^5 f^2 h^2 j^2 l + 691200 a^6 b^5 c^5 g^2 h^2 j^2 k + 665280 a^5 b^7 c^4 d^2 h^2 k^2 m + 506880 a^6 b^5 c^5 e^2 h^2 j^2 m + 414720 a^6 b^5 c^5 e^2 h^2 k^2 l - 322560 a^6 b^5 c^5 e^2 f^2 l^2 m + 241920 a^5 b^7 c^4 d^2 g^2 l^2 m + 138240 a^6 b^5 c^5 e^2 g^2 k^2 m - 108540 a^4 b^9 c^3 d^2 h^2 k^2 m + 69120 a^5 b^7 c^4 g^2 h^2 j^2 k - 53760 a^5 b^7 c^4 f^2 g^2 j^2 m - 51840 a^6 b^5 c^5 d^2 h^2 k^2 m - 34560 a^5 b^7 c^4 f^2 g^2 k^2 l - 23040 a^5 b^7 c^4 e^2 h^2 j^2 m + 18432 a^5 b^7 c^4 f^2 h^2 j^2 l - 13824 a^5 b^7 c^4 e^2 g^2 k^2 m - 2304 a^4 b^9 c^3 f^2 h^2 j^2 l + 1296 a^3 b^{11} c^2 d^2 h^2 k^2 m + 31924224 a^7 b^2 c^7 d^2 f^2 k^2 m - 24551424 a^7 b^2 c^7 d^2 e^2 l^2 m + 10616832 a^7 b^2 c^7 e^2 g^2 j^2 l - 8183808 a^7 b^2 c^7 d^2 g^2 j^2 m - 5529600 a^7 b^2 c^7 d^2 h^2 j^2 l + 5419008 a^6 b^4 c^6 d^2 e^2 l^2 m + 5308416 a^6 b^4 c^6 e^2 g^2 j^2 l - 5087232 a^7 b^2 c^7 e^2 f^2 k^2 l - 5013504 a^7 b^2 c^7 e^2 f^2 j^2 m + 4868352 a^6 b^4 c^6 d^2 f^2 k^2 m - 4644864 a^7 b^2 c^7 d^2 g^2 k^2 l - 3981312 a^6 b^4 c^6 d^2 g^2 k^2 l - 2654208 a^7 b^2 c^7 e^2 h^2 j^2 k - 2367360 a^5 b^6 c^5 d^2 f^2 k^2 m - 2285568 a^6 b^4 c^6 d^2 g^2 j^2 m - 2211840 a^6 b^4 c^6 d^2 h^2 j^2 l - 1695744 a^7 b^2 c^7 f^2 g^2 j^2 k - 1677312 a^6 b^4 c^6 e^2 f^2 j^2 m - 1658880 a^6 b^4 c^6 e^2 f^2 k^2 l - 1400832 a^6 b^4 c^6 f^2 g^2 j^2 k - 1382400 a^6 b^4 c^6 e^2 h^2 j^2 k + 1036800 a^5 b^6 c^5 d^2 g^2 k^2 l + 741888 a^5 b^6 c^5 d^2 g^2 j^2 m - 483840 a^5 b^6 c^5 d^2 e^2 l^2 m + 317952 a^5 b^6 c^5 d^2 h^2 j^2 l + 268920 a^4 b^8 c^4 d^2 f^2 k^2 m - 253440 a^5 b^6 c^5 f^2 g^2 j^2 k - 138240 a^5 b^6 c^5 e^2 h^2 j^2 k + 107520 a^5 b^6 c^5 e^2 f^2 j^2 m - 103680 a^4 b^8 c^4 d^2 g^2 k^2 l - 80640 a^4 b^8 c^4 d^2 g^2 j^2 m + 69120 a^5 b^6 c^5 e^2 f^2 k^2 l + 11520 a^4 b^8 c^4 f^2 g^2 j^2 k + 6912 a^4 b^8 c^4 d^2 h^2 j^2 l - 6912 a^3 b^{10} c^3 d^2 h^2 j^2 l + 6120 a^3 b^{10} c^3 d^2 f^2 k^2 m - 1368 a^2 b^{12} c^2 d^2 f^2 k^2 m - 5087232 a^7 b^2 c^7 e^2 g^2 h^2 m - 2211840 a^6 b^4 c^6 f^2 g^2 h^2 l - 1658880 a^6 b^4 c^6 e^2 g^2 h^2 m - 1105920 a^7 b^2 c^7 f^2 g^2 h^2 l - 69120 a^5 b^6 c^5 f^2 g^2 h^2 l + 69120 a^5 b^6 c^5 e^2 g^2 h^2 m + 6912 a^4 b^8 c^4 f^2 g^2 h^2 l + 7962624 a^6 b^3 c^7 d^2 e^2 k^2 l - 22164480 a^6 b^3 c^7 d^2 f^2 h^2 m + 5160960 a^6 b^3 c^7 d^2 f^2 j^2 l + 4571136 a^6 b^3 c^7 d^2 e^2 j^2 m + 4202496 a^6 b^3 c^7 d^2 g^2 j^2 k + 2801664 a^6 b^3 c^7 e^2 f^2 j^2 k - 2073600 a^5 b^5 c^6 d^2 e^2 k^2 l - 1483776 a^5 b^5 c^6 d^2 e^2 j^2 m + 635904 a^5 b^5 c^6 d^2 g^2 j^2 k + 506880 a^5 b^5 c^6 e^2 f^2 j^2 k - 354816 a^4 b^7 c^5 d^2 f^2 j^2 l + 322560 a^5 b^5 c^6 d^2 f^2 j^2 l - 276480 a^4 b^7 c^5 d^2 g^2 j^2 k + 207360 a^4 b^7 c^5 d^2 e^2 k^2 l + 161280 a^4 b^7 c^5 d^2 e^2 j^2 m + 59904 a^3 b^9 c^4 d^2 f^2 j^2 l + 34560 a^3 b^9 c^4 d^2 g^2 j^2 k - 23040 a^4 b^7 c^5 e^2 f^2 j^2 k - 2304 a^2 b^{11} c^3 d^2 f^2 j^2 l + 8294400 a^6 b^3 c^7 d^2 g^2 h^2 l + 5677056 a^6 b^3 c^7 e^2 f^2 g^2 m + 4423680 a^6 b^3 c^7 e^2 f^2 h^2 l + 3317760 a^6 b^3 c^7 e^2 g^2 h^2 k + 2805120 a^5 b^5 c^6 d^2 f^2 h^2 m + 1843200 a^6 b^3 c^7 f^2 g^2 h^2 j - 829440 a^5 b^5 c^6 d^2 g^2 h^2 l + 783360 a^5 b^5 c^6 f^2 g^2 h^2 j + 437184 a^4 b^7 c^5 d^2 f^2 h^2 m + 414720 a^5 b^5 c^6 e^2 g^2 h^2 k - 322560 a^5 b^5 c^6 e^2 f^2 g^2 m - 146268 a^3 b^9 c^4 d^2 f^2 h^2 m + 138240 a^5 b^5 c^6 e^2 f^2 h^2 l - 62208 a^4 b^7 c^5 d^2 g^2 h^2 l + 20736 a^3 b^9 c^4 d^2 g^2 h^2 l + 18432 a^4 b^7 c^5 f^2 g^2 h^2 j - 13824 a^4 b^7 c^5 e^2 f^2 h^2 l + 9360 a^2 b^{11} c^3 d^2 f^2 h^2 m - 2304 a^3 b^9 c^4 f^2 g^2 h^2 j - 8404992 a^6 b^2 c^8 d^2 e^2 j^2 k - 24551424 a^6 b^2 c^8 d^2 e^2 g^2 m + 21150720 a^6 b^2 c^8 d^2 f^2 h^2 k - 1271808 a^5 b^4 c^7 d^2 e^2 j^2 k + 552960 a^4 b^6 c^6 d^2 e^2 j^2 k - 69120 a^3 b^8 c^5 d^2 e^2 j^2 k - 16588800 a^6 b^2 c^8 d^2 e^2 h^2 l - 7741440 a^6 b^2 c^8 d^2 f^2 g^2 l + 6946560 a^5 b^4 c^7 d^2 f^2 h^2 k - 5529600 a^6 b^2 c^8 d^2 g^2 h^2 j + 5419008 a^5 b^4 c^7 d^2 e^2 g^2 m - 5087232 a^6 b^2 c^8$

$$\begin{aligned}
& 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 - 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 + 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 - 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 - 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 + 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 - 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 - 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^
\end{aligned}$$

$$\begin{aligned}
& 2*g^1*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^1^2*m - 1105920*a^7*b^4*c^5*g^2*k* \\
& m - 921600*a^9*b^2*c^5*f^1^2*m - 829440*a^8*b^4*c^4*h*k^1^2 + 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^1^2 + 3 \\
& 17952*a^7*b^5*c^4*h*j^2*m - 103680*a^7*b^6*c^3*h*k^1^2 + 80640*a^7*b^6*c^3* \\
& f^1^2*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^1*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*1 - 645120*a^8*b^4*c^4*e^1*m^2 - 5529 \\
& 60*a^8*b^2*c^6*h^2*j*1 - 552960*a^7*b^4*c^5*h^2*j*1 + 414720*a^7*b^5*c^4*g* \\
& k^2*1 - 145152*a^6*b^6*c^4*h^2*j*1 + 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^1*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*1 + 5490*a^5*b^9*c^2*f*k^2*m - 3456*a^5*b^ \\
& 8*c^3*h^2*j*1 - 2304*a^6*b^8*c^2*e^1*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^1^2*m - 4423680*a^7*b^2*c^7*e^2* \\
& k*m - 2654208*a^8*b^3*c^5*g*j*1^2 - 2654208*a^7*b^3*c^6*g^2*j*1 + 1769472*a \\
& ^8*b^2*c^6*g*j^2*1 + 1769472*a^7*b^4*c^5*g*j^2*1 - 1354752*a^7*b^5*c^4*d^1^ \\
& 2*m - 1327104*a^7*b^5*c^4*g*j*1^2 - 1327104*a^6*b^5*c^5*g^2*j*1 + 1271808*a \\
& ^8*b^3*c^5*f*k^1^2 - 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*1 + 414720*a^7*b^5*c^4*f*k^1^2 - 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^1^2*m - 17280*a^6*b^7*c^3*f*k^1^2 + 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*1 - 1290240*a^7*b^2*c^7*f^2*j*1 + 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*1 - 829440*a^7*b^4*c^5*e*k^2*1 - 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*1 - 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*1 - 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*1 - 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*1 + 5308416*a^8*b^2*c^6*e*j*1^2 - 5308416*a^6*b^3*c \\
& ^7*e^2*j*1 - 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*1 + 3000960*a^6*b^4*c \\
& ^6*f^2*h*m + 2654208*a^7*b^4*c^5*e*j*1^2 - 2322432*a^8*b^2*c^6*d*k^1^2 + 21 \\
& 25824*a^7*b^3*c^6*d*j^2*m - 1990656*a^7*b^4*c^5*d*k^1^2 - 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*1 + 8294 \\
& 40*a^7*b^3*c^6*g*h^2*1 + 749568*a^7*b^3*c^6*f*j^2*k + 518400*a^6*b^6*c^4*d* \\
& k^1^2 + 414720*a^6*b^5*c^5*g*h^2*1 + 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^1^2 + 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*1 + 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*1 + 1658880*a^6*b^3*c^7*e^2*h*m + \\
& 1596672*a^4*b^6*c^6*d^2*j*1 - 1419264*a^6*b^4*c^6*f*g^2*m - 1105920*a^7*b^ \\
& 4*c^5*f*h^1^2 + 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^1^2 - 508032*a^3*b^8*c^ \\
& 5*d^2*j*1 - 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
\end{aligned}$$

$$\begin{aligned}
& *m + 65664*a^2*b^{10}*c^4*d^2*j^1 - 34560*a^6*b^6*c^4*f*h^1^2 + 6912*a^5*b^7*c^4*e*j*k^2 + 3456*a^5*b^8*c^3*f*h^1^2 + 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^1 - 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*1 - 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*1 - 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^1 + 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^1 + 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*1 - 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^1 - 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^1 - 7962624*a^7*b^3*c^6*e*g^1^2 - 7962624*a^6*b^3*c^7*e*g^2*1 + 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^1^2 - 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^1 - 568320*a^6*b^4*c^6*f*h*j^2 - 414720 \\
& *a^6*b^5*c^5*d*h^1^2 + 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^1^2 - 17280*a^4*b^7*c^5*f*g^2*k + 10368*a^4*b^9*c^3*d*h^1^2 - 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^1 \\
& - 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*1 + 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^1 - 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^1 + 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*1 - 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^1 - 80640*a^4*b^6*c^6*f^2*g^j + 80640*a^4*b^6*c^6*e*f^2*1 \\
& - 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*1 - 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^1^2 - 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^1^2 + 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^1^2 + 17418240*a^4*b^4*c^8*d^2*e^1 + 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^1^2 - 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^1^2 + 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*
\end{aligned}$$

$$\begin{aligned}
& 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^1 + 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^1 + 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 - 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 - 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^1 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^2 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^1^3 - 589824 a^8 b^3 c^5 j^3 l - 442368 a^8 b^5 c^3 j^1^3 - 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 + 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^1^3 + 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 \\
& ^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^1^3 + 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 - 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 \\
& ^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
\end{aligned}$$

$a^4b^5c^7f^3h + 43680a^3b^7c^6f^3h - 21600a^4b^7c^5f^3h - 979$
 $2a^4b^11c^4d^2j^2 + 1350a^3b^9c^4f^3h - 1050a^2b^9c^5f^3h + 16$
 $58880a^6b^3c^9e^2h^2 + 16547328a^4b^2c^10d^3h - 12306816a^3b^4c^$
 $9d^3h + 37310976a^3b^3c^10d^3f + 3037824a^2b^6c^8d^3h - 2654208$
 $a^5b^3c^8e^3g + 1949184a^6b^2c^8d^3h + 1296000a^5b^4c^7d^3h$
 $- 155520a^4b^6c^6d^3h - 40500a^4b^10c^5d^2h^2 - 8100a^3b^8c^5d^*$
 $h^3 + 4050a^2b^10c^4d^3h + 3870720a^5b^3c^10e^2f^2 + 34836480a^4b$
 $c^11d^2e^2 - 108864a^4b^9c^6d^2g^2 - 8068032a^2b^5c^9d^3f - 5623$
 $296a^4b^3c^9d^3f^3 + 1737792a^3b^5c^8d^3f^3 - 260190a^4b^8c^7d^2f^$
 $2 - 211680a^2b^7c^7d^3f^3 - 435456a^4b^7c^8d^2e^2 - 245760a^10c^6j$
 $^2k^m - 384a^6b^10j^1m^2 + 138240a^10c^6h^2k^2m - 90a^5b^11h^2k^m$
 $^2 + 384000a^10c^6f^2k^m^2 - 2211840a^8c^8e^2k^m - 409600a^9c^7f^j$
 $^2m - 147456a^9c^7h^2j^2k - 30a^4b^12f^2k^m^2 + 967680a^9c^7d^2k^2*$
 $m + 384000a^8c^8f^2h^m - 90a^3b^13d^2k^m^2 + 20321280a^7c^9d^2h^m$
 $- 883200a^11b^3c^4k^m^3 - 317952a^10b^3c^5k^3m + 43680a^8b^7c^4k^m^$
 $3 + 1350a^6b^9c^4k^3m - 270b^14c^2d^2h^m + 6a^3b^13f^2h^m^2 + 4838$
 $400a^9c^7d^2h^m^2 + 2903040a^8c^8d^2h^2m - 1032192a^8c^8d^2j^2k + 1$
 $38240a^8c^8f^2h^2k - 3686400a^7c^9e^2f^m - 1327104a^7c^9e^2h^k -$
 $393216a^9b^3c^6j^3l - 245760a^8c^8f^2h^j^2 - 810b^13c^3d^2h^k + 6$
 $30b^13c^3d^2f^m + 18a^2b^14d^2h^m^2 + 2688000a^7c^9d^2f^2m + 58060$
 $8a^8c^8d^2h^k^2 - 5796a^7b^8c^4h^m^3 - 3456b^12c^4d^2g^2j + 1890b^1$
 $2c^4d^2f^k + 6773760a^6c^10d^2f^k - 1344000a^10b^3c^5f^m^3 - 13440$
 $00a^7b^3c^8f^3m - 207360a^9b^3c^6h^k^3 - 207360a^8b^3c^7h^3k - 3682$
 $a^6b^9c^4f^m^3 - 9289728a^6c^10d^2e^2k - 1720320a^7c^9d^2f^j^2 - 508$
 $03200a^5b^3c^10d^3k + 6912b^11c^5d^2e^2j - 10616832a^6b^3c^9e^3l -$
 $2211840a^6c^10e^2f^h - 393216a^8b^3c^7g^2j^3 + 43416a^4b^10c^5d^3m$
 $- 9576a^5b^10c^4d^2m^3 - 9450b^11c^5d^2f^h - 504a^4b^14c^4d^2m^2 + 1$
 $612800a^6c^10d^2f^2h - 1036800a^8b^3c^7d^2k^3 + 45198a^4b^9c^6d^3k -$
 $20736b^10c^6d^2e^2g - 75188736a^4b^3c^11d^3f - 883200a^6b^3c^9f^3*$
 $h - 317952a^7b^3c^8f^3h - 15482880a^5c^11d^2e^2f - 10616832a^5b^3c^1$
 $0e^3g - 345060a^4b^8c^7d^3h - 4262400a^5b^3c^10d^2f^3 + 852768a^4b^7*$
 $c^8d^3f + 7350a^4b^9c^6d^2f^3 + 967680a^10b^3c^3l^2m^2 + 161280a^9*$
 $b^5c^2l^2m^2 + 1684224a^10b^2c^4k^2m^2 + 1264320a^9b^4c^3k^2m$
 $^2 + 126720a^8b^6c^2k^2m^2 + 501760a^9b^3c^4j^2m^2 + 414720a^9b$
 $^3c^4k^2l^2 + 207360a^8b^5c^3k^2l^2 + 170240a^8b^5c^3j^2m^2 +$
 $9216a^7b^7c^2j^2m^2 + 5184a^7b^7c^2k^2l^2 + 884736a^9b^2c^5j^$
 $2l^2 + 884736a^8b^4c^4j^2l^2 + 221184a^7b^6c^3j^2l^2 + 1419840a$
 $^8b^4c^4h^2m^2 + 1387008a^9b^2c^5h^2m^2 + 276480a^8b^3c^5j^2k$
 $^2 + 140544a^7b^5c^4j^2k^2 + 84960a^7b^6c^3h^2m^2 + 25344a^6b^7*$
 $c^3j^2k^2 - 8010a^6b^8c^2h^2m^2 + 576a^5b^9c^2j^2k^2 + 967680*$
 $a^8b^3c^5g^2m^2 + 414720a^8b^3c^5h^2l^2 + 207360a^7b^5c^4h^2l$
 $^2 + 161280a^7b^5c^4g^2m^2 - 20160a^6b^7c^3g^2m^2 + 5184a^6b^7*$
 $c^3h^2l^2 + 576a^5b^9c^2g^2m^2 + 3808000a^8b^2c^6f^2m^2 + 19906$
 $56a^7b^4c^5g^2l^2 + 1643712a^7b^4c^5f^2m^2 + 803520a^7b^4c^5h$
 $^2k^2 + 725760a^8b^2c^6h^2k^2 + 207360a^6b^6c^4h^2k^2 - 125440a$
 $^6b^6c^4f^2m^2 - 13790a^5b^8c^3f^2m^2 + 10530a^5b^8c^3h^2k^2$
 $+ 1785a^4b^10c^2f^2m^2 + 81a^4b^10c^2h^2k^2 + 18427392a^7b^2c^$
 $7d^2m^2 + 967680a^7b^3c^6f^2l^2 + 645120a^7b^3c^6e^2m^2 + 41472$
 $0a^7b^3c^6g^2k^2 + 276480a^7b^3c^6h^2j^2 + 207360a^6b^5c^5g^2$
 $k^2 + 161280a^6b^5c^5f^2l^2 + 140544a^6b^5c^5h^2j^2 - 80640a^6*$
 $b^5c^5e^2m^2 + 25344a^5b^7c^4h^2j^2 - 20160a^5b^7c^4f^2l^2 + 5$
 $184a^5b^7c^4g^2k^2 + 2304a^5b^7c^4e^2m^2 + 576a^4b^9c^3h^2j^$
 $2 + 576a^4b^9c^3f^2l^2 + 7962624a^7b^2c^7e^2l^2 - 4148928a^6b^4*$
 $c^6d^2m^2 + 1419840a^6b^4c^6f^2k^2 + 1387008a^7b^2c^7f^2k^2 -$
 $1183392a^5b^6c^5d^2m^2 + 884736a^7b^2c^7g^2j^2 + 884736a^6b^4c$
 $^6g^2j^2 + 645750a^4b^8c^4d^2m^2 + 221184a^5b^6c^5g^2j^2 - 1159$
 $20a^3b^10c^3d^2m^2 + 84960a^5b^6c^5f^2k^2 + 10836a^2b^12c^2d^$
 $2m^2 - 8010a^4b^8c^4f^2k^2 - 180a^3b^10c^3f^2k^2 + 9a^2b^12c^$
 $2f^2k^2 + 8709120a^6b^3c^7d^2l^2 - 4354560a^5b^5c^6d^2l^2 + 979$

$$\begin{aligned}
& 776a^4b^7c^5d^2l^2 + 829440a^6b^3c^7e^2k^2 + 17480448a^6b^2c^8 \\
& *d^2k^2 + 501760a^6b^3c^7f^2j^2 + 170240a^5b^5c^6f^2j^2 - 108864 \\
& *a^3b^9c^4d^2l^2 + 20736a^5b^5c^6e^2k^2 + 9216a^4b^7c^5f^2j^2 \\
& + 5184a^2b^{11}c^3d^2l^2 - 1984a^3b^9c^4f^2j^2 + 64a^2b^{11}c^3f \\
& ^2j^2 + 3538944a^6b^2c^8e^2j^2 - 3302208a^5b^4c^7d^2k^2 + 884736 \\
& *a^5b^4c^7e^2j^2 + 414720a^6b^3c^7g^2h^2 + 207360a^5b^5c^6g^2* \\
& h^2 - 103680a^4b^6c^6d^2k^2 + 101250a^3b^8c^5d^2k^2 - 5751a^2b^ \\
& 10c^4d^2k^2 + 5184a^4b^7c^5g^2h^2 + 1935360a^5b^3c^8d^2j^2 + 1 \\
& 684224a^6b^2c^8f^2h^2 + 1264320a^5b^4c^7f^2h^2 - 532224a^4b^5c \\
& ^7d^2j^2 + 126720a^4b^6c^6f^2h^2 - 96768a^3b^7c^6d^2j^2 + 62784 \\
& *a^2b^9c^5d^2j^2 - 13950a^3b^8c^5f^2h^2 + 225a^2b^{10}c^4f^2h^2 \\
& + 967680a^5b^3c^8f^2g^2 + 829440a^5b^3c^8e^2h^2 + 161280a^4b^5 \\
& *c^7f^2g^2 + 20736a^4b^5c^7e^2h^2 - 20160a^3b^7c^6f^2g^2 + 576* \\
& a^2b^9c^5f^2g^2 + 11487744a^5b^2c^9d^2h^2 + 7962624a^5b^2c^9e^ \\
& 2g^2 + 35525376a^4b^2c^{10}d^2f^2 - 1412640a^3b^6c^7d^2h^2 + 46137 \\
& 6a^4b^4c^8d^2h^2 + 375030a^2b^8c^6d^2h^2 + 8709120a^4b^3c^9d^ \\
& 2g^2 - 4354560a^3b^5c^8d^2g^2 + 979776a^2b^7c^7d^2g^2 + 645120a \\
& ^4b^3c^9e^2f^2 - 80640a^3b^5c^8e^2f^2 + 2304a^2b^7c^7e^2f^2 - \\
& 15269184a^3b^4c^9d^2f^2 + 2870784a^2b^6c^8d^2f^2 - 17418240a^3* \\
& b^3c^{10}d^2e^2 + 3919104a^2b^5c^9d^2e^2 + 54b^{15}c^d^2k^m + 6a^*b^ \\
& 15d^*f^*m^2 + 115200a^{11}c^5k^2m^2 + 576a^7b^9l^2m^2 + 225a^6b^{10}k \\
& ^2m^2 + 64a^5b^{11}j^2m^2 + 345600a^{10}c^6h^2m^2 + 9a^4b^{12}h^2m^2 \\
& + 320000a^9c^7f^2m^2 + 41472a^9c^7h^2k^2 + 16934400a^8c^8d^2m^ \\
& 2 + 345600a^8c^8f^2k^2 + 81b^{14}c^2d^2k^2 + 3538944a^7c^9e^2j^2 \\
& + 2032128a^7c^9d^2k^2 + 492800a^{11}b^2c^3m^4 + 351456a^{10}b^4c^2m \\
& ^4 + 576b^{13}c^3d^2j^2 + 331776a^9b^4c^3l^4 + 115200a^7c^9f^2h^2 \\
& + 142560a^8b^4c^4k^4 + 103680a^9b^2c^5k^4 + 32400a^7b^6c^3k^4 \\
& + 2025b^{12}c^4d^2h^2 + 2025a^6b^8c^2k^4 + 6096384a^6c^{10}d^2h^2 + \\
& 131072a^8b^2c^6j^4 + 98304a^7b^4c^5j^4 + 32768a^6b^6c^4j^4 + 5 \\
& 184b^{11}c^5d^2g^2 + 4096a^5b^8c^3j^4 + 11025b^{10}c^6d^2f^2 + 5644 \\
& 800a^5c^{11}d^2f^2 + 142560a^6b^4c^6h^4 + 103680a^7b^2c^7h^4 + 32 \\
& 400a^5b^6c^5h^4 + 20736b^9c^7d^2e^2 + 2025a^4b^8c^4h^4 + 331776 \\
& *a^5b^4c^7g^4 + 492800a^5b^2c^9f^4 + 351456a^4b^4c^8f^4 - 43120* \\
& a^3b^6c^7f^4 + 1225a^2b^8c^6f^4 - 27433728a^3b^2c^{11}d^4 + 644630 \\
& 4a^2b^4c^{10}d^4 - 1050a^7b^9k^m^3 + 384000a^{11}c^5h^m^3 + 138240a^ \\
& 9c^7h^3m + 210a^6b^{10}h^m^3 + 47416320a^6c^{10}d^3m - 1134b^{12}c^4* \\
& d^3m + 70a^5b^{11}f^m^3 + 2688000a^{10}c^6d^m^3 + 384000a^7c^9f^3k + \\
& 138240a^9c^7f^k^3 - 3402b^{11}c^5d^3k + 210a^4b^{12}d^m^3 + 7077888* \\
& a^6c^{10}e^3j + 786432a^8c^8e^j^3 - 43120a^9b^6c^m^4 + 28449792a^5* \\
& c^{11}d^3h + 17010b^{10}c^6d^3h + 580608a^7c^9d^h^3 - 39690b^9c^7d^ \\
& 3f - 734832a^*b^6c^9d^4 + 9b^{16}d^2m^2 + 160000a^{12}c^4m^4 + 1225a^ \\
& 8b^8m^4 + 20736a^{10}c^6k^4 + 65536a^9c^7j^4 + 20736a^8c^8h^4 + 49 \\
& 787136a^4c^{12}d^4 + 160000a^6c^{10}f^4 + 5308416a^5c^{11}e^4 + 35721b^ \\
& 8c^8d^4 + a^2b^{14}f^2m^2, z, k1), k1, 1, 4) - ((8a^2c^2g + a^2b^2*1 \\
& + b^3c^e + 8a^3c^1 - 10a^*b^c^2e + a^*b^2c^*g - 6a^2b^*c^*j)/(4c^*(b^4 \\
& + 16a^2c^2 - 8a^*b^2c)) + (x^4*(b^4*1 + 9b^2c^2g + 16a^2c^2*1 - 18* \\
& b^c^3e - 3b^3c^*j - 6a^*b^c^2j + a^*b^2c^*1))/(4c^*(b^4 + 16a^2c^2 - 8* \\
& a^*b^2c)) - (x^7*(3b^3c^2d + 20a^2c^3f + 12a^3c^2k + a^2b^3m - 2 \\
& 4a^*b^c^3d - 16a^3b^*c^m + a^*b^2c^2f - 12a^2b^*c^2h + 3a^2b^2c^*k)) \\
& /(8a^2*(b^4 + 16a^2c^2 - 8a^*b^2c)) + (x^2*(2a^2c^2j - 2b^2c^2e - \\
& 10a^c^3e + b^3c^*g + a^*b^3*1 + 5a^*b^c^2g - 5a^*b^2c^*j + 5a^2b^*c^*1)) \\
& /(2c^*(b^4 + 16a^2c^2 - 8a^*b^2c)) - (c*x^6*(6c^2e + b^2j - 3b^*c^*g + \\
& 2a^*c^*j - 3a^*b^*1))/(2*(b^4 + 16a^2c^2 - 8a^*b^2c)) + (x^3*(4a^4c^2k \\
& - 36a^3c^3f + 2a^3b^3m - 3b^5c^d - 5a^2b^2c^2f - a^*b^4c^*f + 2 \\
& 8a^4b^*c^*m + 20a^*b^3c^2d + 4a^2b^*c^3d + 5a^2b^3c^*h + 16a^3b^*c^2 \\
& *h - 19a^3b^2c^*k))/(8a^2c^*(b^4 + 16a^2c^2 - 8a^*b^2c)) + (x*(12a^3 \\
& *c^2h - 44a^2c^3d + a^3b^2m - 5b^4c^*d + 20a^4c^*m + a^*b^3c^*f - 12 \\
& *a^3b^*c^*k + 37a^*b^2c^2d - 16a^2b^*c^2f + 3a^2b^2c^*h))/(8a^*c^*(b^4 \\
& + 16a^2c^2 - 8a^*b^2c)) - (x^5*(28a^2c^4d + 6b^4c^2d + 4a^3c^3h
\end{aligned}$$

$$- a^2 b^4 m - 36 a^4 c^2 m - 19 a^2 b^2 c^2 h - 49 a b^2 c^3 d + 2 a b^3 c^2 f + 28 a^2 b c^3 f + 5 a^2 b^3 c k + 16 a^3 b c^2 k - 5 a^3 b^2 c m) / (8 a^2 c (b^4 + 16 a^2 c^2 - 8 a b^2 c)) / (x^4 (2 a c + b^2) + a^2 + c^2 x^8 + 2 a b x^2 + 2 b c x^6)$$

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

$$3.58 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5+jx^6+kx^7}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=645

$$\frac{x \left(x^2 (-ab^2j + bc(ah + cd) - 2ac(cf - aj)) + c \left(-\frac{ab(aj+cf)}{c} - 2a(cd - ah) + b^2d \right) \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left(\frac{ab^2j}{c} + \dots \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} + \dots$$

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, number of rules / integrand size = 0.200, Rules used = {1673, 1678, 1166, 205, 1663, 1660, 634, 618, 206, 628}

$$\frac{\tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left(\frac{ab^2j}{c} + \dots \right) + \dots}{2\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}}$$

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*sqrt[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[(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]]) + ((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] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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] && NeQ[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[Pq, 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[PolynomialRemainder[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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 58x^5 + jx^6 + kx^7}{(a + bx^2 + cx^4)^2} dx &= \int \frac{d + fx^2 + hx^4 + jx^6}{(a + bx^2 + cx^4)^2} dx + \int \frac{x(e + gx^2 + 58x^4 + kx^6)}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x \left(c \left(b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x \left(c \left(b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x \left(c \left(b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x \left(c \left(b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x \left(c \left(b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

Mathematica [A] time = 4.40, size = 775, normalized size = 1.20

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*Sqrt[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 - 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]*(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)

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + ix^5 + jx^6 + kx^7}{(a + bx^2 + cx^4)^2} dx$$

Verification is not applicable to the result.

```
[In] IntegrateAlgebraic[(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] IntegrateAlgebraic[(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]
```

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*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*ln(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

$$\frac{abc^2e - 2a^2c^2g + a^2bci - (bc^2d - 2ac^2f + abc^2h - (ab^2c - 2a^2c^2))i^3 + (2ac^2e - abc^2g + (ab^2c - 2a^2c^2))i^2 - (ab^3 - 3a^2bc)k^2 - (a^2b^2 - 2a^3c)k + (abc^2f - 2a^2c^2h + a^2bcj - (b^2c^2 - 2ac^2))d}{2(ab^2c^2 - 4a^3c^2 + (ab^2c^2 - 4a^2c^2)c^4 + (ab^3c^2 - 4a^2bc^2)c^3)} - \int \frac{2(a^2 - 4a^2b^2)c^2 + abc^2j - 2a^2c^2h + a^2bcj + (b^2c^2 - 2ac^2)i^2 + (b^2c^2 - 2ac^2)i^2 + (b^2c^2 - 2ac^2)i^2}{2(ab^2c^2 - 4a^3c^2)}$$

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)*k

$$2*c^2)*i - (a*b^3 - 3*a^2*b*c)*k)*x^2 - (a^2*b^2 - 2*a^3*c)*k + (a*b*c^2*f - 2*a^2*c^2*h + a^2*b*c*j - (b^2*c^2 - 2*a*c^3)*d)*x)/(a^2*b^2*c^2 - 4*a^3*c^3 + (a*b^2*c^3 - 4*a^2*c^4)*x^4 + (a*b^3*c^2 - 4*a^2*b*c^3)*x^2) - 1/2*\integrate(-(2*(a*b^2 - 4*a^2*c)*k*x^3 + a*b*c*f - 2*a^2*c*h + a^2*b*j + (b*c^2*d - 2*a*c^2*f + a*b*c*h + (a*b^2 - 6*a^2*c)*j)*x^2 + (b^2*c - 6*a*c^2)*d - 2*(2*a*c^2*e - a*b*c*g + 2*a^2*c*i - a^2*b*k)*x)/(c*x^4 + b*x^2 + a), x)/(a*b^2*c - 4*a^2*c^2)$$

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) + \text{symsum}(\log(\text{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 + 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 - 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$

$$\begin{aligned}
&^2 - 16384a^7b^5c^5g^2i^2k^2z - 10240a^7b^5c^5f^2j^2k^2z + 4096a^7b^5c^5h^2i^2j^2z - 47104a^6b^5c^6d^2h^2k^2z - 16384a^6b^5c^6e^2g^2k^2z + 6144a^6b^5c^6f^2g^2j^2z + 4096a^6b^5c^6e^2h^2j^2z + 32a^6b^10c^2d^2f^2k^2z - 6144a^5b^5c^7d^2g^2h^2z - 4096a^5b^5c^7d^2f^2i^2z - 32a^6b^8c^4d^2f^2g^2z - 4096a^4b^5c^8d^2e^2f^2z + 64a^6b^7c^5d^2e^2f^2z - 18432a^7b^2c^4h^2j^2k^2z + 4608a^6b^4c^3h^2j^2k^2z - 384a^5b^6c^2h^2j^2k^2z + 12288a^6b^3c^4g^2i^2k^2z + 7680a^6b^3c^4f^2j^2k^2z - 3072a^6b^3c^4h^2i^2j^2z - 3072a^5b^5c^3g^2i^2k^2z - 1920a^5b^5c^3f^2j^2k^2z + 768a^5b^5c^3h^2i^2j^2z + 256a^4b^7c^2g^2i^2k^2z + 160a^4b^7c^2f^2j^2k^2z - 64a^4b^7c^2h^2i^2j^2z - 65536a^6b^2c^5d^2j^2k^2z - 24576a^6b^2c^5e^2i^2k^2z + 21504a^5b^4c^4d^2j^2k^2z + 9216a^6b^2c^5f^2i^2j^2z + 6144a^5b^4c^4e^2i^2k^2z - 3072a^5b^4c^4f^2h^2k^2z - 3072a^4b^6c^3d^2j^2k^2z - 2304a^5b^4c^4f^2i^2j^2z - 2048a^6b^2c^5g^2h^2j^2z + 1536a^5b^4c^4g^2h^2j^2z + 1024a^4b^6c^3f^2h^2k^2z - 512a^4b^6c^3e^2i^2k^2z - 384a^4b^6c^3g^2h^2j^2z + 192a^4b^6c^3f^2i^2j^2z + 160a^3b^8c^2d^2j^2k^2z - 96a^3b^8c^2f^2h^2k^2z + 32a^3b^8c^2g^2h^2j^2z + 41472a^5b^3c^5d^2h^2k^2z - 13440a^4b^5c^4d^2h^2k^2z + 12288a^5b^3c^5e^2g^2k^2z - 4608a^5b^3c^5f^2g^2j^2z - 3072a^5b^3c^5e^2h^2j^2z - 3072a^4b^5c^4e^2g^2k^2z + 1888a^3b^7c^3d^2h^2k^2z + 1152a^4b^5c^4f^2g^2j^2z + 768a^4b^5c^4e^2h^2j^2z + 256a^3b^7c^3e^2g^2k^2z - 96a^3b^7c^3f^2g^2j^2z - 96a^2b^9c^2d^2h^2k^2z - 64a^3b^7c^3e^2h^2j^2z + 9216a^5b^2c^6e^2f^2j^2z - 9216a^5b^2c^6d^2h^2i^2z - 6656a^4b^4c^5d^2f^2k^2z - 6144a^5b^2c^6d^2f^2k^2z + 3456a^3b^6c^4d^2f^2k^2z - 2304a^4b^4c^5e^2f^2j^2z + 2304a^4b^4c^5d^2h^2i^2z - 576a^2b^8c^3d^2f^2k^2z + 192a^3b^6c^4e^2f^2j^2z - 192a^3b^6c^4d^2h^2i^2z + 4608a^4b^3c^6d^2g^2h^2z + 3072a^4b^3c^6d^2f^2i^2z - 1152a^3b^5c^5d^2g^2h^2z - 768a^3b^5c^5d^2f^2i^2z + 96a^2b^7c^4d^2g^2h^2z + 64a^2b^7c^4d^2f^2i^2z - 9216a^4b^2c^7d^2e^2h^2z + 2304a^3b^4c^6d^2e^2h^2z + 2048a^4b^2c^7d^2f^2g^2z - 1536a^3b^4c^6d^2f^2g^2z + 384a^2b^6c^5d^2f^2g^2z - 192a^2b^6c^5d^2e^2h^2z + 3072a^3b^3c^7d^2e^2f^2z - 768a^2b^5c^6d^2e^2f^2z - 3072a^8b^5c^4j^2k^2z + 48a^5b^7c^2j^2k^2z - 49152a^8b^5c^4i^2k^2z + 2304a^5b^7c^2i^2k^2z - 9216a^7b^5c^5h^2k^2z - 32a^4b^8c^2i^2j^2z - 1152a^4b^8c^2g^2k^2z + 9216a^7b^5c^5g^2j^2z - 3072a^6b^5c^6f^2k^2z + 16a^3b^9c^2g^2j^2z - 49152a^7b^5c^5e^2k^2z - 128a^3b^9c^2e^2k^2z - 58368a^5b^5c^7d^2k^2z - 1024a^6b^5c^6g^2h^2z - 432a^6b^9c^3d^2k^2z + 1024a^5b^5c^7f^2g^2z + 32a^6b^8c^4d^2i^2z - 9216a^4b^5c^8d^2g^2z + 336a^6b^7c^5d^2g^2z - 672a^6b^6c^6d^2e^2z + 24576a^8c^5h^2j^2k^2z + 73728a^7c^6d^2j^2k^2z + 32768a^7c^6e^2i^2k^2z - 12288a^7c^6f^2i^2j^2z + 8192a^7c^6f^2h^2k^2z + 24576a^6c^7d^2f^2k^2z - 12288a^6c^7e^2f^2j^2z + 12288a^6c^7d^2h^2i^2z + 12288a^5c^8d^2e^2h^2z + 2304a^7b^3c^3j^2k^2z - 576a^6b^5c^2j^2k^2z + 45056a^7b^3c^3i^2k^2z - 15360a^6b^5c^2i^2k^2z - 12288a^7b^2c^4i^2k^2z + 3072a^6b^4c^3i^2k^2z - 256a^5b^6c^2i^2k^2z + 15872a^7b^2c^4i^2j^2z + 6912a^6b^3c^4h^2k^2z - 4992a^6b^4c^3i^2j^2z - 1728a^5b^5c^3h^2k^2z + 672a^5b^6c^2i^2j^2z + 144a^4b^7c^2h^2k^2z + 24576a^7b^2c^4g^2k^2z - 22528a^6b^4c^3g^2k^2z + 7680a^5b^6c^2g^2k^2z + 4096a^6b^2c^5g^2k^2z - 3072a^5b^4c^4g^2k^2z + 768a^4b^6c^3g^2k^2z - 64a^3b^8c^2g^2k^2z - 7936a^6b^3c^4g^2j^2z + 2496a^5b^5c^3g^2j^2z - 1536a^6b^2c^5h^2i^2z + 1280a^5b^3c^5f^2k^2z + 384a^5b^4c^4h^2i^2z - 336a^4b^7c^2g^2j^2z + 192a^4b^5c^4f^2k^2z - 144a^3b^7c^3f^2k^2z - 32a^4b^6c^3h^2i^2z + 16a^2b^9c^2f^2k^2z + 45056a^6b^3c^4e^2k^2z - 15360a^5b^5c^3e^2k^2z - 12288a^5b^2c^6e^2k^2z + 3072a^4b^4c^5e^2k^2z + 2304a^4b^7c^2e^2k^2z - 256a^3b^6c^4e^2k^2z + 59136a^4b^3c^6d^2k^2z - 23488a^3b^5c^5d^2k^2z + 15872a^6b^2c^5e^2j^2z - 4992a^5b^4c^4e^2j^2z + 4560a^2b^7c^4d^2k^2z + 1536a^5b^2c^6f^2i^2z + 768a^5b^3c^5g^2h^2z + 672a^4b^6c^3e^2j^2z - 384a^4b^4c^5f^2i^2z - 192a^4b^5c^4g^2h^2z - 32a^3b^8c^2e^2j^2z + 32a^3b^6c^4f^2i^2z + 16a^3b^7c^3g^2h^2z - 15872a^4b^2c^7d^2i^2z + 4992a^3b^4c^6d^2i^2z - 1536a^5b^2c^6e^2h^2z - 768a^4b^3c^6f^2g^2z - 672a^2b^6c^5d^2i^2z + 384a^4b^4c^5e^2h^2z + 192a^3b^5c^5f^2g^2z - 32a^3b^6c^4e^2h^2z - 16a^2b^7c^4f^2g^2z + 7936a^3b^3c^7d^2g^2z - 2496a^2b^5c^6d^2g^2z + 1536a^4b^2c^7e^2f^2z - 384a^3
\end{aligned}$$

$$\begin{aligned}
& *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 \\
& - 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
\end{aligned}$$

$$\begin{aligned}
& 072a^6c^5d^*h^*i^*k + 1536a^6c^5e^*h^*i^*j + 4608a^5c^6d^*e^*i^*j - 3072a^5c^6d^*e^*h^*k - 1152a^5c^6d^*f^*h^*j + 512a^5c^6e^*f^*h^*i + 1536a^4c^7d^*e^*f^*i - 2a^*b^9c^d^*f^*j^2 - 1088a^7b^2c^2i^*j^2k + 4800a^7b^2c^2h^*j^*k^2 + 960a^6b^2c^3h^2i^*k + 544a^6b^3c^2g^*j^2k - 144a^5b^4c^2h^2i^*k - 2304a^6b^2c^3g^*i^2k + 1920a^6b^3c^2g^*i^*k^2 + 1152a^5b^3c^3g^2i^*k - 864a^6b^3c^2f^*j^*k^2 + 384a^5b^4c^2g^*i^2k + 192a^6b^2c^3h^*i^2j - 192a^4b^5c^2g^2i^*k - 32a^5b^4c^2h^*i^2j - 1088a^6b^2c^3e^*j^2k + 960a^6b^2c^3g^*i^*j^2 - 480a^5b^3c^3g^*h^2k - 240a^5b^4c^2g^*i^*j^2 + 192a^5b^2c^4f^2i^*k + 72a^4b^5c^2g^*h^2k + 48a^5b^4c^2e^*j^2k + 48a^4b^4c^3f^2i^*k - 16a^3b^6c^2f^2i^*k + 13376a^6b^2c^3d^*j^*k^2 - 5136a^5b^4c^2d^*j^*k^2 - 3840a^6b^2c^3e^*i^*k^2 + 1536a^5b^4c^2e^*i^*k^2 - 768a^5b^3c^3e^*i^2k - 768a^4b^3c^4e^2i^*k + 624a^5b^4c^2f^*h^*k^2 + 576a^6b^2c^3f^*h^*k^2 + 192a^5b^2c^4g^2h^*j + 96a^5b^3c^3f^*i^2j + 48a^4b^4c^3g^2h^*j - 8a^3b^6c^2g^2h^*j + 6848a^4b^2c^5d^2i^*k - 2448a^3b^4c^4d^2i^*k + 960a^5b^2c^4e^*h^2k - 864a^5b^2c^4f^*h^2j + 480a^5b^3c^3e^*i^*j^2 + 336a^4b^3c^4f^2h^*j + 336a^2b^6c^3d^2i^*k + 192a^5b^2c^4g^*h^2i + 144a^5b^3c^3f^*h^*j^2 - 144a^4b^4c^3e^*h^2k - 102a^4b^5c^2f^*h^*j^2 - 96a^4b^3c^4f^2g^*k - 32a^4b^5c^2e^*i^*j^2 - 30a^3b^5c^3f^2h^*j - 24a^3b^5c^3f^2g^*k + 16a^4b^4c^3g^*h^2i - 12a^4b^4c^3f^*h^2j + 12a^3b^6c^2f^*h^2j + 8a^2b^7c^2f^2g^*k - 2a^2b^7c^2f^2h^*j - 9312a^5b^3c^3d^*h^*k^2 + 3288a^4b^5c^2d^*h^*k^2 - 2304a^4b^2c^5e^2g^*k + 1920a^5b^3c^3e^*g^*k^2 + 1152a^4b^3c^4e^*g^2k - 768a^4b^5c^2e^*g^*k^2 + 384a^3b^4c^4e^2g^*k - 320a^5b^2c^4d^*i^2j - 224a^4b^3c^4f^*g^2j + 192a^5b^2c^4f^*h^*i^2 + 192a^4b^2c^5e^2h^*j - 192a^3b^5c^3e^*g^2k - 32a^3b^4c^4e^2h^*j + 24a^3b^5c^3f^*g^2j - 3552a^5b^2c^4d^*h^*j^2 - 3424a^3b^3c^5d^2g^*k + 1332a^4b^4c^3d^*h^*j^2 + 1224a^2b^5c^4d^2g^*k + 960a^5b^2c^4e^*g^*j^2 - 496a^3b^3c^5d^2h^*j + 432a^4b^3c^4d^*h^2j - 240a^4b^4c^3e^*g^*j^2 - 222a^2b^5c^4d^2h^*j + 192a^4b^2c^5f^2g^*i + 192a^4b^2c^5e^*f^2k - 174a^3b^5c^3d^*h^2j - 156a^3b^6c^2d^*h^*j^2 + 48a^3b^4c^4e^*f^2k - 32a^4b^3c^4e^*h^2i + 16a^3b^6c^2e^*g^*j^2 + 16a^3b^4c^4f^2g^*i - 16a^2b^6c^3e^*f^2k + 12a^2b^7c^2d^*h^2j + 1728a^5b^2c^4d^*f^*k^2 + 1392a^4b^4c^3d^*f^*k^2 - 840a^3b^6c^2d^*f^*k^2 - 768a^4b^2c^5e^*g^2i + 576a^4b^2c^5d^*g^2j + 96a^4b^3c^4d^*h^*i^2 + 96a^3b^3c^5e^2f^*j - 80a^3b^4c^4d^*g^2j + 64a^4b^2c^5f^*g^2h + 48a^3b^4c^4f^*g^2h + 6848a^3b^2c^6d^2e^*k - 3552a^3b^2c^6d^2f^*j - 2448a^2b^4c^5d^2e^*k + 1332a^2b^4c^5d^2f^*j + 960a^3b^2c^6d^2g^*i - 496a^4b^3c^4d^*d^*f^*j^2 + 432a^3b^3c^5d^*f^2j - 240a^2b^4c^5d^2g^*i - 222a^3b^5c^3d^*d^*f^*j^2 + 192a^4b^2c^5e^*g^*h^2 - 174a^2b^5c^4d^*d^*f^2j + 42a^2b^7c^2d^*d^*f^*j^2 - 32a^3b^3c^5e^*f^2i + 16a^3b^4c^4e^*g^*h^2 - 320a^3b^2c^6d^*e^2j - 224a^3b^3c^5d^*g^2h + 192a^4b^2c^5d^*d^*f^*i^2 + 192a^3b^2c^6e^2f^*h - 32a^3b^4c^4d^*d^*f^*i^2 + 24a^2b^5c^4d^*d^*g^2h - 864a^3b^2c^6d^*d^*f^2h + 480a^2b^3c^6d^2e^*i + 336a^3b^3c^5d^*d^*f^*h^2 + 192a^3b^2c^6e^*f^2g + 144a^2b^3c^6d^2f^*h - 30a^2b^5c^4d^*d^*f^*h^2 + 16a^2b^4c^5e^*f^2g - 12a^2b^4c^5d^*d^*f^2h + 192a^3b^2c^6d^*d^*f^*g^2 + 96a^2b^3c^6d^*e^2h + 48a^2b^4c^5d^*d^*f^*g^2 + 960a^2b^2c^7d^2e^*g + 192a^2b^2c^7d^*e^2f - 3072a^8b^*c^2j^2k^2 + 1104a^7b^3c^*j^2k^2 + 768a^6b^4c^*i^2k^2 - 256a^6b^3c^2i^3k + 1536a^7b^*c^3h^2k^2 - 960a^7b^*c^3i^2j^2 + 444a^5b^5c^*h^2k^2 - 16a^5b^5c^*i^2j^2 - 3072a^7b^2c^2g^*k^3 - 496a^6b^3c^2h^*j^3 + 192a^4b^6c^*g^2k^2 - 192a^4b^4c^3g^3k + 144a^5b^3c^3h^3j + 32a^3b^6c^2g^3k - 18a^4b^5c^2h^3j - 9a^4b^6c^*h^2j^2 - 192a^6b^*c^4h^2i^2 + 36a^3b^7c^*f^2k^2 - 4a^3b^7c^*g^2j^2 - 2176a^6b^3c^2e^*k^3 - 256a^3b^3c^5e^3k - 192a^6b^2c^3f^*j^3 - 192a^4b^2c^5f^3j + 132a^5b^4c^2f^*j^3 + 128a^4b^3c^4g^3i - 28a^3b^4c^4f^3j + 6a^2b^6c^3f^3j + 10752a^5b^*c^5d^2k^2 - 960a^5b^*c^5e^2j^2 - 192a^5b^*c^5f^2i^2 - 1680a^5b^3c^3d^*j^3 - 1680a^2b^3c^6d^3j + 222a^4b^5c^2d^*j^3 + 80a^4b^3c^4f^*h^3 + 80a^3b^3c^5f^3h + 30a^*b^8c^2d^2j^2 + 6a^3b^5c^3f^*h^3 +
\end{aligned}$$

$$\begin{aligned}
& 6a^2b^5c^4f^3h - 960a^4b^6c^6d^2i^2 - 192a^4b^6c^6e^2h^2 - 192a^4b^2c^5d^3h^3 - 192a^2b^2c^7d^3h + 128a^3b^3c^5e^3g^3 - 28a^3b^4c^4d^3h^3 + 12a^3b^6c^4d^2h^2 + 6a^2b^6c^3d^3h^3 - 192a^3b^6c^7e^2f^2 + 60a^3b^5c^5d^2g^2 + 198a^3b^4c^6d^2f^2 + 144a^2b^3c^6d^3f^3 - 960a^2b^6c^8d^2e^2 + 240a^3b^3c^7d^2e^2 + 4608a^8c^3i^2j^2k - 3072a^8c^3h^2j^2k^2 - 512a^7c^4h^2i^2k + 120a^5b^6h^2j^2k^2 + 768a^7c^4h^2i^2j + 4608a^7c^4e^2j^2k + 512a^6c^5f^2i^2k + 64a^4b^7g^2i^2k^2 - 40a^4b^7f^2j^2k^2 - 9216a^7c^4d^2j^2k^2 - 4096a^7c^4e^2i^2k^2 - 1024a^7c^4f^2h^2k^2 - 4608a^5c^6d^2i^2k - 512a^6c^5e^2h^2k - 192a^6c^5f^2h^2j - 40a^3b^8d^2j^2k^2 + 24a^3b^8f^2h^2k^2 + 2304a^6c^5d^2i^2j + 768a^5c^6e^2h^2j + 256a^6c^5f^2h^2i^2 + 8b^9c^2d^2g^2k - 2b^9c^2d^2h^2j + 6144a^8b^2c^2i^2k^3 - 2176a^7b^3c^2i^2k^3 - 1728a^6c^5d^2h^2j^2 + 1536a^7b^2c^3i^2k^3 + 512a^5c^6e^2f^2k^3 + 24a^2b^9d^2h^2k^2 - 3072a^6c^5d^2f^2k^2 - 16b^8c^3d^2e^2k + 6b^8c^3d^2f^2j - 4608a^4c^7d^2e^2k + 2016a^7b^2c^3h^2j^3 - 1728a^4c^7d^2f^2j + 1088a^6b^4c^2g^2k^3 + 224a^6b^2c^4h^3j + 30a^5b^5c^2h^2j^3 + 2304a^4c^7d^2e^2j + 768a^5c^6d^2f^2i^2 + 256a^4c^7e^2f^2h + 6b^7c^4d^2f^2h + 6144a^7b^2c^3e^2k^3 + 1536a^4b^6c^6e^3k + 512a^6b^2c^4g^2i^3 + 192a^5b^5c^2e^2k^3 - 192a^4c^7d^2f^2h - 10a^4b^6c^2f^2j^3 + 108a^3b^9c^2d^2k^2 + 16b^6c^5d^2e^2g + 4320a^6b^2c^4d^2j^3 + 4320a^3b^6c^7d^3j + 222a^3b^5c^5d^3j + 96a^5b^6c^5f^2h^3 + 96a^4b^6c^6f^3h - 10a^3b^7c^2d^2j^3 + 768a^3c^8d^2e^2f + 512a^3b^6c^7e^3g + 132a^3b^4c^6d^3h + 2016a^2b^6c^8d^3f - 496a^3b^3c^7d^3f + 224a^3b^6c^7d^2f^3 - 18a^3b^5c^5d^2f^3 - 1920a^7b^2c^2i^2k^2 - 1648a^6b^3c^2h^2k^2 + 240a^6b^3c^2i^2j^2 - 960a^6b^2c^3h^2j^2 - 512a^6b^2c^3g^2k^2 - 480a^5b^4c^2g^2k^2 + 198a^5b^4c^2h^2j^2 - 240a^5b^3c^3g^2j^2 - 240a^5b^3c^3f^2k^2 + 60a^4b^5c^2g^2j^2 - 36a^4b^5c^2f^2k^2 - 16a^5b^3c^3h^2i^2 - 1920a^5b^2c^4e^2k^2 + 768a^4b^4c^3e^2k^2 - 464a^5b^2c^4f^2j^2 - 384a^5b^2c^4g^2i^2 - 64a^3b^6c^2e^2k^2 + 42a^4b^4c^3f^2j^2 + 12a^3b^6c^2f^2j^2 - 13104a^4b^3c^4d^2k^2 + 5628a^3b^5c^3d^2k^2 - 1128a^2b^7c^2d^2k^2 + 240a^4b^3c^4e^2j^2 - 48a^4b^3c^4g^2h^2 - 16a^4b^3c^4f^2i^2 - 16a^3b^5c^3e^2j^2 - 4a^3b^5c^3g^2h^2 - 2880a^4b^2c^5d^2j^2 + 1750a^3b^4c^4d^2j^2 - 345a^2b^6c^3d^2j^2 - 192a^4b^2c^5f^2h^2 - 42a^3b^4c^4f^2h^2 + 240a^3b^3c^5d^2i^2 - 48a^3b^3c^5f^2g^2 - 16a^3b^3c^5e^2h^2 - 16a^2b^5c^4d^2i^2 - 4a^2b^5c^4f^2g^2 - 464a^3b^2c^6d^2h^2 - 384a^3b^2c^6e^2g^2 + 42a^2b^4c^5d^2h^2 - 240a^2b^3c^6d^2g^2 - 16a^2b^3c^6e^2f^2 - 960a^2b^2c^7d^2f^2 - 8a^3b^10d^2f^2k^2 - a^2b^8c^2f^2j^2 - 2048a^8c^3i^2k^2 - 100a^6b^5j^2k^2 - 64a^5b^6i^2k^2 - 288a^7c^4h^2j^2 - 36a^4b^7h^2k^2 - 16a^3b^8g^2k^2 - 2048a^6c^5e^2k^2 - 864a^6c^5f^2j^2 - 4a^2b^9f^2k^2 - 2592a^5c^6d^2j^2 - 1536a^5c^6e^2i^2 - 32a^5c^6f^2h^2 - 864a^4c^7d^2h^2 + 360a^7b^2c^2j^4 - 4b^7c^4d^2g^2 - 9b^6c^5d^2f^2 - 288a^3c^8d^2f^2 - 24a^5b^2c^4h^4 - 16b^5c^6d^2e^2 - 9a^4b^4c^3h^4 - 16a^3b^4c^4g^4 - 24a^3b^2c^6f^4 - 9a^2b^4c^5f^4 - a^2b^6c^3f^2h^2 + 192a^6b^5i^2k^3 - 96a^5b^6g^2k^3 - 1728a^7c^4f^2j^3 - 192a^5c^6f^3j - 10b^7c^4d^3j - 1024a^6c^5e^2i^3 - 1024a^4c^7e^3i + 1536a^8b^2c^2k^4 - 10b^6c^5d^3h - 1728a^3c^8d^3h - 192a^5c^6d^3h^3 - 25a^6b^4c^2j^4 + 30b^5c^6d^3f + 360a^3b^2c^8d^4 - 4b^11d^2k^2 - 4096a^9c^2k^4 - 1296a^8c^3j^4 - 144a^7b^4k^4 - 256a^7c^4i^4 - 16a^6c^5h^4 - 16a^4c^7f^4 - 256a^3c^8e^4 - 25b^4c^7d^4 - 1296a^2c^9d^4 - b^8c^3d^2h^2 - b^10c^2d^2j^2, z, n) * ((3072a^5c^6d^2k - 512a^4c^7e^2f - 1536a^5c^6e^2j - 512a^5c^6f^2i + 1024a^6c^5h^2k - 1536a^6c^5i^2j + 32a^3b^5c^5d^2e + 1024a^3b^6c^7d^2e - 16a^3b^6c^4d^2g + 1024a^4b^6c^6d^2i + 512a^4b^6c^6e^2h + 256a^4b^6c^6f^2g + 16a^3b^8c^2d^2k + 256a^5b^6c^5f^2k + 768a^5b^6c^5g^2j + 512a^5b^6c^5h^2i + 1792a^6b^6c^4j^2k - 384a^2b^3c^6d^2e + 192a^2b^4c^5d^2g + 32a^2b^4c^5e^2f - 512a^3b^2c^6d^2g + 32a^2b^5c^4d^2i - 16a^2b^5c^4f^2g - 384a^3b^3c^5d^2i - 128a^3b^3c^5e^2h - 288a^2b^6c^3d^2k + 1792a^3b^4c^4*
\end{aligned}$$

$$\begin{aligned}
& 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)) - \text{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
\end{aligned}$$

$$\begin{aligned}
& ^6c^3fij^*z + 160a^3b^8c^2d^*jk^*z - 96a^3b^8c^2f^*hk^*z + 32a^3b^8c^2g^*hj^*z + 41472a^5b^3c^5d^*hk^*z - 13440a^4b^5c^4d^*hk^*z + 12288a^5b^3c^5e^*g^*k^*z - 4608a^5b^3c^5f^*g^*j^*z - 3072a^5b^3c^5e^*h^*j^*z - 3072a^4b^5c^4e^*g^*k^*z + 1888a^3b^7c^3d^*hk^*z + 1152a^4b^5c^4f^*g^*j^*z + 768a^4b^5c^4e^*h^*j^*z + 256a^3b^7c^3e^*g^*k^*z - 96a^3b^7c^3f^*g^*j^*z - 96a^2b^9c^2d^*hk^*z - 64a^3b^7c^3e^*h^*j^*z + 9216a^5b^2c^6e^*f^*j^*z - 9216a^5b^2c^6d^*h^*i^*z - 6656a^4b^4c^5d^*f^*k^*z - 6144a^5b^2c^6d^*f^*k^*z + 3456a^3b^6c^4d^*f^*k^*z - 2304a^4b^4c^5e^*f^*j^*z + 2304a^4b^4c^5d^*h^*i^*z - 576a^2b^8c^3d^*f^*k^*z + 192a^3b^6c^4e^*f^*j^*z - 192a^3b^6c^4d^*h^*i^*z + 4608a^4b^3c^6d^*g^*h^*z + 3072a^4b^3c^6d^*f^*i^*z - 1152a^3b^5c^5d^*g^*h^*z - 768a^3b^5c^5d^*f^*i^*z + 96a^2b^7c^4d^*g^*h^*z + 64a^2b^7c^4d^*f^*i^*z - 9216a^4b^2c^7d^*e^*h^*z + 2304a^3b^4c^6d^*e^*h^*z + 2048a^4b^2c^7d^*f^*g^*z - 1536a^3b^4c^6d^*f^*g^*z + 384a^2b^6c^5d^*f^*g^*z - 192a^2b^6c^5d^*e^*h^*z + 3072a^3b^3c^7d^*e^*f^*z - 768a^2b^5c^6d^*e^*f^*z - 3072a^8b^*c^4j^2k^*z + 48a^5b^7c^*j^2k^*z - 49152a^8b^*c^4i^*k^2z + 2304a^5b^7c^*i^*k^2z - 9216a^7b^*c^5h^2k^*z - 32a^4b^8c^*i^*j^2z - 1152a^4b^8c^*g^*k^2z + 9216a^7b^*c^5g^*j^2z - 3072a^6b^*c^6f^2k^*z + 16a^3b^9c^*g^*j^2z - 49152a^7b^*c^5e^*k^2z - 128a^3b^9c^*e^*k^2z - 58368a^5b^*c^7d^2k^*z - 1024a^6b^*c^6g^*h^2z - 432a^*b^9c^3d^2k^*z + 1024a^5b^*c^7f^2g^*z + 32a^*b^8c^4d^2i^*z - 9216a^4b^*c^8d^2g^*z + 336a^*b^7c^5d^2g^*z - 672a^*b^6c^6d^2e^*z + 24576a^8c^5h^*j^*k^*z + 73728a^7c^6d^*j^*k^*z + 32768a^7c^6e^*i^*k^*z - 12288a^7c^6f^*i^*j^*z + 8192a^7c^6f^*h^*k^*z + 24576a^6c^7d^*f^*k^*z - 12288a^6c^7e^*f^*j^*z + 12288a^6c^7d^*h^*i^*z + 12288a^5c^8d^*e^*h^*z + 2304a^7b^3c^3j^2k^*z - 576a^6b^5c^2j^2k^*z + 45056a^7b^3c^3i^*k^2z - 15360a^6b^5c^2i^*k^2z - 12288a^7b^2c^4i^2k^*z + 3072a^6b^4c^3i^2k^*z - 256a^5b^6c^2i^2k^*z + 15872a^7b^2c^4i^*j^2z + 6912a^6b^3c^4h^2k^*z - 4992a^6b^4c^3i^*j^2z - 1728a^5b^5c^3h^2k^*z + 672a^5b^6c^2i^*j^2z + 144a^4b^7c^2h^2k^*z + 24576a^7b^2c^4g^*k^2z - 22528a^6b^4c^3g^*k^2z + 7680a^5b^6c^2g^*k^2z + 4096a^6b^2c^5g^2k^*z - 3072a^5b^4c^4g^2k^*z + 768a^4b^6c^3g^2k^*z - 64a^3b^8c^2g^2k^*z - 7936a^6b^3c^4g^*j^2z + 2496a^5b^5c^3g^*j^2z - 1536a^6b^2c^5h^2i^*z + 1280a^5b^3c^5f^2k^*z + 384a^5b^4c^4h^2i^*z - 336a^4b^7c^2g^*j^2z + 192a^4b^5c^4f^2k^*z - 144a^3b^7c^3f^2k^*z - 32a^4b^6c^3h^2i^*z + 16a^2b^9c^2f^2k^*z + 45056a^6b^3c^4e^*k^2z - 15360a^5b^5c^3e^*k^2z - 12288a^5b^2c^6e^2k^*z + 3072a^4b^4c^5e^2k^*z + 2304a^4b^7c^2e^*k^2z - 256a^3b^6c^4e^2k^*z + 59136a^4b^3c^6d^2k^*z - 23488a^3b^5c^5d^2k^*z + 15872a^6b^2c^5e^*j^2z - 4992a^5b^4c^4e^*j^2z + 4560a^2b^7c^4d^2k^*z + 1536a^5b^2c^6f^2i^*z + 768a^5b^3c^5g^*h^2z + 672a^4b^6c^3e^*j^2z - 384a^4b^4c^5f^2i^*z - 192a^4b^5c^4g^*h^2z - 32a^3b^8c^2e^*j^2z + 32a^3b^6c^4f^2i^*z + 16a^3b^7c^3g^*h^2z - 15872a^4b^2c^7d^2i^*z + 4992a^3b^4c^6d^2i^*z - 1536a^5b^2c^6e^*h^2z - 768a^4b^3c^6f^2g^*z - 672a^2b^6c^5d^2i^*z + 384a^4b^4c^5e^*h^2z + 192a^3b^5c^5f^2g^*z - 32a^3b^6c^4e^*h^2z - 16a^2b^7c^4f^2g^*z + 7936a^3b^3c^7d^2g^*z - 2496a^2b^5c^6d^2g^*z + 1536a^4b^2c^7e^*f^2z - 384a^3b^4c^6e^*f^2z + 32a^2b^6c^5e^*f^2z - 15872a^3b^2c^8d^2e^*z + 4992a^2b^4c^7d^2e^*z - 61440a^8b^2c^3k^3z + 21504a^7b^4c^2k^3z + 16384a^8c^5i^2k^*z - 18432a^8c^5i^*j^2z - 128a^4b^9i^*k^2z + 2048a^7c^6h^2i^*z + 64a^3b^10g^*k^2z + 16384a^6c^7e^2k^*z + 16b^11c^2d^2k^*z - 18432a^7c^6e^*j^2z - 2048a^6c^7f^2i^*z + 18432a^5c^8d^2i^*z - 3328a^6b^6c^*k^3z + 2048a^6c^7e^*h^2z - 16b^9c^4d^2g^*z - 2048a^5c^8e^*f^2z + 32b^8c^5d^2e^*z + 18432a^4c^9d^2e^*z + 65536a^9c^4k^3z + 192a^5b^8k^3z - 3328a^7b^*c^3h^*i^*j^*k - 6912a^6b^*c^4d^*i^*j^*k - 3328a^6b^*c^4e^*h^*j^*k - 1536a^6b^*c^4f^*g^*j^*k - 768a^6b^*c^4g^*h^*i^*j - 768a^6b^*c^4f^*h^*i^*k - 6912a^5b^*c^5d^*e^*j^*k - 2304a^5b^*c^5d^*g^*i^*j - 1792a^5b^*c^5e^*f^*i^*j + 1536a^5b^*c^5d^*g^*h^*k - 1280a^5b^*c^5d^*f^*i^*k - 768a^5b^*c^5e^*g^*h^*j - 768a^5b^*c^5e^*f^*h^*k - 256a^5b^*c^5f^*g^*h^*i + 16a^*b^8c^2d^*f^*g^*k - 4a^*b^8c^2d^*f^*h^*j - 2304a^4b^*c^6d^*e^*g^*j - 1792a^4b^*c^6d^*e^*h^*i - 1280a^4b^
\end{aligned}$$

$$\begin{aligned}
& *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^2*i*j - 192*a^4*b^5*c^2 \\
& *g^2*i*k - 32*a^5*b^4*c^2*h^2*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^
\end{aligned}$$

$$\begin{aligned}
& 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 \\
& + 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*
\end{aligned}$$

$$\begin{aligned}
& 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 + 983040*a^8*b*c^6*i*k*z^ \\
& 2 + 983040*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^
\end{aligned}$$

$$\begin{aligned}
& 2 - 3072a^5b^6c^4h^jz^2 + 2304a^4b^8c^3g^kz^2 + 2048a^6b^4c^5h^jz^2 + 576a^4b^8c^3h^jz^2 - 128a^3b^{10}c^2g^kz^2 - 32a^3b^{10}c^2h^jz^2 - 90112a^6b^3c^6e^kz^2 - 49152a^6b^3c^6f^jz^2 + 30720a^5b^5c^5e^kz^2 - 24576a^6b^3c^6g^i z^2 + 15360a^5b^5c^5f^jz^2 + 6144a^5b^5c^5g^i z^2 - 4608a^4b^7c^4e^kz^2 - 2048a^4b^7c^4f^jz^2 - 512a^4b^7c^4g^i z^2 + 256a^3b^9c^3e^kz^2 + 96a^3b^9c^3f^jz^2 + 131072a^6b^2c^7e^i z^2 - 43008a^5b^4c^6d^jz^2 - 12288a^5b^4c^6e^i z^2 + 6144a^5b^4c^6f^h z^2 + 6144a^4b^6c^5d^jz^2 - 2048a^4b^6c^5f^h z^2 + 1024a^4b^6c^5e^i z^2 - 320a^3b^8c^4d^jz^2 + 192a^3b^8c^4f^h z^2 - 49152a^5b^3c^7d^h z^2 - 24576a^5b^3c^7e^g z^2 + 15360a^4b^5c^6d^h z^2 + 6144a^4b^5c^6e^g z^2 - 2048a^3b^7c^5d^h z^2 - 512a^3b^7c^5e^g z^2 + 96a^2b^9c^4d^h z^2 + 24576a^5b^2c^8d^f z^2 - 3072a^3b^6c^6d^f z^2 + 2048a^4b^4c^7d^f z^2 + 576a^2b^8c^5d^f z^2 + 1536a^4b^{10}c^k^2z^2 + 61440a^8b^c^6j^2z^2 - 16a^3b^{11}c^j^2z^2 + 12288a^7b^c^7h^2z^2 + 12288a^6b^c^8f^2z^2 + 61440a^5b^c^9d^2z^2 + 432a^b^9c^5d^2z^2 - 49152a^8c^7h^jz^2 - 147456a^7c^8d^jz^2 - 65536a^7c^8e^i z^2 - 16384a^7c^8f^h z^2 - 49152a^6c^9d^f z^2 + 516096a^8b^2c^5k^2z^2 - 288768a^7b^4c^4k^2z^2 + 88576a^6b^6c^3k^2z^2 - 15744a^5b^8c^2k^2z^2 - 61440a^7b^3c^5j^2z^2 + 24064a^6b^5c^4j^2z^2 - 4608a^5b^7c^3j^2z^2 + 432a^4b^9c^2j^2z^2 + 24576a^7b^2c^6i^2z^2 - 6144a^6b^4c^5i^2z^2 + 512a^5b^6c^4i^2z^2 - 8192a^6b^3c^6h^2z^2 + 1536a^5b^5c^5h^2z^2 - 16a^3b^9c^3h^2z^2 - 8192a^6b^2c^7g^2z^2 + 6144a^5b^4c^6g^2z^2 - 1536a^4b^6c^5g^2z^2 + 128a^3b^8c^4g^2z^2 - 8192a^5b^3c^7f^2z^2 + 1536a^4b^5c^6f^2z^2 - 16a^2b^9c^4f^2z^2 + 24576a^5b^2c^8e^2z^2 - 6144a^4b^4c^7e^2z^2 + 512a^3b^6c^6e^2z^2 - 61440a^4b^3c^8d^2z^2 + 24064a^3b^5c^7d^2z^2 - 4608a^2b^7c^6d^2z^2 - 393216a^9c^6k^2z^2 - 64a^3b^{12}k^2z^2 - 32768a^8c^7i^2z^2 - 32768a^6c^9e^2z^2 - 16b^{11}c^4d^2z^2 - 16384a^7b^c^5g^i k^z - 10240a^7b^c^5f^j k^z + 4096a^7b^c^5h^i j^z - 47104a^6b^c^6d^h k^z - 16384a^6b^c^6e^g k^z + 6144a^6b^c^6f^g j^z + 4096a^6b^c^6e^h j^z + 32a^b^{10}c^2d^f k^z - 6144a^5b^c^7d^g h^z - 4096a^5b^c^7d^f i^z - 32a^b^8c^4d^f g^z - 4096a^4b^c^8d^e f^z + 64a^b^7c^5d^e f^z - 18432a^7b^2c^4h^j k^z + 4608a^6b^4c^3h^j k^z - 384a^5b^6c^2h^j k^z + 12288a^6b^3c^4g^i k^z + 7680a^6b^3c^4f^j k^z - 3072a^6b^3c^4h^i j^z - 3072a^5b^5c^3g^i k^z - 1920a^5b^5c^3f^j k^z + 768a^5b^5c^3h^i j^z + 256a^4b^7c^2g^i k^z + 160a^4b^7c^2f^j k^z - 64a^4b^7c^2h^i j^z - 65536a^6b^2c^5d^j k^z - 24576a^6b^2c^5e^i k^z + 21504a^5b^4c^4d^j k^z + 9216a^6b^2c^5f^i j^z + 6144a^5b^4c^4e^i k^z - 3072a^5b^4c^4f^h k^z - 3072a^4b^6c^3d^j k^z - 2304a^5b^4c^4f^i j^z - 2048a^6b^2c^5g^h j^z + 1536a^5b^4c^4g^h j^z + 1024a^4b^6c^3f^h k^z - 512a^4b^6c^3e^i k^z - 384a^4b^6c^3g^h j^z + 192a^4b^6c^3f^i j^z + 160a^3b^8c^2d^j k^z - 96a^3b^8c^2f^h k^z + 32a^3b^8c^2g^h j^z + 41472a^5b^3c^5d^h k^z - 13440a^4b^5c^4d^h k^z + 12288a^5b^3c^5e^g k^z - 4608a^5b^3c^5f^g j^z - 3072a^5b^3c^5e^h j^z - 3072a^4b^5c^4e^g k^z + 1888a^3b^7c^3d^h k^z + 1152a^4b^5c^4f^g j^z + 768a^4b^5c^4e^h j^z + 256a^3b^7c^3e^g k^z - 96a^3b^7c^3f^g j^z - 96a^2b^9c^2d^h k^z - 64a^3b^7c^3e^h j^z + 9216a^5b^2c^6e^f j^z - 9216a^5b^2c^6d^h i^z - 6656a^4b^4c^5d^f k^z - 6144a^5b^2c^6d^f k^z + 3456a^3b^6c^4d^f k^z - 2304a^4b^4c^5e^f j^z + 2304a^4b^4c^5d^h i^z - 576a^2b^8c^3d^f k^z + 192a^3b^6c^4e^f j^z - 192a^3b^6c^4d^h i^z + 4608a^4b^3c^6d^g h^z + 3072a^4b^3c^6d^f i^z - 1152a^3b^5c^5d^g h^z - 768a^3b^5c^5d^f i^z + 96a^2b^7c^4d^g h^z + 64a^2b^7c^4d^f i^z - 9216a^4b^2c^7d^e h^z + 2304a^3b^4c^6d^e h^z + 2048a^4b^2c^7d^f g^z - 1536a^3b^4c^6d^f g^z + 384a^2b^6c^5d^f g^z - 192a^2b^6c^5d^e h^z + 3072a^3b^3c^7d^e f^z - 768a^2b^5c^6d^e f^z - 3072a^8b^c^4j^2k^z + 48a^5b^7c^j^2k^z - 49152a^8b^c^4i^k^2z + 2304a^5b^7c^i^k^2z - 9216a^7b^c^5h^2k^z - 32a^4b^8c^i^j^2z - 1152a^4b^8c^g
\end{aligned}$$

$$\begin{aligned}
& *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^
\end{aligned}$$

$$\begin{aligned}
& 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^2*i*j^2*k - 1424*a^6*b^4*c^2*h*j*k^2 - 2304*a^7*b^3*c^3*g*j^2*k - 24*a^5*b^5*c^3*g*j^2*k + 2048*a^7*b^3*c^3*g*i*k^2 - 1024*a^7*b^3*c^3*f*j*k^2 - 768*a^5*b^5*c^3*g*i*k^2 + 408*a^5*b^5*c^3*f*j*k^2 + 256*a^6*b^3*c^4*g*h^2*k + 16*a^4*b^6*c^3*g*i*j^2 + 4608*a^6*b^3*c^4*e*i^2*k + 4608*a^5*b^3*c^5*e^2*i*k - 896*a^6*b^3*c^4*f*i^2*j + 768*a^4*b^6*c^3*d*j*k^2 - 256*a^4*b^6*c^3*f*h*k^2 - 128*a^4*b^6*c^3*e*i*k^2 + 2208*a^6*b^3*c^4*f*h*j^2 - 1920*a^6*b^3*c^4*e*i*j^2 + 800*a^5*b^3*c^5*f^2*h*j - 256*a^5*b^3*c^5*f^2*g*k - 16*a*b^8*c^2*d^2*i*k + 6*a^3*b^7*c^3*f*h*j^2 + 8192*a^6*b^3*c^4*d*h*k^2 + 2048*a^6*b^3*c^4*e*g*k^2 - 472*a^3*b^7*c^3*d*h*k^2 + 64*a^3*b^7*c^3*e*g*k^2 + 4896*a^4*b^3*c^6*d^2*h*j + 2304*a^4*b^3*c^6*d^2*g*k + 1824*a^5*b^3*c^5*d*h^2*j - 384*a^5*b^3*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^3*d*h*j^2 + 1536*a^5*b^3*c^5*e*g*i^2 + 1536*a^4*b^3*c^6*e^2*g*i - 896*a^5*b^3*c^5*d*h*i^2 - 896*a^4*b^3*c^6*e^2*f*j + 144*a^2*b^8*c^3*d*f*k^2 + 4896*a^5*b^3*c^5*d*f*j^2 + 1824*a^4*b^3*c^6*d*f^2*j - 384*a^4*b^3*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^3*c^7*d^2*f*h - 1920*a^3*b^3*c^7*d^2*e*i + 800*a^4*b^3*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^3*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^3*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 + 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*
\end{aligned}$$

$$\begin{aligned}
& d^2h^2j - 156a^3b^6c^2d^2h^2j^2 + 48a^3b^4c^4ef^2k - 32a^4b^3c^4 \\
& *e^2h^2i + 16a^3b^6c^2e^2g^2j^2 + 16a^3b^4c^4f^2g^2i - 16a^2b^6c^3 \\
& *ef^2k + 12a^2b^7c^2d^2h^2j + 1728a^5b^2c^4d^2f^2k^2 + 1392a^4b^4 \\
& *c^3d^2f^2k^2 - 840a^3b^6c^2d^2f^2k^2 - 768a^4b^2c^5e^2g^2i + 576a^4b^2 \\
& *c^5d^2g^2j + 96a^4b^3c^4d^2h^2i + 96a^3b^3c^5e^2f^2j - 80a^3b^4 \\
& *c^4d^2g^2j + 64a^4b^2c^5f^2g^2h + 48a^3b^4c^4f^2g^2h + 6848a^3 \\
& *b^2c^6d^2e^2k - 3552a^3b^2c^6d^2f^2j - 2448a^2b^4c^5d^2e^2k + 1 \\
& 332a^2b^4c^5d^2f^2j + 960a^3b^2c^6d^2g^2i - 496a^4b^3c^4d^2f^2j^2 \\
& + 432a^3b^3c^5d^2f^2j - 240a^2b^4c^5d^2g^2i - 222a^3b^5c^3d^2f^2 \\
& j^2 + 192a^4b^2c^5e^2g^2h - 174a^2b^5c^4d^2f^2j + 42a^2b^7c^2d^2 \\
& f^2j^2 - 32a^3b^3c^5e^2f^2i + 16a^3b^4c^4e^2g^2h - 320a^3b^2c^6d^2 \\
& e^2j - 224a^3b^3c^5d^2g^2h + 192a^4b^2c^5d^2f^2i + 192a^3b^2c^6 \\
& e^2f^2h - 32a^3b^4c^4d^2f^2i + 24a^2b^5c^4d^2g^2h - 864a^3b^2c^6 \\
& d^2f^2h + 480a^2b^3c^6d^2e^2i + 336a^3b^3c^5d^2f^2h + 192a^3b^2 \\
& *c^6e^2f^2g + 144a^2b^3c^6d^2f^2h - 30a^2b^5c^4d^2f^2h + 16a^2b^4 \\
& *c^5e^2f^2g - 12a^2b^4c^5d^2f^2h + 192a^3b^2c^6d^2f^2g^2 + 96a^2b^3 \\
& *c^6d^2e^2h + 48a^2b^4c^5d^2f^2g^2 + 960a^2b^2c^7d^2e^2g + 192a^2 \\
& *b^2c^7d^2e^2f - 3072a^8b^3c^2j^2k^2 + 1104a^7b^3c^2j^2k^2 + 768a^6 \\
& *b^4c^2i^2k^2 - 256a^6b^3c^2i^3k + 1536a^7b^3c^3h^2k^2 - 960a^7 \\
& *b^3c^3i^2j^2 + 444a^5b^5c^2h^2k^2 - 16a^5b^5c^2i^2j^2 - 3072a^7b^2 \\
& *c^2g^2k^3 - 496a^6b^3c^2h^2j^3 + 192a^4b^6c^2g^2k^2 - 192a^4b^4c^3 \\
& *g^3k + 144a^5b^3c^3h^3j + 32a^3b^6c^2g^3k - 18a^4b^5c^2h^3 \\
& *j - 9a^4b^6c^2h^2j^2 - 192a^6b^3c^4h^2i^2 + 36a^3b^7c^2f^2k^2 - \\
& 4a^3b^7c^2g^2j^2 - 2176a^6b^3c^2e^2k^3 - 256a^3b^3c^5e^3k - 192a^6 \\
& *b^2c^3f^2j^3 - 192a^4b^2c^5f^3j + 132a^5b^4c^2f^2j^3 + 128a^4 \\
& *b^3c^4g^3i - 28a^3b^4c^4f^3j + 6a^2b^6c^3f^3j + 10752a^5b^3c^5 \\
& *d^2k^2 - 960a^5b^3c^5e^2j^2 - 192a^5b^3c^5f^2i^2 - 1680a^5b^3c^3 \\
& *d^2j^3 - 1680a^2b^3c^6d^3j + 222a^4b^5c^2d^2j^3 + 80a^4b^3c^4 \\
& *f^2h^3 + 80a^3b^3c^5f^3h + 30a^2b^8c^2d^2j^2 + 6a^3b^5c^3f^2h^3 + \\
& 6a^2b^5c^4f^3h - 960a^4b^3c^6d^2i^2 - 192a^4b^3c^6e^2h^2 - 192a^4 \\
& *b^2c^5d^2h^3 - 192a^2b^2c^7d^3h + 128a^3b^3c^5e^2g^3 - 28a^3b^4 \\
& *c^4d^2h^3 + 12a^2b^6c^4d^2h^2 + 6a^2b^6c^3d^2h^3 - 192a^3b^3c^7 \\
& e^2f^2 + 60a^2b^5c^5d^2g^2 + 198a^2b^4c^6d^2f^2 + 144a^2b^3c^6d^2 \\
& f^3 - 960a^2b^3c^8d^2e^2 + 240a^2b^3c^7d^2e^2 + 4608a^8c^3i^2j^2k \\
& - 3072a^8c^3h^2j^2k^2 - 512a^7c^4h^2i^2k + 120a^5b^6h^2j^2k^2 + 768a^7 \\
& *c^4h^2i^2j + 4608a^7c^4e^2j^2k + 512a^6c^5f^2i^2k + 64a^4b^7g^2i \\
& *k^2 - 40a^4b^7f^2j^2k^2 - 9216a^7c^4d^2j^2k^2 - 4096a^7c^4e^2i^2k^2 - 1 \\
& 024a^7c^4f^2h^2k^2 - 4608a^5c^6d^2i^2k - 512a^6c^5e^2h^2k - 192a^6 \\
& *c^5f^2h^2j - 40a^3b^8d^2j^2k^2 + 24a^3b^8f^2h^2k^2 + 2304a^6c^5d^2i^2 \\
& j + 768a^5c^6e^2h^2j + 256a^6c^5f^2h^2i + 8b^9c^2d^2g^2k - 2b^9c^2 \\
& *d^2h^2j + 6144a^8b^3c^2i^2k^3 - 2176a^7b^3c^3i^2k^3 - 1728a^6c^5d^2h^2 \\
& *j^2 + 1536a^7b^3c^3i^3k + 512a^5c^6e^2f^2k + 24a^2b^9d^2h^2k^2 - 30 \\
& 72a^6c^5d^2f^2k^2 - 16b^8c^3d^2e^2k + 6b^8c^3d^2f^2j - 4608a^4c^7 \\
& d^2e^2k + 2016a^7b^3c^3h^2j^3 - 1728a^4c^7d^2f^2j + 1088a^6b^4c^2g^2k^3 \\
& + 224a^6b^3c^4h^3j + 30a^5b^5c^2h^2j^3 + 2304a^4c^7d^2e^2j + 768a^5 \\
& *c^6d^2f^2i + 256a^4c^7e^2f^2h + 6b^7c^4d^2f^2h + 6144a^7b^3c^3e^2 \\
& *k^3 + 1536a^4b^3c^6e^3k + 512a^6b^3c^4g^2i^3 + 192a^5b^5c^2e^2k^3 - 1 \\
& 92a^4c^7d^2f^2h - 10a^4b^6c^2f^2j^3 + 108a^2b^9c^2d^2k^2 + 16b^6c^5 \\
& d^2e^2g + 4320a^6b^3c^4d^2j^3 + 4320a^3b^3c^7d^3j + 222a^2b^5c^5d^3j \\
& + 96a^5b^3c^5f^2h^3 + 96a^4b^3c^6f^3h - 10a^3b^7c^2d^2j^3 + 768a^3c^8 \\
& *d^2e^2f + 512a^3b^3c^7e^3g + 132a^2b^4c^6d^3h + 2016a^2b^3c^8d^3 \\
& *f - 496a^2b^3c^7d^3f + 224a^3b^3c^7d^2f^3 - 18a^2b^5c^5d^2f^3 - 1920a^7 \\
& *b^2c^2i^2k^2 - 1648a^6b^3c^2h^2k^2 + 240a^6b^3c^2i^2j^2 - 960a^6b^2 \\
& *c^3h^2j^2 - 512a^6b^2c^3g^2k^2 - 480a^5b^4c^2g^2k^2 + 198a^5b^4c^2 \\
& *h^2j^2 - 240a^5b^3c^3g^2j^2 - 240a^5b^3c^3f^2k^2 + 60a^4b^5c^2g^2j^2 \\
& - 36a^4b^5c^2f^2k^2 - 16a^5b^3c^3h^2i^2 - 1920a^5b^2c^4e^2k^2 + 768a^4 \\
& *b^4c^3e^2k^2 - 464a^5b^2c^4f^2j^2 - 384a^5b^2c^4g^2i^2 - 64a^3b^6c^2e^2 \\
& *k^2 + 42a^4b^4c^3f^2j^2 + 12a^3b^6c^2f^2j^2 - 13104a^4b^3c^4d^2k^2 + 5628a^3b^
\end{aligned}$$

$$\begin{aligned}
& 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*
\end{aligned}$$

$$\begin{aligned}
& a^2b^3c^4f^2h + a^2b^4c^3fh^2 - 21a^2b^5c^2d^2j^2 + 18a^3b^2c^4fh^2 + 155a^3b^3c^3d^2j^2 - 8a^3b^2c^4g^2h + 436a^3b^4c^2dk^2 - 952a^4b^2c^3d^2k^2 - 5a^2b^4c^3f^2j + 26a^3b^2c^4f^2j - 12a^3b^4c^2f^2j^2 + 2a^4b^2c^3f^2j^2 + 4a^3b^3c^3g^2j + 52a^4b^3c^2f^2k^2 - 6a^3b^4c^2h^2j + 42a^4b^2c^3h^2j + 51a^4b^3c^2h^2j^2 - 360a^5b^2c^2h^2k^2 - 16a^3b^3c^5d^2eg + 96a^2b^3c^6d^2eg - 4a^3b^4c^4d^2fh + 16a^3b^5c^3d^2ek - 4a^3b^5c^3d^2fj + 544a^3b^5c^5d^2ek - 312a^3b^5c^5d^2fj + 96a^3b^5c^5d^2gi + 32a^3b^5c^5d^2efi + 32a^3b^5c^5d^2egh - 8a^3b^6c^2d^2gk + 2a^3b^6c^2d^2hj + 544a^4b^3c^4d^2ik + 224a^4b^3c^4d^2ehk + 32a^4b^3c^4d^2eij + 64a^4b^3c^4d^2fgk - 152a^4b^3c^4d^2fjh + 32a^4b^3c^4d^2g^2h + 192a^5b^3c^3g^2jk + 224a^5b^3c^3h^2ik + 32a^2b^2c^5d^2ei + 52a^2b^2c^5d^2fh - 16a^2b^2c^5d^2efg - 192a^2b^3c^4d^2ek + 70a^2b^3c^4d^2fj - 16a^2b^3c^4d^2gi + 96a^2b^3c^4d^2gk - 30a^2b^4c^3d^2hj + 16a^2b^4c^3d^2efk - 272a^3b^2c^4d^2gk + 100a^3b^2c^4d^2h^2j - 48a^3b^2c^4d^2efk - 16a^3b^2c^4d^2efgj - 16a^3b^2c^4d^2fgi + 16a^2b^5c^2d^2ik - 8a^2b^5c^2d^2fgk + 2a^2b^5c^2d^2fhj - 192a^3b^3c^3d^2ik - 48a^3b^3c^3d^2ehk + 24a^3b^3c^3d^2fgk + 6a^3b^3c^3d^2fhj + 16a^3b^4c^2d^2fik + 24a^3b^4c^2d^2g^2hk + 80a^4b^2c^3e^2jk - 48a^4b^2c^3d^2fik - 112a^4b^2c^3d^2g^2hk - 16a^4b^2c^3d^2g^2ij - 40a^4b^3c^2d^2g^2jk - 48a^4b^3c^2d^2h^2ik + 80a^5b^2c^2d^2ij^2)/(8*(64a^5c^5 - a^2b^6c^2 + 12a^3b^4c^3 - 48a^4b^2c^4)) + (x*(32a^2c^7e^3 + 32a^5c^4i^3 - 12a^4b^5k^3 - 2b^3c^6d^2e + b^4c^5d^2g + 124a^5b^3c^3k^3 - 320a^6b^3c^2k^3 + 96a^3c^6e^2i + 96a^4c^5e^2i^2 + 144a^3c^6d^2k + 128a^5c^4e^2k^2 - b^6c^3d^2k - 4a^2b^7g^2k^2 - 16a^4c^5f^2k + 8a^3b^6i^2k^2 + 16a^5c^4h^2k + 128a^6c^3i^2k^2 - 144a^6c^3j^2k - 4a^2b^3c^4g^3 + 24a^3b^3c^7d^2e - 48a^2c^7d^2ef - 144a^3c^6d^2ej - 48a^3c^6d^2fi - 16a^3c^6d^2efh + 96a^4c^5d^2hk - 144a^4c^5d^2ij - 48a^4c^5d^2ehj - 16a^4c^5d^2fhi - 96a^5c^4d^2fjk - 48a^5c^4d^2hij - 12a^3b^2c^6d^2g + 16a^2b^3c^6d^2ef^2 - 48a^2b^3c^6d^2eg - 2a^3b^3c^5d^2ei + 24a^2b^3c^6d^2ei + 8a^3b^3c^5d^2eh^2 + 18a^3b^4c^4d^2ek + 16a^3b^3c^5d^2ef^2 + 96a^4b^3c^4d^2ej^2 + 8a^2b^6c^2e^2k^2 - 176a^3b^3c^5d^2ek - 48a^4b^3c^4d^2g^2i^2 - a^2b^6c^3g^2j^2 + 8a^4b^3c^4d^2hi + 44a^3b^5c^3g^2k^2 - 64a^5b^3c^3g^2k^2 + 2a^3b^5c^3d^2ij^2 + 96a^5b^3c^3d^2ij^2 - 88a^4b^4c^3d^2ik^2 - 176a^5b^3c^3d^2ik^2 - 3a^4b^4c^3d^2jk^2 + 24a^2b^2c^5d^2eg^2 - 8a^2b^2c^5d^2ef^2g + 2a^2b^3c^4d^2eh^2 - 100a^2b^2c^5d^2ek - a^2b^4c^3d^2g^2h^2 + 2a^2b^5c^2d^2ej^2 - 4a^3b^2c^4d^2g^2h^2 - 28a^3b^3c^3d^2ej^2 + 32a^2b^3c^4d^2e^2k + 24a^3b^2c^4d^2g^2i - 88a^3b^4c^2d^2ek^2 + 216a^4b^2c^3d^2ek^2 - a^2b^4c^3d^2f^2k + 2a^3b^3c^3d^2h^2i + 14a^3b^4c^2d^2g^2j^2 - 48a^4b^2c^3d^2g^2j^2 + 8a^2b^5c^2d^2g^2k - 44a^3b^3c^3d^2g^2k - 108a^4b^3c^2d^2g^2k^2 - 12a^4b^2c^3d^2h^2k - 28a^4b^3c^2d^2ij^2 + 32a^4b^3c^2d^2i^2k + 216a^5b^2c^2d^2ik^2 + 40a^5b^2c^2d^2j^2k - 4a^3b^2c^6d^2ef + 2a^3b^3c^5d^2efg + 32a^2b^3c^6d^2efh + 24a^2b^3c^6d^2efg - 2a^3b^5c^3d^2fk - 8a^3b^5c^3d^2fjk + 72a^3b^5c^3d^2g^2j + 32a^3b^5c^3d^2h^2i + 80a^3b^5c^3d^2efj - 96a^3b^5c^3d^2egi + 8a^3b^5c^3d^2fgh + 72a^4b^3c^4d^2j^2k - 352a^4b^3c^4d^2eik + 8a^4b^3c^4d^2f^2hk + 80a^4b^3c^4d^2f^2ij + 24a^4b^3c^4d^2g^2hj + 56a^5b^3c^3d^2h^2jk + 20a^2b^2c^5d^2ej - 4a^2b^2c^5d^2efi - 16a^2b^2c^5d^2g^2h - 12a^2b^2c^5d^2efh + 18a^2b^3c^4d^2f^2k - 10a^2b^3c^4d^2g^2j - 12a^2b^3c^4d^2efj + 6a^2b^3c^4d^2fgh + 6a^2b^4c^3d^2h^2k - 32a^2b^4c^3d^2eg^2k + 4a^2b^4c^3d^2eh^2j + 6a^2b^4c^3d^2fg^2j - 64a^3b^2c^4d^2hk + 20a^3b^2c^4d^2ij + 176a^3b^2c^4d^2eg^2k - 20a^3b^2c^4d^2eh^2j - 40a^3b^2c^4d^2fg^2j - 12a^3b^2c^4d^2f^2hi - 2a^2b^5c^2d^2g^2hj - 10a^3b^3c^3d^2j^2k + 64a^3b^3c^3d^2eik + 6a^3b^3c^3d^2f^2hk - 12a^3b^3c^3d^2f^2ij + 10a^3b^3c^3d^2g^2hj - 32a^3b^4c^2d^2g^2ik + 4a^3b^4c^2d^2h^2ij + 8a^4b^2c^3d^2f^2jk + 176a^4b^2c^3d^2g^2ik - 20a^4b^2c^3d^2h^2ij - 6a^4b^3c^2d^2h^2jk))/(4*(64a^5c^5 - a^2b^6c^2 + 12a^3b^4c^3 - 48a^4b^2c^4))*root(1572864a^8b^2c^9z^4 - 983040a^7b^4c^8z^4 + 327680a^6b^6c^7z^4 - 61440a^5b^8c^6z^4 + 6144a^4b^10c^5z^4 - 256a^3b^12c^4z^4 - 1048576a^9c^10z^4 - 1572864a^8b^2c^9z^4)
\end{aligned}$$

$$\begin{aligned}
& 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^6 c^6 i k z^2 + 98304 a^7 b^6 c^7 e k z^2 + 57344 a^7 \\
& b^6 c^7 f j z^2 + 32768 a^7 b^6 c^7 g i z^2 + 57344 a^6 b^6 c^8 d h z^2 + 327 \\
& 68 a^6 b^6 c^8 e g z^2 - 32 a^6 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^2 k^2 z^2 + 61440 a^8 b^6 c^6 j^2 z^2 - 16 \\
& a^3 b^{11} c^5 j^2 z^2 + 12288 a^7 b^6 c^7 h^2 z^2 + 12288 a^6 b^6 c^8 f^2 z^2 + 6 \\
& 1440 a^5 b^6 c^9 d^2 z^2 + 432 a^6 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^6 c^5 g i k z - 1024 \\
& 0 a^7 b^6 c^5 f j k z + 4096 a^7 b^6 c^5 h i j z - 47104 a^6 b^6 c^6 d h k z - 16 \\
& 384 a^6 b^6 c^6 e g k z + 6144 a^6 b^6 c^6 f g j z + 4096 a^6 b^6 c^6 e h j z + 3 \\
& 2 a^6 b^{10} c^2 d f k z - 6144 a^5 b^6 c^7 d g h z - 4096 a^5 b^6 c^7 d f i z - 32 \\
& a^6 b^8 c^4 d f g z - 4096 a^4 b^6 c^8 d e f z + 64 a^6 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
\end{aligned}$$

$$\begin{aligned}
& *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 - 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 + 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 - 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
\end{aligned}$$

$$\begin{aligned}
& 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
\end{aligned}$$

$$\begin{aligned}
& 152a^4b^3c^4e^2g^2k - 768a^4b^5c^2e^2g^2k^2 + 384a^3b^4c^4e^2g^2k \\
& - 320a^5b^2c^4d^2i^2j - 224a^4b^3c^4f^2g^2j + 192a^5b^2c^4f^2h^2i \\
& + 192a^4b^2c^5e^2h^2j - 192a^3b^5c^3e^2g^2k - 32a^3b^4c^4e^2h^2j \\
& + 24a^3b^5c^3f^2g^2j - 3552a^5b^2c^4d^2h^2j^2 - 3424a^3b^3c^5d^2g^2k \\
& + 1332a^4b^4c^3d^2h^2j^2 + 1224a^2b^5c^4d^2g^2k + 960a^5b^2c^4e^2g^2j^2 \\
& - 496a^3b^3c^5d^2h^2j + 432a^4b^3c^4d^2h^2j - 240a^4b^4c^3e^2g^2j^2 \\
& - 222a^2b^5c^4d^2h^2j + 192a^4b^2c^5f^2g^2i + 192a^4b^2c^5e^2f^2k \\
& - 174a^3b^5c^3d^2h^2j - 156a^3b^6c^2d^2h^2j^2 + 48a^3b^4c^4e^2f^2k \\
& - 32a^4b^3c^4e^2h^2i + 16a^3b^6c^2e^2g^2j^2 + 16a^3b^4c^4f^2g^2i \\
& - 16a^2b^6c^3e^2f^2k + 12a^2b^7c^2d^2h^2j + 1728a^5b^2c^4d^2f^2k^2 \\
& + 1392a^4b^4c^3d^2f^2k^2 - 840a^3b^6c^2d^2f^2k^2 - 768a^4b^2c^5e^2g^2i \\
& + 576a^4b^2c^5d^2g^2j + 96a^4b^3c^4d^2h^2i^2 + 96a^3b^3c^5e^2f^2j \\
& - 80a^3b^4c^4d^2g^2j + 64a^4b^2c^5f^2g^2h + 48a^3b^4c^4f^2g^2h \\
& + 6848a^3b^2c^6d^2e^2k - 3552a^3b^2c^6d^2f^2j - 2448a^2b^4c^5d^2e^2k \\
& + 1332a^2b^4c^5d^2f^2j + 960a^3b^2c^6d^2g^2i - 496a^4b^3c^4d^2f^2j^2 \\
& + 432a^3b^3c^5d^2f^2j - 240a^2b^4c^5d^2g^2i - 222a^3b^5c^3d^2f^2j^2 \\
& + 192a^4b^2c^5e^2g^2h^2 - 174a^2b^5c^4d^2f^2j + 42a^2b^7c^2d^2f^2j^2 \\
& - 32a^3b^3c^5e^2f^2i + 16a^3b^4c^4e^2g^2h^2 - 320a^3b^2c^6d^2e^2j \\
& - 224a^3b^3c^5d^2g^2h + 192a^4b^2c^5d^2f^2i^2 + 192a^3b^2c^6e^2f^2h \\
& - 32a^3b^4c^4d^2f^2i^2 + 24a^2b^5c^4d^2g^2h - 864a^3b^2c^6d^2f^2h \\
& + 480a^2b^3c^6d^2e^2i + 336a^3b^3c^5d^2f^2h^2 + 192a^3b^2c^6e^2f^2g \\
& + 144a^2b^3c^6d^2f^2h - 30a^2b^5c^4d^2f^2h^2 + 16a^2b^4c^5e^2f^2g \\
& - 12a^2b^4c^5d^2f^2h + 192a^3b^2c^6d^2f^2g^2 + 96a^2b^3c^6d^2e^2h \\
& + 48a^2b^4c^5d^2f^2g^2 + 960a^2b^2c^7d^2e^2g + 192a^2b^2c^7d^2e^2f \\
& - 3072a^8b^3c^2j^2k^2 + 1104a^7b^3c^2j^2k^2 + 768a^6b^4c^2i^2k^2 \\
& - 256a^6b^3c^2i^3k + 1536a^7b^3c^3h^2k^2 - 960a^7b^3c^3i^2j^2 + 444a^5b^5c^3h^2k^2 \\
& - 16a^5b^5c^3i^2j^2 - 3072a^7b^2c^2g^2k^3 - 496a^6b^3c^2h^2j^3 \\
& + 192a^4b^6c^2g^2k^2 - 192a^4b^4c^3g^2k^3 + 144a^5b^3c^3h^3j + 32a^3b^6c^2g^2k^3 \\
& - 18a^4b^5c^2h^3j - 9a^4b^6c^2h^2j^2 - 192a^6b^3c^4h^2i^2 + 36a^3b^7c^2f^2k^2 \\
& - 4a^3b^7c^2g^2j^2 - 2176a^6b^3c^2e^2k^3 - 256a^3b^3c^5e^3k - 192a^6b^2c^3f^2j^3 \\
& - 192a^4b^2c^5f^3j + 132a^5b^4c^2f^2j^3 + 128a^4b^3c^4g^3i - 28a^3b^4c^4f^3j \\
& + 6a^2b^6c^3f^3j + 10752a^5b^3c^5d^2k^2 - 960a^5b^3c^5e^2j^2 - 192a^5b^3c^5f^2i^2 \\
& - 1680a^5b^3c^3d^2j^3 - 1680a^2b^3c^6d^3j + 222a^4b^5c^2d^2j^3 \\
& + 80a^4b^3c^4f^2h^3 + 80a^3b^3c^5f^3h + 30a^8b^8c^2d^2j^2 + 6a^3b^5c^3f^2h^3 \\
& + 6a^2b^5c^4f^3h - 960a^4b^3c^6d^2i^2 - 192a^4b^3c^6e^2h^2 - 192a^4b^2c^5d^2h^3 \\
& - 192a^2b^2c^7d^3h + 128a^3b^3c^5e^2g^3 - 28a^3b^4c^4d^2h^3 + 12a^6b^6c^4d^2h^2 \\
& + 6a^2b^6c^3d^2h^3 - 192a^3b^3c^7e^2f^2 + 60a^6b^5c^5d^2g^2 + 198a^6b^4c^6d^2f^2 \\
& + 144a^2b^3c^6d^2f^3 - 960a^2b^3c^8d^2e^2 + 240a^6b^3c^7d^2e^2 + 4608a^8c^3i^2j^2k \\
& - 3072a^8c^3h^2j^2k^2 - 512a^7c^4h^2i^2k + 120a^5b^6h^2j^2k^2 + 768a^7c^4h^2i^2j \\
& + 4608a^7c^4e^2j^2k^2 + 512a^6c^5f^2i^2k + 64a^4b^7g^2i^2k^2 - 40a^4b^7f^2j^2k^2 \\
& - 9216a^7c^4d^2j^2k^2 - 4096a^7c^4e^2i^2k^2 - 1024a^7c^4f^2h^2k^2 - 4608a^5c^6d^2i^2k \\
& - 512a^6c^5e^2h^2k - 192a^6c^5f^2h^2j - 40a^3b^8d^2j^2k^2 + 24a^3b^8f^2h^2k^2 \\
& + 2304a^6c^5d^2i^2j + 768a^5c^6e^2h^2j + 256a^6c^5f^2h^2i^2 + 8b^9c^2d^2g^2k \\
& - 2b^9c^2d^2h^2j + 6144a^8b^3c^2i^2k^3 - 2176a^7b^3c^2i^2k^3 - 1728a^6c^5d^2h^2j^2 \\
& + 1536a^7b^3c^3i^3k + 512a^5c^6e^2f^2k + 24a^2b^9d^2h^2k^2 - 3072a^6c^5d^2f^2k^2 \\
& - 16b^8c^3d^2e^2k + 6b^8c^3d^2f^2j - 4608a^4c^7d^2e^2k + 2016a^7b^3c^3h^2j^3 \\
& - 1728a^4c^7d^2f^2j + 1088a^6b^4c^2g^2k^3 + 224a^6b^4c^4h^3j + 30a^5b^5c^2h^2j^3 \\
& + 2304a^4c^7d^2e^2j + 768a^5c^6d^2f^2i^2 + 256a^4c^7e^2f^2h + 6b^7c^4d^2f^2h \\
& + 6144a^7b^3c^3e^2k^3 + 1536a^4b^3c^6e^3k + 512a^6b^3c^4g^2i^3 + 192a^5b^5c^2e^2k^3 \\
& - 192a^4c^7d^2f^2h - 10a^4b^6c^2f^2j^3 + 108a^6b^9c^2d^2k^2 + 16b^6c^5d^2e^2g \\
& + 4320a^6b^3c^4d^2j^3 + 4320a^3b^3c^7d^3j + 222a^6b^5c^5d^3j + 96a^5b^3c^5f^2h^3 \\
& + 96a^4b^3c^6f^3h - 10a^3b^7c^2d^2j^3 + 768a^3c^8d^2e^2f + 512a^3b^3c^7e^3g \\
& + 132a^6b^4c^6d^3h + 2016a^2b^3c^8d^3f - 496a^6b^3c^7d^3f + 224a^3b^3
\end{aligned}$$

```

*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^10*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
```

$$3.59 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5+jx^8+kx^{11}}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=1177

$$\frac{x \left(\left(- \left(\left(\frac{ja^2}{c^2} + d \right) b^2 \right) + afb + 2a \left(\frac{ja^2}{c} - ha + cd \right) \right) c^2 + (-ajb^3 - c(-3ja^2 + cha + c^2d)b + 2ac^3f)x^2 \right) \left(ja^2 + \dots \right)}{4ac^2 (b^2 - 4ac) (cx^4 + bx^2 + a)^2} + \dots$$

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}

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] $-(x*(c^2*(a*b*f - b^2*(d + (a^2*j)/c^2) + 2*a*(c*d - a*h + (a^2*j)/c)) + (2*a*c^3*f - a*b^3*j - b*c*(c^2*d + a*c*h - 3*a^2*j))*x^2)/(4*a*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) - (b*c^3*(c*e + a*i) - a*b^4*k + 4*a^2*b^2*c*k - 2*a*c^2*(c^2*g + a^2*k) + (2*c^5*e + b^2*c^3*i - c^4*(b*g + 2*a*i) - b^5*k + 5*a*b^3*c*k - 5*a^2*b*c^2*k)*x^2)/(4*c^4*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (x*(c*(a*b^3*f + 8*a^2*b*c*f + 4*a^2*(7*c^2*d + a*c*h - 9*a^2*j) + b^4*(3*d - (2*a^2*j)/c^2) - a*b^2*(25*c*d + 7*a*h - (11*a^2*j)/c)) + (a*b^2*c^2*f + 20*a^2*c^3*f + b^3*(3*c^2*d + a^2*j) - 4*a*b*c*(6*c^2*d + 3*a*c*h + 4*a^2*j))*x^2)/(8*a^2*c*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (b^3*c^2*i + 2*b*c^3*(3*c*e + a*i) + 11*a*b^4*k - (b^6*k)/c + 32*a^3*c^2*k - 3*b^2*(c^3*g + 13*a^2*c*k) + 2*(6*c^5*e + b^2*c^3*i - c^4*(3*b*g - 2*a*i) + 2*b^5*k - 15*a*b^3*c*k + 25*a^2*b*c^2*k)*x^2)/(4*c^3*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + ((a*b^2*c*f + 20*a^2*c^2*f - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*j) + b^3*(3*c*d + (a^2*j)/c) + (a*b^3*c^2*f - 52*a^2*b*c^3*f - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*j) + b^4*(3*c^2*d - a^2*j) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*j))/(c*sqrt[b^2 - 4*a*c]))*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]]]/(8*sqrt[2]*a^2*sqrt[c]*(b^2 - 4*a*c)^2*sqrt[b - sqrt[b^2 - 4*a*c]]) + ((a*b^2*c*f + 20*a^2*c^2*f - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*j) + b^3*(3*c*d + (a^2*j)/c) - (a*b^3*c^2*f - 52*a^2*b*c^3*f - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*j) + b^4*(3*c^2*d - a^2*j) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*j))/(c*sqrt[b^2 - 4*a*c]))*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]]]/(8*sqrt[2]*a^2*sqrt[c]*(b^2 - 4*a*c)^2*sqrt[b + sqrt[b^2 - 4*a*c]]) - ((12*c^5*e + 2*b^2*c^3*i - c^4*(6*b*g - 4*a*i) - b^5*k + 10*a*b^3*c*k - 30*a^2*b*c^2*k)*ArcTanh[(b + 2*c*x^2)/sqrt[b^2 - 4*a*c]])/(2*c^3*(b^2 - 4*a*c)^(5/2)) + (k*Log[a + b*x^2 + c*x^4])/(4*c^3)$

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] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] := Simp[(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] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(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] && NeQ[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[Pq, 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[PolynomialRemainder[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]] /; 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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 59x^5 + jx^8 + kx^{11}}{(a + bx^2 + cx^4)^3} dx = \int \frac{d + fx^2 + hx^4 + jx^8}{(a + bx^2 + cx^4)^3} dx + \int \frac{x(e + gx^2 + 59x^4 + kx^8)}{(a + bx^2 + cx^4)^3} dx$$

$$= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^2d - ab^2e + c^2e) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^3}$$

$$= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^2d - ab^2e + c^2e) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^3}$$

$$= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^2d - ab^2e + c^2e) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^3}$$

$$= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^2d - ab^2e + c^2e) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^3}$$

$$= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^2d - ab^2e + c^2e) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^3}$$

$$= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^2d - ab^2e + c^2e) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^3}$$

Mathematica [A] time = 7.35, size = 1649, normalized size = 1.40

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*k - 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

$$8a^2c^6dx + ab^3c^4fx + 8a^2b^2c^5fx - 7a^2b^2c^4hx + 4a^3c^5hx - 2a^2b^4c^2jx + 11a^3b^2c^3jx - 36a^4c^4jx + 24a^2c^6ex^2 - 12a^2b^2c^5gx^2 + 4a^2b^2c^4ix^2 + 8a^3c^5ix^2 + 8a^2b^5c^3kx^2 - 60a^3b^3c^2kx^2 + 100a^4b^2c^3kx^2 + 3b^3c^5dx^3 - 24ab^2c^6dx^3 + ab^2c^5fx^3 + 20a^2c^6fx^3 - 12a^2b^2c^5hx^3 + a^2b^3c^3jx^3 - 16a^3b^2c^4jx^3)/(8a^2c^4(-b^2 + 4ac)^2(a + bx^2 + cx^4)) + ((3b^4c^2d - 30ab^2c^3d + 168a^2c^4d + 3b^3c^2\sqrt{b^2 - 4ac}d - 24ab^2c^3\sqrt{b^2 - 4ac}d + ab^3c^2f - 52a^2b^2c^3f + ab^2c^2\sqrt{b^2 - 4ac}f + 20a^2c^3\sqrt{b^2 - 4ac}f + 18a^2b^2c^2h + 24a^3c^3h - 12a^2b^2c^2\sqrt{b^2 - 4ac}h - a^2b^4j + 18a^3b^2c^2j + 40a^4c^2j + a^2b^3\sqrt{b^2 - 4ac}j - 16a^3b^2c^2\sqrt{b^2 - 4ac}j)\text{ArcTan}[(\sqrt{2}\sqrt{c}x)/\sqrt{b - \sqrt{b^2 - 4ac}}])/(8\sqrt{2}a^2c^{3/2}(b^2 - 4ac)^{5/2}\sqrt{b - \sqrt{b^2 - 4ac}}) + ((-3b^4c^2d + 30ab^2c^3d - 168a^2c^4d + 3b^3c^2\sqrt{b^2 - 4ac}d - 24ab^2c^3\sqrt{b^2 - 4ac}d - ab^3c^2f + 52a^2b^2c^3f + ab^2c^2\sqrt{b^2 - 4ac}f + 20a^2c^3\sqrt{b^2 - 4ac}f - 18a^2b^2c^2h - 24a^3c^3h - 12a^2b^2c^2\sqrt{b^2 - 4ac}h + a^2b^4j - 18a^3b^2c^2j - 40a^4c^2j + a^2b^3\sqrt{b^2 - 4ac}j - 16a^3b^2c^2\sqrt{b^2 - 4ac}j)\text{ArcTan}[(\sqrt{2}\sqrt{c}x)/\sqrt{b + \sqrt{b^2 - 4ac}}])/(8\sqrt{2}a^2c^{3/2}(b^2 - 4ac)^{5/2}\sqrt{b + \sqrt{b^2 - 4ac}}) + ((12c^5e - 6b^2c^4g + 2b^2c^3i + 4ac^4i - b^5k + 10ab^3c^2k - 30a^2b^2c^2k + b^4\sqrt{b^2 - 4ac}k - 8ab^2c^2\sqrt{b^2 - 4ac}k + 16a^2c^2\sqrt{b^2 - 4ac}k)\text{Log}[-b + \sqrt{b^2 - 4ac} - 2cx^2])/(4c^3(b^2 - 4ac)^{5/2}) + ((-12c^5e + 6b^2c^4g - 2b^2c^3i - 4ac^4i + b^5k - 10ab^3c^2k + 30a^2b^2c^2k + b^4\sqrt{b^2 - 4ac}k - 8ab^2c^2\sqrt{b^2 - 4ac}k + 16a^2c^2\sqrt{b^2 - 4ac}k)\text{Log}[b + \sqrt{b^2 - 4ac} + 2cx^2])/(4c^3(b^2 - 4ac)^{5/2})$$

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + ix^5 + jx^8 + kx^{11}}{(a + bx^2 + cx^4)^3} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(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] IntegrateAlgebraic[(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]

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] $\text{int}((k*x^{11}+j*x^8+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x)$

[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] $\text{integrate}((k*x^{11}+j*x^8+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, \text{algorithm}="maxima")$

[Out]
$$\frac{1}{8}(12a^4b^3c^3i - (12a^2b^3c^5h - 3(b^3c^5 - 8a^2b^3c^6)d - (a^2b^2c^5 + 20a^2c^6)f - (a^2b^3c^3 - 16a^3b^3c^4)j)x^7 + 4(6a^2c^6e - 3a^2b^3c^5g + (a^2b^2c^4 + 2a^3c^5)i + (2a^2b^5c - 15a^3b^3c^2 + 25a^4b^3c^3)k)x^6 + ((6b^4c^4 - 49a^2b^2c^5 + 28a^2c^6)d + 2(a^2b^3c^4 + 14a^2b^3c^5)f - (19a^2b^2c^4 - 4a^3c^5)h - (a^2b^4c^2 + 5a^3b^2c^3 + 36a^4c^4)j)x^5 + 2(18a^2b^3c^5e - 9a^2b^2c^4g + 3(a^2b^3c^3 + 2a^3b^3c^4)i + (3a^2b^6 - 19a^3b^4c + 11a^4b^2c^2 + 32a^5c^3)k)x^4 + ((3b^5c^3 - 20a^2b^3c^4 - 4a^2b^3c^5)d + (a^2b^4c^3 + 5a^2b^2c^4 + 36a^3c^5)f - (5a^2b^3c^3 + 16a^3b^3c^4)h - 2(a^3b^3c^2 + 14a^4b^3c^3)j)x^3 + 4(2(a^2b^2c^4 + 5a^3c^5)e - (a^2b^3c^3 + 5a^3b^3c^4)g + (5a^3b^2c^3 - 2a^4c^4)i + (3a^3b^5 - 22a^4b^3c + 31a^5b^3c^2)k)x^2 - 2(a^2b^3c^3 - 10a^3b^3c^4)e - 2(a^3b^2c^3 + 8a^4c^4)g + 6(a^4b^4 - 7a^5b^2c + 8a^6c^2)k + ((5a^2b^4c^3 - 37a^2b^2c^4 + 44a^3c^5)d - (a^2b^3c^3 - 16a^3b^3c^4)f - 3(a^3b^2c^3 + 4a^4c^4)h - (a^4b^2c^2 + 20a^5c^3)j)x) / (a^4b^4c^3 - 8a^5b^2c^4 + 16a^6c^5 + (a^2b^4c^5 - 8a^3b^2c^6 + 16a^4c^7)x^8 + 2(a^2b^5c^4 - 8a^3b^3c^5 + 16a^4b^3c^6)x^6 + (a^2b^6c^3 - 6a^3b^4c^4 + 32a^5c^6)x^4 + 2(a^3b^5c^3 - 8a^4b^3c^4 + 16a^5b^3c^5)x^2) + 1/8 \int ((8(a^2b^4 - 8a^3b^2c + 16a^4c^2)kx^3 - (12a^2b^3c^3h - 3(b^3c^3 - 8a^2b^3c^4)d - (a^2b^2c^3 + 20a^2c^4)f - (a^2b^3c - 16a^3b^3c^2)j)x^2 + 3(b^4c^2 - 9a^2b^2c^3 + 28a^2c^4)d + (a^2b^3c^2 - 16a^2b^3c^3)f + 3(a^2b^2c^2 + 4a^3c^3)h + (a^3b^2c + 20a^4c^2)j + 8(6a^2c^4e - 3a^2b^3c^3g + (a^2b^2c^2 + 2a^3c^3)i + (a^3b^3 - 7a^4b^3c)k)x) / (c*x^4 + b*x^2 + a), x) / (a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)$$

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] $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^8 + k*x^{11})/(a + b*x^2 + c*x^4)^3,x)$

[Out]
$$\frac{(x^7(3b^3c^2d + 20a^2c^3f + a^2b^3j - 24a^2b^3c^3d - 16a^3b^3c^3j + a^2b^2c^2f - 12a^2b^3c^2h))/(8a^2(b^4 + 16a^2c^2 - 8a^2b^2c)) - (b^3c^3e + 8a^2c^4g - 3a^2b^4k - 24a^4c^2k - 10a^2b^3c^4e + a^2b^2c^3g - 6a^2b^3c^3i + 21a^3b^2c^3k)/(4c^3(b^4 + 16a^2c^2 - 8a^2b^2c)) + (x^4(3b^6k - 9b^2c^4g + 3b^3c^3i + 32a^3c^3k + 18b^3c^5e + 11a^2b^2c^2k + 6a^2b^3c^4i - 19a^2b^4c^3k))/(4c^3(b^4 + 16a^2c^2 - 8a^2b^2c)) + (x^2(2b^2c^4e - b^3c^3g - 2a^2c^4i + 10a^2c^5e + 3a^2b^5k - 5a^2b^3c^4g + 5a^2b^2c^3i - 22a^2b^3c^3k + 31a^3b^3c^2k))/(2c^3(b^4 + 16a^2c^2 - 8a^2b^2c)) + (x^6(6c^5e + 2b^5k + b^2c^3i - 3b^3c^4g + 2a^2c^4i - 15a^2b^3c^3k + 25a^2b^3c^2k))/(2c^2(b^4$$

$$\begin{aligned}
& + 16a^2c^2 - 8ab^2c) - (x^3(2a^3b^3j - 36a^3c^3f - 3b^5cd \\
& - 5a^2b^2c^2f - ab^4cf + 28a^4b^3c^2j + 20ab^3c^2d + 4a^2b^3c^3 \\
& *d + 5a^2b^3c^3h + 16a^3b^3c^2h))/(8a^2c*(b^4 + 16a^2c^2 - 8ab^2c \\
& c)) + (x^5(28a^2c^4d + 6b^4c^2d + 4a^3c^3h - a^2b^4j - 36a^4c \\
& ^2j - 19a^2b^2c^2h - 49ab^2c^3d + 2ab^3c^2f + 28a^2b^3c^3f - \\
& 5a^3b^2c^3j))/(8a^2c*(b^4 + 16a^2c^2 - 8ab^2c)) - (x(12a^3c^2* \\
& h - 44a^2c^3d + a^3b^2j - 5b^4cd + 20a^4cj + ab^3cf + 37ab^ \\
& 2c^2d - 16a^2b^3c^2f + 3a^2b^2c^3h))/(8a^2c*(b^4 + 16a^2c^2 - 8ab^ \\
& ^2c)))/(x^4(2ac + b^2) + a^2 + c^2x^8 + 2abx^2 + 2b^2cx^6) + \text{symsu} \\
& \text{m}(\log((10368ab^5c^{10}d^3 - 8000a^5c^{11}f^3 - 567b^7c^9d^3 + 169344a \\
& ^3b^3c^{12}d^3 + 193536a^4c^{12}de^2 - 141120a^4c^{12}d^2f + 1728a^6b \\
& ^9h^3 + 315b^8c^8d^2f + 6400a^9b^3c^6j^3 + 27648a^5c^{11}e^2h + \\
& 21504a^6c^{10}di^2 - 135b^9c^7d^2h + 192a^2b^{14}dk^2 - 2880a^6c^ \\
& ^{10}fh^2 + 46080a^6c^{10}e^2j - 1376256a^9c^7dk^2 + 9b^{11}c^5d^2j \\
& + 64a^3b^{13}fk^2 - 8000a^8c^8f^2j + 3072a^7c^9hi^2 + 192a^4b^{11} \\
& 2hk^2 + 5120a^8c^8i^2j - 196608a^{10}c^6hk^2 + 2240a^6b^{10}jk^2 \\
& - 327680a^{11}c^5jk^2 - 67824a^2b^3c^{11}d^3 + 35a^2b^6c^8f^3 + 84a \\
& ^3b^4c^9f^3 - 12720a^4b^2c^{10}f^3 + 540a^4b^5c^7h^3 + 4320a^5b \\
& ^3c^8h^3 + 35a^6b^7c^3j^3 - 1176a^7b^5c^4j^3 + 9456a^8b^3c^5j \\
& ^3 + 129024a^5c^{11}d^2e^2i - 40320a^5c^{11}d^2f^2h - 67200a^6c^{10}d^2f^2j \\
& + 18432a^6c^{10}e^2hi + 245760a^7c^9e^2f^2k + 30720a^7c^9e^2i^2j - 9600a^ \\
& ^7c^9f^2h^2j + 81920a^8c^8f^2i^2k - 6237a^6b^6c^9d^2f + 210a^6b^7c^8d^2 \\
& f^2 + 116160a^4b^3c^{11}d^2f^2 - 36864a^4b^3c^{11}e^2f + 2430a^6b^7c^8d^2 \\
& *h + 133056a^4b^3c^{11}d^2h + 27648a^5b^3c^{10}d^2h^2 - 324a^6b^9c^6d^2j \\
& + 193536a^5b^3c^{10}d^2j + 26880a^5b^3c^{10}f^2h + 63360a^7b^3c^8d^2j^2 \\
& - 5568a^3b^{12}cd^2k^2 - 4096a^6b^3c^9f^2i^2 + 40000a^6b^3c^9f^2j - 2 \\
& 304a^4b^{11}c^2f^2k^2 - 352256a^9b^3c^6f^2k^2 + 8064a^7b^3c^8h^2j + 1248 \\
& 0a^8b^3c^7h^2j^2 - 2112a^5b^{10}c^2hk^2 - 41664a^7b^8c^2jk^2 + 6912a^ \\
& ^2b^4c^{10}de^2 - 62208a^3b^2c^{11}de^2 + 42372a^2b^4c^{10}d^2f - 17 \\
& 64a^2b^5c^9d^2f^2 - 96048a^3b^2c^{11}d^2f - 4608a^3b^3c^{10}d^2f^2 + \\
& 1728a^2b^6c^8d^2g^2 + 2304a^3b^3c^{10}e^2f - 15552a^3b^4c^9d^2g^2 \\
& + 48384a^4b^2c^{10}d^2g^2 - 13716a^2b^5c^9d^2h + 405a^2b^7c^7d^2h \\
& ^2 + 12096a^3b^3c^{10}d^2h - 5400a^3b^5c^8d^2h^2 + 28944a^4b^3c^9d \\
& ^2h^2 + 192a^2b^8c^6d^2i^2 + 576a^3b^5c^8f^2g^2 - 960a^3b^6c^7d^2i \\
& ^2 + 6912a^4b^2c^{10}e^2h - 9216a^4b^3c^9f^2g^2 - 768a^4b^4c^8d^2i \\
& ^2 + 14592a^5b^2c^9d^2i^2 + 3717a^2b^7c^7d^2j - 15a^2b^7c^7f^2* \\
& h + 3a^2b^{11}c^3d^2j^2 - 15192a^3b^5c^8d^2j - 360a^3b^5c^8f^2h \\
& + 135a^3b^6c^7f^2h^2 - 132a^3b^9c^4d^2j^2 - 7920a^4b^3c^9d^2j + \\
& 15696a^4b^3c^9f^2h - 5580a^4b^4c^8f^2h^2 + 2079a^4b^7c^5d^2j^2 - \\
& 20592a^5b^2c^9f^2h^2 - 14448a^5b^5c^6d^2j^2 + 37104a^6b^3c^7d^2j^ \\
& ^2 + 64a^3b^7c^6f^2i^2 + 1728a^4b^4c^8g^2h - 768a^4b^5c^7f^2i^2 + \\
& 70656a^4b^{10}c^2d^2k^2 + 2304a^5b^2c^9e^2j + 6912a^5b^2c^9g^2h \\
& - 3840a^5b^3c^8f^2i^2 - 499008a^5b^8c^3d^2k^2 + 2071104a^6b^6c^4d \\
& ^2k^2 - 4853952a^7b^4c^5d^2k^2 + 5399808a^8b^2c^6d^2k^2 + a^2b^9c^5 \\
& *f^2j + 20a^3b^7c^6f^2j + a^3b^{10}c^3f^2j^2 - 1596a^4b^5c^7f^2j \\
& - 51a^4b^8c^4f^2j^2 + 16736a^5b^3c^8f^2j + 875a^5b^6c^5f^2j^2 - \\
& 2716a^6b^4c^6f^2j^2 - 39600a^7b^2c^7f^2j^2 + 192a^4b^6c^6h^2i^2 + \\
& 1536a^5b^4c^7h^2i^2 + 576a^5b^4c^7g^2j + 28480a^5b^9c^2f^2k^2 + \\
& 3840a^6b^2c^8h^2i^2 + 11520a^6b^2c^8g^2j - 164096a^6b^7c^3f^2k^ \\
& ^2 + 436800a^7b^5c^4f^2k^2 - 338944a^8b^3c^5f^2k^2 - 81a^4b^7c^5h^ \\
& ^2j + 3a^4b^9c^3h^2j^2 + 720a^5b^5c^6h^2j - 78a^5b^7c^4h^2j^2 + \\
& 17136a^6b^3c^7h^2j - 900a^6b^5c^5h^2j^2 + 22272a^7b^3c^6h^2j^2 + \\
& 64a^5b^6c^5i^2j + 1536a^6b^4c^6i^2j - 960a^6b^8c^2h^2k^2 + 53 \\
& 76a^7b^2c^7i^2j + 108672a^7b^6c^3h^2k^2 - 548160a^8b^4c^4h^2k^2 \\
& + 922368a^9b^2c^5h^2k^2 + 305024a^8b^6c^2j^2k^2 - 1042880a^9b^4c^3 \\
& *jk^2 + 1479936a^{10}b^2c^4j^2k^2 - 193536a^4b^3c^{11}d^2eg - 90ab^8c^ \\
& ^7d^2fh + 6ab^{10}c^5d^2fj - 64512a^5b^3c^{10}d^2gi - 24576a^5b^3c^{10}e \\
& ^2fi - 27648a^5b^3c^{10}e^2gh - 1778688a^6b^3c^9d^2ek + 84096a^6b^3c^9d^2 \\
& hj - 46080a^6b^3c^9e^2gj - 9216a^6b^3c^9gh^2i - 592896a^7b^3c^8d^2ik
\end{aligned}$$

$$\begin{aligned}
& - 359424a^7b^8c^8e^h*k - 122880a^7b^8c^8f*g*k - 15360a^7b^8c^8g*i*j \\
& - 549888a^8b^8c^7e^j*k - 119808a^8b^8c^7h*i*k - 183296a^9b^8c^6i*j*k \\
& - 6912a^2b^5c^9d^e*g + 62208a^3b^3c^10d^e*g + 2304a^2b^6c^8d^e* \\
& i - 270a^2b^6c^8d^f*h - 16128a^3b^4c^9d^e*i + 16056a^3b^4c^9d^f* \\
& h - 2304a^3b^4c^9e^f*g + 23040a^4b^2c^10d^e*i - 127008a^4b^2c^1 \\
& 0d^f*h + 36864a^4b^2c^10e^f*g - 1152a^2b^7c^7d^g*i - 48a^2b^8c^ \\
& 6d^f*j - 2304a^2b^9c^5d^e*k + 8064a^3b^5c^8d^g*i + 768a^3b^5c^8 \\
& e^f*i - 2226a^3b^6c^7d^f*j + 43776a^3b^7c^6d^e*k - 11520a^4b^3c \\
& ^9d^g*i - 10752a^4b^3c^9e^f*i - 6912a^4b^3c^9e^g*h + 33384a^4b^4 \\
& c^8d^f*j - 340992a^4b^5c^7d^e*k - 162528a^5b^2c^9d^f*j + 1241856* \\
& a^5b^3c^8d^e*k - 72a^2b^9c^5d^h*j + 1152a^2b^10c^4d^g*k - 384a^ \\
& 3b^6c^7f^g*i + 2016a^3b^7c^6d^h*j - 21888a^3b^8c^5d^g*k - 768a^ \\
& 3b^8c^5e^f*k + 2304a^4b^4c^8e^h*i + 5376a^4b^4c^8f^g*i - 18648a \\
& ^4b^5c^7d^h*j + 170496a^4b^6c^6d^g*k + 19968a^4b^6c^6e^f*k + 138 \\
& 24a^5b^2c^9e^h*i + 12288a^5b^2c^9f^g*i + 67392a^5b^3c^8d^h*j - \\
& 2304a^5b^3c^8e^g*j - 620928a^5b^4c^7d^g*k - 119040a^5b^4c^7e^f* \\
& k + 889344a^6b^2c^8d^g*k + 172032a^6b^2c^8e^f*k - 384a^2b^11c^3* \\
& d^i*k - 24a^3b^8c^5f^h*j + 6528a^3b^9c^4d^i*k + 384a^3b^9c^4f^g* \\
& k - 1152a^4b^5c^7g^h*i + 1050a^4b^6c^6f^h*j - 42240a^4b^7c^5d^ \\
& i*k - 2304a^4b^7c^5e^h*k - 9984a^4b^7c^5f^g*k - 6912a^5b^3c^8g^ \\
& h*i + 768a^5b^4c^7e^i*j - 9576a^5b^4c^7f^h*j + 93312a^5b^5c^6d^ \\
& i*k + 2304a^5b^5c^6e^h*k + 59520a^5b^5c^6f^g*k + 16896a^6b^2c^8* \\
& e^i*j - 57504a^6b^2c^8f^h*j + 117504a^6b^3c^7d^i*k + 103680a^6b^3 \\
& c^7e^h*k - 86016a^6b^3c^7f^g*k - 128a^3b^10c^3f^i*k + 3072a^4b^ \\
& 8c^4f^i*k + 1152a^4b^8c^4g^h*k - 384a^5b^5c^6g^i*j - 13184a^5b^ \\
& 6c^5f^i*k - 1152a^5b^6c^5g^h*k - 8448a^6b^3c^7g^i*j - 11008a^6b \\
& ^4c^6f^i*k - 51840a^6b^4c^6g^h*k - 26880a^6b^5c^5e^j*k + 98304a^ \\
& 7b^2c^7f^i*k + 179712a^7b^2c^7g^h*k + 231168a^7b^3c^6e^j*k - 384 \\
& a^4b^9c^3h^i*k - 384a^5b^7c^4h^i*k + 18048a^6b^5c^5h^i*k + 1344 \\
& 0a^6b^6c^4g^j*k - 25344a^7b^3c^6h^i*k - 115584a^7b^4c^5g^j*k + \\
& 274944a^8b^2c^6g^j*k - 4480a^6b^7c^3i^j*k + 29568a^7b^5c^4i^j*k \\
& - 14592a^8b^3c^5i^j*k)/(512*(4096a^10c^10 + a^4b^12c^4 - 24a^5b^ \\
& 10c^5 + 240a^6b^8c^6 - 1280a^7b^6c^7 + 3840a^8b^4c^8 - 6144a^9b \\
& ^2c^9)) + \text{root}(56371445760a^11b^8c^12z^4 - 503316480a^8b^14c^9z^4 \\
& + 47185920a^7b^16c^8z^4 - 2621440a^6b^18c^7z^4 + 65536a^5b^20c^6 \\
& *z^4 - 171798691840a^14b^2c^15z^4 + 193273528320a^13b^4c^14z^4 - 12 \\
& 8849018880a^12b^6c^13z^4 - 16911433728a^10b^10c^11z^4 + 3523215360* \\
& a^9b^12c^10z^4 + 68719476736a^15c^16z^4 - 47185920a^7b^16c^5kz^3 \\
& + 2621440a^6b^18c^4kz^3 - 65536a^5b^20c^3kz^3 + 171798691840a^1 \\
& 4b^2c^12kz^3 - 193273528320a^13b^4c^11kz^3 + 128849018880a^12b^6 \\
& c^10kz^3 + 16911433728a^10b^10c^8kz^3 - 3523215360a^9b^12c^7kz \\
& ^3 - 56371445760a^11b^8c^9kz^3 + 503316480a^8b^14c^6kz^3 - 687194 \\
& 76736a^15c^13kz^3 + 1536a^6b^18c^6d^fz^2 - 2571632640a^9b^5c^11d \\
& *jz^2 + 2548039680a^9b^3c^13d^hz^2 + 2453667840a^9b^7c^9e^kz^2 + \\
& 2181038080a^12b^3c^10i^kz^2 - 6492782592a^10b^5c^10e^kz^2 + 1509 \\
& 949440a^9b^3c^13e^gz^2 - 1401421824a^8b^5c^12d^hz^2 - 1226833920* \\
& a^9b^8c^8g^kz^2 - 1321205760a^9b^2c^14d^fz^2 - 2793406464a^11b^c \\
& ^13d^jz^2 + 9563013120a^11b^3c^11e^kz^2 + 890634240a^8b^7c^10d^j \\
& *z^2 - 754974720a^8b^5c^12e^gz^2 - 570425344a^11b^5c^9i^kz^2 + 73 \\
& 2168192a^7b^6c^12d^fz^2 - 581959680a^10b^4c^11f^jz^2 - 603979776* \\
& a^10b^2c^13e^iz^2 + 534773760a^11b^3c^11h^jz^2 - 558366720a^8b^9 \\
& c^8e^kz^2 - 4781506560a^11b^4c^10g^kz^2 - 2013265920a^13b^c^11i^ \\
& kz^2 - 456130560a^9b^4c^12f^hz^2 + 384040960a^9b^6c^10f^jz^2 - 2 \\
& 64241152a^10b^7c^8i^kz^2 + 390463488a^7b^7c^11d^hz^2 + 279183360* \\
& a^8b^10c^7g^kz^2 + 301989888a^10b^3c^12g^iz^2 + 222822400a^9b^9* \\
& c^7i^kz^2 - 366280704a^6b^8c^11d^fz^2 - 330301440a^8b^4c^13d^fz \\
& ^2 + 254017536a^8b^6c^11f^hz^2 - 1887436800a^10b^c^14d^hz^2 + 1887 \\
& 43680a^10b^2c^13f^hz^2 - 185303040a^7b^9c^9d^jz^2 - 117964800a^1 \\
& 0b^5c^10h^jz^2 - 6039797760a^12b^c^12e^kz^2 - 67502080a^8b^11c^6
\end{aligned}$$

$$\begin{aligned}
& *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
\end{aligned}$$

$0 * e * g * k * z + 2222456832 * a^{11} * b * c^{10} * d * j * k * z - 454164480 * a^{11} * b^3 * c^8 * h * j * k * z$
 $+ 377487360 * a^8 * b^5 * c^9 * e * g * k * z + 290979840 * a^{10} * b^4 * c^8 * f * j * k * z + 3810263$
 $04 * a^6 * b^8 * c^8 * d * f * k * z + 412876800 * a^8 * b^2 * c^{12} * d * e * j * z + 301989888 * a^{10} * b^2$
 $* c^{10} * e * i * k * z - 320421888 * a^7 * b^7 * c^8 * d * h * k * z + 185794560 * a^{10} * b^5 * c^7 * h * j$
 $* k * z - 192020480 * a^9 * b^6 * c^7 * f * j * k * z + 190709760 * a^9 * b^4 * c^9 * f * h * k * z - 1509$
 $94944 * a^{10} * b^3 * c^9 * g * i * k * z + 168990720 * a^7 * b^9 * c^6 * d * j * k * z + 235929600 * a^9 * b^2$
 $* c^{11} * d * f * k * z - 206438400 * a^8 * b^3 * c^{11} * d * g * j * z - 206438400 * a^7 * b^4 * c^{11} * d$
 $* e * j * z - 101646336 * a^8 * b^6 * c^8 * f * h * k * z - 29245440 * a^9 * b^7 * c^6 * h * j * k * z - 60$
 $817408 * a^{11} * b^2 * c^9 * f * j * k * z + 57835520 * a^8 * b^8 * c^6 * f * j * k * z + 219414528 * a^7 * b^2$
 $* c^{13} * d * e * h * z - 70778880 * a^{10} * b^2 * c^{10} * f * h * k * z + 677376 * a^7 * b^{11} * c^4 * h * j$
 $* k * z - 645120 * a^8 * b^9 * c^5 * h * j * k * z - 53760 * a^6 * b^{13} * c^3 * h * j * k * z + 31457280 * a^8$
 $* b^7 * c^7 * g * i * k * z - 62914560 * a^8 * b^6 * c^8 * e * i * k * z - 94371840 * a^7 * b^7 * c^8 * e * g$
 $* k * z - 221773824 * a^6 * b^3 * c^{13} * d * e * f * z + 82575360 * a^9 * b^2 * c^{11} * d * i * j * z + 11$
 $796480 * a^{10} * b^2 * c^{10} * h * i * j * z - 11796480 * a^7 * b^9 * c^6 * g * i * k * z - 8970240 * a^7 * b^{10}$
 $* c^5 * f * j * k * z + 103219200 * a^7 * b^5 * c^{10} * d * g * j * z - 2457600 * a^8 * b^6 * c^8 * h * i * j$
 $* z + 1769472 * a^6 * b^{11} * c^5 * g * i * k * z + 921600 * a^7 * b^8 * c^7 * h * i * j * z + 673792 * a^6$
 $* b^{12} * c^4 * f * j * k * z - 138240 * a^6 * b^{10} * c^6 * h * i * j * z - 98304 * a^5 * b^{13} * c^4 * g * i * k$
 $* z - 17920 * a^5 * b^{14} * c^3 * f * j * k * z + 7680 * a^5 * b^{12} * c^5 * h * i * j * z - 97136640 * a^5 * b^{10}$
 $* c^7 * d * f * k * z - 29491200 * a^9 * b^3 * c^{10} * g * h * j * z + 58982400 * a^9 * b^2 * c^{11} * e * h$
 $* j * z + 23592960 * a^7 * b^8 * c^7 * e * i * k * z - 22169088 * a^6 * b^{11} * c^5 * d * j * k * z + 2138$
 $1120 * a^7 * b^8 * c^7 * f * h * k * z + 14745600 * a^8 * b^5 * c^9 * g * h * j * z + 42854400 * a^6 * b^9 * c^7$
 $* d * h * k * z - 109707264 * a^7 * b^3 * c^{12} * d * g * h * z - 3686400 * a^7 * b^7 * c^8 * g * h * j * z -$
 $3538944 * a^6 * b^{10} * c^6 * e * i * k * z + 1645056 * a^5 * b^{13} * c^4 * d * j * k * z - 890880 * a^6 * b^{10}$
 $* c^6 * f * h * k * z + 460800 * a^6 * b^9 * c^7 * g * h * j * z - 330240 * a^5 * b^{12} * c^5 * f * h * k * z +$
 $196608 * a^5 * b^{12} * c^5 * e * i * k * z - 53760 * a^4 * b^{15} * c^3 * d * j * k * z + 46080 * a^4 * b^{14} * c^4$
 $* f * h * k * z - 23040 * a^5 * b^{11} * c^6 * g * h * j * z - 1536 * a^3 * b^{16} * c^3 * f * h * k * z - 29$
 $491200 * a^8 * b^4 * c^{10} * e * h * j * z - 17203200 * a^7 * b^6 * c^9 * d * i * j * z + 11796480 * a^6 * b^9$
 $* c^7 * e * g * k * z + 110886912 * a^6 * b^4 * c^{12} * d * f * g * z + 7372800 * a^7 * b^6 * c^9 * e * h * j$
 $* z + 40108032 * a^8 * b^2 * c^{12} * d * h * i * z + 6451200 * a^6 * b^8 * c^8 * d * i * j * z + 2359296 * a^8$
 $* b^3 * c^{11} * f * h * i * z - 967680 * a^5 * b^{10} * c^7 * d * i * j * z - 921600 * a^6 * b^8 * c^8 * e * h * j$
 $* z - 829440 * a^4 * b^{13} * c^5 * d * h * k * z - 589824 * a^5 * b^{11} * c^6 * e * g * k * z - 491520 * a^6$
 $* b^7 * c^9 * f * h * i * z + 184320 * a^5 * b^9 * c^8 * f * h * i * z + 105984 * a^3 * b^{15} * c^4 * d * h * k$
 $* z + 69120 * a^5 * b^{11} * c^6 * d * h * k * z + 53760 * a^4 * b^{12} * c^6 * d * i * j * z + 46080 * a^5 * b^{10}$
 $* c^7 * e * h * j * z - 27648 * a^4 * b^{11} * c^7 * f * h * i * z - 4608 * a^2 * b^{17} * c^3 * d * h * k * z + 1$
 $536 * a^3 * b^{13} * c^6 * f * h * i * z - 25804800 * a^6 * b^7 * c^9 * d * g * j * z - 88473600 * a^6 * b^4 * c^{12}$
 $* d * e * h * z + 51609600 * a^6 * b^6 * c^{10} * d * e * j * z - 84934656 * a^7 * b^2 * c^{13} * d * f * g * z +$
 $117964800 * a^5 * b^5 * c^{12} * d * e * f * z + 15160320 * a^4 * b^{12} * c^6 * d * f * k * z - 456130$
 $56 * a^7 * b^3 * c^{12} * d * f * i * z + 44236800 * a^6 * b^5 * c^{11} * d * g * h * z - 10321920 * a^6 * b^6 * c^{10}$
 $* d * h * i * z + 7077888 * a^7 * b^4 * c^{11} * d * h * i * z - 5898240 * a^7 * b^4 * c^{11} * f * g * h * z +$
 $4718592 * a^8 * b^2 * c^{12} * f * g * h * z + 3225600 * a^5 * b^9 * c^8 * d * g * j * z + 2949120 * a^6 * b^6$
 $* c^{10} * f * g * h * z + 2396160 * a^5 * b^8 * c^9 * d * h * i * z - 1428480 * a^3 * b^{14} * c^5 * d * f * k$
 $* z - 737280 * a^5 * b^8 * c^9 * f * g * h * z - 161280 * a^4 * b^{11} * c^7 * d * g * j * z + 92160 * a^4 * b^{10}$
 $* c^8 * f * g * h * z + 73728 * a^2 * b^{16} * c^4 * d * f * k * z - 50688 * a^3 * b^{12} * c^7 * d * h * i * z -$
 $27648 * a^4 * b^{10} * c^8 * d * h * i * z - 4608 * a^3 * b^{12} * c^7 * f * g * h * z + 4608 * a^2 * b^{14} * c^6 * d$
 $* h * i * z - 58982400 * a^5 * b^6 * c^{11} * d * f * g * z + 11796480 * a^7 * b^3 * c^{12} * e * f * h * z +$
 $8847360 * a^5 * b^7 * c^{10} * d * f * i * z - 6635520 * a^5 * b^7 * c^{10} * d * g * h * z - 6451200 * a^5 * b^8$
 $* c^9 * d * e * j * z - 5898240 * a^6 * b^5 * c^{11} * e * f * h * z - 3809280 * a^4 * b^9 * c^9 * d * f * i * z +$
 $2359296 * a^6 * b^5 * c^{11} * d * f * i * z + 1474560 * a^5 * b^7 * c^{10} * e * f * h * z + 681984 * a^3 * b^{11}$
 $* c^8 * d * f * i * z + 322560 * a^4 * b^{10} * c^8 * d * e * j * z - 276480 * a^4 * b^9 * c^9 * d * g * h * z -$
 $184320 * a^4 * b^9 * c^9 * e * f * h * z + 179712 * a^3 * b^{11} * c^8 * d * g * h * z - 55296 * a^2 * b^{13}$
 $* c^7 * d * f * i * z - 13824 * a^2 * b^{13} * c^7 * d * g * h * z + 9216 * a^3 * b^{11} * c^8 * e * f * h * z + 1$
 $6220160 * a^4 * b^8 * c^{10} * d * f * g * z + 13271040 * a^5 * b^6 * c^{11} * d * e * h * z - 2396160 * a^3 * b^{10}$
 $* c^9 * d * f * g * z + 552960 * a^4 * b^8 * c^{10} * d * e * h * z - 359424 * a^3 * b^{10} * c^9 * d * e * h * z +$
 $175104 * a^2 * b^{12} * c^8 * d * f * g * z + 27648 * a^2 * b^{12} * c^8 * d * e * h * z - 32440320 * a^4 * b^7$
 $* c^{11} * d * e * f * z + 4792320 * a^3 * b^9 * c^{10} * d * e * f * z - 350208 * a^2 * b^{11} * c^9 * d * e * f$
 $* z + 1439170560 * a^{10} * b * c^{11} * d * h * k * z - 3361603584 * a^{10} * b^3 * c^9 * d * j * k * z + 60$
 $3979776 * a^{10} * b * c^{11} * e * g * k * z + 407371776 * a^{12} * b * c^9 * h * j * k * z + 201326592 * a^{11} * b$
 $* c^{10} * g * i * k * z + 346816512 * a^7 * b * c^{14} * d^2 * g * z + 129761280 * a^{11} * b * c^{10} * h^2 * k$
 $* z + 121896960 * a^{10} * b * c^{11} * f^2 * k * z + 458752 * a^6 * b^{15} * c * i * k^2 * z + 19660800$

$a^{11}b^c^{10}g^j^2z + 49152a^5b^{16}c^gk^2z + 7077888a^9b^c^{12}g^h^2z$
 $+ 94464a^*b^{17}c^4d^2k^*z - 19660800a^8b^c^{13}f^2g^*z - 66816a^*b^{14}c^7d^2i^*z + 214272a^*b^{13}c^8d^2g^*z - 428544a^*b^{12}c^9d^2e^*z + 2390753$
 $280a^{11}b^4c^7g^*k^2z - 2411421696a^6b^7c^9d^2k^*z - 6603079680a^8b^3c^{11}d^2k^*z + 3715891200a^9b^c^{12}d^2k^*z - 880803840a^{10}c^{12}d^2f^*k^*z - 1623195648a^{10}b^6c^6g^*k^2z - 402653184a^{11}c^{11}e^*i^*k^*z - 15099$
 $49440a^{12}b^2c^8g^*k^2z - 209715200a^{12}c^{10}f^*j^*k^*z - 330301440a^9c^{13}d^2e^*j^*z + 3019898880a^{12}b^c^9e^*k^2z - 125829120a^{11}c^{11}f^*h^*k^*z - 110100480a^{10}c^{12}d^2i^*j^*z - 198180864a^8c^{14}d^2e^*h^*z - 15728640a^{11}c^{11}h^*i^*j^*z - 1226833920a^9b^7c^6e^*k^2z - 47185920a^{10}c^{12}e^*h^*j^*z - 66060288a^9c^{13}d^2h^*i^*z - 1090519040a^{12}b^3c^7i^*k^2z + 1022754816a^6b^2c^{14}d^2e^*z + 5216108544a^7b^5c^{10}d^2k^*z + 754974720a^9b^2c^{11}e^2k^*z + 721529856a^5b^9c^8d^2k^*z + 613416960a^9b^8c^5g^*k^2z - 642318336a^5b^4c^{13}d^2e^*z - 4781506560a^{11}b^3c^8e^*k^2z - 398131200a^{12}b^3c^7j^2k^*z - 511377408a^6b^3c^{13}d^2g^*z - 377487360a^8b^4c^{10}e^2k^*z + 285212672a^{11}b^5c^6i^*k^2z + 199065600a^{11}b^5c^6j^2k^*z + 279183360a^8b^9c^5e^*k^2z + 321159168a^5b^5c^{12}d^2g^*z + 188743680a^9b^4c^9g^2k^*z + 132120576a^{10}b^7c^5i^*k^2z - 150994944a^{10}b^2c^{10}g^2k^*z - 111411200a^9b^9c^4i^*k^2z - 126812160a^{10}b^3c^9h^2k^*z + 225312768a^7b^2c^{13}d^2i^*z - 139591680a^8b^10c^4g^*k^2z - 49766400a^{10}b^7c^5j^2k^*z - 145463040a^4b^{11}c^7d^2k^*z - 94371840a^8b^6c^8g^2k^*z + 223395840a^4b^6c^{12}d^2e^*z + 33751040a^8b^{11}c^3i^*k^2z - 78970880a^9b^3c^{10}f^2k^*z + 94371840a^7b^6c^9e^2k^*z + 25165824a^{10}b^4c^8i^2k^*z + 6220800a^9b^9c^4j^2k^*z + 39223296a^9b^5c^8h^2k^*z - 311040a^8b^{11}c^3j^2k^*z + 16777216a^{11}b^2c^9i^2k^*z - 10485760a^9b^6c^7i^2k^*z - 5406720a^7b^{13}c^2i^*k^2z + 1376256a^7b^{10}c^5i^2k^*z - 1310720a^8b^8c^6i^2k^*z - 262144a^6b^{12}c^4i^2k^*z + 16384a^5b^{14}c^3i^2k^*z + 10354688a^{11}b^2c^9i^*j^2z + 23592960a^7b^8c^7g^2k^*z + 38559744a^7b^7c^8f^2k^*z + 19169280a^7b^12c^3g^*k^2z - 2048000a^9b^6c^7i^*j^2z - 1520640a^7b^9c^6h^2k^*z - 1105920a^8b^7c^7h^2k^*z + 849920a^8b^8c^6i^*j^2z - 393216a^{10}b^4c^8i^*j^2z + 195840a^6b^{11}c^5h^2k^*z - 145920a^7b^{10}c^5i^*j^2z + 11520a^5b^{13}c^4h^2k^*z + 11008a^6b^{12}c^4i^*j^2z - 2304a^4b^{15}c^3h^2k^*z - 256a^5b^{14}c^3i^*j^2z - 25362432a^{10}b^3c^9g^*j^2z - 24739840a^8b^5c^9f^2k^*z - 38338560a^7b^{11}c^4e^*k^2z - 2949120a^6b^{10}c^6g^2k^*z - 1474560a^6b^{14}c^2g^*k^2z + 50724864a^{10}b^2c^{10}e^*j^2z + 147456a^5b^{12}c^5g^2k^*z - 15150080a^6b^9c^7f^2k^*z + 13271040a^9b^5c^8g^*j^2z - 111697920a^4b^7c^{11}d^2g^*z - 3563520a^8b^7c^7g^*j^2z + 3538944a^9b^2c^{11}h^2i^*z + 2912000a^5b^{11}c^6f^2k^*z - 737280a^7b^6c^9h^2i^*z + 506880a^7b^9c^6g^*j^2z - 291840a^4b^{13}c^5f^2k^*z + 276480a^6b^8c^8h^2i^*z - 41472a^5b^{10}c^7h^2i^*z - 34560a^6b^{11}c^5g^*j^2z + 14080a^3b^{15}c^4f^2k^*z + 2304a^4b^{12}c^6h^2i^*z + 768a^5b^{13}c^4g^*j^2z - 256a^2b^{17}c^3f^2k^*z - 11796480a^6b^8c^8e^2k^*z - 26542080a^9b^4c^9e^*j^2z + 19837440a^3b^{13}c^6d^2k^*z + 2949120a^6b^{13}c^3e^*k^2z + 589824a^5b^{10}c^7e^2k^*z - 98304a^5b^{15}c^2e^*k^2z - 10354688a^8b^2c^{12}f^2i^*z - 43646976a^6b^4c^{12}d^2i^*z - 8847360a^8b^3c^{11}g^*h^2z + 7127040a^8b^6c^8e^*j^2z + 4423680a^7b^5c^{10}g^*h^2z + 2048000a^6b^6c^{10}f^2i^*z - 1771776a^2b^{15}c^5d^2k^*z - 1105920a^6b^7c^9g^*h^2z - 1013760a^7b^8c^7e^*j^2z - 849920a^5b^8c^9f^2i^*z + 393216a^7b^4c^{11}f^2i^*z + 145920a^4b^{10}c^8f^2i^*z + 138240a^5b^9c^8g^*h^2z + 69120a^6b^{10}c^6e^*j^2z - 11008a^3b^{12}c^7f^2i^*z - 6912a^4b^{11}c^7g^*h^2z - 1536a^5b^{12}c^5e^*j^2z + 256a^2b^{14}c^6f^2i^*z - 32587776a^5b^6c^{11}d^2i^*z + 25362432a^7b^3c^{12}f^2g^*z + 21657600a^4b^8c^{10}d^2i^*z + 17694720a^8b^2c^{12}e^*h^2z - 50724864a^7b^2c^{13}e^*f^2z - 13271040a^6b^5c^{11}f^2g^*z - 8847360a^7b^4c^{11}e^*h^2z - 5810688a^3b^{10}c^9d^2i^*z + 3563520a^5b^7c^{10}f^2g^*z + 2211840a^6b^6c^{10}e^*h^2z + 845568a^2b^{12}c^8d^2i^*z - 506880a^4b^9c^9f^2g^*z - 276480a^5b^8c^9e^*h^2z + 34560a^3b^{11}c^8f^2g^*z + 13824a^4b^{10}c^8e^*h^2z - 768a^2b^{13}c^7f^2g^*z + 26542080a^$

$$\begin{aligned}
& 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^3 c^8 i^2 k^2 z + 3246391296 a^{10} b^5 c^7 e k^2 z + 318504960 a^{13} b^3 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^2 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^2 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^3 c^8 f i j k - 5898240 a^{10} b^3 c^8 g h j k - 41287680 a^9 b^3 c^9 d g j k + 4472832 a^9 b^3 c^9 f h i k + 18432000 a^9 b^3 c^9 e f j k + 3391488 a^8 b^3 c^{10} e h i j + 1228800 a^8 b^3 c^{10} f g i j - 24772608 a^8 b^3 c^{10} d g h k + 13418496 a^8 b^3 c^{10} e f h k + 1649024 a^8 b^3 c^{10} d f i k + 737280 a^7 b^3 c^{11} f g h i - 768 a^8 b^{15} c^3 d f i k - 19307520 a^7 b^3 c^{11} d f h j + 16367616 a^7 b^3 c^{11} d e i j + 3686400 a^7 b^3 c^{11} e f g j + 34947072 a^7 b^3 c^{11} d e f k + 2304 a^8 b^{14} c^4 d f g k - 180 a^8 b^{13} c^5 d f h j + 11059200 a^6 b^3 c^{12} d e h i + 5160960 a^6 b^3 c^{12} d f g i + 2211840 a^6 b^3 c^{12} e f g h - 4608 a^8 b^{13} c^5 d e f k - 2304 a^8 b^{11} c^7 d f g i + 4608 a^8 b^{10} c^8 d e f i + 15482880 a^5 b^3 c^{13} d e f g - 13824 a^8 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 + 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 - 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
\end{aligned}$$

$$\begin{aligned}
& *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
\end{aligned}$$

$*k^2 - 152865792*a^5*b^5*c^9*d^2*g*k - 114388992*a^7*b^2*c^{10}*d^2*i*k + 949$
 $61664*a^{10}*b^2*c^7*e*i*k^2 - 9039872*a^{11}*b^2*c^6*i*j^2*k - 56494080*a^{10}*b$
 $^4*c^5*f*j*k^2 - 2052096*a^{10}*b^4*c^5*i*j^2*k + 1327360*a^9*b^6*c^4*i*j^2*k$
 $- 158080*a^8*b^8*c^3*i*j^2*k - 47480832*a^{10}*b^3*c^6*g*i*k^2 + 45576960*a^$
 $9*b^6*c^4*f*j*k^2 + 7954560*a^9*b^7*c^3*h*j*k^2 - 104693760*a^9*b^3*c^7*e*g$
 $*k^2 + 142080*a^8*b^9*c^2*h*j*k^2 + 16017408*a^{10}*b^3*c^6*g*j^2*k - 4930560$
 $*a^9*b^5*c^5*g*j^2*k - 3649536*a^9*b^2*c^8*h^2*i*k - 1843200*a^8*b^4*c^7*h^$
 $2*i*k + 85524480*a^8*b^5*c^6*e*g*k^2 + 474240*a^8*b^7*c^4*g*j^2*k + 288000*$
 $a^7*b^6*c^6*h^2*i*k + 63360*a^6*b^8*c^5*h^2*i*k - 8064*a^5*b^{10}*c^4*h^2*i*k$
 $- 1152*a^4*b^{12}*c^3*h^2*i*k - 15437824*a^{11}*b^2*c^6*f*j*k^2 - 32034816*a^1$
 $0*b^2*c^7*e*j^2*k - 14369280*a^8*b^8*c^3*f*j*k^2 - 13271040*a^8*b^3*c^8*g^2$
 $*i*k + 80267904*a^7*b^7*c^5*d*h*k^2 + 79626240*a^7*b^2*c^{10}*e^2*g*k + 11059$
 $200*a^9*b^5*c^5*g*i*k^2 + 8847360*a^9*b^2*c^8*g*i^2*k - 42113280*a^7*b^9*c^$
 $3*d*j*k^2 + 6389760*a^8*b^7*c^4*g*i*k^2 + 5898240*a^8*b^4*c^7*g*i^2*k - 376$
 $01280*a^9*b^4*c^6*f*h*k^2 - 2949120*a^7*b^9*c^3*g*i*k^2 + 2242560*a^7*b^{10}$
 $c^2*f*j*k^2 - 2211840*a^7*b^5*c^7*g^2*i*k + 1769472*a^6*b^7*c^6*g^2*i*k + 7$
 $49568*a^8*b^3*c^8*h*i^2*j - 442368*a^7*b^6*c^6*g*i^2*k + 442368*a^6*b^{11}*c^$
 $2*g*i*k^2 - 442368*a^6*b^8*c^5*g*i^2*k + 317952*a^7*b^5*c^7*h*i^2*j - 22118$
 $4*a^5*b^9*c^5*g^2*i*k + 73728*a^5*b^{10}*c^4*g*i^2*k + 38400*a^6*b^7*c^6*h*i^$
 $2*j - 1920*a^5*b^9*c^5*h*i^2*j + 9861120*a^9*b^4*c^6*e*j^2*k - 110280960*a^$
 $4*b^6*c^9*d^2*e*k - 93330432*a^6*b^8*c^5*d*f*k^2 + 24645888*a^8*b^6*c^5*f*h$
 $*k^2 + 6359040*a^8*b^3*c^8*g*h^2*k - 22118400*a^9*b^4*c^6*e*i*k^2 - 3862528$
 $*a^8*b^2*c^9*f^2*i*k - 2248704*a^7*b^4*c^8*f^2*i*k - 1290240*a^9*b^2*c^8*g*$
 $i*j^2 - 948480*a^8*b^6*c^5*e*j^2*k - 860160*a^8*b^4*c^7*g*i*j^2 - 414720*a^$
 $7*b^5*c^7*g*h^2*k + 303360*a^6*b^6*c^7*f^2*i*k + 266880*a^5*b^8*c^6*f^2*i*k$
 $- 224640*a^6*b^7*c^6*g*h^2*k - 80640*a^7*b^6*c^6*g*i*j^2 - 72960*a^4*b^{10}$
 $c^5*f^2*i*k + 17280*a^5*b^9*c^5*g*h^2*k + 12672*a^6*b^8*c^5*g*i*j^2 + 5504*$
 $a^3*b^{12}*c^4*f^2*i*k + 3456*a^4*b^{11}*c^4*g*h^2*k - 384*a^5*b^{10}*c^4*g*i*j^2$
 $- 128*a^2*b^{14}*c^3*f^2*i*k + 30265344*a^6*b^4*c^9*d^2*i*k - 12779520*a^8*b$
 $^6*c^5*e*i*k^2 - 11796480*a^8*b^3*c^8*e*i^2*k - 8847360*a^7*b^3*c^9*e^2*i*k$
 $- 7925760*a^{10}*b^2*c^7*f*h*k^2 + 7077888*a^6*b^5*c^8*e^2*i*k - 39813120*a^$
 $7*b^3*c^9*e*g^2*k - 73175040*a^9*b^2*c^8*d*f*k^2 + 5898240*a^7*b^8*c^4*e*i*$
 $k^2 + 5542272*a^6*b^{11}*c^2*d*j*k^2 - 5420160*a^7*b^8*c^4*f*h*k^2 + 55140480$
 $*a^4*b^7*c^8*d^2*g*k + 1271808*a^7*b^3*c^9*g^2*h*j - 1040384*a^8*b^2*c^9*f*$
 $i^2*j + 884736*a^7*b^5*c^7*e*i^2*k - 884736*a^6*b^{10}*c^3*e*i*k^2 + 884736*a$
 $^6*b^7*c^6*e*i^2*k - 884736*a^5*b^7*c^7*e^2*i*k - 697344*a^7*b^4*c^8*f*i^2*$
 $j + 414720*a^6*b^5*c^8*g^2*h*j + 226560*a^6*b^{10}*c^3*f*h*k^2 - 147456*a^5*b$
 $^9*c^5*e*i^2*k - 121856*a^6*b^6*c^7*f*i^2*j + 82560*a^5*b^{12}*c^2*f*h*k^2 +$
 $49152*a^5*b^{12}*c^2*e*i*k^2 - 17280*a^5*b^7*c^7*g^2*h*j + 8960*a^5*b^8*c^6*f$
 $*i^2*j + 14194944*a^5*b^6*c^8*d^2*i*k - 12718080*a^8*b^2*c^9*e*h^2*k - 1061$
 $5680*a^4*b^8*c^7*d^2*i*k - 26542080*a^6*b^4*c^9*e^2*g*k - 23592960*a^7*b^7*$
 $c^5*e*g*k^2 - 5142528*a^8*b^3*c^8*f*h*j^2 + 5068800*a^7*b^2*c^{10}*f^2*h*j -$
 $3755520*a^7*b^3*c^9*f*h^2*j + 3336192*a^7*b^3*c^9*f^2*g*k + 3000960*a^6*b^4$
 $*c^9*f^2*h*j + 2893824*a^3*b^{10}*c^6*d^2*i*k + 1720320*a^8*b^3*c^8*e*i*j^2 +$
 $1704960*a^6*b^5*c^8*f^2*g*k - 1307520*a^5*b^7*c^7*f^2*g*k - 1085760*a^6*b^$
 $5*c^8*f*h^2*j - 959040*a^7*b^5*c^7*f*h*j^2 + 829440*a^7*b^4*c^8*e*h^2*k - 5$
 $52960*a^7*b^2*c^{10}*g*h^2*i - 552960*a^6*b^4*c^9*g*h^2*i + 449280*a^6*b^6*c^$
 $7*e*h^2*k - 422784*a^2*b^{12}*c^5*d^2*i*k + 253440*a^4*b^9*c^6*f^2*g*k + 1612$
 $80*a^7*b^5*c^7*e*i*j^2 - 145152*a^5*b^6*c^8*g*h^2*i + 103200*a^6*b^7*c^6*f*$
 $h*j^2 + 41280*a^5*b^6*c^8*f^2*h*j - 37188*a^4*b^8*c^7*f^2*h*j - 34560*a^5*b$
 $^8*c^6*e*h^2*k - 25344*a^6*b^7*c^6*e*i*j^2 - 17280*a^3*b^{11}*c^5*f^2*g*k + 1$
 $3536*a^5*b^7*c^7*f*h^2*j - 6912*a^4*b^{10}*c^5*e*h^2*k + 5490*a^4*b^9*c^6*f*h$
 $^2*j - 3456*a^4*b^8*c^7*g*h^2*i + 1980*a^3*b^{10}*c^6*f^2*h*j + 810*a^5*b^9*c$
 $^5*f*h*j^2 + 768*a^5*b^9*c^5*e*i*j^2 + 384*a^2*b^{13}*c^4*f^2*g*k - 270*a^4*b$
 $^11*c^4*f*h*j^2 - 180*a^3*b^{11}*c^5*f*h^2*j - 30*a^2*b^{12}*c^5*f^2*h*j + 6*a^$
 $3*b^{13}*c^3*f*h*j^2 + 30067200*a^6*b^2*c^{11}*d^2*h*j + 13271040*a^6*b^5*c^8*e$
 $*g^2*k - 10857600*a^6*b^9*c^4*d*h*k^2 + 2949120*a^6*b^9*c^4*e*g*k^2 + 26542$
 $08*a^5*b^6*c^8*e^2*g*k + 2125824*a^7*b^3*c^9*d*i^2*j + 1658880*a^6*b^3*c^{10}$
 $*e^2*h*j - 1419264*a^6*b^4*c^9*f*g^2*j - 1327104*a^5*b^7*c^7*e*g^2*k - 9216$

$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 - 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 + 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 + 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 + 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 + 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 + 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 - 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 + 25722880*a^{12}*b$

$$\begin{aligned}
& ^3c^4i^k^3 + 19644416a^{11}b^5c^3i^k^3 - 1583680a^9b^9c^j^2k^2 - 9142272a^{10}b^7c^2i^k^3 - 74022912a^{10}b^5c^4e^k^3 - 20643840a^{11}b^c^7h^2k^2 + 37011456a^{10}b^6c^3g^k^3 - 2293760a^9b^3c^7i^3k - 557056a^8b^5c^6i^3k + 147456a^7b^7c^5i^3k - 65536a^6b^12c^i^2k^2 + 32768a^6b^9c^4i^3k - 8192a^5b^11c^3i^3k + 430080a^{10}b^c^8i^2j^2 - 2880a^5b^13c^h^2k^2 + 6635520a^7b^4c^8g^3k - 4792320a^9b^8c^2g^k^3 - 2211840a^6b^6c^7g^3k + 1359360a^{10}b^2c^7h^j^3 + 1173120a^9b^4c^6h^j^3 + 743040a^7b^4c^8h^3j + 622080a^8b^2c^9h^3j + 221184a^5b^8c^6g^3k + 107136a^6b^6c^7h^3j - 32640a^8b^6c^5h^j^3 - 5796a^7b^8c^4h^j^3 + 540a^5b^8c^6h^3j - 270a^4b^10c^5h^3j + 210a^6b^10c^3h^j^3 - 2949120a^{10}b^c^8f^2k^2 + 17694720a^6b^3c^10e^3k + 184320a^8b^c^10h^2i^2 - 3520a^3b^15c^f^2k^2 + 9584640a^9b^7c^3e^k^3 - 2293760a^9b^3c^7f^j^3 - 2293760a^6b^3c^10f^3j - 1769472a^5b^5c^9e^3k - 884736a^6b^3c^10g^3i - 589824a^7b^3c^9g^i^3 - 491520a^8b^9c^2e^k^3 - 442368a^5b^5c^9g^3i - 294912a^6b^5c^8g^i^3 - 199360a^8b^5c^6f^j^3 - 199360a^5b^5c^9f^3j + 61920a^7b^7c^5f^j^3 + 61920a^4b^7c^8f^3j - 49152a^5b^7c^7g^i^3 - 3682a^6b^9c^4f^j^3 - 3682a^3b^9c^7f^3j + 70a^5b^11c^3f^j^3 + 70a^2b^11c^6f^3j + 3870720a^8b^c^10e^2j^2 + 430080a^7b^c^11f^2i^2 - 14152320a^4b^4c^11d^3j + 10644480a^5b^2c^12d^3j + 5483520a^9b^2c^8d^j^3 + 4269888a^3b^6c^10d^3j + 3538944a^5b^2c^12e^3i - 1648128a^5b^3c^11f^3h + 1330560a^8b^4c^7d^j^3 + 1179648a^7b^2c^10e^i^3 - 898560a^6b^3c^10f^h^3 - 826560a^7b^6c^6d^j^3 - 607068a^2b^8c^9d^3j + 589824a^6b^4c^9e^i^3 - 354240a^5b^5c^9f^h^3 - 354240a^4b^5c^10f^3h + 145188a^6b^8c^5d^j^3 + 98304a^5b^6c^8e^i^3 + 43680a^3b^7c^9f^3h - 21600a^4b^7c^8f^h^3 - 9576a^5b^10c^4d^j^3 + 1350a^3b^9c^7f^h^3 - 1050a^2b^9c^8f^3h - 504a^a^b^14c^4d^2j^2 + 210a^4b^12c^3d^j^3 + 3870720a^6b^c^12d^2i^2 + 1658880a^6b^c^12e^2h^2 - 9792a^a^b^11c^7d^2i^2 + 16547328a^4b^2c^13d^3h - 12306816a^3b^4c^12d^3h + 37310976a^3b^3c^13d^3f + 3037824a^2b^6c^11d^3h - 2654208a^5b^3c^11e^g^3 + 1949184a^6b^2c^11d^h^3 + 1296000a^5b^4c^10d^h^3 - 155520a^4b^6c^9d^h^3 - 40500a^a^b^10c^8d^2h^2 - 8100a^3b^8c^8d^h^3 + 4050a^2b^10c^7d^h^3 + 3870720a^5b^c^13e^2f^2 + 34836480a^4b^c^14d^2e^2 - 108864a^a^b^9c^9d^2g^2 - 8068032a^2b^5c^12d^3f - 5623296a^4b^3c^12d^f^3 + 1737792a^3b^5c^11d^f^3 - 260190a^a^b^8c^10d^2f^2 - 211680a^2b^7c^10d^f^3 - 435456a^a^b^7c^11d^2e^2 - 377487360a^12b^c^6e^k^3 + 1434977280a^8b^3c^8d^2k^2 + 173408256a^7c^12d^2e^k + 3276800a^12c^7i^j^2k - 125829120a^13b^c^5i^k^3 + 26214400a^12c^7f^j^k^2 + 1179648a^10c^9h^2i^k + 13440a^6b^13h^j^k^2 + 50331648a^11c^8e^i^k^2 + 110100480a^10c^9d^f^k^2 + 57802752a^8c^11d^2i^k + 9830400a^11c^8e^j^2k - 3276800a^9c^10f^2i^k + 4480a^5b^14f^j^k^2 + 15728640a^11c^8f^h^k^2 - 409600a^9c^10f^i^2j - 1152b^16c^3d^2i^k - 1220516352a^7b^5c^7d^2k^2 + 3538944a^9c^10e^h^2k + 384000a^8c^11f^2h^j + 13440a^4b^15d^j^k^2 + 384a^3b^16f^h^k^2 + 20321280a^7c^12d^2h^j - 245760a^8c^11f^h^i^2 + 3456b^15c^4d^2g^k - 270b^14c^5d^2h^j - 9830400a^8c^11e^f^2k + 4838400a^9c^10d^h^j^2 + 2903040a^8c^11d^h^2j - 1966080a^10b^c^8i^3k + 1433600a^9b^9c^i^k^3 + 1152a^2b^17d^h^k^2 - 3686400a^7c^12e^2f^j - 53084160a^7b^c^11e^3k - 6912b^14c^5d^2e^k - 3456b^12c^7d^2g^i + 630b^13c^6d^2f^j + 2688000a^7c^12d^f^2j + 245760a^8b^10c^g^k^3 - 2211840a^6c^13e^2f^h - 1720320a^7c^12d^f^i^2 - 9450b^11c^8d^2f^h + 6912b^11c^8d^2e^i + 1612800a^6c^13d^f^2h - 1344000a^10b^c^8f^j^3 - 1344000a^7b^c^11f^3j - 393216a^8b^c^10g^i^3 - 23616a^a^b^17c^d^2k^2 - 20736b^10c^9d^2e^g - 75188736a^4b^c^14d^3f - 883200a^6b^c^12f^3h - 317952a^7b^c^11f^h^3 + 43416a^a^b^10c^8d^3j - 15482880a^5c^14d^e^2f - 10616832a^5b^c^13e^3g - 345060a^a^b^8c^10d^3h - 4262400a^5b^c^13d^f^3 + 852768a^a^b^7c^11d^3f + 7350a^a^b^9c^9d^f^3 + 584578368a^6b^7c^6d^2k^2 + 93905920a^12b^3c^4j^2k^2 - 177997248a^5b^9c^5d^2k^2 - 50967040a^11b^5c^3j^2k^2 + 104693760a^9b^2c^8e^2k
\end{aligned}$$

$$\begin{aligned}
& k^2 + 12849984a^{10}b^7c^2j^2k^2 + 20021248a^{11}b^2c^6i^2k^2 - 85524 \\
& 480a^8b^4c^7e^2k^2 + 33223680a^{10}b^3c^6h^2k^2 + 4227072a^{10}b^4c^5i^2k^2 - 3973120a^9b^6c^4i^2k^2 + 344064a^7b^{10}c^2i^2k^2 - 8 \\
& 1920a^8b^8c^3i^2k^2 - 11386368a^9b^5c^5h^2k^2 + 26173440a^9b^4c^6g^2k^2 - 21381120a^8b^6c^5g^2k^2 + 18874368a^{10}b^2c^7g^2k^2 \\
& + 501760a^9b^3c^7i^2j^2 + 452160a^8b^7c^4h^2k^2 + 385920a^7b^9c^3h^2k^2 + 170240a^8b^5c^6i^2j^2 - 48960a^6b^{11}c^2h^2k^2 + 921 \\
& 6a^7b^7c^5i^2j^2 - 1984a^6b^9c^4i^2j^2 + 64a^5b^{11}c^3i^2j^2 + 5898240a^7b^8c^4g^2k^2 + 1419840a^8b^4c^7h^2j^2 + 1387008a^9b^2c^8h^2j^2 - 737280a^6b^{10}c^3g^2k^2 + 84960a^7b^6c^6h^2j^2 + \\
& 36864a^5b^{12}c^2g^2k^2 - 8010a^6b^8c^5h^2j^2 - 180a^5b^{10}c^4h^2j^2 + 9a^4b^{12}c^3h^2j^2 + 14115840a^9b^3c^7f^2k^2 - 9231552a^7b^7c^5f^2k^2 + 23592960a^7b^6c^6e^2k^2 + 4984320a^8b^5c^6f^2k^2 \\
& + 3759040a^6b^9c^4f^2k^2 + 36190080a^4b^{11}c^4d^2k^2 + 967680a^8b^3c^8g^2j^2 - 727360a^5b^{11}c^3f^2k^2 + 276480a^7b^3c^9h^2i^2 + 161280a^7b^5c^7g^2j^2 + 140544a^6b^5c^8h^2i^2 + 72960a^4b^{13}c^2f^2k^2 + 25344a^5b^7c^7h^2i^2 - 20160a^6b^7c^6g^2j^2 + 57 \\
& 6a^5b^9c^5g^2j^2 + 576a^4b^9c^6h^2i^2 + 3808000a^8b^2c^9f^2j^2 - 2949120a^6b^8c^5e^2k^2 + 1643712a^7b^4c^8f^2j^2 + 884736a^7b^2c^10g^2i^2 + 884736a^6b^4c^9g^2i^2 + 221184a^5b^6c^8g^2i^2 \\
& + 147456a^5b^{10}c^4e^2k^2 - 125440a^6b^6c^7f^2j^2 - 13790a^5b^8c^6f^2j^2 + 1785a^4b^{10}c^5f^2j^2 - 70a^3b^{12}c^4f^2j^2 - 495360 \\
& 0a^3b^{13}c^3d^2k^2 + 18427392a^7b^2c^10d^2j^2 + 645120a^7b^3c^9e^2j^2 + 501760a^6b^3c^10f^2i^2 + 442944a^2b^{15}c^2d^2k^2 + 4147 \\
& 20a^6b^3c^10g^2h^2 + 207360a^5b^5c^9g^2h^2 + 170240a^5b^5c^9f^2i^2 - 80640a^6b^5c^8e^2j^2 + 9216a^4b^7c^8f^2i^2 + 5184a^4b^7c^8g^2h^2 + 2304a^5b^7c^7e^2j^2 - 1984a^3b^9c^7f^2i^2 + 64a^2b^{11}c^6f^2i^2 - 4148928a^6b^4c^9d^2j^2 + 3538944a^6b^2c^{11}e^2i^2 + 1684224a^6b^2c^{11}f^2h^2 + 1264320a^5b^4c^{10}f^2h^2 - 118339 \\
& 2a^5b^6c^8d^2j^2 + 884736a^5b^4c^{10}e^2i^2 + 645750a^4b^8c^7d^2j^2 + 126720a^4b^6c^9f^2h^2 - 115920a^3b^{10}c^6d^2j^2 - 13950a^3b^8c^8f^2h^2 + 10836a^2b^{12}c^5d^2j^2 + 225a^2b^{10}c^7f^2h^2 + 1935360a^5b^3c^{11}d^2i^2 + 967680a^5b^3c^{11}f^2g^2 + 829440a^5b^3c^{11}e^2h^2 - 532224a^4b^5c^{10}d^2i^2 + 161280a^4b^5c^{10}f^2g^2 - 96768a^3b^7c^9d^2i^2 + 62784a^2b^9c^8d^2i^2 + 20736a^4b^5c^10e^2h^2 - 20160a^3b^7c^9f^2g^2 + 576a^2b^9c^8f^2g^2 + 11487744a^5b^2c^{12}d^2h^2 + 7962624a^5b^2c^{12}e^2g^2 + 35525376a^4b^2c^{13}d^2f^2 - 1412640a^3b^6c^{10}d^2h^2 + 461376a^4b^4c^{11}d^2h^2 + 375030a^2b^8c^9d^2h^2 + 8709120a^4b^3c^{12}d^2g^2 - 4354560a^3b^5c^{11}d^2g^2 + 979776a^2b^7c^{10}d^2g^2 + 645120a^4b^3c^{12}e^2f^2 - 80640a^3b^5c^{11}e^2f^2 + 2304a^2b^7c^{10}e^2f^2 - 15269184a^3b^4c^{12}d^2f^2 + 2870784a^2b^6c^{11}d^2f^2 - 17418240a^3b^3c^{13}d^2e^2 + 3919104a^2b^5c^{12}d^2e^2 + 384a^2b^{18}d^2f^2k^2 - 199229440a^{14}b^2c^3k^4 + 8388608a^{12}c^7i^2k^2 + 75497472a^{10}c^9e^2k^2 + 78400a^8b^{11}j^2k^2 + 4096a^5b^{14}i^2k^2 + 345600a^{10}c^9h^2j^2 + 576a^4b^{15}h^2k^2 + 57937920a^{13}b^4c^2k^4 + 320000a^9c^{10}f^2j^2 + 64a^2b^{17}f^2k^2 + 16934400a^8c^{11}d^2j^2 + 9b^{16}c^3d^2j^2 + 3538944a^7c^{12}e^2i^2 + 115200a^7c^{12}f^2h^2 + 576b^{13}c^6d^2i^2 + 2025b^{12}c^7d^2h^2 + 6096384a^6c^{13}d^2h^2 + 492800a^{11}b^2c^6j^4 + 351456a^{10}b^4c^5j^4 - 43120a^9b^6c^4j^4 + 5184b^{11}c^8d^2g^2 + 1225a^8b^8c^3j^4 + 131072a^8b^2c^9i^4 + 98304a^7b^4c^8i^4 + 32768a^6b^6c^7i^4 + 11025b^{10}c^9d^2f^2 + 4096a^5b^8c^6i^4 + 5644800a^5c^{14}d^2f^2 + 142560a^6b^4c^9h^4 + 103680a^7b^2c^{10}h^4 + 32400a^5b^6c^8h^4 + 20736b^9c^{10}d^2e^2 + 2025a^4b^8c^7h^4 + 331776a^5b^4c^{10}g^4 + 492800a^5b^2c^{12}f^4 + 351456a^4b^4c^{11}f^4 - 43120a^3b^6c^{10}f^4 + 1225a^2b^8c^9f^4 - 27433728a^3b^2c^{14}d^4 + 6446304a^2b^4c^{13}d^4 + a^2b^{14}c^3f^2j^2 - 81920a^8b^{11}i^3k^3 + 384000a^{11}c^8h^3j^3 + 138240a^9c^{10}h^3j + 47416320a^6c^{13}d^3j - 1134b^{12}c^7d^3j + 7077888a^6c^{13}e^3i + 2688000a^{10}c^9d^3j^3 + 786432a^8c^{11}e^3i^3
\end{aligned}$$

$$\begin{aligned}
& + 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}* \\
& 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)) + \text{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
\end{aligned}$$

$303040a^7b^9c^9d^jz^2 - 117964800a^{10}b^5c^{10}h^jz^2 - 6039797760a^{12}b^c^{12}e^kz^2 - 67502080a^8b^{11}c^6i^kz^2 + 121634816a^{11}b^2c^12f^jz^2 + 188743680a^7b^7c^{11}e^gz^2 - 115671040a^8b^8c^9f^jz^2 + 125829120a^8b^6c^{11}e^iz^2 + 10813440a^7b^{13}c^5i^kz^2 + 76677120a^7b^{11}c^7e^kz^2 - 38338560a^7b^{12}c^6g^kz^2 - 37355520a^9b^7c^9h^jz^2 - 917504a^6b^{15}c^4i^kz^2 + 32768a^5b^{17}c^3i^kz^2 - 62914560a^8b^7c^{10}g^iz^2 + 23101440a^8b^9c^8h^jz^2 - 4349952a^7b^{11}c^7h^jz^2 + 2949120a^6b^{14}c^5g^kz^2 + 337920a^6b^{13}c^6h^jz^2 - 98304a^5b^{16}c^4g^kz^2 - 7680a^5b^{15}c^5h^jz^2 - 61931520a^7b^8c^{10}f^h^z^2 + 23592960a^7b^9c^9g^iz^2 + 17940480a^7b^{10}c^8f^jz^2 - 47185920a^7b^8c^{10}e^iz^2 - 5898240a^6b^{13}c^6e^kz^2 - 3538944a^6b^{11}c^8g^iz^2 - 1347584a^6b^{12}c^7f^jz^2 + 196608a^5b^{15}c^5e^kz^2 + 196608a^5b^{13}c^7g^iz^2 + 35840a^5b^{14}c^6f^jz^2 + 96583680a^5b^{10}c^{10}d^fz^2 + 23371776a^6b^{11}c^8d^jz^2 - 51609600a^6b^9c^{10}d^h^z^2 + 7077888a^6b^{10}c^9e^iz^2 + 6144000a^6b^{10}c^9f^h^z^2 - 1677312a^5b^{13}c^7d^jz^2 - 393216a^5b^{12}c^8e^iz^2 + 61440a^5b^{12}c^8f^h^z^2 + 53760a^4b^{15}c^6d^jz^2 - 46080a^4b^{14}c^7f^h^z^2 + 1536a^3b^{16}c^6f^h^z^2 - 23592960a^6b^9c^{10}e^gz^2 + 1179648a^5b^{11}c^9e^gz^2 + 829440a^4b^{13}c^8d^h^z^2 + 368640a^5b^{11}c^9d^h^z^2 - 105984a^3b^{15}c^7d^h^z^2 + 4608a^2b^{17}c^6d^h^z^2 - 15175680a^4b^{12}c^9d^fz^2 + 1428480a^3b^{14}c^8d^fz^2 - 73728a^2b^{16}c^7d^fz^2 + 4108320768a^{10}b^3c^{12}d^jz^2 - 1207959552a^{10}b^c^{14}e^gz^2 - 578813952a^{12}b^c^{12}h^jz^2 + 3246391296a^{10}b^6c^9g^kz^2 - 402653184a^{11}b^c^{13}g^iz^2 + 3019898880a^{12}b^2c^{11}g^kz^2 - 440401920a^{10}b^c^{14}f^2z^2 - 188743680a^{11}b^c^{13}h^2z^2 + 1761607680a^{10}c^{15}d^fz^2 - 655360a^6b^{18}c^k^2z^2 - 94464a^ab^{17}c^7d^2z^2 + 6936330240a^8b^3c^{14}d^2z^2 + 2464874496a^6b^7c^{12}d^2z^2 - 3963617280a^9b^c^{15}d^2z^2 + 58007224320a^{13}b^4c^8k^2z^2 + 14968422400a^{11}b^8c^6k^2z^2 + 805306368a^{11}c^{14}e^iz^2 - 35966156800a^{12}b^6c^7k^2z^2 + 419430400a^{12}c^{13}f^jz^2 - 1509949440a^9b^2c^{14}e^2z^2 + 251658240a^{11}c^{14}f^h^z^2 - 56874762240a^{14}b^2c^9k^2z^2 - 5400428544a^7b^5c^{13}d^2z^2 + 890470400a^9b^{12}c^4k^2z^2 + 754974720a^8b^4c^{13}e^2z^2 - 730054656a^5b^9c^{11}d^2z^2 + 477102080a^{12}b^3c^{10}j^2z^2 + 477102080a^9b^3c^{13}f^2z^2 - 377487360a^9b^4c^{12}g^2z^2 + 301989888a^{10}b^2c^{13}g^2z^2 - 174325760a^{11}b^5c^9j^2z^2 - 126156800a^8b^{14}c^3k^2z^2 + 188743680a^8b^6c^{11}g^2z^2 + 141557760a^{10}b^3c^{12}h^2z^2 - 174325760a^8b^5c^{12}f^2z^2 - 188743680a^7b^6c^{12}e^2z^2 - 4350935040a^{10}b^10c^5k^2z^2 + 146165760a^4b^{11}c^{10}d^2z^2 - 50331648a^{10}b^4c^{11}i^2z^2 + 11796480a^7b^{16}c^2k^2z^2 - 33554432a^{11}b^2c^{12}i^2z^2 + 11206656a^{10}b^7c^8j^2z^2 + 8929280a^9b^9c^7j^2z^2 + 20971520a^9b^6c^{10}i^2z^2 - 2600960a^8b^{11}c^6j^2z^2 + 291840a^7b^{13}c^5j^2z^2 - 14080a^6b^{15}c^4j^2z^2 + 256a^5b^{17}c^3j^2z^2 - 47185920a^7b^8c^{10}g^2z^2 - 26542080a^8b^7c^{10}h^2z^2 - 2752512a^7b^{10}c^8i^2z^2 + 2621440a^8b^8c^9i^2z^2 + 524288a^6b^{12}c^7i^2z^2 - 32768a^5b^{14}c^6i^2z^2 + 9584640a^7b^9c^9h^2z^2 - 2359296a^9b^5c^{11}h^2z^2 - 1290240a^6b^{11}c^8h^2z^2 + 46080a^5b^{13}c^7h^2z^2 + 2304a^4b^{15}c^6h^2z^2 + 5898240a^6b^{10}c^9g^2z^2 - 294912a^5b^{12}c^8g^2z^2 + 11206656a^7b^7c^{11}f^2z^2 + 8929280a^6b^9c^{10}f^2z^2 + 23592960a^6b^8c^{11}e^2z^2 - 2600960a^5b^{11}c^9f^2z^2 + 291840a^4b^{13}c^8f^2z^2 - 14080a^3b^{15}c^7f^2z^2 + 256a^2b^{17}c^6f^2z^2 - 19860480a^3b^{13}c^9d^2z^2 - 1179648a^5b^{10}c^{10}e^2z^2 + 1771776a^2b^{15}c^8d^2z^2 - 440401920a^{13}b^c^{11}j^2z^2 + 1207959552a^{10}c^{15}e^2z^2 + 134217728a^{12}c^{13}i^2z^2 + 25769803776a^{15}c^{10}k^2z^2 + 16384a^5b^{20}k^2z^2 + 2304b^{19}c^6d^2z^2 + 165150720a^9b^c^{12}d^g^jz + 23592960a^{10}b^c^{11}g^h^jz + 169869312a^7b^c^{14}d^e^fz + 99090432a^8b^c^{13}d^g^h^z - 3145728a^9b^c^{12}f^h^i^z + 56623104a^8b^c^{13}d^f^i^z - 1536a^b^{18}c^3d^f^k^z - 9437184a^8b^c^{13}e^f^h^z + 1536a^b^{15}c^6d^f^i^z - 4608a^b^{14}c^7d^f^g^z + 9216a^b^{13}c^8d^e^f^z + 2173501440a^9b^5c^8d^j^k^z - 1987706880a^9b^3c^{10}d^h^k^z + 1121255424a^8b^5c^9d^h^k^z + 8$

$61143040a^8b^4c^{10}d^fkkz - 859963392a^7b^6c^9d^fkkz - 780779520a^8b^7c^7d^jkkz - 754974720a^9b^3c^{10}e^gkkz + 2222456832a^{11}b^c^{10}d^jkkz - 454164480a^{11}b^3c^8h^jkkz + 377487360a^8b^5c^9e^gkkz + 290979840a^{10}b^4c^8f^jkkz + 381026304a^6b^8c^8d^fkkz + 412876800a^8b^2c^{12}d^e^jz + 301989888a^{10}b^2c^{10}e^i^kz - 320421888a^7b^7c^8d^h^kz + 185794560a^{10}b^5c^7h^jkkz - 192020480a^9b^6c^7f^jkkz + 190709760a^9b^4c^9f^h^kz - 150994944a^{10}b^3c^9g^i^kz + 168990720a^7b^9c^6d^jkkz + 235929600a^9b^2c^{11}d^fkkz - 206438400a^8b^3c^{11}d^g^jz - 206438400a^7b^4c^{11}d^e^jz - 101646336a^8b^6c^8f^h^kz - 29245440a^9b^7c^6h^jkkz - 60817408a^{11}b^2c^9f^jkkz + 57835520a^8b^8c^6f^jkkz + 219414528a^7b^2c^{13}d^e^h^z - 70778880a^{10}b^2c^{10}f^h^kz + 677376a^7b^{11}c^4h^jkkz - 645120a^8b^9c^5h^jkkz - 53760a^6b^{13}c^3h^jkkz + 31457280a^8b^7c^7g^i^kz - 62914560a^8b^6c^8e^i^kz - 94371840a^7b^7c^8e^g^kz - 221773824a^6b^3c^{13}d^e^f^z + 82575360a^9b^2c^{11}d^i^jz + 11796480a^{10}b^2c^{10}h^i^jz - 11796480a^7b^9c^6g^i^kz - 8970240a^7b^{10}c^5f^jkkz + 103219200a^7b^5c^{10}d^g^jz - 2457600a^8b^6c^8h^i^jz + 1769472a^6b^{11}c^5g^i^kz + 921600a^7b^8c^7h^i^jz + 673792a^6b^{12}c^4f^jkkz - 138240a^6b^{10}c^6h^i^jz - 98304a^5b^{13}c^4g^i^kz - 17920a^5b^{14}c^3f^jkkz + 7680a^5b^{12}c^5h^i^jz - 97136640a^5b^{10}c^7d^fkkz - 29491200a^9b^3c^{10}g^h^jz + 58982400a^9b^2c^{11}e^h^jz + 23592960a^7b^8c^7e^i^kz - 22169088a^6b^{11}c^5d^jkkz + 21381120a^7b^8c^7f^h^kz + 14745600a^8b^5c^9g^h^jz + 42854400a^6b^9c^7d^h^kz - 109707264a^7b^3c^{12}d^g^h^z - 3686400a^7b^7c^8g^h^jz - 3538944a^6b^{10}c^6e^i^kz + 1645056a^5b^{13}c^4d^jkkz - 890880a^6b^{10}c^6f^h^kz + 460800a^6b^9c^7g^h^jz - 330240a^5b^{12}c^5f^h^kz + 196608a^5b^{12}c^5e^i^kz - 53760a^4b^{15}c^3d^jkkz + 46080a^4b^{14}c^4f^h^kz - 23040a^5b^{11}c^6g^h^jz - 1536a^3b^{16}c^3f^h^kz - 29491200a^8b^4c^{10}e^h^jz - 17203200a^7b^6c^9d^i^jz + 11796480a^6b^9c^7e^g^kz + 110886912a^6b^4c^{12}d^f^g^z + 7372800a^7b^6c^9e^h^jz + 40108032a^8b^2c^{12}d^h^i^z + 6451200a^6b^8c^8d^i^jz + 2359296a^8b^3c^{11}f^h^i^z - 967680a^5b^{10}c^7d^i^jz - 921600a^6b^8c^8e^h^jz - 829440a^4b^{13}c^5d^h^kz - 589824a^5b^{11}c^6e^g^kz - 491520a^6b^7c^9f^h^i^z + 184320a^5b^9c^8f^h^i^z + 105984a^3b^{15}c^4d^h^kz + 69120a^5b^{11}c^6d^h^kz + 53760a^4b^{12}c^6d^i^jz + 46080a^5b^{10}c^7e^h^jz - 27648a^4b^{11}c^7f^h^i^z - 4608a^2b^{17}c^3d^h^kz + 1536a^3b^{13}c^6f^h^i^z - 25804800a^6b^7c^9d^g^jz - 88473600a^6b^4c^{12}d^e^h^z + 51609600a^6b^6c^{10}d^e^jz - 84934656a^7b^2c^{13}d^f^g^z + 117964800a^5b^5c^{12}d^e^f^z + 15160320a^4b^{12}c^6d^f^kz - 45613056a^7b^3c^{12}d^f^i^z + 44236800a^6b^5c^{11}d^g^h^z - 10321920a^6b^6c^{10}d^h^i^z + 7077888a^7b^4c^{11}d^h^i^z - 5898240a^7b^4c^{11}f^g^h^z + 4718592a^8b^2c^{12}f^g^h^z + 3225600a^5b^9c^8d^g^jz + 2949120a^6b^6c^{10}f^g^h^z + 2396160a^5b^8c^9d^h^i^z - 1428480a^3b^{14}c^5d^f^kz - 737280a^5b^8c^9f^g^h^z - 161280a^4b^{11}c^7d^g^jz + 92160a^4b^{10}c^8f^g^h^z + 73728a^2b^{16}c^4d^f^kz - 50688a^3b^{12}c^7d^h^i^z - 27648a^4b^{10}c^8d^h^i^z - 4608a^3b^{12}c^7f^g^h^z + 4608a^2b^{14}c^6d^h^i^z - 58982400a^5b^6c^{11}d^f^g^z + 11796480a^7b^3c^{12}e^f^h^z + 8847360a^5b^7c^{10}d^f^i^z - 6635520a^5b^7c^{10}d^g^h^z - 6451200a^5b^8c^9d^e^jz - 5898240a^6b^5c^{11}e^f^h^z - 3809280a^4b^9c^9d^f^i^z + 2359296a^6b^5c^{11}d^f^i^z + 1474560a^5b^7c^{10}e^f^h^z + 681984a^3b^{11}c^8d^f^i^z + 322560a^4b^{10}c^8d^e^jz - 276480a^4b^9c^9d^g^h^z - 184320a^4b^9c^9e^f^h^z + 179712a^3b^{11}c^8d^g^h^z - 55296a^2b^{13}c^7d^f^i^z - 13824a^2b^{13}c^7d^g^h^z + 9216a^3b^{11}c^8e^f^h^z + 16220160a^4b^8c^{10}d^f^g^z + 13271040a^5b^6c^{11}d^e^h^z - 2396160a^3b^{10}c^9d^f^g^z + 552960a^4b^8c^{10}d^e^h^z - 359424a^3b^{10}c^9d^e^h^z + 175104a^2b^{12}c^8d^f^g^z + 27648a^2b^{12}c^8d^e^h^z - 32440320a^4b^7c^{11}d^e^f^z + 4792320a^3b^9c^{10}d^e^f^z - 350208a^2b^{11}c^9d^e^f^z + 1439170560a^{10}b^c^{11}d^h^kz - 3361603584a^{10}b^3c^9d^jkkz + 603979776a^{10}b^c^{11}e^g^kz + 407371776a^{12}b^c^9h^jkkz + 201326592a^{11}b^c^{10}g^i^kz + 346816512a^7b$

$$\begin{aligned}
& *c^{14}d^2g^*z + 129761280a^{11}b^*c^{10}h^2k^*z + 121896960a^{10}b^*c^{11}f^2k^* \\
& *z + 458752a^6b^{15}c^*i^*k^2z + 19660800a^{11}b^*c^{10}g^*j^2z + 49152a^5b \\
& ^{16}c^*g^*k^2z + 7077888a^9b^*c^{12}g^*h^2z + 94464a^*b^{17}c^4d^2k^*z - 196 \\
& 60800a^8b^*c^{13}f^2g^*z - 66816a^*b^{14}c^7d^2i^*z + 214272a^*b^{13}c^8d^2 \\
& *g^*z - 428544a^*b^{12}c^9d^2e^*z + 2390753280a^{11}b^4c^7g^*k^2z - 241142 \\
& 1696a^6b^7c^9d^2k^*z - 6603079680a^8b^3c^{11}d^2k^*z + 3715891200a^9 \\
& *b^*c^{12}d^2k^*z - 880803840a^{10}c^{12}d^*f^*k^*z - 1623195648a^{10}b^6c^6g^*k \\
& ^2z - 402653184a^{11}c^{11}e^*i^*k^*z - 1509949440a^{12}b^2c^8g^*k^2z - 2097 \\
& 15200a^{12}c^{10}f^*j^*k^*z - 330301440a^9c^{13}d^*e^*j^*z + 3019898880a^{12}b^*c^ \\
& 9e^*k^2z - 125829120a^{11}c^{11}f^*h^*k^*z - 110100480a^{10}c^{12}d^*i^*j^*z - 198 \\
& 180864a^8c^{14}d^*e^*h^*z - 15728640a^{11}c^{11}h^*i^*j^*z - 1226833920a^9b^7c \\
& ^6e^*k^2z - 47185920a^{10}c^{12}e^*h^*j^*z - 66060288a^9c^{13}d^*h^*i^*z - 10905 \\
& 19040a^{12}b^3c^7i^*k^2z + 1022754816a^6b^2c^{14}d^2e^*z + 5216108544a \\
& ^7b^5c^{10}d^2k^*z + 754974720a^9b^2c^{11}e^2k^*z + 721529856a^5b^9c^ \\
& 8d^2k^*z + 613416960a^9b^8c^5g^*k^2z - 642318336a^5b^4c^{13}d^2e^*z \\
& - 4781506560a^{11}b^3c^8e^*k^2z - 398131200a^{12}b^3c^7j^2k^*z - 511377 \\
& 408a^6b^3c^{13}d^2g^*z - 377487360a^8b^4c^{10}e^2k^*z + 285212672a^{11} \\
& b^5c^6i^*k^2z + 199065600a^{11}b^5c^6j^2k^*z + 279183360a^8b^9c^5e^* \\
& k^2z + 321159168a^5b^5c^{12}d^2g^*z + 188743680a^9b^4c^9g^2k^*z + 13 \\
& 2120576a^{10}b^7c^5i^*k^2z - 150994944a^{10}b^2c^{10}g^2k^*z - 111411200 \\
& a^9b^9c^4i^*k^2z - 126812160a^{10}b^3c^9h^2k^*z + 225312768a^7b^2c^ \\
& 13d^2i^*z - 139591680a^8b^{10}c^4g^*k^2z - 49766400a^{10}b^7c^5j^2k^*z \\
& - 145463040a^4b^{11}c^7d^2k^*z - 94371840a^8b^6c^8g^2k^*z + 22339584 \\
& 0a^4b^6c^{12}d^2e^*z + 33751040a^8b^{11}c^3i^*k^2z - 78970880a^9b^3c \\
& ^{10}f^2k^*z + 94371840a^7b^6c^9e^2k^*z + 25165824a^{10}b^4c^8i^2k^*z \\
& + 6220800a^9b^9c^4j^2k^*z + 39223296a^9b^5c^8h^2k^*z - 311040a^8b \\
& ^{11}c^3j^2k^*z + 16777216a^{11}b^2c^9i^2k^*z - 10485760a^9b^6c^7i^2 \\
& k^*z - 5406720a^7b^{13}c^2i^*k^2z + 1376256a^7b^{10}c^5i^2k^*z - 1310720 \\
& a^8b^8c^6i^2k^*z - 262144a^6b^{12}c^4i^2k^*z + 16384a^5b^{14}c^3i^2 \\
& *k^*z + 10354688a^{11}b^2c^9i^*j^2z + 23592960a^7b^8c^7g^2k^*z + 38559 \\
& 744a^7b^7c^8f^2k^*z + 19169280a^7b^{12}c^3g^*k^2z - 2048000a^9b^6c \\
& ^7i^*j^2z - 1520640a^7b^9c^6h^2k^*z - 1105920a^8b^7c^7h^2k^*z + 84 \\
& 9920a^8b^8c^6i^*j^2z - 393216a^{10}b^4c^8i^*j^2z + 195840a^6b^{11}c^ \\
& 5h^2k^*z - 145920a^7b^{10}c^5i^*j^2z + 11520a^5b^{13}c^4h^2k^*z + 1100 \\
& 8a^6b^{12}c^4i^*j^2z - 2304a^4b^{15}c^3h^2k^*z - 256a^5b^{14}c^3i^*j^2 \\
& *z - 25362432a^{10}b^3c^9g^*j^2z - 24739840a^8b^5c^9f^2k^*z - 3833856 \\
& 0a^7b^{11}c^4e^*k^2z - 2949120a^6b^{10}c^6g^2k^*z - 1474560a^6b^{14}c^ \\
& 2g^*k^2z + 50724864a^{10}b^2c^{10}e^*j^2z + 147456a^5b^{12}c^5g^2k^*z - \\
& 15150080a^6b^9c^7f^2k^*z + 13271040a^9b^5c^8g^*j^2z - 111697920a^4 \\
& *b^7c^{11}d^2g^*z - 3563520a^8b^7c^7g^*j^2z + 3538944a^9b^2c^{11}h^2 \\
& i^*z + 2912000a^5b^{11}c^6f^2k^*z - 737280a^7b^6c^9h^2i^*z + 506880a^ \\
& 7b^9c^6g^*j^2z - 291840a^4b^{13}c^5f^2k^*z + 276480a^6b^8c^8h^2i^* \\
& z - 41472a^5b^{10}c^7h^2i^*z - 34560a^6b^{11}c^5g^*j^2z + 14080a^3b^1 \\
& 5c^4f^2k^*z + 2304a^4b^{12}c^6h^2i^*z + 768a^5b^{13}c^4g^*j^2z - 256 \\
& a^2b^{17}c^3f^2k^*z - 11796480a^6b^8c^8e^2k^*z - 26542080a^9b^4c^9 \\
& e^*j^2z + 19837440a^3b^{13}c^6d^2k^*z + 2949120a^6b^{13}c^3e^*k^2z + 58 \\
& 9824a^5b^{10}c^7e^2k^*z - 98304a^5b^{15}c^2e^*k^2z - 10354688a^8b^2c \\
& ^{12}f^2i^*z - 43646976a^6b^4c^{12}d^2i^*z - 8847360a^8b^3c^{11}g^*h^2z \\
& + 7127040a^8b^6c^8e^*j^2z + 4423680a^7b^5c^{10}g^*h^2z + 2048000a^6 \\
& b^6c^{10}f^2i^*z - 1771776a^2b^{15}c^5d^2k^*z - 1105920a^6b^7c^9g^*h^2 \\
& *z - 1013760a^7b^8c^7e^*j^2z - 849920a^5b^8c^9f^2i^*z + 393216a^7 \\
& b^4c^{11}f^2i^*z + 145920a^4b^{10}c^8f^2i^*z + 138240a^5b^9c^8g^*h^2z \\
& + 69120a^6b^{10}c^6e^*j^2z - 11008a^3b^{12}c^7f^2i^*z - 6912a^4b^{11} \\
& c^7g^*h^2z - 1536a^5b^{12}c^5e^*j^2z + 256a^2b^{14}c^6f^2i^*z - 325877 \\
& 76a^5b^6c^{11}d^2i^*z + 25362432a^7b^3c^{12}f^2g^*z + 21657600a^4b^8 \\
& c^{10}d^2i^*z + 17694720a^8b^2c^{12}e^*h^2z - 50724864a^7b^2c^{13}e^*f^2 \\
& z - 13271040a^6b^5c^{11}f^2g^*z - 8847360a^7b^4c^{11}e^*h^2z - 5810688 \\
& a^3b^{10}c^9d^2i^*z + 3563520a^5b^7c^{10}f^2g^*z + 2211840a^6b^6c^{10} \\
& e^*h^2z + 845568a^2b^{12}c^8d^2i^*z - 506880a^4b^9c^9f^2g^*z - 276480
\end{aligned}$$

$$\begin{aligned}
& 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^8 c^8 i k^2 z + 3246391296 a^{10} b^5 c^7 e k^2 z + 318504960 a^{13} b^8 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 - 14155776 a^9 c^{13} e h^2 z + 39321600 a^8 c^{14} e f^2 z - 4833280 a^9 b^{12} c^3 k 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^8 c^8 f i j k - 5898240 a^{10} b^8 c^8 g h j k - 41287680 a^9 b^8 c^9 d g j k + 4472832 a^9 b^8 c^9 f h i k + 18432000 a^9 b^8 c^9 e f j k + 3391488 a^8 b^8 c^{10} e h i j + 1228800 a^8 b^8 c^{10} f g i j - 24772608 a^8 b^8 c^{10} d g h k + 13418496 a^8 b^8 c^{10} e f h k + 11649024 a^8 b^8 c^{10} d f i k + 737280 a^7 b^8 c^{11} f g h i - 768 a^7 b^{15} c^3 d f i k - 19307520 a^7 b^8 c^{11} d f h j + 16367616 a^7 b^8 c^{11} d e i j + 3686400 a^7 b^8 c^{11} e f g j + 34947072 a^7 b^8 c^{11} d e f k + 2304 a^7 b^{14} c^4 d f g k - 180 a^7 b^{13} c^5 d f h j + 11059200 a^6 b^8 c^{12} d e h i + 5160960 a^6 b^8 c^{12} d f g i + 2211840 a^6 b^8 c^{12} e f g h - 4608 a^7 b^{13} c^5 d e f k - 2304 a^7 b^{11} c^7 d f g i + 4608 a^7 b^{10} c^8 d e f i + 15482880 a^5 b^8 c^{13} d e f g - 13824 a^7 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 - 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 - 5981840 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 - 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
\end{aligned}$$

$g*h*k - 3663360*a^5*b^7*c^7*d*f*i*k + 3322368*a^5*b^8*c^6*d*e*j*k - 2285568$
 $*a^6*b^4*c^9*d*g*i*j + 1896960*a^4*b^9*c^6*d*f*i*k + 1843200*a^6*b^3*c^10*f$
 $*g*h*i - 1677312*a^6*b^4*c^9*e*f*i*j - 1658880*a^6*b^4*c^9*e*g*h*j + 683458$
 $56*a^6*b^3*c^10*d*e*f*k + 783360*a^5*b^5*c^9*f*g*h*i + 741888*a^5*b^6*c^8*d$
 $*g*i*j - 34172928*a^6*b^4*c^9*d*f*g*k - 340992*a^3*b^11*c^5*d*f*i*k - 16128$
 $0*a^4*b^10*c^5*d*e*j*k + 138240*a^4*b^9*c^6*d*g*h*k + 107520*a^5*b^6*c^8*e$
 $f*i*j + 92160*a^4*b^9*c^6*e*f*h*k - 89856*a^3*b^11*c^5*d*g*h*k - 80640*a^4*$
 $b^8*c^7*d*g*i*j + 69120*a^5*b^7*c^7*e*f*h*k + 69120*a^5*b^6*c^8*e*g*h*j + 2$
 $7648*a^2*b^13*c^4*d*f*i*k + 18432*a^4*b^7*c^8*f*g*h*i + 6912*a^2*b^13*c^4*d$
 $*g*h*k - 4608*a^3*b^11*c^5*e*f*h*k - 2304*a^3*b^9*c^7*f*g*h*i + 27164160*a^$
 $5*b^6*c^8*d*f*g*k - 22164480*a^6*b^3*c^10*d*f*h*j - 54328320*a^5*b^5*c^9*d*$
 $e*f*k - 17473536*a^7*b^2*c^10*d*f*g*k - 8225280*a^5*b^6*c^8*d*e*h*k - 80870$
 $40*a^4*b^8*c^7*d*f*g*k + 5677056*a^6*b^3*c^10*e*f*g*j - 5529600*a^6*b^2*c^1$
 $1*d*g*h*i + 4571136*a^6*b^3*c^10*d*e*i*j - 3686400*a^6*b^2*c^11*e*f*h*i + 2$
 $805120*a^5*b^5*c^9*d*f*h*j - 2211840*a^5*b^4*c^10*d*g*h*i - 1566720*a^5*b^4$
 $*c^10*e*f*h*i - 1483776*a^5*b^5*c^9*d*e*i*j + 1198080*a^3*b^10*c^6*d*f*g*k$
 $+ 437184*a^4*b^7*c^8*d*f*h*j - 322560*a^5*b^5*c^9*e*f*g*j + 317952*a^4*b^6*$
 $c^9*d*g*h*i - 276480*a^4*b^8*c^7*d*e*h*k + 179712*a^3*b^10*c^6*d*e*h*k + 16$
 $1280*a^4*b^7*c^8*d*e*i*j - 146268*a^3*b^9*c^7*d*f*h*j - 87552*a^2*b^12*c^5*$
 $d*f*g*k - 36864*a^4*b^6*c^9*e*f*h*i - 13824*a^2*b^12*c^5*d*e*h*k + 9360*a^2$
 $*b^11*c^6*d*f*h*j + 6912*a^3*b^8*c^8*d*g*h*i - 6912*a^2*b^10*c^7*d*g*h*i +$
 $4608*a^3*b^8*c^8*e*f*h*i - 24551424*a^6*b^2*c^11*d*e*g*j + 16174080*a^4*b^7$
 $*c^8*d*e*f*k + 5419008*a^5*b^4*c^10*d*e*g*j + 5160960*a^5*b^3*c^11*d*f*g*i$
 $+ 4423680*a^5*b^3*c^11*e*f*g*h + 4423680*a^5*b^3*c^11*d*e*h*i - 2396160*a^3$
 $*b^9*c^7*d*e*f*k - 635904*a^4*b^5*c^10*d*e*h*i - 483840*a^4*b^6*c^9*d*e*g*j$
 $- 354816*a^3*b^7*c^9*d*f*g*i + 322560*a^4*b^5*c^10*d*f*g*i + 175104*a^2*b^$
 $11*c^6*d*e*f*k + 138240*a^4*b^5*c^10*e*f*g*h + 59904*a^2*b^9*c^8*d*f*g*i -$
 $13824*a^3*b^7*c^9*e*f*g*h - 13824*a^3*b^7*c^9*d*e*h*i + 13824*a^2*b^9*c^8*d$
 $*e*h*i - 16588800*a^5*b^2*c^12*d*e*g*h - 10321920*a^5*b^2*c^12*d*e*f*i + 16$
 $58880*a^4*b^4*c^11*d*e*g*h + 709632*a^3*b^6*c^10*d*e*f*i - 645120*a^4*b^4*c$
 $^11*d*e*f*i + 124416*a^3*b^6*c^10*d*e*g*h - 119808*a^2*b^8*c^9*d*e*f*i - 41$
 $472*a^2*b^8*c^9*d*e*g*h + 7741440*a^4*b^3*c^12*d*e*f*g - 2903040*a^3*b^5*c^$
 $11*d*e*f*g + 387072*a^2*b^7*c^10*d*e*f*g - 381026304*a^11*b*c^7*d*j*k^2 - 2$
 $41827840*a^10*b*c^8*d*h*k^2 - 65667072*a^12*b*c^6*h*j*k^2 - 169344*a^7*b^11$
 $*c*h*j*k^2 - 25165824*a^11*b*c^7*g*i*k^2 - 4915200*a^11*b*c^7*g*j^2*k - 530$
 $84160*a^8*b*c^10*e^2*i*k - 75497472*a^10*b*c^8*e*g*k^2 - 86704128*a^7*b*c^1$
 $1*d^2*g*k + 565248*a^9*b*c^9*h*i^2*j - 168448*a^6*b^12*c*f*j*k^2 - 24576*a^$
 $5*b^13*c*g*i*k^2 - 1769472*a^9*b*c^9*g*h^2*k - 17694720*a^9*b*c^9*e*i^2*k -$
 $411264*a^5*b^13*c*d*j*k^2 - 11520*a^4*b^14*c*f*h*k^2 + 4915200*a^8*b*c^10*$
 $f^2*g*k + 2580480*a^9*b*c^9*e*i*j^2 - 2496000*a^9*b*c^9*f*h*j^2 - 1543680*a$
 $^8*b*c^10*f*h^2*j + 33408*a*b^14*c^4*d^2*i*k - 59512320*a^6*b*c^12*d^2*f*j$
 $+ 5087232*a^7*b*c^11*e^2*h*j + 2727936*a^8*b*c^10*d*i^2*j - 26496*a^3*b^15*$
 $c*d*h*k^2 + 1105920*a^7*b*c^11*e*h^2*i - 107136*a*b^13*c^5*d^2*g*k + 10260*$
 $a*b^12*c^6*d^2*h*j - 10616832*a^6*b*c^12*e^2*g*i - 3538944*a^7*b*c^11*e*g*i$
 $^2 + 1843200*a^7*b*c^11*d*h*i^2 - 18432*a^2*b^16*c*d*f*k^2 - 15552000*a^8*b$
 $*c^10*d*f*j^2 + 24551424*a^6*b*c^12*d*e^2*j - 37062144*a^5*b*c^13*d^2*f*h +$
 $2580480*a^6*b*c^12*e*f^2*i + 214272*a*b^12*c^6*d^2*e*k + 65664*a*b^10*c^8*$
 $d^2*g*i - 25074*a*b^11*c^7*d^2*f*j + 420*a*b^12*c^6*d*f^2*j + 6*a*b^15*c^3*$
 $d*f*j^2 + 23224320*a^5*b*c^13*d^2*e*i + 384*a*b^12*c^6*d*f*i^2 - 5985792*a^$
 $6*b*c^12*d*f*h^2 + 206010*a*b^9*c^9*d^2*f*h - 131328*a*b^9*c^9*d^2*e*i - 63$
 $00*a*b^10*c^8*d*f^2*h + 1350*a*b^11*c^7*d*f*h^2 + 16588800*a^5*b*c^13*d*e^2$
 $*h + 3456*a*b^10*c^8*d*f*g^2 + 435456*a*b^8*c^10*d^2*e*g + 13824*a*b^8*c^10$
 $*d*e^2*f + 3932160*a^11*c^8*h*i*j*k + 27525120*a^10*c^9*d*i*j*k + 82575360*$
 $a^9*c^10*d*e*j*k + 11796480*a^10*c^9*e*h*j*k + 16515072*a^9*c^10*d*h*i*k +$
 $49545216*a^8*c^11*d*e*h*k - 2457600*a^8*c^11*e*f*i*j - 1474560*a^7*c^12*e*f$
 $*h*i - 10321920*a^6*c^13*d*e*f*i + 737077248*a^10*b^3*c^6*d*j*k^2 - 5188147$
 $20*a^9*b^5*c^5*d*j*k^2 + 441354240*a^9*b^3*c^7*d*h*k^2 - 429871104*a^6*b^2*$
 $c^11*d^2*e*k - 272212992*a^8*b^5*c^6*d*h*k^2 + 305731584*a^5*b^4*c^10*d^2*e$
 $*k + 192412800*a^8*b^7*c^4*d*j*k^2 + 111912960*a^11*b^3*c^5*h*j*k^2 + 21493$

$5552a^6b^3c^{10}d^2g^*k + 202427136a^7b^6c^6d^*f^*k^2 - 49904640a^{10}b^5c^4h^*j^*k^2 - 178513920a^8b^4c^7d^*f^*k^2 - 152865792a^5b^5c^9d^2g^*k - 114388992a^7b^2c^{10}d^2i^*k + 94961664a^{10}b^2c^7e^*i^*k^2 - 9039872a^{11}b^2c^6i^*j^2k - 56494080a^{10}b^4c^5f^*j^*k^2 - 2052096a^{10}b^4c^5i^*j^2k + 1327360a^9b^6c^4i^*j^2k - 158080a^8b^8c^3i^*j^2k - 47480832a^{10}b^3c^6g^*i^*k^2 + 45576960a^9b^6c^4f^*j^*k^2 + 7954560a^9b^7c^3h^*j^*k^2 - 104693760a^9b^3c^7e^*g^*k^2 + 142080a^8b^9c^2h^*j^*k^2 + 16017408a^{10}b^3c^6g^*j^2k - 4930560a^9b^5c^5g^*j^2k - 3649536a^9b^2c^8h^2i^*k - 1843200a^8b^4c^7h^2i^*k + 85524480a^8b^5c^6e^*g^*k^2 + 474240a^8b^7c^4g^*j^2k + 288000a^7b^6c^6h^2i^*k + 63360a^6b^8c^5h^2i^*k - 8064a^5b^{10}c^4h^2i^*k - 1152a^4b^{12}c^3h^2i^*k - 15437824a^{11}b^2c^6f^*j^*k^2 - 32034816a^{10}b^2c^7e^*j^2k - 14369280a^8b^8c^3f^*j^*k^2 - 13271040a^8b^3c^8g^2i^*k + 80267904a^7b^7c^5d^*h^*k^2 + 79626240a^7b^2c^{10}e^2g^*k + 11059200a^9b^5c^5g^*i^*k^2 + 8847360a^9b^2c^8g^*i^2k - 42113280a^7b^9c^3d^*j^*k^2 + 6389760a^8b^7c^4g^*i^*k^2 + 5898240a^8b^4c^7g^*i^2k - 37601280a^9b^4c^6f^*h^*k^2 - 2949120a^7b^9c^3g^*i^*k^2 + 2242560a^7b^{10}c^2f^*j^*k^2 - 2211840a^7b^5c^7g^2i^*k + 1769472a^6b^7c^6g^2i^*k + 749568a^8b^3c^8h^i^2j - 442368a^7b^6c^6g^*i^2k + 442368a^6b^{11}c^2g^*i^*k^2 - 442368a^6b^8c^5g^*i^2k + 317952a^7b^5c^7h^i^2j - 221184a^5b^9c^5g^2i^*k + 73728a^5b^{10}c^4g^*i^2k + 38400a^6b^7c^6h^i^2j - 1920a^5b^9c^5h^i^2j + 9861120a^9b^4c^6e^*j^2k - 110280960a^4b^6c^9d^2e^*k - 93330432a^6b^8c^5d^*f^*k^2 + 24645888a^8b^6c^5f^*h^*k^2 + 6359040a^8b^3c^8g^*h^2k - 22118400a^9b^4c^6e^*i^*k^2 - 3862528a^8b^2c^9f^2i^*k - 2248704a^7b^4c^8f^2i^*k - 1290240a^9b^2c^8g^*i^*j^2 - 948480a^8b^6c^5e^*j^2k - 860160a^8b^4c^7g^*i^*j^2 - 414720a^7b^5c^7g^*h^2k + 303360a^6b^6c^7f^2i^*k + 266880a^5b^8c^6f^2i^*k - 224640a^6b^7c^6g^*h^2k - 80640a^7b^6c^6g^*i^*j^2 - 72960a^4b^{10}c^5f^2i^*k + 17280a^5b^9c^5g^*h^2k + 12672a^6b^8c^5g^*i^*j^2 + 5504a^3b^{12}c^4f^2i^*k + 3456a^4b^{11}c^4g^*h^2k - 384a^5b^{10}c^4g^*i^*j^2 - 128a^2b^{14}c^3f^2i^*k + 30265344a^6b^4c^9d^2i^*k - 12779520a^8b^6c^5e^*i^*k^2 - 11796480a^8b^3c^8e^*i^2k - 8847360a^7b^3c^9e^2i^*k - 7925760a^{10}b^2c^7f^*h^*k^2 + 7077888a^6b^5c^8e^2i^*k - 39813120a^7b^3c^9e^*g^2k - 73175040a^9b^2c^8d^*f^*k^2 + 5898240a^7b^8c^4e^*i^*k^2 + 5542272a^6b^{11}c^2d^*j^*k^2 - 5420160a^7b^8c^4f^*h^*k^2 + 55140480a^4b^7c^8d^2g^*k + 1271808a^7b^3c^9g^2h^*j - 1040384a^8b^2c^9f^*i^2j + 884736a^7b^5c^7e^*i^2k - 884736a^6b^{10}c^3e^*i^*k^2 + 884736a^6b^7c^6e^*i^2k - 884736a^5b^7c^7e^2i^*k - 697344a^7b^4c^8f^*i^2j + 414720a^6b^5c^8g^2h^*j + 226560a^6b^{10}c^3f^*h^*k^2 - 147456a^5b^9c^5e^*i^2k - 121856a^6b^6c^7f^*i^2j + 82560a^5b^{12}c^2f^*h^*k^2 + 49152a^5b^{12}c^2e^*i^*k^2 - 17280a^5b^7c^7g^2h^*j + 8960a^5b^8c^6f^*i^2j + 14194944a^5b^6c^8d^2i^*k - 12718080a^8b^2c^9e^*h^2k - 10615680a^4b^8c^7d^2i^*k - 26542080a^6b^4c^9e^2g^*k - 23592960a^7b^7c^5e^*g^*k^2 - 5142528a^8b^3c^8f^*h^*j^2 + 5068800a^7b^2c^{10}f^2h^*j - 3755520a^7b^3c^9f^*h^2j + 3336192a^7b^3c^9f^2g^*k + 3000960a^6b^4c^9f^2h^*j + 2893824a^3b^{10}c^6d^2i^*k + 1720320a^8b^3c^8e^*i^*j^2 + 1704960a^6b^5c^8f^2g^*k - 1307520a^5b^7c^7f^2g^*k - 1085760a^6b^5c^8f^*h^2j - 959040a^7b^5c^7f^*h^*j^2 + 829440a^7b^4c^8e^*h^2k - 552960a^7b^2c^{10}g^*h^2i - 552960a^6b^4c^9g^*h^2i + 449280a^6b^6c^7e^*h^2k - 422784a^2b^{12}c^5d^2i^*k + 253440a^4b^9c^6f^2g^*k + 161280a^7b^5c^7e^*i^*j^2 - 145152a^5b^6c^8g^*h^2i + 103200a^6b^7c^6f^*h^*j^2 + 41280a^5b^6c^8f^2h^*j - 37188a^4b^8c^7f^2h^*j - 34560a^5b^8c^6e^*h^2k - 25344a^6b^7c^6e^*i^*j^2 - 17280a^3b^{11}c^5f^2g^*k + 13536a^5b^7c^7f^*h^2j - 6912a^4b^{10}c^5e^*h^2k + 5490a^4b^9c^6f^*h^2j - 3456a^4b^8c^7g^*h^2i + 1980a^3b^{10}c^6f^2h^*j + 810a^5b^9c^5f^*h^*j^2 + 768a^5b^9c^5e^*i^*j^2 + 384a^2b^{13}c^4f^2g^*k - 270a^4b^{11}c^4f^*h^*j^2 - 180a^3b^{11}c^5f^*h^2j - 30a^2b^{12}c^5f^2h^*j + 6a^3b^{13}c^3f^*h^*j^2 + 30067200a^6b^2c^{11}d^2h^*j + 13271040a^6b^5c^8e^*g^2k - 10857600a^6b^9c^4d^*h^*k^2 + 2949120a^6b^9c^4e^*g^*k^2 + 2654208a^5b^6c^8e^2g^*k + 2125824a^$

$a^7b^3c^9d^i^2j + 1658880a^6b^3c^{10}e^{2h}j - 1419264a^6b^4c^9f^*g^2j - 1327104a^5b^7c^7e^*g^2k - 921600a^7b^2c^{10}f^*g^2j - 737280a^7b^2c^{10}f^*h^i^2 - 568320a^6b^4c^9f^*h^i^2 + 207360a^4b^{13}c^2d^*h^*k^2 - 147456a^5b^{11}c^3e^*g^*k^2 - 136704a^5b^6c^8f^*h^i^2 + 133632a^6b^5c^8d^i^2j - 96768a^5b^7c^7d^i^2j + 80640a^5b^6c^8f^*g^2j - 69120a^5b^5c^9e^{2h}j + 13440a^4b^9c^6d^i^2j - 5760a^5b^{11}c^3d^*h^*k^2 - 2304a^4b^8c^7f^*h^i^2 + 384a^3b^{10}c^6f^*h^i^2 + 11930112a^8b^2c^9d^*h^j^2 - 11646720a^3b^9c^7d^2g^*k + 8432640a^7b^2c^{10}d^*h^2j + 24140160a^5b^{10}c^4d^*f^*k^2 - 6672384a^7b^2c^{10}e^*f^2k + 4450176a^7b^4c^8d^*h^j^2 + 4337280a^6b^4c^9d^*h^2j - 3870720a^8b^2c^9e^*g^j^2 - 3409920a^6b^4c^9e^*f^2k - 2885760a^5b^4c^{10}d^2h^*j - 2844288a^4b^6c^9d^2h^*j + 2615040a^5b^6c^8e^*f^2k - 1687680a^6b^6c^7d^*h^j^2 + 1482624a^2b^{11}c^6d^2g^*k - 1290240a^6b^2c^{11}f^2g^*i + 1105920a^6b^3c^{10}e^*h^2i + 1019412a^3b^8c^8d^2h^*j - 1007424a^5b^6c^8d^*h^2j - 860160a^5b^4c^{10}f^2g^*i - 645120a^7b^4c^8e^*g^j^2 - 506880a^4b^8c^7e^*f^2k + 290304a^5b^5c^9e^*h^2i + 197460a^5b^8c^6d^*h^j^2 - 143802a^2b^{10}c^7d^2h^*j + 80640a^6b^6c^7e^*g^j^2 - 80640a^4b^6c^9f^2g^*i + 51948a^4b^8c^7d^*h^2j + 34560a^3b^{10}c^6e^*f^2k + 12672a^3b^8c^8f^2g^*i + 10800a^3b^{10}c^6d^*h^2j + 6912a^4b^7c^8e^*h^2i - 2304a^5b^8c^6e^*g^j^2 - 768a^2b^{12}c^5e^*f^2k - 684a^3b^{12}c^4d^*h^j^2 - 540a^2b^{12}c^5d^*h^2j - 384a^2b^{10}c^7f^2g^*i - 90a^4b^{10}c^5d^*h^j^2 + 18a^2b^{14}c^3d^*h^j^2 + 23385600a^6b^2c^{11}d^*f^2j + 23293440a^3b^8c^8d^2e^*k + 6137856a^6b^3c^{10}d^*g^2j - 5677056a^6b^2c^{11}e^{2f}j + 5308416a^6b^2c^{11}e^*g^2i - 5308416a^5b^3c^{11}e^{2g}i - 3786240a^4b^{12}c^3d^*f^*k^2 - 3538944a^6b^3c^{10}e^*g^i^2 + 2654208a^5b^4c^{10}e^*g^2i + 1658880a^6b^3c^{10}d^*h^i^2 - 1354752a^5b^5c^9d^*g^2j - 1105920a^5b^4c^{10}f^*g^2h - 884736a^5b^5c^9e^*g^i^2 - 552960a^6b^2c^{11}f^*g^2h + 357120a^3b^{14}c^2d^*f^*k^2 + 322560a^5b^4c^{10}e^{2f}j + 262656a^5b^5c^9d^*h^i^2 + 120960a^4b^7c^8d^*g^2j - 55296a^4b^7c^8d^*h^i^2 - 34560a^4b^6c^9f^*g^2h + 3456a^3b^8c^8f^*g^2h + 1152a^3b^9c^7d^*h^i^2 + 1152a^2b^{11}c^6d^*h^i^2 - 13149696a^7b^3c^9d^*f^j^2 - 11612160a^5b^2c^{12}d^2g^*i + 10906560a^4b^5c^{10}d^2f^*j - 7418880a^5b^3c^{11}d^2f^*j + 3148992a^6b^5c^8d^*f^j^2 - 2985696a^3b^7c^9d^2f^*j - 2965248a^2b^{10}c^7d^2e^*k + 1720320a^5b^3c^{11}e^*f^2i - 1658880a^6b^2c^{11}e^*g^*h^2 + 1596672a^3b^6c^{10}d^2g^*i - 1505280a^4b^6c^9d^*f^2j - 829440a^5b^4c^{10}e^*g^*h^2 - 508032a^2b^8c^9d^2g^*i + 378954a^2b^9c^8d^2f^*j + 362880a^5b^4c^{10}d^*f^2j + 296964a^3b^8c^8d^*f^2j + 161280a^4b^5c^{10}e^*f^2i - 77070a^4b^9c^6d^*f^j^2 - 30240a^5b^7c^7d^*f^j^2 - 25344a^3b^7c^9e^*f^2i - 20736a^4b^6c^9e^*g^*h^2 - 19278a^2b^{10}c^7d^*f^2j + 8820a^3b^{11}c^5d^*f^j^2 + 768a^2b^9c^8e^*f^2i - 378a^2b^{13}c^4d^*f^j^2 - 5419008a^5b^3c^{11}d^*e^2j - 4423680a^5b^2c^{12}e^{2f}h + 4147200a^5b^3c^{11}d^*g^2h - 2580480a^6b^2c^{11}d^*f^i^2 - 967680a^5b^4c^{10}d^*f^i^2 + 483840a^4b^5c^{10}d^*e^2j - 414720a^4b^5c^{10}d^*g^2h - 138240a^4b^4c^{11}e^{2f}h + 64512a^4b^6c^9d^*f^i^2 + 39168a^3b^8c^8d^*f^i^2 - 31104a^3b^7c^9d^*g^2h + 13824a^3b^6c^{10}e^{2f}h + 10368a^2b^9c^8d^*g^2h - 9216a^2b^{10}c^7d^*f^i^2 + 15630336a^5b^2c^{12}d^*f^2h - 14459904a^4b^3c^{12}d^2f^*h + 9630144a^3b^5c^{11}d^2f^*h - 8764416a^5b^3c^{11}d^*f^*h^2 - 3870720a^5b^2c^{12}e^*f^2g - 3193344a^3b^5c^{11}d^2e^*i + 2867328a^4b^4c^{11}d^*f^2h - 2095200a^2b^7c^{10}d^2f^*h - 1414080a^3b^6c^{10}d^*f^2h - 34836480a^4b^2c^{13}d^2e^*g + 1016064a^2b^7c^{10}d^2e^*i - 645120a^4b^4c^{11}e^*f^2g + 306720a^3b^7c^9d^*f^*h^2 + 197820a^2b^8c^9d^*f^2h + 146880a^4b^5c^{10}d^*f^*h^2 + 80640a^3b^6c^{10}e^*f^2g - 55350a^2b^9c^8d^*f^*h^2 - 2304a^2b^8c^9e^*f^2g - 3870720a^5b^2c^{12}d^*f^*g^2 - 1935360a^4b^4c^{11}d^*f^*g^2 - 1658880a^4b^3c^{12}d^*e^2h + 725760a^3b^6c^{10}d^*f^*g^2 + 17418240a^3b^4c^{12}d^2e^*g - 124416a^3b^5c^{11}d^*e^2h - 96768a^2b^8c^9d^*f^*g^2 + 41472a^2b^7c^{10}d^*e^2h - 3919104a^2b^6c^{11}d^2e^*g - 7741440a^4b^2c^{13}d^*e^2f + 2903040a^3b^4c^{12}d^*e^2f - 387072a^2b^6c^{11}d^*e^2f - 681246720a^9b^*c^9d^2k^2 + 265912320a^{11}b^3c^$

$$\begin{aligned}
& 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^{11} \\
& 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^{11} \\
& 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
\end{aligned}$$

$$\begin{aligned}
& 920a^{12}b^3c^4j^2k^2 - 177997248a^5b^9c^5d^2k^2 - 50967040a^{11}b^5c^3j^2k^2 + 104693760a^9b^2c^8e^2k^2 + 12849984a^{10}b^7c^2j^2k^2 \\
& + 20021248a^{11}b^2c^6i^2k^2 - 85524480a^8b^4c^7e^2k^2 + 33223680a^{10}b^3c^6h^2k^2 + 4227072a^{10}b^4c^5i^2k^2 - 3973120a^9b^6c^4i^2k^2 \\
& + 344064a^7b^{10}c^2i^2k^2 - 81920a^8b^8c^3i^2k^2 - 11386368a^9b^5c^5h^2k^2 + 26173440a^9b^4c^6g^2k^2 - 21381120a^8b^6c^5g^2k^2 \\
& + 18874368a^{10}b^2c^7g^2k^2 + 501760a^9b^3c^7i^2j^2 + 452160a^8b^7c^4h^2k^2 + 385920a^7b^9c^3h^2k^2 + 170240a^8b^5c^6i^2j^2 \\
& - 48960a^6b^{11}c^2h^2k^2 + 9216a^7b^7c^5i^2j^2 - 1984a^6b^9c^4i^2j^2 + 64a^5b^{11}c^3i^2j^2 + 5898240a^7b^8c^4g^2k^2 + 1419840a^8b^4c^7h^2j^2 \\
& + 1387008a^9b^2c^8h^2j^2 - 737280a^6b^{10}c^3g^2k^2 + 84960a^7b^6c^6h^2j^2 + 36864a^5b^{12}c^2g^2k^2 - 8010a^6b^8c^5h^2j^2 \\
& - 180a^5b^{10}c^4h^2j^2 + 9a^4b^{12}c^3h^2j^2 + 14115840a^9b^3c^7f^2k^2 - 9231552a^7b^7c^5f^2k^2 + 23592960a^7b^6c^6e^2k^2 \\
& + 4984320a^8b^5c^6f^2k^2 + 3759040a^6b^9c^4f^2k^2 + 36190080a^4b^{11}c^4d^2k^2 + 967680a^8b^3c^8g^2j^2 - 727360a^5b^{11}c^3f^2k^2 \\
& + 276480a^7b^3c^9h^2i^2 + 161280a^7b^5c^7g^2j^2 + 140544a^6b^5c^8h^2i^2 + 72960a^4b^{13}c^2f^2k^2 + 25344a^5b^7c^7h^2i^2 \\
& - 20160a^6b^7c^6g^2j^2 + 576a^5b^9c^5g^2j^2 + 576a^4b^9c^6h^2i^2 + 3808000a^8b^2c^9f^2j^2 - 2949120a^6b^8c^5e^2k^2 \\
& + 1643712a^7b^4c^8f^2j^2 + 884736a^7b^2c^{10}g^2i^2 + 884736a^6b^4c^9g^2i^2 + 221184a^5b^6c^8g^2i^2 + 147456a^5b^{10}c^4e^2k^2 - 125440a^6b^6c^7f^2j^2 \\
& - 13790a^5b^8c^6f^2j^2 + 1785a^4b^{10}c^5f^2j^2 - 70a^3b^{12}c^4f^2j^2 - 4953600a^3b^{13}c^3d^2k^2 + 18427392a^7b^2c^{10}d^2j^2 \\
& + 645120a^7b^3c^9e^2j^2 + 501760a^6b^3c^{10}f^2i^2 + 442944a^2b^{15}c^2d^2k^2 + 414720a^6b^3c^{10}g^2h^2 + 207360a^5b^5c^9g^2h^2 \\
& + 170240a^5b^5c^9f^2i^2 - 80640a^6b^5c^8e^2j^2 + 9216a^4b^7c^8f^2i^2 + 5184a^4b^7c^8g^2h^2 + 2304a^5b^7c^7e^2j^2 \\
& - 1984a^3b^9c^7f^2i^2 + 64a^2b^{11}c^6f^2i^2 - 4148928a^6b^4c^9d^2j^2 + 3538944a^6b^2c^{11}e^2i^2 + 1684224a^6b^2c^{11}f^2h^2 \\
& + 1264320a^5b^4c^{10}f^2h^2 - 1183392a^5b^6c^8d^2j^2 + 884736a^5b^4c^{10}e^2i^2 + 645750a^4b^8c^7d^2j^2 + 126720a^4b^6c^9f^2h^2 \\
& - 115920a^3b^{10}c^6d^2j^2 - 13950a^3b^8c^8f^2h^2 + 10836a^2b^{12}c^5d^2j^2 + 225a^2b^{10}c^7f^2h^2 + 1935360a^5b^3c^{11}d^2i^2 + 967680a^5b^3c^{11}f^2g^2 \\
& + 829440a^5b^3c^{11}e^2h^2 - 532224a^4b^5c^{10}d^2i^2 + 161280a^4b^5c^{10}f^2g^2 - 96768a^3b^7c^9d^2i^2 + 62784a^2b^9c^8d^2i^2 \\
& + 20736a^4b^5c^{10}e^2h^2 - 20160a^3b^7c^9f^2g^2 + 576a^2b^9c^8f^2g^2 + 11487744a^5b^2c^{12}d^2h^2 + 7962624a^5b^2c^{12}e^2g^2 \\
& + 35525376a^4b^2c^{13}d^2f^2 - 1412640a^3b^6c^{10}d^2h^2 + 461376a^4b^4c^{11}d^2h^2 + 375030a^2b^8c^9d^2h^2 + 8709120a^4b^3c^{12}d^2g^2 \\
& - 4354560a^3b^5c^{11}d^2g^2 + 979776a^2b^7c^{10}d^2g^2 + 645120a^4b^3c^{12}e^2f^2 - 80640a^3b^5c^{11}e^2f^2 + 2304a^2b^7c^{10}e^2f^2 \\
& - 15269184a^3b^4c^{12}d^2f^2 + 2870784a^2b^6c^{11}d^2f^2 - 17418240a^3b^3c^{13}d^2e^2 + 3919104a^2b^5c^{12}d^2e^2 + 384a^ab^{18}d^2f^2k^2 \\
& - 199229440a^{14}b^2c^3k^4 + 8388608a^{12}c^7i^2k^2 + 75497472a^{10}c^9e^2k^2 + 78400a^8b^{11}j^2k^2 + 4096a^5b^{14}i^2k^2 + 345600a^{10}c^9h^2j^2 \\
& + 576a^4b^{15}h^2k^2 + 57937920a^{13}b^4c^2k^4 + 320000a^9c^{10}f^2j^2 + 64a^2b^{17}f^2k^2 + 16934400a^8c^{11}d^2j^2 + 9b^{16}c^3d^2j^2 \\
& + 3538944a^7c^{12}e^2i^2 + 115200a^7c^{12}f^2h^2 + 576b^{13}c^6d^2i^2 + 2025b^{12}c^7d^2h^2 + 6096384a^6c^{13}d^2h^2 + 492800a^{11}b^2c^6j^4 \\
& + 351456a^{10}b^4c^5j^4 - 43120a^9b^6c^4j^4 + 5184b^{11}c^8d^2g^2 + 1225a^8b^8c^3j^4 + 131072a^8b^2c^9i^4 + 98304a^7b^4c^8i^4 \\
& + 32768a^6b^6c^7i^4 + 11025b^{10}c^9d^2f^2 + 4096a^5b^8c^6i^4 + 5644800a^5c^{14}d^2f^2 + 142560a^6b^4c^9h^4 + 103680a^7b^2c^{10}h^4 \\
& + 32400a^5b^6c^8h^4 + 20736b^9c^{10}d^2e^2 + 2025a^4b^8c^7h^4 + 331776a^5b^4c^{10}g^4 + 492800a^5b^2c^{12}f^4 + 351456a^4b^4c^{11}f^4 \\
& - 43120a^3b^6c^{10}f^4 + 1225a^2b^8c^9f^4 - 27433728a^3b^2c^{14}d^4 + 6446304a^2b^4c^{13}d^4 + a^2b^{14}c^3f^2j^2 - 81920a^8b^{11}i^2k^3 + 384000a^{11}c^8h^2j^3 \\
& + 138240a^9c^{10}h^3j + 474
\end{aligned}$$

$$\begin{aligned}
& 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
\end{aligned}$$

$4gkz^2 - 7680a^5b^{15}c^5h^jz^2 - 61931520a^7b^8c^{10}f^h^jz^2 + 23592960a^7b^9c^9g^i^jz^2 + 17940480a^7b^{10}c^8f^jz^2 - 47185920a^7b^8c^{10}e^i^jz^2 - 5898240a^6b^{13}c^6e^kz^2 - 3538944a^6b^{11}c^8g^i^jz^2 - 1347584a^6b^{12}c^7f^jz^2 + 196608a^5b^{15}c^5e^kz^2 + 196608a^5b^{13}c^7g^i^jz^2 + 35840a^5b^{14}c^6f^jz^2 + 96583680a^5b^{10}c^{10}df^z^2 + 23371776a^6b^{11}c^8d^jz^2 - 51609600a^6b^9c^{10}d^h^jz^2 + 7077888a^6b^{10}c^9e^i^jz^2 + 6144000a^6b^{10}c^9f^h^jz^2 - 1677312a^5b^{13}c^7d^jz^2 - 393216a^5b^{12}c^8e^i^jz^2 + 61440a^5b^{12}c^8f^h^jz^2 + 53760a^4b^{15}c^6d^jz^2 - 46080a^4b^{14}c^7f^h^jz^2 + 1536a^3b^{16}c^6f^h^jz^2 - 23592960a^6b^9c^{10}e^g^z^2 + 1179648a^5b^{11}c^9e^g^z^2 + 829440a^4b^{13}c^8d^h^jz^2 + 368640a^5b^{11}c^9d^h^jz^2 - 105984a^3b^{15}c^7d^h^jz^2 + 4608a^2b^{17}c^6d^h^jz^2 - 15175680a^4b^{12}c^9d^f^z^2 + 1428480a^3b^{14}c^8d^f^z^2 - 73728a^2b^{16}c^7d^f^z^2 + 4108320768a^{10}b^3c^{12}d^jz^2 - 1207959552a^{10}b^6c^{14}e^g^z^2 - 578813952a^{12}b^6c^{12}h^jz^2 + 3246391296a^{10}b^6c^9g^kz^2 - 402653184a^{11}b^6c^{13}g^i^jz^2 + 3019898880a^{12}b^2c^{11}g^kz^2 - 440401920a^{10}b^6c^{14}f^2z^2 - 188743680a^{11}b^6c^{13}h^2z^2 + 1761607680a^{10}c^{15}d^f^z^2 - 655360a^6b^{18}c^k^2z^2 - 94464a^6b^{17}c^7d^2z^2 + 6936330240a^8b^3c^{14}d^2z^2 + 2464874496a^6b^7c^{12}d^2z^2 - 3963617280a^9b^6c^{15}d^2z^2 + 58007224320a^{13}b^4c^8k^2z^2 + 14968422400a^{11}b^8c^6k^2z^2 + 805306368a^{11}c^{14}e^i^jz^2 - 35966156800a^{12}b^6c^7k^2z^2 + 419430400a^{12}c^{13}f^jz^2 - 1509949440a^9b^2c^{14}e^2z^2 + 251658240a^{11}c^{14}f^h^jz^2 - 56874762240a^{14}b^2c^9k^2z^2 - 5400428544a^7b^5c^{13}d^2z^2 + 890470400a^9b^{12}c^4k^2z^2 + 754974720a^8b^4c^{13}e^2z^2 - 730054656a^5b^9c^{11}d^2z^2 + 477102080a^{12}b^3c^{10}j^2z^2 + 477102080a^9b^3c^{13}f^2z^2 - 377487360a^9b^4c^{12}g^2z^2 + 301989888a^{10}b^2c^{13}g^2z^2 - 174325760a^{11}b^5c^9j^2z^2 - 126156800a^8b^{14}c^3k^2z^2 + 188743680a^8b^6c^{11}g^2z^2 + 141557760a^{10}b^3c^{12}h^2z^2 - 174325760a^8b^5c^{12}f^2z^2 - 188743680a^7b^6c^{12}e^2z^2 - 4350935040a^{10}b^{10}c^5k^2z^2 + 146165760a^4b^{11}c^{10}d^2z^2 - 50331648a^{10}b^4c^{11}i^2z^2 + 11796480a^7b^{16}c^2k^2z^2 - 33554432a^{11}b^2c^{12}i^2z^2 + 11206656a^{10}b^7c^8j^2z^2 + 8929280a^9b^9c^7j^2z^2 + 20971520a^9b^6c^{10}i^2z^2 - 2600960a^8b^{11}c^6j^2z^2 + 291840a^7b^{13}c^5j^2z^2 - 14080a^6b^{15}c^4j^2z^2 + 256a^5b^{17}c^3j^2z^2 - 47185920a^7b^8c^{10}g^2z^2 - 26542080a^8b^7c^{10}h^2z^2 - 2752512a^7b^{10}c^8i^2z^2 + 2621440a^8b^8c^9i^2z^2 + 524288a^6b^{12}c^7i^2z^2 - 32768a^5b^{14}c^6i^2z^2 + 9584640a^7b^9c^9h^2z^2 - 2359296a^9b^5c^{11}h^2z^2 - 1290240a^6b^{11}c^8h^2z^2 + 46080a^5b^{13}c^7h^2z^2 + 2304a^4b^{15}c^6h^2z^2 + 5898240a^6b^{10}c^9g^2z^2 - 294912a^5b^{12}c^8g^2z^2 + 11206656a^7b^7c^{11}f^2z^2 + 8929280a^6b^9c^{10}f^2z^2 + 23592960a^6b^8c^{11}e^2z^2 - 2600960a^5b^{11}c^9f^2z^2 + 291840a^4b^{13}c^8f^2z^2 - 14080a^3b^{15}c^7f^2z^2 + 256a^2b^{17}c^6f^2z^2 - 19860480a^3b^{13}c^9d^2z^2 - 1179648a^5b^{10}c^{10}e^2z^2 + 1771776a^2b^{15}c^8d^2z^2 - 440401920a^{13}b^6c^{11}j^2z^2 + 1207959552a^{10}c^{15}e^2z^2 + 134217728a^{12}c^{13}i^2z^2 + 25769803776a^{15}c^{10}k^2z^2 + 16384a^5b^{20}k^2z^2 + 2304b^{19}c^6d^2z^2 + 165150720a^9b^6c^{12}d^g^jz + 23592960a^{10}b^6c^{11}g^h^jz + 169869312a^7b^6c^{14}d^e^f^z + 99090432a^8b^6c^{13}d^g^h^z - 3145728a^9b^6c^{12}f^h^i^z + 56623104a^8b^6c^{13}d^f^i^z - 1536a^6b^{18}c^3d^f^k^z - 9437184a^8b^6c^{13}e^f^h^z + 1536a^6b^{15}c^6d^f^i^z - 4608a^6b^{14}c^7d^f^g^z + 9216a^6b^{13}c^8d^e^f^z + 2173501440a^9b^5c^8d^j^k^z - 1987706880a^9b^3c^{10}d^h^k^z + 1121255424a^8b^5c^9d^h^k^z + 861143040a^8b^4c^{10}d^f^k^z - 859963392a^7b^6c^9d^f^k^z - 780779520a^8b^7c^7d^j^k^z - 754974720a^9b^3c^{10}e^g^k^z + 2222456832a^{11}b^6c^{10}d^j^k^z - 454164480a^{11}b^3c^8h^j^k^z + 377487360a^8b^5c^9e^g^k^z + 290979840a^{10}b^4c^8f^j^k^z + 381026304a^6b^8c^8d^f^k^z + 412876800a^8b^2c^{12}d^e^j^z + 301989888a^{10}b^2c^{10}e^i^k^z - 320421888a^7b^7c^8d^h^k^z + 185794560a^{10}b^5c^7h^j^k^z - 192020480a^9b^6c^7f^j^k^z + 190709760a^9b^4c^9f^h^k^z - 150994944a^{10}b^3c^9g^i^k^z + 168990720a^7b^9c^6d^j^k^z + 235929600a^9b^2c^{11}d^f^k^z - 206438400a^8b^3c^{11}d^g^j^z$

- 206438400*a^7*b^4*c^11*d*e*j*k*z - 101646336*a^8*b^6*c^8*f*h*k*k*z - 29245440
 *a^9*b^7*c^6*h*j*k*k*z - 60817408*a^11*b^2*c^9*f*j*k*k*z + 57835520*a^8*b^8*c^6
 *f*j*k*k*z + 219414528*a^7*b^2*c^13*d*e*h*k*z - 70778880*a^10*b^2*c^10*f*h*k*k*z
 + 677376*a^7*b^11*c^4*h*j*k*k*z - 645120*a^8*b^9*c^5*h*j*k*k*z - 53760*a^6*b^13
 *c^3*h*j*k*k*z + 31457280*a^8*b^7*c^7*g*i*k*k*z - 62914560*a^8*b^6*c^8*e*i*k*k*z
 - 94371840*a^7*b^7*c^8*e*g*k*k*z - 221773824*a^6*b^3*c^13*d*e*f*k*z + 82575360*
 a^9*b^2*c^11*d*i*j*k*z + 11796480*a^10*b^2*c^10*h*i*j*k*z - 11796480*a^7*b^9*c^6
 *g*i*k*k*z - 8970240*a^7*b^10*c^5*f*j*k*k*z + 103219200*a^7*b^5*c^10*d*g*j*k*z -
 2457600*a^8*b^6*c^8*h*i*j*k*z + 1769472*a^6*b^11*c^5*g*i*k*k*z + 921600*a^7*b^8
 *c^7*h*i*j*k*z + 673792*a^6*b^12*c^4*f*j*k*k*z - 138240*a^6*b^10*c^6*h*i*j*k*z -
 98304*a^5*b^13*c^4*g*i*k*k*z - 17920*a^5*b^14*c^3*f*j*k*k*z + 7680*a^5*b^12*c^5
 *h*i*j*k*z - 97136640*a^5*b^10*c^7*d*f*k*k*z - 29491200*a^9*b^3*c^10*g*h*j*k*z +
 58982400*a^9*b^2*c^11*e*h*j*k*z + 23592960*a^7*b^8*c^7*e*i*k*k*z - 22169088*a^6
 *b^11*c^5*d*j*k*k*z + 21381120*a^7*b^8*c^7*f*h*k*k*z + 14745600*a^8*b^5*c^9*g*
 h*j*k*z + 42854400*a^6*b^9*c^7*d*h*k*k*z - 109707264*a^7*b^3*c^12*d*g*h*k*z - 368
 6400*a^7*b^7*c^8*g*h*j*k*z - 3538944*a^6*b^10*c^6*e*i*k*k*z + 1645056*a^5*b^13*
 c^4*d*j*k*k*z - 890880*a^6*b^10*c^6*f*h*k*k*z + 460800*a^6*b^9*c^7*g*h*j*k*z - 33
 0240*a^5*b^12*c^5*f*h*k*k*z + 196608*a^5*b^12*c^5*e*i*k*k*z - 53760*a^4*b^15*c^3
 *d*j*k*k*z + 46080*a^4*b^14*c^4*f*h*k*k*z - 23040*a^5*b^11*c^6*g*h*j*k*z - 1536*
 a^3*b^16*c^3*f*h*k*k*z - 29491200*a^8*b^4*c^10*e*h*j*k*z - 17203200*a^7*b^6*c^9
 *d*i*j*k*z + 11796480*a^6*b^9*c^7*e*g*k*k*z + 110886912*a^6*b^4*c^12*d*f*g*k*z +
 7372800*a^7*b^6*c^9*e*h*j*k*z + 40108032*a^8*b^2*c^12*d*h*i*k*z + 6451200*a^6*b
 ^8*c^8*d*i*j*k*z + 2359296*a^8*b^3*c^11*f*h*i*k*z - 967680*a^5*b^10*c^7*d*i*j*k*z
 - 921600*a^6*b^8*c^8*e*h*j*k*z - 829440*a^4*b^13*c^5*d*h*k*k*z - 589824*a^5*b^11
 *c^6*e*g*k*k*z - 491520*a^6*b^7*c^9*f*h*i*k*z + 184320*a^5*b^9*c^8*f*h*i*k*z +
 105984*a^3*b^15*c^4*d*h*k*k*z + 69120*a^5*b^11*c^6*d*h*k*k*z + 53760*a^4*b^12*c
 ^6*d*i*j*k*z + 46080*a^5*b^10*c^7*e*h*j*k*z - 27648*a^4*b^11*c^7*f*h*i*k*z - 4608
 *a^2*b^17*c^3*d*h*k*k*z + 1536*a^3*b^13*c^6*f*h*i*k*z - 25804800*a^6*b^7*c^9*d*
 g*j*k*z - 88473600*a^6*b^4*c^12*d*e*h*k*z + 51609600*a^6*b^6*c^10*d*e*j*k*z - 849
 34656*a^7*b^2*c^13*d*f*g*k*z + 117964800*a^5*b^5*c^12*d*e*f*k*z + 15160320*a^4*
 b^12*c^6*d*f*k*k*z - 45613056*a^7*b^3*c^12*d*f*i*k*z + 44236800*a^6*b^5*c^11*d*
 g*h*k*z - 10321920*a^6*b^6*c^10*d*h*i*k*z + 7077888*a^7*b^4*c^11*d*h*i*k*z - 5898
 240*a^7*b^4*c^11*f*g*h*k*z + 4718592*a^8*b^2*c^12*f*g*h*k*z + 3225600*a^5*b^9*c
 ^8*d*g*j*k*z + 2949120*a^6*b^6*c^10*f*g*h*k*z + 2396160*a^5*b^8*c^9*d*h*i*k*z - 1
 428480*a^3*b^14*c^5*d*f*k*k*z - 737280*a^5*b^8*c^9*f*g*h*k*z - 161280*a^4*b^11*
 c^7*d*g*j*k*z + 92160*a^4*b^10*c^8*f*g*h*k*z + 73728*a^2*b^16*c^4*d*f*k*k*z - 506
 88*a^3*b^12*c^7*d*h*i*k*z - 27648*a^4*b^10*c^8*d*h*i*k*z - 4608*a^3*b^12*c^7*f*
 g*h*k*z + 4608*a^2*b^14*c^6*d*h*i*k*z - 58982400*a^5*b^6*c^11*d*f*g*k*z + 1179648
 0*a^7*b^3*c^12*e*f*h*k*z + 8847360*a^5*b^7*c^10*d*f*i*k*z - 6635520*a^5*b^7*c^1
 0*d*g*h*k*z - 6451200*a^5*b^8*c^9*d*e*j*k*z - 5898240*a^6*b^5*c^11*e*f*h*k*z - 38
 09280*a^4*b^9*c^9*d*f*i*k*z + 2359296*a^6*b^5*c^11*d*f*i*k*z + 1474560*a^5*b^7*
 c^10*e*f*h*k*z + 681984*a^3*b^11*c^8*d*f*i*k*z + 322560*a^4*b^10*c^8*d*e*j*k*z -
 276480*a^4*b^9*c^9*d*g*h*k*z - 184320*a^4*b^9*c^9*e*f*h*k*z + 179712*a^3*b^11*c
 ^8*d*g*h*k*z - 55296*a^2*b^13*c^7*d*f*i*k*z - 13824*a^2*b^13*c^7*d*g*h*k*z + 9216
 *a^3*b^11*c^8*e*f*h*k*z + 16220160*a^4*b^8*c^10*d*f*g*k*z + 13271040*a^5*b^6*c^11
 *d*e*h*k*z - 2396160*a^3*b^10*c^9*d*f*g*k*z + 552960*a^4*b^8*c^10*d*e*h*k*z - 3
 59424*a^3*b^10*c^9*d*e*h*k*z + 175104*a^2*b^12*c^8*d*f*g*k*z + 27648*a^2*b^12*c
 ^8*d*e*h*k*z - 32440320*a^4*b^7*c^11*d*e*f*k*z + 4792320*a^3*b^9*c^10*d*e*f*k*z -
 350208*a^2*b^11*c^9*d*e*f*k*z + 1439170560*a^10*b*c^11*d*h*k*k*z - 3361603584*
 a^10*b^3*c^9*d*j*k*k*z + 603979776*a^10*b*c^11*e*g*k*k*z + 407371776*a^12*b*c^9
 *h*j*k*k*z + 201326592*a^11*b*c^10*g*i*k*k*z + 346816512*a^7*b*c^14*d^2*g*k*z + 1
 29761280*a^11*b*c^10*h^2*k*k*z + 121896960*a^10*b*c^11*f^2*k*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*k*z - 19660800*a^8*b*c^13*
 f^2*g*k*z - 66816*a*b^14*c^7*d^2*i*k*z + 214272*a*b^13*c^8*d^2*g*k*z - 428544*a*b
 ^12*c^9*d^2*e*k*z + 2390753280*a^11*b^4*c^7*g*k^2*z - 2411421696*a^6*b^7*c^9*
 d^2*k*k*z - 6603079680*a^8*b^3*c^11*d^2*k*k*z + 3715891200*a^9*b*c^12*d^2*k*k*z -
 880803840*a^10*c^12*d*f*k*k*z - 1623195648*a^10*b^6*c^6*g*k^2*z - 402653184*
 a^11*c^11*e*i*k*k*z - 1509949440*a^12*b^2*c^8*g*k^2*z - 209715200*a^12*c^10*f

$$\begin{aligned}
& *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
\end{aligned}$$

$$\begin{aligned}
& ^{10}i^2kz - 13107200a^{12}c^{10}ij^2z - 16384a^5b^{17}ik^2z - 3932160 \\
& 0a^{11}c^{11}ej^2z - 4718592a^{10}c^{12}h^2iz - 2304b^{19}c^3d^2kz + 1 \\
& 3107200a^9c^{13}f^2iz + 2304b^{16}c^6d^2iz - 14155776a^9c^{13}eh^2z \\
& z + 39321600a^8c^{14}ef^2z - 4833280a^9b^{12}ck^3z - 6912b^{15}c^7d^2 \\
& 2gz + 6962544640a^{14}b^2c^6k^3z + 13824b^{14}c^8d^2ez + 1876951040 \\
& a^{12}b^6c^4k^3z - 4844421120a^{13}b^4c^5k^3z - 437780480a^{11}b^8c^3 \\
& k^3z - 4294967296a^{15}c^7k^3z + 163840a^8b^{14}k^3z + 6144000a^{10} \\
& b^c^8fijjk - 5898240a^{10}b^c^8gghjjk - 41287680a^9b^c^9dggjjk + 4 \\
& 472832a^9b^c^9fghijk + 18432000a^9b^c^9efjjk + 3391488a^8b^c^10 \\
& ehij + 1228800a^8b^c^10fghij - 24772608a^8b^c^10dghhk + 134184 \\
& 96a^8b^c^10efghk + 11649024a^8b^c^10dfijk + 737280a^7b^c^11fgh \\
& hki - 768a^7b^15c^3d^2fik - 19307520a^7b^c^11dfhjk + 16367616a^7 \\
& b^c^11deij + 3686400a^7b^c^11efgj + 34947072a^7b^c^11deefk + \\
& 2304a^7b^14c^4d^2fgk - 180a^7b^13c^5d^2fhj + 11059200a^6b^c^12d^2e \\
& hki + 5160960a^6b^c^12d^2fgi + 2211840a^6b^c^12efgh - 4608a^7b^1 \\
& 3c^5d^2efk - 2304a^7b^11c^7d^2fgi + 4608a^7b^10c^8d^2efi + 1548288 \\
& 0a^5b^c^13d^2efg - 13824a^7b^9c^9d^2efg - 225976320a^8b^2c^9d^2e \\
& jk + 112988160a^8b^3c^8d^2ggjjk - 11427840a^10b^2c^7hijjk - 41779 \\
& 20a^9b^4c^6hijjk + 1399296a^8b^6c^5hijjk - 26880a^6b^10c^3h \\
& ijjk + 16128a^7b^8c^4hijjk - 61562880a^9b^2c^8dijjk + 2009088 \\
& 0a^9b^3c^7ghjjk + 119623680a^7b^4c^8d^2ejjk + 10485760a^9b^3c^ \\
& 7fijjk - 40181760a^9b^2c^8ehjjk - 3778560a^8b^5c^6ghjjk - 13 \\
& 7797632a^7b^2c^10d^2ehk - 1248768a^7b^7c^5fijjk + 229376a^6b^9 \\
& c^4fijjk + 220160a^8b^5c^6fijjk - 209664a^7b^7c^5ghjjk + 80 \\
& 640a^6b^9c^4ghjjk - 8960a^5b^11c^3fijjk - 59811840a^7b^5c^7 \\
& dgjjk + 53084160a^8b^2c^9egijk - 11120640a^8b^4c^7fgjjk + 104 \\
& 5552a^7b^6c^6dijjk - 9216000a^9b^2c^8fgjjk + 7557120a^8b^4c^ \\
& 7ehjjk + 7397376a^8b^3c^8fghijk + 5230080a^7b^6c^6fgjjk - 37 \\
& 675008a^8b^2c^9d^2hijk - 3633408a^6b^8c^5dijjk + 2211840a^8b^4c^ \\
& 7dijjk + 68898816a^7b^3c^9d^2ghhk - 1695744a^8b^2c^9ghhij - \\
& 1400832a^7b^4c^8ghhij + 967680a^7b^5c^7fghijk - 783360a^6b^7c^ \\
& 6fghijk - 741888a^6b^8c^5fgjjk + 499968a^5b^10c^4dijjk + 419 \\
& 328a^7b^6c^6ehhjjk - 253440a^6b^6c^7ghhij - 161280a^6b^8c^5e \\
& hhjjk + 42240a^5b^9c^5fghijk + 26880a^5b^10c^4fgjjk - 26880a^4 \\
& b^12c^3dijjk + 13824a^4b^11c^4fghijk + 11520a^5b^8c^6ghhij - \\
& 768a^3b^13c^3fghijk + 22241280a^8b^3c^8efjjk + 14222592a^6b^ \\
& 7c^6d^2ggjjk - 10460160a^7b^5c^7efjjk + 8847360a^7b^4c^8egijk \\
& - 7741440a^7b^4c^8fgghk - 7077888a^6b^6c^7egijk + 6935040a^6b^ \\
& 6c^7d^2hijk - 6709248a^8b^2c^9fgghk - 3612672a^7b^4c^8d^2hijk \\
& + 2801664a^7b^3c^9ehhij + 2506752a^7b^3c^9fggij + 2419200a^6b^ \\
& 6c^7fgghk - 1661184a^5b^9c^5d^2ggjjk + 1483776a^6b^7c^6efjjk \\
& - 1463040a^5b^8c^6d^2hijk + 884736a^5b^8c^6egijk + 838656a^6b^5 \\
& c^8fggij + 506880a^6b^5c^8ehhij + 80640a^4b^11c^4d^2ggjjk - 53 \\
& 760a^5b^9c^5efjjk - 53760a^5b^7c^7fggij - 46080a^4b^10c^5fg \\
& ghk - 34560a^5b^8c^6fgghk + 25344a^3b^12c^4d^2hijk - 23040a^5 \\
& b^7c^7ehhij + 13824a^4b^10c^5d^2hijk + 2304a^3b^12c^4fgghk - \\
& 2304a^2b^14c^3d^2hijk - 29030400a^6b^5c^8d^2ghk + 28606464a^7b^3 \\
& c^9d^2fik - 28445184a^6b^6c^7d^2ejjk + 58060800a^6b^4c^9d^2ehk \\
& + 15482880a^7b^3c^9efghk - 8183808a^7b^2c^10d^2gij - 6718464a^6 \\
& b^5c^8d^2fik - 5087232a^7b^2c^10egghj - 5013504a^7b^2c^10ef \\
& ij - 4838400a^6b^5c^8efghk + 4112640a^5b^7c^7d^2ghk - 3663360a^ \\
& 5b^7c^7d^2fik + 3322368a^5b^8c^6d^2ejjk - 2285568a^6b^4c^9d^2g \\
& ij + 1896960a^4b^9c^6d^2fik + 1843200a^6b^3c^10fgghk - 1677312 \\
& a^6b^4c^9efgij - 1658880a^6b^4c^9egghj + 68345856a^6b^3c^10d^ \\
& 2efk + 783360a^5b^5c^9fgghk + 741888a^5b^6c^8d^2gij - 34172928 \\
& a^6b^4c^9d^2fgk - 340992a^3b^11c^5d^2fik - 161280a^4b^10c^5d^2 \\
& ejjk + 138240a^4b^9c^6d^2ghk + 107520a^5b^6c^8efgij + 92160a^4 \\
& b^9c^6efghk - 89856a^3b^11c^5d^2ghk - 80640a^4b^8c^7d^2gij + \\
& 69120a^5b^7c^7efghk + 69120a^5b^6c^8egghj + 27648a^2b^13c^4
\end{aligned}$$

$$\begin{aligned}
& *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
\end{aligned}$$

$$\begin{aligned}
& - 1843200a^8b^4c^7h^2i^k + 85524480a^8b^5c^6e^gk^2 + 474240a^8b^7c^4g^j^2k + 288000a^7b^6c^6h^2i^k + 63360a^6b^8c^5h^2i^k - \\
& 8064a^5b^10c^4h^2i^k - 1152a^4b^12c^3h^2i^k - 15437824a^{11}b^2c^6f^j^2k^2 - 32034816a^{10}b^2c^7e^j^2k^2 - 14369280a^8b^8c^3f^j^2k^2 - \\
& 13271040a^8b^3c^8g^2i^k + 80267904a^7b^7c^5d^h^2k^2 + 79626240a^7b^2c^10e^2g^k + 11059200a^9b^5c^5g^i^k^2 + 8847360a^9b^2c^8g^i^2k - \\
& 42113280a^7b^9c^3d^j^2k^2 + 6389760a^8b^7c^4g^i^k^2 + 5898240a^8b^4c^7g^i^2k - 37601280a^9b^4c^6f^h^2k^2 - 2949120a^7b^9c^3g^i^k^2 + 2242560a^7b^10c^2f^j^2k^2 - \\
& 2211840a^7b^5c^7g^2i^k + 1769472a^6b^7c^6g^2i^k + 749568a^8b^3c^8h^i^2j - 442368a^7b^6c^6g^i^2k + 442368a^6b^11c^2g^i^k^2 - 442368a^6b^8c^5g^i^2k + 317952a^7b^5c^7h^i^2j - \\
& 221184a^5b^9c^5g^2i^k + 73728a^5b^10c^4g^i^2k + 38400a^6b^7c^6h^i^2j - 1920a^5b^9c^5h^i^2j + 9861120a^9b^4c^6e^j^2k - 110280960a^4b^6c^9d^2e^k - 93330432a^6b^8c^5d^f^2k^2 + \\
& 24645888a^8b^6c^5f^h^2k^2 + 6359040a^8b^3c^8g^h^2k - 22118400a^9b^4c^6e^i^k^2 - 3862528a^8b^2c^9f^2i^k - 2248704a^7b^4c^8f^2i^k - \\
& 1290240a^9b^2c^8g^i^j^2 - 948480a^8b^6c^5e^j^2k - 860160a^8b^4c^7g^i^j^2 - 414720a^7b^5c^7g^h^2k + 303360a^6b^6c^7f^2i^k + 266880a^5b^8c^6f^2i^k - \\
& 224640a^6b^7c^6g^h^2k - 80640a^7b^6c^6g^i^j^2 - 72960a^4b^10c^5f^2i^k + 17280a^5b^9c^5g^h^2k + 12672a^6b^8c^5g^i^j^2 + 5504a^3b^12c^4f^2i^k + 3456a^4b^11c^4g^h^2k - \\
& 384a^5b^10c^4g^i^j^2 - 128a^2b^14c^3f^2i^k + 30265344a^6b^4c^9d^2i^k - 12779520a^8b^6c^5e^i^k^2 - 11796480a^8b^3c^8e^i^2k - 8847360a^7b^3c^9e^2i^k - \\
& 7925760a^{10}b^2c^7f^h^2k^2 + 7077888a^6b^5c^8e^2i^k - 39813120a^7b^3c^9e^g^2k - 73175040a^9b^2c^8d^f^2k^2 + 5898240a^7b^8c^4e^i^k^2 + 5542272a^6b^11c^2d^j^2k^2 - \\
& 5420160a^7b^8c^4f^h^2k^2 + 55140480a^4b^7c^8d^2g^k + 1271808a^7b^3c^9g^2h^j - 1040384a^8b^2c^9f^i^2j + 884736a^7b^5c^7e^i^2k - 884736a^6b^10c^3e^i^k^2 + \\
& 884736a^6b^7c^6e^i^2k - 884736a^5b^7c^7e^2i^k - 697344a^7b^4c^8f^i^2j + 414720a^6b^5c^8g^2h^j + 226560a^6b^10c^3f^h^2k^2 - 147456a^5b^9c^5e^i^2k - 121856a^6b^6c^7f^i^2j + 82560a^5b^12c^2f^h^2k^2 + \\
& 49152a^5b^12c^2e^i^k^2 - 17280a^5b^7c^7g^2h^j + 8960a^5b^8c^6f^i^2j + 14194944a^5b^6c^8d^2i^k - 12718080a^8b^2c^9e^h^2k - 10615680a^4b^8c^7d^2i^k - 26542080a^6b^4c^9e^2g^k - \\
& 23592960a^7b^7c^5e^g^2k - 5142528a^8b^3c^8f^h^2j^2 + 5068800a^7b^2c^10f^2h^j - 3755520a^7b^3c^9f^h^2j + 3336192a^7b^3c^9f^2g^k + 3000960a^6b^4c^9f^2h^j + 2893824a^3b^10c^6d^2i^k + 1720320a^8b^3c^8e^i^j^2 + 1704960a^6b^5c^8f^2g^k - 1307520a^5b^7c^7f^2g^k - 1085760a^6b^5c^8f^h^2j - 959040a^7b^5c^7f^h^2j^2 + 829440a^7b^4c^8e^h^2k - 552960a^7b^2c^10g^h^2i - 552960a^6b^4c^9g^h^2i + 449280a^6b^6c^7e^h^2k - 422784a^2b^12c^5d^2i^k + 253440a^4b^9c^6f^2g^k + 161280a^7b^5c^7e^i^j^2 - 145152a^5b^6c^8g^h^2i + 103200a^6b^7c^6f^h^2j^2 + 41280a^5b^6c^8f^2h^j - 37188a^4b^8c^7f^2h^j - 34560a^5b^8c^6e^h^2k - 25344a^6b^7c^6e^i^j^2 - 17280a^3b^11c^5f^2g^k + 13536a^5b^7c^7f^h^2j - 6912a^4b^10c^5e^h^2k + 5490a^4b^9c^6f^h^2j - 3456a^4b^8c^7g^h^2i + 1980a^3b^10c^6f^2h^j + 810a^5b^9c^5f^h^2j^2 + 768a^5b^9c^5e^i^j^2 + 384a^2b^13c^4f^2g^k - 270a^4b^11c^4f^h^2j - 180a^3b^11c^5f^h^2j - 30a^2b^12c^5f^2h^j + 6a^3b^13c^3f^h^2j^2 + 30067200a^6b^2c^11d^2h^j + 13271040a^6b^5c^8e^g^2k - 10857600a^6b^9c^4d^h^2k^2 + 2949120a^6b^9c^4e^g^2k + 2654208a^5b^6c^8e^2g^k + 2125824a^7b^3c^9d^i^2j + 1658880a^6b^3c^10e^2h^j - 1419264a^6b^4c^9f^g^2j - 1327104a^5b^7c^7e^g^2k - 921600a^7b^2c^10f^g^2j - 737280a^7b^2c^10f^h^i^2 - 568320a^6b^4c^9f^h^i^2 + 207360a^4b^13c^2d^h^2k^2 - 147456a^5b^11c^3e^g^2k - 136704a^5b^6c^8f^h^i^2 + 133632a^6b^5c^8d^i^2j - 96768a^5b^7c^7d^i^2j + 80640a^5b^6c^8f^g^2j - 69120a^5b^5c^9e^2h^j + 13440a^4b^9c^6d^i^2j - 5760a^5b^11c^3d^h^2k^2 - 2304a^4b^8c^7f^h^i^2 + 384a^3b^10c^6f^h^i^2 + 11930112a^8b^2c^9d^h^2j^2 - 11646720a^3b^9c^7d^2g^k + 8432640a^7b^2c^10d^h^2j + 24140160a
\end{aligned}$$

$^5b^{10}c^4d^f k^2 - 6672384a^7b^2c^{10}e^f^2k + 4450176a^7b^4c^8d^h j^2 + 4337280a^6b^4c^9d^h^2j - 3870720a^8b^2c^9e^g j^2 - 3409920a^6b^4c^9e^f^2k - 2885760a^5b^4c^{10}d^2h^*j - 2844288a^4b^6c^9d^2h^*j + 2615040a^5b^6c^8e^f^2k - 1687680a^6b^6c^7d^h^*j^2 + 1482624a^2b^{11}c^6d^2g^*k - 1290240a^6b^2c^{11}f^2g^*i + 1105920a^6b^3c^{10}e^h^2i + 1019412a^3b^8c^8d^2h^*j - 1007424a^5b^6c^8d^h^2j - 860160a^5b^4c^{10}f^2g^*i - 645120a^7b^4c^8e^g j^2 - 506880a^4b^8c^7e^f^2k + 290304a^5b^5c^9e^h^2i + 197460a^5b^8c^6d^h^*j^2 - 143802a^2b^{10}c^7d^2h^*j + 80640a^6b^6c^7e^g j^2 - 80640a^4b^6c^9f^2g^*i + 51948a^4b^8c^7d^h^2j + 34560a^3b^{10}c^6e^f^2k + 12672a^3b^8c^8f^2g^*i + 10800a^3b^{10}c^6d^h^2j + 6912a^4b^7c^8e^h^2i - 2304a^5b^8c^6e^g j^2 - 768a^2b^{12}c^5e^f^2k - 684a^3b^{12}c^4d^h^*j^2 - 540a^2b^{12}c^5d^h^2j - 384a^2b^{10}c^7f^2g^*i - 90a^4b^{10}c^5d^h^*j^2 + 18a^2b^{14}c^3d^h^*j^2 + 23385600a^6b^2c^{11}d^f^2j + 23293440a^3b^8c^8d^2e^*k + 6137856a^6b^3c^{10}d^g^2j - 5677056a^6b^2c^{11}e^2*f^*j + 5308416a^6b^2c^{11}e^g^2i - 5308416a^5b^3c^{11}e^2g^*i - 3786240a^4b^{12}c^3d^f k^2 - 3538944a^6b^3c^{10}e^g i^2 + 2654208a^5b^4c^{10}e^g^2i + 1658880a^6b^3c^{10}d^h i^2 - 1354752a^5b^5c^9d^g^2j - 1105920a^5b^4c^{10}f^g^2h - 884736a^5b^5c^9e^g i^2 - 552960a^6b^2c^{11}f^g^2h + 357120a^3b^{14}c^2d^f k^2 + 322560a^5b^4c^{10}e^2f^*j + 262656a^5b^5c^9d^h i^2 + 120960a^4b^7c^8d^g^2j - 55296a^4b^7c^8d^h i^2 - 34560a^4b^6c^9f^g^2h + 3456a^3b^8c^8f^g^2h + 1152a^3b^9c^7d^h i^2 + 1152a^2b^{11}c^6d^h i^2 - 13149696a^7b^3c^9d^f j^2 - 11612160a^5b^2c^{12}d^2g^*i + 10906560a^4b^5c^{10}d^2f^*j - 7418880a^5b^3c^{11}d^2f^*j + 3148992a^6b^5c^8d^f j^2 - 2985696a^3b^7c^9d^2f^*j - 2965248a^2b^{10}c^7d^2e^*k + 1720320a^5b^3c^{11}e^f^2i - 1658880a^6b^2c^{11}e^g h^2 + 1596672a^3b^6c^{10}d^2g^*i - 1505280a^4b^6c^9d^f^2j - 829440a^5b^4c^{10}e^g h^2 - 508032a^2b^8c^9d^2g^*i + 378954a^2b^9c^8d^2f^*j + 362880a^5b^4c^{10}d^f^2j + 296964a^3b^8c^8d^f^2j + 161280a^4b^5c^{10}e^f^2i - 77070a^4b^9c^6d^f j^2 - 30240a^5b^7c^7d^f j^2 - 25344a^3b^7c^9e^f^2i - 20736a^4b^6c^9e^g h^2 - 19278a^2b^{10}c^7d^f^2j + 8820a^3b^{11}c^5d^f j^2 + 768a^2b^9c^8e^f^2i - 378a^2b^{13}c^4d^f j^2 - 5419008a^5b^3c^{11}d^e^2j - 4423680a^5b^2c^{12}e^2f^*h + 4147200a^5b^3c^{11}d^g^2h - 2580480a^6b^2c^{11}d^f i^2 - 967680a^5b^4c^{10}d^f i^2 + 483840a^4b^5c^{10}d^e^2j - 414720a^4b^5c^{10}d^g^2h - 138240a^4b^4c^{11}e^2f^*h + 64512a^4b^6c^9d^f i^2 + 39168a^3b^8c^8d^f i^2 - 31104a^3b^7c^9d^g^2h + 13824a^3b^6c^{10}e^2f^*h + 10368a^2b^9c^8d^g^2h - 9216a^2b^{10}c^7d^f i^2 + 15630336a^5b^2c^{12}d^f^2h - 14459904a^4b^3c^{12}d^2f^*h + 9630144a^3b^5c^{11}d^2f^*h - 8764416a^5b^3c^{11}d^f h^2 - 3870720a^5b^2c^{12}e^f^2g - 3193344a^3b^5c^{11}d^2e^*i + 2867328a^4b^4c^{11}d^f^2h - 2095200a^2b^7c^{10}d^2f^*h - 1414080a^3b^6c^{10}d^f^2h - 34836480a^4b^2c^{13}d^2e^*g + 1016064a^2b^7c^{10}d^2e^*i - 645120a^4b^4c^{11}e^f^2g + 306720a^3b^7c^9d^f h^2 + 197820a^2b^8c^9d^f^2h + 146880a^4b^5c^{10}d^f h^2 + 80640a^3b^6c^{10}e^f^2g - 55350a^2b^9c^8d^f h^2 - 2304a^2b^8c^9e^f^2g - 3870720a^5b^2c^{12}d^f g^2 - 1935360a^4b^4c^{11}d^f g^2 - 1658880a^4b^3c^{12}d^e^2h + 725760a^3b^6c^{10}d^f g^2 + 17418240a^3b^4c^{12}d^2e^*g - 124416a^3b^5c^{11}d^e^2h - 96768a^2b^8c^9d^f g^2 + 41472a^2b^7c^{10}d^e^2h - 3919104a^2b^6c^{11}d^2e^*g - 7741440a^4b^2c^{13}d^e^2f + 2903040a^3b^4c^{12}d^e^2f - 387072a^2b^6c^{11}d^e^2f - 681246720a^9b^c^9d^2k^2 + 265912320a^{11}b^3c^5e^*k^3 + 188743680a^{12}b^2c^5g^*k^3 - 132956160a^{11}b^4c^4g^*k^3 - 52101120a^{13}b^c^5j^2k^2 + 25722880a^{12}b^3c^4i^*k^3 + 19644416a^{11}b^5c^3i^*k^3 - 1583680a^9b^9c^j^2k^2 - 9142272a^{10}b^7c^2i^*k^3 - 74022912a^{10}b^5c^4e^*k^3 - 20643840a^{11}b^c^7h^2k^2 + 37011456a^{10}b^6c^3g^*k^3 - 2293760a^9b^3c^7i^3k - 557056a^8b^5c^6i^3k + 147456a^7b^7c^5i^3k - 65536a^6b^{12}c^i^2k^2 + 32768a^6b^9c^4i^3k - 8192a^5b^{11}c^3i^3k + 430080a^{10}b^c^8i^2j^2 - 2880a^5b^{13}c^h^2k^2 + 6635520a^7b^4c^8g^3k - 4792320a^9b^8c^2g^*k^3 - 2211840a^6b^6c^7g^3k + 1359360a$

$$\begin{aligned}
& ^{10}b^2c^7h^3j^3 + 1173120a^9b^4c^6h^3j^3 + 743040a^7b^4c^8h^3j^3 + \\
& 622080a^8b^2c^9h^3j^3 + 221184a^5b^8c^6g^3k^3 + 107136a^6b^6c^7h^3j^3 - 32640a^8b^6c^5h^3j^3 - 5796a^7b^8c^4h^3j^3 + 540a^5b^8c^6h^3j^3 - 270a^4b^10c^5h^3j^3 + 210a^6b^10c^3h^3j^3 - 2949120a^{10}b^3c^8f^2k^2 + 17694720a^6b^3c^{10}e^3k^3 + 184320a^8b^3c^{10}h^2i^2 - 3520a^3b^{15}c^3f^2k^2 + 9584640a^9b^7c^3e^3k^3 - 2293760a^9b^3c^7f^3j^3 - 2293760a^6b^3c^{10}f^3j^3 - 1769472a^5b^5c^9e^3k^3 - 884736a^6b^3c^{10}g^3i^3 - 589824a^7b^3c^9g^3i^3 - 491520a^8b^9c^2e^3k^3 - 442368a^5b^5c^9g^3i^3 - 294912a^6b^5c^8g^3i^3 - 199360a^8b^5c^6f^3j^3 - 199360a^5b^5c^9f^3j^3 + 61920a^7b^7c^5f^3j^3 + 61920a^4b^7c^8f^3j^3 - 49152a^5b^7c^7g^3i^3 - 3682a^6b^9c^4f^3j^3 - 3682a^3b^9c^7f^3j^3 + 70a^5b^{11}c^3f^3j^3 + 70a^2b^{11}c^6f^3j^3 + 3870720a^8b^3c^{10}e^2j^2 + 430080a^7b^3c^{11}f^2i^2 - 14152320a^4b^4c^{11}d^3j^3 + 10644480a^5b^2c^{12}d^3j^3 + 5483520a^9b^2c^8d^3j^3 + 4269888a^3b^6c^{10}d^3j^3 + 3538944a^5b^2c^{12}e^3i^3 - 1648128a^5b^3c^{11}f^3h^3 + 1330560a^8b^4c^7d^3j^3 + 1179648a^7b^2c^{10}e^3i^3 - 898560a^6b^3c^{10}f^3h^3 - 826560a^7b^6c^6d^3j^3 - 607068a^2b^8c^9d^3j^3 + 589824a^6b^4c^9e^3i^3 - 354240a^5b^5c^9f^3h^3 - 354240a^4b^5c^{10}f^3h^3 + 145188a^6b^8c^5d^3j^3 + 98304a^5b^6c^8e^3i^3 + 43680a^3b^7c^9f^3h^3 - 21600a^4b^7c^8f^3h^3 - 9576a^5b^{10}c^4d^3j^3 + 1350a^3b^9c^7f^3h^3 - 1050a^2b^9c^8f^3h^3 - 504a^3b^{14}c^4d^2j^2 + 210a^4b^{12}c^3d^3j^3 + 3870720a^6b^3c^{12}d^2i^2 + 1658880a^6b^3c^{12}e^2h^2 - 9792a^3b^{11}c^7d^2i^2 + 16547328a^4b^2c^{13}d^3h^3 - 12306816a^3b^4c^{12}d^3h^3 + 37310976a^3b^3c^{13}d^3f^3 + 3037824a^2b^6c^{11}d^3h^3 - 2654208a^5b^3c^{11}e^3g^3 + 1949184a^6b^2c^{11}d^3h^3 + 1296000a^5b^4c^{10}d^3h^3 - 155520a^4b^6c^9d^3h^3 - 40500a^3b^{10}c^8d^2h^2 - 8100a^3b^8c^8d^3h^3 + 4050a^2b^{10}c^7d^3h^3 + 3870720a^5b^3c^{13}e^2f^2 + 34836480a^4b^3c^{14}d^2e^2 - 108864a^3b^9c^9d^2g^2 - 8068032a^2b^5c^{12}d^3f^3 - 5623296a^4b^3c^{12}d^3f^3 + 1737792a^3b^5c^{11}d^3f^3 - 260190a^3b^8c^{10}d^2f^2 - 211680a^2b^7c^{10}d^3f^3 - 435456a^3b^7c^{11}d^2e^2 - 377487360a^{12}b^3c^6e^3k^3 + 1434977280a^8b^3c^8d^2k^2 + 173408256a^7c^{12}d^2e^3k^3 + 3276800a^{12}c^7i^3j^2k^3 - 125829120a^{13}b^3c^5i^3k^3 + 26214400a^{12}c^7f^3j^3k^2 + 1179648a^{10}c^9h^2i^3k^3 + 13440a^6b^{13}h^3j^3k^2 + 50331648a^{11}c^8e^3i^3k^2 + 110100480a^{10}c^9d^3f^3k^2 + 57802752a^8c^{11}d^2i^3k^3 + 9830400a^{11}c^8e^3j^2k^3 - 3276800a^9c^{10}f^2i^3k^3 + 4480a^5b^{14}f^3j^3k^2 + 15728640a^{11}c^8f^3h^3k^2 - 409600a^9c^{10}f^3i^2j^3 - 1152b^{16}c^3d^2i^3k^3 - 1220516352a^7b^5c^7d^2k^2 + 3538944a^9c^{10}e^3h^2k^3 + 384000a^8c^{11}f^2h^3j^3 + 13440a^4b^{15}d^3j^3k^2 + 384a^3b^{16}f^3h^3k^2 + 20321280a^7c^{12}d^2h^3j^3 - 245760a^8c^{11}f^3h^3i^2 + 3456b^{15}c^4d^2g^3k^3 - 270b^{14}c^5d^2h^3j^3 - 9830400a^8c^{11}e^3f^2k^3 + 4838400a^9c^{10}d^3h^3j^2 + 2903040a^8c^{11}d^3h^2j^3 - 1966080a^{10}b^3c^8i^3k^3 + 1433600a^9b^9c^3i^3k^3 + 1152a^2b^{17}d^3h^3k^2 - 3686400a^7c^{12}e^2f^3j^3 - 53084160a^7b^3c^{11}e^3k^3 - 6912b^{14}c^5d^2e^3k^3 - 3456b^{12}c^7d^2g^3i^3 + 630b^{13}c^6d^2f^3j^3 + 2688000a^7c^{12}d^3f^2j^3 + 245760a^8b^{10}c^3g^3k^3 - 2211840a^6c^{13}e^2f^3h^3 - 1720320a^7c^{12}d^3f^3i^2 - 9450b^{11}c^8d^2f^3h^3 + 6912b^{11}c^8d^2e^3i^3 + 1612800a^6c^{13}d^3f^2h^3 - 1344000a^{10}b^3c^8f^3j^3 - 1344000a^7b^3c^{11}f^3j^3 - 393216a^8b^3c^{10}g^3i^3 - 23616a^3b^{17}c^3d^2k^2 - 20736b^{10}c^9d^2e^3g^3 - 75188736a^4b^3c^{14}d^3f^3 - 883200a^6b^3c^{12}f^3h^3 - 317952a^7b^3c^{11}f^3h^3 + 43416a^3b^{10}c^8d^3j^3 - 15482880a^5c^{14}d^2e^2f^3 - 10616832a^5b^3c^{13}e^3g^3 - 345060a^3b^8c^{10}d^3h^3 - 4262400a^5b^3c^{13}d^3f^3 + 852768a^3b^7c^{11}d^3f^3 + 7350a^3b^9c^9d^3f^3 + 584578368a^6b^7c^6d^2k^2 + 93905920a^{12}b^3c^4j^2k^2 - 177997248a^5b^9c^5d^2k^2 - 50967040a^{11}b^5c^3j^2k^2 + 104693760a^9b^2c^8e^2k^2 + 12849984a^{10}b^7c^2j^2k^2 + 20021248a^{11}b^2c^6i^2k^2 - 85524480a^8b^4c^7e^2k^2 + 33223680a^{10}b^3c^6h^2k^2 + 4227072a^{10}b^4c^5i^2k^2 - 3973120a^9b^6c^4i^2k^2 + 344064a^7b^{10}c^2i^2k^2 - 81920a^8b^8c^3i^2k^2 - 11386368a^9b^5c^5h^2k^2 + 26173440a^9b^4c^6g^2k^2 - 21381120a^8b^6c^5g^2k^2 + 18874368a^{10}b^2c^7g^2k^2 + 501760a^9b^3c^7i^2j^2 + 452160a^8b^7c^4h^2k^2 + 385920a^7b^9c^3h^2k^2 + 170240a^8b^5c^6i^2j^2 - 48960a
\end{aligned}$$

$$\begin{aligned}
& ^6b^{11}c^2h^2k^2 + 9216a^7b^7c^5i^2j^2 - 1984a^6b^9c^4i^2j^2 + \\
& 64a^5b^{11}c^3i^2j^2 + 5898240a^7b^8c^4g^2k^2 + 1419840a^8b^4c^7h^2j^2 + 1387008a^9b^2c^8h^2j^2 - 737280a^6b^{10}c^3g^2k^2 + 849 \\
& 60a^7b^6c^6h^2j^2 + 36864a^5b^{12}c^2g^2k^2 - 8010a^6b^8c^5h^2j^2 - 180a^5b^{10}c^4h^2j^2 + 9a^4b^{12}c^3h^2j^2 + 14115840a^9b^3c^7f^2k^2 - 9231552a^7b^7c^5f^2k^2 + 23592960a^7b^6c^6e^2k^2 + \\
& 4984320a^8b^5c^6f^2k^2 + 3759040a^6b^9c^4f^2k^2 + 36190080a^4b^{11}c^4d^2k^2 + 967680a^8b^3c^8g^2j^2 - 727360a^5b^{11}c^3f^2k^2 + \\
& 276480a^7b^3c^9h^2i^2 + 161280a^7b^5c^7g^2j^2 + 140544a^6b^5c^8h^2i^2 + 72960a^4b^{13}c^2f^2k^2 + 25344a^5b^7c^7h^2i^2 - 20160 \\
& a^6b^7c^6g^2j^2 + 576a^5b^9c^5g^2j^2 + 576a^4b^9c^6h^2i^2 + 3808000a^8b^2c^9f^2j^2 - 2949120a^6b^8c^5e^2k^2 + 1643712a^7b^4c^8f^2j^2 + 884736a^7b^2c^{10}g^2i^2 + 884736a^6b^4c^9g^2i^2 + 2 \\
& 21184a^5b^6c^8g^2i^2 + 147456a^5b^{10}c^4e^2k^2 - 125440a^6b^6c^7f^2j^2 - 13790a^5b^8c^6f^2j^2 + 1785a^4b^{10}c^5f^2j^2 - 70a^3b^{12}c^4f^2j^2 - 4953600a^3b^{13}c^3d^2k^2 + 18427392a^7b^2c^{10}d^2j^2 + 645120a^7b^3c^9e^2j^2 + 501760a^6b^3c^{10}f^2i^2 + 442944a^2b^{15}c^2d^2k^2 + 414720a^6b^3c^{10}g^2h^2 + 207360a^5b^5c^9g^2h^2 + 170240a^5b^5c^9f^2i^2 - 80640a^6b^5c^8e^2j^2 + 9216a^4b^7c^8f^2i^2 + 5184a^4b^7c^8g^2h^2 + 2304a^5b^7c^7e^2j^2 - 1984a^3b^9c^7f^2i^2 + 64a^2b^{11}c^6f^2i^2 - 4148928a^6b^4c^9d^2j^2 + 3538944a^6b^2c^{11}e^2i^2 + 1684224a^6b^2c^{11}f^2h^2 + 1264320a^5b^4c^{10}f^2h^2 - 1183392a^5b^6c^8d^2j^2 + 884736a^5b^4c^{10}e^2i^2 + 645750a^4b^8c^7d^2j^2 + 126720a^4b^6c^9f^2h^2 - 115920a^3b^{10}c^6d^2j^2 - 13950a^3b^8c^8f^2h^2 + 10836a^2b^{12}c^5d^2j^2 + 25a^2b^{10}c^7f^2h^2 + 1935360a^5b^3c^{11}d^2i^2 + 967680a^5b^3c^{11}f^2g^2 + 829440a^5b^3c^{11}e^2h^2 - 532224a^4b^5c^{10}d^2i^2 + 161280a^4b^5c^{10}f^2g^2 - 96768a^3b^7c^9d^2i^2 + 62784a^2b^9c^8d^2i^2 + 20736a^4b^5c^{10}e^2h^2 - 20160a^3b^7c^9f^2g^2 + 576a^2b^9c^8f^2g^2 + 11487744a^5b^2c^{12}d^2h^2 + 7962624a^5b^2c^{12}e^2g^2 + 35525376a^4b^2c^{13}d^2f^2 - 1412640a^3b^6c^{10}d^2h^2 + 461376a^4b^4c^{11}d^2h^2 + 375030a^2b^8c^9d^2h^2 + 8709120a^4b^3c^{12}d^2g^2 - 4354560a^3b^5c^{11}d^2g^2 + 979776a^2b^7c^{10}d^2g^2 + 645120a^4b^3c^{12}e^2f^2 - 80640a^3b^5c^{11}e^2f^2 + 2304a^2b^7c^{10}e^2f^2 - 15269184a^3b^4c^{12}d^2f^2 + 2870784a^2b^6c^{11}d^2f^2 - 17418240a^3b^3c^{13}d^2e^2 + 3919104a^2b^5c^{12}d^2e^2 + 384a^2b^{18}d^2f^2k^2 - 199229440a^{14}b^2c^3k^4 + 8388608a^{12}c^7i^2k^2 + 75497472a^{10}c^9e^2k^2 + 78400a^8b^{11}j^2k^2 + 4096a^5b^{14}i^2k^2 + 345600a^{10}c^9h^2j^2 + 576a^4b^{15}h^2k^2 + 57937920a^{13}b^4c^2k^4 + 320000a^9c^{10}f^2j^2 + 64a^2b^{17}f^2k^2 + 16934400a^8c^{11}d^2j^2 + 9b^{16}c^3d^2j^2 + 3538944a^7c^{12}e^2i^2 + 115200a^7c^{12}f^2h^2 + 576b^{13}c^6d^2i^2 + 2025b^{12}c^7d^2h^2 + 6096384a^6c^{13}d^2h^2 + 492800a^{11}b^2c^6j^4 + 351456a^{10}b^4c^5j^4 - 43120a^9b^6c^4j^4 + 5184b^{11}c^8d^2g^2 + 1225a^8b^8c^3j^4 + 131072a^8b^2c^9i^4 + 98304a^7b^4c^8i^4 + 32768a^6b^6c^7i^4 + 11025b^{10}c^9d^2f^2 + 4096a^5b^8c^6i^4 + 5644800a^5c^{14}d^2f^2 + 142560a^6b^4c^9h^4 + 103680a^7b^2c^{10}h^4 + 32400a^5b^6c^8h^4 + 20736b^9c^{10}d^2e^2 + 2025a^4b^8c^7h^4 + 331776a^5b^4c^{10}g^4 + 492800a^5b^2c^{12}f^4 + 351456a^4b^4c^{11}f^4 - 43120a^3b^6c^{10}f^4 + 1225a^2b^8c^9f^4 - 27433728a^3b^2c^{14}d^4 + 6446304a^2b^4c^{13}d^4 + a^2b^{14}c^3f^2j^2 - 81920a^8b^{11}i^2k^3 + 384000a^{11}c^8h^3j^3 + 138240a^9c^{10}h^3j + 47416320a^6c^{13}d^3j - 1134b^{12}c^7d^3j + 7077888a^6c^{13}e^3i + 2688000a^{10}c^9d^3j^3 + 786432a^8c^{11}e^3i^3 + 28449792a^5c^{14}d^3h - 7782400a^{12}b^6c^3k^4 + 17010b^{10}c^9d^3h + 580608a^7c^{12}d^3h^3 - 39690b^9c^{10}d^3f - 734832a^2b^6c^{12}d^4 + 268435456a^{15}c^4k^4 + 576b^{19}d^2k^2 + 409600a^{11}b^8k^4 + 160000a^{12}c^7j^4 + 65536a^9c^{10}i^4 + 20736a^8c^{11}h^4 + 49787136a^4c^{15}d^4 + 160000a^6c^{13}f^4 + 5308416a^5c^{14}e^4 + 35721b^8c^{11}d^4, z, n) * x * (8388608a^{11}b^3c^{13} - 512a^4b^{15}c^6 + 14336a^5b^{13}c^7 - 172032a^6b^{11}c^8 + 1146880a^7b^9c^9 - 4587520a^8b^7c^{11}
\end{aligned}$$

$$\begin{aligned}
& 0 + 11010048a^9b^5c^{11} - 14680064a^{10}b^3c^{12}) / (64(4096a^{10}c^{10} + \\
& a^4b^{12}c^4 - 24a^5b^{10}c^5 + 240a^6b^8c^6 - 1280a^7b^6c^7 + 3840a^8b^4c^8 - \\
& 6144a^9b^2c^9))) - (x(451584a^6c^{13}d^2 + 18b^{12}c^7d^2 - 25600a^7c^{12}f^2 + 9216a^8c^{11}h^2 + 128a^4b^{15}k^2 + 25600a^{10} \\
& c^9j^2 - 504a^5b^{10}c^8d^2 - 73728a^6b^8c^{12}e^2 - 8192a^8b^6c^{10}i^2 - 3712a^5b^{13}c^8k^2 - 3538944a^{11}b^8c^7k^2 + 6228a^2b^8c^9d^2 - 426 \\
& 24a^3b^6c^{10}d^2 + 176256a^4b^4c^{11}d^2 - 423936a^5b^2c^{12}d^2 - 4608a^4b^5c^{10}e^2 + 36864a^5b^3c^{11}e^2 + 2a^2b^{10}c^7f^2 - 84a^3 \\
& b^8c^8f^2 + 3520a^4b^6c^9f^2 - 26240a^5b^4c^{10}f^2 + 59904a^6b^2c^{11}f^2 - 1152a^4b^7c^8g^2 + 9216a^5b^5c^9g^2 - 18432a^6b^3c^{10}g^2 + 468a^4b^8c^7h^2 - 3456a^5b^6c^8h^2 + 5760a^6b^4c^9h^2 \\
& - 128a^4b^9c^6i^2 + 512a^5b^7c^7i^2 + 1536a^6b^5c^8i^2 - 4096a^7b^3c^9i^2 + 2a^4b^{12}c^3j^2 - 88a^5b^{10}c^4j^2 + 1236a^6b^8c^5j^2 - 5760a^7b^6c^6j^2 + 8320a^8b^4c^7j^2 - 6144a^9b^2c^8j^2 \\
& + 46464a^6b^{11}c^2k^2 - 326400a^7b^9c^3k^2 + 1394560a^8b^7c^4k^2 - 3640320a^9b^5c^5k^2 + 5404672a^{10}b^3c^6k^2 + 129024a^7c^{12}d^2h \\
& + 215040a^8c^{11}d^2j + 786432a^9c^{10}e^2k + 30720a^9c^{10}h^2j + 262144a^{10}c^9i^2k + 12a^5b^{11}c^7d^2f - 218112a^6b^8c^{12}d^2f - 49152a^7b^6c^{11} \\
& e^2i - 9216a^7b^6c^{11}f^2h - 25600a^8b^6c^{10}f^2j - 393216a^9b^6c^9g^2k - 420a^2b^9c^8d^2f + 4992a^3b^7c^9d^2f - 36480a^4b^5c^{10}d^2f + 14438 \\
& 4a^5b^3c^{11}d^2f + 36a^2b^{10}c^7d^2h - 360a^3b^8c^8d^2h + 3456a^4b^6c^9d^2h + 4608a^4b^6c^9e^2g - 11520a^5b^4c^{10}d^2h - 36864a^5b^4c^{10}e^2g - 27648a^6b^2c^{11}d^2h + 73728a^6b^2c^{11}e^2g + 12a^3b^9c^7 \\
& f^2h - 1536a^4b^7c^8e^2i - 2304a^4b^7c^8f^2h + 168a^4b^8c^7d^2j + 9216a^5b^5c^9e^2i + 17280a^5b^5c^9f^2h - 768a^5b^6c^8d^2j - 30720a^6b^3c^{10}f^2h + 11520a^6b^4c^9d^2j - 98304a^7b^2c^{10}d^2j + 768a^4 \\
& b^8c^7g^2i + 140a^4b^9c^6f^2j - 4608a^5b^6c^8g^2i - 3584a^5b^7c^7f^2j + 1536a^5b^8c^6e^2k + 20352a^6b^5c^8f^2j - 26112a^6b^6c^7e^2k + 24576a^7b^2c^{10}g^2i - 26624a^7b^3c^9f^2j + 184320a^7b^4c^8e^2k - 614400a^8b^2c^9e^2k - 60a^4b^{10}c^5h^2j + 1560a^5b^8c^6h^2j - 76 \\
& 8a^5b^9c^5g^2k - 8832a^6b^6c^7h^2j + 13056a^6b^7c^6g^2k + 13056a^7b^4c^8h^2j - 92160a^7b^5c^7g^2k - 3072a^8b^2c^9h^2j + 307200a^8b^3c^8g^2k + 256a^5b^{10}c^4i^2k - 3840a^6b^8c^5i^2k + 22016a^7b^6c^6i^2k - 40960a^8b^4c^7i^2k - 73728a^9b^2c^8i^2k)) / (64(4096a^{10}c^{10} \\
& + a^4b^{12}c^4 - 24a^5b^{10}c^5 + 240a^6b^8c^6 - 1280a^7b^6c^7 + 3840a^8b^4c^8 - 6144a^9b^2c^9))) + (x(13824a^4c^{12}e^3 + 512a^7c^9 \\
& i^3 - 640a^7b^9k^3 - 54b^7c^9d^2e + 27b^8c^8d^2g + 11840a^8b^7c^8k^3 - 376832a^{11}b^8c^4k^3 + 13824a^5c^{11}e^2i + 4608a^6c^{10}e^2i^2 - 9b^9c^7d^2i + 112896a^6c^{10}d^2k + 98304a^9c^7e^2k^2 + 9b^{12}c^4d^2k - 6400a^7c^9f^2k + 64a^4b^{12}i^2k^2 + 2304a^8c^8h^2k + 3 \\
& 2768a^{10}c^6i^2k^2 + 6400a^{10}c^6j^2k - 1728a^4b^3c^9g^3 + 64a^4b^6c^6i^3 + 384a^5b^4c^7i^3 + 768a^6b^2c^8i^3 - 85824a^9b^5c^2k^3 + 287296a^{10}b^3c^3k^3 - 20160a^4c^{12}d^2e^2f - 6720a^5c^{11}d^2f^2i - 2880a^5c^{11}e^2f^2h - 4800a^6c^{10}e^2f^2j - 960a^6c^{10}f^2h^2i + 32256a^7c^9d^2h^2k - 1600a^7c^9f^2i^2j + 53760a^8c^8d^2j^2k + 7680a^9c^7h^2j^2k + 972a^5b^5c^{10}d^2e + 24192a^3b^8c^{12}d^2e - 486a^5b^6c^9d^2g + 62 \\
& 40a^4b^8c^{11}e^2f^2 - 20736a^4b^8c^{11}e^2g + 144a^5b^7c^8d^2i + 8064a^4b^8c^{11}d^2i + 1728a^5b^8c^{10}e^2h^2 - 252a^5b^{10}c^5d^2k + 2080a^5b^8c^{10}f^2i + 3840a^7b^8c^8e^2j^2 - 2304a^6b^8c^9g^2i^2 - 122112a^6b^8c^9e^2k + 576a^6b^8c^9h^2i - 192a^4b^{11}c^8g^2k^2 - 49152a^9b^8c^6g^2k^2 + 1280a^8b^8c^7i^2j^2 - 1088a^5b^{10}c^8i^2k^2 - 13568a^8b^8c^7i^2k^2 - 7344a^2b^3c^{11}d^2e + 3672a^2b^4c^{10}d^2g - 6a^2b^5c^9e^2f^2 - 1 \\
& 2096a^3b^2c^{11}d^2g + 192a^3b^3c^{10}e^2f^2 + 10368a^4b^2c^{10}e^2g^2 - 900a^2b^5c^9d^2i + 3a^2b^6c^8f^2g + 1584a^3b^3c^{10}d^2i - 96a^3b^4c^9f^2g - 3120a^4b^2c^{10}f^2g + 1296a^4b^3c^9e^2h^2 + 6 \\
& 912a^4b^2c^{10}e^2i + 1152a^4b^4c^8e^2i^2 + 4608a^5b^2c^9e^2i^2 - a^2b^7c^7f^2i + 3114a^2b^8c^6d^2k + 30a^3b^5c^8f^2i - 21222a^3b^6c^7d^2k + 1104a^4b^3c^9f^2i - 648a^4b^4c^8g^2h^2 + 82584a^4b^4c^8d^2k + 6a^4b^7c^5e^2j^2 - 864a^5b^2c^9g^2h^2 - 166464a^5
\end{aligned}$$

$$\begin{aligned}
& *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 + 1 \\
& 80*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*
\end{aligned}$$

$$\begin{aligned}
& 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
\end{aligned}$$

$$\begin{aligned}
& + 46080a^5b^{13}c^7h^2z^2 + 2304a^4b^{15}c^6h^2z^2 + 5898240a^6b^{10} \\
& *c^9g^2z^2 - 294912a^5b^{12}c^8g^2z^2 + 11206656a^7b^7c^{11}f^2z^2 \\
& + 8929280a^6b^9c^{10}f^2z^2 + 23592960a^6b^8c^{11}e^2z^2 - 2600960a^5 \\
& *b^{11}c^9f^2z^2 + 291840a^4b^{13}c^8f^2z^2 - 14080a^3b^{15}c^7f^2z^2 \\
& ^2 + 256a^2b^{17}c^6f^2z^2 - 19860480a^3b^{13}c^9d^2z^2 - 1179648a^5 \\
& *b^{10}c^{10}e^2z^2 + 1771776a^2b^{15}c^8d^2z^2 - 440401920a^{13}b^*c^{11}j \\
& ^2z^2 + 1207959552a^{10}c^{15}e^2z^2 + 134217728a^{12}c^{13}i^2z^2 + 25769 \\
& 803776a^{15}c^{10}k^2z^2 + 16384a^5b^{20}k^2z^2 + 2304b^{19}c^6d^2z^2 + \\
& 165150720a^9b^*c^{12}d*g*j*z + 23592960a^{10}b^*c^{11}g*h*j*z + 169869312a^ \\
& 7b^*c^{14}d*e*f*z + 99090432a^8b^*c^{13}d*g*h*z - 3145728a^9b^*c^{12}f*h*i*z \\
& + 56623104a^8b^*c^{13}d*f*i*z - 1536a^*b^{18}c^3d*f*k*z - 9437184a^8b^*c^ \\
& 13e*f*h*z + 1536a^*b^{15}c^6d*f*i*z - 4608a^*b^{14}c^7d*f*g*z + 9216a^*b^1 \\
& 3c^8d*e*f*z + 2173501440a^9b^5c^8d*j*k*z - 1987706880a^9b^3c^{10}d* \\
& h*k*z + 1121255424a^8b^5c^9d*h*k*z + 861143040a^8b^4c^{10}d*f*k*z - 8 \\
& 59963392a^7b^6c^9d*f*k*z - 780779520a^8b^7c^7d*j*k*z - 754974720a^ \\
& 9b^3c^{10}e*g*k*z + 2222456832a^{11}b^*c^{10}d*j*k*z - 454164480a^{11}b^3c^ \\
& 8h*j*k*z + 377487360a^8b^5c^9e*g*k*z + 290979840a^{10}b^4c^8f*j*k*z \\
& + 381026304a^6b^8c^8d*f*k*z + 412876800a^8b^2c^{12}d*e*j*z + 30198988 \\
& 8a^{10}b^2c^{10}e*i*k*z - 320421888a^7b^7c^8d*h*k*z + 185794560a^{10}b^ \\
& 5c^7h*j*k*z - 192020480a^9b^6c^7f*j*k*z + 190709760a^9b^4c^9f*h*k \\
& *z - 150994944a^{10}b^3c^9g*i*k*z + 168990720a^7b^9c^6d*j*k*z + 23592 \\
& 9600a^9b^2c^{11}d*f*k*z - 206438400a^8b^3c^{11}d*g*j*z - 206438400a^7* \\
& b^4c^{11}d*e*j*z - 101646336a^8b^6c^8f*h*k*z - 29245440a^9b^7c^6h*j \\
& *k*z - 60817408a^{11}b^2c^9f*j*k*z + 57835520a^8b^8c^6f*j*k*z + 21941 \\
& 4528a^7b^2c^{13}d*e*h*z - 70778880a^{10}b^2c^{10}f*h*k*z + 677376a^7b^1 \\
& 1c^4h*j*k*z - 645120a^8b^9c^5h*j*k*z - 53760a^6b^{13}c^3h*j*k*z + 3 \\
& 1457280a^8b^7c^7g*i*k*z - 62914560a^8b^6c^8e*i*k*z - 94371840a^7b \\
& ^7c^8e*g*k*z - 221773824a^6b^3c^{13}d*e*f*z + 82575360a^9b^2c^{11}d*i \\
& *j*z + 11796480a^{10}b^2c^{10}h*i*j*z - 11796480a^7b^9c^6g*i*k*z - 8970 \\
& 240a^7b^{10}c^5f*j*k*z + 103219200a^7b^5c^{10}d*g*j*z - 2457600a^8b^6 \\
& *c^8h*i*j*z + 1769472a^6b^{11}c^5g*i*k*z + 921600a^7b^8c^7h*i*j*z + \\
& 673792a^6b^{12}c^4f*j*k*z - 138240a^6b^{10}c^6h*i*j*z - 98304a^5b^{13} \\
& c^4g*i*k*z - 17920a^5b^{14}c^3f*j*k*z + 7680a^5b^{12}c^5h*i*j*z - 9713 \\
& 6640a^5b^{10}c^7d*f*k*z - 29491200a^9b^3c^{10}g*h*j*z + 58982400a^9b^ \\
& 2c^{11}e*h*j*z + 23592960a^7b^8c^7e*i*k*z - 22169088a^6b^{11}c^5d*j*k \\
& *z + 21381120a^7b^8c^7f*h*k*z + 14745600a^8b^5c^9g*h*j*z + 42854400 \\
& *a^6b^9c^7d*h*k*z - 109707264a^7b^3c^{12}d*g*h*z - 3686400a^7b^7c^8 \\
& *g*h*j*z - 3538944a^6b^{10}c^6e*i*k*z + 1645056a^5b^{13}c^4d*j*k*z - 89 \\
& 0880a^6b^{10}c^6f*h*k*z + 460800a^6b^9c^7g*h*j*z - 330240a^5b^{12}c^ \\
& 5f*h*k*z + 196608a^5b^{12}c^5e*i*k*z - 53760a^4b^{15}c^3d*j*k*z + 4608 \\
& 0a^4b^{14}c^4f*h*k*z - 23040a^5b^{11}c^6g*h*j*z - 1536a^3b^{16}c^3f*h \\
& *k*z - 29491200a^8b^4c^{10}e*h*j*z - 17203200a^7b^6c^9d*i*j*z + 11796 \\
& 480a^6b^9c^7e*g*k*z + 110886912a^6b^4c^{12}d*f*g*z + 7372800a^7b^6* \\
& c^9e*h*j*z + 40108032a^8b^2c^{12}d*h*i*z + 6451200a^6b^8c^8d*i*j*z + \\
& 2359296a^8b^3c^{11}f*h*i*z - 967680a^5b^{10}c^7d*i*j*z - 921600a^6b^ \\
& 8c^8e*h*j*z - 829440a^4b^{13}c^5d*h*k*z - 589824a^5b^{11}c^6e*g*k*z - \\
& 491520a^6b^7c^9f*h*i*z + 184320a^5b^9c^8f*h*i*z + 105984a^3b^{15} \\
& c^4d*h*k*z + 69120a^5b^{11}c^6d*h*k*z + 53760a^4b^{12}c^6d*i*j*z + 460 \\
& 80a^5b^{10}c^7e*h*j*z - 27648a^4b^{11}c^7f*h*i*z - 4608a^2b^{17}c^3d* \\
& h*k*z + 1536a^3b^{13}c^6f*h*i*z - 25804800a^6b^7c^9d*g*j*z - 88473600 \\
& *a^6b^4c^{12}d*e*h*z + 51609600a^6b^6c^{10}d*e*j*z - 84934656a^7b^2c^ \\
& 13d*f*g*z + 117964800a^5b^5c^{12}d*e*f*z + 15160320a^4b^{12}c^6d*f*k*z \\
& - 45613056a^7b^3c^{12}d*f*i*z + 44236800a^6b^5c^{11}d*g*h*z - 10321920 \\
& *a^6b^6c^{10}d*h*i*z + 7077888a^7b^4c^{11}d*h*i*z - 5898240a^7b^4c^{11} \\
& *f*g*h*z + 4718592a^8b^2c^{12}f*g*h*z + 3225600a^5b^9c^8d*g*j*z + 294 \\
& 9120a^6b^6c^{10}f*g*h*z + 2396160a^5b^8c^9d*h*i*z - 1428480a^3b^{14} \\
& c^5d*f*k*z - 737280a^5b^8c^9f*g*h*z - 161280a^4b^{11}c^7d*g*j*z + 92 \\
& 160a^4b^{10}c^8f*g*h*z + 73728a^2b^{16}c^4d*f*k*z - 50688a^3b^{12}c^7* \\
& d*h*i*z - 27648a^4b^{10}c^8d*h*i*z - 4608a^3b^{12}c^7f*g*h*z + 4608a^2
\end{aligned}$$

$$\begin{aligned}
& *b^{14}c^6d^*h^*i^*z - 58982400*a^5b^6c^{11}d^*f^*g^*z + 11796480*a^7b^3c^{12}e \\
& *f^*h^*z + 8847360*a^5b^7c^{10}d^*f^*i^*z - 6635520*a^5b^7c^{10}d^*g^*h^*z - 6451 \\
& 200*a^5b^8c^9d^*e^*j^*z - 5898240*a^6b^5c^{11}e^*f^*h^*z - 3809280*a^4b^9c^ \\
& 9d^*f^*i^*z + 2359296*a^6b^5c^{11}d^*f^*i^*z + 1474560*a^5b^7c^{10}e^*f^*h^*z + 6 \\
& 81984*a^3b^{11}c^8d^*f^*i^*z + 322560*a^4b^{10}c^8d^*e^*j^*z - 276480*a^4b^9c^ \\
& 9d^*g^*h^*z - 184320*a^4b^9c^9e^*f^*h^*z + 179712*a^3b^{11}c^8d^*g^*h^*z - 552 \\
& 96*a^2b^{13}c^7d^*f^*i^*z - 13824*a^2b^{13}c^7d^*g^*h^*z + 9216*a^3b^{11}c^8e^* \\
& f^*h^*z + 16220160*a^4b^8c^{10}d^*f^*g^*z + 13271040*a^5b^6c^{11}d^*e^*h^*z - 239 \\
& 6160*a^3b^{10}c^9d^*f^*g^*z + 552960*a^4b^8c^{10}d^*e^*h^*z - 359424*a^3b^{10}c^ \\
& 9d^*e^*h^*z + 175104*a^2b^{12}c^8d^*f^*g^*z + 27648*a^2b^{12}c^8d^*e^*h^*z - 324 \\
& 40320*a^4b^7c^{11}d^*e^*f^*z + 4792320*a^3b^9c^{10}d^*e^*f^*z - 350208*a^2b^{11} \\
& *c^9d^*e^*f^*z + 1439170560*a^{10}b^c^{11}d^*h^*k^*z - 3361603584*a^{10}b^3c^9d^*j \\
& *k^*z + 603979776*a^{10}b^c^{11}e^*g^*k^*z + 407371776*a^{12}b^c^9h^*j^*k^*z + 20132 \\
& 6592*a^{11}b^c^{10}g^*i^*k^*z + 346816512*a^7b^c^{14}d^2g^*z + 129761280*a^{11}b^c \\
& ^{10}h^2k^*z + 121896960*a^{10}b^c^{11}f^2k^*z + 458752*a^6b^{15}c^i^*k^2z + \\
& 19660800*a^{11}b^c^{10}g^*j^2z + 49152*a^5b^{16}c^*g^*k^2z + 7077888*a^9b^c^1 \\
& 2g^*h^2z + 94464*a*b^{17}c^4d^2k^*z - 19660800*a^8b^c^{13}f^2g^*z - 66816* \\
& a*b^{14}c^7d^2i^*z + 214272*a*b^{13}c^8d^2g^*z - 428544*a*b^{12}c^9d^2e^*z \\
& + 2390753280*a^{11}b^4c^7g^*k^2z - 2411421696*a^6b^7c^9d^2k^*z - 660307 \\
& 9680*a^8b^3c^{11}d^2k^*z + 3715891200*a^9b^c^{12}d^2k^*z - 880803840*a^{10}c \\
& ^{12}d^*f^*k^*z - 1623195648*a^{10}b^6c^6g^*k^2z - 402653184*a^{11}c^{11}e^*i^*k^* \\
& z - 1509949440*a^{12}b^2c^8g^*k^2z - 209715200*a^{12}c^{10}f^*j^*k^*z - 3303014 \\
& 40*a^9c^{13}d^*e^*j^*z + 3019898880*a^{12}b^c^9e^*k^2z - 125829120*a^{11}c^{11}f \\
& *h^*k^*z - 110100480*a^{10}c^{12}d^*i^*j^*z - 198180864*a^8c^{14}d^*e^*h^*z - 1572864 \\
& 0*a^{11}c^{11}h^*i^*j^*z - 1226833920*a^9b^7c^6e^*k^2z - 47185920*a^{10}c^{12}e \\
& *h^*j^*z - 66060288*a^9c^{13}d^*h^*i^*z - 1090519040*a^{12}b^3c^7i^*k^2z + 1022 \\
& 754816*a^6b^2c^{14}d^2e^*z + 5216108544*a^7b^5c^{10}d^2k^*z + 754974720*a \\
& ^9b^2c^{11}e^2k^*z + 721529856*a^5b^9c^8d^2k^*z + 613416960*a^9b^8c^5 \\
& *g^*k^2z - 642318336*a^5b^4c^{13}d^2e^*z - 4781506560*a^{11}b^3c^8e^*k^2z \\
& - 398131200*a^{12}b^3c^7j^2k^*z - 511377408*a^6b^3c^{13}d^2g^*z - 377487 \\
& 360*a^8b^4c^{10}e^2k^*z + 285212672*a^{11}b^5c^6i^*k^2z + 199065600*a^{11}b \\
& ^5c^6j^2k^*z + 279183360*a^8b^9c^5e^*k^2z + 321159168*a^5b^5c^{12}d^ \\
& 2g^*z + 188743680*a^9b^4c^9g^2k^*z + 132120576*a^{10}b^7c^5i^*k^2z - 15 \\
& 0994944*a^{10}b^2c^{10}g^2k^*z - 111411200*a^9b^9c^4i^*k^2z - 126812160*a \\
& ^{10}b^3c^9h^2k^*z + 225312768*a^7b^2c^{13}d^2i^*z - 139591680*a^8b^{10}c \\
& ^4g^*k^2z - 49766400*a^{10}b^7c^5j^2k^*z - 145463040*a^4b^{11}c^7d^2k^*z \\
& - 94371840*a^8b^6c^8g^2k^*z + 223395840*a^4b^6c^{12}d^2e^*z + 33751040 \\
& *a^8b^{11}c^3i^*k^2z - 78970880*a^9b^3c^{10}f^2k^*z + 94371840*a^7b^6c^ \\
& 9e^2k^*z + 25165824*a^{10}b^4c^8i^2k^*z + 6220800*a^9b^9c^4j^2k^*z + 3 \\
& 9223296*a^9b^5c^8h^2k^*z - 311040*a^8b^{11}c^3j^2k^*z + 16777216*a^{11}b \\
& ^2c^9i^2k^*z - 10485760*a^9b^6c^7i^2k^*z - 5406720*a^7b^{13}c^2i^*k^2z \\
& + 1376256*a^7b^{10}c^5i^2k^*z - 1310720*a^8b^8c^6i^2k^*z - 262144*a^6 \\
& *b^{12}c^4i^2k^*z + 16384*a^5b^{14}c^3i^2k^*z + 10354688*a^{11}b^2c^9i^*j^ \\
& 2z + 23592960*a^7b^8c^7g^2k^*z + 38559744*a^7b^7c^8f^2k^*z + 1916928 \\
& 0*a^7b^{12}c^3g^*k^2z - 2048000*a^9b^6c^7i^*j^2z - 1520640*a^7b^9c^6* \\
& h^2k^*z - 1105920*a^8b^7c^7h^2k^*z + 849920*a^8b^8c^6i^*j^2z - 393216 \\
& *a^{10}b^4c^8i^*j^2z + 195840*a^6b^{11}c^5h^2k^*z - 145920*a^7b^{10}c^5i \\
& *j^2z + 11520*a^5b^{13}c^4h^2k^*z + 11008*a^6b^{12}c^4i^*j^2z - 2304*a^4 \\
& *b^{15}c^3h^2k^*z - 256*a^5b^{14}c^3i^*j^2z - 25362432*a^{10}b^3c^9g^*j^2z \\
& z - 24739840*a^8b^5c^9f^2k^*z - 38338560*a^7b^{11}c^4e^*k^2z - 2949120* \\
& a^6b^{10}c^6g^2k^*z - 1474560*a^6b^{14}c^2g^*k^2z + 50724864*a^{10}b^2c^1 \\
& 0e^*j^2z + 147456*a^5b^{12}c^5g^2k^*z - 15150080*a^6b^9c^7f^2k^*z + 13 \\
& 271040*a^9b^5c^8g^*j^2z - 111697920*a^4b^7c^{11}d^2g^*z - 3563520*a^8b \\
& ^7c^7g^*j^2z + 3538944*a^9b^2c^{11}h^2i^*z + 2912000*a^5b^{11}c^6f^2k^* \\
& z - 737280*a^7b^6c^9h^2i^*z + 506880*a^7b^9c^6g^*j^2z - 291840*a^4b^ \\
& 13c^5f^2k^*z + 276480*a^6b^8c^8h^2i^*z - 41472*a^5b^{10}c^7h^2i^*z - \\
& 34560*a^6b^{11}c^5g^*j^2z + 14080*a^3b^{15}c^4f^2k^*z + 2304*a^4b^{12}c^6 \\
& *h^2i^*z + 768*a^5b^{13}c^4g^*j^2z - 256*a^2b^{17}c^3f^2k^*z - 11796480*a \\
& ^6b^8c^8e^2k^*z - 26542080*a^9b^4c^9e^*j^2z + 19837440*a^3b^{13}c^6d
\end{aligned}$$

$$\begin{aligned}
& ^2k^*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}* \\
& ^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^
\end{aligned}$$

$$\begin{aligned}
& 4c^8fg^hk - 7077888a^6b^6c^7eg^ik + 6935040a^6b^6c^7d^hik - \\
& 6709248a^8b^2c^9fg^hk - 3612672a^7b^4c^8d^hik + 2801664a^7b^3c^9e^hij + 2506752a^7b^3c^9fg^ij + 2419200a^6b^6c^7fg^hk - \\
& 1661184a^5b^9c^5d^gjk + 1483776a^6b^7c^6ef^jk - 1463040a^5b^8c^6d^hik + 884736a^5b^8c^6eg^ik + 838656a^6b^5c^8fg^ij + 5 \\
& 06880a^6b^5c^8e^hij + 80640a^4b^11c^4d^gjk - 53760a^5b^9c^5ef^jk - 53760a^5b^7c^7fg^ij - 46080a^4b^10c^5fg^hk - 34560a^5b^8c^6fg^hk + 25344a^3b^12c^4d^hik - 23040a^5b^7c^7e^hij \\
& + 13824a^4b^10c^5d^hik + 2304a^3b^12c^4fg^hk - 2304a^2b^14c^3d^hik - 29030400a^6b^5c^8d^g^hk + 28606464a^7b^3c^9d^fik - 2 \\
& 8445184a^6b^6c^7d^e^jk + 58060800a^6b^4c^9d^e^hk + 15482880a^7b^3c^9ef^hk - 8183808a^7b^2c^10d^g^ij - 6718464a^6b^5c^8d^fik - \\
& 5087232a^7b^2c^10e^g^hj - 5013504a^7b^2c^10ef^ij - 4838400a^6b^5c^8ef^hk + 4112640a^5b^7c^7d^g^hk - 3663360a^5b^7c^7d^fik \\
& + 3322368a^5b^8c^6d^e^jk - 2285568a^6b^4c^9d^g^ij + 1896960a^4b^9c^6d^fik + 1843200a^6b^3c^10fg^hi - 1677312a^6b^4c^9ef^ij - 1658880a^6b^4c^9e^g^hj + 68345856a^6b^3c^10d^ef^k + 783360a^5b^5c^9fg^hi + 741888a^5b^6c^8d^g^ij - 34172928a^6b^4c^9d^fg^k - 340992a^3b^11c^5d^fik - 161280a^4b^10c^5d^e^jk + 138240a^4b^9c^6d^g^hk + 107520a^5b^6c^8ef^ij + 92160a^4b^9c^6ef^hk - 89856a^3b^11c^5d^g^hk - 80640a^4b^8c^7d^g^ij + 69120a^5b^7c^7ef^hk + 69120a^5b^6c^8e^g^hj + 27648a^2b^13c^4d^fik + 18432a^4b^7c^8fg^hi + 6912a^2b^13c^4d^g^hk - 4608a^3b^11c^5ef^hk - 2304a^3b^9c^7fg^hi + 27164160a^5b^6c^8d^fg^k - 22164480a^6b^3c^10d^fik - 54328320a^5b^5c^9d^ef^k - 17473536a^7b^2c^10d^fg^k - 8225280a^5b^6c^8d^e^hk - 8087040a^4b^8c^7d^fg^k + 5677056a^6b^3c^10ef^g^j - 5529600a^6b^2c^11d^g^hi + 4571136a^6b^3c^10d^e^ij - 3686400a^6b^2c^11ef^hi + 2805120a^5b^5c^9d^fik - 2211840a^5b^4c^10d^g^hi - 1566720a^5b^4c^10ef^hi - 1483776a^5b^5c^9d^e^ij + 1198080a^3b^10c^6d^fg^k + 437184a^4b^7c^8d^fik - 322560a^5b^5c^9ef^g^j + 317952a^4b^6c^9d^g^hi - 276480a^4b^8c^7d^e^hk + 179712a^3b^10c^6d^e^hk + 161280a^4b^7c^8d^e^ij - 146268a^3b^9c^7d^fik - 87552a^2b^12c^5d^fg^k - 36864a^4b^6c^9ef^hi - 13824a^2b^12c^5d^e^hk + 9360a^2b^11c^6d^fik + 6912a^3b^8c^8d^g^hi - 6912a^2b^10c^7d^g^hi + 4608a^3b^8c^8ef^hi - 24551424a^6b^2c^11d^e^g^j + 16174080a^4b^7c^8d^ef^k + 5419008a^5b^4c^10d^e^g^j + 5160960a^5b^3c^11d^fik + 4423680a^5b^3c^11ef^gh + 4423680a^5b^3c^11d^e^hi - 2396160a^3b^9c^7d^ef^k - 635904a^4b^5c^10d^e^hi - 483840a^4b^6c^9d^e^g^j - 354816a^3b^7c^9d^fik + 322560a^4b^5c^10d^fik + 175104a^2b^11c^6d^ef^k + 138240a^4b^5c^10ef^gh + 59904a^2b^9c^8d^fg^i - 13824a^3b^7c^9ef^gh - 13824a^3b^7c^9d^e^hi + 13824a^2b^9c^8d^e^hi - 16588800a^5b^2c^12d^e^gh - 10321920a^5b^2c^12d^ef^i + 1658880a^4b^4c^11d^e^gh + 709632a^3b^6c^10d^ef^i - 645120a^4b^4c^11d^ef^i + 124416a^3b^6c^10d^e^gh - 119808a^2b^8c^9d^ef^i - 41472a^2b^8c^9d^e^gh + 7741440a^4b^3c^12d^ef^g - 2903040a^3b^5c^11d^ef^g + 387072a^2b^7c^10d^ef^g - 381026304a^11b^c^7d^jk^2 - 241827840a^10b^c^8d^hk^2 - 65667072a^12b^c^6h^jk^2 - 169344a^7b^11c^h^jk^2 - 25165824a^11b^c^7g^ik^2 - 4915200a^11b^c^7g^j^2k - 53084160a^8b^c^10e^2ik - 75497472a^10b^c^8e^g^k^2 - 86704128a^7b^c^11d^2g^k + 565248a^9b^c^9h^i^2j - 168448a^6b^12c^f^jk^2 - 24576a^5b^13c^g^ik^2 - 1769472a^9b^c^9g^h^2k - 17694720a^9b^c^9e^i^2k - 411264a^5b^13c^d^jk^2 - 11520a^4b^14c^f^hk^2 + 4915200a^8b^c^10f^2g^k + 2580480a^9b^c^9e^i^j^2 - 2496000a^9b^c^9f^h^j^2 - 1543680a^8b^c^10f^h^2j + 33408a^b^14c^4d^2ik - 59512320a^6b^c^12d^2f^j + 5087232a^7b^c^11e^2h^j + 2727936a^8b^c^10d^i^2j - 26496a^3b^15c^d^hk^2 + 1105920a^7b^c^11e^h^2i - 107136a^b^13c^5d^2g^k + 10260a^b^12c^6d^2h^j - 10616832a^6b^c^12e^2g^i - 3538944a^7b^c^11e^g^i^2 + 1843200a^7b^c^11d^hi^2 - 18432a^2b^16c^d^fk^2 - 15552000a^8b^c^10d^fj^2 + 24551424a^6b^c^
\end{aligned}$$

$$\begin{aligned}
& 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*
\end{aligned}$$

$$\begin{aligned}
& e^{i \cdot 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^2 h^2 j - 959040 a^7 b^5 c^7 f^2 h^2 j + 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^2 h^2 j + 41280 a^5 b^6 c^8 f^2 h^2 j \\
& - 37188 a^4 b^8 c^7 f^2 h^2 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^2 h^2 j - 6912 a^4 b^{10} c^5 e^* h^2 k \\
& + 5490 a^4 b^9 c^6 f^2 h^2 j - 3456 a^4 b^8 c^7 g^* h^2 i + 1980 a^3 b^{10} c^6 f^2 h^2 j + 810 a^5 b^9 c^5 f^2 h^2 j \\
& + 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^2 h^2 j \\
& - 180 a^3 b^{11} c^5 f^2 h^2 j - 30 a^2 b^{12} c^5 f^2 h^2 j + 6 a^3 b^{13} c^3 f^2 h^2 j \\
& + 30067200 a^6 b^2 c^{11} d^2 h^2 j + 13271040 a^6 b^5 c^8 e^* g^2 k - 10857600 a^6 b^9 c^4 d^2 h^2 k^2 \\
& + 2949120 a^6 b^9 c^4 e^* g^2 k^2 + 2654208 a^5 b^6 c^8 e^2 g^* k + 2125824 a^7 b^3 c^9 d^2 i^2 j \\
& + 1658880 a^6 b^3 c^{10} e^2 h^2 j - 1419264 a^6 b^4 c^9 f^2 g^2 j - 1327104 a^5 b^7 c^7 e^* g^2 k \\
& - 921600 a^7 b^2 c^{10} f^2 g^2 j - 737280 a^7 b^2 c^{10} f^2 h^2 i^2 - 568320 a^6 b^4 c^9 f^2 h^2 i^2 \\
& + 207360 a^4 b^{13} c^2 d^2 h^2 k^2 - 147456 a^5 b^{11} c^3 e^* g^2 k^2 - 136704 a^5 b^6 c^8 f^2 h^2 i^2 \\
& + 133632 a^6 b^5 c^8 d^2 i^2 j - 96768 a^5 b^7 c^7 d^2 i^2 j + 80640 a^5 b^6 c^8 f^2 g^2 j \\
& - 69120 a^5 b^5 c^9 e^2 h^2 j + 13440 a^4 b^9 c^6 d^2 i^2 j - 5760 a^5 b^{11} c^3 d^2 h^2 k^2 \\
& - 2304 a^4 b^8 c^7 f^2 h^2 i^2 + 384 a^3 b^{10} c^6 f^2 h^2 i^2 + 11930112 a^8 b^2 c^9 d^2 h^2 j^2 \\
& - 11646720 a^3 b^9 c^7 d^2 g^* k + 8432640 a^7 b^2 c^{10} d^2 h^2 j + 24140160 a^5 b^{10} c^4 d^2 f^2 k^2 \\
& - 6672384 a^7 b^2 c^{10} e^2 f^2 k + 4450176 a^7 b^4 c^8 d^2 h^2 j^2 + 4337280 a^6 b^4 c^9 d^2 h^2 j \\
& - 3870720 a^8 b^2 c^9 e^* g^2 j^2 - 3409920 a^6 b^4 c^9 e^2 f^2 k - 2885760 a^5 b^4 c^{10} d^2 h^2 j \\
& - 2844288 a^4 b^6 c^9 d^2 h^2 j + 2615040 a^5 b^6 c^8 e^2 f^2 k - 1687680 a^6 b^6 c^7 d^2 h^2 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^2 h^2 i \\
& + 1019412 a^3 b^8 c^8 d^2 h^2 j - 1007424 a^5 b^6 c^8 d^2 h^2 j - 860160 a^5 b^4 c^{10} f^2 g^* i \\
& - 645120 a^7 b^4 c^8 e^* g^2 j^2 - 506880 a^4 b^8 c^7 e^2 f^2 k + 290304 a^5 b^5 c^9 e^2 h^2 i \\
& + 197460 a^5 b^8 c^6 d^2 h^2 j^2 - 143802 a^2 b^{10} c^7 d^2 h^2 j + 80640 a^6 b^6 c^7 e^* g^2 j^2 \\
& - 80640 a^4 b^6 c^9 f^2 g^* i + 51948 a^4 b^8 c^7 d^2 h^2 j + 34560 a^3 b^{10} c^6 e^2 f^2 k \\
& + 12672 a^3 b^8 c^8 f^2 g^* i + 10800 a^3 b^{10} c^6 d^2 h^2 j + 6912 a^4 b^7 c^8 e^* h^2 i \\
& - 2304 a^5 b^8 c^6 e^* g^2 j^2 - 768 a^2 b^{12} c^5 e^2 f^2 k - 684 a^3 b^{12} c^4 d^2 h^2 j^2 \\
& - 540 a^2 b^{12} c^5 d^2 h^2 j - 384 a^2 b^{10} c^7 f^2 g^* i - 90 a^4 b^{10} c^5 d^2 h^2 j^2 \\
& + 18 a^2 b^{14} c^3 d^2 h^2 j^2 + 23385600 a^6 b^2 c^{11} d^2 f^2 j + 23293440 a^3 b^8 c^8 d^2 e^* k \\
& + 6137856 a^6 b^3 c^{10} d^2 g^2 j - 5677056 a^6 b^2 c^{11} e^2 f^2 j + 5308416 a^6 b^2 c^{11} e^2 g^2 i \\
& - 5308416 a^5 b^3 c^{11} e^2 g^2 i - 3786240 a^4 b^{12} c^3 d^2 f^2 k^2 - 3538944 a^6 b^3 c^{10} e^2 g^2 i^2 \\
& + 2654208 a^5 b^4 c^{10} e^2 g^2 i + 1658880 a^6 b^3 c^{10} d^2 h^2 i^2 - 1354752 a^5 b^5 c^9 d^2 g^2 j \\
& - 1105920 a^5 b^4 c^{10} f^2 g^2 h - 884736 a^5 b^5 c^9 e^2 g^2 i^2 - 552960 a^6 b^2 c^{11} f^2 g^2 h \\
& + 357120 a^3 b^{14} c^2 d^2 f^2 k^2 + 322560 a^5 b^4 c^{10} e^2 f^2 j + 262656 a^5 b^5 c^9 d^2 h^2 i^2 \\
& + 120960 a^4 b^7 c^8 d^2 g^2 j - 55296 a^4 b^7 c^8 d^2 h^2 i^2 - 34560 a^4 b^6 c^9 f^2 g^2 h \\
& + 3456 a^3 b^8 c^8 f^2 g^2 h + 1152 a^3 b^9 c^7 d^2 h^2 i^2 + 1152 a^2 b^{11} c^6 d^2 h^2 i^2 \\
& - 13149696 a^7 b^3 c^9 d^2 f^2 j^2 - 11612160 a^5 b^2 c^{12} d^2 g^* i + 10906560 a^4 b^5 c^{10} d^2 f^2 j \\
& - 7418880 a^5 b^3 c^{11} d^2 f^2 j + 3148992 a^6 b^5 c^8 d^2 f^2 j^2 - 2985696 a^3 b^7 c^9 d^2 f^2 j \\
& - 2965248 a^2 b^{10} c^7 d^2 e^* k + 1720320 a^5 b^3 c^{11} e^2 f^2 i - 1658880 a^6 b^2 c^{11} e^2 g^* h^2 \\
& + 1596672 a^3 b^6 c^{10} d^2 g^* i - 1505280 a^4 b^6 c^9 d^2 f^2 j - 829440 a^5 b^4 c^{10} e^2 g^* h^2 \\
& - 508032 a^2 b^8 c^9 d^2 g^* i + 378954 a^2 b^9 c^8 d^2 f^2 j + 362880 a^5 b^4 c^{10} d^2 f^2 j \\
& + 296964 a^3 b^8 c^8 d^2 f^2 j + 161280 a^4 b^5 c^{10} e^2 f^2 i - 77070 a^4 b^9 c^6 d^2 f^2 j^2 \\
& - 30240 a^5 b^7 c^7 d^2 f^2 j^2 - 25344 a^3 b^7 c^9 e^2 f^2 i - 20736 a^4 b^6 c^9 e^2 g^* h^2 \\
& - 19278 a^2 b^{10} c^7 d^2 f^2 j + 8820 a^3 b^{11} c^5 d^2 f^2 j^2 + 768 a^2 b^9 c^8 e^2 f^2 i \\
& - 378 a^2 b^{13} c^4 d^2 f^2 j^2 - 5419008 a^5 b^3 c^{11} d^2 e^2 j - 4423680 a^5 b^2 c^{12} e^2 f^* h \\
& + 4147200 a^5 b^3 c^{11} d^2 g^2 h - 2580480 a^6 b^2 c^{11} d^2 f^2 i^2 - 967680 a^5 b^4 c^{10} d^2 f^2 i^2 \\
& + 483840 a^4 b^5 c^{10} d^2 e^2 j - 414720 a^4 b^5 c^{10} d^2 g^2 h - 138240 a^4 b^4 c^{11} e^2 f^2 h \\
& + 64512 a^4 b^6 c^9 d^2 f^2 i^2 + 39168 a^3 b^8 c^8 d^2 f^2 i^2 - 31104 a^3 b^7 c^9 d^2 g^2 h \\
& + 13824 a^3 b^6 c^{10} e^2 f^2 h + 1
\end{aligned}$$

$0368a^2b^9c^8d^2g^2h - 9216a^2b^{10}c^7d^2fi^2 + 15630336a^5b^2c^{11}d^2f^2h - 14459904a^4b^3c^{12}d^2f^2h + 9630144a^3b^5c^{11}d^2f^2h - 8764416a^5b^3c^{11}d^2f^2h^2 - 3870720a^5b^2c^{12}e^2f^2g - 3193344a^3b^5c^{11}d^2e^2i + 2867328a^4b^4c^{11}d^2f^2h - 2095200a^2b^7c^{10}d^2f^2h - 1414080a^3b^6c^{10}d^2f^2h - 34836480a^4b^2c^{13}d^2e^2g + 1016064a^2b^7c^{10}d^2e^2i - 645120a^4b^4c^{11}e^2f^2g + 306720a^3b^7c^9d^2f^2h^2 + 197820a^2b^8c^9d^2f^2h + 146880a^4b^5c^{10}d^2f^2h^2 + 80640a^3b^6c^{10}e^2f^2g - 55350a^2b^9c^8d^2f^2h^2 - 2304a^2b^8c^9e^2f^2g - 3870720a^5b^2c^{12}d^2f^2g^2 - 1935360a^4b^4c^{11}d^2f^2g^2 - 1658880a^4b^3c^{12}d^2e^2h + 725760a^3b^6c^{10}d^2f^2g^2 + 17418240a^3b^4c^{12}d^2e^2g - 124416a^3b^5c^{11}d^2e^2h - 96768a^2b^8c^9d^2f^2g^2 + 41472a^2b^7c^{10}d^2e^2h - 3919104a^2b^6c^{11}d^2e^2g - 7741440a^4b^2c^{13}d^2e^2f + 2903040a^3b^4c^{12}d^2e^2f - 387072a^2b^6c^{11}d^2e^2f - 681246720a^9b^3c^9d^2k^2 + 265912320a^{11}b^3c^5e^2k^3 + 188743680a^{12}b^2c^5g^2k^3 - 132956160a^{11}b^4c^4g^2k^3 - 52101120a^{13}b^3c^5j^2k^2 + 25722880a^{12}b^3c^4i^2k^3 + 19644416a^{11}b^5c^3i^2k^3 - 1583680a^9b^9c^2j^2k^2 - 9142272a^{10}b^7c^2i^2k^3 - 74022912a^{10}b^5c^4e^2k^3 - 20643840a^{11}b^3c^7h^2k^2 + 37011456a^{10}b^6c^3g^2k^3 - 2293760a^9b^3c^7i^3k - 557056a^8b^5c^6i^3k + 147456a^7b^7c^5i^3k - 65536a^6b^{12}c^2i^2k^2 + 32768a^6b^9c^4i^3k - 8192a^5b^{11}c^3i^3k + 430080a^{10}b^3c^8i^2j^2 - 2880a^5b^{13}c^8h^2k^2 + 6635520a^7b^4c^8g^3k - 4792320a^9b^8c^2g^2k^3 - 2211840a^6b^6c^7g^3k + 1359360a^{10}b^2c^7h^2j^3 + 1173120a^9b^4c^6h^2j^3 + 743040a^7b^4c^8h^3j + 622080a^8b^2c^9h^3j + 221184a^5b^8c^6g^3k + 107136a^6b^6c^7h^3j - 32640a^8b^6c^5h^2j^3 - 5796a^7b^8c^4h^2j^3 + 540a^5b^8c^6h^3j - 270a^4b^{10}c^5h^3j + 210a^6b^{10}c^3h^2j^3 - 2949120a^{10}b^3c^8f^2k^2 + 17694720a^6b^3c^{10}e^3k + 184320a^8b^3c^{10}h^2i^2 - 3520a^3b^{15}c^2f^2k^2 + 9584640a^9b^7c^3e^2k^3 - 2293760a^9b^3c^7f^2j^3 - 2293760a^6b^3c^{10}f^3j - 1769472a^5b^5c^9e^3k - 884736a^6b^3c^{10}g^3i - 589824a^7b^3c^9g^2i^3 - 491520a^8b^9c^2e^2k^3 - 442368a^5b^5c^9g^3i - 294912a^6b^5c^8g^2i^3 - 199360a^8b^5c^6f^2j^3 - 199360a^5b^5c^9f^3j + 61920a^7b^7c^5f^2j^3 + 61920a^4b^7c^8f^3j - 49152a^5b^7c^7g^2i^3 - 3682a^6b^9c^4f^2j^3 - 3682a^3b^9c^7f^3j + 70a^5b^{11}c^3f^2j^3 + 70a^2b^{11}c^6f^3j + 3870720a^8b^3c^{10}e^2j^2 + 430080a^7b^3c^{11}f^2i^2 - 14152320a^4b^4c^{11}d^3j + 10644480a^5b^2c^{12}d^3j + 5483520a^9b^2c^8d^2j^3 + 4269888a^3b^6c^{10}d^3j + 3538944a^5b^2c^{12}e^3i - 1648128a^5b^3c^{11}f^3h + 1330560a^8b^4c^7d^2j^3 + 1179648a^7b^2c^{10}e^2i^3 - 898560a^6b^3c^{10}f^2h^3 - 826560a^7b^6c^6d^2j^3 - 607068a^2b^8c^9d^3j + 589824a^6b^4c^9e^2i^3 - 354240a^5b^5c^9f^2h^3 - 354240a^4b^5c^{10}f^3h + 145188a^6b^8c^5d^2j^3 + 98304a^5b^6c^8e^2i^3 + 43680a^3b^7c^9f^3h - 21600a^4b^7c^8f^2h^3 - 9576a^5b^{10}c^4d^2j^3 + 1350a^3b^9c^7f^2h^3 - 1050a^2b^9c^8f^3h - 504a^4b^{14}c^4d^2j^2 + 210a^4b^{12}c^3d^2j^3 + 3870720a^6b^3c^{12}d^2i^2 + 1658880a^6b^3c^{12}e^2h^2 - 9792a^4b^{11}c^7d^2i^2 + 16547328a^4b^2c^{13}d^3h - 12306816a^3b^4c^{12}d^3h + 37310976a^3b^3c^{13}d^3f + 3037824a^2b^6c^{11}d^3h - 2654208a^5b^3c^{11}e^2g^3 + 1949184a^6b^2c^{11}d^2h^3 + 1296000a^5b^4c^{10}d^2h^3 - 155520a^4b^6c^9d^2h^3 - 40500a^4b^{10}c^8d^2h^2 - 8100a^3b^8c^8d^2h^3 + 4050a^2b^{10}c^7d^2h^3 + 3870720a^5b^3c^{13}e^2f^2 + 34836480a^4b^3c^{14}d^2e^2 - 108864a^4b^9c^9d^2g^2 - 8068032a^2b^5c^{12}d^3f - 5623296a^4b^3c^{12}d^2f^3 + 1737792a^3b^5c^{11}d^2f^3 - 260190a^4b^8c^{10}d^2f^2 - 211680a^2b^7c^{10}d^2f^3 - 435456a^4b^7c^{11}d^2e^2 - 377487360a^{12}b^3c^6e^2k^3 + 1434977280a^8b^3c^8d^2k^2 + 173408256a^7c^{12}d^2e^2k + 3276800a^{12}c^7i^2j^2k - 125829120a^{13}b^3c^5i^2k^3 + 26214400a^{12}c^7f^2j^2k^2 + 1179648a^{10}c^9h^2i^2k + 13440a^6b^{13}h^2j^2k^2 + 50331648a^{11}c^8e^2i^2k^2 + 110100480a^{10}c^9d^2f^2k^2 + 57802752a^8c^{11}d^2i^2k + 9830400a^{11}c^8e^2j^2k - 3276800a^9c^{10}f^2i^2k + 4480a^5b^{14}f^2j^2k^2 + 15728640a^{11}c^8f^2h^2k^2 - 409600a^9c^{10}f^2i^2j - 1152b^{16}c^3d^2i^2k - 1220516352a^7b^5c^7d^2k^2 + 3538944a^9c^{10}e^2h^2k + 384000a^8c^{11}f^2h^2j + 13440a^4b^{15}d^2j^2k^2 + 384$

$$\begin{aligned}
& 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 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 a b^8 c^{10} d^3 h \\
& - 4262400 a^5 b c^{13} d f^3 + 852768 a a b^7 c^{11} d^3 f + 7350 a 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 \\
& 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 \\
& 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 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
\end{aligned}$$

```

*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

```


*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

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

$$\int (a + bx^2 + cx^4)^3 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(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] IntegrateAlgebraic[(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]

fricas [A] time = 1.45, size = 463, normalized size = 1.11

.....

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

.....

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^15 + 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

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((c*x^4+b*x^2+a)^3*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6), x)$

[Out] $\frac{1}{19}c^4fx^{19} + \frac{1}{18}c^4eex^{18} + \frac{1}{17}(3b^3c^3f + c^3(bf + cd))x^{17} + \frac{1}{4}b^3c^3eex^{16} + \frac{1}{15}((a^2c^2 + 2b^2c + (2ac + b^2)c)cf + 3b^2c^2(bf + cd) + c^3(a^2f + b^2d))x^{15} + \frac{1}{14}((a^2c^2 + 2b^2c + (2ac + b^2)c)ce + 3b^2c^2e + a^2c^3e)x^{14} + \frac{1}{13}((4ab^2c + (2ac + b^2)b)cf + (a^2c^2 + 2b^2c + (2ac + b^2)c)(bf + cd) + 3b^2c^2(a^2f + b^2d) + a^2c^3d)x^{13} + \frac{1}{12}((4ab^2c + (2ac + b^2)b)ce + (a^2c^2 + 2b^2c + (2ac + b^2)c)b^2e + 3a^2b^2c^2e)x^{12} + \frac{1}{11}((a^2c^2 + 2ab^2 + (2ac + b^2)a)cf + (4ab^2c + (2ac + b^2)b)(bf + cd) + (a^2c^2 + 2b^2c + (2ac + b^2)c)(a^2f + b^2d) + 3d^2ab^2c^2)x^{11} + \frac{1}{10}((a^2c^2 + 2ab^2 + (2ac + b^2)a)ce + (4ab^2c + (2ac + b^2)b)b^2e + (a^2c^2 + 2b^2c + (2ac + b^2)c)a^2e)x^{10} + \frac{1}{9}(3a^2b^2c^2f + (a^2c^2 + 2ab^2 + (2ac + b^2)a)(bf + cd) + (4ab^2c + (2ac + b^2)b)(a^2f + b^2d) + (a^2c^2 + 2b^2c + (2ac + b^2)c)a^2d)x^9 + \frac{1}{8}(3a^2b^2c^2e + (a^2c^2 + 2ab^2 + (2ac + b^2)a)b^2e + (4ab^2c + (2ac + b^2)b)a^2e)x^8 + \frac{1}{7}(a^3c^2f + 3a^2b^2(bf + cd) + (a^2c^2 + 2ab^2 + (2ac + b^2)a)(a^2f + b^2d) + (4ab^2c + (2ac + b^2)b)a^2d)x^7 + \frac{1}{6}(a^3c^2e + 3a^2b^2e + (a^2c^2 + 2ab^2 + (2ac + b^2)a)a^2e)x^6 + \frac{1}{5}(a^3(bf + cd) + 3a^2b^2(a^2f + b^2d) + (a^2c^2 + 2ab^2 + (2ac + b^2)a)a^2d)x^5 + a^3b^2eex^4 + \frac{1}{3}(a^3(a^2f + b^2d) + 3a^3b^2d)x^3 + \frac{1}{2}a^4eex^2 + a^4d^2x$

maxima [A] time = 0.52, size = 418, normalized size = 1.00

$\frac{1}{19}c^4fx^{19} + \frac{1}{18}c^4eex^{18} + \frac{1}{17}(3b^3c^3f + c^3(bf + cd))x^{17} + \frac{1}{4}b^3c^3eex^{16} + \frac{1}{15}((a^2c^2 + 2b^2c + (2ac + b^2)c)cf + 3b^2c^2(bf + cd) + c^3(a^2f + b^2d))x^{15} + \frac{1}{14}((a^2c^2 + 2b^2c + (2ac + b^2)c)ce + 3b^2c^2e + a^2c^3e)x^{14} + \frac{1}{13}((4ab^2c + (2ac + b^2)b)cf + (a^2c^2 + 2b^2c + (2ac + b^2)c)(bf + cd) + 3b^2c^2(a^2f + b^2d) + a^2c^3d)x^{13} + \frac{1}{12}((4ab^2c + (2ac + b^2)b)ce + (a^2c^2 + 2b^2c + (2ac + b^2)c)b^2e + 3a^2b^2c^2e)x^{12} + \frac{1}{11}((a^2c^2 + 2ab^2 + (2ac + b^2)a)cf + (4ab^2c + (2ac + b^2)b)(bf + cd) + (a^2c^2 + 2b^2c + (2ac + b^2)c)(a^2f + b^2d) + 3d^2ab^2c^2)x^{11} + \frac{1}{10}((a^2c^2 + 2ab^2 + (2ac + b^2)a)ce + (4ab^2c + (2ac + b^2)b)b^2e + (a^2c^2 + 2b^2c + (2ac + b^2)c)a^2e)x^{10} + \frac{1}{9}(3a^2b^2c^2f + (a^2c^2 + 2ab^2 + (2ac + b^2)a)(bf + cd) + (4ab^2c + (2ac + b^2)b)(a^2f + b^2d) + (a^2c^2 + 2b^2c + (2ac + b^2)c)a^2d)x^9 + \frac{1}{8}(3a^2b^2c^2e + (a^2c^2 + 2ab^2 + (2ac + b^2)a)b^2e + (4ab^2c + (2ac + b^2)b)a^2e)x^8 + \frac{1}{7}(a^3c^2f + 3a^2b^2(bf + cd) + (a^2c^2 + 2ab^2 + (2ac + b^2)a)(a^2f + b^2d) + (4ab^2c + (2ac + b^2)b)a^2d)x^7 + \frac{1}{6}(a^3c^2e + 3a^2b^2e + (a^2c^2 + 2ab^2 + (2ac + b^2)a)a^2e)x^6 + \frac{1}{5}(a^3(bf + cd) + 3a^2b^2(a^2f + b^2d) + (a^2c^2 + 2ab^2 + (2ac + b^2)a)a^2d)x^5 + a^3b^2eex^4 + \frac{1}{3}(a^3(a^2f + b^2d) + 3a^3b^2d)x^3 + \frac{1}{2}a^4eex^2 + a^4d^2x$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{integrate}((c*x^4+b*x^2+a)^3*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6), x, \text{algorithm}="maxima")$

[Out] $\frac{1}{19}c^4fx^{19} + \frac{1}{18}c^4eex^{18} + \frac{1}{4}b^3c^3eex^{16} + \frac{1}{17}(c^4d + 4b^3c^3f)x^{17} + \frac{1}{7}(3b^2c^2 + 2a^2c^3)eex^{14} + \frac{2}{15}(2b^2c^3d + (3b^2c^2 + 2a^2c^3)f)x^{15} + \frac{1}{3}(b^3c + 3a^2b^2c^2)eex^{12} + \frac{2}{13}((3b^2c^2 + 2a^2c^3)d + 2(b^3c + 3a^2b^2c^2)f)x^{13} + \frac{1}{10}(b^4 + 12a^2b^2c + 6a^2c^2)eex^{10} + \frac{1}{11}(4(b^3c + 3a^2b^2c^2)d + (b^4 + 12a^2b^2c + 6a^2c^2)f)x^{11} + \frac{1}{2}(ab^3 + 3a^2b^2c)eex^8 + \frac{1}{9}((b^4 + 12a^2b^2c + 6a^2c^2)d + 4(ab^3 + 3a^2b^2c)f)x^9 + a^3b^2eex^4 + \frac{1}{3}(3a^2b^2 + 2a^3c)eex^6 + \frac{2}{7}(2(ab^3 + 3a^2b^2c)d + (3a^2b^2 + 2a^3c)f)x^7 + \frac{1}{2}a^4eex^2 + a^4d^2x + \frac{2}{5}(2a^3b^2f + (3a^2b^2 + 2a^3c)d)x^5 + \frac{1}{3}(4a^3b^2d + a^4f)x^3$

mupad [B] time = 0.38, size = 398, normalized size = 0.96

$\frac{1}{19}c^4fx^{19} + \frac{1}{18}c^4eex^{18} + \frac{1}{17}(3b^3c^3f + c^3(bf + cd))x^{17} + \frac{1}{4}b^3c^3eex^{16} + \frac{1}{15}((a^2c^2 + 2b^2c + (2ac + b^2)c)cf + 3b^2c^2(bf + cd) + c^3(a^2f + b^2d))x^{15} + \frac{1}{14}((a^2c^2 + 2b^2c + (2ac + b^2)c)ce + 3b^2c^2e + a^2c^3e)x^{14} + \frac{1}{13}((4ab^2c + (2ac + b^2)b)cf + (a^2c^2 + 2b^2c + (2ac + b^2)c)(bf + cd) + 3b^2c^2(a^2f + b^2d) + a^2c^3d)x^{13} + \frac{1}{12}((4ab^2c + (2ac + b^2)b)ce + (a^2c^2 + 2b^2c + (2ac + b^2)c)b^2e + 3a^2b^2c^2e)x^{12} + \frac{1}{11}((a^2c^2 + 2ab^2 + (2ac + b^2)a)cf + (4ab^2c + (2ac + b^2)b)(bf + cd) + (a^2c^2 + 2b^2c + (2ac + b^2)c)(a^2f + b^2d) + 3d^2ab^2c^2)x^{11} + \frac{1}{10}((a^2c^2 + 2ab^2 + (2ac + b^2)a)ce + (4ab^2c + (2ac + b^2)b)b^2e + (a^2c^2 + 2b^2c + (2ac + b^2)c)a^2e)x^{10} + \frac{1}{9}(3a^2b^2c^2f + (a^2c^2 + 2ab^2 + (2ac + b^2)a)(bf + cd) + (4ab^2c + (2ac + b^2)b)(a^2f + b^2d) + (a^2c^2 + 2b^2c + (2ac + b^2)c)a^2d)x^9 + \frac{1}{8}(3a^2b^2c^2e + (a^2c^2 + 2ab^2 + (2ac + b^2)a)b^2e + (4ab^2c + (2ac + b^2)b)a^2e)x^8 + \frac{1}{7}(a^3c^2f + 3a^2b^2(bf + cd) + (a^2c^2 + 2ab^2 + (2ac + b^2)a)(a^2f + b^2d) + (4ab^2c + (2ac + b^2)b)a^2d)x^7 + \frac{1}{6}(a^3c^2e + 3a^2b^2e + (a^2c^2 + 2ab^2 + (2ac + b^2)a)a^2e)x^6 + \frac{1}{5}(a^3(bf + cd) + 3a^2b^2(a^2f + b^2d) + (a^2c^2 + 2ab^2 + (2ac + b^2)a)a^2d)x^5 + a^3b^2eex^4 + \frac{1}{3}(a^3(a^2f + b^2d) + 3a^3b^2d)x^3 + \frac{1}{2}a^4eex^2 + a^4d^2x$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((a + b*x^2 + c*x^4)^3*(a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 + c*f*x^6), x)$

[Out] $x^3((a^4f)/3 + (4a^3b^2d)/3) + x^{17}((c^4d)/17 + (4b^3c^3f)/17) + x^5((6a^2b^2d)/5 + (4a^3c^3d)/5 + (4a^3b^2f)/5) + x^{15}((2b^2c^2f)/5 + (4b^3c^3d)/15 + (4a^2c^3f)/15) + x^9((b^4d)/9 + (2a^2c^2d)/3 + (4a^2b^3f)/9 + (4a^2b^2cd)/3 + (4a^2b^2cf)/3) + x^{11}((b^4f)/11 + (6a^2c^2f)/11 + (4b^3cd)/11 + (12a^2b^2cd)/11 + (12a^2b^2cf)/11) + x^7((6a^2b^2f)/7 + (4a^2b^3d)/7 + (4a^3c^3f)/7 + (12a^2b^2cd)/7) + x^{13}((6b^2c^2d)/13 + (4a^2c^3d)/13 + (4b^3cf)/13 + (12a^2b^2cf)/13) +$

3.61

$$\int (a + bx^2 + cx^4)^2 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx$$

Optimal. Leaf size=259

$$a^3 dx + \frac{1}{2} a^3 ex^2 + \frac{1}{7} x^7 (3a^2 cf + 3ab^2 f + 6abcd + b^3 d) + \frac{1}{3} a^2 x^3 (af + 3bd) + \frac{3}{4} a^2 bex^4 + \frac{3}{11} cx^{11} (acf + b^2 f + bcd) + \frac{3}{5} a^2 cex^5 + \frac{1}{15} cfx^6$$

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}

$$\frac{1}{7} x^7 (3a^2 cf + 3ab^2 f + 6abcd + b^3 d) + \frac{1}{3} a^2 x^3 (af + 3bd) + \frac{3}{4} a^2 bex^4 + \frac{3}{11} cx^{11} (acf + b^2 f + bcd) + \frac{3}{5} a^2 cex^5 + \frac{1}{15} cfx^6$$

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)/10 + (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[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\int (a + bx^2 + cx^4)^2 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx = \int (a^3 d + a^3 ex + a^2(3bd + a^2 cf + 3ab^2 f + 6abcd + b^3 d)x^2 + a^2(af + 3bd)x^3 + a^2 bex^4 + a^2 cex^5 + a^2 cfx^6) dx = a^3 dx + \frac{1}{2} a^3 ex^2 + \frac{1}{7} a^2 x^7 (3a^2 cf + 3ab^2 f + 6abcd + b^3 d) + \frac{1}{3} a^2 x^3 (af + 3bd) + \frac{3}{4} a^2 bex^4 + \frac{3}{11} cx^{11} (acf + b^2 f + bcd) + \frac{3}{5} a^2 cex^5 + \frac{1}{15} cfx^6$$

Mathematica [A] time = 0.05, size = 259, normalized size = 1.00

$$a^3 dx + \frac{1}{2} a^3 ex^2 + \frac{1}{7} x^7 (3a^2 cf + 3ab^2 f + 6abcd + b^3 d) + \frac{1}{3} a^2 x^3 (af + 3bd) + \frac{3}{4} a^2 bex^4 + \frac{3}{11} cx^{11} (acf + b^2 f + bcd) + \frac{3}{5} a^2 cex^5 + \frac{1}{15} cfx^6$$

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)/10 + (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

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

$$\int (a + bx^2 + cx^4)^2 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(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] IntegrateAlgebraic[(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]

fricas [A] time = 1.02, size = 285, normalized size = 1.10

$$\frac{1}{15}d^2f^2c^3 + \frac{1}{14}c^2a^2e^3 + \frac{1}{13}a^2bd^3 + \frac{3}{13}a^2b^2c^2b + \frac{1}{4}a^2c^2b^2 + \frac{3}{11}a^2bd^2b + \frac{3}{11}a^2f^2db^2 + \frac{3}{10}a^2f^2c^2a + \frac{3}{10}a^2c^2a^2 + \frac{1}{3}a^2c^2a^2 + \frac{1}{3}a^2f^2b^3 + \frac{1}{3}a^2bd^2c + \frac{2}{3}a^2f^2c^2a + \frac{1}{8}a^2bd^2 + \frac{3}{4}a^2c^2ba + \frac{1}{2}a^2db^3 + \frac{6}{7}a^2db^2c + \frac{3}{7}a^2f^2c^2 + \frac{1}{2}a^2c^2a^2 + \frac{1}{2}a^2c^2a^2 + \frac{3}{5}a^2db^2a + \frac{3}{5}a^2f^2db^2 + \frac{3}{5}a^2f^2ba^2 + \frac{3}{4}a^2db^2 + a^2db^2 + \frac{1}{3}a^2f^2a^2 + \frac{1}{2}a^2c^2a^2 + a^2da^2$$

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^2*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

$$\frac{1}{15}d^2f^2c^3 + \frac{1}{14}c^2a^2e^3 + \frac{1}{13}a^2bd^3 + \frac{3}{13}a^2b^2c^2b + \frac{1}{4}a^2c^2b^2 + \frac{3}{11}a^2bd^2b + \frac{3}{11}a^2f^2db^2 + \frac{3}{10}a^2f^2c^2a + \frac{3}{10}a^2c^2a^2 + \frac{1}{3}a^2c^2a^2 + \frac{1}{3}a^2f^2b^3 + \frac{1}{3}a^2bd^2c + \frac{2}{3}a^2f^2c^2a + \frac{1}{8}a^2bd^2 + \frac{3}{4}a^2c^2ba + \frac{1}{2}a^2db^3 + \frac{6}{7}a^2db^2c + \frac{3}{7}a^2f^2c^2 + \frac{1}{2}a^2c^2a^2 + \frac{1}{2}a^2c^2a^2 + \frac{3}{5}a^2db^2a + \frac{3}{5}a^2f^2db^2 + \frac{3}{5}a^2f^2ba^2 + \frac{3}{4}a^2db^2 + a^2db^2 + \frac{1}{3}a^2f^2a^2 + \frac{1}{2}a^2c^2a^2 + a^2da^2$$

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*e*x^14 + 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

$$\frac{d^2f^2c^3}{15} + \frac{c^2a^2e^3}{14} + \frac{a^2bd^3}{13} + \frac{3a^2b^2c^2b}{13} + \frac{a^2c^2b^2}{4} + \frac{3a^2bd^2b}{11} + \frac{3a^2f^2db^2}{11} + \frac{3a^2f^2c^2a}{10} + \frac{3a^2c^2a^2}{10} + \frac{a^2c^2a^2}{3} + \frac{a^2f^2b^3}{3} + \frac{a^2bd^2c}{3} + \frac{2a^2f^2c^2a}{3} + \frac{a^2bd^2}{8} + \frac{3a^2c^2ba}{4} + \frac{a^2db^3}{2} + \frac{6a^2db^2c}{7} + \frac{3a^2f^2c^2}{7} + \frac{a^2c^2a^2}{2} + \frac{a^2c^2a^2}{2} + \frac{3a^2db^2a}{5} + \frac{3a^2f^2db^2}{5} + \frac{3a^2f^2ba^2}{5} + \frac{3a^2db^2}{4} + a^2db^2 + \frac{a^2f^2a^2}{3} + \frac{a^2c^2a^2}{2} + a^2da^2$$

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

$$\frac{1}{15}c^3fx^{15} + \frac{1}{14}c^2fx^{14} + \frac{1}{4}bc^2fx^{13} + \frac{1}{13}(c^3d + 3bc^2f)x^{12} + \frac{3}{10}(b^2c + ac^2)fx^{10} + \frac{3}{11}(bc^2d + (b^2c + ac^2)f)x^{11} + \frac{1}{8}(b^3 + 6abc)fx^8 + \frac{1}{9}(3(b^2c + ac^2)d + (b^3 + 6abc)f)x^7 + \frac{1}{2}a^2fx^6 + \frac{1}{2}(b^3 + 6abc)d + 3(ab^2 + a^2c)f)x^5 + \frac{1}{5}(a^2b^2 + a^2c^2)fx^4 + \frac{1}{3}(3a^2bd + a^2f)x^3$$

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

$$x^3\left(\frac{a^3}{3} + bda\right) + x^{10}\left(\frac{d^3}{15} + \frac{3bf^2}{13}\right) + x^8\left(\frac{3f^2b}{5} + \frac{3cd^2}{5} + \frac{3dad^2}{5}\right) + x^{11}\left(\frac{3f^2c}{11} + \frac{3db^2}{11} + \frac{3af^2}{11}\right) + x^7\left(\frac{3cf^2}{7} + \frac{3fab^2}{7} + \frac{6cdab}{7} + \frac{db^3}{7}\right) + x^9\left(\frac{fb^3}{9} + \frac{d^2c}{3} + \frac{2afbc}{3} + \frac{ad^2}{3}\right) + \frac{a^3ex^2}{2} + \frac{c^3ex^{14}}{14} + \frac{c^3fx^{15}}{15} + a^2dx + \frac{ae^x(b^2+ac)}{2} + \frac{be^x(b^2+6ac)}{8} + \frac{3ce^{10}(b^2+ac)}{10} + \frac{3a^2be^x^4}{4} + \frac{b^2ce^{12}}{4}$$

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

$$a^2dx + \frac{a^2ex^2}{2} + \frac{3a^2bx^4}{4} + \frac{bc^2ex^{12}}{4} + \frac{c^3ex^{14}}{14} + \frac{c^3fx^{15}}{15} + x^{13}\left(\frac{3bc^2f}{13} + \frac{c^3d}{13}\right) + x^{11}\left(\frac{3ac^2f}{11} + \frac{3b^2cd}{11} + \frac{3bc^2d}{11}\right) + x^{10}\left(\frac{3ac^2c}{10} + \frac{3b^2cc}{10}\right) + x^9\left(\frac{2abcf}{3} + \frac{ac^2d}{3} + \frac{b^2f}{9} + \frac{b^2cd}{3}\right) + x^8\left(\frac{3abcc}{4} + \frac{b^3c}{8}\right) + x^7\left(\frac{3a^2cf}{7} + \frac{3ab^2f}{7} + \frac{6abcc}{7} + \frac{b^3d}{7}\right) + x^6\left(\frac{a^2cc}{2} + \frac{ab^2c}{2}\right) + x^5\left(\frac{3a^2bf}{5} + \frac{3a^2cd}{5} + \frac{3ab^2d}{5}\right) + x^3\left(\frac{a^2f}{3} + a^2bd\right)$$

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**14/4 + 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

$$\int (a + bx^2 + cx^4) (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx$$

Optimal. Leaf size=154

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{6} ex^6 (2ac + b^2) + \frac{1}{3} ax^3 (af + 2bd) + \frac{1}{2} abex^4 + \frac{1}{9} c^2 ex^{10} + \frac{1}{11} c^2 fx^{11}$$

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}

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{6} ex^6 (2ac + b^2) + \frac{1}{3} ax^3 (af + 2bd) + \frac{1}{2} abex^4 + \frac{1}{9} c^2 ex^{10} + \frac{1}{11} c^2 fx^{11}$$

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[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\int (a + bx^2 + cx^4) (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx = \int (a^2 d + a^2 ex + a(2bd + a^2 f) + b^2 ex^2 + (2acd + b^2 d)ex + (2abf + 2acd + b^2 d)x^3 + (2ac + b^2)ex^4 + (af + 2bd)ax^3 + abex^4 + c^2 ex^{10} + c^2 fx^{11}) dx$$

$$= a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{3} a(2bd + a^2 f)x^3 + \frac{1}{4} (2acd + b^2 d)ex^4 + \frac{1}{5} (2abf + 2acd + b^2 d)x^5 + \frac{1}{6} (2ac + b^2)ex^6 + \frac{1}{7} (af + 2bd)ax^7 + \frac{1}{8} abex^8 + \frac{1}{10} c^2 ex^{10} + \frac{1}{11} c^2 fx^{11}$$

Mathematica [A] time = 0.03, size = 154, normalized size = 1.00

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{6} ex^6 (2ac + b^2) + \frac{1}{3} ax^3 (af + 2bd) + \frac{1}{2} abex^4 + \frac{1}{9} c^2 ex^{10} + \frac{1}{11} c^2 fx^{11}$$

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

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

$$\int (a + bx^2 + cx^4) (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(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] IntegrateAlgebraic[(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]

fricas [A] time = 1.10, size = 151, normalized size = 0.98

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

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

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

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

$$\frac{c^2fx^{11}}{11} + \frac{c^2ex^{10}}{10} + \frac{bcx^8}{4} + \frac{(bcf + (bf + cd)c)x^9}{9} + \frac{abex^4}{2} + \frac{(acf + (bf + cd)b + (af + bd)c)x^7}{7} + \frac{(2ace + b^2e)x^6}{6} + \frac{a^2ex^2}{2} + \frac{(acd + (bf + cd)a + (af + bd)b)x^5}{5} + a^2dx + \frac{(abd + (af + bd)a)x^3}{3}$$

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

$$\frac{1}{11}c^2fx^{11} + \frac{1}{10}c^2ex^{10} + \frac{1}{4}bcx^8 + \frac{1}{9}(c^2d + 2bcf)x^9 + \frac{1}{6}(b^2 + 2ac)ex^6 + \frac{1}{7}(2bcd + (b^2 + 2ac)f)x^7 + \frac{1}{2}abex^4 + \frac{1}{5}(2abf + (b^2 + 2ac)d)x^5 + \frac{1}{2}a^2ex^2 + a^2dx + \frac{1}{3}(2abd + a^2f)x^3$$

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

$$x^5 \left(\frac{db^2}{5} + \frac{2afb}{5} + \frac{2acd}{5} \right) + x^7 \left(\frac{fb^2}{7} + \frac{2cdb}{7} + \frac{2acf}{7} \right) + x^3 \left(\frac{fa^2}{3} + \frac{2bda}{3} \right) + x^9 \left(\frac{dc^2}{9} + \frac{2bfc}{9} \right) + \frac{a^2ex^2}{2} + \frac{c^2ex^{10}}{10} + \frac{c^2fx^{11}}{11} + \frac{ex^6(b^2 + 2ac)}{6} + a^2dx + \frac{abex^4}{2} + \frac{bcex^8}{4}$$

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

$$a^2 dx + \frac{a^2 e x^2}{2} + \frac{a b e x^4}{2} + \frac{b c e x^8}{4} + \frac{c^2 e x^{10}}{10} + \frac{c^2 f x^{11}}{11} + x^9 \left(\frac{2 b c f}{9} + \frac{c^2 d}{9} \right) + x^7 \left(\frac{2 a c f}{7} + \frac{b^2 f}{7} + \frac{2 b c d}{7} \right) + x^6 \left(\frac{a c e}{3} + \frac{b^2 e}{6} \right) + x^5 \left(\frac{2 a b f}{5} + \frac{2 a c d}{5} + \frac{b^2 d}{5} \right) + x^3 \left(\frac{a^2 f}{3} + \frac{2 a b d}{3} \right)$$

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)`

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

$$3.63 \quad \int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=20

$$dx + \frac{ex^2}{2} + \frac{fx^3}{3}$$

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

$$\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{a + bx^2 + cx^4} dx = \int (d + ex + fx^2) dx = dx + \frac{ex^2}{2} + \frac{fx^3}{3}$$

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

IntegrateAlgebraic [A] time = 2.16, size = 19, normalized size = 0.95

$$\frac{1}{6}x(6d + 3ex + 2fx^2)$$

Antiderivative was successfully verified.

[In] IntegrateAlgebraic[(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] (x*(6*d + 3*e*x + 2*f*x^2))/6

fricas [A] time = 0.88, 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

$$\frac{1}{3}fx^3 + \frac{1}{2}x^2e + dx$$

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

$$\frac{1}{3}fx^3 + \frac{1}{2}ex^2 + dx$$

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

$$\frac{1}{3}fx^3 + \frac{1}{2}ex^2 + dx$$

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="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

$$\frac{fx^3}{3} + \frac{ex^2}{2} + dx$$

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
```

$$3.64 \quad \int \frac{ad+aux+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=211

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}} - \frac{e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

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] && !MatchQ[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] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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

$$\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cf x^6}{(a + bx^2 + cx^4)^2} dx = \int \frac{d + ex + fx^2}{a + bx^2 + cx^4} dx$$

$$= \int \frac{ex}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2}{a + bx^2 + cx^4} dx$$

$$= e \int \frac{x}{a + bx^2 + cx^4} dx + \frac{1}{2} \left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \int \frac{1}{a + bx^2 + cx^4} dx$$

$$= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}}$$

$$= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}}$$

$$= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}}$$

Mathematica [A] time = 0.06, size = 234, normalized size = 1.11

$$\frac{\frac{\sqrt{2} \left(f \left(\sqrt{b^2 - 4ac} - b \right) + 2cd \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\sqrt{2} \left(f \left(\sqrt{b^2 - 4ac} + b \right) - 2cd \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}}}{2\sqrt{b^2 - 4ac}} + e \log \left(\sqrt{b^2 - 4ac} - b - 2cx^2 \right) - e \log \left(\sqrt{b^2 - 4ac} + b + 2cx^2 \right)$$

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)^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[
```


$2)*(-2*c*d + (b + \text{Sqrt}[b^2 - 4*a*c])*f)*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]]/(\text{Sqrt}[c]*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) + e*\text{Log}[-b + \text{Sqrt}[b^2 - 4*a*c] - 2*c*x^2] - e*\text{Log}[b + \text{Sqrt}[b^2 - 4*a*c] + 2*c*x^2)]/(2*\text{Sqrt}[b^2 - 4*a*c])$

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

$$\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{(a + bx^2 + cx^4)^2} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(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] IntegrateAlgebraic[(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]

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]
$$\begin{aligned} & -1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*\text{sqrt}(b^2 - 4*a*c)*e*\text{log}(x^2 + 1/2*(b + \text{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)*\text{sqrt}(b^2 - 4*a*c)*e*\text{log}(x^2 + 1/2*(b - \text{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*((\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^4 - 8*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^2*c - 2*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^3*c - 2*b^4*c + 16*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*c^2 + 8*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^2*c^2 + 16*a*b^2*c^2 + 2*b^3*c^2 - 4*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a*c^3 - 32*a^2*c^3 - 8*a*b*c^3 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^3 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*b^2*c - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*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 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^2 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^2*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b*c - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*f)*\text{arctan}(2*\text{sqrt}(1/2)*x/\text{sqrt}((b + \text{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)*\text{abs}(c)) + 1/4*((\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^4 - 8*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b^2*c - 2*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^3*c + 2*b^4*c + 16*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*c^2 + 8*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b*c^2 + \text{sqrt}(2) \end{aligned}$$

) $\sqrt{b^2 - 4ac}$)*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 + 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))

maple [B] time = 0.02, size = 616, normalized size = 2.92

$$\frac{2\sqrt{2}af\operatorname{arctanh}\left(\frac{\sqrt{2}c}{\sqrt{b+\sqrt{4ac+P}}}\right)}{(4ac-P)\sqrt{(b+\sqrt{4ac+P})}} - \frac{2\sqrt{2}af\operatorname{arctanh}\left(\frac{\sqrt{2}c}{\sqrt{b-\sqrt{4ac+P}}}\right)}{(4ac-P)\sqrt{(b-\sqrt{4ac+P})}} + \frac{\sqrt{2}bf\operatorname{arctanh}\left(\frac{\sqrt{2}c}{\sqrt{b+\sqrt{4ac+P}}}\right)}{2(4ac-P)\sqrt{(b+\sqrt{4ac+P})}} - \frac{\sqrt{2}bf\operatorname{arctanh}\left(\frac{\sqrt{2}c}{\sqrt{b-\sqrt{4ac+P}}}\right)}{2(4ac-P)\sqrt{(b-\sqrt{4ac+P})}} + \frac{\sqrt{4ac+P}\sqrt{2}bf\operatorname{arctanh}\left(\frac{\sqrt{2}c}{\sqrt{b+\sqrt{4ac+P}}}\right)}{2(4ac-P)\sqrt{(b+\sqrt{4ac+P})}} - \frac{\sqrt{4ac+P}\sqrt{2}bf\operatorname{arctanh}\left(\frac{\sqrt{2}c}{\sqrt{b-\sqrt{4ac+P}}}\right)}{2(4ac-P)\sqrt{(b-\sqrt{4ac+P})}} + \frac{\sqrt{4ac+P}\sqrt{2}af\operatorname{arctanh}\left(\frac{\sqrt{2}c}{\sqrt{b+\sqrt{4ac+P}}}\right)}{(4ac-P)\sqrt{(b+\sqrt{4ac+P})}} - \frac{\sqrt{4ac+P}\sqrt{2}af\operatorname{arctanh}\left(\frac{\sqrt{2}c}{\sqrt{b-\sqrt{4ac+P}}}\right)}{(4ac-P)\sqrt{(b-\sqrt{4ac+P})}} + \frac{\sqrt{4ac+P}\operatorname{erf}\left(\frac{2c\sqrt{2}}{\sqrt{b+\sqrt{4ac+P}}}\right)}{2(4ac-P)} - \frac{\sqrt{4ac+P}\operatorname{erf}\left(\frac{2c\sqrt{2}}{\sqrt{b-\sqrt{4ac+P}}}\right)}{2(4ac-P)}$$

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] $-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})-2*c/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f*a+1/2/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f*b^2-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*f+c*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*d+1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})+2/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*a*c*f*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/2/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b^2*f*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b*f*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)+(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*d*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)$

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

$$\int \frac{cfx^6 + cex^5 + bex^3 + (cd + bf)x^4 + aex + (bd + af)x^2 + ad}{(cx^4 + bx^2 + a)^2} dx$$

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)


```

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

$$3.65 \quad \int \frac{ad+aux+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=368

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c}\left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c}\left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}\right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b+\sqrt{b^2-4ac}}}$$

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}

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c}\left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c}\left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b+\sqrt{b^2-4ac}}} - \frac{e(b+2cx^2)}{2(b^2-4ac)(a+bx^2+cx^4)} + \frac{2ce \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{(b^2-4ac)^{3/2}}$$

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 + 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*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] && !MatchQ[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] && (GtQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 618

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

$x] \&\& \text{NeQ}[b^2 - 4*a*c, 0]$

Rule 1107

$\text{Int}[(x_*)*((a_*) + (b_*)*(x_*)^2 + (c_*)*(x_*)^4)^{(p_*)}, x_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(a + b*x + c*x^2)^p, x], x, x^2], x] /; \text{FreeQ}\{a, b, c, p\}, x]$

Rule 1166

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

Rule 1178

$\text{Int}[((d_*) + (e_*)*(x_*)^2)*((a_*) + (b_*)*(x_*)^2 + (c_*)*(x_*)^4)^{(p_*)}, x_Symbol] \rightarrow \text{Simp}[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 + c*x^4)^{(p+1)})/(2*a*(p+1)*(b^2 - 4*a*c)), x] + \text{Dist}[1/(2*a*(p+1)*(b^2 - 4*a*c)), \text{Int}[\text{Simp}[(2*p+3)*d*b^2 - a*b*e - 2*a*c*d*(4*p+5) + (4*p+7)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^{(p+1)}, x], x] /; \text{FreeQ}\{a, b, c, d, e\}, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{NeQ}[c*d^2 - b*d*e + a*e^2, 0] \&\& \text{LtQ}[p, -1] \&\& \text{IntegerQ}[2*p]$

Rule 1586

$\text{Int}[(u_*)*(P_x)^{(p_*)}*(Q_x)^{(q_*)}, x_Symbol] \rightarrow \text{Int}[u*\text{PolynomialQuotient}[P_x, Q_x, x]^p*Q_x^{(p+q)}, x] /; \text{FreeQ}[q, x] \&\& \text{PolyQ}[P_x, x] \&\& \text{PolyQ}[Q_x, x] \&\& \text{EqQ}[\text{PolynomialRemainder}[P_x, Q_x, x], 0] \&\& \text{IntegerQ}[p] \&\& \text{LtQ}[p*q, 0]$

Rule 1673

$\text{Int}[(P_q)*((a_*) + (b_*)*(x_*)^2 + (c_*)*(x_*)^4)^{(p_*)}, x_Symbol] \rightarrow \text{Module}\{q = \text{Expon}[P_q, x], k\}, \text{Int}[\text{Sum}[\text{Coeff}[P_q, x, 2*k]*x^{(2*k)}, \{k, 0, q/2\}]*(a + b*x^2 + c*x^4)^p, x] + \text{Int}[x*\text{Sum}[\text{Coeff}[P_q, x, 2*k+1]*x^{(2*k)}, \{k, 0, (q-1)/2\}]*(a + b*x^2 + c*x^4)^p, x]] /; \text{FreeQ}\{a, b, c, p\}, x] \&\& \text{PolyQ}[P_q, x] \&\& \text{!PolyQ}[P_q, x^2]$

Rubi steps

$$\begin{aligned}
\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{(a + bx^2 + cx^4)^3} dx &= \int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^2} dx \\
&= \int \frac{ex}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{1}{2} \frac{1}{(b^2 - 4ac)} \frac{1}{(a + bx^2 + cx^4)} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \frac{1}{(b^2 - 4ac)} \frac{1}{(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

Mathematica [A] time = 1.20, size = 398, normalized size = 1.08

$$\frac{1}{4} \left(\frac{2ab(e + fx) + 4acx(d + x(e + fx)) - 2bdx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} + \frac{\sqrt{2}\sqrt{c} \left(b(d\sqrt{b^2 - 4ac} + 4af) - 2a(\sqrt{b^2 - 4ac} + 6cd) + b^2d \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b^2 - 4ac}} \right)}{a(b^2 - 4ac)^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\sqrt{2}\sqrt{c} \left(bd\sqrt{b^2 - 4ac} - 2af\sqrt{b^2 - 4ac} - 4abf + 12acd + b^2(-d) \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b^2 - 4ac}} \right)}{a(b^2 - 4ac)^{3/2} \sqrt{b^2 - 4ac} + b} - \frac{4ce \log(\sqrt{b^2 - 4ac} - b - 2cx^2)}{(b^2 - 4ac)^{3/2}} + \frac{4ce \log(\sqrt{b^2 - 4ac} + b + 2cx^2)}{(b^2 - 4ac)^{3/2}} \right)$$

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

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

$$\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{(a + bx^2 + cx^4)^3} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(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] IntegrateAlgebraic[(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]

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]
$$\frac{1}{2} \cdot (b \cdot c \cdot d \cdot x^3 - 2 \cdot a \cdot c \cdot f \cdot x^3 - 2 \cdot a \cdot c \cdot x^2 \cdot e + b^2 \cdot d \cdot x - 2 \cdot a \cdot c \cdot d \cdot x - a \cdot b \cdot f \cdot x - a \cdot b \cdot e) / ((c \cdot x^4 + b \cdot x^2 + a) \cdot (a \cdot b^2 - 4 \cdot a^2 \cdot c)) + \frac{1}{16} \cdot ((2 \cdot b^3 \cdot c^2 - 8 \cdot a \cdot b \cdot c^3 - \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot b^3 + 4 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a \cdot b \cdot c + 2 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot b^2 \cdot c - \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot b \cdot c^2 - 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot b \cdot c^2) \cdot (a \cdot b^2 - 4 \cdot a^2 \cdot c)^2 \cdot d - 2 \cdot (2 \cdot a \cdot b^2 \cdot c^2 - 8 \cdot a^2 \cdot c^3 - \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a \cdot b^2 + 4 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^2 \cdot c + 2 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a \cdot b \cdot c - \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a \cdot c^2 - 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a \cdot c^2) \cdot (a \cdot b^2 - 4 \cdot a^2 \cdot c)^2 \cdot f + 2 \cdot (\sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a \cdot b^6 - 14 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^2 \cdot b^4 \cdot c - 2 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a \cdot b^5 \cdot c - 2 \cdot a \cdot b^6 \cdot c + 64 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^3 \cdot b^2 \cdot c^2 + 20 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^2 \cdot b^3 \cdot c^2 + \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a \cdot b^4 \cdot c^2 + 28 \cdot a^2 \cdot b^4 \cdot c^2 - 96 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^4 \cdot c^3 - 48 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^3 \cdot b \cdot c^3 - 10 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^2 \cdot b^2 \cdot c^3 - 128 \cdot a^3 \cdot b^2 \cdot c^3 + 24 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^3 \cdot c^4 + 192 \cdot a^4 \cdot c^4 + 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a \cdot b^4 \cdot c - 20 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a^2 \cdot b^2 \cdot c^2 + 48 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a^3 \cdot c^3) \cdot d \cdot \text{abs}(a \cdot b^2 - 4 \cdot a^2 \cdot c) + 2 \cdot (\sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^2 \cdot b^5 - 8 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^3 \cdot b^3 \cdot c - 2 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^2 \cdot b^4 \cdot c - 2 \cdot a^2 \cdot b^5 \cdot c + 16 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^4 \cdot b \cdot c^2 + 8 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^3 \cdot b^2 \cdot c^2 + \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^2 \cdot b^3 \cdot c^2 + 16 \cdot a^3 \cdot b^3 \cdot c^2 - 4 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^3 \cdot b \cdot c^3 - 32 \cdot a^4 \cdot b \cdot c^3 + 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a^2 \cdot b^3 \cdot c - 8 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a^3 \cdot b \cdot c^2) \cdot f \cdot \text{abs}(a \cdot b^2 - 4 \cdot a^2 \cdot c) + (2 \cdot a^2 \cdot b^7 \cdot c^2 - 40 \cdot a^3 \cdot b^5 \cdot c^3 + 224 \cdot a^4 \cdot b^3 \cdot c^4 - 384 \cdot a^5 \cdot b \cdot c^5 - \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^2 \cdot b^7 + 20 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^3 \cdot b^5 \cdot c + 2 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^2 \cdot b^6 \cdot c - 112 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^4 \cdot b^3 \cdot c^2 - 32 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^3 \cdot b^4 \cdot c^2 - \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^2 \cdot b^5 \cdot c^2 + 192 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^5 \cdot b \cdot c^3 + 96 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^4 \cdot b^2 \cdot c^3 + 16 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^3 \cdot b^3 \cdot c^3 - 48 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c}) \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot a^4 \cdot b \cdot c^4 - 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a^2 \cdot b^5 \cdot c^2 + 32 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a^3 \cdot b^3 \cdot c^3 - 96 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a^4 \cdot b \cdot c^4) \cdot d + 4 \cdot (2 \cdot a^3 \cdot b^6 \cdot c^2 - 16 \cdot a^4 \cdot b^4 \cdot c^3 + 32 \cdot a^5 \cdot b^2 \cdot c^4 - \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c})$$

$$\begin{aligned}
& *c) * \sqrt{b*c + \sqrt{b^2 - 4*a*c}} * a^3*b^6 + 8*\sqrt{2}*\sqrt{b^2 - 4*a*c} * \\
& \sqrt{b*c + \sqrt{b^2 - 4*a*c}} * a^4*b^4*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c} * \sqrt{ \\
& (b*c + \sqrt{b^2 - 4*a*c}) * a^3*b^5*c - 16*\sqrt{2}*\sqrt{b^2 - 4*a*c} * \sqrt{ \\
& (b*c + \sqrt{b^2 - 4*a*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}) * a^4*b^3*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c} * \sqrt{ \\
& (b*c + \sqrt{b^2 - 4*a*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}) * 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) * \text{abs}(a*b^2 - 4*a^2*c) * \text{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}} * b^3 + 4*\sqrt{2} * \sqrt{ \\
& (b^2 - 4*a*c) * \sqrt{b*c - \sqrt{b^2 - 4*a*c}} * a*b*c + 2*\sqrt{2} * \sqrt{ \\
& (b^2 - 4*a*c) * \sqrt{b*c - \sqrt{b^2 - 4*a*c}} * b^2*c - \sqrt{2} * \sqrt{ \\
& (b^2 - 4*a*c) * \sqrt{b*c - \sqrt{b^2 - 4*a*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}) * a*b^2 + 4*\sqrt{2} * \sqrt{b^2 - 4*a*c} * \sqrt{ \\
& (b*c - \sqrt{b^2 - 4*a*c}) * a^2*c + 2*\sqrt{2} * \sqrt{b^2 - 4*a*c} * \sqrt{ \\
& (b*c - \sqrt{b^2 - 4*a*c}) * a*b*c - \sqrt{2} * \sqrt{b^2 - 4*a*c} * \sqrt{ \\
& (b*c - \sqrt{b^2 - 4*a*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}) * a*b^6 - 14*\sqrt{2} * \sqrt{b*c - \sqrt{b^2 - 4*a*c}} * \\
& a^2*b^4*c - 2*\sqrt{2} * \sqrt{b*c - \sqrt{b^2 - 4*a*c}} * a*b^5*c + 2*a*b^6*c \\
& + 64*\sqrt{2} * \sqrt{b*c - \sqrt{b^2 - 4*a*c}} * a^3*b^2*c^2 + 20*\sqrt{2} * \sqrt{ \\
& (b*c - \sqrt{b^2 - 4*a*c}) * a^2*b^3*c^2 + \sqrt{2} * \sqrt{b*c - \sqrt{b^2 - 4*a* \\
& 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}} * a^3*b*c^3 - 10*\sqrt{ \\
& 2} * \sqrt{b*c - \sqrt{b^2 - 4*a*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}} * 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 * \text{abs}(a \\
& *b^2 - 4*a^2*c) - 2*(\sqrt{2} * \sqrt{b*c - \sqrt{b^2 - 4*a*c}} * a^2*b^5 - 8*\sqrt{ \\
& 2} * \sqrt{b*c - \sqrt{b^2 - 4*a*c}} * a^3*b^3*c - 2*\sqrt{2} * \sqrt{b*c - \sqrt{ \\
& (b^2 - 4*a*c) * a^2*b^4*c + 2*a^2*b^5*c + 16*\sqrt{2} * \sqrt{b*c - \sqrt{ \\
& (b^2 - 4*a*c) * a^4*b*c^2 + 8*\sqrt{2} * \sqrt{b*c - \sqrt{b^2 - 4*a*c}} * a^3*b^2*c^ \\
& 2 + \sqrt{2} * \sqrt{b*c - \sqrt{b^2 - 4*a*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}} * 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 * \text{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}} * a^2*b^7 + 20*\sqrt{2} * \sqrt{ \\
& (b^2 - 4*a*c) * \sqrt{b*c - \sqrt{b^2 - 4*a*c}} * a^3*b^5*c + 2*\sqrt{2} * \sqrt{ \\
& (b^2 - 4*a*c) * \sqrt{b*c - \sqrt{b^2 - 4*a*c}} * a^2*b^6*c - 112*\sqrt{2} * \sqrt{ \\
& (b^2 - 4*a*c) * \sqrt{b*c - \sqrt{b^2 - 4*a*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}} * a^3*b^4*c^2 - \sqrt{2} * \sqrt{ \\
& (b^2 - 4*a*c) * \sqrt{b*c - \sqrt{b^2 - 4*a*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}} * a^5*b*c^3 + 96*\sqrt{2} * \sqrt{ \\
& (b^2 - 4*a*c) * \sqrt{b*c - \sqrt{b^2 - 4*a*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}} * a^3*b^3*c^3 - 48*\sqrt{2} * \sqrt{ \\
& (b^2 - 4*a*c) * \sqrt{b*c - \sqrt{b^2 - 4*a*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}) * a^3*b^6 + 8*\sqrt{2} * \sqrt{b^2 - 4*a*c} * \sqrt{ \\
& (b*c - \sqrt{b^2 - 4*a*c}) * a^4*b^4*c + 2*\sqrt{2} * \sqrt{b^2 - 4*a*c} * \sqrt{ \\
& (b*c - \sqrt{b^2 - 4*a*c}) * a^3*b^5*c - 16*\sqrt{2} * \sqrt{b^2 - 4*a*c} * \sqrt{ \\
& (b*c - \sqrt{b^2 - 4*a*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}) * a^4*b^3*c^2 - \sqrt{2} * \sqrt{b^2 - 4*a*c} * \sqrt{ \\
& (b*c - \sqrt{b^2 - 4*a*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}) * 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*
\end{aligned}$$

$$\begin{aligned} &) * c)^{(1/2)} * c * x) + 2 / (4 * a * c - b^2)^2 / (x^2 + 1/2 * b / c + 1/2 * (-4 * a * c + b^2)^{(1/2)} / c) * a * c * \\ & e - 1/2 / (4 * a * c - b^2)^2 / (x^2 + 1/2 * b / c + 1/2 * (-4 * a * c + b^2)^{(1/2)} / c) * b^2 * f * x + 1 / (4 * a * c \\ & - b^2)^2 / (x^2 + 1/2 * b / c + 1/2 * (-4 * a * c + b^2)^{(1/2)} / c) * (-4 * a * c + b^2)^{(1/2)} * c * d * x - 1 / (\\ & 4 * a * c - b^2)^2 / (x^2 + 1/2 * b / c + 1/2 * (-4 * a * c + b^2)^{(1/2)} / c) * b * c * d * x + 1/4 / (4 * a * c - b^2) \\ & ^2 / (x^2 + 1/2 * b / c + 1/2 * (-4 * a * c + b^2)^{(1/2)} / c) / a * b^3 * d * x - 1 / (4 * a * c - b^2)^2 / (x^2 + 1/ \\ & 2 * b / c - 1/2 * (-4 * a * c + b^2)^{(1/2)} / c) * (-4 * a * c + b^2)^{(1/2)} * c * d * x - 1 / (4 * a * c - b^2)^2 / (x \\ & ^2 + 1/2 * b / c - 1/2 * (-4 * a * c + b^2)^{(1/2)} / c) * b * c * d * x + 1/4 / (4 * a * c - b^2)^2 / (x^2 + 1/2 * b / c \\ & - 1/2 * (-4 * a * c + b^2)^{(1/2)} / c) / a * b^3 * d * x \end{aligned}$$

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]
$$\begin{aligned} & -1/2 * (2 * a * c * e * x^2 - (b * c * d - 2 * a * c * f) * x^3 + a * b * e + (a * b * f - (b^2 - 2 * a * c) * \\ & d) * x) / ((a * b^2 * c - 4 * a^2 * c^2) * x^4 + a^2 * b^2 - 4 * a^3 * c + (a * b^3 - 4 * a^2 * b * c) * \\ & x^2) - 1/2 * \text{integrate}((4 * a * c * e * x - a * b * f - (b * c * d - 2 * a * c * f) * x^2 - (b^2 - 6 * \\ & a * c) * d) / (c * x^4 + b * x^2 + a), x) / (a * b^2 - 4 * a^2 * c) \end{aligned}$$

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]
$$\begin{aligned} & \text{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)) - \\ & \text{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)) + \text{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 - \end{aligned}$$

$$\begin{aligned}
& 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 -
\end{aligned}$$

```

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

$$3.66 \int \frac{ad+aux+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^4} dx$$

Optimal. Leaf size=621

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} + \frac{\sqrt{c} \left(-\frac{52a^2bcf + 168a^2c^2d + \dots}{\sqrt{b^2 - 4ac}} \right)}{\dots}$$

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, number of rules / integrand size = 0.159, Rules used = {1586, 1673, 1178, 1166, 205, 12, 1107, 614, 618, 206}

1/2 * (a^2 * (20c^2 * f + ab^2 * f - 24abcd + 3b^3 * d) + 8a^2 * b * c * f + 28a^2 * c^2 * d + ab^3 * f - 25ab^2 * cd + 3b^4 * d) / (8a^2 * (b^2 - 4ac)^2 * (a + bx^2 + cx^4)) + sqrt(c) * (-52a^2 * b * c * f + 168a^2 * c^2 * d + ...)

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] && !MatchQ[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] && (GtQ[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] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[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] && NeQ[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_Symbol] := 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

$$\begin{aligned}
 \int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{(a + bx^2 + cx^4)^4} dx &= \int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^3} dx \\
 &= \int \frac{ex}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx \\
 &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{\int \frac{ex}{(a + bx^2 + cx^4)^3} dx}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
 &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3d - 2ex - fx^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}
 \end{aligned}$$

Mathematica [A] time = 3.58, size = 625, normalized size = 1.01

$$\frac{\frac{\sqrt{c} \sqrt{bx^2 + 2d} + c \sqrt{2d + bx^2 + 2cx^2} + 2ab \sqrt{bx^2 + 2d} - 2bdx + b^2 \sqrt{c} - 2bcx^2 + ab^2 \sqrt{bx^2 + 2d}}{x^2 \sqrt{bx^2 + 2d} \sqrt{c} + b^2 \sqrt{c}}}{\sqrt{c} \sqrt{bx^2 + 2d} + c \sqrt{2d + bx^2 + 2cx^2} + 2ab \sqrt{bx^2 + 2d} - 2bdx + b^2 \sqrt{c} - 2bcx^2 + ab^2 \sqrt{bx^2 + 2d}} + \frac{\sqrt{c} \sqrt{bx^2 + 2d} + c \sqrt{2d + bx^2 + 2cx^2} + 2ab \sqrt{bx^2 + 2d} - 2bdx + b^2 \sqrt{c} - 2bcx^2 + ab^2 \sqrt{bx^2 + 2d}}{x^2 \sqrt{bx^2 + 2d} \sqrt{c} + b^2 \sqrt{c}}}{\sqrt{c} \sqrt{bx^2 + 2d} + c \sqrt{2d + bx^2 + 2cx^2} + 2ab \sqrt{bx^2 + 2d} - 2bdx + b^2 \sqrt{c} - 2bcx^2 + ab^2 \sqrt{bx^2 + 2d}}$$

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]]) + (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]]) + (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

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

$$\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{(a + bx^2 + cx^4)^4} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(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] IntegrateAlgebraic[(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]

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]
$$\begin{aligned} & -3*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*\text{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 + \text{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)*\text{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 - \text{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*(\text{sqrt}(2)*\text{sqrt}(b*c + \\ & \text{sqrt}(b^2 - 4*a*c))*b^8 - 17*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^6 \\ & *c - 2*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^7*c - 2*b^8*c + 116*\text{sqrt}(2) \\ &)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*b^4*c^2 + 26*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(\\ & b^2 - 4*a*c))*a*b^5*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^6*c^2 \\ & + 34*a*b^6*c^2 + 2*b^7*c^2 - 368*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a \\ & ^3*b^2*c^3 - 128*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*b^3*c^3 - 13*s \\ & \text{qrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^4*c^3 - 232*a^2*b^4*c^3 - 30*a*b \\ & ^5*c^3 + 448*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^4*c^4 + 224*\text{sqrt}(2)* \\ & \text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^3*b*c^4 + 64*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 \\ & - 4*a*c))*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176*a^2*b^3*c^4 - 112*\text{sqrt}(2)*s \\ & \text{qrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^3*c^5 - 896*a^4*c^5 - 352*a^3*b*c^5 - \text{sqrt} \\ & (2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^7 + 15*\text{sqrt}(2)*\text{sqrt} \\ & (b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^5*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 \\ & - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^6*c - 88*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a* \\ & c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*b^3*c^2 - 22*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a* \\ & c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^4*c^2 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*s \end{aligned}$$


```
t(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b^6*c + 2*a*b^7*c + 144*sqrt(2)*sqrt
(b*c - sqrt(b^2 - 4*a*c))*a^3*b^3*c^2 + 40*sqrt(2)*sqrt(b*c - sqrt(b^2 -
4*a*c))*a^2*b^4*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*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))*
a^4*b*c^3 - 128*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^3*b^2*c^3 - 20*sq
qrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*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))*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))*a*b^6 - 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt
(b^2 - 4*a*c))*a^2*b^4*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^
2 - 4*a*c))*a*b^5*c + 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 -
4*a*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))*a^2*b^3*c^2 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a
*c))*a*b^4*c^2 + 160*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*
c))*a^4*c^3 + 80*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*
a^3*b*c^3 - 18*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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))*
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 -
```

$$8*a^4*b^3*c + 16*a^5*b*c^2)*x^2) + 1/8*\text{integrate}((48*a^2*c^2*e*x + (3*(b^3*c - 8*a*b*c^2)*d + (a*b^2*c + 20*a^2*c^2)*f)*x^2 + 3*(b^4 - 9*a*b^2*c + 28*a^2*c^2)*d + (a*b^3 - 16*a^2*b*c)*f)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)$$

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] $\text{int}((a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^4, x)$

[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) + \text{symsum}(\log(\text{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 - 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 + 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 + 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 - 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 - 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$

$$\begin{aligned}
& 2 + 11025b^{10}c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 20736b^9c^4d^2e^2 \\
& + 492800a^5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 \\
& + 1225a^2b^8c^3f^4 - 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 \\
& - 39690b^9c^4d^3f - 734832a^6c^6d^4 + 49787136a^4c^9d^4 + 160 \\
& 000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k) * (\text{root}(5637 \\
& 1445760a^{11}b^8c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c \\
& ^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 12 \\
& 8849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9 \\
& b^{12}c^4z^4 - 2621440a^6b^{18}c^2z^4 + 68719476736a^{15}c^{10}z^4 + 65536 \\
& a^5b^{20}z^4 - 73728a^2b^{16}c^4d^2f^2z^2 - 1321205760a^9b^2c^8d^2f^2z^2 + \\
& 732168192a^7b^6c^6d^2f^2z^2 - 366280704a^6b^8c^5d^2f^2z^2 - 330301440a \\
& a^8b^4c^7d^2f^2z^2 + 96583680a^5b^{10}c^4d^2f^2z^2 - 15175680a^4b^{12}c^3 \\
& d^2f^2z^2 + 1428480a^3b^{14}c^2d^2f^2z^2 - 440401920a^{10}b^6c^8f^2z^2 + 17 \\
& 61607680a^{10}c^9d^2f^2z^2 - 14080a^3b^{15}c^2f^2z^2 + 6936330240a^8b^3c \\
& ^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^6c^9d^2z^2 \\
& - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a \\
& b^{17}c^4d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2 \\
& z^2 + 477102080a^9b^3c^7f^2z^2 - 174325760a^8b^5c^6f^2z^2 - 1887 \\
& 43680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 + 11206656a^7b \\
& ^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 \\
& - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^ \\
& 3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^ \\
& 2z^2 + 1536a^6b^{18}d^2f^2z^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^ \\
& 2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^6c^8d^2e^2f^2z^2 + 9216a^2b^{13}c^2d \\
& e^2f^2z^2 - 221773824a^6b^3c^7d^2e^2f^2z^2 + 117964800a^5b^5c^6d^2e^2f^2z^2 - 32 \\
& 440320a^4b^7c^5d^2e^2f^2z^2 + 4792320a^3b^9c^4d^2e^2f^2z^2 - 350208a^2b^{11}c \\
& ^3d^2e^2f^2z^2 - 428544a^6b^{12}c^3d^2e^2z^2 + 1022754816a^6b^2c^8d^2e^2z^2 - \\
& 642318336a^5b^4c^7d^2e^2z^2 + 223395840a^4b^6c^6d^2e^2z^2 - 50724864a^ \\
& 7b^2c^7e^2f^2z^2 + 26542080a^6b^4c^6e^2f^2z^2 - 46725120a^3b^8c^5d^2 \\
& e^2z^2 - 7127040a^5b^6c^5e^2f^2z^2 + 1013760a^4b^8c^4e^2f^2z^2 - 69120a^ \\
& 3b^{10}c^3e^2f^2z^2 + 1536a^2b^{12}c^2e^2f^2z^2 + 5930496a^2b^{10}c^4d^2e \\
& z^2 - 693633024a^7c^9d^2e^2z^2 + 39321600a^8c^8e^2f^2z^2 + 13824b^{14}c^2 \\
& d^2e^2z^2 + 13824a^6b^8c^4d^2e^2f^2 - 7741440a^4b^2c^7d^2e^2f^2 + 2903040a \\
& ^3b^4c^6d^2e^2f^2 - 387072a^2b^6c^5d^2e^2f^2 + 37310976a^3b^3c^7d^3 \\
& f^2 + 3870720a^5b^6c^7e^2f^2 + 34836480a^4b^6c^8d^2e^2 - 8068032a^2b^ \\
& 5c^6d^3f^2 - 5623296a^4b^3c^6d^2f^3 + 1737792a^3b^5c^5d^2f^3 - 26019 \\
& 0a^6b^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 - 435456a^6b^7c^5d^2e^2 - \\
& 75188736a^4b^6c^8d^3f^2 - 15482880a^5c^8d^2e^2f^2 - 4262400a^5b^6c^7d^ \\
& f^3 + 852768a^6b^7c^5d^3f^2 + 7350a^6b^9c^3d^2f^3 + 35525376a^4b^2c^7 \\
& d^2f^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2 \\
& b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^ \\
& ^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 + 11025b^{11} \\
& 0c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 20736b^9c^4d^2e^2 + 492800a^ \\
& 5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^ \\
& ^8c^3f^4 - 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 - 39690b^9 \\
& c^4d^3f - 734832a^6c^6d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^ \\
& ^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k) * ((768a^2b^{14}c^2d - \\
& 22020096a^9c^9d - 22272a^3b^{12}c^3d + 282624a^4b^{10}c^4d - 2027520 \\
& a^5b^8c^5d + 8847360a^6b^6c^6d - 23396352a^7b^4c^7d + 34603008a \\
& a^8b^2c^8d + 256a^3b^{13}c^2f - 9216a^4b^{11}c^3f + 122880a^5b^9c^ \\
& ^4f - 819200a^6b^7c^5f + 2949120a^7b^5c^6f - 5505024a^8b^3c^7f \\
& + 4194304a^9b^6c^8f) / (512(a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 24 \\
& 0a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + \\
& (x(786432a^9c^9e - 768a^4b^{10}c^4e + 15360a^5b^8c^5e - 122880a^ \\
& 6b^6c^6e + 491520a^7b^4c^7e - 983040a^8b^2c^8e)) / (32(a^4b^{12} + \\
& 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^ \\
& a^8b^4c^4 - 6144a^9b^2c^5)) + (\text{root}(56371445760a^{11}b^8c^6z^4 - 503 \\
& 316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798691840a^{14}b^2 \\
& c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^7z^4 -
\end{aligned}$$

$$\begin{aligned}
& 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^3z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - 73728a^2b^{16} \\
& *c*d*f*z^2 - 1321205760a^9b^2c^8d*f*z^2 + 732168192a^7b^6c^6d*f*z^2 - 366280704a^6b^8c^5d*f*z^2 - 330301440a^8b^4c^7d*f*z^2 + 96583680 \\
& *a^5b^{10}c^4d*f*z^2 - 15175680a^4b^{12}c^3d*f*z^2 + 1428480a^3b^{14}c^2d*f*z^2 - 440401920a^{10}b^8c^8f^2z^2 + 1761607680a^{10}c^9d*f*z^2 - 14 \\
& 080a^3b^{15}c*f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^8c^9d^2z^2 - 1509949440a^9b^2c^8e^2z \\
& ^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^8b^{17}c^6d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f \\
& ^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 \\
& + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^8b^{18}d*f*z^2 + \\
& 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^8c^8d*e*f*z + 9216a^8b^{13}c^2d*e*f*z - 221773824a^6b^3c^7 \\
& *d*e*f*z + 117964800a^5b^5c^6d*e*f*z - 32440320a^4b^7c^5d*e*f*z + 4792320a^3b^9c^4d*e*f*z - 350208a^2b^{11}c^3d*e*f*z - 428544a^8b^{12}c^3 \\
& d^2e*z + 1022754816a^6b^2c^8d^2e*z - 642318336a^5b^4c^7d^2e*z + 223395840a^4b^6c^6d^2e*z - 50724864a^7b^2c^7e*f^2z + 26542080a^6 \\
& b^4c^6e*f^2z - 46725120a^3b^8c^5d^2e*z - 7127040a^5b^6c^5e*f^2z + 1013760a^4b^8c^4e*f^2z - 69120a^3b^{10}c^3e*f^2z + 1536a^2b^{12}c^2e*f^2z + 5930496a^2b^{10}c^4d^2e*z - 693633024a^7c^9d^2e*z \\
& + 39321600a^8c^8e*f^2z + 13824b^{14}c^2d^2e*z + 13824a^8b^8c^4d^2e^2f - 7741440a^4b^2c^7d^2e^2f + 2903040a^3b^4c^6d^2e^2f - 387072a^2b^6c^5d^2e^2f + 37310976a^3b^3c^7d^3f + 3870720a^5b^6c^7e^2f^2 \\
& + 34836480a^4b^8c^8d^2e^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^2f^3 + 1737792a^3b^5c^5d^2f^3 - 260190a^8b^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 - 435456a^8b^7c^5d^2e^2 - 75188736a^4b^8c^8d^3f - 15 \\
& 482880a^5c^8d^2e^2f - 4262400a^5b^8c^7d^2f^3 + 852768a^8b^7c^5d^3f + 7350a^8b^9c^3d^2f^3 + 35525376a^4b^2c^7d^2f^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 + 11025b^{10}c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 20736b^9c^4d^2e^2 + 492800a^5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 - 39690b^9c^4d^3f - 734832a^8b^6c^6d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k) * x * (4194304a^{11}b^9c^9 - 256a^4b^{15}c^2 + 7168a^5b^{13}c^3 - 86016a^6b^{11}c^4 + 573440a^7b^9c^5 - 2293760a^8b^7c^6 + 5505024a^9b^5c^7 - 7340032a^{10}b^3c^8) / (32 * (a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (3244032a^6b^8c^8d^2e - 983040a^7c^8e^2f + 4608a^2b^9c^4d^2e - 87552a^3b^7c^5d^2e + 681984a^4b^5c^6d^2e - 2433024a^5b^3c^7d^2e + 1536a^3b^8c^4e^2f - 39936a^4b^6c^5e^2f + 184320a^5b^4c^6e^2f + 49152a^6b^2c^7e^2f) / (512 * (a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) - (x * (225792a^6c^9d^2 + 9b^{12}c^3d^2 - 12800a^7c^8f^2 - 252a^8b^{10}c^4d^2 - 36864a^6b^8c^8e^2 + 3114a^2b^8c^5d^2 - 21312a^3b^6c^6d^2 + 88128a^4b^4c^7d^2 - 211968a^5b^2c^8d^2 - 2304a^4b^5c^6e^2 + 18432a^5b^3c^7e^2 + a^2b^{10}c^3f^2 - 42a^3b^8c^4f^2 + 1760a^4b^6c^5f^2 - 13120a^5b^4c^6f^2 + 29952a^6b^2c^7f^2 + 6a^8b^{11}c^3d^2f - 109056a^6b^8c^8d^2f - 210a^2b^9c^4d^2f + 2496a^3b^7c^5d^2f - 18240a^4b^5c^6d^2f + 72192a^5b^3c^7d^2f)) / (32 * (a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) - (567b^7c^5d^3 + 8000a^5c^7f^3 - 10368a^8b^5c^6d^3 - 169344a^3b^8c^8d^3 - 193536a^4c^8d^2e^2 + 141120a^4c^8d^2f - 315b^8c^4d^2f + 67824a^2b^3c^7d^3 - 35a^2b^6c^4f^3 - 8
\end{aligned}$$

$$\begin{aligned}
& 4a^3b^4c^5f^3 + 12720a^4b^2c^6f^3 + 6237a^5b^6c^5d^2f - 210a^6b^7c^4d^2f^2 - 116160a^4b^2c^7d^2f^2 + 36864a^4b^2c^7e^2f - 6912a^2b^4c^6d^2e^2 + 62208a^3b^2c^7d^2e^2 - 42372a^2b^4c^6d^2f + 1764a^2b^5c^5d^2f^2 + 96048a^3b^2c^7d^2f + 4608a^3b^3c^6d^2f^2 - 2304a^3b^3c^6e^2f)/(512(a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (x*(6912a^4c^8e^3 - 27b^7c^5d^2e - 10080a^4c^8d^2e^2 + 486a^5b^5c^6d^2e + 12096a^3b^2c^8d^2e + 3120a^4b^2c^7e^2f^2 - 3672a^2b^3c^7d^2e - 3a^2b^5c^5e^2f^2 + 96a^3b^3c^6e^2f^2 - 18a^5b^6c^5d^2e^2 + 450a^2b^4c^6d^2e^2 - 2448a^3b^2c^7d^2e^2f)/(32(a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)))*\text{root}(56371445760a^{11}b^8c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^3z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - 73728a^2b^{16}c^4d^2fz^2 - 1321205760a^9b^2c^8d^2fz^2 + 732168192a^7b^6c^6d^2fz^2 - 366280704a^6b^8c^5d^2fz^2 - 330301440a^8b^4c^7d^2fz^2 + 96583680a^5b^{10}c^4d^2fz^2 - 15175680a^4b^{12}c^3d^2fz^2 + 1428480a^3b^{14}c^2d^2fz^2 - 440401920a^{10}b^2c^8f^2z^2 + 1761607680a^{10}c^9d^2fz^2 - 14080a^3b^{15}c^2f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^2c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^8b^{17}c^2d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^6b^{18}d^2fz^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^2c^8d^2e^2fz + 9216a^5b^{13}c^2d^2e^2fz - 221773824a^6b^3c^7d^2e^2fz + 117964800a^5b^5c^6d^2e^2fz - 32440320a^4b^7c^5d^2e^2fz + 4792320a^3b^9c^4d^2e^2fz - 350208a^2b^{11}c^3d^2e^2fz - 428544a^5b^{12}c^3d^2e^2z + 1022754816a^6b^2c^8d^2e^2z - 642318336a^5b^4c^7d^2e^2z + 223395840a^4b^6c^6d^2e^2z - 50724864a^7b^2c^7e^2f^2z + 26542080a^6b^4c^6e^2f^2z - 46725120a^3b^8c^5d^2e^2z - 7127040a^5b^6c^5e^2f^2z + 1013760a^4b^8c^4e^2f^2z - 69120a^3b^{10}c^3e^2f^2z + 1536a^2b^{12}c^2e^2f^2z + 5930496a^2b^{10}c^4d^2e^2z - 693633024a^7c^9d^2e^2z + 39321600a^8c^8e^2f^2z + 13824b^{14}c^2d^2e^2z + 13824a^8b^8c^4d^2e^2f - 7741440a^4b^2c^7d^2e^2f + 2903040a^3b^4c^6d^2e^2f - 387072a^2b^6c^5d^2e^2f + 37310976a^3b^3c^7d^3f + 3870720a^5b^2c^7e^2f^2 + 34836480a^4b^2c^8d^2e^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^3f + 1737792a^3b^5c^5d^3f - 260190a^5b^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 - 435456a^5b^7c^5d^2e^2 - 75188736a^4b^2c^8d^3f - 15482880a^5c^8d^2e^2f - 4262400a^5b^2c^7d^2f^3 + 852768a^5b^7c^5d^3f + 7350a^5b^9c^3d^2f^3 + 35525376a^4b^2c^7d^2f^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 + 11025b^{10}c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 20736b^9c^4d^2e^2 + 492800a^5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 - 39690b^9c^4d^3f - 734832a^5b^6c^6d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k), k, 1, 4)
\end{aligned}$$

`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
```


$$3.67 \quad \int \frac{2-x-2x^2+x^3}{4-5x^2+x^4} dx$$

Optimal. Leaf size=4

$$\log(x + 2)$$

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_))^(n_), x_Symbol] :> Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 1586

Int[(u_.)*(P_x_)^(p_.)*(Q_x_)^(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

$$\int \frac{2-x-2x^2+x^3}{4-5x^2+x^4} dx = \int \frac{1}{2+x} dx = \log(2+x)$$

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]

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

$$\int \frac{2-x-2x^2+x^3}{4-5x^2+x^4} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(2 - x - 2*x^2 + x^3)/(4 - 5*x^2 + x^4), x]

[Out] IntegrateAlgebraic[(2 - x - 2*x^2 + x^3)/(4 - 5*x^2 + x^4), x]

fricas [A] time = 1.12, 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)

$$3.68 \quad \int \frac{(d+ex)(2-x-2x^2+x^3)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=14

$$(d - 2e) \log(x + 2) + ex$$

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] && LeQ[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

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

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]

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

$$\int \frac{(d+ex)(2-x-2x^2+x^3)}{4-5x^2+x^4} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[((d + e*x)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4), x]

fricas [A] time = 1.38, 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

$$\ln(x + 2) (d - 2e) + ex$$

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)

$$3.69 \quad \int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=31

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

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] /; FreeQ[{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]

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[((d + e*x + f*x^2)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4), x]

fricas [A] time = 1.22, size = 27, normalized size = 0.87

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

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

$$\frac{1}{2}fx^2 - 2fx + xe + (d + 4f - 2e)\log(|x + 2|)$$

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

$$\frac{fx^2}{2} + d\ln(x + 2) + ex - 2e\ln(x + 2) - 2fx + 4f\ln(x + 2)$$

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

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

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

$$x(e - 2f) + \frac{fx^2}{2} + \ln(x + 2)(d - 2e + 4f)$$

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

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

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)
```

$$3.70 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=51

$$\log(x+2)(d-2e+4f-8g) + x(e-4f+12g) + \frac{1}{2}(x+2)^2(f-6g) + \frac{1}{3}g(x+2)^3$$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3}{2+x} dx \\ &= \int \left(e-4f+12g + \frac{d-2e+4f-8g}{2+x} + (f-6g)(2+x) + g(2+x)^2 \right) dx \\ &= (e-4f+12g)x + \frac{1}{2}(f-6g)(2+x)^2 + \frac{1}{3}g(2+x)^3 + (d-2e+4f-8g)\log(2+x) \end{aligned}$$

Mathematica [A] time = 0.02, size = 45, normalized size = 0.88

$$\log(x+2)(d-2e+4f-8g) + \frac{1}{6}(x+2)(6e+3f(x-6)+2g(x^2-5x+22))$$

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]

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

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

Verification is not applicable to the result.

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

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

fricas [A] time = 1.38, size = 43, normalized size = 0.84

$$\frac{1}{3}gx^3 + \frac{1}{2}(f - 2g)x^2 + (e - 2f + 4g)x + (d - 2e + 4f - 8g)\log(x + 2)$$

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="fricas")

[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)*log(x + 2)

giac [A] time = 0.25, size = 49, normalized size = 0.96

$$\frac{1}{3}gx^3 + \frac{1}{2}fx^2 - gx^2 - 2fx + 4gx + xe + (d + 4f - 8g - 2e)\log(|x + 2|)$$

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="giac")

[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

$$\frac{gx^3}{3} + \frac{fx^2}{2} - gx^2 + d\ln(x + 2) + ex - 2e\ln(x + 2) - 2fx + 4f\ln(x + 2) + 4gx - 8g\ln(x + 2)$$

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

$$\frac{1}{3}gx^3 + \frac{1}{2}(f - 2g)x^2 + (e - 2f + 4g)x + (d - 2e + 4f - 8g)\log(x + 2)$$

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="maxima")

[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)*log(x + 2)

mupad [B] time = 0.04, size = 44, normalized size = 0.86

$$x^2 \left(\frac{f}{2} - g \right) + x (e - 2f + 4g) + \frac{gx^3}{3} + \ln(x + 2) (d - 2e + 4f - 8g)$$

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

$$\frac{gx^3}{3} + x^2\left(\frac{f}{2} - g\right) + x(e - 2f + 4g) + (d - 2e + 4f - 8g)\log(x + 2)$$

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)`

$$3.71 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=68

$$\log(x+2)(d-2e+4f-8g+16h) + x(e-2f+4g-8h) + \frac{1}{2}x^2(f-2g+4h) + \frac{1}{3}x^3(g-2h) + \frac{hx^4}{4}$$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{2+x} dx \\ &= \int \left(e \left(1 - \frac{2(f-2g+4h)}{e} \right) + (f-2g+4h)x + (g-2h)x^2 \right) dx \\ &= (e-2f+4g-8h)x + \frac{1}{2}(f-2g+4h)x^2 + \frac{1}{3}(g-2h)x^3 \end{aligned}$$

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]

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

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

Verification is not applicable to the result.

[In] IntegrateAlgebraic[((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] IntegrateAlgebraic[((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]

fricas [A] time = 1.35, size = 62, normalized size = 0.91

$$\frac{1}{4}hx^4 + \frac{1}{3}(g - 2h)x^3 + \frac{1}{2}(f - 2g + 4h)x^2 + (e - 2f + 4g - 8h)x + (d - 2e + 4f - 8g + 16h)\log(x + 2)$$

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, algorithm="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

$$\frac{1}{4}hx^4 + \frac{1}{3}gx^3 - \frac{2}{3}hx^3 + \frac{1}{2}fx^2 - gx^2 + 2hx^2 - 2fx + 4gx - 8hx + xe + (d + 4f - 8g + 16h - 2e)\log(|x + 2|)$$

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, algorithm="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

$$\frac{hx^4}{4} + \frac{gx^3}{3} - \frac{2hx^3}{3} + \frac{fx^2}{2} - gx^2 + 2hx^2 + d \ln(x + 2) + ex - 2e \ln(x + 2) - 2fx + 4f \ln(x + 2) + 4gx - 8g \ln(x + 2) - 8hx + 16h \ln(x + 2)$$

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

$$\frac{1}{4}hx^4 + \frac{1}{3}(g - 2h)x^3 + \frac{1}{2}(f - 2g + 4h)x^2 + (e - 2f + 4g - 8h)x + (d - 2e + 4f - 8g + 16h)\log(x + 2)$$

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, algorithm="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

$$x^3 \left(\frac{g}{3} - \frac{2h}{3} \right) + \ln(x+2) (d - 2e + 4f - 8g + 16h) + \frac{hx^4}{4} + x^2 \left(\frac{f}{2} - g + 2h \right) + x (e - 2f + 4g - 8h)$$

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

$$\frac{hx^4}{4} + x^3 \left(\frac{g}{3} - \frac{2h}{3} \right) + x^2 \left(\frac{f}{2} - g + 2h \right) + x (e - 2f + 4g - 8h) + (d - 2e + 4f - 8g + 16h) \log(x + 2)$$

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)

$$3.72 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=92

$$\log(x+2)(d-2e+4f-8g+16h-32i)+x(e-2f+4g-8h+16i)+\frac{1}{2}x^2(f-2g+4h-8i)+\frac{1}{3}x^3(g-2h+4i)+\frac{1}{4}x^4(h-2i)+\frac{ix^5}{5}$$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+72x^5)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+72x^5}{2+x} dx \\ &= \int \left(1152 \left(1 + \frac{e-2f+4g-8h}{1152} \right) + (-576+f-2g-4h)x \right) dx \\ &= (1152+e-2f+4g-8h)x - \frac{1}{2}(576-f+2g-4h)x^2 \end{aligned}$$

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]

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

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

Verification is not applicable to the result.

[In] IntegrateAlgebraic[((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] IntegrateAlgebraic[((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]

fricas [A] time = 1.14, size = 84, normalized size = 0.91

$$\frac{1}{5}ix^5 + \frac{1}{4}(h-2i)x^4 + \frac{1}{3}(g-2h+4i)x^3 + \frac{1}{2}(f-2g+4h-8i)x^2 + (e-2f+4g-8h+16i)x + (d-2e+4f-8g+16h-32i)\log(x+2)$$

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

$$\frac{1}{5}ix^5 + \frac{1}{4}hx^4 - \frac{1}{2}ix^4 + \frac{1}{3}gx^3 - \frac{2}{3}hx^3 + \frac{4}{3}ix^3 + \frac{1}{2}fx^2 - gx^2 + 2hx^2 - 4ix^2 - 2fx + 4gx - 8hx + 16ix + xe + (d + 4f - 8g + 16h - 32i - 2e)\log(|x + 2|)$$

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

$$\frac{ix^5}{5} + \frac{hx^4}{4} - \frac{ix^4}{2} + \frac{gx^3}{3} - \frac{2hx^3}{3} + \frac{4ix^3}{3} + \frac{fx^2}{2} - gx^2 + 2hx^2 - 4ix^2 + d\ln(x+2) + ex - 2e\ln(x+2) - 2fx + 4f\ln(x+2) + 4gx - 8g\ln(x+2) - 8hx + 16h\ln(x+2) + 16ix - 32i\ln(x+2)$$

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

$$\frac{1}{5}ix^5 + \frac{1}{4}(h-2i)x^4 + \frac{1}{3}(g-2h+4i)x^3 + \frac{1}{2}(f-2g+4h-8i)x^2 + (e-2f+4g-8h+16i)x + (d-2e+4f-8g+16h-32i)\log(x+2)$$

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

$$x^4 \left(\frac{h}{4} - \frac{i}{2} \right) + \ln(x+2) (d - 2e + 4f - 8g + 16h - 32i) + \frac{ix^5}{5} + x^2 \left(\frac{f}{2} - g + 2h - 4i \right) + x (e - 2f + 4g - 8h + 16i) + x^3 \left(\frac{g}{3} - \frac{2h}{3} + \frac{4i}{3} \right)$$

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), 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

$$\frac{ix^5}{5} + x^4 \left(\frac{h}{4} - \frac{i}{2} \right) + x^3 \left(\frac{g}{3} - \frac{2h}{3} + \frac{4i}{3} \right) + x^2 \left(\frac{f}{2} - g + 2h - 4i \right) + x (e - 2f + 4g - 8h + 16i) + (d - 2e + 4f - 8g + 16h - 32i) \log(x + 2)$$

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)`

$$3.73 \quad \int \frac{2-3x+x^2}{4-5x^2+x^4} dx$$

Optimal. Leaf size=11

$$\log(x+1) - \log(x+2)$$

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_))^(n_), x_Symbol] :> Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 616

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(n_), 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]

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

$$\int \frac{2-3x+x^2}{4-5x^2+x^4} dx$$

Verification is not applicable to the result.

```
[In] IntegrateAlgebraic[(2 - 3*x + x^2)/(4 - 5*x^2 + x^4),x]
[Out] IntegrateAlgebraic[(2 - 3*x + x^2)/(4 - 5*x^2 + x^4), x]
fricas [A]   time = 1.22, 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*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)
```

$$3.74 \quad \int \frac{(d+ex)(2-3x+x^2)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=22

$$(d - e) \log(x + 1) - (d - 2e) \log(x + 2)$$

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_))^(n_), 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] :> With[{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

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

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]

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

$$\int \frac{(d + ex)(2 - 3x + x^2)}{4 - 5x^2 + x^4} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[((d + e*x)*(2 - 3*x + x^2))/(4 - 5*x^2 + x^4), x]

fricas [A] time = 0.98, 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)
```

$$3.75 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=29

$$\log(x+1)(d-e+f) - \log(x+2)(d-2e+4f) + fx$$

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_))^(n_), 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] := With[{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]

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[((2 - 3*x + x^2)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4), x]

fricas [A] time = 0.85, size = 29, normalized size = 1.00

$$fx - (d - 2e + 4f) \log(x + 2) + (d - e + f) \log(x + 1)$$

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

$$fx - (d + 4f - 2e) \log(|x + 2|) + (d + f - e) \log(|x + 1|)$$

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

$$-d \ln(x + 2) + d \ln(x + 1) + 2e \ln(x + 2) - e \ln(x + 1) + fx - 4f \ln(x + 2) + f \ln(x + 1)$$

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

$$fx - (d - 2e + 4f) \log(x + 2) + (d - e + f) \log(x + 1)$$

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

$$fx + \ln(x + 1) (d - e + f) - \ln(x + 2) (d - 2e + 4f)$$

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

$$fx + (-d + 2e - 4f) \log\left(x + \frac{4d - 6e + 10f}{2d - 3e + 5f}\right) + (d - e + f) \log(x + 1)$$

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)`

$$3.76 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=47

$$\log(x+1)(d-e+f-g) - \log(x+2)(d-2e+4f-8g) + x(f-3g) + \frac{gx^2}{2}$$

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_))^(n_), 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] := With[{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

$$\begin{aligned} \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3}{2+3x+x^2} dx \\ &= \int \left(f-3g+gx + \frac{d-2f+6g+(e-3f+7g)x}{2+3x+x^2} \right) dx \\ &= (f-3g)x + \frac{gx^2}{2} + \int \frac{d-2f+6g+(e-3f+7g)x}{2+3x+x^2} dx \\ &= (f-3g)x + \frac{gx^2}{2} - (d-2e+4f-8g) \int \frac{1}{2+x} dx + (d-e+f-g) \int \frac{1}{2+x} dx \\ &= (f-3g)x + \frac{gx^2}{2} + (d-e+f-g) \log(1+x) - (d-2e+4f-8g) \log(2+x) \end{aligned}$$

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]

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

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

Verification is not applicable to the result.

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

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

fricas [A] time = 0.88, 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="fricas")

[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

$$\frac{gx^2}{2} - d\ln(x+2) + d\ln(x+1) + 2e\ln(x+2) - e\ln(x+1) + fx - 4f\ln(x+2) + f\ln(x+1) - 3gx + 8g\ln(x+2) - g\ln(x+1)$$

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*ln(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="maxima")

[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

$$\ln(x+1)(d-e+f-g) + x(f-3g) + \frac{gx^2}{2} - \ln(x+2)(d-2e+4f-8g)$$

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)

$$3.77 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=66

$$\log(x+1)(d-e+f-g+h) - \log(x+2)(d-2e+4f-8g+16h) + x(f-3g+7h) + \frac{1}{2}x^2(g-3h) + \frac{hx^3}{3}$$

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_))^(n_), 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] := With[{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

$$\begin{aligned}
\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{2+3x+x^2} dx \\
&= \int \left(f-3g+7h + (g-3h)x + hx^2 + \frac{d-2f+6g-14h+(g-3h)x+hx^2}{2+3x} \right) dx \\
&= (f-3g+7h)x + \frac{1}{2}(g-3h)x^2 + \frac{hx^3}{3} + \int \frac{d-2f+6g-14h+(g-3h)x+hx^2}{2+3x} dx \\
&= (f-3g+7h)x + \frac{1}{2}(g-3h)x^2 + \frac{hx^3}{3} + (d-e+f-g+h) \log(x+1) \\
&= (f-3g+7h)x + \frac{1}{2}(g-3h)x^2 + \frac{hx^3}{3} + (d-e+f-g+h) \log(x+1)
\end{aligned}$$

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]

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

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

Verification is not applicable to the result.

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

fricas [A] time = 0.92, 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] $1/3*h*x^3 + 1/2*g*x^2 - 3/2*h*x^2 + f*x - 3*g*x + 7*h*x - (d + 4*f - 8*g + 16*h - 2*e)*\log(\text{abs}(x + 2)) + (d + f - g + h - e)*\log(\text{abs}(x + 1))$

maple [A] time = 0.01, size = 98, normalized size = 1.48

$$\frac{hx^3}{3} + \frac{gx^2}{2} - \frac{3hx^2}{2} - d\ln(x+2) + d\ln(x+1) + 2e\ln(x+2) - e\ln(x+1) + fx - 4f\ln(x+2) + f\ln(x+1) - 3gx + 8g\ln(x+2) - g\ln(x+1) + 7hx - 16h\ln(x+2) + h\ln(x+1)$$

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

$$\frac{1}{3}hx^3 + \frac{1}{2}(g-3h)x^2 + (f-3g+7h)x - (d-2e+4f-8g+16h)\log(x+2) + (d-e+f-g+h)\log(x+1)$$

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="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

$$x^2 \left(\frac{g}{2} - \frac{3h}{2} \right) + x(f-3g+7h) - \ln(x+2)(d-2e+4f-8g+16h) + \frac{hx^3}{3} + \ln(x+1)(d-e+f-g+h)$$

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

$$\frac{hx^3}{3} + x^2 \left(\frac{g}{2} - \frac{3h}{2} \right) + x(f-3g+7h) + (-d+2e-4f+8g-16h)\log\left(x + \frac{4d-6e+10f-18g+34h}{2d-3e+5f-9g+17h}\right) + (d-e+f-g+h)\log(x+1)$$

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)`

[Out] $h*x**3/3 + x**2*(g/2 - 3*h/2) + x*(f - 3*g + 7*h) + (-d + 2*e - 4*f + 8*g - 16*h)*\log(x + (4*d - 6*e + 10*f - 18*g + 34*h)/(2*d - 3*e + 5*f - 9*g + 17*h)) + (d - e + f - g + h)*\log(x + 1)$

$$3.78 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=90

$$\log(x+1)(d-e+f-g+h-i)-\log(x+2)(d-2e+4f-8g+16h-32i)+x(f-3g+7h-15i)+\frac{1}{2}x^2(g-3h+7i)+\frac{1}{3}x^3(h-3i)+\frac{ix^4}{4}$$

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}

$$\log(x+1)(d-e+f-g+h-i)-\log(x+2)(d-2e+4f-8g+16h-32i)+x(f-3g+7h-15i)+\frac{1}{2}x^2(g-3h+7i)+\frac{1}{3}x^3(h-3i)+\frac{ix^4}{4}$$

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_))^(n_), 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] := With[{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[ExpandIntegrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, -2]

Rubi steps

$$\begin{aligned}
\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+78x^5)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+78x^5}{2+3x+x^2} dx \\
&= \int \left(-1170 + f - 3g + 7h + (546 + g - 3h)x - (234 - h)x^2 \right) dx \\
&= -((1170 - f + 3g - 7h)x) + \frac{1}{2}(546 + g - 3h)x^2 - \frac{1}{3}(234 - h)x^3 \\
&= -((1170 - f + 3g - 7h)x) + \frac{1}{2}(546 + g - 3h)x^2 - \frac{1}{3}(234 - h)x^3 \\
&= -((1170 - f + 3g - 7h)x) + \frac{1}{2}(546 + g - 3h)x^2 - \frac{1}{3}(234 - h)x^3
\end{aligned}$$

Mathematica [A] time = 0.04, size = 91, normalized size = 1.01

$$\log(x+1)(d-e+f-g+h-i) + \log(x+2)(-d+2e-4f+8g-16h+32i) + x(f-3g+7h-15i) + \frac{1}{2}x^2(g-3h+7i) + \frac{1}{3}x^3(h-3i) + \frac{ix^4}{4}$$

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]

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

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

Verification is not applicable to the result.

[In] IntegrateAlgebraic[((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] IntegrateAlgebraic[((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]

fricas [A] time = 0.72, size = 84, normalized size = 0.93

$$\frac{1}{4}ix^4 + \frac{1}{3}(h-3i)x^3 + \frac{1}{2}(g-3h+7i)x^2 + (f-3g+7h-15i)x - (d-2e+4f-8g+16h-32i)\log(x+2) + (d-e+f-g+h-i)\log(x+1)$$

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, algorithm="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

$$\frac{1}{4}ix^4 + \frac{1}{3}hx^3 - ix^3 + \frac{1}{2}gx^2 - \frac{3}{2}hx^2 + \frac{7}{2}ix^2 + fx - 3gx + 7hx - 15ix - (d+4f-8g+16h-32i-2e)\log(|x+2|) + (d+f-g+h-i-e)\log(|x+1|)$$

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, algorithm="giac")

[Out] $\frac{1}{4}ix^4 + \frac{1}{3}hx^3 - ix^3 + \frac{1}{2}gx^2 - \frac{3}{2}hx^2 + \frac{7}{2}ix^2 + fx - 3gx + 7hx - 15ix - (d + 4f - 8g + 16h - 32i - 2e) \cdot \log(\text{abs}(x + 2)) + (d + f - g + h - i - e) \cdot \log(\text{abs}(x + 1))$

maple [A] time = 0.01, size = 134, normalized size = 1.49

$$\frac{ix^4}{4} + \frac{hx^3}{3} - ix^3 + \frac{gx^2}{2} - \frac{3hx^2}{2} + \frac{7ix^2}{2} - d \ln(x+2) + d \ln(x+1) + 2e \ln(x+2) - e \ln(x+1) + fx - 4f \ln(x+2) + f \ln(x+1) - 3gx + 8g \ln(x+2) - g \ln(x+1) + 7hx - 16h \ln(x+2) + h \ln(x+1) - 15ix + 32i \ln(x+2) - i \ln(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((x^2-3x+2) \cdot (ix^5+hx^4+gx^3+fx^2+ex+d) / (x^4-5x^2+4), x)$

[Out] $\frac{1}{4}ix^4 + \frac{1}{3}hx^3 - ix^3 + \frac{1}{2}gx^2 - \frac{3}{2}hx^2 + \frac{7}{2}ix^2 + fx - 3gx + 7hx - 15ix + d \cdot \ln(x+1) - e \cdot \ln(x+1) + f \cdot \ln(x+1) - g \cdot \ln(x+1) + h \cdot \ln(x+1) - i \cdot \ln(x+1) - d \cdot \ln(x+2) + 2e \cdot \ln(x+2) - 4f \cdot \ln(x+2) + 8g \cdot \ln(x+2) - 16h \cdot \ln(x+2) + 32i \cdot \ln(x+2)$

maxima [A] time = 0.44, size = 84, normalized size = 0.93

$$\frac{1}{4}ix^4 + \frac{1}{3}(h-3i)x^3 + \frac{1}{2}(g-3h+7i)x^2 + (f-3g+7h-15i)x - (d-2e+4f-8g+16h-32i) \log(x+2) + (d-e+f-g+h-i) \log(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{integrate}((x^2-3x+2) \cdot (ix^5+hx^4+gx^3+fx^2+ex+d) / (x^4-5x^2+4), x, \text{algorithm}="maxima")$

[Out] $\frac{1}{4}ix^4 + \frac{1}{3}(h-3i)x^3 + \frac{1}{2}(g-3h+7i)x^2 + (f-3g+7h-15i)x - (d-2e+4f-8g+16h-32i) \cdot \log(x+2) + (d-e+f-g+h-i) \cdot \log(x+1)$

mupad [B] time = 0.08, size = 86, normalized size = 0.96

$$x^3 \left(\frac{h}{3} - i \right) - \ln(x+2) (d-2e+4f-8g+16h-32i) + \ln(x+1) (d-e+f-g+h-i) + \frac{ix^4}{4} + x^2 \left(\frac{g}{2} - \frac{3h}{2} + \frac{7i}{2} \right) + x (f-3g+7h-15i)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}(((x^2-3x+2) \cdot (d+ex+fx^2+gx^3+hx^4+ix^5)) / (x^4-5x^2+4), x)$

[Out] $x^3 \cdot (h/3 - i) - \log(x+2) \cdot (d-2e+4f-8g+16h-32i) + \log(x+1) \cdot (d-e+f-g+h-i) + (ix^4)/4 + x^2 \cdot (g/2 - (3h)/2 + (7i)/2) + x \cdot (f-3g+7h-15i)$

sympy [A] time = 2.59, size = 122, normalized size = 1.36

$$\frac{ix^4}{4} + x^3 \left(\frac{h}{3} - i \right) + x^2 \left(\frac{g}{2} - \frac{3h}{2} + \frac{7i}{2} \right) + x (f-3g+7h-15i) + (-d+2e-4f+8g-16h+32i) \log\left(x + \frac{4d-6e+10f-18g+34h-66i}{2d-3e+5f-9g+17h-33i}\right) + (d-e+f-g+h-i) \log(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{integrate}((x^2-3x+2) \cdot (ix^5+hx^4+gx^3+fx^2+ex+d) / (x^4-5x^2+4), x)$

[Out] $ix^4/4 + x^3 \cdot (h/3 - i) + x^2 \cdot (g/2 - 3h/2 + 7i/2) + x \cdot (f - 3g + 7h - 15i) + (-d + 2e - 4f + 8g - 16h + 32i) \cdot \log(x + (4d - 6e + 10f - 18g + 34h - 66i) / (2d - 3e + 5f - 9g + 17h - 33i)) + (d - e + f - g + h - i) \cdot \log(x + 1)$

$$3.79 \quad \int \frac{2+x}{4-5x^2+x^4} dx$$

Optimal. Leaf size=29

$$-\frac{1}{2} \log(1-x) + \frac{1}{3} \log(2-x) + \frac{1}{6} \log(x+1)$$

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

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

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

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(2 + x)/(4 - 5*x^2 + x^4), x]

[Out] IntegrateAlgebraic[(2 + x)/(4 - 5*x^2 + x^4), x]

fricas [A] time = 1.20, 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

$$\frac{1}{6} \log(|x + 1|) - \frac{1}{2} \log(|x - 1|) + \frac{1}{3} \log(|x - 2|)$$

Verification of antiderivative is not currently implemented for this CAS.

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

$$\frac{\ln(x - 2)}{3} - \frac{\ln(x - 1)}{2} + \frac{\ln(x + 1)}{6}$$

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

$$\frac{1}{6} \log(x + 1) - \frac{1}{2} \log(x - 1) + \frac{1}{3} \log(x - 2)$$

Verification of antiderivative is not currently implemented for this CAS.

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

$$\frac{\ln(x + 1)}{6} - \frac{\ln(x - 1)}{2} + \frac{\ln(x - 2)}{3}$$

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

$$\frac{\log(x - 2)}{3} - \frac{\log(x - 1)}{2} + \frac{\log(x + 1)}{6}$$

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

$$3.80 \quad \int \frac{(2+x)(d+ex)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=42

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

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_)*(P_x_)^(p_)*(Q_x_)^(q_), x_Symbol] :> Int[u*PolynomialQuotient[P_x, Q_x, x]^p*Q_x^(p+q), x] /; FreeQ[q, x] && PolyQ[P_x, x] && PolyQ[Q_x, x] && EqQ[PolynomialRemainder[P_x, Q_x, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 2074

Int[(P_)^(p_)*(Q_)^(q_), x_Symbol] :> With[{PP = Factor[P]}, Int[ExpandIntegrand[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

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[((2 + x)*(d + e*x))/(4 - 5*x^2 + x^4), x]

fricas [A] time = 0.96, 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)*log(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

$$\frac{(d - e) \log\left(x + \frac{26d^3 + 66d^2e - 9d^2(d - e) + 78d^2e^2 - 12d(d - e)d - 7d(d - e)^2 + 46e^3 + 3e^2(d - e) - 8d(d - e)^2}{10d^3 + 69d^2e + 102d^2e^2 + 35e^3}\right)}{6} - \frac{(d + e) \log\left(x + \frac{26d^3 + 66d^2e + 27d^2(d + e) + 78d^2e^2 + 36d(d + e) - 63d(d + e)^2 + 46e^3 - 9e^2(d + e) - 72d(d + e)^2}{10d^3 + 69d^2e + 102d^2e^2 + 35e^3}\right)}{2} + \frac{(d + 2e) \log\left(x + \frac{26d^3 + 66d^2e - 18d^2(d + 2e) + 78d^2e^2 - 24d(d + 2e) - 28d(d + 2e)^2 + 46e^3 + 6e^2(d + 2e) - 32d(d + 2e)^2}{10d^3 + 69d^2e + 102d^2e^2 + 35e^3}\right)}{3}$$

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] $(d - e) \log(x + (26d^3 + 66d^2e - 9d^2(d - e) + 78de^2 - 12de(d - e) - 7d(d - e)^2 + 46e^3 + 3e^2(d - e) - 8e(d - e)^2)/(10d^3 + 69d^2e + 102de^2 + 35e^3))/6 - (d + e) \log(x + (26d^3 + 66d^2e + 27d^2(d + e) + 78de^2 + 36de(d + e) - 63d(d + e)^2 + 46e^3 - 9e^2(d + e) - 72e(d + e)^2)/(10d^3 + 69d^2e + 102de^2 + 35e^3))/2 + (d + 2e) \log(x + (26d^3 + 66d^2e - 18d^2(d + 2e) + 78de^2 - 24de(d + 2e) - 28d(d + 2e)^2 + 46e^3 + 6e^2(d + 2e) - 32e(d + 2e)^2)/(10d^3 + 69d^2e + 102de^2 + 35e^3))/3$

$$3.81 \quad \int \frac{(2+x)(d+ex+fx^2)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=47

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

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[ExpandIntegrand[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

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

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

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[((2 + x)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4), x]

fricas [A] time = 1.18, size = 37, normalized size = 0.79

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

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

$$\frac{1}{6}(d + f - e)\log(|x + 1|) - \frac{1}{2}(d + f + e)\log(|x - 1|) + \frac{1}{3}(d + 4f + 2e)\log(|x - 2|)$$

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

$$\frac{d \ln(x-2)}{3} - \frac{d \ln(x-1)}{2} + \frac{d \ln(x+1)}{6} + \frac{2e \ln(x-2)}{3} - \frac{e \ln(x-1)}{2} - \frac{e \ln(x+1)}{6} + \frac{4f \ln(x-2)}{3} - \frac{f \ln(x-1)}{2} + \frac{f \ln(x+1)}{6}$$

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

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

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

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

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

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] $(d - e + f) \log(x + (26d^3 + 66d^2e + 132d^2f - 9d^2(d - e + f) + 78de^2 + 276d^2ef - 12d^2e(d - e + f) + 222d^2f^2 + 6d^2f(d - e + f) - 7d^2(d - e + f)^2 + 46e^3 + 204e^2f + 3e^2(d - e + f) + 282ef^2 + 36ef(d - e + f) - 8e(d - e + f)^2 + 116f^3 + 51f^2(d - e + f) - 13f(d - e + f)^2) / (10d^3 + 69d^2e + 102d^2f + 102de^2 + 318d^2ef + 246d^2f^2 + 35e^3 + 174e^2f + 285ef^2 + 154f^3)) / 6 - (d + e + f) \log(x + (26d^3 + 66d^2e + 132d^2f + 27d^2(d + e + f) + 78de^2 + 276d^2ef + 36d^2e(d + e + f) + 222d^2f^2 - 18d^2f(d + e + f) - 63d^2(d + e + f)^2 + 46e^3 + 204e^2f - 9e^2(d + e + f) + 282ef^2 - 108ef(d + e + f) - 72e(d + e + f)^2 + 116f^3 - 153f^2(d + e + f) - 117f(d + e + f)^2) / (10d^3 + 69d^2e + 102d^2f + 102de^2 + 318d^2ef + 246d^2f^2 + 35e^3 + 174e^2f + 285ef^2 + 154f^3)) / 2 + (d + 2e + 4f) \log(x + (26d^3 + 66d^2e + 132d^2f - 18d^2(d + 2e + 4f) + 78de^2 + 276d^2ef - 24d^2e(d + 2e + 4f) + 222d^2f^2 + 12d^2f(d + 2e + 4f) - 28d^2(d + 2e + 4f)^2 + 46e^3 + 204e^2f + 6e^2(d + 2e + 4f) + 282ef^2 + 72ef(d + 2e + 4f) - 32e(d + 2e + 4f)^2 + 116f^3 + 102f^2(d + 2e + 4f) - 52f(d + 2e + 4f)^2) / (10d^3 + 69d^2e + 102d^2f + 102de^2 + 318d^2ef + 246d^2f^2 + 35e^3 + 174e^2f + 285ef^2 + 154f^3)) / 3$

$$3.82 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=57

$$-\frac{1}{2} \log(1-x)(d+e+f+g) + \frac{1}{3} \log(2-x)(d+2e+4f+8g) + \frac{1}{6} \log(x+1)(d-e+f-g) + gx$$

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[ExpandIntegrand[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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3}{2-x-2x^2+x^3} dx \\ &= \int \left(g + \frac{d+2e+4f+8g}{3(-2+x)} + \frac{-d-e-f-g}{2(-1+x)} + \frac{d-e+f-g}{6(1+x)} \right) dx \\ &= gx - \frac{1}{2}(d+e+f+g) \log(1-x) + \frac{1}{3}(d+2e+4f+8g) \log(2-x) + \frac{1}{6}(d- \end{aligned}$$

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

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

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

Verification is not applicable to the result.

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

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

fricas [A] time = 1.16, size = 47, normalized size = 0.82

$$gx + \frac{1}{6}(d - e + f - g)\log(x + 1) - \frac{1}{2}(d + e + f + g)\log(x - 1) + \frac{1}{3}(d + 2e + 4f + 8g)\log(x - 2)$$

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

$$gx + \frac{1}{6}(d + f - g - e)\log(|x + 1|) - \frac{1}{2}(d + f + g + e)\log(|x - 1|) + \frac{1}{3}(d + 4f + 8g + 2e)\log(|x - 2|)$$

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

$$\frac{d \ln(x-2)}{3} - \frac{d \ln(x-1)}{2} + \frac{d \ln(x+1)}{6} + \frac{2e \ln(x-2)}{3} - \frac{e \ln(x-1)}{2} - \frac{e \ln(x+1)}{6} + \frac{4f \ln(x-2)}{3} - \frac{f \ln(x-1)}{2} + \frac{f \ln(x+1)}{6} + gx + \frac{8g \ln(x-2)}{3} - \frac{g \ln(x-1)}{2} - \frac{g \ln(x+1)}{6}$$

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

$$gx + \frac{1}{6}(d - e + f - g)\log(x + 1) - \frac{1}{2}(d + e + f + g)\log(x - 1) + \frac{1}{3}(d + 2e + 4f + 8g)\log(x - 2)$$

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

$$\ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} \right) - \ln(x - 1) \left(\frac{d}{2} + \frac{e}{2} + \frac{f}{2} + \frac{g}{2} \right) + \ln(x - 2) \left(\frac{d}{3} + \frac{2e}{3} + \frac{4f}{3} + \frac{8g}{3} \right) + gx$$

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) + log(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) + 78*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$$

$$3.83 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=74

$$-\frac{1}{2} \log(1-x)(d+e+f+g+h) + \frac{1}{3} \log(2-x)(d+2e+4f+8g+16h) + \frac{1}{6} \log(x+1)(d-e+f-g+h) + x(g+2h) + \frac{hx^2}{2}$$

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[ExpandIntegrand[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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{2-x-2x^2+x^3} dx \\ &= \int \left(g \left(1 + \frac{2h}{g} \right) + \frac{d+2e+4f+8g+16h}{3(-2+x)} + \frac{-d-e-f-g-h}{2(-1+x)} \right) dx \\ &= (g+2h)x + \frac{hx^2}{2} - \frac{1}{2}(d+e+f+g+h) \log(1-x) + \frac{1}{3}(d+2e+4f+8g+16h) \log(2-x) + \frac{1}{6}(d-e+f-g+h) \log(1+x) \end{aligned}$$

Mathematica [A] time = 0.03, size = 71, normalized size = 0.96

$$\frac{1}{6} (-3 \log(1-x)(d+e+f+g+h) + 2 \log(2-x)(d+2(e+2f+4g+8h)) + \log(x+1)(d-e+f-g+h) + 6x(g+2h) + 3hx^2)$$

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

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

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

Verification is not applicable to the result.

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

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

fricas [A] time = 0.74, size = 62, normalized size = 0.84

$$\frac{1}{2}hx^2 + (g + 2h)x + \frac{1}{6}(d - e + f - g + h)\log(x + 1) - \frac{1}{2}(d + e + f + g + h)\log(x - 1) + \frac{1}{3}(d + 2e + 4f + 8g + 16h)\log(x - 2)$$

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="fricas")

[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

$$\frac{1}{2}hx^2 + gx + 2hx + \frac{1}{6}(d + f - g + h - e)\log(|x + 1|) - \frac{1}{2}(d + f + g + h + e)\log(|x - 1|) + \frac{1}{3}(d + 4f + 8g + 16h + 2e)\log(|x - 2|)$$

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

$$\frac{hx^2}{2} + \frac{d \ln(x-2)}{3} - \frac{d \ln(x-1)}{2} + \frac{d \ln(x+1)}{6} + \frac{2e \ln(x-2)}{3} - \frac{e \ln(x-1)}{2} - \frac{e \ln(x+1)}{6} + \frac{4f \ln(x-2)}{3} - \frac{f \ln(x-1)}{2} + \frac{f \ln(x+1)}{6} + gx + \frac{8g \ln(x-2)}{3} - \frac{g \ln(x-1)}{2} - \frac{g \ln(x+1)}{6} + 2hx + \frac{16h \ln(x-2)}{3} - \frac{h \ln(x-1)}{2} + \frac{h \ln(x+1)}{6}$$

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

$$\frac{1}{2}hx^2 + (g + 2h)x + \frac{1}{6}(d - e + f - g + h)\log(x + 1) - \frac{1}{2}(d + e + f + g + h)\log(x - 1) + \frac{1}{3}(d + 2e + 4f + 8g + 16h)\log(x - 2)$$

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="maxima")

[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

$$x(g + 2h) + \frac{hx^2}{2} - \ln(x - 1) \left(\frac{d}{2} + \frac{e}{2} + \frac{f}{2} + \frac{g}{2} + \frac{h}{2} \right) + \ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} \right) + \ln(x - 2) \left(\frac{d}{3} + \frac{2e}{3} + \frac{4f}{3} + \frac{8g}{3} + \frac{16h}{3} \right)$$

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))/(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
```

$$3.84 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=96

$$-\frac{1}{2} \log(1-x)(d+e+f+g+h+i) + \frac{1}{3} \log(2-x)(d+2e+4f+8g+16h+32i) + \frac{1}{6} \log(x+1)(d-e+f-g+h-i) + x(g+2h+5i) +$$

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}

$$-\frac{1}{2} \log(1-x)(d+e+f+g+h+i) + \frac{1}{3} \log(2-x)(d+2e+4f+8g+16h+32i) + \frac{1}{6} \log(x+1)(d-e+f-g+h-i) + x(g+2h+5i) + \frac{1}{2}x^2(h+2i) + \frac{ix^3}{3}$$

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[ExpandIntegrand[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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+84x^5)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+84x^5}{2-x-2x^2+x^3} dx \\ &= \int \left(420 \left(1 + \frac{1}{420}(g+2h) \right) + \frac{2688+d+2e+4f+8g+16h}{3(-2+x)} \right) dx \\ &= (420+g+2h)x + \frac{1}{2}(168+h)x^2 + 28x^3 - \frac{1}{2}(84+d+e+f+x) \end{aligned}$$

Mathematica [A] time = 0.05, size = 91, normalized size = 0.95

$$\frac{1}{6}(-3 \log(1-x)(d+e+f+g+h+i) + 2 \log(2-x)(d+2e+4(f+2g+4h+8i)) + \log(x+1)(d-e+f-g+h-i) + 6x(g+2h+5i) + 3x^2(h+2i) + 2ix^3)$$

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

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

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

Verification is not applicable to the result.

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

fricas [A] time = 1.21, size = 82, normalized size = 0.85

$$\frac{1}{3}ix^3 + \frac{1}{2}(h+2i)x^2 + (g+2h+5i)x + \frac{1}{6}(d-e+f-g+h-i)\log(x+1) - \frac{1}{2}(d+e+f+g+h+i)\log(x-1) + \frac{1}{3}(d+2e+4f+8g+16h+32i)\log(x-2)$$

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

$$\frac{1}{3}ix^3 + \frac{1}{2}hx^2 + ix^2 + gx + 2hx + 5ix + \frac{1}{6}(d+f-g+h-i-e)\log(|x+1|) - \frac{1}{2}(d+f+g+h+i+e)\log(|x-1|) + \frac{1}{3}(d+4f+8g+16h+32i+2e)\log(|x-2|)$$

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

$$\frac{ix^3}{3} + \frac{hx^2}{2} + ix^2 + \frac{d \ln(x-2)}{3} - \frac{d \ln(x-1)}{2} + \frac{d \ln(x+1)}{6} + \frac{2e \ln(x-2)}{3} - \frac{e \ln(x-1)}{2} - \frac{e \ln(x+1)}{6} + \frac{4f \ln(x-2)}{3} - \frac{f \ln(x-1)}{2} + \frac{f \ln(x+1)}{6} + gx + \frac{8g \ln(x-2)}{3} - \frac{g \ln(x-1)}{2} - \frac{g \ln(x+1)}{6} + 2hx + \frac{16h \ln(x-2)}{3} - \frac{h \ln(x-1)}{2} + \frac{h \ln(x+1)}{6} + 5ix + \frac{32i \ln(x-2)}{3} - \frac{i \ln(x-1)}{2} - \frac{i \ln(x+1)}{6}$$

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

$$\frac{1}{3}ix^3 + \frac{1}{2}(h+2i)x^2 + (g+2h+5i)x + \frac{1}{6}(d-e+f-g+h-i)\log(x+1) - \frac{1}{2}(d+e+f+g+h+i)\log(x-1) + \frac{1}{3}(d+2e+4f+8g+16h+32i)\log(x-2)$$

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

$$x(g+2h+5i) + \frac{ix^3}{3} - \ln(x-1)\left(\frac{d}{2} + \frac{e}{2} + \frac{f}{2} + \frac{g}{2} + \frac{h}{2} + \frac{i}{2}\right) + \ln(x+1)\left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} - \frac{i}{6}\right) + \ln(x-2)\left(\frac{d}{3} + \frac{2e}{3} + \frac{4f}{3} + \frac{8g}{3} + \frac{16h}{3} + \frac{32i}{3}\right) + x^2\left(\frac{h}{2} + i\right)$$

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), 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

$$3.85 \quad \int \frac{2-x-2x^2+x^3}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=46

$$\frac{1}{12(x+2)} - \frac{1}{18} \log(1-x) + \frac{1}{48} \log(2-x) + \frac{1}{6} \log(x+1) - \frac{19}{144} \log(x+2)$$

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[ExpandIntegrand[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

$$\begin{aligned} \int \frac{2-x-2x^2+x^3}{(4-5x^2+x^4)^2} dx &= \int \frac{1}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left(\frac{1}{48(-2+x)} - \frac{1}{18(-1+x)} + \frac{1}{6(1+x)} - \frac{1}{12(2+x)^2} - \frac{19}{144(2+x)} \right) dx \\ &= \frac{1}{12(2+x)} - \frac{1}{18} \log(1-x) + \frac{1}{48} \log(2-x) + \frac{1}{6} \log(1+x) - \frac{19}{144} \log(2+x) \end{aligned}$$

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

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

$$\int \frac{2 - x - 2x^2 + x^3}{(4 - 5x^2 + x^4)^2} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(2 - x - 2*x^2 + x^3)/(4 - 5*x^2 + x^4)^2,x]

[Out] IntegrateAlgebraic[(2 - x - 2*x^2 + x^3)/(4 - 5*x^2 + x^4)^2, x]

fricas [A] time = 1.06, size = 45, normalized size = 0.98

$$\frac{19(x+2)\log(x+2) - 24(x+2)\log(x+1) + 8(x+2)\log(x-1) - 3(x+2)\log(x-2) - 12}{144(x+2)}$$

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

$$\frac{1}{12(x+2)} - \frac{19}{144} \log(|x+2|) + \frac{1}{6} \log(|x+1|) - \frac{1}{18} \log(|x-1|) + \frac{1}{48} \log(|x-2|)$$

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)^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

$$-\frac{19 \ln(x+2)}{144} + \frac{\ln(x-2)}{48} - \frac{\ln(x-1)}{18} + \frac{\ln(x+1)}{6} + \frac{1}{12x+24}$$

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

$$\frac{1}{12(x+2)} - \frac{19}{144} \log(x+2) + \frac{1}{6} \log(x+1) - \frac{1}{18} \log(x-1) + \frac{1}{48} \log(x-2)$$

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)^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

$$\frac{\ln(x+1)}{6} - \frac{\ln(x-1)}{18} + \frac{\ln(x-2)}{48} - \frac{19 \ln(x+2)}{144} + \frac{1}{12(x+2)}$$

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)^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

$$\frac{\log(x - 2)}{48} - \frac{\log(x - 1)}{18} + \frac{\log(x + 1)}{6} - \frac{19 \log(x + 2)}{144} + \frac{1}{12x + 24}$$

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)`

$$3.86 \quad \int \frac{(d+ex)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=71

$$\frac{d-2e}{12(x+2)} - \frac{1}{18}(d+e)\log(1-x) + \frac{1}{48}(d+2e)\log(2-x) + \frac{1}{6}(d-e)\log(x+1) - \frac{1}{144}(19d-26e)\log(x+2)$$

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])/48 + ((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

$$\begin{aligned} \int \frac{(d+ex)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left(\frac{d+2e}{48(-2+x)} + \frac{-d-e}{18(-1+x)} + \frac{d-e}{6(1+x)} + \frac{-d+2e}{12(2+x)^2} + \frac{-19d+26e}{144(2+x)} \right) dx \\ &= \frac{d-2e}{12(2+x)} - \frac{1}{18}(d+e)\log(1-x) + \frac{1}{48}(d+2e)\log(2-x) + \frac{1}{6}(d-e)\log(1+x) \end{aligned}$$

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

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

$$\int \frac{(d+ex)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[((d + e*x)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4)^2, x]

fricas [A] time = 1.14, size = 93, normalized size = 1.31

$$\frac{(19d - 26e)x + 38d - 52e \log(x + 2) - 24((d - e)x + 2d - 2e) \log(x + 1) + 8((d + e)x + 2d + 2e) \log(x - 1) - 3((d + 2e)x + 2d + 4e) \log(x - 2) - 12d + 24e}{144(x + 2)}$$

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

$$-\frac{1}{144}(19d - 26e) \log(|x + 2|) + \frac{1}{6}(d - e) \log(|x + 1|) - \frac{1}{18}(d + e) \log(|x - 1|) + \frac{1}{48}(d + 2e) \log(|x - 2|) + \frac{d - 2e}{12(x + 2)}$$

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

$$-\frac{19d \ln(x + 2)}{144} + \frac{d \ln(x - 2)}{48} - \frac{d \ln(x - 1)}{18} + \frac{d \ln(x + 1)}{6} + \frac{13e \ln(x + 2)}{72} + \frac{e \ln(x - 2)}{24} - \frac{e \ln(x - 1)}{18} - \frac{e \ln(x + 1)}{6} + \frac{d}{12x + 24} - \frac{e}{6(x + 2)}$$

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)^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

$$-\frac{1}{144}(19d - 26e) \log(x + 2) + \frac{1}{6}(d - e) \log(x + 1) - \frac{1}{18}(d + e) \log(x - 1) + \frac{1}{48}(d + 2e) \log(x - 2) + \frac{d - 2e}{12(x + 2)}$$

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

$$\frac{\frac{d}{12} - \frac{e}{6}}{x + 2} + \ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} \right) - \ln(x - 1) \left(\frac{d}{18} + \frac{e}{18} \right) + \ln(x - 2) \left(\frac{d}{48} + \frac{e}{24} \right) - \ln(x + 2) \left(\frac{19d}{144} - \frac{13e}{72} \right)$$

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 - 2e)/(12x + 24) + (d - e) \log(x + (-1534775d^{**6} + 8032360d^{**5}e - 984027d^{**5}(d - e) - 12991180d^{**4}e^{**2} + 11797266d^{**4}e*(d - e) + 3567168d^{**4}(d - e)^{**2} + 1075200d^{**3}e^{**3} - 32721528d^{**3}e^{**2}(d - e) - 8725248d^{**3}e*(d - e)^{**2} - 247104d^{**3}(d - e)^{**3} + 16959280d^{**2}e^{**4} + 38977296d^{**2}e^{**3}(d - e) - 2820096d^{**2}e^{**2}(d - e)^{**2} - 10357632d^{**2}e*(d - e)^{**3} - 15836800d*e^{**5} - 21294960d*e^{**4}(d - e) + 15436800d*e^{**3}(d - e)^{**2} + 16277760d*e^{**2}(d - e)^{**3} + 4283840e^{**6} + 3876000e^{**5}(d - e) - 6865920e^{**4}(d - e)^{**2} - 4078080e^{**3}(d - e)^{**3})/(801262d^{**6} - 4662251d^{**5}e + 7296938d^{**4}e^{**2} + 1388616d^{**3}e^{**3} - 12447440d^{**2}e^{**4} + 9990800d*e^{**5} - 2380000e^{**6})/6 - (d + e) \log(x + (-1534775d^{**6} + 8032360d^{**5}e + 328009d^{**5}(d + e) - 12991180d^{**4}e^{**2} - 3932422d^{**4}e*(d + e) + 396352d^{**4}(d + e)^{**2} + 1075200d^{**3}e^{**3} + 10907176d^{**3}e^{**2}(d + e) - 969472d^{**3}e*(d + e)^{**2} + 9152d^{**3}(d + e)^{**3} + 16959280d^{**2}e^{**4} - 12992432d^{**2}e^{**3}(d + e) - 313344d^{**2}e^{**2}(d + e)^{**2} + 383616d^{**2}e*(d + e)^{**3} - 15836800d*e^{**5} + 7098320d*e^{**4}(d + e) + 1715200d*e^{**3}(d + e)^{**2} - 602880d*e^{**2}(d + e)^{**3} + 4283840e^{**6} - 1292000e^{**5}(d + e) - 762880e^{**4}(d + e)^{**2} + 151040e^{**3}(d + e)^{**3})/(801262d^{**6} - 4662251d^{**5}e + 7296938d^{**4}e^{**2} + 1388616d^{**3}e^{**3} - 12447440d^{**2}e^{**4} + 9990800d*e^{**5} - 2380000e^{**6})/18 + (d + 2e) \log(x + (-1534775d^{**6} + 8032360d^{**5}e - 984027d^{**5}(d + 2e)/8 - 12991180d^{**4}e^{**2} + 5898633d^{**4}e*(d + 2e)/4 + 55737d^{**4}(d + 2e)^{**2} + 1075200d^{**3}e^{**3} - 4090191d^{**3}e^{**2}(d + 2e) - 136332d^{**3}e*(d + 2e)^{**2} - 3861d^{**3}(d + 2e)^{**3}/8 + 16959280d^{**2}e^{**4} + 4872162d^{**2}e^{**3}(d + 2e) - 44064d^{**2}e^{**2}(d + 2e)^{**2} - 80919d^{**2}e*(d + 2e)^{**3}/4 - 15836800d*e^{**5} - 2661870d*e^{**4}(d + 2e) + 241200d*e^{**3}(d + 2e)^{**2} + 63585d*e^{**2}(d + 2e)^{**3}/2 + 4283840e^{**6} + 484500e^{**5}(d + 2e) - 107280e^{**4}(d + 2e)^{**2} - 7965e^{**3}(d + 2e)^{**3})/(801262d^{**6} - 4662251d^{**5}e + 7296938d^{**4}e^{**2} + 1388616d^{**3}e^{**3} - 12447440d^{**2}e^{**4} + 9990800d*e^{**5} - 2380000e^{**6})/48 - (19d - 26e) \log(x + (-1534775d^{**6} + 8032360d^{**5}e + 328009d^{**5}(19d - 26e)/8 - 12991180d^{**4}e^{**2} - 1966211d^{**4}e*(19d - 26e)/4 + 6193d^{**4}(19d - 26e)^{**2} + 1075200d^{**3}e^{**3} + 1363397d^{**3}e^{**2}(19d - 26e) - 15148d^{**3}e*(19d - 26e)^{**2} + 143d^{**3}(19d - 26e)^{**3}/8 + 16959280d^{**2}e^{**4} - 1624054d^{**2}e^{**3}(19d - 26e) - 4896d^{**2}e^{**2}(19d - 26e)^{**2} + 2997d^{**2}e*(19d - 26e)^{**3}/4 - 15836800d*e^{**5} + 887290d*e^{**4}(19d - 26e) + 26800d*e^{**3}(19d - 26e)^{**2} - 2355d*e^{**2}(19d - 26e)^{**3}/2 + 4283840e^{**6} - 161500e^{**5}(19d - 26e) - 11920e^{**4}(19d - 26e)^{**2} + 295e^{**3}(19d - 26e)^{**3})/(801262d^{**6} - 4662251d^{**5}e + 7296938d^{**4}e^{**2} + 1388616d^{**3}e^{**3} - 12447440d^{**2}e^{**4} + 9990800d*e^{**5} - 2380000e^{**6})/144$

$$3.87 \quad \int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=82

$$\frac{d-2e+4f}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f) + \frac{1}{48} \log(2-x)(d+2e+4f) + \frac{1}{6} \log(x+1)(d-e+f) - \frac{1}{144} \log(x+2)(19d-26e+28f)$$

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

$$\begin{aligned} \int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left(\frac{d+2e+4f}{48(-2+x)} + \frac{-d-e-f}{18(-1+x)} + \frac{d-e+f}{6(1+x)} + \frac{-d+2e-4f}{12(2+x)^2} + \frac{-19d}{144} \right) dx \\ &= \frac{d-2e+4f}{12(2+x)} - \frac{1}{18}(d+e+f) \log(1-x) + \frac{1}{48}(d+2e+4f) \log(2-x) \end{aligned}$$

Mathematica [A] time = 0.06, size = 77, normalized size = 0.94

$$\frac{1}{144} \left(\frac{12(d-2e+4f)}{x+2} + 24 \log(-x-1)(d-e+f) - 8 \log(1-x)(d+e+f) + 3 \log(2-x)(d+2e+4f) + \log(x+2)(-19d+26e-28f) \right)$$

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

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[((d + e*x + f*x^2)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4)^2, x]

fricas [A] time = 1.18, size = 116, normalized size = 1.41

$$\frac{((19d - 26e + 28f)x + 38d - 52e + 56f)\log(x + 2) - 24((d - e + f)x + 2d - 2e + 2f)\log(x + 1) + 8((d + e + f)x + 2d + 2e + 2f)\log(x - 1) - 3((d + 2e + 4f)x + 2d + 4e + 8f)\log(x - 2) - 12d + 24e - 48f}{144(x + 2)}$$

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="fricas")

[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

$$-\frac{1}{144}(19d + 28f - 26e)\log(|x + 2|) + \frac{1}{6}(d + f - e)\log(|x + 1|) - \frac{1}{18}(d + f + e)\log(|x - 1|) + \frac{1}{48}(d + 4f + 2e)\log(|x - 2|) + \frac{d + 4f - 2e}{12(x + 2)}$$

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

$$-\frac{19d \ln(x+2)}{144} + \frac{d \ln(x-2)}{48} - \frac{d \ln(x-1)}{18} + \frac{d \ln(x+1)}{6} + \frac{13e \ln(x+2)}{72} + \frac{e \ln(x-2)}{24} - \frac{e \ln(x-1)}{18} - \frac{e \ln(x+1)}{6} - \frac{7f \ln(x+2)}{36} + \frac{f \ln(x-2)}{12} - \frac{f \ln(x-1)}{18} + \frac{f \ln(x+1)}{6} + \frac{d}{12x+24} - \frac{e}{6(x+2)} + \frac{f}{3x+6}$$

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

$$-\frac{1}{144}(19d - 26e + 28f)\log(x + 2) + \frac{1}{6}(d - e + f)\log(x + 1) - \frac{1}{18}(d + e + f)\log(x - 1) + \frac{1}{48}(d + 2e + 4f)\log(x - 2) + \frac{d - 2e + 4f}{12(x + 2)}$$

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="maxima")

[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

$$\frac{\frac{d}{12} - \frac{e}{6} + \frac{f}{3}}{x+2} + \ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} \right) - \ln(x-1) \left(\frac{d}{18} + \frac{e}{18} + \frac{f}{18} \right) + \ln(x-2) \left(\frac{d}{48} + \frac{e}{24} + \frac{f}{12} \right) - \ln(x+2) \left(\frac{19d}{144} - \frac{13e}{72} + \frac{7f}{36} \right)$$

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] $(d/12 - e/6 + f/3)/(x + 2) + \log(x + 1)*(d/6 - e/6 + f/6) - \log(x - 1)*(d/18 + e/18 + f/18) + \log(x - 2)*(d/48 + e/24 + f/12) - \log(x + 2)*((19*d)/144 - (13*e)/72 + (7*f)/36)$

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

$$3.88 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=95

$$\frac{d-2e+4f-8g}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g) + \frac{1}{48} \log(2-x)(d+2e+4f+8g) + \frac{1}{6} \log(x+1)(d-e+f-g) - \frac{1}{144} \log(x+2)(19d-26e+28f-8g)$$

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}

$$\frac{d-2e+4f-8g}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g) + \frac{1}{48} \log(2-x)(d+2e+4f+8g) + \frac{1}{6} \log(x+1)(d-e+f-g) - \frac{1}{144} \log(x+2)(19d-26e+28f-8g)$$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left(\frac{d+2e+4f+8g}{48(-2+x)} + \frac{-d-e-f-g}{18(-1+x)} + \frac{d-e+f-g}{6(1+x)} + \frac{-d+e+f-g}{12(1+x)} \right) dx \\ &= \frac{d-2e+4f-8g}{12(2+x)} - \frac{1}{18}(d+e+f+g)\log(1-x) + \frac{1}{48}(d+2e+4f+8g)\log(2-x) + \frac{1}{6}(d-e+f-g)\log(x+1) - \frac{1}{144}\log(x+2)(19d-26e+28f-8g) \end{aligned}$$

Mathematica [A] time = 0.05, size = 90, normalized size = 0.95

$$\frac{1}{144} \left(\frac{12(d-2e+4f-8g)}{x+2} + 24\log(-x-1)(d-e+f-g) - 8\log(1-x)(d+e+f+g) + 3\log(2-x)(d+2e+4f+8g) + \log(x+2)(-19d+26e-28f+8g) \right)$$

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)^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

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

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

Verification is not applicable to the result.

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

fricas [A] time = 2.74, size = 141, normalized size = 1.48

$$\frac{((19d - 26e + 28f - 8g)x + 38d - 52e + 56f - 16g)\log(x + 2) - 24((d - e + f - g)x + 2d - 2e + 2f - 2g)\log(x + 1) + 8((d + e + f + g)x + 2d + 2e + 2f + 2g)\log(x - 1) - 3((d + 2e + 4f + 8g)x + 2d + 4e + 8f + 16g)\log(x - 2) - 12d + 24e - 48f + 96g}{144(x + 2)}$$

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

$$-\frac{1}{144}(19d + 28f - 8g - 26e)\log(|x + 2|) + \frac{1}{6}(d + f - g - e)\log(|x + 1|) - \frac{1}{18}(d + f + g + e)\log(|x - 1|) + \frac{1}{48}(d + 4f + 8g + 2e)\log(|x - 2|) + \frac{d + 4f - 8g - 2e}{12(x + 2)}$$

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

$$-\frac{19d \ln(x+2)}{144} + \frac{d \ln(x-2)}{48} - \frac{d \ln(x-1)}{18} + \frac{d \ln(x+1)}{6} + \frac{13e \ln(x+2)}{72} + \frac{e \ln(x-2)}{24} - \frac{e \ln(x-1)}{18} - \frac{e \ln(x+1)}{6} - \frac{7f \ln(x+2)}{36} + \frac{f \ln(x-2)}{12} - \frac{f \ln(x-1)}{18} + \frac{f \ln(x+1)}{6} + \frac{g \ln(x+2)}{18} + \frac{g \ln(x-2)}{6} - \frac{g \ln(x-1)}{18} - \frac{g \ln(x+1)}{6} + \frac{d}{12x+24} - \frac{e}{6(x+2)} + \frac{f}{3x+6} - \frac{2g}{3(x+2)}$$

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)-19/144*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

$$-\frac{1}{144}(19d - 26e + 28f - 8g)\log(x + 2) + \frac{1}{6}(d - e + f - g)\log(x + 1) - \frac{1}{18}(d + e + f + g)\log(x - 1) + \frac{1}{48}(d + 2e + 4f + 8g)\log(x - 2) + \frac{d - 2e + 4f - 8g}{12(x + 2)}$$

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

$$\frac{\frac{d}{12} - \frac{e}{6} + \frac{f}{3} - \frac{2g}{3}}{x+2} + \ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} \right) - \ln(x-1) \left(\frac{d}{18} + \frac{e}{18} + \frac{f}{18} + \frac{g}{18} \right) + \ln(x-2) \left(\frac{d}{48} + \frac{e}{24} + \frac{f}{12} + \frac{g}{6} \right) - \ln(x+2) \left(\frac{19d}{144} - \frac{13e}{72} + \frac{7f}{36} - \frac{g}{18} \right)$$

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

$$3.89 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=106

$$\frac{d-2e+4f-8g+16h}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g+h) + \frac{1}{48} \log(2-x)(d+2e+4f+8g+16h) + \frac{1}{6} \log(x+1)(d-e+f-g-h)$$

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}

$$\frac{d-2e+4f-8g+16h}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g+h) + \frac{1}{48} \log(2-x)(d+2e+4f+8g+16h) + \frac{1}{6} \log(x+1)(d-e+f-g-h) - \frac{1}{144} \log(x+2)(19d-26e+28f-8g-80h)$$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left(\frac{d+2e+4f+8g+16h}{48(-2+x)} + \frac{-d-e-f-g-h}{18(-1+x)} + \frac{d-2e+4f-8g+16h}{12(2+x)} - \frac{1}{18}(d+e+f+g+h) \log(1-x) \right) dx \end{aligned}$$

Mathematica [A] time = 0.06, size = 102, normalized size = 0.96

$$\frac{1}{144} \left(\frac{12(d-2e+4f-8g+16h)}{x+2} + 24 \log(-x-1)(d-e+f-g+h) - 8 \log(1-x)(d+e+f+g+h) + 3 \log(2-x)(d+2e+4f+8g+16h) + \log(x+2)(-19d+26e-28f+8g+80h) \right)$$

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))*Log[2 - x] + (-19*d + 26*e - 28*f + 8*g + 80*h)*Log[2 + x])/144

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

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

Verification is not applicable to the result.

[In] IntegrateAlgebraic[((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] IntegrateAlgebraic[((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]

fricas [A] time = 14.10, size = 164, normalized size = 1.55

((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
144*(x + 2)

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, algorithm="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

-1/144*(19*d + 28*f - 8*g - 80*h - 26*e)*log(|x + 2|) + 1/6*(d + f - g + h - e)*log(|x + 1|) - 1/18*(d + f + g + h + e)*log(|x - 1|) + 1/48*(d + 4*f + 8*g + 16*h + 2*e)*log(|x - 2|) + (d + 4*f - 8*g + 16*h - 2*e)/12*(x + 2)

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, algorithm="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

5*h*ln(x+2)/9 - h*ln(x-1)/18 + h*ln(x+1)/6 - h*ln(x-2)/3 - g*ln(x-1)/18 + g*ln(x+2)/18 - g*ln(x-2)/6 - g*ln(x+1)/6 - 19*d*ln(x+2)/144 + 13*g*ln(x+2)/72 - e*ln(x-1)/18 - d*ln(x-1)/18 - e*ln(x+1)/6 - d*ln(x+1)/6 - d*ln(x-2)/48 - e*ln(x-2)/24 - f*ln(x-2)/12 - f*ln(x+1)/6 - f*ln(x-1)/18 - 7*f*ln(x+2)/36 - f/(3*x+6) + d/(12*x+24) + 4*h/(3*x+2) - 2*g/(3*(x+2)) - e/(6*(x+2))

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)+1/18*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)-1/18*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

-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) + (d - 2*e + 4*f - 8*g + 16*h)/12*(x + 2)

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, algorithm="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

$$\frac{\frac{d}{12} - \frac{e}{6} + \frac{f}{3} - \frac{2g}{3} + \frac{4h}{3}}{x+2} + \ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} \right) - \ln(x-1) \left(\frac{d}{18} + \frac{e}{18} + \frac{f}{18} + \frac{g}{18} + \frac{h}{18} \right) + \ln(x-2) \left(\frac{d}{48} + \frac{e}{24} + \frac{f}{12} + \frac{g}{6} + \frac{h}{3} \right) + \ln(x+2) \left(\frac{13e}{72} - \frac{19d}{144} - \frac{7f}{36} + \frac{g}{18} + \frac{5h}{9} \right)$$

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

$$3.90 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=122

$$\frac{d-2e+4f-8g+16h-32i}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g+h+i) + \frac{1}{48} \log(2-x)(d+2e+4f+8g+16h+32i) + \frac{1}{6} \log(x+1)$$

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, number of rules / integrand size = 0.039, Rules used = {1586, 6742}

$$\frac{d-2e+4f-8g+16h-32i}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g+h+i) + \frac{1}{48} \log(2-x)(d+2e+4f+8g+16h+32i) + \frac{1}{6} \log(x+1)(d-e+f-g+h-i) - \frac{1}{144} \log(x+2)(19d-26e+28f-8g-80h+352i) + ix$$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+90x^5)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+90x^5}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left(90 + \frac{2880+d+2e+4f+8g+16h}{48(-2+x)} + \frac{-90-d-2e-4f-8g-16h}{12(2+x)} \right) dx \\ &= 90x - \frac{2880-d+2e-4f+8g-16h}{12(2+x)} - \frac{1}{18}(90+d+e+f+g+h+i) \log(1-x) + \frac{1}{48}(d+2e+4f+8g+16h+32i) \log(2-x) + \frac{1}{6}(d-e+f-g+h-i) \log(x+1) - \frac{1}{144}(19d-26e+28f-8g-80h+352i) \log(2+x) \end{aligned}$$

Mathematica [A] time = 0.06, size = 118, normalized size = 0.97

$$\frac{1}{144} \left(\frac{12(d-2e-2f+4g-8h+16i)}{x+2} - 8 \log(1-x)(d+e+f+g+h+i) + 3 \log(2-x)(d+2e+4(f+2g+4h+8i)) + 24 \log(x+1)(d-e+f-g+h-i) + \log(x+2)(-19d+26e-28f+8g+80h-352i) + 144ix \right)$$

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]

$$+ 24*(d - e + f - g + h - i)*\text{Log}[1 + x] + (-19*d + 26*e - 28*f + 8*g + 80*h - 352*i)*\text{Log}[2 + x])/144$$

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

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

Verification is not applicable to the result.

[In] IntegrateAlgebraic[((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] IntegrateAlgebraic[((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]

fricas [A] time = 83.28, size = 200, normalized size = 1.64

$$\frac{144i^2 + 288i - ((19d - 26e + 28f - 8g - 80h + 352i)x + 38d - 52e + 56f - 16g - 160h + 704i)\log(x + 2) + 24((d - e + f - g + h - i)x + 2d - 2e + 2f - 2g + 2h - 2i)\log(x + 1) - 8((d + e + f + g + h + i)x + 2d + 2e + 2f + 2g + 2h + 2i)\log(x - 1) + 3((d + 2e + 4f + 8g + 16h + 32i)x + 2d + 4e + 8f + 16g + 32h + 64i)\log(x - 2) + 12d - 24e + 48f - 96g + 192h - 384i}{144(x + 2)}$$

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

$$ix - \frac{1}{144}(19d + 28f - 8g - 80h + 352i - 26e)\log((x + 2)) + \frac{1}{6}(d + f - g + h - i - e)\log((x + 1)) - \frac{1}{18}(d + f + g + h + i + e)\log((x - 1)) + \frac{1}{48}(d + 4f + 8g + 16h + 32i + 2e)\log((x - 2)) + \frac{d + 4f - 8g + 16h - 32i - 2e}{12(x + 2)}$$

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

$$\frac{22 \ln(x + 2)}{9} - \frac{5 \ln(x - 1)}{18} - \frac{5 \ln(x + 1)}{6} - \frac{2 \ln(x - 2)}{3} - \frac{5 \ln(x + 2)}{9} - \frac{8 \ln(x - 1)}{18} - \frac{8 \ln(x + 1)}{6} - \frac{8 \ln(x - 2)}{3} - \frac{g \ln(x - 1)}{18} - \frac{g \ln(x + 2)}{18} - \frac{g \ln(x - 2)}{6} - \frac{g \ln(x + 1)}{6} - \frac{13 \ln(x + 2)}{144} - \frac{13 \ln(x - 2)}{72} - \frac{e \ln(x - 1)}{18} - \frac{d \ln(x - 1)}{18} - \frac{e \ln(x + 1)}{6} - \frac{d \ln(x + 1)}{6} - \frac{d \ln(x - 2)}{48} - \frac{e \ln(x - 2)}{24} - \frac{f \ln(x - 2)}{12} - \frac{f \ln(x + 1)}{6} - \frac{f \ln(x - 1)}{18} - \frac{7 \ln(x + 2)}{36} - \frac{f}{3e + 6} - \frac{d}{12x + 24} - \frac{8}{3(x + 2)} - \frac{4h}{3(x + 2)} - \frac{2g}{3(x + 2)} - \frac{e}{6(x + 2)}$$

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)-1/18*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)+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

$$ix - \frac{1}{144}(19d - 26e + 28f - 8g - 80h + 352i)\log(x + 2) + \frac{1}{6}(d - e + f - g + h - i)\log(x + 1) - \frac{1}{18}(d + e + f + g + h + i)\log(x - 1) + \frac{1}{48}(d + 2e + 4f + 8g + 16h + 32i)\log(x - 2) + \frac{d - 2e + 4f - 8g + 16h - 32i}{12(x + 2)}$$

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

$$ix + \frac{\frac{d}{12} - \frac{e}{6} + \frac{f}{3} - \frac{2g}{3} + \frac{4h}{3} - \frac{8i}{3}}{x+2} + \ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} - \frac{i}{6} \right) + \ln(x-2) \left(\frac{d}{48} + \frac{e}{24} + \frac{f}{12} + \frac{g}{6} + \frac{h}{3} + \frac{2i}{3} \right) - \ln(x-1) \left(\frac{d}{18} + \frac{e}{18} + \frac{f}{18} + \frac{g}{18} + \frac{h}{18} + \frac{i}{18} \right) - \ln(x+2) \left(\frac{19d}{144} - \frac{13e}{72} + \frac{7f}{36} - \frac{g}{18} - \frac{5h}{9} + \frac{22i}{9} \right)$$

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

$$3.91 \quad \int \frac{2-3x+x^2}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=56

$$-\frac{3x+5}{12(x^2+3x+2)} - \frac{1}{36} \log(1-x) + \frac{1}{144} \log(2-x) - \frac{7}{36} \log(x+1) + \frac{31}{144} \log(x+2)$$

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}

$$-\frac{3x+5}{12(x^2+3x+2)} - \frac{1}{36} \log(1-x) + \frac{1}{144} \log(2-x) - \frac{7}{36} \log(x+1) + \frac{31}{144} \log(x+2)$$

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_))^(n_), 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] :> With[{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*Simp[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] /; 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),

$x], x] + \text{Dist}[1/q, \text{Int}[(c*C*d^2 - B*c*d*e + A*c*e^2 + b*B*d*f - A*c*d*f - a*C*d*f - A*b*e*f + a*A*f^2 - f*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B*f)*x)/(d + e*x + f*x^2), x], x] /; \text{NeQ}[q, 0]] /; \text{FreeQ}[\{a, b, c, d, e, f, A, B, C\}, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{NeQ}[e^2 - 4*d*f, 0]$

Rule 1586

$\text{Int}[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] \rightarrow \text{Int}[u*\text{PolynomialQuotient}[Px, Qx, x]^{p*Qx^{(p+q)}, x}] /; \text{FreeQ}[q, x] \&\& \text{PolyQ}[Px, x] \&\& \text{PolyQ}[Qx, x] \&\& \text{EqQ}[\text{PolynomialRemainder}[Px, Qx, x], 0] \&\& \text{IntegerQ}[p] \&\& \text{LtQ}[p*q, 0]$

Rubi steps

$$\begin{aligned} \int \frac{2-3x+x^2}{(4-5x^2+x^4)^2} dx &= \int \frac{1}{(2-3x+x^2)(2+3x+x^2)^2} dx \\ &= -\frac{5+3x}{12(2+3x+x^2)} + \frac{1}{72} \int \frac{-18+48x-18x^2}{(2-3x+x^2)(2+3x+x^2)} dx \\ &= -\frac{5+3x}{12(2+3x+x^2)} + \frac{\int \frac{252-108x}{2-3x+x^2} dx}{5184} + \frac{\int \frac{-900+108x}{2+3x+x^2} dx}{5184} \\ &= -\frac{5+3x}{12(2+3x+x^2)} + \frac{1}{144} \int \frac{1}{-2+x} dx - \frac{1}{36} \int \frac{1}{-1+x} dx - \frac{7}{36} \int \frac{1}{1+x} dx + \frac{31}{144} \int \frac{1}{2+x} dx \\ &= -\frac{5+3x}{12(2+3x+x^2)} - \frac{1}{36} \log(1-x) + \frac{1}{144} \log(2-x) - \frac{7}{36} \log(1+x) + \frac{31}{144} \log(2+x) \end{aligned}$$

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

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

$$\int \frac{2-3x+x^2}{(4-5x^2+x^4)^2} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(2 - 3*x + x^2)/(4 - 5*x^2 + x^4)^2, x]

[Out] IntegrateAlgebraic[(2 - 3*x + x^2)/(4 - 5*x^2 + x^4)^2, x]

fricas [A] time = 0.95, size = 72, normalized size = 1.29

$$\frac{31(x^2+3x+2)\log(x+2) - 28(x^2+3x+2)\log(x+1) - 4(x^2+3x+2)\log(x-1) + (x^2+3x+2)\log(x-2) - 36x - 60}{144(x^2+3x+2)}$$

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

$$-\frac{3x+5}{12(x+2)(x+1)} + \frac{31}{144} \log(|x+2|) - \frac{7}{36} \log(|x+1|) - \frac{1}{36} \log(|x-1|) + \frac{1}{144} \log(|x-2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4)^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

$$\frac{31 \ln(x+2)}{144} + \frac{\ln(x-2)}{144} - \frac{\ln(x-1)}{36} - \frac{7 \ln(x+1)}{36} - \frac{1}{6(x+1)} - \frac{1}{12(x+2)}$$

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] 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

$$-\frac{3x+5}{12(x^2+3x+2)} + \frac{31}{144} \log(x+2) - \frac{7}{36} \log(x+1) - \frac{1}{36} \log(x-1) + \frac{1}{144} \log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4)^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) - 1/36*log(x - 1) + 1/144*log(x - 2)

mupad [B] time = 0.05, size = 42, normalized size = 0.75

$$\frac{\ln(x-2)}{144} - \frac{7 \ln(x+1)}{36} - \frac{\ln(x-1)}{36} + \frac{31 \ln(x+2)}{144} - \frac{\frac{x}{4} + \frac{5}{12}}{x^2 + 3x + 2}$$

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

$$\frac{-3x-5}{12x^2+36x+24} + \frac{\log(x-2)}{144} - \frac{\log(x-1)}{36} - \frac{7\log(x+1)}{36} + \frac{31\log(x+2)}{144}$$

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

$$3.92 \quad \int \frac{(d+ex)(2-3x+x^2)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=89

$$-\frac{x(3d-4e)+5d-6e}{12(x^2+3x+2)} - \frac{1}{36}(d+e)\log(1-x) + \frac{1}{144}(d+2e)\log(2-x) - \frac{1}{36}(7d-13e)\log(x+1) + \frac{1}{144}(31d-50e)\log(x+2)$$

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}

$$-\frac{x(3d-4e)+5d-6e}{12(x^2+3x+2)} - \frac{1}{36}(d+e)\log(1-x) + \frac{1}{144}(d+2e)\log(2-x) - \frac{1}{36}(7d-13e)\log(x+1) + \frac{1}{144}(31d-50e)\log(x+2)$$

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_))^(n_), 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] := With[{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] /; 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

$$\begin{aligned} \int \frac{(d+ex)(2-3x+x^2)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex}{(2-3x+x^2)(2+3x+x^2)^2} dx \\ &= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{1}{72} \int \frac{6(3d-10e)-24(2d-3e)x+6(3d-4e)x^2}{(2-3x+x^2)(2+3x+x^2)} dx \\ &= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{\int \frac{108(3d-10e)-288(2d-3e)+(-36(3d-10e)+72(3d-4e))x}{2-3x+x^2} dx}{5184} - \int \frac{10}{144} dx \\ &= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{1}{36}(7d-13e) \int \frac{1}{1+x} dx - \frac{1}{144}(-d-2e) \int \frac{1}{-2+x} dx \\ &= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{1}{36}(d+e) \log(1-x) + \frac{1}{144}(d+2e) \log(2-x) - \frac{1}{36}(7d-13e) \log(1+x) \end{aligned}$$

Mathematica [A] time = 0.05, size = 80, normalized size = 0.90

$$\frac{1}{144} \left(\frac{12(-3dx-5d+4ex+6e)}{x^2+3x+2} - 4(d+e) \log(1-x) + (d+2e) \log(2-x) + 4(13e-7d) \log(x+1) + (31d-50e) \log(x+2) \right)$$

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

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

$$\int \frac{(d+ex)(2-3x+x^2)}{(4-5x^2+x^4)^2} dx$$

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[((d + e*x)*(2 - 3*x + x^2))/(4 - 5*x^2 + x^4)^2, x]

fricas [A] time = 0.94, size = 153, normalized size = 1.72

$$\frac{12(3d-4e)x - (31d-50e)x^2 + 3(31d-50e)x + 62d - 100e}{144(x^2+3x+2)} \log(x+2) + 4((7d-13e)x^2 + 3(7d-13e)x + 14d - 26e) \log(x+1) + 4((d+e)x^2 + 3(d+e)x + 2d+2e) \log(x-1) - ((d+2e)x^2 + 3(d+2e)x + 2d+4e) \log(x-2) + 60d - 72e$$

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] $-1/144*(12*(3*d - 4*e)*x - ((31*d - 50*e)*x^2 + 3*(31*d - 50*e)*x + 62*d - 100*e)*\log(x + 2) + 4*((7*d - 13*e)*x^2 + 3*(7*d - 13*e)*x + 14*d - 26*e)*\log(x + 1) + 4*((d + e)*x^2 + 3*(d + e)*x + 2*d + 2*e)*\log(x - 1) - ((d + 2*e)*x^2 + 3*(d + 2*e)*x + 2*d + 4*e)*\log(x - 2) + 60*d - 72*e)/(x^2 + 3*x + 2)$

giac [A] time = 0.38, size = 85, normalized size = 0.96

$$\frac{1}{144}(31d - 50e)\log(|x + 2|) - \frac{1}{36}(7d - 13e)\log(|x + 1|) - \frac{1}{36}(d + e)\log(|x - 1|) + \frac{1}{144}(d + 2e)\log(|x - 2|) - \frac{(3d - 4e)x + 5d - 6e}{12(x + 2)(x + 1)}$$

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)^2,x, algorithm="giac")

[Out] $1/144*(31*d - 50*e)*\log(\text{abs}(x + 2)) - 1/36*(7*d - 13*e)*\log(\text{abs}(x + 1)) - 1/36*(d + e)*\log(\text{abs}(x - 1)) + 1/144*(d + 2*e)*\log(\text{abs}(x - 2)) - 1/12*((3*d - 4*e)*x + 5*d - 6*e)/((x + 2)*(x + 1))$

maple [A] time = 0.01, size = 90, normalized size = 1.01

$$\frac{31d \ln(x+2)}{144} + \frac{d \ln(x-2)}{144} - \frac{d \ln(x-1)}{36} - \frac{7d \ln(x+1)}{36} - \frac{25e \ln(x+2)}{72} + \frac{e \ln(x-2)}{72} - \frac{e \ln(x-1)}{36} + \frac{13e \ln(x+1)}{36} - \frac{d}{6(x+1)} - \frac{d}{12(x+2)} + \frac{e}{6x+6} + \frac{e}{6x+12}$$

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

$$\frac{1}{144}(31d - 50e)\log(x + 2) - \frac{1}{36}(7d - 13e)\log(x + 1) - \frac{1}{36}(d + e)\log(x - 1) + \frac{1}{144}(d + 2e)\log(x - 2) - \frac{(3d - 4e)x + 5d - 6e}{12(x^2 + 3x + 2)}$$

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

$$\ln(x-2) \left(\frac{d}{144} + \frac{e}{72} \right) - \ln(x-1) \left(\frac{d}{36} + \frac{e}{36} \right) - \ln(x+1) \left(\frac{7d}{36} - \frac{13e}{36} \right) - \frac{\frac{5d}{12} - \frac{e}{2} + x \left(\frac{d}{4} - \frac{e}{3} \right)}{x^2 + 3x + 2} + \ln(x+2) \left(\frac{31d}{144} - \frac{25e}{72} \right)$$

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 + (-24383100d^6 + 187408066d^5e + 10439775d^5(d + e) - 511591980d^4e^2 - 94132290d^4e(d + e) + 667200d^4(d + e)^2 + 469491120d^3e^3 + 333672552d^3e^2(d + e) - 2703328d^3e(d + e)^2 - 198000d^3(d + e)^3 + 322778400d^2e^4 - 582497712d^2e^3(d + e) + 1752768d^2e^2(d + e)^2 + 1107552d^2e(d + e)^3 - 863493856de^5 + 500776560de^4(d + e) + 4226944de^3(d + e)^2 - 1880640de^2(d + e)^3 + 429000000e^6 - 169242912e^5(d + e) - 4538112e^4(d + e)^2 + 964224e^3(d + e)^3) / (13474125d^6 - 102860175d^5e + 274190390d^4e^2 - 224142072d^3e^3 - 245084096d^2e^4 + 535797456de^5 - 256183200e^6) / 36 + (d + 2e) \log(x + (-24383100d^6 + 187408066d^5e - 10439775d^5(d + 2e) / 4 - 511591980d^4e^2 + 47066145d^4e(d + 2e) / 2 + 41700d^4(d + 2e)^2 + 469491120d^3e^3 - 83418138d^3e^2(d + 2e) - 168958d^3e(d + 2e)^2 + 12375d^3e(d + 2e)^3 / 4 + 322778400d^2e^4 + 145624428d^2e^3(d + 2e) + 109548d^2e^2(d + 2e)^2 - 34611d^2e(d + 2e)^3 / 2 - 863493856de^5 - 125194140de^4(d + 2e) + 264184de^3(d + 2e)^2 + 29385de^2(d + 2e)^3 + 429000000e^6 + 42310728e^5(d + 2e) - 283632e^4(d + 2e)^2 - 15066e^3(d + 2e)^3) / (13474125d^6 - 102860175d^5e + 274190390d^4e^2 - 224142072d^3e^3 - 245084096d^2e^4 + 535797456de^5 - 256183200e^6) / 144 - (7d - 13e) \log(x + (-24383100d^6 + 187408066d^5e + 10439775d^5(7d - 13e) - 511591980d^4e^2 - 94132290d^4e(7d - 13e) + 667200d^4(7d - 13e)^2 + 469491120d^3e^3 + 333672552d^3e^2(7d - 13e) - 2703328d^3e(7d - 13e)^2 - 198000d^3(7d - 13e)^3 + 322778400d^2e^4 - 582497712d^2e^3(7d - 13e) + 1752768d^2e^2(7d - 13e)^2 + 1107552d^2e(7d - 13e)^3 - 863493856de^5 + 500776560de^4(7d - 13e) + 4226944de^3(7d - 13e)^2 - 1880640de^2(7d - 13e)^3 + 429000000e^6 - 169242912e^5(7d - 13e) - 4538112e^4(7d - 13e)^2 + 964224e^3(7d - 13e)^3) / (13474125d^6 - 102860175d^5e + 274190390d^4e^2 - 224142072d^3e^3 - 245084096d^2e^4 + 535797456de^5 - 256183200e^6) / 36 + (31d - 50e) \log(x + (-24383100d^6 + 187408066d^5e - 10439775d^5(31d - 50e) / 4 - 511591980d^4e^2 + 47066145d^4e(31d - 50e) / 2 + 41700d^4(31d - 50e)^2 + 469491120d^3e^3 - 83418138d^3e^2(31d - 50e) - 168958d^3e(31d - 50e)^2 + 12375d^3e(31d - 50e)^3 / 4 + 322778400d^2e^4 + 145624428d^2e^3(31d - 50e) + 109548d^2e^2(31d - 50e)^2 - 34611d^2e(31d - 50e)^3 / 2 - 863493856de^5 - 125194140de^4(31d - 50e) + 264184de^3(31d - 50e)^2 + 29385de^2(31d - 50e)^3 + 429000000e^6 + 42310728e^5(31d - 50e) - 283632e^4(31d - 50e)^2 - 15066e^3(31d - 50e)^3) / (13474125d^6 - 102860175d^5e + 274190390d^4e^2 - 224142072d^3e^3 - 245084096d^2e^4 + 535797456de^5 - 256183200e^6) / 144 + (-5d + 6e + x(-3d + 4e)) / (12x^2 + 36x + 24)$

$$3.93 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=105

$$-\frac{x(3d-4e+6f)+5d-6e+8f}{12(x^2+3x+2)} - \frac{1}{36} \log(1-x)(d+e+f) + \frac{1}{144} \log(2-x)(d+2e+4f) - \frac{1}{36} \log(x+1)(7d-13e+19f) +$$

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}

$$-\frac{x(3d-4e+6f)+5d-6e+8f}{12(x^2+3x+2)} - \frac{1}{36} \log(1-x)(d+e+f) + \frac{1}{144} \log(2-x)(d+2e+4f) - \frac{1}{36} \log(x+1)(7d-13e+19f) + \frac{1}{144} \log(x+2)(31d-50e+76f)$$

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_))^(n_), 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] := With[{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) - (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] /; 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

$$\begin{aligned} \int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2}{(2-3x+x^2)(2+3x+x^2)^2} dx \\ &= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{1}{72} \int \frac{6(3d-10e+12f)-24(2d-3x+x^2)}{(2-3x+x^2)^2} dx \\ &= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{\int \frac{-288(2d-3e+5f)+108(3d-10e+12f)+(72(3d-10e+12f)-24(2d-3x+x^2))}{2-3x+x^2} dx}{5184} \\ &= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{1}{144}(-31d+50e-76f) \int \frac{1}{2+x} dx \\ &= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{1}{36}(d+e+f) \log(1-x) + \frac{1}{144}(d+e+f) \log(2+x) \end{aligned}$$

Mathematica [A] time = 0.07, size = 97, normalized size = 0.92

$$\frac{1}{144} \left(-\frac{12(d(3x+5)-4ex-6e+6fx+8f)}{x^2+3x+2} - 4\log(1-x)(d+e+f) + \log(2-x)(d+2e+4f) - 4\log(x+1)(7d-13e+19f) + \log(x+2)(31d-50e+76f) \right)$$

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
```

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[((2 - 3*x + x^2)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4)^2, x]

fricas [B] time = 1.28, size = 191, normalized size = 1.82

$$\frac{12(3d-4e+6f)x - ((31d-50e+76f)x^2 + 3(31d-50e+76f)x + 62d-100e+152f)\log(x+2) + 4((7d-13e+19f)x^2 + 3(7d-13e+19f)x + 14d-26e+38f)\log(x+1) + 4((d+e+f)x^2 + 3(d+e+f)x + 2d+2e+2f)\log(x-1) - ((d+2e+4f)x^2 + 3(d+2e+4f)x + 2d+4e+8f)\log(x-2) + 60d-72e+96f}{144(x^2+3x+2)}$$

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

$$\frac{1}{144}(31d+76f-50e)\log(|x+2|) - \frac{1}{36}(7d+19f-13e)\log(|x+1|) - \frac{1}{36}(d+f+e)\log(|x-1|) + \frac{1}{144}(d+4f+2e)\log(|x-2|) - \frac{(3d+6f-4e)x+5d+8f-6e}{12(x+2)(x+1)}$$

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(abs(x + 1)) - 1/36*(d + f + e)*log(abs(x - 1)) + 1/144*(d + 4*f + 2*e)*log(abs(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

$$\frac{31d \ln(x+2)}{144} + \frac{d \ln(x-2)}{144} - \frac{d \ln(x-1)}{36} - \frac{7d \ln(x+1)}{36} - \frac{25e \ln(x+2)}{72} + \frac{e \ln(x-2)}{72} - \frac{e \ln(x-1)}{36} + \frac{13e \ln(x+1)}{36} + \frac{19f \ln(x+2)}{36} + \frac{f \ln(x-2)}{36} - \frac{f \ln(x-1)}{36} - \frac{19f \ln(x+1)}{36} - \frac{d}{6(x+1)} - \frac{d}{12(x+2)} + \frac{e}{6x+6} + \frac{e}{6x+12} - \frac{f}{6(x+1)} - \frac{f}{3(x+2)}$$

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

$$\frac{1}{144}(31d-50e+76f)\log(x+2) - \frac{1}{36}(7d-13e+19f)\log(x+1) - \frac{1}{36}(d+e+f)\log(x-1) + \frac{1}{144}(d+2e+4f)\log(x-2) - \frac{(3d-4e+6f)x+5d-6e+8f}{12(x^2+3x+2)}$$

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

$$\ln(x-2) \left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} \right) - \ln(x+1) \left(\frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} \right) - \ln(x-1) \left(\frac{d}{36} + \frac{e}{36} + \frac{f}{36} \right) + \ln(x+2) \left(\frac{31d}{144} - \frac{25e}{72} + \frac{19f}{36} \right) - \frac{\frac{5d}{12} - \frac{e}{2} + \frac{2f}{3} + x \left(\frac{d}{4} - \frac{e}{3} + \frac{f}{2} \right)}{x^2 + 3x + 2}$$

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] $\log(x - 2) \cdot (d/144 + e/72 + f/36) - \log(x + 1) \cdot ((7 \cdot d)/36 - (13 \cdot e)/36 + (19 \cdot f)/36) - \log(x - 1) \cdot (d/36 + e/36 + f/36) + \log(x + 2) \cdot ((31 \cdot d)/144 - (25 \cdot e)/72 + (19 \cdot f)/36) - ((5 \cdot d)/12 - e/2 + (2 \cdot f)/3 + x \cdot (d/4 - e/3 + f/2)) / (3 \cdot x + x^2 + 2)$

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

$$3.94 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=117

$$-\frac{d-2e+4f-8g}{12(x+2)} - \frac{d-e+f-g}{6(x+1)} - \frac{1}{36} \log(1-x)(d+e+f+g) + \frac{1}{144} \log(2-x)(d+2e+4f+8g) - \frac{1}{36} \log(x+1)(7d-13e+19f-25g) + \frac{1}{144} \log(x+2)(31d-50e+76f-104g)$$

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, number of rules / integrand size = 0.056, Rules used = {1586, 6728}

$$-\frac{d-2e+4f-8g}{12(x+2)} - \frac{d-e+f-g}{6(x+1)} - \frac{1}{36} \log(1-x)(d+e+f+g) + \frac{1}{144} \log(2-x)(d+2e+4f+8g) - \frac{1}{36} \log(x+1)(7d-13e+19f-25g) + \frac{1}{144} \log(x+2)(31d-50e+76f-104g)$$

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] /; SumQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]

Rubi steps

$$\begin{aligned} \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3}{(2-3x+x^2)(2+3x+x^2)^2} dx \\ &= \int \left(\frac{d+2e+4f+8g}{144(-2+x)} + \frac{-d-e-f-g}{36(-1+x)} + \frac{d-e+f-g}{6(1+x)^2} + \frac{-7d+13e+19f-25g}{36(1+x)} \right) dx \\ &= -\frac{d-e+f-g}{6(1+x)} - \frac{d-2e+4f-8g}{12(2+x)} - \frac{1}{36}(d+e+f+g)\log(1-x) + \end{aligned}$$

Mathematica [A] time = 0.06, size = 114, normalized size = 0.97

$$\frac{1}{144} \left(\frac{12(-3dx-5d+4ex+6e-6fx-8f+10gx+12g)}{x^2+3x+2} - 4\log(1-x)(d+e+f+g) + \log(2-x)(d+2e+4f+8g) + 4\log(x+1)(-7d+13e-19f+25g) + \log(x+2)(31d-50e+76f-104g) \right)$$

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

$(-7*d + 13*e - 19*f + 25*g)*\text{Log}[1 + x] + (31*d - 50*e + 76*f - 104*g)*\text{Log}[2 + x])/144$

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

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

Verification is not applicable to the result.

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

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

fricas [B] time = 3.20, size = 229, normalized size = 1.96

$\frac{12(3d - 4e + f - 10g) - ((3d - 50e + 76f - 104g)^2 + 3(3d - 50e + 76f - 104g) + 62d - 100e + 152f - 208g)\log(x + 2) + 4((7d - 13e + 19f - 25g)^2 + 3(7d - 13e + 19f - 25g) + 14d - 26e + 38f - 50g)\log(x + 1) + 4((d + e + f + g)^2 + 3(d + e + f + g) + 2d + 2e + 2f + 2g)\log(x - 1) - ((d + 2e + 4f + 8g)^2 + 3(d + 2e + 4f + 8g) + 2d + 4e + 8f + 16g)\log(x - 2) + 60d - 72e - 96f - 144g}{144(x^2 + 3x + 2)}$

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="fricas")

[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

$\frac{1}{144}(31d + 76f - 104g - 50e)\log(x + 2) - \frac{1}{36}(7d + 19f - 25g - 13e)\log(x + 1) - \frac{1}{36}(d + f + g + e)\log(x - 1) + \frac{1}{144}(d + 4f + 8g + 2e)\log(x - 2) - \frac{(3d + 6f - 10g - 4e)x + 5d + 8f - 12g - 6e}{12(x + 2)(x + 1)}$

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)^2,x, algorithm="giac")

[Out] $1/144*(31*d + 76*f - 104*g - 50*e)*\log(\text{abs}(x + 2)) - 1/36*(7*d + 19*f - 25*g - 13*e)*\log(\text{abs}(x + 1)) - 1/36*(d + f + g + e)*\log(\text{abs}(x - 1)) + 1/144*(d + 4*f + 8*g + 2*e)*\log(\text{abs}(x - 2)) - 1/12*((3*d + 6*f - 10*g - 4*e)*x + 5*d + 8*f - 12*g - 6*e)/((x + 2)*(x + 1))$

maple [A] time = 0.02, size = 178, normalized size = 1.52

$\frac{31d \ln(x+2)}{144} + \frac{d \ln(x-2)}{144} - \frac{d \ln(x-1)}{36} - \frac{7d \ln(x+1)}{36} - \frac{25e \ln(x+2)}{72} - \frac{e \ln(x-2)}{72} - \frac{e \ln(x-1)}{36} - \frac{13e \ln(x+1)}{36} - \frac{19f \ln(x+2)}{36} - \frac{f \ln(x-2)}{36} - \frac{f \ln(x-1)}{36} - \frac{19f \ln(x+1)}{36} - \frac{13g \ln(x+2)}{18} - \frac{g \ln(x-2)}{18} - \frac{g \ln(x-1)}{36} - \frac{25g \ln(x+1)}{36} - \frac{d}{6(x+1)} - \frac{d}{12(x+2)} + \frac{e}{6x+6} + \frac{e}{6x+12} - \frac{f}{6(x+1)} - \frac{f}{3(x+2)} + \frac{g}{6x+6} + \frac{2g}{3(x+2)}$

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] $1/144*d*\ln(x-2)+1/72*e*\ln(x-2)+1/36*f*\ln(x-2)+1/18*g*\ln(x-2)-7/36*d*\ln(x+1)+13/36*e*\ln(x+1)-19/36*f*\ln(x+1)+25/36*g*\ln(x+1)-1/6/(x+1)*d+1/6/(x+1)*e-1/6/(x+1)*f+1/6/(x+1)*g-1/36*d*\ln(x-1)-1/36*e*\ln(x-1)-1/36*f*\ln(x-1)-1/36*g*\ln(x-1)-1/12/(x+2)*d+1/6/(x+2)*e-1/3/(x+2)*f+2/3/(x+2)*g+31/144*d*\ln(x+2)-25/72*e*\ln(x+2)+19/36*f*\ln(x+2)-13/18*g*\ln(x+2)$

maxima [A] time = 0.44, size = 107, normalized size = 0.91

$$\frac{1}{144}(31d - 50e + 76f - 104g)\log(x + 2) - \frac{1}{36}(7d - 13e + 19f - 25g)\log(x + 1) - \frac{1}{36}(d + e + f + g)\log(x - 1) + \frac{1}{144}(d + 2e + 4f + 8g)\log(x - 2) - \frac{(3d - 4e + 6f - 10g)x + 5d - 6e + 8f - 12g}{12(x^2 + 3x + 2)}$$

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="maxima")

[Out] 1/144*(31*d - 50*e + 76*f - 104*g)*log(x + 2) - 1/36*(7*d - 13*e + 19*f - 25*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

$$\ln(x-2)\left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} + \frac{g}{18}\right) - \ln(x+1)\left(\frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} - \frac{25g}{36}\right) - \ln(x-1)\left(\frac{d}{36} + \frac{e}{36} + \frac{f}{36} + \frac{g}{36}\right) + \ln(x+2)\left(\frac{31d}{144} - \frac{25e}{72} + \frac{19f}{36} - \frac{13g}{18}\right) - \frac{\frac{5d}{12} - \frac{e}{2} + \frac{2f}{3} - g + x\left(\frac{d}{4} - \frac{e}{3} + \frac{f}{2} - \frac{5g}{6}\right)}{x^2 + 3x + 2}$$

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

$$3.95 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=131

$$-\frac{d-e+f-g+h}{6(x+1)} - \frac{d-2e+4f-8g+16h}{12(x+2)} - \frac{1}{36} \log(1-x)(d+e+f+g+h) + \frac{1}{144} \log(2-x)(d+2e+4f+8g+16h) -$$

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, number of rules / integrand size = 0.049, Rules used = {1586, 6728}

$$-\frac{d-e+f-g+h}{6(x+1)} - \frac{d-2e+4f-8g+16h}{12(x+2)} - \frac{1}{36} \log(1-x)(d+e+f+g+h) + \frac{1}{144} \log(2-x)(d+2e+4f+8g+16h) - \frac{1}{36} \log(x+1)(7d-13e+19f-25g+31h) + \frac{1}{144} \log(x+2)(31d-50e+76f-104g+112h)$$

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] /; SumQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]

Rubi steps

$$\begin{aligned} \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{(2-3x+x^2)(2+3x+x^2)^2} dx \\ &= \int \left(\frac{d+2e+4f+8g+16h}{144(-2+x)} + \frac{-d-e-f-g-h}{36(-1+x)} + \frac{d-e+g+h}{6(1+x)} \right) dx \\ &= -\frac{d-e+f-g+h}{6(1+x)} - \frac{d-2e+4f-8g+16h}{12(2+x)} - \frac{1}{36} (d+e+g+h) \log(1-x) + \frac{1}{144} (d+2e+4f+8g+16h) \log(2-x) - \frac{1}{36} (7d-13e+19f-25g+31h) \log(x+1) + \frac{1}{144} (31d-50e+76f-104g+112h) \log(x+2) \end{aligned}$$

Mathematica [A] time = 0.06, size = 136, normalized size = 1.04

$$\frac{1}{144} \left(\frac{12d(3x+5)+2(-e(2x+3)+3fx+4f-5gx-6g+9hx+10h)}{x^2+3x+2} - 4 \log(1-x)(d+e+f+g+h) + \log(2-x)(d+2(e+2f+4g+8h)) - 4 \log(x+1)(7d-13e+19f-25g+31h) + \log(x+2)(31d-50e+76f-104g+112h) \right)$$

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

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

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

Verification is not applicable to the result.

[In] IntegrateAlgebraic[((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] IntegrateAlgebraic[((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]

fricas [B] time = 14.85, size = 267, normalized size = 2.04

1/144*(31*d + 76*f - 104*g + 112*h - 50*e)*log(x + 2) - 1/36*(7*d + 19*f - 25*g + 31*h - 13*e)*log(x + 1) - 1/36*(d + f + g + h + e)*log(x - 1) + 1/144*(d + 4*f + 8*g + 16*h + 2*e)*log(x - 2) - (3*d + 6*f - 10*g + 18*h - 4*e)*x + 5*d + 8*f - 12*g + 20*h - 6*e / (12*(x + 2)*(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)^2,x, algorithm="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 + 152*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

1/144*(31*d + 76*f - 104*g + 112*h - 50*e)*log(x + 2) - 1/36*(7*d + 19*f - 25*g + 31*h - 13*e)*log(x + 1) - 1/36*(d + f + g + h + e)*log(x - 1) + 1/144*(d + 4*f + 8*g + 16*h + 2*e)*log(x - 2) - (3*d + 6*f - 10*g + 18*h - 4*e)*x + 5*d + 8*f - 12*g + 20*h - 6*e / (12*(x + 2)*(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)^2,x, algorithm="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

7*h*ln(x+2)/9 - h*ln(x-1)/36 + 31*h*ln(x+1)/36 + 4*h*ln(x-2)/9 - g*ln(x-1)/36 + 13*g*ln(x+2)/18 - g*ln(x-2)/18 + 25*g*ln(x+1)/36 + 31*f*ln(x+2)/144 + 25*f*ln(x+2)/72 + e*ln(x-1)/36 - d*ln(x-1)/36 + 13*d*ln(x+1)/36 + 7*d*ln(x+1)/36 + d*ln(x-2)/144 + d*ln(x-2)/72 + f*ln(x-2)/36 + 19*f*ln(x+1)/36 + f*ln(x-1)/36 + 19*f*ln(x+2)/36 + e/6 + e/6 + e/6 + 4*h/3 + h/3 + 2e/3 + 5*d/12 + d/12 + d/12 + f/3 + f/3 + f/3 + f/3

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)-1/36*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

$$\frac{1}{144}(31d - 50e + 76f - 104g + 112h)\log(x+2) - \frac{1}{36}(7d - 13e + 19f - 25g + 31h)\log(x+1) - \frac{1}{36}(d + e + f + g + h)\log(x-1) + \frac{1}{144}(d + 2e + 4f + 8g + 16h)\log(x-2) - \frac{(3d - 4e + 6f - 10g + 18h)x + 5d - 6e + 8f - 12g + 20h}{12(x^2 + 3x + 2)}$$

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, algorithm="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) + 1/144*(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

$$\ln(x-2)\left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} + \frac{g}{18} + \frac{h}{9}\right) - \ln(x-1)\left(\frac{d}{36} + \frac{e}{36} + \frac{f}{36} + \frac{g}{36} + \frac{h}{36}\right) - \ln(x+1)\left(\frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} - \frac{25g}{36} + \frac{31h}{36}\right) - \frac{\frac{5d}{12} - \frac{e}{2} + \frac{2f}{3} - g + \frac{5h}{3} + x\left(\frac{d}{4} - \frac{e}{3} + \frac{f}{2} - \frac{5g}{6} + \frac{3h}{2}\right)}{x^2 + 3x + 2} + \ln(x+2)\left(\frac{31d}{144} - \frac{25e}{72} + \frac{19f}{36} - \frac{13g}{18} + \frac{7h}{9}\right)$$

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

$$3.96 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=147

$$\frac{d-2e+4f-8g+16h-32i}{12(x+2)} - \frac{d-e+f-g+h-i}{6(x+1)} - \frac{1}{36} \log(1-x)(d+e+f+g+h+i) + \frac{1}{144} \log(2-x)(d+2e+4f+8g+16h-32i)$$

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}

$$\frac{d-2e+4f-8g+16h-32i}{12(x+2)} - \frac{d-e+f-g+h-i}{6(x+1)} - \frac{1}{36} \log(1-x)(d+e+f+g+h+i) + \frac{1}{144} \log(2-x)(d+2e+4f+8g+16h+32i) - \frac{1}{36} \log(x+1)(7d-13e+19f-25g+31h-37i) + \frac{1}{144} \log(x+2)(31d-50e+76f-104g+112h-32i)$$

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] /; SumQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]

Rubi steps

$$\begin{aligned} \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+96x^5)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+96x^5}{(2-3x+x^2)(2+3x+x^2)^2} dx \\ &= \int \left(\frac{3072+d+2e+4f+8g+16h}{144(-2+x)} + \frac{-96-d-e-f}{36(-1+x)} \right) dx \\ &= \frac{96-d+e-f+g-h}{6(1+x)} + \frac{3072-d+2e-4f+8g-16h}{12(2+x)} \end{aligned}$$

Mathematica [A] time = 0.08, size = 153, normalized size = 1.04

$$\frac{1}{144} \left(\frac{12(2i(2x+3)-3fx-4f+5gx+6g-9hx-10h+17ix+18i)-d(3x+5)}{x^2+3x+2} - 4 \log(1-x)(d+e+f+g+h+i) + \log(2-x)(d+2e+4f+8g+4h+8i) + 4 \log(x+1)(-7d+13e-19f+25g-31h+37i) + \log(x+2)(31d-50e+76f-104g+112h-32i) \right)$$

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

-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

$$\frac{1}{144}(31d - 50e + 76f - 104g + 112h - 32i)\log(x+2) - \frac{1}{36}(7d - 13e + 19f - 25g + 31h - 37i)\log(x+1) - \frac{1}{36}(d + e + f + g + h + i)\log(x-1) + \frac{1}{144}(d + 2e + 4f + 8g + 16h + 32i)\log(x-2) - \frac{(3d - 4e + 6f - 10g + 18h - 34i)x + 5d - 6e + 8f - 12g + 20h - 36i}{12(x^2 + 3x + 2)}$$

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, algorithm="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

$$\ln(x-2)\left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} + \frac{g}{18} + \frac{h}{9} + \frac{2i}{9}\right) - \ln(x-1)\left(\frac{d}{36} + \frac{e}{36} + \frac{f}{36} + \frac{g}{36} + \frac{h}{36} + \frac{i}{36}\right) - \ln(x+1)\left(\frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} - \frac{25g}{36} + \frac{31h}{36} - \frac{37i}{36}\right) + \ln(x+2)\left(\frac{31d}{144} - \frac{25e}{72} + \frac{19f}{36} - \frac{13g}{18} + \frac{7h}{9} - \frac{2i}{9}\right) - \frac{\frac{5d}{12} - \frac{e}{2} + \frac{2f}{3} - g + \frac{5h}{3} - 3i + x\left(\frac{d}{4} - \frac{e}{2} + \frac{f}{6} + \frac{3h}{2} - \frac{7i}{6}\right)}{x^2 + 3x + 2}$$

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 + (19*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

$$3.97 \quad \int \frac{2+x}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=68

$$\frac{1}{12(1-x)} + \frac{1}{36(2-x)} - \frac{1}{36(x+1)} + \frac{1}{18} \log(1-x) - \frac{35}{432} \log(2-x) + \frac{1}{54} \log(x+1) + \frac{1}{144} \log(x+2)$$

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_)*(P_x_)^(p_)*(Q_x_)^(q_), x_Symbol] :> Int[u*PolynomialQuotient[P_x, Q_x, x]^p*Q_x^(p+q), x] /; FreeQ[q, x] && PolyQ[P_x, x] && PolyQ[Q_x, x] && EqQ[PolynomialRemainder[P_x, Q_x, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 2074

Int[(P_)^(p_)*(Q_)^(q_), x_Symbol] :> With[{PP = Factor[P]}, Int[ExpandIntegrand[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

$$\begin{aligned} \int \frac{2+x}{(4-5x^2+x^4)^2} dx &= \int \frac{1}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{1}{36(-2+x)^2} - \frac{35}{432(-2+x)} + \frac{1}{12(-1+x)^2} + \frac{1}{18(-1+x)} + \frac{1}{36(1+x)^2} + \frac{1}{54(1+x)} \right) dx \\ &= \frac{1}{12(1-x)} + \frac{1}{36(2-x)} - \frac{1}{36(1+x)} + \frac{1}{18} \log(1-x) - \frac{35}{432} \log(2-x) + \frac{1}{54} \log(1+x) \end{aligned}$$

Mathematica [A] time = 0.03, size = 60, normalized size = 0.88

$$\frac{1}{432} \left(\frac{12(-5x^2+6x+5)}{x^3-2x^2-x+2} + 24 \log(1-x) - 35 \log(2-x) + 8 \log(x+1) + 3 \log(x+2) \right)$$

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

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

$$\int \frac{2+x}{(4-5x^2+x^4)^2} dx$$

Verification is not applicable to the result.

[In] IntegrateAlgebraic[(2 + x)/(4 - 5*x^2 + x^4)^2,x]

[Out] IntegrateAlgebraic[(2 + x)/(4 - 5*x^2 + x^4)^2, x]

fricas [B] time = 1.03, size = 103, normalized size = 1.51

$$\frac{60x^2 - 3(x^3 - 2x^2 - x + 2)\log(x+2) - 8(x^3 - 2x^2 - x + 2)\log(x+1) - 24(x^3 - 2x^2 - x + 2)\log(x-1) + 35(x^3 - 2x^2 - x + 2)\log(x-2) - 72x - 60}{432(x^3 - 2x^2 - x + 2)}$$

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

$$-\frac{5x^2 - 6x - 5}{36(x+1)(x-1)(x-2)} + \frac{1}{144} \log(|x+2|) + \frac{1}{54} \log(|x+1|) + \frac{1}{18} \log(|x-1|) - \frac{35}{432} \log(|x-2|)$$

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

$$\frac{\ln(x+2)}{144} - \frac{35 \ln(x-2)}{432} + \frac{\ln(x-1)}{18} + \frac{\ln(x+1)}{54} - \frac{1}{36(x-2)} - \frac{1}{36(x+1)} - \frac{1}{12(x-1)}$$

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

$$-\frac{5x^2 - 6x - 5}{36(x^3 - 2x^2 - x + 2)} + \frac{1}{144} \log(x+2) + \frac{1}{54} \log(x+1) + \frac{1}{18} \log(x-1) - \frac{35}{432} \log(x-2)$$

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

$$\frac{\ln(x-1)}{18} + \frac{\ln(x+1)}{54} - \frac{35 \ln(x-2)}{432} + \frac{\ln(x+2)}{144} - \frac{-\frac{5x^2}{36} + \frac{x}{6} + \frac{5}{36}}{-x^3 + 2x^2 + x - 2}$$

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] $(-5*x**2 + 6*x + 5)/(36*x**3 - 72*x**2 - 36*x + 72) - 35*\log(x - 2)/432 + \log(x - 1)/18 + \log(x + 1)/54 + \log(x + 2)/144$

$$3.98 \quad \int \frac{(2+x)(d+ex)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=105

$$-\frac{d-e}{36(x+1)} + \frac{d+e}{12(1-x)} + \frac{d+2e}{36(2-x)} + \frac{1}{36}(2d+5e)\log(1-x) - \frac{1}{432}(35d+58e)\log(2-x) + \frac{1}{108}(2d+e)\log(x+1) + \frac{1}{144}(d-2e)\log(x+2)$$

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}

$$-\frac{d-e}{36(x+1)} + \frac{d+e}{12(1-x)} + \frac{d+2e}{36(2-x)} + \frac{1}{36}(2d+5e)\log(1-x) - \frac{1}{432}(35d+58e)\log(2-x) + \frac{1}{108}(2d+e)\log(x+1) + \frac{1}{144}(d-2e)\log(x+2)$$

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

$$\begin{aligned} \int \frac{(2+x)(d+ex)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{d+2e}{36(-2+x)^2} + \frac{-35d-58e}{432(-2+x)} + \frac{d+e}{12(-1+x)^2} + \frac{2d+5e}{36(-1+x)} + \frac{d-e}{36(1+x)^2} + \frac{2d+e}{108(1+x)} \right) dx \\ &= \frac{d+e}{12(1-x)} + \frac{d+2e}{36(2-x)} - \frac{d-e}{36(1+x)} + \frac{1}{36}(2d+5e)\log(1-x) - \frac{1}{432}(35d+58e)\log(2-x) \end{aligned}$$

Mathematica [A] time = 0.09, size = 97, normalized size = 0.92

$$\frac{1}{432} \left(\frac{12(d(-5x^2+6x+5)+2e(5-2x^2))}{x^3-2x^2-x+2} + 12(2d+5e)\log(1-x) - (35d+58e)\log(2-x) + 4(2d+e)\log(x+1) + 3(d-2e)\log(x+2) \right)$$

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

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[((2+x)*(d+e*x))/(4-5*x^2+x^4)^2,x]

fricas [B] time = 1.29, size = 211, normalized size = 2.01

$$\frac{12(5d+4e)x^2-72dx-3((d-2e)x^2-2(d-2e)x-4)\log(x+2)-4((2d+e)x^2-2(2d+e)x+4d+2e)\log(x+1)-12((2d+5e)x^2-2(2d+5e)x-2(2d+5e)x+4d+10e)\log(x-1)+(35d+58e)x^2-2(35d+58e)x-35d+58e+70d+116e)\log(x-2)-60d-120e}{432(x^3-2x^2-x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

$$\frac{1}{144}(d-2e)\log(|x+2|) + \frac{1}{108}(2d+e)\log(|x+1|) + \frac{1}{36}(2d+5e)\log(|x-1|) - \frac{1}{432}(35d+58e)\log(|x-2|) - \frac{(5d+4e)x^2-6dx-5d-10e}{36(x+1)(x-1)(x-2)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

$$\frac{d \ln(x+2)}{144} - \frac{35d \ln(x-2)}{432} + \frac{d \ln(x-1)}{18} + \frac{d \ln(x+1)}{54} - \frac{e \ln(x+2)}{72} - \frac{29e \ln(x-2)}{216} + \frac{5e \ln(x-1)}{36} + \frac{e \ln(x+1)}{108} - \frac{d}{36(x-2)} - \frac{d}{36(x+1)} - \frac{d}{12(x-1)} - \frac{e}{18(x-2)} + \frac{e}{36x+36} - \frac{e}{12(x-1)}$$

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

$$\frac{1}{144}(d-2e)\log(x+2) + \frac{1}{108}(2d+e)\log(x+1) + \frac{1}{36}(2d+5e)\log(x-1) - \frac{1}{432}(35d+58e)\log(x-2) - \frac{(5d+4e)x^2-6dx-5d-10e}{36(x^3-2x^2-x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

$$\ln(x-1) \left(\frac{d}{18} + \frac{5e}{36} \right) - \frac{\left(-\frac{5d}{36} - \frac{e}{9} \right) x^2 + \frac{dx}{6} + \frac{5d}{36} + \frac{5e}{18}}{-x^3 + 2x^2 + x - 2} + \ln(x+1) \left(\frac{d}{54} + \frac{e}{108} \right) + \ln(x+2) \left(\frac{d}{144} - \frac{e}{72} \right) - \ln(x-2) \left(\frac{35d}{432} + \frac{29e}{216} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x + 2)*(d + e*x))/(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 + 208470400*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 + 362061760*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 + 39056*d**2*(2*d + e)**3 + 614357568*d*e**4 - 114598960*d*e**3*(2*d + e) - 2666752*d**2*(2*d + e)**2 + 250880*d*e*(2*d + e)**3 + 208470400*e**5 - 60181808*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 - 72512220*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 + 1054512*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 + 362061760*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 + 364910432*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 + 28649740*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)

$$3.99 \quad \int \frac{(2+x)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=122

$$-\frac{d-e+f}{36(x+1)} + \frac{d+e+f}{12(1-x)} + \frac{d+2e+4f}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f) - \frac{1}{432} \log(2-x)(35d+58e+92f) + \frac{1}{108} \log(x+1)$$

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}

$$-\frac{d-e+f}{36(x+1)} + \frac{d+e+f}{12(1-x)} + \frac{d+2e+4f}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f) - \frac{1}{432} \log(2-x)(35d+58e+92f) + \frac{1}{108} \log(x+1)(2d+e-4f) + \frac{1}{144} \log(x+2)(d-2e+4f)$$

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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{d+2e+4f}{36(-2+x)^2} + \frac{-35d-58e-92f}{432(-2+x)} + \frac{d+e+f}{12(-1+x)^2} + \frac{2d+5e+8f}{36(-1+x)} + \frac{d-e-f}{36(1+x)} \right) dx \\ &= \frac{d+e+f}{12(1-x)} + \frac{d+2e+4f}{36(2-x)} - \frac{d-e+f}{36(1+x)} + \frac{1}{36} (2d+5e+8f) \log(1-x) - \frac{1}{432} (35d+58e+92f) \log(2-x) + \frac{1}{108} (2d+e-4f) \log(x+1) + \frac{1}{144} (d-2e+4f) \log(x+2) \end{aligned}$$

Mathematica [A] time = 0.05, size = 121, normalized size = 0.99

$$\frac{1}{432} \left(\frac{12(d(-5x^2+6x+5)+e(10-4x^2)+2f(-4x^2+3x+4))}{x^3-2x^2-x+2} + 12 \log(1-x)(2d+5e+8f) - \log(2-x)(35d+58e+92f) + 4 \log(x+1)(2d+e-4f) + 3 \log(x+2)(d-2e+4f) \right)$$

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)*Log[2 - x] + 4*(2*d + e - 4*f)*Log[1 + x] + 3*(d - 2*e + 4*f)*Log[2 + x])/432

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

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

Verification is not applicable to the result.

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

[Out] IntegrateAlgebraic[((2+x)*(d+e*x+f*x^2))/(4-5*x^2+x^4)^2,x]

fricas [B] time = 1.32, size = 267, normalized size = 2.19

$\frac{1}{432} \frac{(5d+4e+8f)^2 - 7(d+e)^2 - 3((d-2e+4f)^2 - 2(d-2e+4f)^2 - (d-2e+4f)^2 + 2d-4e+8f) \log(x+2) - 4((2d+e-4f)^2 - 2(2d+e-4f)^2 - (2d+e-4f)^2 + 4d+2e-8f) \log(x+1) - 12((2d+5e+8f)^2 - 2(2d+5e+8f)^2 - (2d+5e+8f)^2 + 4d+10e+16f) \log(x-1) + ((35d+58e+92f)^2 - 2(35d+58e+92f)^2 - (35d+58e+92f)^2 + 70d+116e+184f) \log(x-2) - 60d - 120e - 96f}{432(x^3 - 2x^2 - x + 2)}$

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

$$\frac{1}{144}(d+4f-2e)\log(x+2) + \frac{1}{108}(2d-4f+e)\log(x+1) + \frac{1}{36}(2d+8f+5e)\log(x-1) - \frac{1}{432}(35d+92f+58e)\log(x-2) - \frac{(5d+8f+4e)x^2 - 6(d+f)x - 5d - 8f - 10e}{36(x+1)(x-1)(x-2)}$$

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] $1/144*(d + 4*f - 2*e)*\log(\text{abs}(x + 2)) + 1/108*(2*d - 4*f + e)*\log(\text{abs}(x + 1)) + 1/36*(2*d + 8*f + 5*e)*\log(\text{abs}(x - 1)) - 1/432*(35*d + 92*f + 58*e)*\log(\text{abs}(x - 2)) - 1/36*((5*d + 8*f + 4*e)*x^2 - 6*(d + f)*x - 5*d - 8*f - 10*e)/((x + 1)*(x - 1)*(x - 2))$

maple [A] time = 0.02, size = 158, normalized size = 1.30

$$\frac{d \ln(x+2)}{144} - \frac{35d \ln(x-2)}{432} + \frac{d \ln(x-1)}{18} + \frac{d \ln(x+1)}{54} - \frac{e \ln(x+2)}{72} - \frac{29e \ln(x-2)}{216} + \frac{5e \ln(x-1)}{36} + \frac{e \ln(x+1)}{108} + \frac{f \ln(x+2)}{36} - \frac{23f \ln(x-2)}{108} + \frac{2f \ln(x-1)}{9} + \frac{f \ln(x+1)}{27} - \frac{d}{36(x-2)} - \frac{d}{36(x+1)} - \frac{d}{12(x-1)} - \frac{e}{18(x-2)} + \frac{e}{36(x+1)} + \frac{e}{12(x-1)} - \frac{f}{9(x-2)} - \frac{f}{36(x+1)} - \frac{f}{12(x-1)}$$

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

$$\frac{1}{144}(d-2e+4f)\log(x+2) + \frac{1}{108}(2d+e-4f)\log(x+1) + \frac{1}{36}(2d+5e+8f)\log(x-1) - \frac{1}{432}(35d+58e+92f)\log(x-2) - \frac{(5d+4e+8f)x^2 - 6(d+f)x - 5d - 10e - 8f}{36(x^3 - 2x^2 - x + 2)}$$

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

$$\ln(x-1) \left(\frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} \right) + \ln(x+1) \left(\frac{d}{54} + \frac{e}{108} - \frac{f}{27} \right) + \ln(x+2) \left(\frac{d}{144} - \frac{e}{72} + \frac{f}{36} \right) - \ln(x-2) \left(\frac{35d}{432} + \frac{29e}{216} + \frac{23f}{108} \right) - \frac{\left(-\frac{5d}{36} - \frac{e}{9} - \frac{2f}{9} \right) x^2 + \left(\frac{d}{6} + \frac{f}{6} \right) x + \frac{5d}{36} + \frac{5e}{18} + \frac{2f}{9}}{-x^3 + 2x^2 + x - 2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

$$3.100 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=141

$$-\frac{d-e+f-g}{36(x+1)} + \frac{d+e+f+g}{12(1-x)} + \frac{d+2e+4f+8g}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g) - \frac{1}{432} \log(2-x)(35d+58e+92f+136g) + \frac{1}{108} \log(x+1)(2d+e-4f+7g) + \frac{1}{144} \log(x+2)(d-2e+4f-8g)$$

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, number of rules / integrand size = 0.065, Rules used = {1586, 6742}

$$-\frac{d-e+f-g}{36(x+1)} + \frac{d+e+f+g}{12(1-x)} + \frac{d+2e+4f+8g}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g) - \frac{1}{432} \log(2-x)(35d+58e+92f+136g) + \frac{1}{108} \log(x+1)(2d+e-4f+7g) + \frac{1}{144} \log(x+2)(d-2e+4f-8g)$$

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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{d+2e+4f+8g}{36(-2+x)^2} + \frac{-35d-58e-92f-136g}{432(-2+x)} + \frac{d+e+f+g}{12(-1+x)^2} + \frac{2d+e-4f+7g}{108(-1+x)} \right) dx \\ &= \frac{d+e+f+g}{12(1-x)} + \frac{d+2e+4f+8g}{36(2-x)} - \frac{d-e+f-g}{36(1+x)} + \frac{1}{36}(2d+5e+8f+11g) \log(1-x) - \frac{1}{432}(35d+58e+92f+136g) \log(2-x) + \frac{1}{108}(2d+e-4f+7g) \log(x+1) + \frac{1}{144}(d-2e+4f-8g) \log(x+2) \end{aligned}$$

Mathematica [A] time = 0.07, size = 144, normalized size = 1.02

$$\frac{1}{432} \left(\frac{12(d(-5x^2+6x+5)+2(e(5-2x^2)+f(-4x^2+3x+4))+g(8-5x^2))}{x^3-2x^2-x+2} + 12 \log(1-x)(2d+5e+8f+11g) - \log(2-x)(35d+58e+92f+136g) + 4 \log(x+1)(2d+e-4f+7g) + 3 \log(x+2)(d-2e+4f-8g) \right)$$

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

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

$$\ln(x-1) \left(\frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} + \frac{11g}{36} \right) + \ln(x+2) \left(\frac{d}{144} - \frac{e}{72} + \frac{f}{36} - \frac{g}{18} \right) + \ln(x+1) \left(\frac{d}{54} + \frac{e}{108} - \frac{f}{27} + \frac{7g}{108} \right) - \ln(x-2) \left(\frac{35d}{432} + \frac{29e}{216} + \frac{23f}{108} + \frac{17g}{54} \right) - \frac{\left(-\frac{5d}{36} - \frac{e}{9} - \frac{2f}{9} - \frac{5g}{18} \right) x^2 + \left(\frac{d}{6} + \frac{f}{6} \right) x + \frac{5d}{36} + \frac{5e}{18} + \frac{2f}{9} + \frac{4g}{9}}{-x^3 + 2x^2 + x - 2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x + 2)*(d + e*x + f*x^2 + g*x^3))/(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)/18 + (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

$$3.101 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=158

$$-\frac{d-e+f-g+h}{36(x+1)} + \frac{d+e+f+g+h}{12(1-x)} + \frac{d+2e+4f+8g+16h}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14h) - \frac{1}{432} \log$$

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}

$$-\frac{d-e+f-g+h}{36(x+1)} + \frac{d+e+f+g+h}{12(1-x)} + \frac{d+2e+4f+8g+16h}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14h) - \frac{1}{432} \log(2-x)(35d+58e+92f+136g+176h) + \frac{1}{108} \log(x+1)(2d+e-4f+7g-10h) + \frac{1}{144} \log(x+2)(d-2e+4f-8g+16h)$$

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)*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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{d+2e+4f+8g+16h}{36(-2+x)^2} + \frac{-35d-58e-92f-136g-176h}{432(-2+x)} \right) dx \\ &= \frac{d+e+f+g+h}{12(1-x)} + \frac{d+2e+4f+8g+16h}{36(2-x)} - \frac{d-e+f-g+h}{36(1+x)} \end{aligned}$$

Mathematica [A] time = 0.09, size = 169, normalized size = 1.07

$$\frac{1}{432} \left(\frac{12(d(-5x^2+6x+5)+2(e(5-2x^2)+f(-4x^2+3x+4)-5gx^2+8g-10hx^2+3ix+10h))}{x^3-2x^2-x+2} + 12 \log(1-x)(2d+5e+8f+11g+14h) - \log(2-x)(35d+58e+92f+136g+176h) + 4 \log(x+1)(2d+e-4f+7g-10h) + 3 \log(x+2)(d-2e+4f-8g+16h) \right)$$

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[
```

$2 - x] + 4*(2*d + e - 4*f + 7*g - 10*h)*\text{Log}[1 + x] + 3*(d - 2*e + 4*f - 8*g + 16*h)*\text{Log}[2 + x])/432$

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

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

Verification is not applicable to the result.

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

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

fricas [B] time = 18.48, size = 376, normalized size = 2.38

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="fricas")

[Out] $-1/432*(12*(5*d + 4*e + 8*f + 10*g + 20*h)*x^2 - 72*(d + f + h)*x - 3*((d - 2*e + 4*f - 8*g + 16*h)*x^3 - 2*(d - 2*e + 4*f - 8*g + 16*h)*x^2 - (d - 2*e + 4*f - 8*g + 16*h)*x + 2*d - 4*e + 8*f - 16*g + 32*h)*\log(x + 2) - 4*((2*d + e - 4*f + 7*g - 10*h)*x^3 - 2*(2*d + e - 4*f + 7*g - 10*h)*x^2 - (2*d + e - 4*f + 7*g - 10*h)*x + 4*d + 2*e - 8*f + 14*g - 20*h)*\log(x + 1) - 12*((2*d + 5*e + 8*f + 11*g + 14*h)*x^3 - 2*(2*d + 5*e + 8*f + 11*g + 14*h)*x^2 - (2*d + 5*e + 8*f + 11*g + 14*h)*x + 4*d + 10*e + 16*f + 22*g + 28*h)*\log(x - 1) + ((35*d + 58*e + 92*f + 136*g + 176*h)*x^3 - 2*(35*d + 58*e + 92*f + 136*g + 176*h)*x^2 - (35*d + 58*e + 92*f + 136*g + 176*h)*x + 70*d + 116*e + 184*f + 272*g + 352*h)*\log(x - 2) - 60*d - 120*e - 96*f - 192*g - 240*h)/(x^3 - 2*x^2 - x + 2)$

giac [A] time = 0.37, size = 155, normalized size = 0.98

$$\frac{1}{144}(d+4f-8g+16h-2e)\log(|x+2|) + \frac{1}{108}(2d-4f+7g-10h+e)\log(|x+1|) + \frac{1}{36}(2d+8f+11g+14h+5e)\log(|x-1|) - \frac{1}{432}(35d+92f+136g+176h+58e)\log(|x-2|) - \frac{(5d+8f+10g+20h+4e)x^2-6(d+f+h)x-5d-8f-16g-20h-10e}{36(x+1)(x-1)(x-2)}$$

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="giac")

[Out] $1/144*(d + 4*f - 8*g + 16*h - 2*e)*\log(\text{abs}(x + 2)) + 1/108*(2*d - 4*f + 7*g - 10*h + e)*\log(\text{abs}(x + 1)) + 1/36*(2*d + 8*f + 11*g + 14*h + 5*e)*\log(\text{abs}(x - 1)) - 1/432*(35*d + 92*f + 136*g + 176*h + 58*e)*\log(\text{abs}(x - 2)) - 1/36*((5*d + 8*f + 10*g + 20*h + 4*e)*x^2 - 6*(d + f + h)*x - 5*d - 8*f - 16*g - 20*h - 10*e)/((x + 1)*(x - 1)*(x - 2))$

maple [A] time = 0.02, size = 262, normalized size = 1.66

$$\frac{h \ln(x-2)}{9} - \frac{7 h \ln(x-1)}{18} + \frac{5 h \ln(x+1)}{54} - \frac{11 h \ln(x+2)}{27} + \frac{11 g \ln(x-1)}{36} - \frac{1}{18} g \ln(x+2) - \frac{17}{54} g \ln(x-2) + \frac{7}{108} g \ln(x+1) + \frac{1}{144} d \ln(x+2) - \frac{1}{72} e \ln(x-2)$$

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)^2,x)

[Out] $1/9*h*\ln(x+2)+7/18*h*\ln(x-1)-5/54*h*\ln(x+1)-11/27*h*\ln(x-2)+11/36*g*\ln(x-1)-1/18*g*\ln(x+2)-17/54*g*\ln(x-2)+7/108*g*\ln(x+1)+1/144*d*\ln(x+2)-1/72*e*\ln(x-2)$

+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)*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

$$\frac{1}{144}(d-2e+4f-8g+16h)\log(x+2) + \frac{1}{108}(2d+e-4f+7g-10h)\log(x+1) + \frac{1}{36}(2d+5e+8f+11g+14h)\log(x-1) - \frac{1}{432}(35d+58e+92f+136g+176h)\log(x-2) - \frac{(5d+4e+8f+10g+20h)x^2-6(d+f+h)x-5d-10e-8f-16g-20h}{36(x^3-2x^2-x+2)}$$

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="maxima")

[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) - 1/432*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

$$\ln(x-1)\left(\frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} + \frac{11g}{36} + \frac{7h}{18}\right) - \frac{\left(\frac{5d}{36} - \frac{e}{9} - \frac{2f}{9} - \frac{5g}{18} - \frac{5h}{9}\right)x^2 + \left(\frac{d}{6} + \frac{f}{6} + \frac{h}{6}\right)x + \frac{5d}{36} + \frac{5e}{18} + \frac{2f}{9} + \frac{4g}{9} + \frac{5h}{9}}{-x^3+2x^2+x-2} + \ln(x+2)\left(\frac{d}{144} - \frac{e}{72} + \frac{f}{36} - \frac{g}{18} + \frac{h}{9}\right) + \ln(x+1)\left(\frac{d}{54} + \frac{e}{108} - \frac{f}{27} + \frac{7g}{108} - \frac{5h}{54}\right) - \ln(x-2)\left(\frac{35d}{432} + \frac{29e}{216} + \frac{23f}{108} + \frac{17g}{54} + \frac{11h}{27}\right)$$

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))/(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 + (17*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

$$3.102 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=177

$$-\frac{d-e+f-g+h-i}{36(x+1)} + \frac{d+e+f+g+h+i}{12(1-x)} + \frac{d+2e+4f+8g+16h+32i}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14h$$

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, number of rules / integrand size = 0.049, Rules used = {1586, 6742}

$$\frac{d-e+f-g+h-i}{36(x+1)} + \frac{d+e+f+g+h+i}{12(1-x)} + \frac{d+2e+4f+8g+16h+32i}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14h+17i) - \frac{1}{432} \log(2-x)(35d+58e+92f+136g+176h+160i) + \frac{1}{108} \log(x+1)(2d+e-4f+7g-10h+13i) + \frac{1}{144} \log(x+2)(d-2e+4f-8g+16h-32i)$$

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 + 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

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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+102x^5)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+102x^5}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{3264+d+2e+4f+8g+16h}{36(-2+x)^2} + \frac{-16320-35d-58e-17i}{432(-2+x)} \right) dx \\ &= \frac{102+d+e+f+g+h}{12(1-x)} + \frac{3264+d+2e+4f+8g+16h}{36(2-x)} + \end{aligned}$$

Mathematica [A] time = 0.11, size = 195, normalized size = 1.10

$$\frac{-5d^2+6dx+5d-4ex^2+10e-8fx^2+6fx+8f-10gx^2+16g-20hx^2+6hx+20h-34ix^2+40i}{36(e^3-2x^2-x+2)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14h+17i) + \frac{1}{432} \log(2-x)(-35d-58e-92f-136g-176h-160i) + \frac{1}{108} \log(x+1)(2d+e-4f+7g-10h+13i) + \frac{1}{144} \log(x+2)(d-2e+4f-8g+16h-32i)$$

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^4))

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

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

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

Verification is not applicable to the result.

[In] IntegrateAlgebraic[((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] IntegrateAlgebraic[((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]

fricas [B] time = 104.72, size = 430, normalized size = 2.43

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, algorithm="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 + 13*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

$\frac{1}{144}(d+4f-8g+16h-32i-2e)\log(x+2) + \frac{1}{108}(2d-4f+7g-10h+13i+e)\log(x+1) + \frac{1}{36}(2d+8f+11g+14h+17i+5e)\log(x-1) - \frac{1}{432}(85d+92f+136g+176h+160i+58e)\log(x-2) - \frac{(5d+8f+10g+20h+34i+4e)x^2-6(d+f+h)x-5d-8f-16g-20h-40i-10e}{36(x+1)(x-1)(x-2)}$

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, algorithm="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

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] $-2/9*i*\ln(x+2)+17/36*i*\ln(x-1)+13/108*i*\ln(x+1)-10/27*i*\ln(x-2)+1/9*h*\ln(x+2)+7/18*h*\ln(x-1)-5/54*h*\ln(x+1)-11/27*h*\ln(x-2)+11/36*g*\ln(x-1)-1/18*g*\ln(x+2)-17/54*g*\ln(x-2)+7/108*g*\ln(x+1)+1/144*d*\ln(x+2)-1/72*e*\ln(x+2)+5/36*e*\ln(x-1)+1/18*d*\ln(x-1)+1/108*e*\ln(x+1)+1/54*d*\ln(x+1)-35/432*d*\ln(x-2)-29/216*e*\ln(x-2)-23/108*f*\ln(x-2)-1/27*f*\ln(x+1)+2/9*f*\ln(x-1)+1/36*f*\ln(x+2)+1/36/(x+1)*i-1/12/(x-1)*i-8/9/(x-2)*i-1/36/(x+1)*h-1/12/(x-1)*h-4/9/(x-2)*h+1/36/(x+1)*g-1/12/(x-1)*g-2/9/(x-2)*g-1/36/(x-2)*d-1/18/(x-2)*e-1/36/(x+1)*d+1/36/(x+1)*e-1/12/(x-1)*d-1/12/(x-1)*e-1/12/(x-1)*f-1/9/(x-2)*f-1/36/(x+1)*f$

maxima [A] time = 0.46, size = 163, normalized size = 0.92

$$\frac{1}{144}(d-2e+4f-8g+16h-32i)\log(x+2)+\frac{1}{108}(2d+e-4f+7g-10h+13i)\log(x+1)+\frac{1}{36}(2d+5e+8f+11g+14h+17i)\log(x-1)-\frac{1}{432}(35d+58e+92f+136g+176h+160i)\log(x-2)-\frac{(5d+4e+8f+10g+20h+34i)^2-6(d+f+h)x-5d-10e-8f-16g-20h-40i}{36(x^2-2x^2-x+2)}$$

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, algorithm="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

$$\ln(x-1)\left(\frac{d}{18}+\frac{5e}{36}+\frac{2f}{9}+\frac{11g}{36}+\frac{7h}{18}+\frac{17i}{36}\right)+\ln(x+2)\left(\frac{d}{144}-\frac{e}{72}+\frac{f}{36}-\frac{g}{18}+\frac{h}{9}+\frac{2i}{9}\right)+\ln(x+1)\left(\frac{d}{54}+\frac{e}{108}+\frac{f}{27}+\frac{7g}{108}+\frac{5h}{54}+\frac{13i}{108}\right)-\ln(x-2)\left(\frac{35d}{432}+\frac{29e}{216}+\frac{23f}{108}+\frac{17g}{54}+\frac{11h}{27}+\frac{10i}{27}\right)-\frac{\left(\frac{5d}{36}+\frac{e}{9}+\frac{2f}{9}+\frac{11g}{36}+\frac{7h}{18}+\frac{17i}{36}\right)^2+\left(\frac{d}{9}+\frac{f}{9}+\frac{2}{9}\right)x+\frac{5d}{36}+\frac{5e}{18}+\frac{2f}{9}+\frac{4g}{9}+\frac{5h}{9}+\frac{10i}{9}}{-x^3+2x^2-x-2}$$

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+i*x^5))/(x^4-5*x^2+4)^2,x)

[Out] $\log(x-1)*(d/18+(5*e)/36+(2*f)/9+(11*g)/36+(7*h)/18+(17*i)/36)+\log(x+2)*(d/144-e/72+f/36-g/18+h/9-(2*i)/9)+\log(x+1)*(d/54+e/108-f/27+(7*g)/108-(5*h)/54+(13*i)/108)-\log(x-2)*((35*d)/432+(29*e)/216+(23*f)/108+(17*g)/54+(11*h)/27+(10*i)/27)-((5*d)/36+(5*e)/18+(2*f)/9+(4*g)/9+(5*h)/9+(10*i)/9-x^2*((5*d)/36+e/9+(2*f)/9+(5*g)/18+(5*h)/9+(17*i)/18)+x*(d/6+f/6+h/6))/(x+2*x^2-x^3-2)$

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

$$3.103 \quad \int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx$$

Optimal. Leaf size=19

$$\frac{gx}{\sqrt{a + bx^2 + cx^4}}$$

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])] /; FreeQ[m, x] && PolyQ[Pp, x] && PolyQ[Qq, x] && NeQ[m, -1]

Rubi steps

$$\int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx = \frac{gx}{\sqrt{a + bx^2 + cx^4}}$$

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

IntegrateAlgebraic [A] time = 1.24, size = 19, normalized size = 1.00

$$\frac{gx}{\sqrt{a + bx^2 + cx^4}}$$

Antiderivative was successfully verified.

[In] IntegrateAlgebraic[(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]

fricas [A] time = 1.41, 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

$$\frac{(b^4g - 8ab^2cg + 16a^2c^2g)x}{\sqrt{cx^4 + bx^2 + a}(b^4 - 8ab^2c + 16a^2c^2)}$$

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

$$\frac{gx}{\sqrt{cx^4 + bx^2 + a}}$$

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

$$\frac{gx}{\sqrt{cx^4 + bx^2 + a}}$$

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

$$-g \left(\int \left(\frac{a}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} \right) dx + \int \frac{cx^4}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} dx \right)$$

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)

[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))

$$3.104 \quad \int \frac{ag+ex-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$$

Optimal. Leaf size=57

$$\frac{gx}{\sqrt{a+bx^2+cx^4}} - \frac{e(b+2cx^2)}{(b^2-4ac)\sqrt{a+bx^2+cx^4}}$$

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}

$$\frac{gx}{\sqrt{a+bx^2+cx^4}} - \frac{e(b+2cx^2)}{(b^2-4ac)\sqrt{a+bx^2+cx^4}}$$

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] && !MatchQ[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])]] /; FreeQ[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

$$\begin{aligned}
\int \frac{ag + ex - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx &= \int \frac{ex}{(a + bx^2 + cx^4)^{3/2}} dx + \int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx \\
&= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + e \int \frac{x}{(a + bx^2 + cx^4)^{3/2}} dx \\
&= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(a + bx + cx^2)^{3/2}} dx, x, x^2 \right) \\
&= \frac{gx}{\sqrt{a + bx^2 + cx^4}} - \frac{e(b + 2cx^2)}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}}
\end{aligned}$$

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

IntegrateAlgebraic [A] time = 31.28, size = 51, normalized size = 0.89

$$\frac{-4acgx + b^2gx - be - 2cex^2}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}}$$

Antiderivative was successfully verified.

[In] IntegrateAlgebraic[(a*g + e*x - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2), x]

[Out] $(-(b*e) + b^2*g*x - 4*a*c*g*x - 2*c*e*x^2)/((b^2 - 4*a*c)*\operatorname{Sqrt}[a + b*x^2 + c*x^4])$

fricas [A] time = 1.50, size = 82, normalized size = 1.44

$$\frac{\sqrt{cx^4 + bx^2 + a} (2cex^2 - (b^2 - 4ac)gx + be)}{(b^2c - 4ac^2)x^4 + ab^2 - 4a^2c + (b^3 - 4abc)x^2}$$

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] $-\operatorname{sqrt}(c*x^4 + b*x^2 + a)*(2*c*e*x^2 - (b^2 - 4*a*c)*g*x + b*e)/((b^2*c - 4*a*c^2)*x^4 + a*b^2 - 4*a^2*c + (b^3 - 4*a*b*c)*x^2)$

giac [B] time = 2.01, size = 142, normalized size = 2.49

$$\frac{\left(\frac{2(b^2ce - 4ac^2e)x}{b^4 - 8ab^2c + 16a^2c^2} - \frac{b^4g - 8ab^2cg + 16a^2c^2g}{b^4 - 8ab^2c + 16a^2c^2} \right) x + \frac{b^3e - 4abce}{b^4 - 8ab^2c + 16a^2c^2}}{\sqrt{cx^4 + bx^2 + a}}$$

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] $-\frac{((2*(b^2*c*e - 4*a*c^2*e)*x)/(b^4 - 8*a*b^2*c + 16*a^2*c^2) - (b^4*g - 8*a*b^2*c*g + 16*a^2*c^2*g)/(b^4 - 8*a*b^2*c + 16*a^2*c^2))*x + (b^3*e - 4*a*b*c*e)/(b^4 - 8*a*b^2*c + 16*a^2*c^2)}{\sqrt{c*x^4 + b*x^2 + a}}$

maple [A] time = 0.00, size = 52, normalized size = 0.91

$$\frac{4acgx - b^2gx + 2ce x^2 + be}{\sqrt{c x^4 + b x^2 + a} (4ac - b^2)}$$

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

$$\frac{2cex^2 + be - (b^2g - 4acg)x}{\sqrt{cx^4 + bx^2 + a} (b^2 - 4ac)}$$

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] $-(2*c*e*x^2 + b*e - (b^2*g - 4*a*c*g)*x)/(\sqrt{c*x^4 + b*x^2 + a}*(b^2 - 4*a*c))$

mapad [B] time = 0.93, size = 51, normalized size = 0.89

$$\frac{-g b^2 x + eb + 2cex^2 + 4acgx}{(4ac - b^2) \sqrt{cx^4 + bx^2 + a}}$$

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

$$-\int\left(-\frac{ag}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}\right)dx - \int\left(-\frac{ex}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}\right)dx - \int\frac{cgx^4}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}dx$$

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] $-\text{Integral}(-a*g/(a*\sqrt{a + b*x**2 + c*x**4} + b*x**2*\sqrt{a + b*x**2 + c*x**4} + c*x**4*\sqrt{a + b*x**2 + c*x**4}), x) - \text{Integral}(-e*x/(a*\sqrt{a + b*x**2 + c*x**4} + b*x**2*\sqrt{a + b*x**2 + c*x**4} + c*x**4*\sqrt{a + b*x**2 + c*x**4}), x) - \text{Integral}(c*g*x**4/(a*\sqrt{a + b*x**2 + c*x**4} + b*x**2*\sqrt{a + b*x**2 + c*x**4} + c*x**4*\sqrt{a + b*x**2 + c*x**4}), x)$

$$3.105 \quad \int \frac{ag+fx^3-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$$

Optimal. Leaf size=57

$$\frac{f(2a+bx^2)}{(b^2-4ac)\sqrt{a+bx^2+cx^4}} + \frac{gx}{\sqrt{a+bx^2+cx^4}}$$

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}

$$\frac{f(2a+bx^2)}{(b^2-4ac)\sqrt{a+bx^2+cx^4}} + \frac{gx}{\sqrt{a+bx^2+cx^4}}$$

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] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]
```

Rule 636

```
Int[((d_.) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(3/2), x_Symbol] := 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] := Dist[1/2, Subst[Int[x^((m-1)/2)*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{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])] /; FreeQ[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

$$\begin{aligned}
\int \frac{ag + fx^3 - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx &= \int \frac{fx^3}{(a + bx^2 + cx^4)^{3/2}} dx + \int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx \\
&= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + f \int \frac{x^3}{(a + bx^2 + cx^4)^{3/2}} dx \\
&= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + \frac{1}{2} f \operatorname{Subst} \left(\int \frac{x}{(a + bx + cx^2)^{3/2}} dx, x, x^2 \right) \\
&= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + \frac{f(2a + bx^2)}{(b^2 - 4ac) \sqrt{a + bx^2 + cx^4}}
\end{aligned}$$

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

IntegrateAlgebraic [A] time = 34.51, size = 53, normalized size = 0.93

$$\frac{4acgx - 2af + b^2(-g)x - bfx^2}{(b^2 - 4ac) \sqrt{a + bx^2 + cx^4}}$$

Antiderivative was successfully verified.

[In] IntegrateAlgebraic[(a*g + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x]

[Out] -((-2*a*f - b^2*g*x + 4*a*c*g*x - b*f*x^2)/((b^2 - 4*a*c)*Sqrt[a + b*x^2 + c*x^4]))

fricas [A] time = 1.36, size = 80, normalized size = 1.40

$$\frac{\sqrt{cx^4 + bx^2 + a} (bfx^2 + (b^2 - 4ac)gx + 2af)}{(b^2c - 4ac^2)x^4 + ab^2 - 4a^2c + (b^3 - 4abc)x^2}$$

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

$$\frac{\left(\frac{(b^3f - 4abcf)x}{b^4 - 8ab^2c + 16a^2c^2} + \frac{b^4g - 8ab^2cg + 16a^2c^2g}{b^4 - 8ab^2c + 16a^2c^2} \right) x + \frac{2(ab^2f - 4a^2cf)}{b^4 - 8ab^2c + 16a^2c^2}}{\sqrt{cx^4 + bx^2 + a}}$$

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] $((b^3f - 4abc)f)x/(b^4 - 8ab^2c + 16a^2c^2) + (b^4g - 8ab^2c * g + 16a^2c^2g)/(b^4 - 8ab^2c + 16a^2c^2))x + 2*(ab^2f - 4a^2c * f)/(b^4 - 8ab^2c + 16a^2c^2))/\sqrt{cx^4 + bx^2 + a}$

maple [A] time = 0.00, size = 53, normalized size = 0.93

$$\frac{4acgx - b^2gx - bf x^2 - 2af}{\sqrt{cx^4 + bx^2 + a} (4ac - b^2)}$$

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] $(4a*c*g*x-b^2*g*x-b*f*x^2-2*a*f)/(c*x^4+b*x^2+a)^(1/2)/(4*a*c-b^2)$

maxima [A] time = 0.63, size = 49, normalized size = 0.86

$$\frac{bf x^2 + 2af + (b^2g - 4acg)x}{\sqrt{cx^4 + bx^2 + a} (b^2 - 4ac)}$$

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] $(b*f*x^2 + 2*a*f + (b^2*g - 4*a*c*g)*x)/(\sqrt{c*x^4 + b*x^2 + a}*(b^2 - 4*a*c))$

mapad [B] time = 0.96, size = 51, normalized size = 0.89

$$\frac{g b^2 x + f b x^2 - 4 a c g x + 2 a f}{(4 a c - b^2) \sqrt{c x^4 + b x^2 + a}}$$

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

$$-\int\left(-\frac{ag}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}\right)dx - \int\left(-\frac{fx^3}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}\right)dx - \int\frac{cgx^4}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}dx$$

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] $-\text{Integral}(-a*g/(a*\sqrt{a + b*x**2 + c*x**4} + b*x**2*\sqrt{a + b*x**2 + c*x**4} + c*x**4*\sqrt{a + b*x**2 + c*x**4}), x) - \text{Integral}(-f*x**3/(a*\sqrt{a + b*x**2 + c*x**4} + b*x**2*\sqrt{a + b*x**2 + c*x**4} + c*x**4*\sqrt{a + b*x**2 + c*x**4}), x) - \text{Integral}(c*g*x**4/(a*\sqrt{a + b*x**2 + c*x**4} + b*x**2*\sqrt{a + b*x**2 + c*x**4} + c*x**4*\sqrt{a + b*x**2 + c*x**4}), x)$

$$3.106 \quad \int \frac{ag+ex+fx^3-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$$

Optimal. Leaf size=69

$$\frac{gx}{\sqrt{a+bx^2+cx^4}} - \frac{-2af+x^2(2ce-bf)+be}{(b^2-4ac)\sqrt{a+bx^2+cx^4}}$$

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}

$$\frac{gx}{\sqrt{a+bx^2+cx^4}} - \frac{-2af+x^2(2ce-bf)+be}{(b^2-4ac)\sqrt{a+bx^2+cx^4}}$$

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_Symbol] :> 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])]] /; FreeQ[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

$$\begin{aligned} \int \frac{ag + ex + fx^3 - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx &= \int \frac{x(e + fx^2)}{(a + bx^2 + cx^4)^{3/2}} dx + \int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + \frac{1}{2} \text{Subst} \left(\int \frac{e + fx}{(a + bx + cx^2)^{3/2}} dx, x, x^2 \right) \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} - \frac{be - 2af + (2ce - bf)x^2}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} \end{aligned}$$

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 + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2), x]

[Out] \$Aborted

IntegrateAlgebraic [A] time = 45.62, size = 61, normalized size = 0.88

$$\frac{-4acgx + 2af + b^2gx - be + bfx^2 - 2cex^2}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}}$$

Antiderivative was successfully verified.

[In] IntegrateAlgebraic[(a*g + e*x + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2), x]

[Out] $(-(b*e) + 2*a*f + b^2*g*x - 4*a*c*g*x - 2*c*e*x^2 + b*f*x^2)/((b^2 - 4*a*c)*\text{Sqrt}[a + b*x^2 + c*x^4])$

fricas [A] time = 1.03, size = 92, normalized size = 1.33

$$\frac{\sqrt{cx^4 + bx^2 + a} \left((b^2 - 4ac)gx - (2ce - bf)x^2 - be + 2af \right)}{(b^2c - 4ac^2)x^4 + ab^2 - 4a^2c + (b^3 - 4abc)x^2}$$

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="fricas")

[Out] $\text{sqrt}(c*x^4 + b*x^2 + a)*((b^2 - 4*a*c)*g*x - (2*c*e - b*f)*x^2 - b*e + 2*a*f)/((b^2*c - 4*a*c^2)*x^4 + a*b^2 - 4*a^2*c + (b^3 - 4*a*b*c)*x^2)$

giac [B] time = 2.10, size = 166, normalized size = 2.41

$$\frac{\left(\frac{(b^3f - 4abcf - 2b^2ce + 8ac^2e)x}{b^4 - 8ab^2c + 16a^2c^2} + \frac{b^4g - 8ab^2cg + 16a^2c^2g}{b^4 - 8ab^2c + 16a^2c^2} \right) x + \frac{2ab^2f - 8a^2cf - b^3e + 4abce}{b^4 - 8ab^2c + 16a^2c^2}}{\sqrt{cx^4 + bx^2 + a}}$$

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] $((b^3f - 4abcf - 2b^2ce + 8ac^2e)x/(b^4 - 8ab^2c + 16a^2c^2) + (b^4g - 8ab^2cg + 16a^2c^2g)/(b^4 - 8ab^2c + 16a^2c^2))x + (2ab^2f - 8a^2cf - b^3e + 4abc^2e)/(b^4 - 8ab^2c + 16a^2c^2)/\sqrt{cx^4 + bx^2 + a}$

maple [A] time = 0.00, size = 63, normalized size = 0.91

$$\frac{4acgx - b^2gx - bfx^2 + 2cex^2 - 2af + be}{\sqrt{cx^4 + bx^2 + a} (4ac - b^2)}$$

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] $(4acgx - b^2gx - bfx^2 + 2cex^2 - 2af + be)/(c^2x^4 + b^2x^2 + a^2)^{1/2}/(4ac - b^2)$

maxima [A] time = 0.68, size = 94, normalized size = 1.36

$$\frac{\sqrt{cx^4 + bx^2 + a}((2ce - bf)x^2 + be - 2af - (b^2g - 4acg)x)}{(b^2c - 4ac^2)x^4 + ab^2 - 4a^2c + (b^3 - 4abc)x^2}$$

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="maxima")`

[Out] $-\sqrt{cx^4 + bx^2 + a}((2ce - bf)x^2 + be - 2af - (b^2g - 4acg)x)/((b^2c - 4ac^2)x^4 + ab^2 - 4a^2c + (b^3 - 4abc)x^2)$

mupad [B] time = 0.98, size = 62, normalized size = 0.90

$$\frac{gb^2x + fbx^2 - eb - 2cex^2 - 4acgx + 2af}{(4ac - b^2)\sqrt{cx^4 + bx^2 + a}}$$

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] $-(2af - be + bfx^2 - 2cex^2 + b^2gx - 4acgx)/(4ac - b^2)(a + b^2x^2 + c^2x^4)^{1/2}$

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

$-\int\left(\frac{ag}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}\right)dx - \int\left(\frac{cx}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}\right)dx - \int\left(\frac{f^3}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}\right)dx - \int\frac{cg^4}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}dx$

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] $-\text{Integral}(-a/g/(a*\sqrt{a + b*x**2 + c*x**4} + b*x**2*\sqrt{a + b*x**2 + c*x**4} + c*x**4*\sqrt{a + b*x**2 + c*x**4}), x) - \text{Integral}(-e/x/(a*\sqrt{a + b*x**2 + c*x**4} + b*x**2*\sqrt{a + b*x**2 + c*x**4} + c*x**4*\sqrt{a + b*x**2 + c*x**4})), x) - \text{Integral}(-f*x**3/(a*\sqrt{a + b*x**2 + c*x**4} + b*x**2*\sqrt{a + b*x**2 + c*x**4} + c*x**4*\sqrt{a + b*x**2 + c*x**4})), x) - \text{Integral}(c*g*x**4/(a*\sqrt{a + b*x**2 + c*x**4} + b*x**2*\sqrt{a + b*x**2 + c*x**4} + c*x**4*\sqrt{a + b*x**2 + c*x**4})), x)$

Chapter 4

Appendix

Local contents

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4.1 Download section

The following zip files contain the raw integrals used in this test.

This is a subset of Rubi test suite thanks to Albert Rich, which includes only the algebraic integrals with elementray optimal antiderivatives. It also includes a subset of a test file provided thanks to Sam Blake.

Mathematica format Mathematica_syntax_CAS_integration_elementary_version.zip

Maple and Mupad format Maple_syntax_CAS_integration_elementary_version.zip

Sympy format SYMPY_syntax_CAS_integration_elementary_version.zip

Sage math format SAGE_syntax_CAS_integration_elementary_version.zip

4.2 Listing of Grading functions

The following are the current version of the grading functions used for grading the quality of the antiderivative with reference to the optimal antiderivative included in the test suite.

There is a version for Maple and for Mathematica/Rubi. There is a version for grading Sympy and version for use with Sagemath.

The following are links to the current source code.

The following are the listings of source code of the grading functions.

4.2.1 Mathematica and Rubi grading function

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)

(* ::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]
```

4.2.2 Maple grading function

```
# File: GradeAntiderivative.mpl
# Original version thanks to Albert Rich emailed on 03/21/2017

#Nasser 03/22/2017 Use Maple leaf count instead since buildin
#Nasser 03/23/2017 missing 'ln' for ElementaryFunctionQ added
#Nasser 03/24/2017 corrected the check for complex result
#Nasser 10/27/2017 check for leafsize and do not call ExpnType()
#                    if leaf size is "too large". Set at 500,000
#Nasser 12/22/2019 Added debug flag, added 'dilog' to special functions
#                    see problem 156, file Apostol_Problems

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;
end if;
```

```

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:

```

4.2.3 Sympy grading function

```

#Dec 24, 2019. Nasser M. Abbasi:
#       Port of original Maple grading function by
#       Albert Rich to use with Sympy/Python
#Dec 27, 2019 Nasser. Added `RootSum`. See problem 177, Timofeev file
#       added 'exp_polar'
from sympy import *

def leaf_count(expr):
  #sympy do not have leaf count function. This is approximation
  return round(1.7*count_ops(expr))

def is_sqrt(expr):
  if isinstance(expr,Pow):
    if expr.args[1] == Rational(1,2):
      return True
    else:
      return False
  else:
    return False

def is_elementary_function(func):
  return func in [exp,log,ln,sin,cos,tan,cot,sec,csc,
                 asin,acos,atan,acot,asec,acsc,sinh,cosh,tanh,coth,sech,csch,
                 asinh,acosh,atanh,acoth,asech,acsch
                 ]

def is_special_function(func):
  return func in [ erf,erfc,erfi,
                 fresnels,fresnelc,Ei,Ei,Li,Si,Ci,Shi,Chi,
                 gamma,loggamma,digamma,zeta,polylog,LambertW,
                 elliptic_f,elliptic_e,elliptic_pi,exp_polar
                 ]

def is_hypergeometric_function(func):
  return func in [hyper]

def is_appell_function(func):
  return func in [appellf1]

def is_atom(expn):

```

```

try:
    if expn.isAtom or isinstance(expn,int) or isinstance(expn,float):
        return True
    else:
        return False

except AttributeError as error:
    return False

def expnType(expn):
    debug=False
    if debug:
        print("expn=",expn,"type(expn)=",type(expn))

    if is_atom(expn):
        return 1
    elif isinstance(expn,list):
        return max(map(expnType, expn)) #apply(max,map(ExpnType,expn))
    elif is_sqrt(expn):
        if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
            return 1
        else:
            return max(2,expnType(expn.args[0])) #max(2,ExpnType(op(1,expn)))
    elif isinstance(expn,Pow): #type(expn,'^^')
        if isinstance(expn.args[1],Integer): #type(op(2,expn),'integer')
            return expnType(expn.args[0]) #ExpnType(op(1,expn))
        elif isinstance(expn.args[1],Rational): #type(op(2,expn),'rational')
            if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
                return 1
            else:
                return max(2,expnType(expn.args[0])) #max(2,ExpnType(op(1,expn)))
    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"

```

4.2.4 SageMath grading function

```

#Dec 24, 2019. Nasser: Ported original Maple grading function by
#           Albert Rich to use with Sagemath. This is used to
#           grade Fracas, 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"

```