

# 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](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"> <li>1. antiderivative contains a hypergeometric function and the optimal antiderivative does not.</li> <li>2. antiderivative contains a special function and the optimal antiderivative does not.</li> <li>3. antiderivative contains the imaginary unit and the optimal antiderivative does not.</li> </ol>
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.

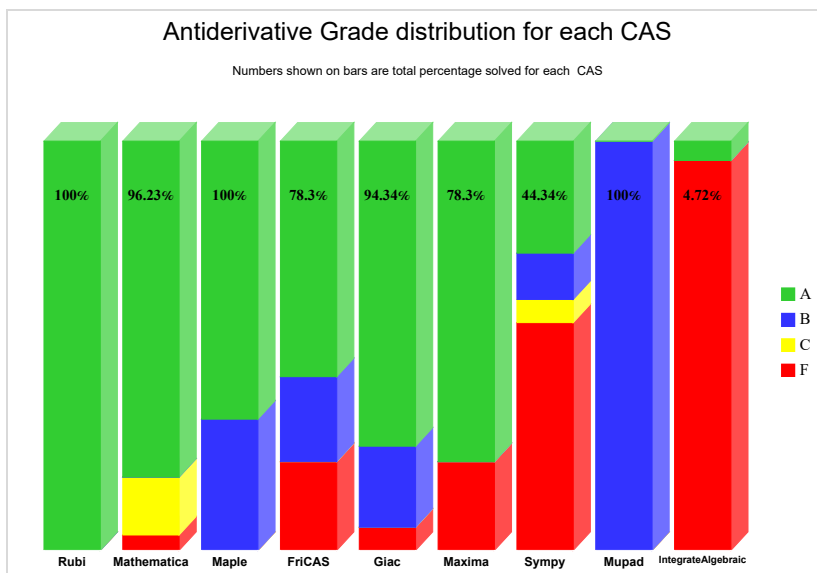
Table 1.2: Description of grading applied to integration result

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

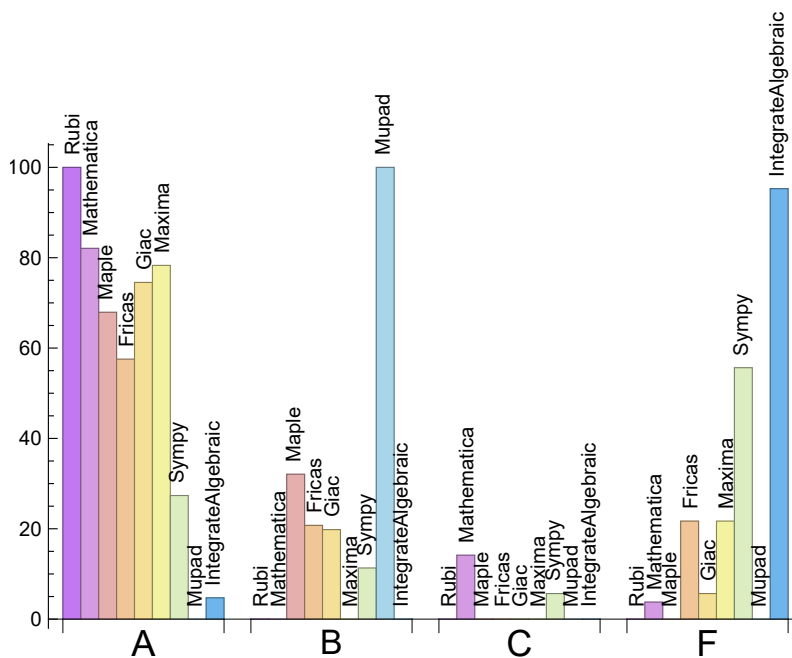
System	% A grade	% B grade	% C grade	% F grade
Rubi	100.00	0.00	0.00	0.00
Mathematica	82.08	0.00	14.15	3.77
Maxima	78.30	0.00	0.00	21.70
Giac	74.53	19.81	0.00	5.66
Maple	67.92	32.08	0.00	0.00
Fricas	57.55	20.75	0.00	21.70
Sympy	27.36	11.32	5.66	55.66
IntegrateAlgebraic	4.72	0.00	0.00	95.28
Mupad	N/A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



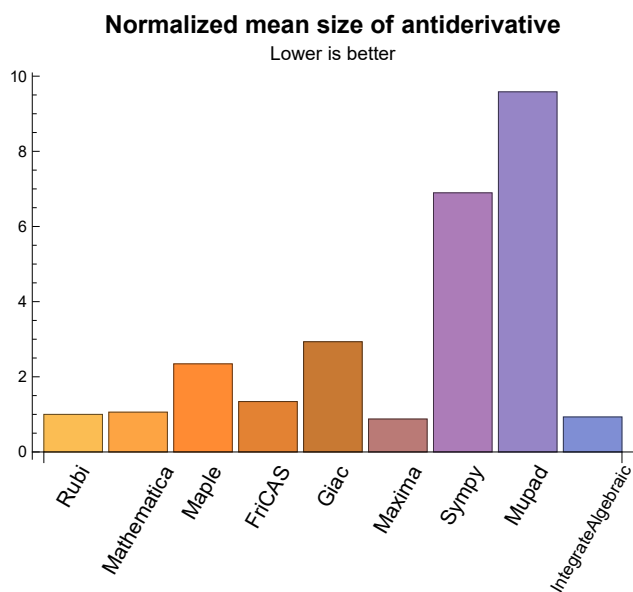
## 1.3 Performance

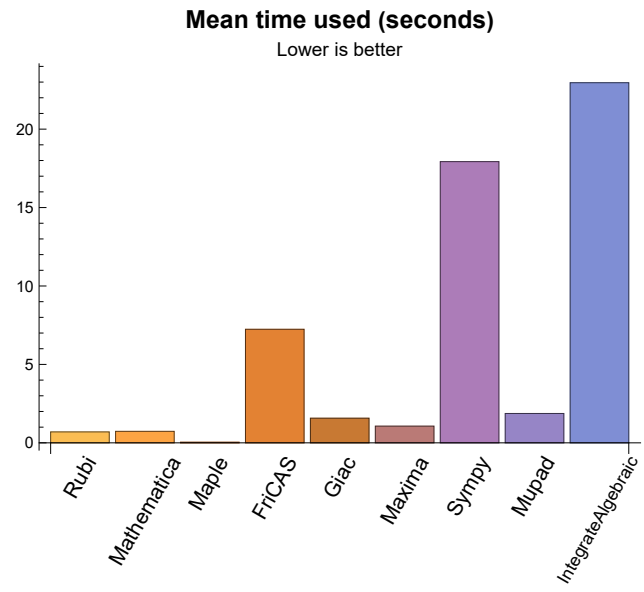
The table below summarizes the performance of each CAS system in terms of CPU time and leaf size of results.

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 buildin system function LeafSize is used to find the leaf size of each antiderivative.

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

```

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

```

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

```
try:
```

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

except Exception as ee:
    leafCount =1
```

### 1.9.4 Important note about Mupad results

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

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

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

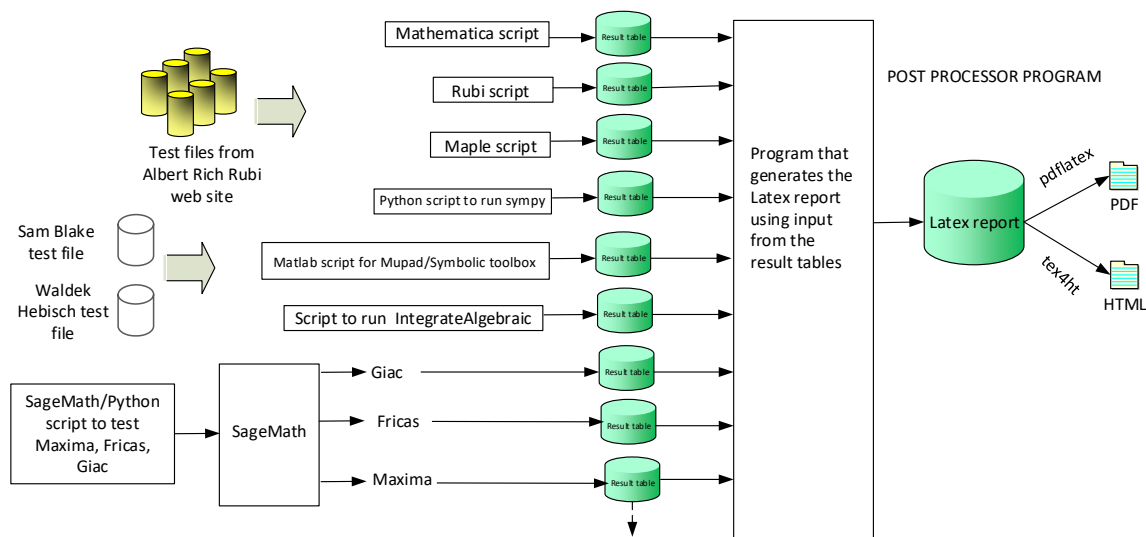
```
integrand = evalin(symengine,'cos(x)*sin(x)')
the_variable = evalin(symengine,'x')
anti = int(integrand,the_variable)
```

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

## 1.10 Design of the test system

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





**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"
13. integer. 1 if result was verified or 0 if not verified.  
*The following field present only in Rubi and Mathematica Tables*
14. integer. Number of rules used.  
*The following fields present only in Rubi Tables*
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

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May 11, 2021



# 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

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

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
61	A	2	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
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

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
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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3.65	$\int \frac{ad+aux+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^3} dx$	760
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3.69	$\int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{4-5x^2+x^4} dx$	791
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3.76	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx$	813
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3.80	$\int \frac{(2+x)(d+ex)}{4-5x^2+x^4} dx$	828
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3.84	$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx$	842
3.85	$\int \frac{2-x-2x^2+x^3}{(4-5x^2+x^4)^2} dx$	846
3.86	$\int \frac{(d+ex)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx$	849
3.87	$\int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx$	853
3.88	$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$	857

- 3.89  $\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 861$
- 3.90  $\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 865$
- 3.91  $\int \frac{2-3x+x^2}{(4-5x^2+x^4)^2} dx \dots\dots\dots 869$
- 3.92  $\int \frac{(d+ex)(2-3x+x^2)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 873$
- 3.93  $\int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 879$
- 3.94  $\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 884$
- 3.95  $\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 888$
- 3.96  $\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 892$
- 3.97  $\int \frac{2+x}{(4-5x^2+x^4)^2} dx \dots\dots\dots 896$
- 3.98  $\int \frac{(2+x)(d+ex)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 899$
- 3.99  $\int \frac{(2+x)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 903$
- 3.100  $\int \frac{(2+x)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 907$
- 3.101  $\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 911$
- 3.102  $\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx \dots\dots\dots 915$
- 3.103  $\int \frac{ag-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx \dots\dots\dots 919$
- 3.104  $\int \frac{ag+ex-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx \dots\dots\dots 922$
- 3.105  $\int \frac{ag+fx^3-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx \dots\dots\dots 926$
- 3.106  $\int \frac{ag+ex+fx^3-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx \dots\dots\dots 930$

### 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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

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



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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

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

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

**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

$$\begin{aligned} \int (a + bx^2 + cx^4)(d + ex + fx^2 + gx^3 + hx^4) dx &= \int (ad + aex + (bd + af)x^2 + (be + ag)x^3 + (cd + bf + ah)x^4 + (c*d + b*f + a*h)x^5 + (c*e + b*g)x^6 + (c*f + b*h)x^7 + (c*g*x^8) + (c*h*x^9)) dx \\ &= adx + \frac{1}{2}aex^2 + \frac{1}{3}(bd + af)x^3 + \frac{1}{4}(be + ag)x^4 + \frac{1}{5}(cd + bf + ah)x^5 + \frac{1}{6}(c*d + b*f + a*h)x^6 + \frac{1}{7}(c*e + b*g)x^7 + \frac{1}{8}(c*f + b*h)x^8 + \frac{1}{9}c*g*x^9 + \frac{1}{10}c*h*x^{10} \end{aligned}$$

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

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

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

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

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

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

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

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

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

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

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

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

**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]  $\frac{1}{10}c*i*x^{10} + \frac{1}{9}c*h*x^9 + \frac{1}{8}c*g*x^8 + \frac{1}{8}b*i*x^8 + \frac{1}{7}c*f*x^7 + \frac{1}{7}b*h*x^7 + \frac{1}{6}b*g*x^6 + \frac{1}{6}a*i*x^6 + \frac{1}{6}c*x^6*e + \frac{1}{5}c*d*x^5 + \frac{1}{5}b*f*x^5 + \frac{1}{5}a*h*x^5 + \frac{1}{4}a*g*x^4 + \frac{1}{4}b*x^4*e + \frac{1}{3}b*d*x^3 + \frac{1}{3}a*f*x^3 + \frac{1}{2}a*x^2*e + a*d*x$

**maple [A]** time = 0.00, size = 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

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

**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

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

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]  $a^2dx + \frac{1}{2}a^2e^x + \frac{2}{3}abdx^3 + \frac{1}{2}abe^x + \frac{1}{5}(2ac + b^2)dx^5 + \frac{1}{6}(2ac + b^2)e^x + \frac{2}{7}bcdx^7 + \frac{1}{4}bce^x + \frac{1}{9}c^2dx^9 + \frac{1}{10}c^2e^x + 0$

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

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

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]  $\frac{1}{10}c^2e^{10} + \frac{1}{9}c^2dx^9 + \frac{1}{4}bce^x + \frac{2}{7}bcdx^7 + \frac{1}{6}(b^2 + 2ac)e^x + \frac{1}{2}abdx^4 + \frac{1}{5}(b^2 + 2ac)dx^5 + \frac{2}{3}abdx^3 + \frac{1}{2}a^2e^x + a^2dx$

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

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

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

**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]  $a^2dx + a^2e^x + \frac{2}{3}abdx^3 + \frac{1}{2}abex^4 + \frac{2}{7}bcdx^7 + \frac{1}{4}bcex^8 + \frac{1}{9}c^2dx^9 + \frac{1}{10}c^2e^x + x^6(a^2c + b^2e) + x^5(2acd + b^2d)$

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

**Optimal.** Leaf size=154

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

**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}

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

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

$$\begin{aligned} \int (d + ex + fx^2)(a + bx^2 + cx^4)^2 dx &= \int (a^2 d + a^2 ex + a(2bd + af)x^2 + 2abex^3 + (b^2 d + 2acd + 2abf)x^4 + (b^2 e + 2ace + 2abf)x^5 + (b^2 c + 2ace)x^6 + (2bce + b^2 f + 2acf)x^7 + bce x^8 + (c^2 d + 2b^2 f)x^9 + c^2 ex^{10} + c^2 f x^{11}) dx \\ &= a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{3} a(2bd + af)x^3 + \frac{1}{2} abex^4 + \frac{1}{5} (b^2 d + 2acd + 2abf)x^5 + \frac{1}{6} (b^2 c + 2ace)x^6 + \frac{1}{7} (2bce + b^2 f + 2acf)x^7 + \frac{1}{4} bce x^8 + \frac{1}{10} c^2 ex^{10} + \frac{1}{11} c^2 f x^{11} \end{aligned}$$

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

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

Antiderivative was successfully verified.

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

[Out]  $a^2dx + (a^2ex^2)/2 + (a(2bd + af)x^3)/3 + (abex^4)/2 + ((b^2d + 2acd + 2abf)x^5)/5 + ((b^2 + 2ac)ex^6)/6 + ((2b^2c + 2abf)x^7)/7 + (b^2cx^8)/4 + (c(c^2d + 2bf)x^9)/9 + (c^2ex^{10})/10 + (c^2fx^{11})/11$

**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")

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

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

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

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")

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

**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)

[Out]  $\frac{1}{11}c^2fx^{11} + \frac{1}{10}c^2ex^{10} + \frac{1}{9}(2b^2c^2d + 2b^2c^2f + c^2d^2)x^9 + \frac{1}{4}b^2c^2ex^8 + \frac{1}{7}(2b^2c^2d + f(2ac + b^2))x^7 + \frac{1}{6}(2ac + b^2)ex^6 + \frac{1}{5}(d(2ac + b^2) + 2ab^2f)x^5 + \frac{1}{2}ab^2ex^4 + \frac{1}{3}(a^2f + 2ab^2d)x^3 + \frac{1}{2}a^2ex^2 + a^2d^2x$

**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")

[Out]  $\frac{1}{11}c^2fx^{11} + \frac{1}{10}c^2ex^{10} + \frac{1}{4}b^2c^2ex^8 + \frac{1}{9}(c^2d + 2b^2c^2f)x^9 + \frac{1}{6}(b^2 + 2ac)ex^6 + \frac{1}{7}(2b^2c^2d + (b^2 + 2ac)f)x^7 + \frac{1}{2}ab^2ex^4 + \frac{1}{5}(2ab^2f + (b^2 + 2ac)d)x^5 + \frac{1}{2}a^2ex^2 + a^2d^2x + \frac{1}{3}(2ab^2d + a^2f)x^3$

**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)

[Out]  $x^5((b^2d)/5 + (2ac^2d)/5 + (2ab^2f)/5) + x^7((b^2f)/7 + (2b^2cd)/7 + (2ac^2f)/7) + x^3((a^2f)/3 + (2ab^2d)/3) + x^9((c^2d)/9 + (2b^2c^2f)/9) + (a^2ex^2)/2 + (c^2ex^{10})/10 + (c^2fx^{11})/11 + (ex^6(2ac + b^2))/6 + a^2d^2x + (ab^2ex^4)/2 + (b^2c^2ex^8)/4$

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

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

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]  $a^2d^2x + a^2ex^2/2 + ab^2ex^4/2 + b^2c^2ex^8/4 + c^2ex^{10}/10 + c^2fx^{11}/11 + x^9(2b^2c^2f/9 + c^2d/9) + x^7(2ac^2f/7 + b^2c^2f/7 + 2b^2cd/7) + x^6(ac^2e/3 + b^2e/6) + x^5(2ab^2f/5 + 2ac^2d/5 + b^2c^2d/5) + x^3(a^2f/3 + 2abd/3)$



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

**Optimal.** Leaf size=196

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{8} x^8 (2acg + b^2 g + 2bce) + \frac{1}{6} x^6 (2abg + 2acd + b^2 d) + \frac{1}{10} x^{10} (2bg + ce) + \frac{1}{11} c^2 f x^{11} + \frac{1}{12} c^2 g x^{12}$$

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

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{8} x^8 (2acg + b^2 g + 2bce) + \frac{1}{6} x^6 (2abg + 2acd + b^2 d) + \frac{1}{10} x^{10} (2bg + ce) + \frac{1}{11} c^2 f x^{11} + \frac{1}{12} c^2 g x^{12}$$

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**

$$\int (d + ex + fx^2 + gx^3) (a + bx^2 + cx^4)^2 dx = \int (a^2 d + a^2 ex + a(2bd + af)x^2 + a(2be + ag)x^3 + (b^2 d + 2acd + 2abf + 2acd + b^2 d)x^4 + (2bce + 2abg + 2acd + b^2 d)x^5 + (2bce + 2abg + 2acd + b^2 d)x^6 + (2bce + 2abg + 2acd + b^2 d)x^7 + (2bce + 2abg + 2acd + b^2 d)x^8 + (2bce + 2abg + 2acd + b^2 d)x^9 + (2bce + 2abg + 2acd + b^2 d)x^{10} + (2bce + 2abg + 2acd + b^2 d)x^{11} + (2bce + 2abg + 2acd + b^2 d)x^{12}) dx$$

$$= a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{3} a(2bd + af)x^3 + \frac{1}{4} a(2be + ag)x^4 + \frac{1}{5} (b^2 d + 2acd + 2abf + 2acd + b^2 d)x^5 + \frac{1}{6} (2bce + 2abg + 2acd + b^2 d)x^6 + \frac{1}{7} (2bce + 2abg + 2acd + b^2 d)x^7 + \frac{1}{8} (2bce + 2abg + 2acd + b^2 d)x^8 + \frac{1}{9} (2bce + 2abg + 2acd + b^2 d)x^9 + \frac{1}{10} (2bce + 2abg + 2acd + b^2 d)x^{10} + \frac{1}{11} (2bce + 2abg + 2acd + b^2 d)x^{11} + \frac{1}{12} (2bce + 2abg + 2acd + b^2 d)x^{12}$$

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

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{8} x^8 (2acg + b^2 g + 2bce) + \frac{1}{6} x^6 (2abg + 2acd + b^2 d) + \frac{1}{10} x^{10} (2bg + ce) + \frac{1}{11} c^2 f x^{11} + \frac{1}{12} c^2 g x^{12}$$

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]  $a^2dx + (a^2ex^2)/2 + (a(2bd + af)x^3)/3 + (a(2be + ag)x^4)/4 + ((b^2d + 2acd + 2abf)x^5)/5 + ((b^2e + 2ace + 2abg)x^6)/6 + ((2bc*d + b^2f + 2ac*f)x^7)/7 + ((2bc*e + b^2g + 2ac*g)x^8)/8 + (c(c*d + 2bf)x^9)/9 + (c(c*e + 2bg)x^{10})/10 + (c^2fx^{11})/11 + (c^2gx^{12})/12$

**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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

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

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

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

$$\frac{1}{12} c^2 g x^{12} + \frac{1}{11} c^2 f x^{11} + \frac{1}{10} (c^2 e + 2 b c g) x^{10} + \frac{1}{9} (2 f b c + c^2 d) x^9 + \frac{1}{8} (2 b c e + (b^2 + 2 a c) g) x^8 + \frac{1}{7} (2 b c d + (b^2 + 2 a c) f) x^7 + \frac{1}{6} (2 a b g + (b^2 + 2 a c) e) x^6 + \frac{1}{5} (2 a b f + (b^2 + 2 a c) d) x^5 + \frac{1}{2} a^2 e x^2 + \frac{1}{4} (2 a b e + a^2 g) x^4 + \frac{1}{3} (2 a b d + a^2 f) x^3$$

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

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

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),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

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

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

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

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}

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

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

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

Mathematica [A] time = 0.08, 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

$$\frac{1}{13}x^{13}hc^2 + \frac{1}{12}x^{12}gc^2 + \frac{1}{11}x^{11}fc^2 + \frac{2}{11}x^{11}hcb + \frac{1}{10}x^{10}ac^2 + \frac{1}{9}x^{10}gcb + \frac{1}{9}x^{10}fcb + \frac{1}{9}x^{10}hb^2 + \frac{2}{9}x^{10}hca + \frac{1}{8}x^9ecb + \frac{1}{8}x^9gb^2 + \frac{1}{4}x^9gca + \frac{2}{7}x^9dcb + \frac{1}{7}x^9fcb + \frac{1}{7}x^9fca + \frac{2}{7}x^9hba + \frac{1}{6}x^8eb^2 + \frac{1}{3}x^8eca + \frac{1}{3}x^8gba + \frac{1}{3}x^8db^2 + \frac{2}{5}x^8dca + \frac{2}{5}x^8fba + \frac{1}{5}x^8hac + \frac{1}{4}x^8gcb + \frac{2}{3}x^8dba + \frac{1}{3}x^8fa^2 + \frac{1}{2}x^8ca^2 + xda^2$$

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

$$\frac{1}{13}c^2ha^3 + \frac{1}{12}c^2ga^3 + \frac{1}{11}c^2fa^3 + \frac{2}{11}hca^3 + \frac{1}{10}hca^3 + \frac{1}{10}c^2ga^3 + \frac{1}{9}c^2fa^3 + \frac{2}{9}hca^3 + \frac{1}{9}hca^3 + \frac{1}{8}hca^3 + \frac{1}{4}hca^3 + \frac{1}{4}hca^3 + \frac{2}{7}hca^3 + \frac{1}{7}hca^3 + \frac{2}{7}hca^3 + \frac{1}{3}hca^3 + \frac{1}{3}hca^3 + \frac{1}{3}hca^3 + \frac{2}{5}hca^3 + \frac{2}{5}hca^3 + \frac{1}{5}hca^3 + \frac{1}{4}hca^3 + \frac{1}{2}hca^3 + \frac{2}{3}hca^3 + \frac{1}{3}hca^3 + \frac{1}{2}hca^3 + a^2d$$

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

$$\begin{aligned} & \int 9 + 2/9*a*c*h*x^9 + 1/8*b^2*g*x^8 + 1/4*a*c*g*x^8 + 1/4*b*c*x^8*e + 2/7*b*c*d*x^7 \\ & + 1/7*b^2*f*x^7 + 2/7*a*c*f*x^7 + 2/7*a*b*h*x^7 + 1/3*a*b*g*x^6 + 1/6*b^2*x^6*e \\ & + 1/3*a*c*x^6*e + 1/5*b^2*d*x^5 + 2/5*a*c*d*x^5 + 2/5*a*b*f*x^5 + 1/5*a^2*h*x^5 \\ & + 1/4*a^2*g*x^4 + 1/2*a*b*x^4*e + 2/3*a*b*d*x^3 + 1/3*a^2*f*x^3 + 1/2*a^2*x^2*e \\ & + a^2*d*x \end{aligned}$$

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

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

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

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

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^4 + 1/4\*(2\*a\*b\*e + a^2\*g)\*x^3 + a^2\*d\*x + 1/3\*(2\*a\*b\*d + a^2\*f)\*x^3

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

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

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<sup>2</sup>\*h)/5 + (2\*a\*c\*d)/5 + (2\*a\*b\*f)/5) + x<sup>7</sup>\*((b<sup>2</sup>\*f)/7 + (2\*b\*c\*d)/7 + (2\*a\*c\*f)/7 + (2\*a\*b\*h)/7) + x<sup>9</sup>\*((c<sup>2</sup>\*d)/9 + (b<sup>2</sup>\*h)/9 + (2\*b\*c\*f)/9 + (2\*a\*c\*h)/9) + (a<sup>2</sup>\*e\*x<sup>2</sup>)/2 + (c<sup>2</sup>\*g\*x<sup>12</sup>)/12 + (c<sup>2</sup>\*h\*x<sup>13</sup>)/13 + a<sup>2</sup>\*d\*x

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

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

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\_))^-1, x\_Symbol] := Simp[Log[RemoveContent[a + b\*x, x]]/b, x] /; FreeQ[{a, b}, x]

#### Rule 207

Int[((a\_) + (b\_.)\*(x\_)^2)^-1, x\_Symbol] := -Simp[ArcTanh[(Rt[b, 2]\*x)/Rt[-a, 2]]/(Rt[-a, 2]\*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a, 0] || GtQ[b, 0])

#### Rule 616

Int[((a\_.) + (b\_.)\*(x\_) + (c\_.)\*(x\_)^2)^-1, x\_Symbol] := With[{q = Rt[b^2 - 4\*a\*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c\*x, x], x], x] - Dist[c/q, Int[1/Simp[b/2 + q/2 + c\*x, x], x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4\*a\*c, 0] && PosQ[b^2 - 4\*a\*c] && PerfectSquareQ[b^2 - 4\*a\*c]

#### Rule 1093

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

### Rule 1107

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

### Rule 1673

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

### Rubi steps

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

**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(abs(x + 2)) + 1/6\*(d - e)\*log(abs(x + 1)) - 1/6\*(d + e) \*log(abs(x - 1)) + 1/12\*(d + 2\*e)\*log(abs(x - 2))

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

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
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

### Rule 1673

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

### Rubi steps

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

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

**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) - 1



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

$Q[c*d^2 - a*e^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4*a*c]$

### Rule 1247

$\text{Int}[(x_*)*((d_*) + (e_*)*(x_*)^2)^(q_*)*((a_*) + (b_*)*(x_*)^2 + (c_*)*(x_*)^4)^(p_*), x\_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(d + e*x)^q*(a + b*x + c*x^2)^p, x], x, x^2], x] \ /; \text{FreeQ}\{a, b, c, d, e, p, q\}, x]$

### Rule 1673

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

### 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] && Ne

$Q[c*d^2 - a*e^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4*a*c]$

### Rule 1247

$\text{Int}[(x_*)*((d_*) + (e_*)*(x_*)^2)^(q_*)*((a_*) + (b_*)*(x_*)^2 + (c_*)*(x_*)^4)^(p_*), x\_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(d + e*x)^(q)*(a + b*x + c*x^2)^p, x], x, x^2], x] \ /; \text{FreeQ}\{a, b, c, d, e, p, q\}, x]$

### Rule 1673

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

### Rule 1676

$\text{Int}[(Pq_*)/((a_*) + (b_*)*(x_*)^2 + (c_*)*(x_*)^4), x\_Symbol] \rightarrow \text{Int}[\text{ExpandIntegrand}[Pq/(a + b*x^2 + c*x^4), x], x] \ /; \text{FreeQ}\{a, b, c\}, x] \ \&\& \ \text{PolyQ}[Pq, x^2] \ \&\& \ \text{Expon}[Pq, x^2] > 1$

### 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] && Ne

$Q[cd^2 - ae^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4ac]$

### Rule 1657

$\text{Int}[(Pq_*)*((a_) + (b_*)(x_) + (c_*)(x_)^2)^{(p_)}, x\_Symbol] \rightarrow \text{Int}[\text{ExpandIntegrand}[Pq*(a + b*x + c*x^2)^p, x], x] \ /; \ \text{FreeQ}\{a, b, c\}, x\} \ \&\& \ \text{PolyQ}[Pq, x] \ \&\& \ \text{IGtQ}[p, -2]$

### Rule 1663

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

### Rule 1673

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

### Rule 1676

$\text{Int}[(Pq_)/((a_) + (b_*)(x_)^2 + (c_*)(x_)^4), x\_Symbol] \rightarrow \text{Int}[\text{ExpandIntegrand}[Pq/(a + b*x^2 + c*x^4), x], x] \ /; \ \text{FreeQ}\{a, b, c\}, x\} \ \&\& \ \text{PolyQ}[Pq, x^2] \ \&\& \ \text{Expon}[Pq, x^2] > 1$

### Rubi steps

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

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

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

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

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

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

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

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

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

**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}, x]

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



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

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

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

**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

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

**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

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

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

**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

$-\ln\left(x - \frac{1}{2} - \frac{\sqrt{3}11}{2}\right)\left(\frac{d}{4} - \frac{f}{4} + \frac{\sqrt{3}d11}{12} + \frac{\sqrt{3}e11}{6} + \frac{\sqrt{3}f11}{12}\right) - \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}11}{2}\right)\left(\frac{d}{4} - \frac{f}{4} + \frac{\sqrt{3}d11}{12} - \frac{\sqrt{3}e11}{6} + \frac{\sqrt{3}f11}{12}\right) + \ln\left(x - \frac{1}{2} + \frac{\sqrt{3}11}{2}\right)\left(\frac{d}{4} - \frac{f}{4} + \frac{\sqrt{3}d11}{12} + \frac{\sqrt{3}e11}{6} + \frac{\sqrt{3}f11}{12}\right) + \ln\left(x + \frac{1}{2} + \frac{\sqrt{3}11}{2}\right)\left(\frac{d}{4} - \frac{f}{4} + \frac{\sqrt{3}d11}{12} - \frac{\sqrt{3}e11}{6} + \frac{\sqrt{3}f11}{12}\right)$

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 + 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 - sqrt(3)*I*(d + 2*e + f)/12) + 15*d*e**3*f**2 + 48*d*e**3*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**2 - 54*d*e**2*f**2*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12) + 288*d*e**2*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**3 - 20*d*e*f**4 + 180*d*e*f**2*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**2 + 36*d*f**4*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12) - 72*d*f**2*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**3 - 8*e**5*f - 96*e**3*f*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**2 + 36*e**2*f**3*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12) + 11*e*f**5 - 48*e*f**3*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**2 - 6*f**5*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12) + 144*f**3*(-d/4 + f/4 - sqrt(3)*I*(d + 2*e + f)/12)**3)/(3*d**6 - 3*d**5*f - 8*d**4*e**2 - 3*d**4*f**2 + 40*d**3*e**2*f + 6*d**3*f**3 - 16*d**2*e**4 - 48*d**2*e**2*f**2 - 3*d**2*f**4 + 16*d*e**4*f + 40*d*e**2*f**3 - 3*d*f**5 - 16*e**4*f**2 - 8*e**2*f**4 + 3*f**6)) + (-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12)*log(x + (-7*d**5*e + 6*d**5*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12) + 25*d**4*e*f + 18*d**4*f*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12) - 15*d**3*e**3 - 18*d**3*e**2*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12) - 25*d**3*e*f**2 + 60*d**3*e*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12)**2 - 42*d**3*f**2*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12) + 72*d**3*(-d/4 + f/4 + sqrt(3)*I*(d + 2*e + f)/12)**3 + 108*d**2*e**2*f
```



$$\begin{aligned}
& (-d/4 + f/4 + \sqrt{3})I*(d + 2e + f)/12) + 20*d**2*e*f**3 - 144*d**2*e*f*( \\
& -d/4 + f/4 + \sqrt{3})I*(d + 2e + f)/12)**2 - 12*d**2*f**3*(-d/4 + f/4 + \sqrt{3})I*(d + 2e + f) \\
& /12) - 144*d**2*f*(-d/4 + f/4 + \sqrt{3})I*(d + 2e + f) \\
& /12)**3 + 4*d*e**5 + 24*d*e**4*(-d/4 + f/4 + \sqrt{3})I*(d + 2e + f)/12) + \\
& 15*d*e**3*f**2 + 48*d*e**3*(-d/4 + f/4 + \sqrt{3})I*(d + 2e + f)/12)**2 - \\
& 54*d*e**2*f**2*(-d/4 + f/4 + \sqrt{3})I*(d + 2e + f)/12) + 288*d*e**2*(-d/4 \\
& + f/4 + \sqrt{3})I*(d + 2e + f)/12)**3 - 20*d*e*f**4 + 180*d*e*f**2*(-d/4 \\
& + f/4 + \sqrt{3})I*(d + 2e + f)/12)**2 + 36*d*f**4*(-d/4 + f/4 + \sqrt{3})I*( \\
& d + 2e + f)/12) - 72*d*f**2*(-d/4 + f/4 + \sqrt{3})I*(d + 2e + f)/12)**3 \\
& - 8*e**5*f - 96*e**3*f*(-d/4 + f/4 + \sqrt{3})I*(d + 2e + f)/12)**2 + 36*e* \\
& *2*f**3*(-d/4 + f/4 + \sqrt{3})I*(d + 2e + f)/12) + 11*e*f**5 - 48*e*f**3*( \\
& -d/4 + f/4 + \sqrt{3})I*(d + 2e + f)/12)**2 - 6*f**5*(-d/4 + f/4 + \sqrt{3})I* \\
& I*(d + 2e + f)/12) + 144*f**3*(-d/4 + f/4 + \sqrt{3})I*(d + 2e + 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 - 2e + f)/12)*\log(x + (-7*d**5*e + 6*d**5*(d/4 - f/4 - \sqrt{3}) \\
& I*(d - 2e + f)/12) + 25*d**4*e*f + 18*d**4*f*(d/4 - f/4 - \sqrt{3})I*(d \\
& - 2e + 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 - 2e + f) \\
& /12)**2 - 42*d**3*f**2*(d/4 - f/4 - \sqrt{3})I*(d - 2e + f)/12) + 72*d**3* \\
& (d/4 - f/4 - \sqrt{3})I*(d - 2e + f)/12)**3 + 108*d**2*e**2*f*(d/4 - f/4 - \\
& \sqrt{3})I*(d - 2e + f)/12) + 20*d**2*e*f**3 - 144*d**2*e*f*(d/4 - f/4 - \sqrt{3}) \\
& I*(d - 2e + f)/12)**2 - 12*d**2*f**3*(d/4 - f/4 - \sqrt{3})I*(d - 2e \\
& + f)/12) - 144*d**2*f*(d/4 - f/4 - \sqrt{3})I*(d - 2e + f)/12)**3 + 4*d*e* \\
& *5 + 24*d*e**4*(d/4 - f/4 - \sqrt{3})I*(d - 2e + f)/12) + 15*d*e**3*f**2 + \\
& 48*d*e**3*(d/4 - f/4 - \sqrt{3})I*(d - 2e + f)/12)**2 - 54*d*e**2*f**2*(d/4 \\
& - f/4 - \sqrt{3})I*(d - 2e + f)/12) + 288*d*e**2*(d/4 - f/4 - \sqrt{3})I*(d \\
& - 2e + f)/12)**3 - 20*d*e*f**4 + 180*d*e*f**2*(d/4 - f/4 - \sqrt{3})I*(d - \\
& 2e + f)/12)**2 + 36*d*f**4*(d/4 - f/4 - \sqrt{3})I*(d - 2e + f)/12) - 72* \\
& d*f**2*(d/4 - f/4 - \sqrt{3})I*(d - 2e + f)/12)**3 - 8*e**5*f - 96*e**3*f*( \\
& d/4 - f/4 - \sqrt{3})I*(d - 2e + f)/12)**2 + 36*e**2*f**3*(d/4 - f/4 - \sqrt{3}) \\
& I*(d - 2e + f)/12) + 11*e*f**5 - 48*e*f**3*(d/4 - f/4 - \sqrt{3})I*(d - \\
& 2e + f)/12)**2 - 6*f**5*(d/4 - f/4 - \sqrt{3})I*(d - 2e + f)/12) + 144*f* \\
& *3*(d/4 - f/4 - \sqrt{3})I*(d - 2e + 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 - 2e + f)/12)* \\
& \log(x + (-7*d**5*e + 6*d**5*(d/4 - f/4 + \sqrt{3})I*(d - 2e + f)/12) + 25*d \\
& **4*e*f + 18*d**4*f*(d/4 - f/4 + \sqrt{3})I*(d - 2e + f)/12) - 15*d**3*e**3 \\
& - 18*d**3*e**2*(d/4 - f/4 + \sqrt{3})I*(d - 2e + f)/12) - 25*d**3*e*f**2 + \\
& 60*d**3*e*(d/4 - f/4 + \sqrt{3})I*(d - 2e + f)/12)**2 - 42*d**3*f**2*(d/4 \\
& - f/4 + \sqrt{3})I*(d - 2e + 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 - 2e + f)/12) + \\
& 20*d**2*e*f**3 - 144*d**2*e*f*(d/4 - f/4 + \sqrt{3})I*(d - 2e + f)/12)**2
\end{aligned}$$

```

- 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**5 + 24*d**4*(d/4 - f/4 + s
  qrt(3)*I*(d - 2*e + f)/12) + 15*d**3*f**2 + 48*d**3*(d/4 - f/4 + sqrt(3
  )*I*(d - 2*e + f)/12)**2 - 54*d**2*f**2*(d/4 - f/4 + sqrt(3)*I*(d - 2*e +
  f)/12) + 288*d**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**4*f + 40*d**2*f**3 - 3*d*f**5 - 16*e**4*f**2 - 8*e**2*f**4 + 3*f**6
  ))

```

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

**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), In

$t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /;$  FreeQ[{a, b, c, d, e}, x] && NeQ[2\*c\*d - b\*e, 0] && NeQ[b^2 - 4\*a\*c, 0] && !NiceSqrtQ[b^2 - 4\*a\*c]

### Rule 1169

Int[((d\_) + (e\_)\*(x\_)^2)/((a\_) + (b\_)\*(x\_)^2 + (c\_)\*(x\_)^4), x\_Symbol] :> With[{q = Rt[a/c, 2]}, With[{r = Rt[2\*q - b/c, 2]}, Dist[1/(2\*c\*q\*r), Int[(d\*r - (d - e\*q)\*x)/(q - r\*x + x^2), x], x] + Dist[1/(2\*c\*q\*r), Int[(d\*r + (d - e\*q)\*x)/(q + r\*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4\*a\*c, 0] && NeQ[c\*d^2 - b\*d\*e + a\*e^2, 0] && NegQ[b^2 - 4\*a\*c]

### Rule 1247

Int[(x\_)\*((d\_) + (e\_)\*(x\_)^2)^(q\_)\*((a\_) + (b\_)\*(x\_)^2 + (c\_)\*(x\_)^4)^(p\_), x\_Symbol] :> Dist[1/2, Subst[Int[(d + e\*x)^q\*(a + b\*x + c\*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]

### Rule 1673

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

### Rubi steps

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

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

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

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

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

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

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

**mupad [B]** time = 1.13, size = 199, normalized size = 1.57

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

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

**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

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

**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), In



$\int \frac{(b + 2cx)/(a + bx + cx^2)}{x} dx$  ; 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

$\int \frac{(d_1 + (e_1)x^2)/(a_1 + (b_1)x^2 + (c_1)x^4)}{x} dx$  :> 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

$\int (x_1)^{q_1} ((d_1 + (e_1)x_1^2)^{q_2}) ((a_1 + (b_1)x_1^2 + (c_1)x_1^4)^{p_1}) dx_1$  :> 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

$\int (Pq_1) ((a_1 + (b_1)x_1^2 + (c_1)x_1^4)^{p_1}) dx_1$  :> 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

$\int (Pq_1) / ((a_1 + (b_1)x_1^2 + (c_1)x_1^4)) dx_1$  :> 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

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

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

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

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

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

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.



$(1/2)*f*1i)/12 - (3^{(1/2)}*g*1i)/12 - (3^{(1/2)}*h*1i)/6) + h*x$   
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

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

**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}

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

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), In

$\int \frac{(b + 2cx)/(a + bx + cx^2)}{x} dx$  ; 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

$\int \frac{(d + e x^2)/(a + b x^2 + c x^4)}{x} dx$  :> 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[ExpandIntegrand[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[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

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

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

[In] 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))-1/3\*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] 1/2\*i\*x^2 + 1/6\*sqrt(3)\*(d - 2\*e + f + g - 2\*h + i)\*arctan(1/3\*sqrt(3)\*(2\*x + 1)) + 1/6\*sqrt(3)\*(d + 2\*e + f - g - 2\*h - i)\*arctan(1/3\*sqrt(3)\*(2\*x - 1)) + h\*x + 1/4\*(d - f + g - i)\*log(x^2 + x + 1) - 1/4\*(d - f - g + i)\*log(x^2 - x + 1)

**mupad [B]** time = 7.80, size = 1509, normalized size = 9.99

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] h\*x - log(d\*g\*3i - d\*f\*9i - d\*e\*6i + d\*h\*3i + d\*i\*3i + e\*h\*6i - f\*h\*3i - g\*h\*3i - h\*i\*3i - 3\*3^(1/2)\*d^2 - d^2\*x\*6i - f^2\*x\*3i + d^2\*3i + f^2\*6i - 2\*3^(1/2)\*d\*e + 3\*3^(1/2)\*d\*f + 3^(1/2)\*d\*g + 4\*3^(1/2)\*e\*f + 3\*3^(1/2)\*d\*h + 3^(1/2)\*d\*i - 2\*3^(1/2)\*e\*h - 2\*3^(1/2)\*f\*g - 3\*3^(1/2)\*f\*h - 2\*3^(1/2)\*f\*i + 3^(1/2)\*g\*h + 3^(1/2)\*h\*i + d\*f\*x\*9i + e\*f\*x\*6i + d\*h\*x\*3i - e\*h\*x\*6i - f\*g\*x\*3i - f\*h\*x\*3i - f\*i\*x\*3i + g\*h\*x\*3i + h\*i\*x\*3i - 3\*3^(1/2)\*f^2\*x + 3\*3^(1/2)\*d\*f\*x - 2\*3^(1/2)\*d\*g\*x - 2\*3^(1/2)\*e\*f\*x - 3\*3^(1/2)\*d\*h\*x - 2\*3^(1/2)\*d\*i\*x - 2\*3^(1/2)\*e\*h\*x + 3^(1/2)\*f\*g\*x + 3\*3^(1/2)\*f\*h\*x + 3^(1/2)\*f\*i\*x + 3^(1/2)\*g\*h\*x + 3^(1/2)\*h\*i\*x + 4\*3^(1/2)\*d\*e\*x)\*(d/4 - f/4 - g/4 + i/4 + (3^(1/2)\*d\*1i)/12 + (3^(1/2)\*e\*1i)/6 + (3^(1/2)\*f\*1i)/12 - (3^(1/2)\*g\*1i)/12 - (3^(1/2)\*h\*1i)/6 - (3^(1/2)\*i\*1i)/12) - log(d\*e\*6i + d\*f\*9i - d\*g\*3i - d\*h\*3i - d\*i\*3i - e\*h\*6i + f\*h\*3i + g\*h\*3i + h\*i\*3i - 3\*3^(1/2)\*d^2 + d^2\*x\*6i + f^2\*x\*3i - d^2\*3i - f^2\*6i - 2\*3^(1/2)\*d\*e + 3\*3^(1/2)\*d\*f + 3^(1/2)\*d\*g + 4\*3^(1/2)\*e\*f + 3\*3^(1/2)\*d\*h + 3^(1/2)\*d\*i - 2\*3^(1/2)\*e\*h - 2\*3^(1/2)\*f\*g - 3\*3^(1/2)\*f\*h - 2\*3^(1/2)\*f\*i + 3^(1/2)\*g\*h + 3^(1/2)\*h\*i - d\*f\*x\*9i - e\*f\*x\*6i - d\*h\*x\*3i + e\*h\*x\*6i + f\*g\*x\*3i + f\*h\*x\*3i + f\*i\*x\*3i - g\*h\*x\*3i - h\*i\*x\*3i - 3\*3^(1/2)\*f^2\*x + 3\*3^(1/2)\*d\*f\*x - 2\*3^(1/2)\*d\*g\*x - 2\*3^(1/2)\*e\*f\*x - 3\*3^(1/2)\*d\*h\*x - 2\*3^(1/2)\*d\*i\*x - 2\*3^(1/2)\*e\*h\*x + 3^(1/2)\*f\*g\*x + 3\*3^(1/2)\*f\*h\*x + 3^(1/2)\*f\*i\*x + 3^(1/2)\*g\*h\*x + 3^(1/2)\*h\*i\*x + 4\*3^(1/2)\*d\*e\*x)\*(d/4 - f/4 - g/4 + i/4 - (3^(1/2)\*d\*1i)/12 - (3^(1/2)\*e\*1i)/6 - (3^(1/2)\*f\*1i)/12 + (3^(1/2)\*g\*1i)/12 + (3^(1/2)\*h\*1i)/6 + (3^(1/2)\*i\*1i)/12) - log(d\*f\*9i - d\*e\*6i + d\*g\*3i - d\*h\*3i + d\*i\*3i + e\*h\*6i + f\*h\*3i - g\*h\*3i - h\*i\*3i - 3\*3^(1/2)\*d^2 - d^2\*x\*6i - f^2\*x\*3i - d^2\*3i - f^2\*6i + 2\*3^(1/2)\*d\*e + 3\*3^(1/2)\*d\*f - 3^(1/2)\*d\*g - 4\*3^(1/2)\*e\*f + 3\*3^(1/2)\*d\*h - 3^(1/2)\*d\*i + 2\*3^(1/2)\*e\*h + 2\*3^(1/2)\*f\*g - 3\*3^(1/2)\*f\*h + 2\*

$$\begin{aligned}
& 3^{(1/2)}*f*i - 3^{(1/2)}*g*h - 3^{(1/2)}*h*i + d*f*x*9i - e*f*x*6i + d*h*x*3i + \\
& e*h*x*6i + f*g*x*3i - f*h*x*3i + f*i*x*3i - g*h*x*3i - h*i*x*3i + 3*3^{(1/2)} \\
& *f^2*x - 3*3^{(1/2)}*d*f*x - 2*3^{(1/2)}*d*g*x - 2*3^{(1/2)}*e*f*x + 3*3^{(1/2)}*d* \\
& h*x - 2*3^{(1/2)}*d*i*x - 2*3^{(1/2)}*e*h*x + 3^{(1/2)}*f*g*x - 3*3^{(1/2)}*f*h*x + \\
& 3^{(1/2)}*f*i*x + 3^{(1/2)}*g*h*x + 3^{(1/2)}*h*i*x + 4*3^{(1/2)}*d*e*x)*(f/4 - d/ \\
& 4 - g/4 + i/4 + (3^{(1/2)}*d*1i)/12 - (3^{(1/2)}*e*1i)/6 + (3^{(1/2)}*f*1i)/12 + \\
& (3^{(1/2)}*g*1i)/12 - (3^{(1/2)}*h*1i)/6 + (3^{(1/2)}*i*1i)/12) + \log(d*f*9i - d* \\
& e*6i + d*g*3i - d*h*3i + d*i*3i + e*h*6i + f*h*3i - g*h*3i - h*i*3i + 3*3^{(1/2)} \\
& *d^2 - d^2*x*6i - f^2*x*3i - d^2*3i - f^2*6i - 2*3^{(1/2)}*d*e - 3*3^{(1/2)} \\
& )*d*f + 3^{(1/2)}*d*g + 4*3^{(1/2)}*e*f - 3*3^{(1/2)}*d*h + 3^{(1/2)}*d*i - 2*3^{(1/2)} \\
& *e*h - 2*3^{(1/2)}*f*g + 3*3^{(1/2)}*f*h - 2*3^{(1/2)}*f*i + 3^{(1/2)}*g*h + 3^{(1/2)} \\
& *h*i + d*f*x*9i - e*f*x*6i + d*h*x*3i + e*h*x*6i + f*g*x*3i - f*h*x*3i + \\
& f*i*x*3i - g*h*x*3i - h*i*x*3i - 3*3^{(1/2)}*f^2*x + 3*3^{(1/2)}*d*f*x + 2*3^{(1/2)} \\
& *d*g*x + 2*3^{(1/2)}*e*f*x - 3*3^{(1/2)}*d*h*x + 2*3^{(1/2)}*d*i*x + 2*3^{(1/2)} \\
& *e*h*x - 3^{(1/2)}*f*g*x + 3*3^{(1/2)}*f*h*x - 3^{(1/2)}*f*i*x - 3^{(1/2)}*g*h*x - \\
& 3^{(1/2)}*h*i*x - 4*3^{(1/2)}*d*e*x)*(d/4 - f/4 + g/4 - i/4 + (3^{(1/2)}*d*1i)/1 \\
& 2 - (3^{(1/2)}*e*1i)/6 + (3^{(1/2)}*f*1i)/12 + (3^{(1/2)}*g*1i)/12 - (3^{(1/2)}*h*1 \\
& i)/6 + (3^{(1/2)}*i*1i)/12) + (i*x^2)/2
\end{aligned}$$

**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),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

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

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

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

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} \cdot (\sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot b^4 - 8 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c \cdot a \cdot b^2 \cdot c - 2 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c \cdot b^3 \cdot c - 2 \cdot b^4 \cdot c + 16 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c \cdot a^2 \cdot c^2 + 8 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c \cdot a \cdot b \cdot c^2 + \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c \cdot b^2 \cdot c^2 + 16 \cdot a \cdot b^2 \cdot c^2 + 2 \cdot b^3 \cdot c^2 - 4 \cdot \sqrt{2} \cdot \sqrt{b \cdot c + \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c \cdot a \cdot c^3 - 32 \cdot a^2 \cdot c^3 - 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 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 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 c \cdot b \cdot c^2 + 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot b^2 \cdot c - 8 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a \cdot c^2 - 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot b \cdot c^2) \cdot \arctan\left(\frac{2 \cdot \sqrt{2} \cdot x / \sqrt{(b + \sqrt{b^2 - 4 \cdot a \cdot c}) / c}}{(a \cdot b^4 - 8 \cdot a^2 \cdot b^2 \cdot c - 2 \cdot a \cdot b^3 \cdot c + 16 \cdot a^3 \cdot c^2 + 8 \cdot a^2 \cdot b \cdot c^2 + a \cdot b^2 \cdot c^2 - 4 \cdot a^2 \cdot c^3) \cdot a \cdot b \cdot c}\right) + \frac{1}{4} \cdot (\sqrt{2} \cdot \sqrt{b \cdot c - \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c) \cdot b^4 - 8 \cdot \sqrt{2} \cdot \sqrt{b \cdot c - \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c \cdot a \cdot b^2 \cdot c - 2 \cdot \sqrt{2} \cdot \sqrt{b \cdot c - \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c \cdot b^3 \cdot c + 2 \cdot b^4 \cdot c + 16 \cdot \sqrt{2} \cdot \sqrt{b \cdot c - \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c \cdot a^2 \cdot c^2 + 8 \cdot \sqrt{2} \cdot \sqrt{b \cdot c - \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c \cdot a \cdot b \cdot c^2 + \sqrt{2} \cdot \sqrt{b \cdot c - \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c \cdot b^2 \cdot c^2 - 16 \cdot a \cdot b^2 \cdot c^2 - 2 \cdot b^3 \cdot c^2 - 4 \cdot \sqrt{2} \cdot \sqrt{b \cdot c - \sqrt{b^2 - 4 \cdot a \cdot c}} \cdot c \cdot a \cdot c^3 + 32 \cdot a^2 \cdot c^3 + 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 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 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 c \cdot b \cdot c^2 - 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot b^2 \cdot c + 8 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a \cdot c^2 + 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot b \cdot c^2) \cdot \arctan\left(\frac{2 \cdot \sqrt{2} \cdot x / \sqrt{(b - \sqrt{b^2 - 4 \cdot a \cdot c}) / c}}{(a \cdot b^4 - 8 \cdot a^2 \cdot b^2 \cdot c - 2 \cdot a \cdot b^3 \cdot c + 16 \cdot a^3 \cdot c^2 + 8 \cdot a^2 \cdot b \cdot c^2 + a \cdot b^2 \cdot c^2 - 4 \cdot a^2 \cdot c^3) \cdot a \cdot b \cdot c}\right) - \frac{1}{2} \cdot (b^2 \cdot c^2 - 4 \cdot a \cdot c^3 - 2 \cdot b \cdot c^3 + c^4) \cdot \sqrt{b^2 - 4 \cdot a \cdot c} \cdot e \cdot \log(x^2 + 1/2 \cdot (b + \sqrt{b^2 - 4 \cdot a \cdot c}) / c) / ((b^4 - 8 \cdot a \cdot b^2 \cdot c - 2 \cdot b^3 \cdot c + 16 \cdot a^2 \cdot c^2 + 8 \cdot a \cdot b \cdot c^2 + b^2 \cdot c^2 - 4 \cdot a \cdot c^3) \cdot c^2) + \frac{1}{2} \cdot (b^2 \cdot c^2 - 4 \cdot a \cdot c^3 - 2 \cdot b \cdot c^3 + c^4) \cdot \sqrt{b^2 - 4 \cdot a \cdot c} \cdot e \cdot \log(x^2 + 1/2 \cdot (b - \sqrt{b^2 - 4 \cdot a \cdot c}) / c)$

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

**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]  $\operatorname{symsum}(\log(c^2*(d*e^2 + e^3*x + 4*\operatorname{root}(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)^2*b^2*d - 8*\operatorname{root}(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)^3*b^3*x - 16*\operatorname{root}(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*$



```

b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)^2*a*c*d + 2*root(128*a^2*b^2
*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z
^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d
^2*e^2 - c*d^4 - a*e^4, z, k)*b*e^2*x - 4*root(128*a^2*b^2*c*z^4 - 256*a^3*
c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*
z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 -
a*e^4, z, k)*c*d^2*x - 4*root(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^
4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z
^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)^2*b^
2*e*x + 4*root(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*
c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2
*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)*b*d*e + 32*root(128
*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2
*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e
*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)^3*a*b*c*x + 16*root(128*a^2*b^2*c*z^4
- 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8
*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2
- c*d^4 - a*e^4, z, k)^2*a*c*e*x))*root(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^
4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 -
4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4,
z, k), k, 1, 4)

```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] Timed out

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

**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

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

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

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

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}*c})*b^4 - 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*b^2*c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*b^3*c - 2*b^4*c + 16*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^2*c^2 + 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*b*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*b^2*c^2 + 16*a*b^2*c^2 - 2*b^3*c^2 - 4*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*c^3 - 32*a^2*c^3 + 8*a*b*c^3 + \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*b^3 - 4*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*b*c - 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*b^2*c + \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*b*c^2 + 2*(b^2 - 4*a*c)*b^2*c - 8*(b^2 - 4*a*c)*a*c^2 + 2*(b^2 - 4*a*c)*b*c^2)*d + 2*(2*a*b^2*c^2 - 8*a^2*c^3 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*b^2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^2*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*b*c - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*f)*\arctan(2*\sqrt{1/2}*x/\sqrt{(b + \sqrt{b^2 - 4*a*c}))/c))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*abs(c)) + 1/4*((\sqrt{2})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*b^4 - 8*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a*b^2*c - 2*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*b^3*c + 2*b^4*c + 16*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a^2*c^2 + 8*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a*b*c^2 + \sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*b^2*c^2 - 16*a*b^2*c^2 - 2*b^3*c^2 - 4*\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^2 + \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^2 - 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))$$

$$\begin{aligned} & \text{rt}(2) \cdot \sqrt{b \cdot c - \sqrt{b^2 - 4 \cdot a \cdot c} \cdot c} \cdot a \cdot c^3 + 32 \cdot a^2 \cdot c^3 + 8 \cdot a \cdot b \cdot c^3 + \sqrt{2} \\ & (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 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 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 c} \cdot b \cdot c^2 - 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot b^2 \cdot c \\ & + 8 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a \cdot c^2 + 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot b \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{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^2 + 4 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c} \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 c + 2 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4 \cdot a \cdot c} \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 \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 c} \cdot a \cdot c^2 - 2 \cdot (b^2 - 4 \cdot a \cdot c) \cdot a \cdot c^2 \cdot f) \cdot \arctan(2 \cdot \sqrt{2} \cdot \sqrt{2} \cdot x / \sqrt{c} \\ & / ((b - \sqrt{b^2 - 4 \cdot a \cdot c}) / c)) / ((a \cdot b^4 - 8 \cdot a^2 \cdot b^2 \cdot c - 2 \cdot a \cdot b^3 \cdot c + 16 \cdot a^3 \cdot c^2 + 8 \cdot a^2 \cdot b \cdot c^2 + a \cdot b^2 \cdot c^2 - 4 \cdot a^2 \cdot c^3) \cdot \text{abs}(c)) \end{aligned}$$

**maple [B]** time = 0.03, size = 616, normalized size = 2.92

$$\frac{2\sqrt{2} \operatorname{arctanh}\left(\frac{\sqrt{2}x}{\sqrt{(b-\sqrt{b^2-4ac})c}}\right)}{(4a-b)\sqrt{(b+\sqrt{4ac+P^2})}} - \frac{2\sqrt{2} \operatorname{arctanh}\left(\frac{\sqrt{2}x}{\sqrt{(b+\sqrt{4ac+P^2})}}\right)}{(4a-b)\sqrt{(b+\sqrt{4ac+P^2})}} + \frac{\sqrt{2} \operatorname{arctanh}\left(\frac{\sqrt{2}x}{\sqrt{(b+\sqrt{4ac+P^2})}}\right)}{2(4a-b)\sqrt{(b+\sqrt{4ac+P^2})}} - \frac{\sqrt{2} \operatorname{arctanh}\left(\frac{\sqrt{2}x}{\sqrt{(b+\sqrt{4ac+P^2})}}\right)}{2(4a-b)\sqrt{(b+\sqrt{4ac+P^2})}} - \frac{\sqrt{4ac+P^2} \sqrt{2} \operatorname{arctanh}\left(\frac{\sqrt{2}x}{\sqrt{(b+\sqrt{4ac+P^2})}}\right)}{2(4a-b)\sqrt{(b+\sqrt{4ac+P^2})}} - \frac{\sqrt{4ac+P^2} \sqrt{2} \operatorname{arctanh}\left(\frac{\sqrt{2}x}{\sqrt{(b+\sqrt{4ac+P^2})}}\right)}{2(4a-b)\sqrt{(b+\sqrt{4ac+P^2})}} - \frac{\sqrt{4ac+P^2} \sqrt{2} \operatorname{arctanh}\left(\frac{\sqrt{2}x}{\sqrt{(b+\sqrt{4ac+P^2})}}\right)}{(4a-b)\sqrt{(b+\sqrt{4ac+P^2})}} - \frac{\sqrt{4ac+P^2} \sqrt{2} \operatorname{arctanh}\left(\frac{\sqrt{2}x}{\sqrt{(b+\sqrt{4ac+P^2})}}\right)}{(4a-b)\sqrt{(b+\sqrt{4ac+P^2})}} - \frac{\sqrt{4ac+P^2} \operatorname{sh}\left(\frac{2x}{c}\right) \operatorname{sh}\left(\frac{2x}{c} + \frac{b+\sqrt{4ac+P^2}}{2(4a-b)}\right)}{2(4a-b)}$$

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] 
$$\begin{aligned} & -1/2 \cdot (-4 \cdot a \cdot c + b^2)^{(1/2)} / (4 \cdot a \cdot c - b^2) \cdot e \cdot \ln(-2 \cdot c \cdot x^2 - b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) - 2 \cdot c \\ & / (4 \cdot a \cdot c - b^2) \cdot 2^{(1/2)} / ((-b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot c \cdot x) \cdot f \cdot a + 1/2 / (4 \cdot a \cdot c - b^2) \cdot 2^{(1/2)} / ((-b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot c \cdot x) \cdot f \cdot b^2 - 1/2 \cdot (-4 \cdot a \cdot c + b^2)^{(1/2)} / (4 \cdot a \cdot c - b^2) \cdot 2^{(1/2)} / ((-b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot c \cdot x) \cdot b \cdot f + c \cdot (-4 \cdot a \cdot c + b^2)^{(1/2)} / (4 \cdot a \cdot c - b^2) \cdot 2^{(1/2)} / ((-b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot c \cdot x) \cdot d + 1/2 \cdot (-4 \cdot a \cdot c + b^2)^{(1/2)} / (4 \cdot a \cdot c - b^2) \cdot e \cdot \ln(2 \cdot c \cdot x^2 + b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) + 2 \cdot c / (4 \cdot a \cdot c - b^2) \cdot 2^{(1/2)} / ((b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot \operatorname{arctan}(2^{(1/2)} / ((b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot c \cdot x) \cdot f \cdot a - 1/2 / (4 \cdot a \cdot c - b^2) \cdot 2^{(1/2)} / ((b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot \operatorname{arctan}(2^{(1/2)} / ((b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot c \cdot x) \cdot f \cdot b^2 - 1/2 \cdot (-4 \cdot a \cdot c + b^2)^{(1/2)} / (4 \cdot a \cdot c - b^2) \cdot 2^{(1/2)} / ((b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot \operatorname{arctan}(2^{(1/2)} / ((b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot c \cdot x) \cdot b \cdot f + c \cdot (-4 \cdot a \cdot c + b^2)^{(1/2)} / (4 \cdot a \cdot c - b^2) \cdot 2^{(1/2)} / ((b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot \operatorname{arctan}(2^{(1/2)} / ((b + (-4 \cdot a \cdot c + b^2)^{(1/2)}) \cdot c)^{(1/2)} \cdot c \cdot x) \cdot d \end{aligned}$$

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

**mupad [B]** time = 2.14, size = 3942, normalized size = 18.68

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] symsum(log(c^2\*d\*e^2 - c^2\*d^2\*f + c^2\*e^3\*x - a\*c\*f^3 - 8\*root(16\*a\*b^4\*c\*z^4 - 128\*a^2\*b^2\*c^2\*z^4 + 256\*a^3\*c^3\*z^4 - 16\*a\*b^2\*c\*d\*f\*z^2 + 64\*a^2\*c^2\*d\*f\*z^2 - 16\*a^2\*b\*c\*f^2\*z^2 - 8\*a\*b^2\*c\*e^2\*z^2 - 16\*a\*b\*c^2\*d^2\*z^2 + 32\*a^2\*c^2\*e^2\*z^2 + 4\*b^3\*c\*d^2\*z^2 + 4\*a\*b^3\*f^2\*z^2 + 16\*a^2\*c\*e\*f^2\*z + 4\*b^2\*c\*d^2\*e\*z - 4\*a\*b^2\*e\*f^2\*z - 16\*a\*c^2\*d^2\*e\*z - 4\*a\*c\*d\*e^2\*f + 2\*a\*c\*d^2\*f^2 - 2\*b\*c\*d^3\*f - 2\*a\*b\*d\*f^3 + b\*c\*d^2\*e^2 + a\*b\*e^2\*f^2 + a\*c\*e^4 + b^2\*d^2\*f^2 + c^2\*d^4 + a^2\*f^4, z, k)^3\*b^3\*c^2\*x + b\*c\*d\*f^2 - 16\*root(16\*a\*b^4\*c\*z^4 - 128\*a^2\*b^2\*c^2\*z^4 + 256\*a^3\*c^3\*z^4 - 16\*a\*b^2\*c\*d\*f\*z^2 + 64\*a^2\*c^2\*d\*f\*z^2 - 16\*a^2\*b\*c\*f^2\*z^2 - 8\*a\*b^2\*c\*e^2\*z^2 - 16\*a\*b\*c^2\*d^2\*z^2 + 32\*a^2\*c^2\*e^2\*z^2 + 4\*b^3\*c\*d^2\*z^2 + 4\*a\*b^3\*f^2\*z^2 + 16\*a^2\*c\*e\*f^2\*z + 4\*b^2\*c\*d^2\*e\*z - 4\*a\*b^2\*e\*f^2\*z - 16\*a\*c^2\*d^2\*e\*z - 4\*a\*c\*d\*e^2\*f + 2\*a\*c\*d^2\*f^2 - 2\*b\*c\*d^3\*f - 2\*a\*b\*d\*f^3 + b\*c\*d^2\*e^2 + a\*b\*e^2\*f^2 + a\*c\*e^4 + b^2\*d^2\*f^2 + c^2\*d^4 + a^2\*f^4, z, k)^2\*a\*c^3\*d - 4\*root(16\*a\*b^4\*c\*z^4 - 128\*a^2\*b^2\*c^2\*z^4 + 256\*a^3\*c^3\*z^4 - 16\*a\*b^2\*c\*d\*f\*z^2 + 64\*a^2\*c^2\*d\*f\*z^2 - 16\*a^2\*b\*c\*f^2\*z^2 - 8\*a\*b^2\*c\*e^2\*z^2 - 16\*a\*b\*c^2\*d^2\*z^2 + 32\*a^2\*c^2\*e^2\*z^2 + 4\*b^3\*c\*d^2\*z^2 + 4\*a\*b^3\*f^2\*z^2 + 16\*a^2\*c\*e\*f^2\*z + 4\*b^2\*c\*d^2\*e\*z - 4\*a\*b^2\*e\*f^2\*z - 16\*a\*c^2\*d^2\*e\*z - 4\*a\*c\*d\*e^2\*f + 2\*a\*c\*d^2\*f^2 - 2\*b\*c\*d^3\*f - 2\*a\*b\*d\*f^3 + b\*c\*d^2\*e^2 + a\*b\*e^2\*f^2 + a\*c\*e^4 + b^2\*d^2\*f^2 + c^2\*d^4 + a^2\*f^4, z, k)^2\*b^2\*c^2\*d + 32\*root(16\*a\*b^4\*c\*z^4 - 128\*a^2\*b^2\*c^2\*z^4 + 256\*a^3\*c^3\*z^4 - 16\*a\*b^2\*c\*d\*f\*z^2 + 64\*a^2\*c^2\*d\*f\*z^2 - 16\*a^2\*b\*c\*f^2\*z^2 - 8\*a\*b^2\*c\*e^2\*z^2 - 16\*a\*b\*c^2\*d^2\*z^2 + 32\*a^2\*c^2\*e^2\*z^2 + 4\*b^3\*c\*d^2\*z^2 + 4\*a\*b^3\*f^2\*z^2 + 16\*a^2\*c\*e\*f^2\*z + 4\*b^2\*c\*d^2\*e\*z - 4\*a\*b^2\*e\*f^2\*z - 16\*a\*c^2\*d^2\*e\*z - 4\*a\*c\*d\*e^2\*f + 2\*a\*c\*d^2\*f^2 - 2\*b\*c\*d^3\*f - 2\*a\*b\*d\*f^3 + b\*c\*d^2\*e^2 + a\*b\*e^2\*f^2 + a\*c\*e^4 + b^2\*d^2\*f^2 + c^2\*d^4 + a^2\*f^4, z, k)^3\*a\*b\*c^3\*x + 16\*root(16\*a\*b^4\*c\*z^4 - 128\*a^2\*b^2\*c^2\*z^4 + 256\*a^3\*c^3\*z^4 - 16\*a\*b^2\*c\*d\*f\*z^2 + 64\*a^2\*c^2\*d\*f\*z^2 - 16\*a^2\*b\*c\*f^2\*z^2 - 8\*a\*b^2\*c\*e^2\*z^2 - 16\*a\*b\*c^2\*d^2\*z^2 + 32\*a^2\*c^2\*e^2\*z^2 + 4\*b^3\*c\*d^2\*z^2 + 4\*a\*b^3\*f^2\*z^2 + 16\*a^2\*c\*e\*f^2\*z + 4\*b^2\*c\*d^2\*e\*z - 4\*a\*b^2\*e\*f^2\*z - 16\*a\*c^2\*d^2\*e\*z - 4\*a\*c\*d\*e^2\*f + 2\*a\*c\*d^2\*f^2 - 2\*b\*c\*d^3\*f - 2\*a\*b\*d\*f^3 + b\*c\*d^2\*e^2 + a\*b\*e^2\*f^2

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



$$\begin{aligned}
&^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + \\
&4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16 \\
&*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 \\
&+ b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, \\
&k), k, 1, 4)
\end{aligned}$$

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),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

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

**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}

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

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] := S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]]/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

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

Rule 1166

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

Rule 1247

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

Rule 1673

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

Rubi steps

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

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

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

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]\*Sqrt[c]\*x)/Sqrt[b - Sqrt[b^2 - 4\*a\*c]]])/Sqrt[b - Sqrt[b^2 - 4\*a\*c]] + (2\*Sqrt[2]\*Sqrt[c]\*(-2\*c\*d + (b + Sqrt[b^2 - 4\*a\*c])\*f)\*ArcTan[(Sqrt[2]\*Sqrt[c]\*x)/Sqrt[b + Sqrt[b^2 - 4\*a\*c]]])/Sqrt[b + Sqrt[b^2 - 4\*a\*c]] + (2\*c\*e + (-b + Sqrt[b^2 - 4\*a\*c])\*g)\*Log[-b + Sqrt[b^2 - 4\*a\*c] - 2\*c\*x^2] + (-2\*c\*e + (b + Sqrt[b^2 - 4\*a\*c])\*g)\*Log[b + Sqrt[b^2 - 4\*a\*c] + 2\*c\*x^2]/(4\*c\*Sqrt[b^2 - 4\*a\*c])

**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.





$$\frac{c^2 c^4 \sqrt{b^2 - 4ac} e \log(x^2 + \frac{1}{2}(bc - \sqrt{b^2 c^2 - 4ac^3}))}{c^2} / ((ab^4 - 8a^2 b^2 c - 2a^3 b^3 c + 16a^3 c^2 + 8a^2 b^2 c^2 + ab^2 c^2 - 4a^2 c^3) c^2 \text{abs}(c))$$

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

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] 
$$\frac{1}{(4ac-b^2)} \ln(-2cx^2-b+(-4ac+b^2)^{1/2}) g a^{-1/4} / (4ac-b^2) / c \ln(-2cx^2-b+(-4ac+b^2)^{1/2}) g b^2 + 1/4 (-4ac+b^2)^{1/2} / (4ac-b^2) / c \ln(-2cx^2-b+(-4ac+b^2)^{1/2}) b g - 1/2 (-4ac+b^2)^{1/2} / (4ac-b^2) e \ln(-2cx^2-b+(-4ac+b^2)^{1/2}) - 2c / (4ac-b^2) 2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) f a + 1/2 / (4ac-b^2) 2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) f b^2 - 1/2 (-4ac+b^2)^{1/2} / (4ac-b^2) 2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) b f + c (-4ac+b^2)^{1/2} / (4ac-b^2) 2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) d + 1 / (4ac-b^2) \ln(2cx^2+b+(-4ac+b^2)^{1/2}) g a^{-1/4} / (4ac-b^2) / c \ln(2cx^2+b+(-4ac+b^2)^{1/2}) g b^2 - 1/4 (-4ac+b^2)^{1/2} / (4ac-b^2) / c \ln(2cx^2+b+(-4ac+b^2)^{1/2}) b g + 1/2 (-4ac+b^2)^{1/2} / (4ac-b^2) e \ln(2cx^2+b+(-4ac+b^2)^{1/2}) + 2 / (4ac-b^2) 2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} a c f \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) - 1/2 / (4ac-b^2) 2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} b^2 f \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) - 1/2 (-4ac+b^2)^{1/2} / (4ac-b^2) 2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} b f \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) + (-4ac+b^2)^{1/2} / (4ac-b^2) 2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} c d \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} c x)$$

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

[Out]  $\text{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*\text{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*\text{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*\text{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$



$$\begin{aligned}
& *g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + \\
& 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f \\
& ^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2* \\
& c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*c^3*d^2*x - 2*\text{root}(128*a^2*b^2 \\
& *c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16* \\
& a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f \\
& *z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8* \\
& a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2 \\
& *z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^ \\
& 4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4 \\
& *a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2* \\
& g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e* \\
& g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f \\
& *g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2* \\
& b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b \\
& *c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 \\
& - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2 \\
& *d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*b \\
& ^3*g^2*x + b^2*e*g^2*x + c^2*d^2*g*x + 4*\text{root}(128*a^2*b^2*c^3*z^4 - 16*a*b^ \\
& 4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 25 \\
& 6*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e \\
& *g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 \\
& - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2* \\
& g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^ \\
& 2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - \\
& 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e \\
& *f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d \\
& ^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g \\
& + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4* \\
& a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2 \\
& *b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 \\
& - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2 \\
& *g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)^2*b^2*c^2*d + 32*\text{ro} \\
& \text{ot}(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c \\
& ^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16 \\
& *a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^ \\
& 2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + \\
& 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^ \\
& 2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b \\
& *c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 1 \\
& 6*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g* \\
& z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - \\
& 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2* \\
& c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d \\
& *e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 -
\end{aligned}$$

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







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

$$\begin{aligned}
&4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2 \\
&*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2 \\
&*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a* \\
&b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c \\
&*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^ \\
&2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + \\
&3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c* \\
&e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - \\
&b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z \\
&, k), k, 1, 4)
\end{aligned}$$

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

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

**Rubi [A]** time = 0.73, antiderivative size = 290, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 35,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.257$ , Rules used = {1673, 1676, 1166, 205, 1247, 634, 618, 206, 628}

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

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] := S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

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

Rule 1166

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

Rule 1247

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

Rule 1673

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

Rule 1676

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

Rubi steps

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

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

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

Antiderivative was successfully verified.

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

[Out] (4\*sqrt(c)\*h\*x + (2\*sqrt(2)\*(2\*c^2\*d + b\*(b - sqrt(b^2 - 4\*a\*c))\*h + c\*(-(b\*f) + sqrt(b^2 - 4\*a\*c)\*f - 2\*a\*h))\*ArcTan[(sqrt(2)\*sqrt(c)\*x)/sqrt(b - sqrt(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] 
$$\begin{aligned} & h*x/c + 1/4*g*\log(\text{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^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^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^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*\text{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)* \end{aligned}$$





$$a*b*c^5 + (b^4*c^2 - 4*a*b^2*c^3 - 2*b^3*c^3 + b^2*c^4)*\sqrt{b^2 - 4*a*c}) * e) * \log(x^2 + 1/2*(b*c^3 - \sqrt{b^2*c^6 - 4*a*c^7}))/c^4 / ((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(c))$$

**maple [B]** time = 0.04, size = 1132, normalized size = 3.90

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] 
$$\begin{aligned} & h*x/c - 1/4*(-4*a*c+b^2)/(4*a*c-b^2)/c * \ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)}) * g + 1/4 * (-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2) * b/c * g * \ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)}) - 1/2 * (-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2) * e * \ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)}) - 1/2 * (-4*a*c+b^2) / (4*a*c-b^2) / c * 2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b * h + 1/2 * (-4*a*c+b^2) / (4*a*c-b^2) * 2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * f - (-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2) * 2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * a * h + 1/2 * (-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2) / c * 2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b^2 * h - 1/2 * (-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2) * 2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{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)} * \operatorname{arctanh}(2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * d - 1/4 * (-4*a*c+b^2) / (4*a*c-b^2) / c * \ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)}) * g - 1/4 * (-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2) * b/c * g * \ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)}) + 1/2 * (-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2) * e * \ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)}) + 1/2 * (-4*a*c+b^2) / (4*a*c-b^2) / c * 2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctan}(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b * h - 1/2 * (-4*a*c+b^2) / (4*a*c-b^2) * 2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{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)} * \operatorname{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)} * \operatorname{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)} * \operatorname{arctan}(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b * f * \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)} * c * d * \operatorname{arctan}(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c * 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((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a), x, algorithm="maxima")`

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

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

[Out]  $\text{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 - \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)*(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)$

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



$$\begin{aligned}
& e^2 h^2 + 4 a b^2 c d^2 h^2 + 3 a b^2 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 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 - 2 a b^3 e^2 h^2 - b c^3 d^2 e^2 - b^4 d^2 h^2 - a^2 c^2 f^4 - a^3 c g^4 - a c^3 e^4 - a^4 h^4 - c^4 d^4, z, k) * x * (8 b^3 c^3 - 32 a b c^4) / c - (4 b c^3 d e + 8 a c^3 d g - 8 a c^3 e f - 4 b^2 c^2 d g - 8 a^2 c^2 g h + 4 a b c^2 e h + 4 a b c^2 f g) / c + (x * (4 c^4 d^2 + 2 b^4 h^2 - 4 a c^3 f^2 - 2 b c^3 e^2 + 2 b^3 c g^2 + 2 b^2 c^2 f^2 + 4 a^2 c^2 h^2 - 4 b c^3 d f - 8 a c^3 d h + 8 a c^3 e g - 4 b^3 c f h - 10 a b c^2 g^2 - 8 a b^2 c h^2 + 4 b^2 c^2 d h + 12 a b c^2 f h)) / c - (a c^2 f^3 - a^2 b h^3 - c^3 d e^2 + c^3 d^2 f - b^3 d h^2 + a c^2 d g^2 - b c^2 d f^2 - b^2 c d g^2 + a b^2 f h^2 + a c^2 e^2 h - b c^2 d^2 h + a^2 c f h^2 - a^2 c g^2 h + 2 a b c d h^2 + a b c f g^2 - 2 a b c f^2 h + 2 b c^2 d e g - 2 a c^2 d f h - 2 a c^2 e f g + 2 b^2 c d f h) / c) * \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 e g^3 + 2 a b c^2 e^3 g + 2 a b c^2 d f^3 + 2 a^3 b f h^3 + 4 a^3 c d h^3 + 4 a c^3 d^3 h + 2 b c^3 d^3 f - a^2 b c f^2 g^2 - a b^2 c e^2 g^2 - a b c^2 e^2 f^2 - 6 a^2 c^2 d^2 h^2 - 2 a^2 c^2 e^2 g^2 - 2 a^3 c f^2 h^2 - 2 b^2 c^2 d^3 h - 2 a^2 b^2 d h^3 - 2 a c^3 d^2 f^2 - a^2 b^2 f^2 h^2 - b^2 c^2 d^2 f^2 - a^3 b g^2 h^2 - b^3 c d^2 g^2 - a b^3 e^2 h^2 - b c^3 d^2 e^2 - b^4 d^2 h^2 - a^2 c^2 f^4 - a^3 c g^4 - a c^3 e^4 - a^4 h^4 - c^4 d^4, z, k), k
\end{aligned}$$

, 1, 4) + (h\*x)/c

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] Timed out

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

**Optimal.** Leaf size=321

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

**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}

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

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] && 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[ExpandIntegrand[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

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

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

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

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] 1/4\*(c\*g - b\*i)\*log(abs(c\*x^4 + b\*x^2 + a))/c^2 + 1/2\*(c\*i\*x^2 + 2\*c\*h\*x)/c^2 + 1/8\*((2\*b^4\*c^3 - 16\*a\*b^2\*c^4 + 32\*a^2\*c^5 - sqrt(2)\*sqrt(b^2 - 4\*a\*c))\*sqrt(b\*c - sqrt(b^2 - 4\*a\*c)\*c)\*b^4\*c + 8\*sqrt(2)\*sqrt(b^2 - 4\*a\*c)\*sqrt(b\*c - sqrt(b^2 - 4\*a\*c)\*c)\*a\*b^2\*c^2 + 2\*sqrt(2)\*sqrt(b^2 - 4\*a\*c)\*sqrt(b\*c - sqrt(b^2 - 4\*a\*c)\*c)\*b^3\*c^2 - 16\*sqrt(2)\*sqrt(b^2 - 4\*a\*c)\*sqrt(b\*c - 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



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



$$\begin{aligned}
& *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)*\text{sqrt}(b^2 \\
& - 4*a*c))*\text{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)*\text{sqrt}(b^2 - 4*a*c))*i*\log(x^2 + 1/2*(b*c^5 + \\
& \text{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*\text{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)*\text{sqrt}(b^2 - 4*a*c))*\text{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)*\text{sqrt}(b^2 - 4*a*c))*i \\
& *log(x^2 + 1/2*(b*c^5 - \text{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*\text{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)*\text{sqrt}(b^2 - 4*a*c))*g*\text{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)*\text{sqrt}(b^2 - 4*a*c))*\text{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)*\text{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)*\text{sqrt}(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(b*c^5 + \text{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*\text{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)*\text{sqr} \\
& t(b^2 - 4*a*c))*g*\text{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)*\text{sqrt}(b^2 - 4*a*c))*\text{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)*\text{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)*\text{sqrt}(b^2 \\
& - 4*a*c))*e)*log(x^2 + 1/2*(b*c^5 - \text{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*\text{abs}(c))
\end{aligned}$$

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] 
$$\begin{aligned} & -1/2*(-4*a*c+b^2)/(4*a*c-b^2)/c*2^{(1/2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*a \\ & rctanh(2^{(1/2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*h+1/2*(-4*a*c+b^2)^{(1/2)/} \\ & (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)/} \\ & (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)})*} \\ & (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)/} \\ & (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)/} \\ & (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)})*} \\ & (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)})*} \\ & (1/2)})*c)^{(1/2)}*arctanh(2^{(1/2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f-1/2 \\ & *(-4*a*c+b^2)/(4*a*c-b^2)*2^{(1/2)/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*f*arctan \\ & (2^{(1/2)/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)+1/4*(-4*a*c+b^2)^{(1/2)/(4*a*} \\ & c-b^2)*b/c*g*ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})-1/4*(-4*a*c+b^2)^{(1/2)/(4*a*} \\ & c-b^2)*b/c*g*ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})+1/c*h*x-1/2*(-4*a*c+b^2)^{(1/2)} \\ & )/(4*a*c-b^2)*e*ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})+1/2*(-4*a*c+b^2)^{(1/2)/(4} \\ & *a*c-b^2)*e*ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})-(-4*a*c+b^2)^{(1/2)/(4*a*c-b^2)} \\ & *2^{(1/2)/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*a*h*arctan(2^{(1/2)/((b+(-4*a*c+b^2)} \\ & )^{(1/2)})*c)^{(1/2)}*c*x)-(-4*a*c+b^2)^{(1/2)/(4*a*c-b^2)*2^{(1/2)/((-b+(-4*a*c} \\ & +b^2)^{(1/2)})*c)^{(1/2)}*arctanh(2^{(1/2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x} \\ & )*a*h-1/4*(-4*a*c+b^2)/(4*a*c-b^2)/c*g*ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})-1/ \\ & 4*(-4*a*c+b^2)/(4*a*c-b^2)/c*g*ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})+1/2*i*x^2/c \\ & +1/4*(-4*a*c+b^2)/(4*a*c-b^2)/c^2*ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*b*i+1/2 \\ & *(-4*a*c+b^2)^{(1/2)/(4*a*c-b^2)/c*ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*a*i-1/4 \\ & *(-4*a*c+b^2)^{(1/2)/(4*a*c-b^2)/c^2*ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*b^2*i \\ & +1/4*(-4*a*c+b^2)/(4*a*c-b^2)/c^2*ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*b*i-1/2* \\ & (-4*a*c+b^2)^{(1/2)/(4*a*c-b^2)/c*ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*a*i+1/4* \\ & (-4*a*c+b^2)^{(1/2)/(4*a*c-b^2)/c^2*ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*b^2*i \end{aligned}$$

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

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

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^2\*z^2 + 16\*a^2\*b\*c^4\*f^2\*z^2 - 4\*a\*b^3\*c^3\*f^2\*z^2 + 8\*a\*b^2\*c^4\*e^2\*z^2 + 64\*a^3\*c^4\*f\*h\*z^2 + 64\*a^3\*c^4\*e\*i\*z^2 - 64\*a^2\*c^5\*d\*f\*z^2 - 4\*a\*b^5\*c\*h^2\*z^2 + 16\*a\*b\*c^5\*d^2\*z^2 - 56\*a^3\*b^2\*c^2\*i^2\*z^2 + 28\*a^2\*b^3\*c^2\*h^2\*z^2 + 40\*a^2\*b^2\*c^3\*g^2\*z^2 - 32\*a^4\*c^3\*i^2\*z^2 - 96\*a^3\*c^4\*g^2\*z^2 - 32\*a^2\*c^5\*e^2\*z^2 - 4\*b^3\*c^4\*d^2\*z^2 - 4\*a\*b^6\*i^2\*z^2 + 32\*a^2\*b\*c^3\*e\*f\*h\*z - 32\*a^2\*b\*c^3\*d\*f\*i\*z - 8\*a\*b^3\*c^2\*e\*f\*h\*z + 8\*a\*b^3\*c^2\*d\*f\*i\*z - 8\*a\*b^2\*c^3\*d\*f\*g\*z + 8\*a\*b^2\*c^3\*d\*e\*h\*z - 8\*a\*b^4\*c\*e\*g\*i\*z + 40\*a^2\*b^2\*c^2\*e\*g\*i\*z + 8\*a^2\*b^2\*c^2\*f\*g\*h\*z - 8\*a^2\*b^2\*c^2\*d\*h\*i\*z + 4\*a^3\*b^2\*c\*h^2\*i\*z - 32\*a^3\*b\*c^2\*g^2\*i\*z + 12\*a^3\*b^2\*c\*g\*i^2\*z + 8\*a^2\*b^3\*c\*g^2\*i\*z + 16\*a^3\*b\*c^2\*g\*h^2\*z - 4\*a^2\*b^3\*c\*g\*h^2\*z + 32\*a^3\*b\*c^2\*e\*i^2\*z - 24\*a^2\*b^3\*c\*e\*i^2\*z - 16\*a^2\*b\*c^3\*e^2\*i\*z + 4\*a\*b^3\*c^2\*e^2\*i\*z + 20\*a\*b^2\*c^3\*d

$$\begin{aligned}
& ^2i*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^2*e*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)*(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*
\end{aligned}$$

$$\begin{aligned}
& b^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^2 \\
& *b^3c^3ef^2h^2z - 32a^2b^3c^3d^2f^2i^2z - 8a^2b^3c^2ef^2h^2z + 8a^2b^3c^2d^2 \\
& *f^2i^2z - 8a^2b^2c^3d^2f^2g^2z + 8a^2b^2c^3d^2e^2h^2z - 8a^2b^4c^2e^2g^2i^2z + 40 \\
& *a^2b^2c^2e^2g^2i^2z + 8a^2b^2c^2f^2g^2h^2z - 8a^2b^2c^2d^2h^2i^2z + 4a^2 \\
& *3b^2c^2h^2i^2z - 32a^3b^2c^2g^2i^2z + 12a^3b^2c^2g^2i^2z + 8a^2b^3c^2 \\
& *g^2i^2z + 16a^3b^2c^2g^2h^2z - 4a^2b^3c^2g^2h^2z + 32a^3b^2c^2e^2i^2z \\
& z - 24a^2b^3c^2e^2i^2z - 16a^2b^3c^3e^2i^2z + 4a^2b^3c^2e^2i^2z + 20a^2 \\
& *b^2c^3d^2i^2z - 16a^2b^2c^3e^2g^2i^2z + 4a^2b^3c^2e^2g^2i^2z - 4a^2b^2c^3 \\
& *e^2g^2i^2z + 4a^2b^2c^3e^2f^2i^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^2 \\
& *h^2z - 16a^2b^4c^2d^2g^2z - 4a^2b^2c^2f^2i^2z - 20a^2b^2c^2e^2h^2z \\
& z - 4a^2b^2c^2g^2i^2z - 16a^4c^2h^2i^2z + 16a^4c^2g^2i^2z + 16a^3c^3 \\
& *f^2i^2z - 4a^2b^4g^2i^2z - 4b^4c^2d^2i^2z + 16a^3c^3e^2h^2z - 16a^2c^4 \\
& *d^2i^2z + 16a^2c^4e^2g^2z + 4b^3c^3d^2g^2z - 16a^2c^4e^2f^2z - 4b^2c^4 \\
& *d^2e^2z + 4a^2b^5e^2i^2z - 16a^4b^2c^3i^2z + 16a^2c^5d^2e^2z + 4a^3b^3 \\
& *i^2z + 16a^3c^3g^2i^2z + 4a^2b^2c^2d^2g^2h^2i + 12a^2b^2c^2d^2f^2g^2i - 4a^2 \\
& *b^2c^2e^2f^2g^2h - 4a^2b^2c^2d^2e^2h^2i + 4a^2b^2c^2d^2e^2f^2i - 4a^3b^2c^2 \\
& *f^2g^2i - 4a^2b^2c^2e^2g^2i - 2a^2b^2c^2e^2g^2i - 8a^2b^2c^2d^2g^2i + 2a^2 \\
& *b^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^2 \\
& *f^2g^2 + 8a^3c^2e^2f^2h^2i - 8a^3c^2d^2g^2h^2i + 8a^2c^3d^2e^2g^2h - 8a^2c^3 \\
& *d^2e^2f^2i - 2a^3b^2c^2e^2h^2i + 6a^3b^2c^2d^2h^2i^2 - 2a^3b^2c^2e^2g^2i^2 + 2a^2 \\
& *b^3c^2e^2g^2i + 6a^2b^3c^2d^2e^2i + 2a^2b^3c^2d^2f^2h^2 - 2a^2b^3c^2d^2f^2h \\
& - 2a^2b^3c^3d^2e^2h + 4a^2b^2c^2e^2i^2 - 5a^2b^2c^2d^2i^2 + 3a^2b^2c^2e^2h^2 + 4a^2 \\
& *b^2c^2d^2h^2 - 4a^3c^2f^2g^2i + 2a^3b^2c^2f^2h^2i + 4a^3c^2f^2g^2h + 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^2 \\
& *d^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^2 \\
& *b^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^2 + 2b^4c^2d^2g^2i + 2a^3b^2c^2 \\
& *g^3i + 2a^2b^4d^2f^2i^2 - 4a^2c^4d^2e^2g + 2a^3b^2c^2f^2h^3 + 4a^2c^4d^2e^2f + 2a^2 \\
& *b^2c^3e^3g + 2a^2b^2c^3d^2f^3 - 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^3 \\
& *c^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 - 2a^3b^2e^2i^3 + 4a^3c^2d^2h^3 - 2a^2c^4d^2f^2 - a^3 \\
& *b^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^2 \\
& *b^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) * ((x * (4b^2c^4e - 8b^3c^3g + 16a^2c^4i + 8b^4c^2i - 16a^2c^5e + 32a^2b^2c^4g - 36a^2b^2c^3i)) / c^2 - (4b^2c^4d + 16a^2
\end{aligned}$$

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

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

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

**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



$$3.25 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{a+bx^2+cx^4} dx$$

**Optimal.** Leaf size=545

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

**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,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$ , Rules used = {1673, 1676, 1166, 205, 1663, 1657, 634, 618, 206, 628}

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

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), 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 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]
```

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

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

**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*1)*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 + Sqr
t[b^2 - 4*a*c]*f + 2*a*h) + b^3*(b + Sqrt[b^2 - 4*a*c])*m + c^2*(b^2*h + b
*Sqrt[b^2 - 4*a*c]*h + 3*a*b*k + a*Sqrt[b^2 - 4*a*c]*k + 2*a^2*m) - b*c*(b^
2*k + b*Sqrt[b^2 - 4*a*c]*k + 4*a*b*m + 2*a*Sqrt[b^2 - 4*a*c]*m))*ArcTan[(S
qrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]])/(Sqrt[2]*c^(7/2)*Sqrt[b^2 -
4*a*c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((2*c^3*e + c^2*(-(b*g) + Sqrt[b^2 -
4*a*c]*g - 2*a*j) + b^2*(-b + Sqrt[b^2 - 4*a*c])*1 + c*(b^2*j - b*Sqrt[b^2
- 4*a*c]*j + 3*a*b*1 - a*Sqrt[b^2 - 4*a*c]*1))*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])*1 - c*(b^2*j + b*Sqrt[b^2 -
4*a*c]*j + 3*a*b*1 + a*Sqrt[b^2 - 4*a*c]*1))*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

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

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), 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), 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)
, x, algorithm="fricas")
```

```
[Out] Timed out
```

**giac [B]** time = 7.21, size = 11831, normalized size = 21.71

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)
,x, algorithm="giac")
```

```
[Out] -1/8*((2*b^4*c^5 - 16*a*b^2*c^6 + 32*a^2*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^4*c^3 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b^2*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^3*c^4 - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^2*c^5 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^2*c^5 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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))*b^5*c^2 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b^3*c^3 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^4*c^3 - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^2*b*c^4 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^3*c^4 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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))*b^6*c + 9*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b^4*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^5*c^2 - 24*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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))*a*b^3*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^4*c^3 + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^3*c^4 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^2*b*c^4 + 5*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b^2*c^4 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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))*b^7 + 10*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 - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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))*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 + 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^3*b*c^3 + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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))*a*b^3*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
```



$$\begin{aligned}
& 2 - 4*a*c)*c)*b^3*c^6 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4 \\
& *a*c)*c)*a*b*c^7 - 2*(b^2 - 4*a*c)*b^3*c^6 + 4*(b^2 - 4*a*c)*a*b*c^7)*h - ( \\
& 2*b^6*c^5 - 14*a*b^4*c^6 + 24*a^2*b^2*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt( \\
& b*c - sqrt(b^2 - 4*a*c)*c)*b^6*c^3 + 7*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - \\
& sqrt(b^2 - 4*a*c)*c)*a*b^4*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sq \\
& rt(b^2 - 4*a*c)*c)*b^5*c^4 - 12*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b \\
& ^2 - 4*a*c)*c)*a^2*b^2*c^5 - 6*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^ \\
& 2 - 4*a*c)*c)*a*b^3*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4 \\
& *a*c)*c)*b^4*c^5 + 3*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c) \\
& *c)*a*b^2*c^6 - 2*(b^2 - 4*a*c)*b^4*c^5 + 6*(b^2 - 4*a*c)*a*b^2*c^6)*k + (2 \\
& *b^7*c^4 - 16*a*b^5*c^5 + 36*a^2*b^3*c^6 - 16*a^3*b*c^7 - sqrt(2)*sqrt(b^2 \\
& - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^7*c^2 + 8*sqrt(2)*sqrt(b^2 - 4*a \\
& *c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^5*c^3 + 2*sqrt(2)*sqrt(b^2 - 4*a*c) \\
& *sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^6*c^3 - 18*sqrt(2)*sqrt(b^2 - 4*a*c)*sqr \\
& t(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^4 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt \\
& (b*c - sqrt(b^2 - 4*a*c)*c)*a*b^4*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c \\
& - sqrt(b^2 - 4*a*c)*c)*b^5*c^4 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqr \\
& t(b^2 - 4*a*c)*c)*a^3*b*c^5 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b \\
& ^2 - 4*a*c)*c)*a^2*b^2*c^5 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^ \\
& 2 - 4*a*c)*c)*a*b^3*c^5 - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - \\
& 4*a*c)*c)*a^2*b*c^6 - 2*(b^2 - 4*a*c)*b^5*c^4 + 8*(b^2 - 4*a*c)*a*b^3*c^5 \\
& - 4*(b^2 - 4*a*c)*a^2*b*c^6)*m)*arctan(2*sqrt(1/2)*x/sqrt((b*c^11 + sqrt(b^ \\
& 2*c^22 - 4*a*c^23))/c^12))/((a*b^4*c^5 - 8*a^2*b^2*c^6 - 2*a*b^3*c^6 + 16*a \\
& ^3*c^7 + 8*a^2*b*c^7 + a*b^2*c^7 - 4*a^2*c^8)*c^2) - 1/8*((2*b^4*c^5 - 16*a \\
& *b^2*c^6 + 32*a^2*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a \\
& *c)*c)*b^4*c^3 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c \\
& )*a*b^2*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b \\
& ^3*c^4 - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c \\
& ^5 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^5 - \\
& sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^5 + 4*sqrt( \\
& 2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*c^6 - 2*(b^2 - 4*a*c \\
& )*b^2*c^5 + 8*(b^2 - 4*a*c)*a*c^6)*c^2*f - (2*b^5*c^4 - 16*a*b^3*c^5 + 32*a \\
& ^2*b*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^ \\
& 2 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 + \\
& 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c^3 - 16*s \\
& qrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 - 8*sqrt \\
& (2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 - sqrt(2)*s \\
& qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^4 + 4*sqrt(2)*sqrt(b \\
& ^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^5 - 2*(b^2 - 4*a*c)*b^3*c \\
& ^4 + 8*(b^2 - 4*a*c)*a*b*c^5)*c^2*h + (2*b^6*c^3 - 18*a*b^4*c^4 + 48*a^2*b^ \\
& 2*c^5 - 32*a^3*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c) \\
& *c)*b^6*c + 9*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b \\
& ^4*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^ \\
& 2 - 24*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^ \\
& 3 - 10*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3
\end{aligned}$$

$$\begin{aligned}
& - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} b^4 c^3 + 16 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^3 c^4 + 8 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b c^4 + 5 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^2 c^4 - 4 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 c^5 - 2(b^2 - 4ac) b^4 c^3 + 10(b^2 - 4ac) a b^2 c^4 - 8(b^2 - 4ac) a^2 c^5 c^2 k - (2b^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 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} b^7 + 10 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^5 c + 2 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} b^6 c - 32 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b^3 c^2 - 12 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^4 c^2 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} b^5 c^2 + 32 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^3 b c^3 + 16 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b^2 c^3 + 6 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^3 c^3 - 8 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b c^4 - 2(b^2 - 4ac) b^5 c^2 + 12(b^2 - 4ac) a b^3 c^3 - 16(b^2 - 4ac) a^2 b c^4) c^2 m - 2(\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} b^4 c^5 - 8 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^2 c^6 - 2 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} b^3 c^6 - 2 b^4 c^6 + 16 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 c^7 + 8 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b c^7 + \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} b^2 c^7 + 16 a b^2 c^7 - 4 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 c^8 - 32 a^2 c^8 + 2(b^2 - 4ac) b^2 c^6 - 8(b^2 - 4ac) a c^7) d \operatorname{abs}(c) + 2(\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^4 c^4 - 8 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b^2 c^5 - 2 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^3 c^5 - 2 a b^4 c^5 + 16 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^3 c^6 + 8 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b c^6 + \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^2 c^6 + 16 a^2 b^2 c^6 - 4 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 c^7 - 32 a^3 c^7 + 2(b^2 - 4ac) a b^2 c^5 - 8(b^2 - 4ac) a^2 c^6) h \operatorname{abs}(c) - 2(\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^5 c^3 - 8 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b^3 c^4 - 2 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^4 c^4 - 2 a b^5 c^4 + 16 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^3 b c^5 + 8 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b^2 c^5 + \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^3 c^5 + 16 a^2 b^3 c^5 - 4 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b c^6 - 32 a^3 b c^6 + 2(b^2 - 4ac) a b^3 c^4 - 8(b^2 - 4ac) a^2 b c^5) k \operatorname{abs}(c) + 2(\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^6 c^2 - 9 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b^4 c^3 - 2 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^5 c^3 - 2 a b^6 c^3 + 24 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^3 b^2 c^4 + 10 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b^3 c^4 + \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a b^4 c^4 + 18 a^2 b^4 c^4 - 16 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^4 c^5 - 8 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^3 b c^5 - 5 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b^2 c^5 - 48 a^3 b^2 c^5 + 4 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^3 c^6 + 32 a^4 c^6 + 2(b^2 - 4ac) a b^4
\end{aligned}$$



$$\begin{aligned}
& c^3 - 10*(b^2 - 4*a*c)*a^2*b^2*c^4 + 8*(b^2 - 4*a*c)*a^3*c^5)*m*abs(c) + 2 \\
& *(2*b^3*c^8 - 8*a*b*c^9 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4 \\
& *a*c}}*c)*b^3*c^6 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}} \\
& *c)*a*b*c^7 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b \\
& ^2*c^7 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b*c^8 - \\
& 2*(b^2 - 4*a*c)*b*c^8)*d - (2*b^4*c^7 - 8*a*b^2*c^8 - \sqrt{2}*\sqrt{b^2 - 4* \\
& a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^4*c^5 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}* \\
& \sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^2*c^6 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{ \\
& t(b*c + \sqrt{b^2 - 4*a*c}}*c)*b^3*c^6 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \\
& \sqrt{b^2 - 4*a*c}}*c)*b^2*c^7 - 2*(b^2 - 4*a*c)*b^2*c^7)*f + (2*b^5*c^6 - 1 \\
& 2*a*b^3*c^7 + 16*a^2*b*c^8 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - \\
& - 4*a*c}}*c)*b^5*c^4 + 6*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a \\
& *c}}*c)*a*b^3*c^5 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}} \\
& *c)*b^4*c^5 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a \\
& ^2*b*c^6 - 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^ \\
& 2*c^6 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^3*c^6 + \\
& 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b*c^7 - 2*(b \\
& ^2 - 4*a*c)*b^3*c^6 + 4*(b^2 - 4*a*c)*a*b*c^7)*h - (2*b^6*c^5 - 14*a*b^4*c^ \\
& 6 + 24*a^2*b^2*c^7 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}} \\
& *c)*b^6*c^3 + 7*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a \\
& *b^4*c^4 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^5* \\
& c^4 - 12*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^2* \\
& c^5 - 6*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^3*c^5 \\
& - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^4*c^5 + 3*\sqrt{ \\
& rt(2)*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^2*c^6 - 2*(b^2 \\
& - 4*a*c)*b^4*c^5 + 6*(b^2 - 4*a*c)*a*b^2*c^6)*k + (2*b^7*c^4 - 16*a*b^5*c^5 \\
& + 36*a^2*b^3*c^6 - 16*a^3*b*c^7 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{ \\
& t(b^2 - 4*a*c}}*c)*b^7*c^2 + 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 \\
& - 4*a*c}}*c)*a*b^5*c^3 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - \\
& 4*a*c}}*c)*b^6*c^3 - 18*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a* \\
& c}}*c)*a^2*b^3*c^4 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}} \\
& )*c)*a*b^4*c^4 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)* \\
& b^5*c^4 + 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b \\
& *c^5 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^2* \\
& c^5 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^3*c^5 \\
& - 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b*c^6 - \\
& 2*(b^2 - 4*a*c)*b^5*c^4 + 8*(b^2 - 4*a*c)*a*b^3*c^5 - 4*(b^2 - 4*a*c)*a^2*b \\
& *c^6)*m)*arctan(2*\sqrt{1/2}*x/\sqrt{(b*c^11 - \sqrt{b^2*c^22 - 4*a*c^23}))/c^1 \\
& 2))/((a*b^4*c^5 - 8*a^2*b^2*c^6 - 2*a*b^3*c^6 + 16*a^3*c^7 + 8*a^2*b*c^7 + \\
& a*b^2*c^7 - 4*a^2*c^8)*c^2) + 1/4*(c^2*g - b*c*j + b^2*l - a*c*l)*log(abs(c \\
& *x^4 + b*x^2 + a))/c^3 - 1/16*((b^6*c^2 - 8*a*b^4*c^3 - 2*b^5*c^3 + 16*a^2* \\
& b^2*c^4 + 8*a*b^3*c^4 + b^4*c^4 - 4*a*b^2*c^5 - (b^5*c^2 - 8*a*b^3*c^3 - 2* \\
& b^4*c^3 + 16*a^2*b*c^4 + 8*a*b^2*c^4 + b^3*c^4 - 4*a*b*c^5)*\sqrt{b^2 - 4*a* \\
& c}))*g*abs(c) - (b^7*c - 10*a*b^5*c^2 - 2*b^6*c^2 + 32*a^2*b^3*c^3 + 12*a*b^ \\
& 4*c^3 + b^5*c^3 - 32*a^3*b*c^4 - 16*a^2*b^2*c^4 - 6*a*b^3*c^4 + 8*a^2*b*c^5
\end{aligned}$$

$$\begin{aligned}
& - (b^6c - 10ab^4c^2 - 2b^5c^2 + 32a^2b^2c^3 + 12ab^3c^3 + b^4c^3 - 32a^3c^4 - 16a^2b^2c^4 - 6ab^2c^4 + 8a^2c^5) \sqrt{b^2 - 4ac} \\
& )) * j * \text{abs}(c) + (b^8 - 11ab^6c - 2b^7c + 40a^2b^4c^2 + 14ab^5c^2 + b^6c^2 - 48a^3b^2c^3 - 24a^2b^3c^3 - 7ab^4c^3 + 12a^2b^2c^4 - \\
& (b^7 - 11ab^5c - 2b^6c + 40a^2b^3c^2 + 14ab^4c^2 + b^5c^2 - 48a^3b^2c^3 - 24a^2b^3c^3 - 7ab^4c^3 + 12a^2b^2c^4) \sqrt{b^2 - 4ac} \\
& ) * l * \text{abs}(c) - 2(b^5c^3 - 8ab^3c^4 - 2b^4c^4 + 16a^2b^2c^5 + 8ab^2c^5 + b^3c^5 - 4ab^2c^6 - (b^4c^3 - 8ab^2c^4 - 2b^3c^4 + 16a^2c^5 \\
& + 8ab^2c^5 + b^2c^5 - 4ac^6) \sqrt{b^2 - 4ac}) * \text{abs}(c) * e + (b^6c^3 - 8ab^4c^4 - 2b^5c^4 + 16a^2b^2c^5 + 8ab^3c^5 + b^4c^5 - 4ab^2c^6 - \\
& (b^5c^3 - 4ab^3c^4 - 2b^4c^4 + b^3c^5) \sqrt{b^2 - 4ac}) * g - (b^7c^2 - 10ab^5c^3 - 2b^6c^3 + 32a^2b^3c^4 + 12ab^4c^4 + b^5c^4 - 32a^3b^2c^5 - \\
& 16a^2b^2c^5 - 6ab^3c^5 + 8a^2b^2c^6 - (b^6c^2 - 6ab^4c^3 - 2b^5c^3 + 8a^2b^2c^4 + 4ab^3c^4 + b^4c^4 - 2ab^2c^5) \sqrt{b^2 - 4ac}) * j + (b^8c - 11ab^6c^2 - 2b^7c^2 + 40a^2b^4c^3 + 14ab^5c^3 + b^6c^3 - 48a^3b^2c^4 - 24a^2b^3c^4 - 7ab^4c^4 + 12a^2b^2c^5 - (b^7c - 7ab^5c^2 - 2b^6c^2 + 12a^2b^3c^3 + 6ab^4c^3 + b^5c^3 - 3ab^3c^4) \sqrt{b^2 - 4ac}) * l - 2(b^5c^4 - 8ab^3c^5 - 2b^4c^5 + 16a^2b^2c^6 + 8ab^2c^6 + b^3c^6 - 4ab^2c^7 - (b^4c^4 - 4ab^2c^5 - 2b^3c^5 + b^2c^6) \sqrt{b^2 - 4ac}) * e) * \log(x^2 + 1/2(b^2c^11 + \sqrt{b^2c^22 - 4ac^23})/c^12) / ((ab^4c^2 - 8a^2b^2c^3 - 2ab^3c^3 + 16a^3c^4 + 8a^2b^2c^4 + ab^2c^4 - 4a^2c^5) * c^2 * \text{abs}(c)) - 1/16 * ((b^6c^2 - 8ab^4c^3 - 2b^5c^3 + 16a^2b^2c^4 + 8ab^3c^4 + b^4c^4 - 4ab^2c^5 + (b^5c^2 - 8ab^3c^3 - 2b^4c^3 + 16a^2b^2c^4 + 8ab^2c^4 + b^3c^4 - 4ab^2c^5) \sqrt{b^2 - 4ac}) * g * \text{abs}(c) - (b^7c - 10ab^5c^2 - 2b^6c^2 + 32a^2b^3c^3 + 12ab^4c^3 + b^5c^3 - 32a^3b^2c^4 - 16a^2b^2c^4 - 6ab^3c^4 + 8a^2b^2c^5 + (b^6c - 10ab^4c^2 - 2b^5c^2 + 32a^2b^2c^3 + 12ab^3c^3 + b^4c^3 - 32a^3c^4 - 16a^2b^2c^4 - 6ab^2c^4 + 8a^2c^5) \sqrt{b^2 - 4ac}) * j * \text{abs}(c) + (b^8 - 11ab^6c - 2b^7c + 40a^2b^4c^2 + 14ab^5c^2 + b^6c^2 - 48a^3b^2c^3 - 24a^2b^3c^3 - 7ab^4c^3 + 12a^2b^2c^4 + (b^7 - 11ab^5c - 2b^6c + 40a^2b^3c^2 + 14ab^4c^2 + b^5c^2 - 48a^3b^2c^3 - 24a^2b^3c^3 - 7ab^4c^3 + 12a^2b^2c^4) \sqrt{b^2 - 4ac}) * l * \text{abs}(c) - 2(b^5c^3 - 8ab^3c^4 - 2b^4c^4 + 16a^2b^2c^5 + 8ab^2c^5 + b^3c^5 - 4ab^2c^6 + (b^4c^3 - 8ab^2c^4 - 2b^3c^4 + 16a^2c^5 + 8ab^2c^5 + b^2c^5 - 4ac^6) \sqrt{b^2 - 4ac}) * \text{abs}(c) * e + (b^6c^3 - 8ab^4c^4 - 2b^5c^4 + 16a^2b^2c^5 + 8ab^3c^5 + b^4c^5 - 4ab^2c^6 + (b^5c^3 - 4ab^3c^4 - 2b^4c^4 + b^3c^5) \sqrt{b^2 - 4ac}) * g - (b^7c^2 - 10ab^5c^3 - 2b^6c^3 + 32a^2b^3c^4 + 12ab^4c^4 + b^5c^4 - 32a^3b^2c^5 - 16a^2b^2c^5 - 6ab^3c^5 + 8a^2b^2c^6 + (b^6c^2 - 6ab^4c^3 - 2b^5c^3 + 8a^2b^2c^4 + 4ab^3c^4 + b^4c^4 - 2ab^2c^5) \sqrt{b^2 - 4ac}) * j + (b^8c - 11ab^6c^2 - 2b^7c^2 + 40a^2b^4c^3 + 14ab^5c^3 + b^6c^3 - 48a^3b^2c^4 - 24a^2b^3c^4 - 7ab^4c^4 + 12a^2b^2c^5 + (b^7c - 7ab^5c^2 - 2b^6c^2 + 12a^2b^3c^3 + 6ab^4c^3 + b^5c^3 - 3ab^3c^4) \sqrt{b^2 - 4ac}) * l - 2(b^5c^4 - 8ab^3c^5 - 2b^4c^5
\end{aligned}$$



$$\begin{aligned}
& (c+b^2)^{(1/2)} * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c*x) \\
& * b*h*a+1/2/c^3/(4*a*c-b^2)*2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \arctan( \\
& 2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c*x) * b^5*m-1/2/c^3/(4*a*c-b^2)*2^{( \\
& 1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1 \\
& /2)}) * c)^{(1/2)} * c*x) * b^5*m-2/c^2*(-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2)*2^{(1/2)} / ((b+( \\
& -4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} \\
& * c*x) * a*b^2*m+3/2/c*(-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2)*2^{(1/2)} / ((b+(-4*a*c+b^2) \\
& ^{(1/2)}) * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c*x) * a*b*k \\
& +3/2/c*(-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2)*2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{( \\
& 1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c*x) * a*b*k-2/c^2*(-4 \\
& *a*c+b^2)^{(1/2)} / (4*a*c-b^2)*2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arcta} \\
& \operatorname{nh}(2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c*x) * a*b^2*m-1/c^2*a*m*x+1/c^3 \\
& * b^2*m*x-1/c^2*b*k*x-1/3/c^2*x^3*b*m-1/2/c^2*x^2*b*1+1/c*h*x+1/(4*a*c-b^2)* \\
& a*g*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})+1/(4*a*c-b^2)*a*g*\ln(2*c*x^2+b+(-4*a* \\
& c+b^2)^{(1/2)})-1/2*(-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2)*e*\ln(-2*c*x^2-b+(-4*a*c+b^ \\
& 2)^{(1/2)})+1/2*(-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2)*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1 \\
& /2)})-(-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2)*2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2} \\
& ) * a*h*\arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c*x) - (-4*a*c+b^2)^{(1/ \\
& 2)} / (4*a*c-b^2)*2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / (( \\
& -b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c*x) * a*h+5/2/c/(4*a*c-b^2)*2^{(1/2)} / ((b+(-4* \\
& a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c* \\
& x) * b^2*k*a-5/2/c/(4*a*c-b^2)*2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arct} \\
& \operatorname{anh}(2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c*x) * b^2*k*a+4/c/(4*a*c-b^2)* \\
& 2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1 \\
& /2)}) * c)^{(1/2)} * c*x) * a^2*b*m+1/c*(-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2)*2^{(1/2)} / ((b+( \\
& -4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} \\
& * c*x) * a^2*m-1/2/c^2*(-4*a*c+b^2)^{(1/2)} / (4*a*c-b^2)*2^{(1/2)} / ((b+(-4*a*c+b^2) \\
& ^{(1/2)}) * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c*x) * b^3*k \\
& +1/4*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)}
\end{aligned}$$

$$\frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx} a^{2k} b^m + \frac{2}{(4ac-b^2)^{1/2}} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx} \operatorname{arctanh}\left(\frac{2^{1/2}}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx}\right) a^{2k-2} + \frac{2}{(4ac-b^2)^{1/2}} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}cx} \operatorname{arctan}\left(\frac{2^{1/2}}{((b+(-4ac+b^2)^{1/2})c)^{1/2}cx}\right) a^{2k+5/4} + \frac{5}{4c^2} \frac{1}{(4ac-b^2)} \ln\left(\frac{-2cx^2-b+(-4ac+b^2)^{1/2}}{(-4ac+b^2)^{1/2}}\right) a^{2k+5/4} + \frac{5}{4c^2} \frac{1}{(4ac-b^2)} \ln\left(\frac{2cx^2+b+(-4ac+b^2)^{1/2}}{(-4ac+b^2)^{1/2}}\right) a^{2k-1} + \frac{1}{c} \frac{1}{(4ac-b^2)} \ln\left(\frac{2cx^2+b+(-4ac+b^2)^{1/2}}{(-4ac+b^2)^{1/2}}\right) a^{2k+1/2} + \frac{1}{c} \frac{1}{(4ac-b^2)} \ln\left(\frac{-2cx^2-b+(-4ac+b^2)^{1/2}}{(-4ac+b^2)^{1/2}}\right) a^{2k+1/4} + \frac{3}{c^3} \frac{1}{(4ac-b^2)} \ln\left(\frac{-2cx^2-b+(-4ac+b^2)^{1/2}}{(-4ac+b^2)^{1/2}}\right) b^{3k-1} + \frac{1}{4c^2} \frac{1}{(4ac-b^2)} \ln\left(\frac{-2cx^2-b+(-4ac+b^2)^{1/2}}{(-4ac+b^2)^{1/2}}\right) b^{2k-j-1/2} + \frac{1}{c} \frac{1}{(4ac-b^2)} \ln\left(\frac{2cx^2+b+(-4ac+b^2)^{1/2}}{(-4ac+b^2)^{1/2}}\right) a^{2k-j-1/4} + \frac{3}{c^3} \frac{1}{(4ac-b^2)} \ln\left(\frac{2cx^2+b+(-4ac+b^2)^{1/2}}{(-4ac+b^2)^{1/2}}\right) b^{3k+1} + \frac{1}{4c^2} \frac{1}{(4ac-b^2)} \ln\left(\frac{2cx^2+b+(-4ac+b^2)^{1/2}}{(-4ac+b^2)^{1/2}}\right) b^{2k+j}$$

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

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

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),x, algorithm="maxima")

[Out] 1/60\*(12\*c^2\*m\*x^5 + 15\*c^2\*l\*x^4 + 20\*(c^2\*k - b\*c\*m)\*x^3 + 30\*(c^2\*j - b\*c\*l)\*x^2 + 60\*(c^2\*h - b\*c\*k + (b^2 - a\*c)\*m)\*x)/c^3 - integrate(-(c^3\*d - a\*c^2\*h + a\*b\*c\*k + (c^3\*g - b\*c^2\*j + (b^2\*c - a\*c^2)\*l)\*x^3 + (c^3\*f - b\*c^2\*h + (b^2\*c - a\*c^2)\*k - (b^3 - 2\*a\*b\*c)\*m)\*x^2 - (a\*b^2 - a^2\*c)\*m + (c^3\*e - a\*c^2\*j + a\*b\*c\*l)\*x)/(c\*x^4 + b\*x^2 + a), x)/c^3

**mupad** [B] time = 4.31, size = 49150, normalized size = 90.18

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e\*x + f\*x^2 + g\*x^3 + h\*x^4 + j\*x^5 + k\*x^6 + l\*x^7 + m\*x^8)/(a + b\*x^2 + c\*x^4),x)

[Out] x^2\*(j/(2\*c) - (b\*l)/(2\*c^2)) - x\*((b\*(k/c - (b\*m)/c^2))/c - h/c + (a\*m)/c^2) + x^3\*(k/(3\*c) - (b\*m)/(3\*c^2)) + symsum(log((c^7\*d\*e^2 - a\*c^6\*f^3 - c^7\*d^2\*f + b^7\*d\*m^2 + a^4\*c^3\*k^3 + a^4\*b^3\*m^3 + a^2\*b\*c^4\*h^3 + b^2\*c^5\*d\*g^2 + b^3\*c^4\*d\*h^2 + a^2\*c^5\*d\*j^2 - a^2\*c^5\*f\*h^2 + a^2\*c^5\*g^2\*h + b^4\*c^3\*d\*j^2 - a^3\*c^4\*d\*l^2 - b^2\*c^5\*d^2\*k + b^5\*c^2\*d\*k^2 + 3\*a^2\*c^5\*f^2\*k - 3\*a^3\*c^4\*f\*k^2 + a^2\*c^5\*e^2\*m - a^3\*c^4\*h\*j^2 + b^3\*c^4\*d^2\*m + a^3\*c^4\*h^2\*k - a^4\*c^3\*f\*m^2 + a^2\*b^5\*h\*m^2 - a^3\*c^4\*g^2\*m + a^4\*c^3\*h\*l^2 - a^3\*b^4\*k\*m^2 + a^4\*c^3\*j^2\*m + a^5\*c^2\*k\*m^2 - a^5\*c^2\*l^2\*m - a^3\*b^2\*c^2\*k^3 - a\*c^6\*d\*g^2 + b\*c^6\*d\*f^2 - a\*c^6\*e^2\*h + b\*c^6\*d^2\*h + a\*c^6\*d^2\*k -

$$\begin{aligned}
& 2a^5b^3c^3 + b^6c^2d^2 - a^6b^2f^2 - 2a^5b^2c^5d^2h^2 - a^5b^2c^5f^2g^2 \\
& + 2a^5b^2c^5f^2h^2 + a^5b^2c^5e^2k^2 - 2a^5b^2c^5d^2m^2 - 6a^5b^5c^2d^2m^2 - 2 \\
& *b^2c^5d^2f^2h^2 - a^5b^5c^2f^2l^2 + 2b^2c^5d^2e^2j^2 - 2b^3c^4d^2e^2l^2 + 2b^3c^4 \\
& *d^2f^2k^2 - 2b^3c^4d^2g^2j^2 - 2a^2c^5d^2f^2m^2 + 2a^2c^5d^2g^2l^2 - 2a^2c^5 \\
& *d^2h^2k^2 - 2a^2c^5e^2f^2l^2 - 2a^2c^5e^2g^2k^2 + 2a^2c^5e^2h^2j^2 - 2a^2c^5f^2 \\
& *g^2j^2 - 2b^4c^3d^2f^2m^2 + 2b^4c^3d^2g^2l^2 - 2b^4c^3d^2h^2k^2 + 2b^5c^2d^2h^2m^2 \\
& + 2a^3c^4f^2h^2m^2 - 2a^3c^4g^2h^2l^2 - 2b^5c^2d^2j^2l^2 + 2a^3c^4d^2k^2m^2 - \\
& 2a^3c^4e^2j^2m^2 + 2a^3c^4e^2k^2l^2 + 2a^3c^4f^2j^2l^2 + 2a^3c^4g^2j^2k^2 + 2a^4 \\
& *c^3g^2l^2m^2 - 2a^4c^3h^2k^2m^2 - 2a^4c^3j^2k^2l^2 - 3a^2b^2c^4d^2j^2 - a^2b^2 \\
& *c^4f^2h^2 - 4a^2b^3c^3d^2k^2 + 3a^2b^2c^4d^2k^2 - a^2b^3c^3f^2j^2 - 5a^2 \\
& *b^4c^2d^2l^2 + 2a^2b^2c^4f^2j^2 - 2a^2b^2c^4f^2k^2 - a^2b^4c^2f^2k^2 - \\
& 4a^3b^2c^3d^2m^2 - a^2b^2c^4e^2m^2 - 3a^3b^2c^3f^2l^2 + 2a^2b^3c^3f^2m^2 \\
& - 5a^2b^2c^4f^2m^2 + 5a^2b^4c^2f^2m^2 + a^2b^4c^2h^2l^2 - 4a^3b^2c^3h^2 \\
& *2m^2 - a^3b^2c^3j^2k^2 - 4a^3b^3c^2h^2m^2 + 5a^4b^2c^2h^2m^2 - a^3b^3c^2k^2 \\
& *l^2 + 2a^4b^2c^2k^2l^2 + 2a^3b^3c^2k^2m^2 - 3a^4b^2c^2k^2m^2 + a^4b^2c^2 \\
& *k^2m^2 + a^4b^2c^2l^2m^2 - 2b^2c^6d^2e^2g^2 + 2a^2c^6d^2f^2h^2 + 2a^2c^6e^2f^2g^2 - \\
& 2a^2c^6d^2e^2j^2 - 2b^6c^2d^2k^2m^2 + 6a^2b^2c^3d^2l^2 + 3a^2b^2c^3f^2k^2 \\
& + 10a^2b^3c^2d^2m^2 + a^2b^2c^3h^2j^2 + 4a^2b^3c^2f^2l^2 - 2a^2b^2 \\
& *c^3h^2k^2 + a^2b^3c^2h^2k^2 - 6a^3b^2c^2f^2m^2 - 3a^3b^2c^2h^2l^2 \\
& + 2a^2b^3c^2h^2m^2 + 4a^2b^2c^5d^2e^2l^2 - 4a^2b^2c^5d^2f^2k^2 + 4a^2b^2c^5d^2g^2 \\
& *j^2 - 2a^2b^2c^5e^2f^2j^2 + 2a^2b^5c^2f^2k^2m^2 + 6a^2b^2c^4d^2f^2m^2 - 6a^2b^2 \\
& *c^4d^2g^2 \\
& *l^2 + 6a^2b^2c^4d^2h^2k^2 + 2a^2b^2c^4e^2f^2l^2 + 2a^2b^2c^4f^2g^2j^2 - 8a^2b^3c^3 \\
& *d^2h^2m^2 - 2a^2b^3c^3f^2g^2l^2 + 2a^2b^3c^3f^2h^2k^2 + 6a^2b^2c^4d^2h^2m^2 + 2a^2 \\
& *b^2c^4e^2g^2m^2 - 2a^2b^2c^4e^2h^2l^2 + 4a^2b^2c^4f^2g^2l^2 - 2a^2b^2c^4f^2h^2k^2 - \\
& 2a^2b^2c^4g^2h^2j^2 + 8a^2b^3c^3d^2j^2l^2 - 6a^2b^2c^4d^2j^2l^2 - 2a^2b^4c^2f^2h^2 \\
& *m^2 + 10a^2b^4c^2d^2k^2m^2 + 2a^2b^4c^2f^2j^2l^2 + 8a^3b^2c^3f^2k^2m^2 - 2a^3b^2c^3 \\
& *g^2k^2l^2 + 4a^3b^2c^3h^2j^2l^2 - 2a^2b^4c^2h^2k^2m^2 - 2a^4b^2c^2j^2l^2m^2 + 4a^2 \\
& *b^2c^3f^2h^2m^2 + 2a^2b^2c^3g^2h^2l^2 - 12a^2b^2c^3d^2k^2m^2 - 6a^2b^2c^3 \\
& *f^2j^2l^2 - 8a^2b^3c^2f^2k^2m^2 - 2a^2b^3c^2h^2j^2l^2 + 4a^3b^2c^2h^2k^2m^2 + \\
& 2a^3b^2c^2j^2k^2l^2)/c^5 - \text{root}(128a^2b^2c^8z^4 - 16a^2b^4c^7z^4 - 2 \\
& 56a^3c^9z^4 + 384a^3b^2c^6l^1z^3 - 144a^2b^4c^5l^1z^3 + 128a^2b^3 \\
& *c^6j^1z^3 - 128a^2b^2c^7g^1z^3 + 16a^2b^6c^4l^1z^3 - 256a^3b^2c^7j^1 \\
& *z^3 - 16a^2b^5c^5j^1z^3 + 16a^2b^4c^6g^1z^3 - 256a^4c^7l^1z^3 + 256a^3 \\
& *c^8g^1z^3 - 96a^4b^2c^5j^1z^2 + 8a^2b^7c^2j^1z^2 + 160a^4b^2c^5h^1m^2 \\
& *z^2 - 8a^2b^7c^2h^1m^2z^2 + 8a^2b^6c^3h^1k^2z^2 - 8a^2b^6c^3g^1l^2z^2 + 8a^2 \\
& *b^6c^3f^1m^2z^2 + 160a^3b^2c^6g^1j^2z^2 - 96a^3b^2c^6f^1k^2z^2 - 96a^3b^2 \\
& *c^6e^1l^2z^2 - 96a^3b^2c^6d^1m^2z^2 + 8a^2b^5c^4g^1j^2z^2 - 8a^2b^5c^4f^1k^2 \\
& *z^2 - 8a^2b^5c^4e^1l^2z^2 - 8a^2b^5c^4d^1m^2z^2 + 8a^2b^4c^5e^1j^2z^2 + 8a^2 \\
& *b^4c^5d^1k^2z^2 + 8a^2b^4c^5f^1h^2z^2 + 32a^2b^2c^7e^1g^2z^2 + 32a^2b^2c^7 \\
& *d^1h^2z^2 - 8a^2b^3c^6e^1g^2z^2 - 8a^2b^3c^6d^1h^2z^2 + 16a^2b^2c^7d^1f^2z^2 \\
& + 8a^2b^8c^2k^2m^2z^2 - 304a^4b^2c^4k^2m^2z^2 + 264a^3b^4c^3k^2m^2z^2 \\
& - 80a^2b^6c^2k^2m^2z^2 + 184a^3b^3c^4j^1l^2z^2 - 72a^2b^5c^3j^1l^2z^2 \\
& - 200a^3b^3c^4h^1m^2z^2 + 72a^2b^5c^3h^1m^2z^2 - 240a^3b^2c^5g^1l^2z^2 \\
& + 144a^3b^2c^5h^1k^2z^2 + 144a^3b^2c^5f^1m^2z^2 + 80a^2b^4c^4g^1l^2z^2 \\
& - 64a^2b^4c^4h^1k^2z^2 - 64a^2b^4c^4f^1m^2z^2 - 72a^2b^3c^5g^1j^2
\end{aligned}$$

$$\begin{aligned}
& *z^2 + 56*a^2*b^3*c^5*f*k*z^2 + 56*a^2*b^3*c^5*e*l*z^2 + 56*a^2*b^3*c^5*d*m \\
& *z^2 - 48*a^2*b^2*c^6*e*j*z^2 - 48*a^2*b^2*c^6*d*k*z^2 - 48*a^2*b^2*c^6*f*h \\
& *z^2 - 112*a^5*b*c^4*m^2*z^2 + 44*a^2*b^7*c*m^2*z^2 + 80*a^4*b*c^5*k^2*z^2 \\
& - 4*a*b^7*c^2*k^2*z^2 - 4*a*b^6*c^3*j^2*z^2 - 48*a^3*b*c^6*h^2*z^2 - 4*a*b^ \\
& 5*c^4*h^2*z^2 - 4*a*b^4*c^5*g^2*z^2 + 16*a^2*b*c^7*f^2*z^2 - 4*a*b^3*c^6*f^ \\
& 2*z^2 + 8*a*b^2*c^7*e^2*z^2 + 64*a^5*c^5*k*m*z^2 + 192*a^4*c^6*g*l*z^2 - 64 \\
& *a^4*c^6*h*k*z^2 - 64*a^4*c^6*f*m*z^2 + 64*a^3*c^7*e*j*z^2 + 64*a^3*c^7*d*k \\
& *z^2 + 64*a^3*c^7*f*h*z^2 - 4*a*b^8*c*l^2*z^2 - 64*a^2*c^8*d*f*z^2 + 16*a*b \\
& *c^8*d^2*z^2 + 252*a^4*b^3*c^3*m^2*z^2 - 168*a^3*b^5*c^2*m^2*z^2 + 168*a^4* \\
& b^2*c^4*l^2*z^2 - 132*a^3*b^4*c^3*l^2*z^2 + 40*a^2*b^6*c^2*l^2*z^2 - 100*a^ \\
& 3*b^3*c^4*k^2*z^2 + 36*a^2*b^5*c^3*k^2*z^2 - 56*a^3*b^2*c^5*j^2*z^2 + 32*a^ \\
& 2*b^4*c^4*j^2*z^2 + 28*a^2*b^3*c^5*h^2*z^2 + 40*a^2*b^2*c^6*g^2*z^2 - 96*a^ \\
& 5*c^5*l^2*z^2 - 32*a^4*c^6*j^2*z^2 - 96*a^3*c^7*g^2*z^2 - 32*a^2*c^8*e^2*z^ \\
& 2 - 4*b^3*c^7*d^2*z^2 - 4*a*b^9*m^2*z^2 + 32*a^5*b*c^3*h*l*m*z + 8*a^2*b^6* \\
& c*g*k*m*z + 96*a^4*b*c^4*e*k*m*z + 32*a^4*b*c^4*h*j*k*z + 32*a^4*b*c^4*g*j* \\
& l*z + 32*a^4*b*c^4*f*j*m*z - 64*a^4*b*c^4*g*h*m*z - 8*a*b^6*c^2*e*j*l*z + 8 \\
& *a*b^6*c^2*e*h*m*z - 64*a^3*b*c^5*e*h*k*z + 64*a^3*b*c^5*e*g*l*z - 64*a^3*b \\
& *c^5*e*f*m*z + 32*a^3*b*c^5*f*g*k*z - 32*a^3*b*c^5*d*h*l*z + 32*a^3*b*c^5*d \\
& *g*m*z - 8*a*b^5*c^3*e*h*k*z + 8*a*b^5*c^3*e*g*l*z - 8*a*b^5*c^3*e*f*m*z - \\
& 8*a*b^4*c^4*e*g*j*z + 8*a*b^4*c^4*e*f*k*z - 8*a*b^4*c^4*d*f*l*z + 8*a*b^4*c \\
& ^4*d*e*m*z - 32*a^2*b*c^6*d*f*j*z + 32*a^2*b*c^6*d*e*k*z + 8*a*b^3*c^5*d*f* \\
& j*z - 8*a*b^3*c^5*d*e*k*z + 32*a^2*b*c^6*e*f*h*z - 8*a*b^3*c^5*e*f*h*z - 8* \\
& a*b^2*c^6*d*f*g*z + 8*a*b^2*c^6*d*e*h*z - 8*a*b^7*c*e*k*m*z - 40*a^5*b^2*c^ \\
& 2*k*l*m*z + 48*a^4*b^3*c^2*j*k*m*z - 8*a^4*b^3*c^2*h*l*m*z + 104*a^4*b^2*c^ \\
& 3*g*k*m*z - 56*a^3*b^4*c^2*g*k*m*z - 40*a^4*b^2*c^3*h*j*m*z + 8*a^4*b^2*c^3 \\
& *h*k*l*z + 8*a^4*b^2*c^3*f*l*m*z + 8*a^3*b^4*c^2*h*j*m*z - 152*a^3*b^3*c^3* \\
& e*k*m*z + 64*a^2*b^5*c^2*e*k*m*z - 40*a^3*b^3*c^3*g*j*l*z - 8*a^3*b^3*c^3*h \\
& *j*k*z - 8*a^3*b^3*c^3*f*j*m*z + 8*a^2*b^5*c^2*g*j*l*z + 48*a^3*b^3*c^3*g*h \\
& *m*z - 8*a^2*b^5*c^2*g*h*m*z - 104*a^3*b^2*c^4*e*j*l*z + 56*a^2*b^4*c^3*e*j \\
& *l*z + 8*a^3*b^2*c^4*f*j*k*z - 8*a^3*b^2*c^4*d*k*l*z + 8*a^3*b^2*c^4*d*j*m* \\
& z + 104*a^3*b^2*c^4*e*h*m*z - 56*a^2*b^4*c^3*e*h*m*z - 40*a^3*b^2*c^4*g*h*k \\
& *z - 40*a^3*b^2*c^4*f*g*m*z - 8*a^3*b^2*c^4*f*h*l*z + 8*a^2*b^4*c^3*g*h*k*z \\
& + 8*a^2*b^4*c^3*f*g*m*z + 48*a^2*b^3*c^4*e*h*k*z - 48*a^2*b^3*c^4*e*g*l*z \\
& + 48*a^2*b^3*c^4*e*f*m*z - 8*a^2*b^3*c^4*f*g*k*z + 8*a^2*b^3*c^4*d*h*l*z - \\
& 8*a^2*b^3*c^4*d*g*m*z + 40*a^2*b^2*c^5*e*g*j*z - 40*a^2*b^2*c^5*e*f*k*z + 4 \\
& 0*a^2*b^2*c^5*d*f*l*z - 40*a^2*b^2*c^5*d*e*m*z - 8*a^2*b^2*c^5*d*h*j*z + 8* \\
& a^2*b^2*c^5*d*g*k*z + 8*a^2*b^2*c^5*f*g*h*z + 8*a^4*b^4*c*k*l*m*z - 64*a^5* \\
& b*c^3*j*k*m*z - 8*a^3*b^5*c*j*k*m*z - 32*a^6*b*c^2*l*m^2*z + 24*a^5*b^3*c*l \\
& *m^2*z - 28*a^4*b^4*c*j*m^2*z + 16*a^5*b*c^3*k^2*l*z + 4*a^3*b^5*c*j*l^2*z \\
& + 48*a^5*b*c^3*g*m^2*z + 32*a^3*b^5*c*g*m^2*z - 4*a^2*b^6*c*g*l^2*z - 36*a^ \\
& 2*b^6*c*e*m^2*z - 32*a^4*b*c^4*g*k^2*z - 16*a^3*b*c^5*f^2*l*z - 48*a^4*b*c^ \\
& 4*e*l^2*z - 32*a^3*b*c^5*g^2*j*z - 4*a*b^4*c^4*e^2*l*z + 32*a^2*b*c^6*d^2*l \\
& *z - 24*a*b^3*c^5*d^2*l*z + 4*a*b^6*c^2*e*k^2*z + 32*a^3*b*c^5*e*j^2*z + 16 \\
& *a^3*b*c^5*g*h^2*z - 16*a^2*b*c^6*e^2*j*z + 4*a*b^5*c^3*e*j^2*z + 4*a*b^3*c \\
& ^5*e^2*j*z + 20*a*b^2*c^6*d^2*j*z + 4*a*b^4*c^4*e*h^2*z - 16*a^2*b*c^6*e*g^
\end{aligned}$$





$$\begin{aligned}
& h*j*1 + 12*a^3*b^2*c^3*e*g*j*1 + 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*1 - 4*a^2*b^4*c^2*e*g*j*1 + 4*a^2*b^4*c^2*d*h*j*1 \\
& - 16*a^3*b^2*c^3*e*g*h*m + 4*a^3*b^2*c^3*f*g*h*1 + 4*a^2*b^4*c^2*e*g*h*m + \\
& 20*a^2*b^3*c^3*d*f*j*1 - 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*1 - 16*a^2*b^2*c^4*d*f*g*1 + 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*1 + 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*1^ \\
& 2 + 2*a^5*b^2*c*f*1^2*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*1*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*1 + \\
& 2*a^2*b^5*c*f^2*k*m + 6*a^5*b*c^2*f*k*1^2 + 6*a^5*b*c^2*d*1^2*m - 2*a^5*b* \\
& c^2*g*j*1^2 + 2*a^4*b^3*c*g*j*1^2 - 2*a^4*b^3*c*f*k*1^2 - 2*a^4*b^3*c*d*1^2 \\
& *m - 2*a^4*b*c^3*g^2*j*1 - 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*1 - 10*a^4*b^3*c*f*h*m^2 - 10*a^4*b*c^3*f*h^2*m - 1 \\
& 0*a^4*b*c^3*e*j^2*1 - 2*a^4*b*c^3*g*h^2*1 - 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*1^2 + 2*a^3*b^4*c*d*k*1^2 + 2*a*b^5*c^2*e^2*j* \\
& 1 - 12*a*b^4*c^3*d^2*j*1 - 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*1^2 - 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*1 - 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*1^2 - 10*a^4*b*c^3*d*h*1^2 - 10* \\
& a^3*b*c^4*e*g^2*1 - 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*1^2 - 2*a^2*b^5*c*d*h*1^2 + 2*a*b^4*c^3*e^2*h*k - 2*a*b^4*c^3*e^2*g*1 \\
& + 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*1 - 10*a*b^3*c^ \\
& 4*d^2*h*k + 10*a*b^3*c^4*d^2*g*1 - 6*a*b^3*c^4*d^2*f*m - 4*a*b^4*c^3*d*f^2* \\
& m - 2*a^3*b*c^4*e*h^2*j - 2*a^2*b*c^5*d^2*f*m + 6*a^3*b*c^4*d*h*j^2 + 6*a^2 \\
& *b*c^5*e^2*f*k + 6*a^2*b*c^5*d*e^2*m - 2*a^3*b*c^4*e*g*j^2 - 2*a^2*b*c^5*e^ \\
& 2*g*j + 2*a*b^3*c^4*e^2*g*j - 2*a*b^3*c^4*e^2*f*k - 2*a*b^3*c^4*d*e^2*m + 1 \\
& 4*a^3*b*c^4*d*f*k^2 - 10*a^2*b*c^5*d*f^2*k - 8*a*b^2*c^5*d^2*g*j - 8*a*b^2* \\
& c^5*d^2*e*1 + 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*1*m - 8* \\
& a^6*c^2*g*k*1*m - 8*a^5*c^3*f*j*k*1 + 8*a^5*c^3*e*j*k*m - 8*a^5*c^3*d*j*1*m \\
& + 8*a^5*c^3*g*h*k*1 - 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*1*m - 8*a^5*c^3*e*h*1*m - 2*a^6*b*c*h*1^2*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*1 + 8*a^4*c^4*e*f*k*1 - 8*a^4*c^4*e*f*j*m + 8* \\
& a^4*c^4*d*h*j*1 - 8*a^4*c^4*d*g*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*1*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
\end{aligned}$$

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

$$\begin{aligned}
& l^2 + 4a^3c^5eg^2j + 4a^3c^5d^2g^2k + 2b^4c^4d^2g^2j - 2b^4c^4 \\
& *d^2f^2k + 2b^4c^4d^2e^2l - 6a^3b^2c^4f^3m + 4a^3c^5f^2g^2h + 4a^ \\
& 2c^6d^2g^2j + 4a^2c^6d^2f^2k + 4a^2c^6d^2e^2l - 2a^5b^2c^2g^2l^3 + \\
& 2a^5b^2c^2h^2k^3 + 2a^4b^2c^3h^3k - 4a^3c^5e^2g^2h^2 + 4a^3c^5d^2f^2 \\
& j^2 - 4a^2c^6d^2e^2k - 2b^3c^5d^2e^2j + 8a^5b^2c^2d^2m^3 + 8a^2b^6c^2 \\
& *d^2m^2 + 8a^2b^2c^5d^3m - 6a^5b^2c^2e^2l^3 - 6a^2b^2c^5e^3l - 4a^ \\
& 2c^6e^2f^2h + 2b^3c^5d^2f^2h + 2a^4b^3c^2e^2l^3 + 2a^4b^2c^3g^2j^3 + \\
& 2a^3b^2c^4g^3j + 2a^2b^3c^4e^3l + 4a^2c^6e^2f^2g + 4a^2c^6d^2f^2 \\
& 2h - 6a^4b^2c^3d^2k^3 - 4a^2c^6d^2f^2g^2 + 2b^2c^6d^2e^2g - 2a^2b^2c^ \\
& ^5e^3j + 2a^3b^2c^4f^2h^3 + 2a^2b^2c^5f^3h + 2a^2b^2c^5e^2g^3 + 3a^2 \\
& b^2c^6d^2g^2 - 9a^4b^2c^2f^2m^2 + 4a^4b^2c^2g^2l^2 - 14a^3b^3c^2 \\
& e^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^2 \\
& k^2 - 14a^2b^3c^3d^2l^2 + 5a^2b^3c^3e^2k^2 - 9a^2b^2c^4d^2 \\
& k^2 + 4a^2b^2c^4e^2j^2 + 4a^7c^2k^2l^2m - 4a^7c^2j^2l^2m^2 + 2b^7c^2 \\
& *d^2k^2m + 2a^6b^2c^2k^3m + 2a^6b^2c^2j^3l^3 + 2a^2b^7d^2f^2m^2 - 6a^6b^2c^2 \\
& f^2m^3 - 6a^2b^2c^6d^3k - 4a^2c^7d^2e^2g + 4a^2c^7d^2e^2f + 2a^2b^2c^6e^3 \\
& *g + 2a^2b^2c^6d^2f^3 - a^5b^2c^2j^2l^2 - a^5b^2c^2j^2k^2 - a^4b^3c^2h^ \\
& 2l^2 - a^3b^4c^2g^2l^2 - a^4b^2c^3h^2j^2 - a^2b^5c^2f^2l^2 - a^2b^5c^ \\
& ^2e^2k^2 - a^3b^2c^4g^2h^2 - a^2b^4c^3e^2j^2 - a^2b^2c^5f^2g^2 - a^2 \\
& b^3c^4e^2h^2 - a^2b^2c^5e^2g^2 + 2a^7b^2k^2m^3 + 4a^7c^2h^2m^3 + 4a^2c^ \\
& ^7d^3h + 2b^2c^7d^3f - a^6b^2c^2k^2l^2 - 2a^6c^2j^2l^2 - 6a^6c^2 \\
& h^2m^2 - a^2b^6c^2e^2l^2 - 6a^5c^3g^2l^2 - 2a^5c^3h^2k^2 - 2a^5c^ \\
& ^3f^2m^2 - 6a^4c^4f^2k^2 - 6a^4c^4d^2m^2 - 2a^4c^4g^2j^2 - 2a^ \\
& 4c^4e^2l^2 - 6a^3c^5e^2j^2 - 2a^3c^5d^2k^2 - 2a^3c^5f^2h^2 \\
& - a^2b^2c^6e^2f^2 - 6a^2c^6d^2h^2 - 2a^2c^6e^2g^2 - a^4b^2c^2h^ \\
& 2k^2 - a^3b^3c^2g^2k^2 - a^3b^2c^3g^2j^2 - a^2b^4c^2f^2k^2 - a^ \\
& ^2b^3c^3f^2j^2 - a^2b^2c^4f^2h^2 - 2a^7c^2k^2m^2 + 4a^5c^3h^3m \\
& - 2a^6b^2h^2m^3 + 4a^6c^2g^2l^3 + 4a^4c^4g^3l - 2b^4c^4d^3m + \\
& 2a^5b^3f^2m^3 - 4a^6c^2d^2m^3 + 4a^5c^3f^2k^3 + 4a^3c^5f^3k - 4a^ \\
& 2c^6d^3m + 2b^3c^5d^3k - 2a^4b^4d^2m^3 + 4a^4c^4e^2j^3 + 4a^2 \\
& c^6e^3j - 2b^2c^6d^3h + 4a^3c^5d^2h^3 - 2a^2c^7d^2f^2 - a^6b^2c^2 \\
& k^2m^2 - a^5b^3j^2m^2 - a^4b^4h^2m^2 - a^3b^5g^2m^2 - a^2b^6f^2 \\
& m^2 - b^6c^2d^2k^2 - b^5c^3d^2j^2 - b^4c^4d^2h^2 - b^3c^5d^2g^ \\
& 2 - b^2c^6d^2f^2 - a^7b^2l^2m^2 - b^7c^2d^2l^2 - a^2b^7e^2m^2 - b^2c^7 \\
& *d^2e^2 - b^8d^2m^2 - a^6c^2k^4 - a^5c^3j^4 - a^4c^4h^4 - a^3c^5g^ \\
& 4 - a^2c^6f^4 - a^7c^2l^4 - a^2c^7e^4 - a^8m^4 - c^8d^4, z, k1)*(root \\
& (128a^2b^2c^8z^4 - 16a^2b^4c^7z^4 - 256a^3c^9z^4 + 384a^3b^2c^6 \\
& *l^2z^3 - 144a^2b^4c^5l^2z^3 + 128a^2b^3c^6j^2z^3 - 128a^2b^2c^7g^2 \\
& z^3 + 16a^2b^6c^4l^2z^3 - 256a^3b^2c^7j^2z^3 - 16a^2b^5c^5j^2z^3 + 16a^2 \\
& b^4c^6g^2z^3 - 256a^4c^7l^2z^3 + 256a^3c^8g^2z^3 - 96a^4b^2c^5j^2l^2z^ \\
& 2 + 8a^2b^7c^2j^2l^2z^2 + 160a^4b^2c^5h^2m^2z^2 - 8a^2b^7c^2h^2m^2z^2 + 8a^ \\
& 2b^6c^3h^2k^2z^2 - 8a^2b^6c^3g^2l^2z^2 + 8a^2b^6c^3f^2m^2z^2 + 160a^3b^2c^ \\
& 6g^2j^2z^2 - 96a^3b^2c^6f^2k^2z^2 - 96a^3b^2c^6e^2l^2z^2 - 96a^3b^2c^6d^2m^2 \\
& z^2 + 8a^2b^5c^4g^2j^2z^2 - 8a^2b^5c^4f^2k^2z^2 - 8a^2b^5c^4e^2l^2z^2 - 8a^
\end{aligned}$$

$$\begin{aligned}
& *b^5c^4d*mmz^2 + 8*a*b^4c^5e*jz^2 + 8*a*b^4c^5d*kz^2 + 8*a*b^4c^5f*h*z^2 + 32*a^2*b*c^7*e*gz^2 + 32*a^2*b*c^7*d*h*z^2 - 8*a*b^3c^6*e*gz^2 \\
& - 8*a*b^3c^6*d*h*z^2 + 16*a*b^2c^7*d*f*z^2 + 8*a*b^8c*k*mmz^2 - 304*a^4 \\
& *b^2c^4*k*mmz^2 + 264*a^3*b^4c^3*k*mmz^2 - 80*a^2*b^6c^2*k*mmz^2 + 184*a \\
& ^3*b^3c^4*j*1*z^2 - 72*a^2*b^5c^3*j*1*z^2 - 200*a^3*b^3c^4*h*mmz^2 + 72* \\
& a^2*b^5c^3*h*mmz^2 - 240*a^3*b^2c^5*g*1*z^2 + 144*a^3*b^2c^5*h*k*z^2 + 1 \\
& 44*a^3*b^2c^5*f*mmz^2 + 80*a^2*b^4c^4*g*1*z^2 - 64*a^2*b^4c^4*h*k*z^2 - \\
& 64*a^2*b^4c^4*f*mmz^2 - 72*a^2*b^3c^5*g*j*z^2 + 56*a^2*b^3c^5*f*k*z^2 + \\
& 56*a^2*b^3c^5*e*1*z^2 + 56*a^2*b^3c^5*d*mmz^2 - 48*a^2*b^2c^6*e*j*z^2 - \\
& 48*a^2*b^2c^6*d*k*z^2 - 48*a^2*b^2c^6*f*h*z^2 - 112*a^5*b*c^4*m^2*z^2 + 4 \\
& 4*a^2*b^7c*m^2*z^2 + 80*a^4*b*c^5*k^2*z^2 - 4*a*b^7c^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^5c^4*h^2*z^2 - 4*a*b^4c^5*g^2* \\
& z^2 + 16*a^2*b*c^7*f^2*z^2 - 4*a*b^3c^6*f^2*z^2 + 8*a*b^2c^7*e^2*z^2 + 64 \\
& *a^5c^5*k*mmz^2 + 192*a^4c^6*g*1*z^2 - 64*a^4c^6*h*k*z^2 - 64*a^4c^6*f* \\
& m*z^2 + 64*a^3c^7*e*j*z^2 + 64*a^3c^7*d*k*z^2 + 64*a^3c^7*f*h*z^2 - 4*a* \\
& b^8c^1^2*z^2 - 64*a^2c^8*d*f*z^2 + 16*a*b*c^8*d^2*z^2 + 252*a^4*b^3c^3*m \\
& ^2*z^2 - 168*a^3*b^5c^2*m^2*z^2 + 168*a^4*b^2c^4*1^2*z^2 - 132*a^3*b^4c^ \\
& 3*1^2*z^2 + 40*a^2*b^6c^2*1^2*z^2 - 100*a^3*b^3c^4*k^2*z^2 + 36*a^2*b^5c \\
& ^3*k^2*z^2 - 56*a^3*b^2c^5*j^2*z^2 + 32*a^2*b^4c^4*j^2*z^2 + 28*a^2*b^3c \\
& ^5*h^2*z^2 + 40*a^2*b^2c^6*g^2*z^2 - 96*a^5c^5*1^2*z^2 - 32*a^4c^6*j^2*z \\
& ^2 - 96*a^3c^7*g^2*z^2 - 32*a^2c^8*e^2*z^2 - 4*b^3c^7*d^2*z^2 - 4*a*b^9* \\
& m^2*z^2 + 32*a^5*b*c^3*h*1*m*z + 8*a^2*b^6c*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*1*z + 32*a^4*b*c^4*f*j*m*z - 64* \\
& a^4*b*c^4*g*h*m*z - 8*a*b^6c^2*e*j*1*z + 8*a*b^6c^2*e*h*m*z - 64*a^3*b*c^ \\
& 5*e*h*k*z + 64*a^3*b*c^5*e*g*1*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*1*z + 32*a^3*b*c^5*d*g*m*z - 8*a*b^5c^3*e*h*k*z + 8 \\
& *a*b^5c^3*e*g*1*z - 8*a*b^5c^3*e*f*m*z - 8*a*b^4c^4*e*g*j*z + 8*a*b^4c^ \\
& 4*e*f*k*z - 8*a*b^4c^4*d*f*1*z + 8*a*b^4c^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^3c^5*d*f*j*z - 8*a*b^3c^5*d*e*k*z + 32*a \\
& ^2*b*c^6*e*f*h*z - 8*a*b^3c^5*e*f*h*z - 8*a*b^2c^6*d*f*g*z + 8*a*b^2c^6* \\
& d*e*h*z - 8*a*b^7c*e*k*m*z - 40*a^5*b^2c^2*k*1*m*z + 48*a^4*b^3c^2*j*k*m \\
& *z - 8*a^4*b^3c^2*h*1*m*z + 104*a^4*b^2c^3*g*k*m*z - 56*a^3*b^4c^2*g*k*m \\
& *z - 40*a^4*b^2c^3*h*j*m*z + 8*a^4*b^2c^3*h*k*1*z + 8*a^4*b^2c^3*f*1*m*z \\
& + 8*a^3*b^4c^2*h*j*m*z - 152*a^3*b^3c^3*e*k*m*z + 64*a^2*b^5c^2*e*k*m*z \\
& - 40*a^3*b^3c^3*g*j*1*z - 8*a^3*b^3c^3*h*j*k*z - 8*a^3*b^3c^3*f*j*m*z + \\
& 8*a^2*b^5c^2*g*j*1*z + 48*a^3*b^3c^3*g*h*m*z - 8*a^2*b^5c^2*g*h*m*z - 1 \\
& 04*a^3*b^2c^4*e*j*1*z + 56*a^2*b^4c^3*e*j*1*z + 8*a^3*b^2c^4*f*j*k*z - 8 \\
& *a^3*b^2c^4*d*k*1*z + 8*a^3*b^2c^4*d*j*m*z + 104*a^3*b^2c^4*e*h*m*z - 56 \\
& *a^2*b^4c^3*e*h*m*z - 40*a^3*b^2c^4*g*h*k*z - 40*a^3*b^2c^4*f*g*m*z - 8* \\
& a^3*b^2c^4*f*h*1*z + 8*a^2*b^4c^3*g*h*k*z + 8*a^2*b^4c^3*f*g*m*z + 48*a^ \\
& 2*b^3c^4*e*h*k*z - 48*a^2*b^3c^4*e*g*1*z + 48*a^2*b^3c^4*e*f*m*z - 8*a^2 \\
& *b^3c^4*f*g*k*z + 8*a^2*b^3c^4*d*h*1*z - 8*a^2*b^3c^4*d*g*m*z + 40*a^2*b \\
& ^2c^5*e*g*j*z - 40*a^2*b^2c^5*e*f*k*z + 40*a^2*b^2c^5*d*f*1*z - 40*a^2*b \\
& ^2c^5*d*e*m*z - 8*a^2*b^2c^5*d*h*j*z + 8*a^2*b^2c^5*d*g*k*z + 8*a^2*b^2* \\
& c^5*f*g*h*z + 8*a^4*b^4c*k*1*m*z - 64*a^5*b*c^3*j*k*m*z - 8*a^3*b^5c*j*k*
\end{aligned}$$



$$\begin{aligned}
& 2*b*c^5*d*f*g*j + 12*a^2*b*c^5*d*e*f*1 - 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*1 - 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*1*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*1 + 4*a^4*b^2*c^2*d*j* \\
& l*m + 12*a^4*b^2*c^2*f*h*k*m + 4*a^4*b^2*c^2*g*h*j*m + 4*a^4*b^2*c^2*e*h*1* \\
& m - 4*a^3*b^3*c^2*d*j*k*1 + 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*1 - 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*1 + 12*a^3*b^2*c^3*e*g*j*1 + \\
& 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*1 - 4* \\
& a^2*b^4*c^2*e*g*j*1 + 4*a^2*b^4*c^2*d*h*j*1 - 16*a^3*b^2*c^3*e*g*h*m + 4*a^ \\
& 3*b^2*c^3*f*g*h*1 + 4*a^2*b^4*c^2*e*g*h*m + 20*a^2*b^3*c^3*d*f*j*1 - 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*1 - 16*a^2*b^2*c^4*d*f*g*1 + 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*1 + 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*1^2 + 2*a^5*b^2*c*f*1^2*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*1*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*1 + 2*a^2*b^5*c*f^2*k*m + 6*a^5*b*c \\
& ^2*f*k*1^2 + 6*a^5*b*c^2*d*1^2*m - 2*a^5*b*c^2*g*j*1^2 + 2*a^4*b^3*c*g*j*1^ \\
& 2 - 2*a^4*b^3*c*f*k*1^2 - 2*a^4*b^3*c*d*1^2*m - 2*a^4*b*c^3*g^2*j*1 - 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*1 - 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*1 - 2*a^4*b*c^ \\
& 3*g*h^2*1 - 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*1^2 \\
& + 2*a^3*b^4*c*d*k*1^2 + 2*a*b^5*c^2*e^2*j*1 - 12*a*b^4*c^3*d^2*j*1 - 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*1^2 - 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*1 - 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*1^2 - 10*a^4*b*c^3*d*h*1^2 - 10*a^3*b*c^4*e*g^2*1 - 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*1^2 - 2*a^2*b^5*c*d*h*1^2 + \\
& 2*a*b^4*c^3*e^2*h*k - 2*a*b^4*c^3*e^2*g*1 + 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*1 - 10*a*b^3*c^4*d^2*h*k + 10*a*b^3*c^4*d^2*g*1 \\
& - 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*1 + 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*1*m - 8*a^6*c^2*g*k*1*m - 8*a^5*c^3*f*j* \\
& k*1 + 8*a^5*c^3*e*j*k*m - 8*a^5*c^3*d*j*1*m + 8*a^5*c^3*g*h*k*1 - 8*a^5*c^3
\end{aligned}$$

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

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



$$\begin{aligned}
& *c^7*d + 16*a*c^8*d - 20*a^2*b^2*c^5*m + 4*a*b^2*c^6*h - 4*a*b^3*c^5*k + 16 \\
& *a^2*b*c^6*k + 4*a*b^4*c^4*m)/c^5 + (x*(4*b^2*c^7*e - 8*b^3*c^6*g + 16*a^2* \\
& c^7*j + 8*b^4*c^5*j - 8*b^5*c^4*l - 16*a*c^8*e + 32*a*b*c^7*g - 36*a*b^2*c^ \\
& 6*j + 44*a*b^3*c^5*l - 48*a^2*b*c^6*l))/c^5 + (\text{root}(128*a^2*b^2*c^8*z^4 - 1 \\
& 6*a*b^4*c^7*z^4 - 256*a^3*c^9*z^4 + 384*a^3*b^2*c^6*l*z^3 - 144*a^2*b^4*c^5 \\
& *l*z^3 + 128*a^2*b^3*c^6*j*z^3 - 128*a^2*b^2*c^7*g*z^3 + 16*a*b^6*c^4*l*z^3 \\
& - 256*a^3*b*c^7*j*z^3 - 16*a*b^5*c^5*j*z^3 + 16*a*b^4*c^6*g*z^3 - 256*a^4* \\
& c^7*l*z^3 + 256*a^3*c^8*g*z^3 - 96*a^4*b*c^5*j*l*z^2 + 8*a*b^7*c^2*j*l*z^2 \\
& + 160*a^4*b*c^5*h*m*z^2 - 8*a*b^7*c^2*h*m*z^2 + 8*a*b^6*c^3*h*k*z^2 - 8*a*b \\
& ^6*c^3*g*l*z^2 + 8*a*b^6*c^3*f*m*z^2 + 160*a^3*b*c^6*g*j*z^2 - 96*a^3*b*c^6 \\
& *f*k*z^2 - 96*a^3*b*c^6*e*l*z^2 - 96*a^3*b*c^6*d*m*z^2 + 8*a*b^5*c^4*g*j*z^ \\
& 2 - 8*a*b^5*c^4*f*k*z^2 - 8*a*b^5*c^4*e*l*z^2 - 8*a*b^5*c^4*d*m*z^2 + 8*a*b \\
& ^4*c^5*e*j*z^2 + 8*a*b^4*c^5*d*k*z^2 + 8*a*b^4*c^5*f*h*z^2 + 32*a^2*b*c^7*e \\
& *g*z^2 + 32*a^2*b*c^7*d*h*z^2 - 8*a*b^3*c^6*e*g*z^2 - 8*a*b^3*c^6*d*h*z^2 + \\
& 16*a*b^2*c^7*d*f*z^2 + 8*a*b^8*c*k*m*z^2 - 304*a^4*b^2*c^4*k*m*z^2 + 264*a \\
& ^3*b^4*c^3*k*m*z^2 - 80*a^2*b^6*c^2*k*m*z^2 + 184*a^3*b^3*c^4*j*l*z^2 - 72* \\
& a^2*b^5*c^3*j*l*z^2 - 200*a^3*b^3*c^4*h*m*z^2 + 72*a^2*b^5*c^3*h*m*z^2 - 24 \\
& 0*a^3*b^2*c^5*g*l*z^2 + 144*a^3*b^2*c^5*h*k*z^2 + 144*a^3*b^2*c^5*f*m*z^2 + \\
& 80*a^2*b^4*c^4*g*l*z^2 - 64*a^2*b^4*c^4*h*k*z^2 - 64*a^2*b^4*c^4*f*m*z^2 - \\
& 72*a^2*b^3*c^5*g*j*z^2 + 56*a^2*b^3*c^5*f*k*z^2 + 56*a^2*b^3*c^5*e*l*z^2 + \\
& 56*a^2*b^3*c^5*d*m*z^2 - 48*a^2*b^2*c^6*e*j*z^2 - 48*a^2*b^2*c^6*d*k*z^2 - \\
& 48*a^2*b^2*c^6*f*h*z^2 - 112*a^5*b*c^4*m^2*z^2 + 44*a^2*b^7*c*m^2*z^2 + 80 \\
& *a^4*b*c^5*k^2*z^2 - 4*a*b^7*c^2*k^2*z^2 - 4*a*b^6*c^3*j^2*z^2 - 48*a^3*b*c \\
& ^6*h^2*z^2 - 4*a*b^5*c^4*h^2*z^2 - 4*a*b^4*c^5*g^2*z^2 + 16*a^2*b*c^7*f^2*z \\
& ^2 - 4*a*b^3*c^6*f^2*z^2 + 8*a*b^2*c^7*e^2*z^2 + 64*a^5*c^5*k*m*z^2 + 192*a \\
& ^4*c^6*g*l*z^2 - 64*a^4*c^6*h*k*z^2 - 64*a^4*c^6*f*m*z^2 + 64*a^3*c^7*e*j*z \\
& ^2 + 64*a^3*c^7*d*k*z^2 + 64*a^3*c^7*f*h*z^2 - 4*a*b^8*c*l^2*z^2 - 64*a^2*c \\
& ^8*d*f*z^2 + 16*a*b*c^8*d^2*z^2 + 252*a^4*b^3*c^3*m^2*z^2 - 168*a^3*b^5*c^2 \\
& *m^2*z^2 + 168*a^4*b^2*c^4*l^2*z^2 - 132*a^3*b^4*c^3*l^2*z^2 + 40*a^2*b^6*c \\
& ^2*l^2*z^2 - 100*a^3*b^3*c^4*k^2*z^2 + 36*a^2*b^5*c^3*k^2*z^2 - 56*a^3*b^2* \\
& c^5*j^2*z^2 + 32*a^2*b^4*c^4*j^2*z^2 + 28*a^2*b^3*c^5*h^2*z^2 + 40*a^2*b^2* \\
& c^6*g^2*z^2 - 96*a^5*c^5*l^2*z^2 - 32*a^4*c^6*j^2*z^2 - 96*a^3*c^7*g^2*z^2 \\
& - 32*a^2*c^8*e^2*z^2 - 4*b^3*c^7*d^2*z^2 - 4*a*b^9*m^2*z^2 + 32*a^5*b*c^3*h \\
& *l*m*z + 8*a^2*b^6*c*g*k*m*z + 96*a^4*b*c^4*e*k*m*z + 32*a^4*b*c^4*h*j*k*z \\
& + 32*a^4*b*c^4*g*j*l*z + 32*a^4*b*c^4*f*j*m*z - 64*a^4*b*c^4*g*h*m*z - 8*a* \\
& b^6*c^2*e*j*l*z + 8*a*b^6*c^2*e*h*m*z - 64*a^3*b*c^5*e*h*k*z + 64*a^3*b*c^5 \\
& *e*g*l*z - 64*a^3*b*c^5*e*f*m*z + 32*a^3*b*c^5*f*g*k*z - 32*a^3*b*c^5*d*h*l \\
& *z + 32*a^3*b*c^5*d*g*m*z - 8*a*b^5*c^3*e*h*k*z + 8*a*b^5*c^3*e*g*l*z - 8*a \\
& *b^5*c^3*e*f*m*z - 8*a*b^4*c^4*e*g*j*z + 8*a*b^4*c^4*e*f*k*z - 8*a*b^4*c^4* \\
& d*f*l*z + 8*a*b^4*c^4*d*e*m*z - 32*a^2*b*c^6*d*f*j*z + 32*a^2*b*c^6*d*e*k*z \\
& + 8*a*b^3*c^5*d*f*j*z - 8*a*b^3*c^5*d*e*k*z + 32*a^2*b*c^6*e*f*h*z - 8*a*b \\
& ^3*c^5*e*f*h*z - 8*a*b^2*c^6*d*f*g*z + 8*a*b^2*c^6*d*e*h*z - 8*a*b^7*c*e*k* \\
& m*z - 40*a^5*b^2*c^2*k*l*m*z + 48*a^4*b^3*c^2*j*k*m*z - 8*a^4*b^3*c^2*h*l*m \\
& *z + 104*a^4*b^2*c^3*g*k*m*z - 56*a^3*b^4*c^2*g*k*m*z - 40*a^4*b^2*c^3*h*j* \\
& m*z + 8*a^4*b^2*c^3*h*k*l*z + 8*a^4*b^2*c^3*f*l*m*z + 8*a^3*b^4*c^2*h*j*m*z
\end{aligned}$$

$$\begin{aligned}
& - 152a^3b^3c^3ekmz + 64a^2b^5c^2ekmz - 40a^3b^3c^3gj*1z \\
& z - 8a^3b^3c^3h*j*kz - 8a^3b^3c^3f*j*mz + 8a^2b^5c^2gj*1z + \\
& 48a^3b^3c^3g*h*mz - 8a^2b^5c^2g*h*mz - 104a^3b^2c^4ej*1z + \\
& 56a^2b^4c^3ej*1z + 8a^3b^2c^4f*j*kz - 8a^3b^2c^4d*k*1z + 8 \\
& a^3b^2c^4d*j*mz + 104a^3b^2c^4e*h*mz - 56a^2b^4c^3e*h*mz - 4 \\
& 0a^3b^2c^4g*h*kz - 40a^3b^2c^4f*g*mz - 8a^3b^2c^4f*h*1z + 8 \\
& a^2b^4c^3g*h*kz + 8a^2b^4c^3f*g*mz + 48a^2b^3c^4e*h*kz - 48a \\
& ^2b^3c^4e*g*1z + 48a^2b^3c^4e*f*mz - 8a^2b^3c^4f*g*kz + 8a^2 \\
& *b^3c^4d*h*1z - 8a^2b^3c^4d*g*mz + 40a^2b^2c^5e*g*jz - 40a^2* \\
& b^2c^5e*f*kz + 40a^2b^2c^5d*f*1z - 40a^2b^2c^5d*e*mz - 8a^2b \\
& ^2c^5d*h*jz + 8a^2b^2c^5d*g*kz + 8a^2b^2c^5f*g*h*1z + 8a^4b^4* \\
& c*k*1mz - 64a^5b*c^3*j*k*mz - 8a^3b^5c*j*k*mz - 32a^6b*c^2*1m^2 \\
& *z + 24a^5b^3c*1m^2z - 28a^4b^4c*j*m^2z + 16a^5b*c^3*k^2*1z + 4 \\
& a^3b^5c*j*1^2z + 48a^5b*c^3g*m^2z + 32a^3b^5c*g*m^2z - 4a^2b^ \\
& 6c*g*1^2z - 36a^2b^6c*e*m^2z - 32a^4b*b*c^4g*k^2z - 16a^3b*b*c^5f^ \\
& 2*1z - 48a^4b*b*c^4e*1^2z - 32a^3b*b*c^5g^2*jz - 4a*b^4c^4e^2*1z + \\
& 32a^2b*c^6d^2*1z - 24a*b^3c^5d^2*1z + 4a*b^6c^2e*k^2z + 32a^3 \\
& *b*c^5e*j^2z + 16a^3b*c^5g*h^2z - 16a^2b*c^6e^2*jz + 4a*b^5c^3* \\
& e*j^2z + 4a*b^3c^5e^2*jz + 20a*b^2c^6d^2*jz + 4a*b^4c^4e*h^2z \\
& - 16a^2b*c^6e*g^2z + 4a*b^3c^5e*g^2z - 4a*b^2c^6e^2*g*z + 4a*b^ \\
& 2c^6e*f^2z + 32a^6c^3k*1mz - 32a^5c^4h*h*k*1z + 32a^5c^4h*j*m* \\
& z - 32a^5c^4g*k*mz - 32a^5c^4f*1mz - 32a^4c^5f*j*kz + 32a^4c \\
& ^5e*j*1z + 32a^4c^5d*k*1z - 32a^4c^5d*j*mz + 32a^4c^5g*h*kz + \\
& 32a^4c^5f*h*1z + 32a^4c^5f*g*mz - 32a^4c^5e*h*mz - 32a^3c^6* \\
& e*g*jz + 32a^3c^6e*f*kz + 32a^3c^6d*h*jz - 32a^3c^6d*g*kz - 32 \\
& *a^3c^6d*f*1z + 32a^3c^6d*e*mz - 32a^3c^6f*g*h*1z + 4a*b^7c*e*1^ \\
& 2z + 32a^2c^7d*f*g*z - 32a^2c^7d*e*h*1z - 16a*b*c^7d^2*g*z + 52a^5 \\
& *b^2c^2*j*m^2z - 4a^4b^3c^2k^2*1z + 36a^4b^2c^3j^2*1z - 16a^4* \\
& b^3c^2*j*1^2z - 8a^3b^4c^2j^2*1z - 20a^4b^2c^3j*k^2z + 4a^3b^ \\
& 4c^2*j*k^2z - 76a^4b^3c^2g*m^2z - 60a^4b^2c^3g*1^2z + 44a^3b^ \\
& 2c^4g^2*1z + 28a^3b^4c^2g*1^2z - 8a^2b^4c^3g^2*1z + 104a^3b^ \\
& 4c^2e*m^2z - 100a^4b^2c^3e*m^2z + 24a^3b^3c^3g*k^2z + 4a^3b^ \\
& 2c^4h^2*jz - 4a^2b^5c^2g*k^2z + 4a^2b^3c^4f^2*1z + 76a^3b^3* \\
& c^3e*1^2z - 32a^2b^5c^2e*1^2z + 20a^2b^2c^5e^2*1z + 12a^3b^2* \\
& c^4g*j^2z + 8a^2b^3c^4g^2*jz - 4a^2b^4c^3g*j^2z + 52a^3b^2c^ \\
& 4e*k^2z - 28a^2b^4c^3e*k^2z - 4a^2b^2c^5f^2*jz - 24a^2b^3c^4 \\
& *e*j^2z - 4a^2b^3c^4g*h^2z - 20a^2b^2c^5e*h^2z + 20a^5b^2c^2* \\
& 1^3z + 4a^3b^3c^3j^3z - 4a^2b^2c^5g^3z - 4a^4b^5*1m^2z - 16* \\
& a^6c^3j*m^2z - 16a^5c^4j^2*1z + 4a^3b^6*j*m^2z + 16a^5c^4j*k^2 \\
& *z + 48a^5c^4g*1^2z - 48a^4c^5g^2*1z - 4a^2b^7g*m^2z + 16a^5c \\
& ^4e*m^2z - 16a^4c^5h^2*jz + 16a^4c^5g*j^2z - 16a^3c^6e^2*1z + \\
& 4b^5c^4d^2*1z - 16a^4c^5e*k^2z + 16a^3c^6f^2*jz - 4b^4c^5d^ \\
& 2*jz - 16a^2c^7d^2*jz - 4a^4b^4c*1^3z + 16a^3c^6e*h^2z - 16a^ \\
& 4b*b*c^4j^3z + 16a^2c^7e^2*g*z + 4b^3c^6d^2*g*z - 16a^2c^7e*f^2z \\
& - 4b^2c^7d^2*e*z + 4a*b^8e*m^2z + 16a*c^8d^2*e*z - 16a^6c^3*1^3*
\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^*e^*h^*j^*k^*m - 4a^4b^3c^*g^*h^*j^*k - 4a^4b^3c^*f^*g^*k^*l - 4a^4b^3c^*f^*g^*j^*m - 4a^4b^3c^*e^*h^*k^*l - 4a^4b^3c^*e^*f^*l^*m - 4a^4b^3c^*d^*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^*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^*c^2h^2k^*m + 2a^4b^3c^*h^2k^*m + 2a^5b^2c^*h^*k^*l^2 + 2a^5b^2c^*f^*l^2m - 2a^5b^*c^2h^*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^*
\end{aligned}$$

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

$$\begin{aligned}
& *l^2 - 5a^3*b*c^4*e^2*k^2 + 3a^3*b*c^4*f^2*j^2 + 6a*b^4*c^3*d^2*k^2 + 2a^3*b^3*c^2*d*k^3 - 2a^3*b^2*c^3*e*j^3 - 5a^2*b*c^5*d^2*j^2 + 5a*b^3*c^4*d^2*j^2 + 3a^2*b*c^5*e^2*h^2 + 4a*b^2*c^5*d^2*h^2 - 2a^2*b^2*c^4*d*h^3 - 4a^6*c^2*j^2*k*m + 2a^6*b^2*j^2*l*m^2 + 4a^6*c^2*j^2*k^2*l + 4a^6*c^2*h*k^2*m - 4a^6*c^2*h*k*l^2 - 4a^6*c^2*f*l^2*m + 4a^5*c^3*g^2*k*m + 2a^5*b^3*h*k*m^2 - 2a^5*b^3*g*l*m^2 + 4a^6*c^2*g*j*m^2 + 4a^6*c^2*f*k*m^2 + 4a^6*c^2*e*l*m^2 - 4a^5*c^3*h^2*j*l + 4a^5*c^3*h*j^2*k + 4a^5*c^3*g*j^2*l + 4a^5*c^3*f*j^2*m - 4a^4*c^4*e^2*k*m + 2a^4*b^4*g*j*m^2 - 2a^4*b^4*f*k*m^2 + 2a^4*b^4*e*l*m^2 - 4a^5*c^3*g*j^2*k - 4a^5*c^3*e*k^2*l - 4a^5*c^3*d*k^2*m + 4a^4*c^4*f^2*j*l + 4a^5*c^3*e*j^2*l + 4a^5*c^3*d*k^2*l + 4a^4*c^4*f^2*h*m + 2b^6*c^2*d^2*j^2*l - 2a^3*b^5*e*j*m^2 + 2a^3*b^5*d*k*m^2 + 4a^5*c^3*f*h*l^2 - 4a^4*c^4*g^2*h*k - 4a^4*c^4*f*g^2*m - 4a^3*c^5*d^2*j^2*l - 2b^6*c^2*d^2*h*m + 2a^3*b^5*f*h*m^2 + 12a^5*c^3*d*h*m^2 - 12a^4*c^4*d*h^2*m + 12a^3*c^5*d^2*h*m - 4a^5*c^3*e*g*m^2 + 4a^4*c^4*g*h^2*j + 4a^4*c^4*f*h^2*k + 4a^4*c^4*e*h^2*l - 4a^4*c^4*d*j^2*k + 3a^6*b*c*j^2*m^2 - 4a^4*c^4*f*h*j^2 + 4a^3*c^5*e^2*h*k + 4a^3*c^5*e^2*g*l + 4a^3*c^5*e^2*f*m + 2b^5*c^3*d^2*h*k - 2b^5*c^3*d^2*g*l + 2b^5*c^3*d^2*f*m + 2a^5*b*c^2*j^3*l + 2a^2*b^6*e*g*m^2 - 2a^2*b^6*d*h*m^2 + 4a^4*c^4*e*g*k^2 + 4a^4*c^4*d*h*k^2 - 4a^3*c^5*f^2*g*j - 4a^3*c^5*e*f^2*l - 4a^3*c^5*d*f^2*m - 4a^4*c^4*d*f*l^2 + 4a^3*c^5*e*g^2*j + 4a^3*c^5*d*g^2*k + 2b^4*c^4*d^2*g*j - 2b^4*c^4*d^2*f*k + 2b^4*c^4*d^2*e*l - 6a^3*b*c^4*f^3*m + 4a^3*c^5*f*g^2*h + 4a^2*c^6*d^2*g*j + 4a^2*c^6*d^2*f*k + 4a^2*c^6*d^2*e*l - 2a^5*b^2*c*g*l^3 + 2a^5*b*c^2*h*k^3 + 2a^4*b*c^3*h^3*k - 4a^3*c^5*e*g*h^2 + 4a^3*c^5*d*f*j^2 - 4a^2*c^6*d*e^2*k - 2b^3*c^5*d^2*e*j + 8a^5*b^2*c*d*m^3 + 8a*b^6*c*d^2*m^2 + 8a*b^2*c^5*d^3*m - 6a^5*b*c^2*e*l^3 - 6a^2*b*c^5*e^3*l - 4a^2*c^6*e^2*f*h + 2b^3*c^5*d^2*f*h + 2a^4*b^3*c*e*l^3 + 2a^4*b*c^3*g*j^3 + 2a^3*b*c^4*g^3*j + 2a*b^3*c^4*e^3*l + 4a^2*c^6*e*f^2*g + 4a^2*c^6*d*f^2*h - 6a^4*b*c^3*d*k^3 - 4a^2*c^6*d*f*g^2 + 2b^2*c^6*d^2*e*g - 2a*b^2*c^5*e^3*j + 2a^3*b*c^4*f*h^3 + 2a^2*b*c^5*f^3*h + 2a^2*b*c^5*e*g^3 + 3a*b*c^6*d^2*g^2 - 9a^4*b^2*c^2*f^2*m^2 + 4a^4*b^2*c^2*g^2*l^2 - 14a^3*b^3*c^2*e^2*m^2 + 5a^3*b^3*c^2*f^2*l^2 - 20a^2*b^4*c^2*d^2*m^2 + 16a^3*b^2*c^3*d^2*m^2 - 9a^3*b^2*c^3*e^2*l^2 + 6a^2*b^4*c^2*e^2*l^2 + 4a^3*b^2*c^3*f^2*k^2 - 14a^2*b^3*c^3*d^2*l^2 + 5a^2*b^3*c^3*e^2*k^2 - 9a^2*b^2*c^4*d^2*k^2 + 4a^2*b^2*c^4*e^2*j^2 + 4a^7*c*k^2*l^2*m - 4a^7*c*j^2*l^2*m + 2b^7*c*d^2*k*m + 2a^6*b*c*k^3*m + 2a^6*b*c*j^2*l^3 + 2a*b^7*d*f*m^2 - 6a^6*b*c*f*m^3 - 6a*b*c^6*d^3*k - 4a*c^7*d^2*e*g + 4a*c^7*d*e^2*f + 2a*b*c^6*e^3*g + 2a*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 + 2a^7*b*k^2*m^3 + 4a^7*c*h^2*m^3 + 4a*c^7*d^3*h + 2b*c^7*d^3*f - a^6*b*c*k^2*l^2 - 2a^6*c^2*j^2*l^2 - 6a^6*c^2*h^2*m^2 - a*b^6*c*e^2*l^2 - 6a^5*c^3*g^2*l^2 - 2a^5*c^3*h^2*k^2 - 2a^5*c^3*f^2*m^2 - 6a^4*c^4*f^2*k^2 - 6a^4*c^4*d^2*m^2 - 2a^4*c^4*g^2*j^2 - 2a^4*c^4*e^2*l^2 - 6a^3*c^5*e^2*j^2 - 2a^3*c^5*d^2*k^2 - 2a^3*c^5*f^2*h^2 - a*b*c^6*e^2*f^2 - 6a^2*c^6*d^2*h^2 - 2a^2*c^6*e^2*g
\end{aligned}$$

$$\begin{aligned}
&^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^2 k^2 m^2 + 4 a^5 c^3 h^3 m - 2 a^6 b^2 h^3 m^3 + 4 a^6 c^2 g^3 l^3 + 4 a^4 c^4 g^3 l^3 - 2 b^4 c^4 d^3 m + 2 a^5 b^3 f^3 m^3 - 4 a^6 c^2 d^3 m^3 + 4 a^5 c^3 f^3 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^3 m^3 + 4 a^4 c^4 e^3 j^3 + 4 a^2 c^6 e^3 j - 2 b^2 c^6 d^3 h + 4 a^3 c^5 d^3 h^3 - 2 a^3 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^3 l^2 m^2 - b^7 c^4 d^2 l^2 - a^7 b^7 e^2 m^2 - b^7 c^4 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^4 l^4 - a^7 c^4 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^7 c^4 d^2 e + 8 a^7 c^4 d^2 g - 8 a^7 c^4 e^2 f - 4 b^2 c^6 d^2 g - 8 a^2 c^6 g^2 h + 4 b^3 c^5 d^2 j - 8 a^2 c^6 d^2 l + 8 a^2 c^6 e^2 k + 8 a^2 c^6 f^2 j - 4 b^4 c^4 d^2 l + 8 a^3 c^5 g^2 m + 8 a^3 c^5 h^2 l - 8 a^3 c^5 j^2 k - 8 a^4 c^4 l^2 m + 16 a^2 b^2 c^5 d^2 l - 4 a^2 b^2 c^5 e^2 k - 4 a^2 b^2 c^5 f^2 j + 4 a^2 b^3 c^4 e^2 m + 4 a^2 b^3 c^4 f^2 l - 12 a^2 b^2 c^5 e^2 m - 12 a^2 b^2 c^5 f^2 l + 4 a^2 b^2 c^5 g^2 k + 4 a^2 b^2 c^5 h^2 j + 4 a^3 b^2 c^4 j^2 m + 4 a^3 b^2 c^4 k^2 l - 4 a^2 b^2 c^4 g^2 m - 4 a^2 b^2 c^4 h^2 l + 4 a^2 b^2 c^6 e^2 h + 4 a^2 b^2 c^6 f^2 g - 12 a^2 b^2 c^6 d^2 j) / c^5 + (x * (4 c^8 d^2 + 2 b^8 m^2 - 4 a^7 c^7 f^2 - 2 b^7 c^7 e^2 + 2 b^7 c^4 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^2 b^2 c^5 h^2 - 10 a^2 b^3 c^4 j^2 + 6 a^2 b^2 c^5 j^2 - 12 a^2 b^4 c^3 k^2 - 14 a^2 b^5 c^2 l^2 - 18 a^3 b^2 c^4 l^2 - 4 b^7 c^4 d^2 f - 8 a^7 c^4 d^2 h + 8 a^7 c^4 e^2 g - 4 b^7 c^4 k^2 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^2 b^2 c^6 g^2 + 4 b^2 c^6 d^2 h - 16 a^2 b^6 c^2 m^2 - 4 b^3 c^5 f^2 h - 4 b^3 c^5 d^2 k + 8 a^2 c^6 d^2 m - 8 a^2 c^6 e^2 l + 8 a^2 c^6 f^2 k - 8 a^2 c^6 g^2 j + 4 b^4 c^4 d^2 m + 4 b^4 c^4 f^2 k - 4 b^4 c^4 g^2 j - 4 b^5 c^3 f^2 m + 4 b^5 c^3 g^2 l - 4 b^5 c^3 h^2 k - 8 a^3 c^5 h^2 m + 8 a^3 c^5 j^2 l + 4 b^6 c^2 h^2 m - 4 b^6 c^2 j^2 l - 16 a^2 b^2 c^5 d^2 m + 4 a^2 b^2 c^5 e^2 l - 16 a^2 b^2 c^5 f^2 k + 20 a^2 b^2 c^5 g^2 j + 20 a^2 b^3 c^4 f^2 m - 24 a^2 b^3 c^4 g^2 l + 20 a^2 b^3 c^4 h^2 k - 20 a^2 b^2 c^5 f^2 m + 28 a^2 b^2 c^5 g^2 l - 20 a^2 b^2 c^5 h^2 k - 24 a^2 b^4 c^3 h^2 m + 24 a^2 b^4 c^3 j^2 l + 28 a^2 b^5 c^2 k^2 m + 28 a^3 b^2 c^4 k^2 m + 36 a^2 b^2 c^4 h^2 m - 32 a^2 b^2 c^4 j^2 l - 56 a^2 b^3 c^3 k^2 m + 12 a^2 b^2 c^6 f^2 h + 12 a^2 b^2 c^6 d^2 k - 4 a^2 b^2 c^6 e^2 j) / c^5) + (x * (c^7 e^3 + c^7 d^2 g + b^7 e^2 m^2 - a^3 c^4 j^3 + b^2 c^5 e^2 g^2 - a^3 b^3 c^4 l^3 + 2 a^4 b^2 c^2 l^3 + b^3 c^4 e^2 h^2 + 3 a^2 c^5 e^2 j^2 + a^2 c^5 g^2 h^2 + 2 b^2 c^5 e^2 j^2 + b^4 c^3 e^2 j^2 - a^2 c^5 g^2 j + a^3 c^4 e^2 l^2 + b^2 c^5 d^2 l + b^5 c^2 e^2 k^2 + a^2 c^5 f^2 l - a^3 c^4 g^2 k^2 - 2 b^3 c^4 e^2 l - a^3 c^4 h^2 l + a^4 c^3 g^2 m^2 + a^2 b^5 j^2 m^2 - a^4 c^3 j^2 l^2 + a^4 c^3 k^2 l - a^3 b^4 l^2 m^2 - a^5 c^2 l^2 m^2 - 2 c^7 d^2 e^2 f + a^2 b^2 c^3 j^3 - a^2 b^2 c^5 g^3 + a^2 c^6 e^2 g^2 + b^2 c^6 e^2 f^2 - a^2 c^6 f^2 g - 2 b^2 c^6 e^2 g - 3 a^2 c^6 e^2 j - b^2 c^6 d^2 j - a^2 c^6 d^2 l + b^6 c^2 e^2 l^2 - a^2 b^6 g^2 m^2 - 2 a^2 b^2 c^5 e^2 h^2 + 5 a^2 b^2 c^5 e^2 l^2 - 6 a^2 b^5 c^2 e^2 m^2 - 2 b^2 c^5 e^2 f^2 h - a^2 b^5 c^2 g^2 l^2 - 2 b^2 c^5 d^2 e^2 k + 2 b^3 c^4 d^2 e^2 m + 2 b^3 c^4 e^2 f^2 k - 2 b^3 c^4 e^2 g^2 j + 2 a^2 c^5 d^2 g^2 m + 2 a^2 c^5 d^2 h^2 l - 2 a^2 c^5 e^2 f^2 m - 2 a^2 c^5 e^2 g^2 l - 2 a^2 c^5 e^2 h^2 k + 2 a^2 c^5
\end{aligned}$$

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

$$\begin{aligned}
& e^2z^2 + 64a^5c^5k^2m^2z^2 + 192a^4c^6g^2l^2z^2 - 64a^4c^6h^2k^2z^2 - 64a^4c^6f^2m^2z^2 + 64a^3c^7e^2j^2z^2 + 64a^3c^7d^2k^2z^2 + 64a^3c^7f^2h^2z^2 - 4a^2b^8c^2l^2z^2 - 64a^2c^8d^2f^2z^2 + 16a^2b^8c^2d^2z^2 + 252a^4b^3c^3m^2z^2 - 168a^3b^5c^2m^2z^2 + 168a^4b^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^2b^9m^2z^2 + 32a^5b^3c^3h^2l^2m^2z + 8a^2b^6c^2g^2k^2m^2z + 96a^4b^2c^4e^2k^2m^2z + 32a^4b^2c^4h^2j^2k^2z + 32a^4b^2c^4g^2j^2l^2z + 32a^4b^2c^4f^2j^2m^2z - 64a^4b^2c^4g^2h^2m^2z - 8a^2b^6c^2e^2j^2l^2z + 8a^2b^6c^2e^2h^2m^2z - 64a^3b^2c^5e^2h^2k^2z + 64a^3b^2c^5e^2g^2l^2z - 64a^3b^2c^5e^2f^2m^2z + 32a^3b^2c^5f^2g^2k^2z - 32a^3b^2c^5d^2h^2l^2z + 32a^3b^2c^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^2c^6d^2f^2j^2z + 32a^2b^2c^6d^2e^2k^2z + 8a^2b^3c^5d^2f^2j^2z - 8a^2b^3c^5d^2e^2k^2z + 32a^2b^2c^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^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^4e^2j^2l^2z + 56a^2b^4c^3e^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^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^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^2c^3k^2l^2z + 4a^3b^5c^2j^2l^2z + 48a^5b^2c^3g^2m^2z + 32a^3b^5c^2g^2m^2z - 4a^2b^6c^2g^2l^2z - 36a^2b^6c^2e^2m^2z - 32a^4b^2c^4g^2k^2z - 16a^3b^2c^5f^2l^2z - 48a^4b^2c^4e^2l^2z - 32a^3b^2c^5g^2j^2z - 4a^2b^4c^4e^2l^2z + 32a^2b^2c^6d^2l^2z - 24a^2b^3c^5d^2l^2z + 4a^2b^6c^2e^2k^2z + 32a^3b^2c^5e^2j^2z + 16a^3b^2c^5g^2h^2z - 16a^2b^2c^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^2c^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^6
\end{aligned}$$



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

$$\begin{aligned}
& + 4a^2b^2c^4efgk + 4a^2b^2c^4dghj + 4a^2b^2c^4deh1 + \\
& 4a^2b^2c^4degm + 2a^5b^2c^2j^2k^2m - 4a^5b^2c^2hk^2m - 2a^5b^2c^2h^2k^2m + 2a^4b^3c^2h^2k^2m + 2a^5b^2c^2h^2k^2m + 2a^5b^2c^2f^2k^2m - 2a^5b^2c^2h^2j^2m + 2a^3b^4c^2g^2k^2m + 14a^4b^3c^2f^2k^2m - 10a^5b^2c^2f^2k^2m - 8a^5b^2c^2g^2j^2m - 8a^5b^2c^2e^2m + 4a^5b^2c^2f^2k^2m + 4a^4b^3c^2f^2k^2m - 2a^5b^2c^2g^2k^2m + 2a^2b^5c^2f^2k^2m \\
& + 6a^5b^2c^2f^2k^2m + 6a^5b^2c^2d^2m - 2a^5b^2c^2g^2j^2m + 2a^4b^3c^2g^2j^2m - 2a^4b^3c^2f^2k^2m - 2a^4b^3c^2d^2m - 2a^4b^3c^2g^2j^2m - 14a^4b^3c^2d^2k^2m - 10a^5b^2c^2e^2j^2m + 10a^4b^3c^2e^2j^2m - 10a^3b^4c^2d^2k^2m - 6a^4b^3c^2d^2k^2m + 6a^4b^3c^2g^2h^2m - 4a^3b^4c^2d^2k^2m - 2a^5b^2c^2d^2k^2m + 14a^5b^2c^2f^2h^2m + 14a^3b^4c^2e^2j^2m - 10a^4b^3c^2f^2h^2m - 10a^4b^3c^2f^2h^2m - 10a^4b^3c^2e^2j^2m - 2a^4b^3c^2g^2h^2m - 2a^4b^3c^2f^2j^2k - 2a^4b^3c^2d^2j^2m - 2a^3b^4c^2e^2j^2m + 2a^3b^4c^2d^2k^2m + 2a^3b^4c^2e^2j^2m - 12a^3b^4c^2d^2j^2m - 10a^3b^4c^2e^2h^2m + 6a^4b^3c^2e^2j^2k^2 + 2a^3b^4c^2f^2h^2m - 2a^3b^4c^2e^2h^2m - 12a^3b^4c^2e^2g^2m + 12a^3b^4c^2d^2h^2m + 12a^3b^4c^2d^2h^2m + 6a^3b^4c^2f^2g^2m - 2a^4b^3c^2f^2h^2k^2 - 2a^3b^4c^2f^2h^2k + 14a^4b^3c^2e^2g^2m - 10a^4b^3c^2d^2h^2m - 10a^3b^4c^2e^2g^2m - 2a^3b^4c^2f^2g^2k - 2a^3b^4c^2d^2g^2m + 2a^2b^5c^2e^2g^2m - 2a^2b^5c^2d^2h^2m + 2a^2b^4c^3e^2h^2k - 2a^2b^4c^3e^2g^2m + 2a^2b^4c^3e^2f^2m - 14a^2b^5c^2d^2f^2m + 14a^2b^5c^2d^2h^2k - 10a^4b^3c^2d^2f^2m - 10a^3b^4c^2d^2h^2k - 10a^2b^5c^2d^2g^2m - 10a^2b^5c^2d^2h^2k + 10a^2b^5c^2d^2g^2m - 6a^2b^3c^4d^2f^2m - 4a^2b^4c^3d^2f^2m - 2a^3b^4c^2e^2h^2j - 2a^2b^5c^2d^2f^2m + 6a^3b^4c^2d^2h^2j^2 + 6a^2b^5c^2e^2f^2k + 6a^2b^5c^2d^2e^2m - 2a^3b^4c^2e^2g^2j - 2a^2b^5c^2e^2g^2j + 2a^2b^3c^4e^2g^2j - 2a^2b^3c^4e^2f^2k - 2a^2b^3c^4d^2e^2m + 14a^3b^4c^2d^2f^2k^2 - 10a^2b^5c^2d^2f^2k - 8a^2b^2c^5d^2g^2j - 8a^2b^2c^5d^2e^2m + 4a^2b^3c^4d^2d^2f^2k + 4a^2b^2c^5d^2f^2k - 2a^2b^5c^2e^2f^2j + 2a^2b^5c^2d^2f^2k^2 + 2a^2b^4c^3d^2f^2j^2 + 2a^2b^2c^5d^2e^2k - 2a^2b^5c^2d^2g^2h + 2a^2b^2c^5e^2f^2h - 4a^2b^2c^5d^2f^2h - 2a^2b^5c^2d^2f^2h^2 + 2a^2b^3c^4d^2d^2f^2h^2 + 2a^2b^2c^5d^2f^2g^2 + 8a^6c^2h^2j^2m - 8a^6c^2g^2k^2m - 8a^5c^3f^2j^2k^2m + 8a^5c^3e^2j^2k^2m - 8a^5c^3d^2j^2m + 8a^5c^3g^2h^2k^2m - 8a^5c^3g^2h^2j^2m - 8a^5c^3f^2g^2k^2m - 8a^5c^3e^2h^2m - 2a^6b^2c^2h^2m + 8a^4c^4f^2g^2j^2k - 8a^4c^4e^2h^2j^2k - 8a^4c^4e^2g^2j^2m + 8a^4c^4e^2f^2k^2m - 8a^4c^4d^2h^2j^2m - 8a^4c^4d^2g^2k^2m + 8a^4c^4d^2f^2k^2m + 8a^4c^4d^2e^2m + 8a^4c^4d^2e^2m + 6a^6b^2c^2g^2k^2m - 2a^6b^2c^2h^2k^2m - 8a^4c^4f^2g^2h^2m + 8a^4c^4e^2g^2h^2m + 2a^2b^6c^2e^2k^2m + 8a^3c^5d^2e^2j^2k + 8a^3c^5e^2f^2h^2j - 8a^3c^5e^2f^2g^2k - 8a^3c^5d^2g^2h^2j - 8a^3c^5d^2d^2f^2h^2k + 8a^3c^5d^2d^2f^2g^2m - 8a^3c^5d^2e^2h^2m - 8a^3c^5d^2e^2g^2m - 8a^2c^6d^2e^2f^2j + 8a^2c^6d^2e^2g^2h + 2a^2b^6c^2d^2f^2m + 6a^2b^6c^2d^2e^2j - 2a^2b^6c^2d^2f^2h - 2a^2b^6c^2d^2e^2h - 8a^4b^2c^2g^2k^2m - 10a^3b^3c^2f^2k^2m + 2a^4b^2c^2h^2j^2m + 18a^3b^2c^3e^2k^2m - 12a^2b^4c^2e^2k^2m - 4a^4b^2c^2g^2j^2m + 2a^3b^3c^2g^2j^2m + 28a^2b^3c^3d^2k^2m + 14a^4b^2c^2d^2k^2m - 8a^3b^2c^3f^2j^2m + 2a^4b^2c^2g^2j^2k^2 + 2a^4b^2c^2e^2k^2m -
\end{aligned}$$

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

$$\begin{aligned}
& ^5d^3m - 6a^5b^2c^2e^1l^3 - 6a^2b^2c^5e^3l - 4a^2c^6e^2f^2h + 2b^3c^5d^2f^2h + 2a^4b^3c^2e^1l^3 + 2a^4b^2c^3g^2j^3 + 2a^3b^2c^4g^3j + \\
& 2a^2b^3c^4e^3l + 4a^2c^6e^2f^2g + 4a^2c^6d^2f^2h - 6a^4b^2c^3d^2k^3 - 4a^2c^6d^2f^2g^2 + 2b^2c^6d^2e^2g - 2a^2b^2c^5e^3j + 2a^3b^2c^4f^2h^3 + 2a^2b^2c^5f^3h + 2a^2b^2c^5e^2g^3 + 3a^2b^2c^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^3c^3d^2l^2 + 5a^2b^3c^3e^2k^2 - 9a^2b^2c^4d^2k^2 + 4a^2b^2c^4e^2j^2 + 4a^7c^2k^2l^2m - 4a^7c^2j^2l^2m^2 + 2b^7c^2d^2k^2m + 2a^6b^2c^2k^3m + 2a^6b^2c^2j^3l^3 + 2a^6b^2c^2d^2f^2m^2 - 6a^6b^2c^2f^2m^3 - 6a^6b^2c^2d^3k - 4a^6c^7d^2e^2g + 4a^6c^7d^2e^2f + 2a^6b^2c^6e^3g + 2a^6b^2c^6d^2f^3 - a^5b^2c^2j^2l^2 - a^5b^2c^2j^2k^2 - a^4b^3c^2h^2l^2 - a^3b^4c^2g^2l^2 - a^4b^2c^3h^2j^2 - a^2b^5c^2f^2l^2 - a^2b^5c^2e^2k^2 - a^3b^2c^4g^2h^2 - a^2b^4c^3e^2j^2 - a^2b^2c^5f^2g^2 - a^2b^3c^4e^2h^2 - a^2b^2c^5e^2g^2 + 2a^7b^2k^2m^3 + 4a^7c^2h^2m^3 + 4a^6c^7d^3h + 2b^2c^7d^3f - a^6b^2c^2k^2l^2 - 2a^6c^2j^2l^2 - 6a^6c^2h^2m^2 - a^6b^2c^2e^2l^2 - 6a^5c^3g^2l^2 - 2a^5c^3h^2k^2 - 2a^5c^3f^2m^2 - 6a^4c^4f^2k^2 - 6a^4c^4d^2m^2 - 2a^4c^4g^2j^2 - 2a^4c^4e^2l^2 - 6a^3c^5e^2j^2 - 2a^3c^5d^2k^2 - 2a^3c^5f^2h^2 - a^2b^2c^6e^2f^2 - 6a^2c^6d^2h^2 - 2a^2c^6e^2g^2 - a^4b^2c^2h^2k^2 - a^3b^3c^2g^2k^2 - a^3b^2c^3g^2j^2 - a^2b^4c^2f^2k^2 - a^2b^3c^3f^2j^2 - a^2b^2c^4f^2h^2 - 2a^7c^2k^2m^2 + 4a^5c^3h^3m - 2a^6b^2h^2m^3 + 4a^6c^2g^2l^3 + 4a^4c^4g^3l - 2b^4c^4d^3m + 2a^5b^3f^2m^3 - 4a^6c^2d^2m^3 + 4a^5c^3f^2k^3 + 4a^3c^5f^3k - 4a^2c^6d^3m + 2b^3c^5d^3k - 2a^4b^4d^2m^3 + 4a^4c^4e^2j^3 + 4a^2c^6e^3j - 2b^2c^6d^3h + 4a^3c^5d^2h^3 - 2a^6c^7d^2f^2 - a^6b^2k^2m^2 - a^5b^3j^2m^2 - a^4b^4h^2m^2 - a^3b^5g^2m^2 - a^2b^6f^2m^2 - b^6c^2d^2k^2 - b^5c^3d^2j^2 - b^4c^4d^2h^2 - b^3c^5d^2g^2 - b^2c^6d^2f^2 - a^7b^2l^2m^2 - b^7c^2d^2l^2 - a^2b^7e^2m^2 - b^7c^2d^2e^2 - b^8d^2m^2 - a^6c^2k^4 - a^5c^3j^4 - a^4c^4h^4 - a^3c^5g^4 - a^2c^6f^4 - a^7c^2l^4 - a^6c^7e^4 - a^8m^4 - c^8d^4, z, k1), k1, 1, 4) + (1*x^4)/(4*c) + (m*x^5)/(5*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((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] && Int

egerQ[4\*p]

### Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := With[{q = Rt[b^2
- 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x] - 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 1092

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := -Simp[(x*(b^2 -
2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)),
x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(b^2 - 2*a*c + 2*(p + 1)*(b^2
- 4*a*c) + b*c*(4*p + 7)*x^2)*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ
[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && IntegerQ[2*p]
```

### Rule 1107

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

### Rule 1166

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

### Rule 1673

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

### Rubi steps

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

**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

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

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

**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

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

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] && Int

egerQ[4\*p]

### Rule 616

Int[((a\_.) + (b\_.)\*(x\_) + (c\_.)\*(x\_)^2)^(-1), x\_Symbol] := With[{q = Rt[b^2 - 4\*a\*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c\*x, x], x], x] - Dist[c/q, Int[1/Simp[b/2 + q/2 + c\*x, x], x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4\*a\*c, 0] && PosQ[b^2 - 4\*a\*c] && PerfectSquareQ[b^2 - 4\*a\*c]

### Rule 1107

Int[(x\_)\*((a\_) + (b\_.)\*(x\_)^2 + (c\_.)\*(x\_)^4)^(p\_.), x\_Symbol] := Dist[1/2, Subst[Int[(a + b\*x + c\*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]

### Rule 1166

Int[((d\_) + (e\_.)\*(x\_)^2)/((a\_) + (b\_.)\*(x\_)^2 + (c\_.)\*(x\_)^4), x\_Symbol] :> With[{q = Rt[b^2 - 4\*a\*c, 2]}, Dist[e/2 + (2\*c\*d - b\*e)/(2\*q), Int[1/(b/2 - q/2 + c\*x^2), x], x] + Dist[e/2 - (2\*c\*d - b\*e)/(2\*q), Int[1/(b/2 + q/2 + c\*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4\*a\*c, 0] && 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

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

**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

$$\frac{12(5d+8f)^3 + 96e^2 - 12(17d+20f)x - ((19d-32e+52f)^4 - 5(19d-32e+52f)^2 + 76d-128e+208f)\log(x+2) + 8((d-4e+7f)^4 - 5(d-4e+7f)^2 + 4d-16e+28f)\log(x+1) - 8((d+4e+7f)^4 - 5(d+4e+7f)^2 + 4d+16e+28f)\log(x-1) + ((19d+32e+52f)^4 - 5(19d+32e+52f)^2 + 76d+128e+208f)\log(x-2) - 240e}{864(x^4-5x^2+4)}$$

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

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

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

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

mupad [B] time = 0.10, size = 107, normalized size = 0.93

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

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]  $-(d - 4e + 7f)*\log(x + (-6006260*d**5*e + 2341251*d**5*(d - 4e + 7f) - 246016240*d**4*e*f + 31626180*d**4*f*(d - 4e + 7f) - 18247680*d**3*e**3 + 24099840*d**3*e**2*(d - 4e + 7f) - 2758371200*d**3*e*f**2 + 7387904*d**3*e*(d - 4e + 7f)**2 + 171122976*d**3*f**2*(d - 4e + 7f) - 665280*d**3*(d - 4e + 7f)**3 + 298598400*d**2*e**3*f + 369487872*d**2*e**2*f*(d - 4e + 7f) - 13192256000*d**2*e*f**3 + 90885120*d**2*e*f*(d - 4e + 7f)**2 + 441486720*d**2*f**3*(d - 4e + 7f) - 5536512*d**2*f*(d - 4e + 7f)**3 + 587202560*d*e**5 - 12582912*d*e**4*(d - 4e + 7f) + 1353646080*d*e**3*f**2 - 36700160*d*e**3*(d - 4e + 7f)**2 + 1448755200*d*e**2*f**2*(d - 4e + 7f) + 786432*d*e**2*(d - 4e + 7f)**3 - 28282393600*d*e*f**4 + 362729472*d*e*f**2*(d - 4e + 7f)**2 + 399575808*d*f**4*(d - 4e + 7f) - 10368000*d*f**2*(d - 4e + 7f)**3 + 2751463424*e**5*f + 251658240*e**4*f*(d - 4e + 7f) - 530841600*e**3*f**3 - 171966464*e**3*f*(d - 4e + 7f)**2 + 1935212544*e**2*f**3*(d - 4e + 7f) - 15728640*e**2*f*(d - 4e + 7f)**3 - 21886889984*e*f**5 + 483737600*e*f**3*(d - 4e + 7f)**2 - 212474880*f**5*(d - 4e + 7f) + 4534272*f**3*(d - 4e + 7f)**3)/(1675971*d**6 + 28507545*d**5*f - 66150400*d**4*e**2 + 168075324*d**4*f**2 - 1091117056*d**3*e**2*f + 384095520*d**3*f**3 + 318767104*d**2*e**4 - 6528860160*d**2*e**2*f**2 + 162082944*d**2*f**4 + 3103784960*d*e**4*f - 17414619136*d*e**2*f**3 - 305130240*d*f**5 + 6106906624*e**4*f**2 - 17414225920*e**2*f**4 + 67931136*f**6))/108 + (d$

$$\begin{aligned}
& + 4*e + 7*f) * \log(x + (-6006260*d**5*e - 2341251*d**5*(d + 4*e + 7*f) - 2460 \\
& 16240*d**4*e*f - 31626180*d**4*f*(d + 4*e + 7*f) - 18247680*d**3*e**3 - 240 \\
& 99840*d**3*e**2*(d + 4*e + 7*f) - 2758371200*d**3*e*f**2 + 7387904*d**3*e*( \\
& d + 4*e + 7*f)**2 - 171122976*d**3*f**2*(d + 4*e + 7*f) + 665280*d**3*(d + \\
& 4*e + 7*f)**3 + 298598400*d**2*e**3*f - 369487872*d**2*e**2*f*(d + 4*e + 7* \\
& f) - 13192256000*d**2*e*f**3 + 90885120*d**2*e*f*(d + 4*e + 7*f)**2 - 44148 \\
& 6720*d**2*f**3*(d + 4*e + 7*f) + 5536512*d**2*f*(d + 4*e + 7*f)**3 + 587202 \\
& 560*d*e**5 + 12582912*d*e**4*(d + 4*e + 7*f) + 1353646080*d*e**3*f**2 - 367 \\
& 00160*d*e**3*(d + 4*e + 7*f)**2 - 1448755200*d*e**2*f**2*(d + 4*e + 7*f) - \\
& 786432*d*e**2*(d + 4*e + 7*f)**3 - 28282393600*d*e*f**4 + 362729472*d*e*f** \\
& 2*(d + 4*e + 7*f)**2 - 399575808*d*f**4*(d + 4*e + 7*f) + 10368000*d*f**2*( \\
& d + 4*e + 7*f)**3 + 2751463424*e**5*f - 251658240*e**4*f*(d + 4*e + 7*f) - \\
& 530841600*e**3*f**3 - 171966464*e**3*f*(d + 4*e + 7*f)**2 - 1935212544*e**2 \\
& *f**3*(d + 4*e + 7*f) + 15728640*e**2*f*(d + 4*e + 7*f)**3 - 21886889984*e* \\
& f**5 + 483737600*e*f**3*(d + 4*e + 7*f)**2 + 212474880*f**5*(d + 4*e + 7*f) \\
& - 4534272*f**3*(d + 4*e + 7*f)**3)/(1675971*d**6 + 28507545*d**5*f - 66150 \\
& 400*d**4*e**2 + 168075324*d**4*f**2 - 1091117056*d**3*e**2*f + 384095520*d* \\
& *3*f**3 + 318767104*d**2*e**4 - 6528860160*d**2*e**2*f**2 + 162082944*d**2* \\
& f**4 + 3103784960*d*e**4*f - 17414619136*d*e**2*f**3 - 305130240*d*f**5 + 6 \\
& 106906624*e**4*f**2 - 17414225920*e**2*f**4 + 67931136*f**6))/108 + (19*d - \\
& 32*e + 52*f) * \log(x + (-6006260*d**5*e - 2341251*d**5*(19*d - 32*e + 52*f)/ \\
& 8 - 246016240*d**4*e*f - 7906545*d**4*f*(19*d - 32*e + 52*f)/2 - 18247680*d \\
& **3*e**3 - 3012480*d**3*e**2*(19*d - 32*e + 52*f) - 2758371200*d**3*e*f**2 \\
& + 115436*d**3*e*(19*d - 32*e + 52*f)**2 - 21390372*d**3*f**2*(19*d - 32*e + \\
& 52*f) + 10395*d**3*(19*d - 32*e + 52*f)**3/8 + 298598400*d**2*e**3*f - 461 \\
& 85984*d**2*e**2*f*(19*d - 32*e + 52*f) - 13192256000*d**2*e*f**3 + 1420080* \\
& d**2*e*f*(19*d - 32*e + 52*f)**2 - 55185840*d**2*f**3*(19*d - 32*e + 52*f) \\
& + 21627*d**2*f*(19*d - 32*e + 52*f)**3/2 + 587202560*d*e**5 + 1572864*d*e** \\
& 4*(19*d - 32*e + 52*f) + 1353646080*d*e**3*f**2 - 573440*d*e**3*(19*d - 32* \\
& e + 52*f)**2 - 181094400*d*e**2*f**2*(19*d - 32*e + 52*f) - 1536*d*e**2*(19 \\
& *d - 32*e + 52*f)**3 - 28282393600*d*e*f**4 + 5667648*d*e*f**2*(19*d - 32*e \\
& + 52*f)**2 - 49946976*d*f**4*(19*d - 32*e + 52*f) + 20250*d*f**2*(19*d - 3 \\
& 2*e + 52*f)**3 + 2751463424*e**5*f - 31457280*e**4*f*(19*d - 32*e + 52*f) - \\
& 530841600*e**3*f**3 - 2686976*e**3*f*(19*d - 32*e + 52*f)**2 - 241901568*e \\
& **2*f**3*(19*d - 32*e + 52*f) + 30720*e**2*f*(19*d - 32*e + 52*f)**3 - 2188 \\
& 6889984*e*f**5 + 7558400*e*f**3*(19*d - 32*e + 52*f)**2 + 26559360*f**5*(19 \\
& *d - 32*e + 52*f) - 8856*f**3*(19*d - 32*e + 52*f)**3)/(1675971*d**6 + 2850 \\
& 7545*d**5*f - 66150400*d**4*e**2 + 168075324*d**4*f**2 - 1091117056*d**3*e* \\
& *2*f + 384095520*d**3*f**3 + 318767104*d**2*e**4 - 6528860160*d**2*e**2*f** \\
& 2 + 162082944*d**2*f**4 + 3103784960*d*e**4*f - 17414619136*d*e**2*f**3 - 3 \\
& 05130240*d*f**5 + 6106906624*e**4*f**2 - 17414225920*e**2*f**4 + 67931136*f \\
& **6))/864 - (19*d + 32*e + 52*f) * \log(x + (-6006260*d**5*e + 2341251*d**5*(1 \\
& 9*d + 32*e + 52*f)/8 - 246016240*d**4*e*f + 7906545*d**4*f*(19*d + 32*e + 5 \\
& 2*f)/2 - 18247680*d**3*e**3 + 3012480*d**3*e**2*(19*d + 32*e + 52*f) - 2758 \\
& 371200*d**3*e*f**2 + 115436*d**3*e*(19*d + 32*e + 52*f)**2 + 21390372*d**3*
\end{aligned}$$

$$\begin{aligned}
& f^{**2}*(19*d + 32*e + 52*f) - 10395*d^{**3}*(19*d + 32*e + 52*f)^{**3}/8 + 29859840 \\
& 0*d^{**2}*e^{**3}*f + 46185984*d^{**2}*e^{**2}*f*(19*d + 32*e + 52*f) - 13192256000*d^{** \\
& 2}*e*f^{**3} + 1420080*d^{**2}*e*f*(19*d + 32*e + 52*f)^{**2} + 55185840*d^{**2}*f^{**3}*(1 \\
& 9*d + 32*e + 52*f) - 21627*d^{**2}*f*(19*d + 32*e + 52*f)^{**3}/2 + 587202560*d*e \\
& **5 - 1572864*d*e^{**4}*(19*d + 32*e + 52*f) + 1353646080*d*e^{**3}*f^{**2} - 573440 \\
& *d*e^{**3}*(19*d + 32*e + 52*f)^{**2} + 181094400*d*e^{**2}*f^{**2}*(19*d + 32*e + 52*f \\
& ) + 1536*d*e^{**2}*(19*d + 32*e + 52*f)^{**3} - 28282393600*d*e*f^{**4} + 5667648*d* \\
& e*f^{**2}*(19*d + 32*e + 52*f)^{**2} + 49946976*d*f^{**4}*(19*d + 32*e + 52*f) - 202 \\
& 50*d*f^{**2}*(19*d + 32*e + 52*f)^{**3} + 2751463424*e^{**5}*f + 31457280*e^{**4}*f*(19 \\
& *d + 32*e + 52*f) - 530841600*e^{**3}*f^{**3} - 2686976*e^{**3}*f*(19*d + 32*e + 52* \\
& f)^{**2} + 241901568*e^{**2}*f^{**3}*(19*d + 32*e + 52*f) - 30720*e^{**2}*f*(19*d + 32* \\
& e + 52*f)^{**3} - 21886889984*e*f^{**5} + 7558400*e*f^{**3}*(19*d + 32*e + 52*f)^{**2} \\
& - 26559360*f^{**5}*(19*d + 32*e + 52*f) + 8856*f^{**3}*(19*d + 32*e + 52*f)^{**3})/( \\
& 1675971*d^{**6} + 28507545*d^{**5}*f - 66150400*d^{**4}*e^{**2} + 168075324*d^{**4}*f^{**2} - \\
& 1091117056*d^{**3}*e^{**2}*f + 384095520*d^{**3}*f^{**3} + 318767104*d^{**2}*e^{**4} - 65288 \\
& 60160*d^{**2}*e^{**2}*f^{**2} + 162082944*d^{**2}*f^{**4} + 3103784960*d*e^{**4}*f - 17414619 \\
& 136*d*e^{**2}*f^{**3} - 305130240*d*f^{**5} + 6106906624*e^{**4}*f^{**2} - 17414225920*e^{** \\
& 2}*f^{**4} + 67931136*f^{**6}))/864 + (-8*e*x^{**2} + 20*e + x^{**3}*(-5*d - 8*f) + x*(1 \\
& 7*d + 20*f))/(72*x^{**4} - 360*x^{**2} + 288)
\end{aligned}$$



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

**Optimal.** Leaf size=138

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

**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, number of rules / 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\_))^(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], 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) + (d + e\*x)\*(a + b\*x + c\*x^2)^p, x]

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

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

**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

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



[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

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

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

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

**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], 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[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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^2} dx \\
&= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + 32h + (5d + 8f + 20h)x^2}{4 - 5x^2 + x^4} dx \\
&= \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{18}(-2e - 5g) \int \frac{1}{4 - 5x^2 + x^4} dx \\
&= \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432}(19d - 32e + 52f - 80g + 112h) \int \frac{1}{4 - 5x^2 + x^4} dx \\
&= \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432}(19d - 32e + 52f - 80g + 112h) \int \frac{1}{4 - 5x^2 + x^4} dx
\end{aligned}$$

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

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

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]





$$\frac{1}{(x-2)*d-1/72/(x-2)*e-1/36/(x+1)*d+1/36/(x+1)*e-1/36/(x-1)*d-1/36/(x-1)*e-1/36/(x-1)*f-1/36/(x+2)*f-1/36/(x-2)*f-1/36/(x+1)*f}$$

**maxima** [A] time = 1.18, size = 145, normalized size = 0.97

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

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

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

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

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

**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, number of rules / integrand size = 0.237, Rules used = {1673, 1678, 1166, 207, 1663, 1660, 12, 616, 31}

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

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] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

### Rule 1660

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

### Rule 1663

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

### Rule 1673

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

### Rule 1678

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := With[{d =
Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
+ b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
```

+ 7)\*(b\*d - 2\*a\*e)\*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4\*a\*c, 0] && LtQ[p, -1]

### Rubi steps

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3 + hx^4 + 30x^5}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{x(e + gx^2 + 30x^4)}{(4 - 5x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^2} dx \\ &= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + 32h + 4 - 5x^2}{4 - 5x^2 + x^4} dx \\ &= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} \\ &= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} \\ &= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} \\ &= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} \end{aligned}$$

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

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

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

---

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]  $\text{int}((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)$

[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

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

Verification of antiderivative is not currently implemented for this CAS.

[In]  $\text{integrate}((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, \text{algorithm}="maxima")$

[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

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

Verification of antiderivative is not currently implemented for this CAS.

[In]  $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^4 - 5*x^2 + 4)^2,x)$

[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] && !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 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

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

**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)



$$\begin{aligned}
& e)/18)**2 + 163296*d**2*(-d/4 + \sqrt{3}*I*(d + 2*e)/18)**3 + 1792*e**5 + 11 \\
& 520*e**4*(-d/4 + \sqrt{3}*I*(d + 2*e)/18) + 48384*e**3*(-d/4 + \sqrt{3}*I*(d \\
& + 2*e)/18)**2 + 311040*e**2*(-d/4 + \sqrt{3}*I*(d + 2*e)/18)**3)/(3348*d**5 \\
& - 11408*d**3*e**2 - 7936*d*e**4)) + (d/4 - \sqrt{3}*I*(d - 2*e)/18)*\log(x + \\
& (-10309*d**4*e + 1026*d**4*(d/4 - \sqrt{3}*I*(d - 2*e)/18) - 7200*d**2*e**3 \\
& - 31536*d**2*e**2*(d/4 - \sqrt{3}*I*(d - 2*e)/18) + 108432*d**2*e*(d/4 - \sqrt{3} \\
& *I*(d - 2*e)/18)**2 + 163296*d**2*(d/4 - \sqrt{3}*I*(d - 2*e)/18)**3 + 1 \\
& 792*e**5 + 11520*e**4*(d/4 - \sqrt{3}*I*(d - 2*e)/18) + 48384*e**3*(d/4 - \sqrt{3} \\
& *I*(d - 2*e)/18)**2 + 311040*e**2*(d/4 - \sqrt{3}*I*(d - 2*e)/18)**3)/( \\
& 3348*d**5 - 11408*d**3*e**2 - 7936*d*e**4)) + (d/4 + \sqrt{3}*I*(d - 2*e)/18 \\
& )*\log(x + (-10309*d**4*e + 1026*d**4*(d/4 + \sqrt{3}*I*(d - 2*e)/18) - 7200* \\
& d**2*e**3 - 31536*d**2*e**2*(d/4 + \sqrt{3}*I*(d - 2*e)/18) + 108432*d**2*e* \\
& (d/4 + \sqrt{3}*I*(d - 2*e)/18)**2 + 163296*d**2*(d/4 + \sqrt{3}*I*(d - 2*e)/ \\
& 18)**3 + 1792*e**5 + 11520*e**4*(d/4 + \sqrt{3}*I*(d - 2*e)/18) + 48384*e**3 \\
& *(d/4 + \sqrt{3}*I*(d - 2*e)/18)**2 + 311040*e**2*(d/4 + \sqrt{3}*I*(d - 2*e) \\
& /18)**3)/(3348*d**5 - 11408*d**3*e**2 - 7936*d*e**4)) + (-d*x**3 + d*x + 2* \\
& e*x**2 + e)/(6*x**4 + 6*x**2 + 6)
\end{aligned}$$

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

Optimal. Leaf size=165

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

**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), 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_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

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

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

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

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

**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

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

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

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

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

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

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

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

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]  $\frac{1}{4} * ((-1/3 * d - 1/3 * e + 2/3 * f) * x - 2/3 * d + 1/3 * e + 1/3 * f) / (x^2 + x + 1) + 1/4 * d * \ln(x^2 + x + 1) - 1/8 * f * \ln(x^2 + x + 1) + 1/9 * 3^{(1/2)} * d * \arctan(1/3 * (2 * x + 1) * 3^{(1/2)}) - 2/9 * 3^{(1/2)} * e * \arctan(1/3 * (2 * x + 1) * 3^{(1/2)}) + 1/36 * 3^{(1/2)} * f * \arctan(1/3 * (2 * x + 1) * 3^{(1/2)}) - 1/4 * ((1/3 * d - 1/3 * e - 2/3 * f) * x - 2/3 * d - 1/3 * e + 1/3 * f) / (x^2 - x + 1) - 1/4 * d * \ln(x^2 - x + 1) + 1/8 * f * \ln(x^2 - x + 1) + 1/9 * 3^{(1/2)} * d * \arctan(1/3 * (2 * x - 1) * 3^{(1/2)}) + 2/9 * 3^{(1/2)} * e * \arctan(1/3 * (2 * x - 1) * 3^{(1/2)}) + 1/36 * 3^{(1/2)} * f * \arctan(1/3 * (2 * x - 1) * 3^{(1/2)})$

**maxima [A]** time = 2.39, size = 120, normalized size = 0.73

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

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

**mupad [B]** time = 0.32, size = 201, normalized size = 1.22

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

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]  $\frac{(e/6 - x^3 * (d/6 - f/3) + (e * x^2) / 3 + x * (d/6 + f/6)) / (x^2 + x^4 + 1) - \log(x - (3^{(1/2)} * i) / 2 - 1/2) * (d/4 - f/8 + (3^{(1/2)} * d * i) / 18 + (3^{(1/2)} * e * i) / 9 + (3^{(1/2)} * f * i) / 72) - \log(x - (3^{(1/2)} * i) / 2 + 1/2) * (f/8 - d/4 + (3^{(1/2)} * d * i) / 18 - (3^{(1/2)} * e * i) / 9 + (3^{(1/2)} * f * i) / 72) + \log(x + (3^{(1/2)} * i) / 2 - 1/2) * (f/8 - d/4 + (3^{(1/2)} * d * i) / 18 + (3^{(1/2)} * e * i) / 9 + (3^{(1/2)} * f * i) / 72) + \log(x + (3^{(1/2)} * i) / 2 + 1/2) * (d/4 - f/8 + (3^{(1/2)} * d * i) / 18 - (3^{(1/2)} * e * i) / 9 + (3^{(1/2)} * f * i) / 72)}$

**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]  $(-d/4 + f/8 - \sqrt{3} * I * (4 * d + 8 * e + f) / 72) * \log(x + (-164944 * d ** 5 * e + 16416 * d ** 5 * (-d/4 + f/8 - \sqrt{3} * I * (4 * d + 8 * e + f) / 72) + 336520 * d ** 4 * e * f + 20066 * d ** 4 * f * (-d/4 + f/8 - \sqrt{3} * I * (4 * d + 8 * e + f) / 72) - 115200 * d ** 3 * e ** 3 - 5 * 04576 * d ** 3 * e ** 2 * (-d/4 + f/8 - \sqrt{3} * I * (4 * d + 8 * e + f) / 72) - 272380 * d ** 3 * e$

$$\begin{aligned}
& 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 \\
& (3)*I*(4*d + 8*e + f)/72)^{**3} - 31040*d*e*f^{**4} + 1270080*d*e*f^{**2}*(-d/4 + f/ \\
& 8 - \sqrt{3}*I*(4*d + 8*e + f)/72)^{**2} + 14040*d*f^{**4}*(-d/4 + f/8 - \sqrt{3}*I \\
& *(4*d + 8*e + f)/72) + 139968*d*f^{**2}*(-d/4 + f/8 - \sqrt{3}*I*(4*d + 8*e + f \\
& )/72)^{**3} - 20480*e^{**5}*f - 36864*e^{**4}*f*(-d/4 + f/8 - \sqrt{3}*I*(4*d + 8*e + \\
& f)/72) - 2880*e^{**3}*f^{**3} - 552960*e^{**3}*f*(-d/4 + f/8 - \sqrt{3}*I*(4*d + 8*e \\
& + f)/72)^{**2} + 70848*e^{**2}*f^{**3}*(-d/4 + f/8 - \sqrt{3}*I*(4*d + 8*e + f)/72) \\
& - 995328*e^{**2}*f*(-d/4 + f/8 - \sqrt{3}*I*(4*d + 8*e + f)/72)^{**3} + 3956*e*f^{** \\
& 5} - 209088*e*f^{**3}*(-d/4 + f/8 - \sqrt{3}*I*(4*d + 8*e + f)/72)^{**2} - 3996*f^{** \\
& 5}*(-d/4 + f/8 - \sqrt{3}*I*(4*d + 8*e + f)/72) + 233280*f^{**3}*(-d/4 + f/8 - s \\
& qrt(3)*I*(4*d + 8*e + f)/72)^{**3})/(53568*d^{**6} - 69984*d^{**5}*f - 182528*d^{**4}*e \\
& **2 + 23652*d^{**4}*f^{**2} + 377344*d^{**3}*e^{**2}*f + 5400*d^{**3}*f^{**3} - 126976*d^{**2}*e \\
& **4 - 278400*d^{**2}*e^{**2}*f^{**2} - 4131*d^{**2}*f^{**4} + 102400*d*e^{**4}*f + 93568*d*e* \\
& *2*f^{**3} + 81*d*f^{**5} - 28672*e^{**4}*f^{**2} - 11648*e^{**2}*f^{**4} + 189*f^{**6})) + (-d/ \\
& 4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72)*\log(x + (-164944*d^{**5}*e + 16416*d^{** \\
& 5}*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72) + 336520*d^{**4}*e*f + 200664*d* \\
& *4*f*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72) - 115200*d^{**3}*e^{**3} - 50457 \\
& 6*d^{**3}*e^{**2}*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72) - 272380*d^{**3}*e*f^{** \\
& 2} + 1734912*d^{**3}*e*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72)^{**2} - 229500* \\
& d^{**3}*f^{**2}*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72) + 2612736*d^{**3}*(-d/4 \\
& + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72)^{**3} + 51840*d^{**2}*e^{**3}*f + 881280*d^{**2}* \\
& e^{**2}*f*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72) + 119420*d^{**2}*e*f^{**3} - 2 \\
& 477952*d^{**2}*e*f*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72)^{**2} + 50436*d^{**2} \\
& *f^{**3}*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72) - 2519424*d^{**2}*f*(-d/4 + \\
& f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72)^{**3} + 28672*d*e^{**5} + 184320*d*e^{**4}*(-d/4 \\
& + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72) + 8640*d*e^{**3}*f^{**2} + 774144*d*e^{**3}*( \\
& -d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72)^{**2} - 409536*d*e^{**2}*f^{**2}*(-d/4 + \\
& f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72) + 4976640*d*e^{**2}*(-d/4 + f/8 + \sqrt{3}*I* \\
& I*(4*d + 8*e + f)/72)^{**3} - 31040*d*e*f^{**4} + 1270080*d*e*f^{**2}*(-d/4 + f/8 + \\
& \sqrt{3}*I*(4*d + 8*e + f)/72)^{**2} + 14040*d*f^{**4}*(-d/4 + f/8 + \sqrt{3}*I*(4* \\
& d + 8*e + f)/72) + 139968*d*f^{**2}*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72 \\
& )^{**3} - 20480*e^{**5}*f - 36864*e^{**4}*f*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/ \\
& 72) - 2880*e^{**3}*f^{**3} - 552960*e^{**3}*f*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f \\
& )/72)^{**2} + 70848*e^{**2}*f^{**3}*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72) - 99 \\
& 5328*e^{**2}*f*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72)^{**3} + 3956*e*f^{**5} - \\
& 209088*e*f^{**3}*(-d/4 + f/8 + \sqrt{3}*I*(4*d + 8*e + f)/72)^{**2} - 3996*f^{**5}*(-
\end{aligned}$$

$$\begin{aligned}
& d/4 + f/8 + \sqrt{3} * I * (4*d + 8*e + f)/72) + 233280*f**3*(-d/4 + f/8 + \sqrt{3} \\
& 3)*I*(4*d + 8*e + f)/72)**3)/(53568*d**6 - 69984*d**5*f - 182528*d**4*e**2 \\
& + 23652*d**4*f**2 + 377344*d**3*e**2*f + 5400*d**3*f**3 - 126976*d**2*e**4 \\
& - 278400*d**2*e**2*f**2 - 4131*d**2*f**4 + 102400*d*e**4*f + 93568*d*e**2*f \\
& **3 + 81*d*f**5 - 28672*e**4*f**2 - 11648*e**2*f**4 + 189*f**6)) + (d/4 - f \\
& /8 - \sqrt{3} * I * (4*d - 8*e + f)/72) * \log(x + (-164944*d**5*e + 16416*d**5*(d/ \\
& 4 - f/8 - \sqrt{3} * I * (4*d - 8*e + f)/72) + 336520*d**4*e*f + 200664*d**4*f*( \\
& d/4 - f/8 - \sqrt{3} * I * (4*d - 8*e + f)/72) - 115200*d**3*e**3 - 504576*d**3* \\
& e**2*(d/4 - f/8 - \sqrt{3} * I * (4*d - 8*e + f)/72) - 272380*d**3*e*f**2 + 1734 \\
& 912*d**3*e*(d/4 - f/8 - \sqrt{3} * I * (4*d - 8*e + f)/72)**2 - 229500*d**3*f**2 \\
& *(d/4 - f/8 - \sqrt{3} * I * (4*d - 8*e + f)/72) + 2612736*d**3*(d/4 - f/8 - \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} \\
& (3) * I * (4*d - 8*e + f)/72)**2 - 409536*d*e**2*f**2*(d/4 - f/8 - \sqrt{3} * I * (4 \\
& *d - 8*e + f)/72) + 4976640*d*e**2*(d/4 - f/8 - \sqrt{3} * I * (4*d - 8*e + f)/7 \\
& 2)**3 - 31040*d*e*f**4 + 1270080*d*e*f**2*(d/4 - f/8 - \sqrt{3} * I * (4*d - 8*e \\
& + f)/72)**2 + 14040*d*f**4*(d/4 - f/8 - \sqrt{3} * I * (4*d - 8*e + f)/72) + 13 \\
& 9968*d*f**2*(d/4 - f/8 - \sqrt{3} * I * (4*d - 8*e + f)/72)**3 - 20480*e**5*f - \\
& 36864*e**4*f*(d/4 - f/8 - \sqrt{3} * I * (4*d - 8*e + f)/72) - 2880*e**3*f**3 - \\
& 552960*e**3*f*(d/4 - f/8 - \sqrt{3} * I * (4*d - 8*e + f)/72)**2 + 70848*e**2*f* \\
& *3*(d/4 - f/8 - \sqrt{3} * I * (4*d - 8*e + f)/72) - 995328*e**2*f*(d/4 - f/8 - \\
& \sqrt{3} * I * (4*d - 8*e + f)/72)**3 + 3956*e*f**5 - 209088*e*f**3*(d/4 - f/8 - \\
& \sqrt{3} * I * (4*d - 8*e + f)/72)**2 - 3996*f**5*(d/4 - f/8 - \sqrt{3} * I * (4*d - \\
& 8*e + f)/72) + 233280*f**3*(d/4 - f/8 - \sqrt{3} * I * (4*d - 8*e + f)/72)**3)/ \\
& (53568*d**6 - 69984*d**5*f - 182528*d**4*e**2 + 23652*d**4*f**2 + 377344*d* \\
& *3*e**2*f + 5400*d**3*f**3 - 126976*d**2*e**4 - 278400*d**2*e**2*f**2 - 413 \\
& 1*d**2*f**4 + 102400*d*e**4*f + 93568*d*e**2*f**3 + 81*d*f**5 - 28672*e**4* \\
& f**2 - 11648*e**2*f**4 + 189*f**6)) + (d/4 - f/8 + \sqrt{3} * I * (4*d - 8*e + f \\
& )/72) * \log(x + (-164944*d**5*e + 16416*d**5*(d/4 - f/8 + \sqrt{3} * I * (4*d - 8* \\
& e + f)/72) + 336520*d**4*e*f + 200664*d**4*f*(d/4 - f/8 + \sqrt{3} * I * (4*d - \\
& 8*e + f)/72) - 115200*d**3*e**3 - 504576*d**3*e**2*(d/4 - f/8 + \sqrt{3} * I * ( \\
& 4*d - 8*e + f)/72) - 272380*d**3*e*f**2 + 1734912*d**3*e*(d/4 - f/8 + \sqrt{3} \\
& (3) * I * (4*d - 8*e + f)/72)**2 - 229500*d**3*f**2*(d/4 - f/8 + \sqrt{3} * I * (4*d \\
& - 8*e + f)/72) + 2612736*d**3*(d/4 - f/8 + \sqrt{3} * I * (4*d - 8*e + f)/72)**3 \\
& + 51840*d**2*e**3*f + 881280*d**2*e**2*f*(d/4 - f/8 + \sqrt{3} * I * (4*d - 8*e \\
& + f)/72) + 119420*d**2*e*f**3 - 2477952*d**2*e*f*(d/4 - f/8 + \sqrt{3} * I * (4 \\
& *d - 8*e + f)/72)**2 + 50436*d**2*f**3*(d/4 - f/8 + \sqrt{3} * I * (4*d - 8*e + \\
& f)/72) - 2519424*d**2*f*(d/4 - f/8 + \sqrt{3} * I * (4*d - 8*e + f)/72)**3 + 286 \\
& 72*d*e**5 + 184320*d*e**4*(d/4 - f/8 + \sqrt{3} * I * (4*d - 8*e + f)/72) + 8640 \\
& *d*e**3*f**2 + 774144*d*e**3*(d/4 - f/8 + \sqrt{3} * I * (4*d - 8*e + f)/72)**2 \\
& - 409536*d*e**2*f**2*(d/4 - f/8 + \sqrt{3} * I * (4*d - 8*e + f)/72) + 4976640*d
\end{aligned}$$

$$\begin{aligned}
& *e^{**2}*(d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72)**3 - 31040*d*e*f**4 + 1270 \\
& 080*d*e*f**2*(d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72)**2 + 14040*d*f**4*( \\
& d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72) + 139968*d*f**2*(d/4 - f/8 + \sqrt{ \\
& 3)*I*(4*d - 8*e + f)/72)**3 - 20480*e**5*f - 36864*e**4*f*(d/4 - f/8 + \sqrt{ \\
& t(3)*I*(4*d - 8*e + f)/72) - 2880*e**3*f**3 - 552960*e**3*f*(d/4 - f/8 + \sqrt{ \\
& rt(3)*I*(4*d - 8*e + f)/72)**2 + 70848*e**2*f**3*(d/4 - f/8 + \sqrt{3)*I*(4* \\
& d - 8*e + f)/72) - 995328*e**2*f*(d/4 - f/8 + \sqrt{3)*I*(4*d - 8*e + f)/72) \\
& **3 + 3956*e*f**5 - 209088*e*f**3*(d/4 - f/8 + \sqrt{3)*I*(4*d - 8*e + f)/72 \\
& )**2 - 3996*f**5*(d/4 - f/8 + \sqrt{3)*I*(4*d - 8*e + f)/72) + 233280*f**3*( \\
& d/4 - f/8 + \sqrt{3)*I*(4*d - 8*e + f)/72)**3)/(53568*d**6 - 69984*d**5*f - \\
& 182528*d**4*e**2 + 23652*d**4*f**2 + 377344*d**3*e**2*f + 5400*d**3*f**3 - \\
& 126976*d**2*e**4 - 278400*d**2*e**2*f**2 - 4131*d**2*f**4 + 102400*d*e**4*f \\
& + 93568*d*e**2*f**3 + 81*d*f**5 - 28672*e**4*f**2 - 11648*e**2*f**4 + 189* \\
& f**6)) + (2*e*x**2 + e + x**3*(-d + 2*f) + x*(d + f))/(6*x**4 + 6*x**2 + 6)
\end{aligned}$$

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

Optimal. Leaf size=179

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

**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, number of rules / 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_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

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

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

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

Warning: Unable to verify antiderivative.

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

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

**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

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

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

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

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="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

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

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]  $1/4*((-1/3*d-1/3*e-1/3*g+2/3*f)*x-2/3*d+1/3*e-2/3*g+1/3*f)/(x^2+x+1)+1/4*d*\ln(x^2+x+1)-1/8*f*\ln(x^2+x+1)+1/9*3^(1/2)*d*\arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*\arctan(1/3*(2*x+1)*3^(1/2))+1/36*3^(1/2)*f*\arctan(1/3*(2*x+1)*3^(1/2))+1/9*3^(1/2)*g*\arctan(1/3*(2*x+1)*3^(1/2))-1/4*((1/3*d-1/3*e-1/3*g-2/3*f)*x-2/3*d-1/3*e+2/3*g+1/3*f)/(x^2-x+1)-1/4*d*\ln(x^2-x+1)+1/8*f*\ln(x^2-x+1)+1/9*3^(1/2)*d*\arctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(1/2)*e*\arctan(1/3*(2*x-$

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

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

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)^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

$$\frac{\left(\frac{d-f}{6}\right)^2 x^3 + \left(\frac{d-f}{6}\right)\left(\frac{e}{3}\right)x^2 + \left(\frac{d+f}{6}\right)x + \frac{e}{3} - \frac{1}{3}}{x^4 + x^2 + 1} - \ln\left(x - \frac{1}{2} - \frac{\sqrt{3}i}{2}\right)\left(\frac{d}{6} - \frac{f}{6} + \frac{\sqrt{3}di}{18} + \frac{\sqrt{3}ei}{9} + \frac{\sqrt{3}fi}{18} - \frac{\sqrt{3}gi}{18}\right) - \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}i}{2}\right)\left(\frac{d}{6} - \frac{f}{6} + \frac{\sqrt{3}di}{18} - \frac{\sqrt{3}ei}{9} + \frac{\sqrt{3}fi}{18} + \frac{\sqrt{3}gi}{18}\right) + \ln\left(x - \frac{1}{2} + \frac{\sqrt{3}i}{2}\right)\left(\frac{d}{6} - \frac{f}{6} + \frac{\sqrt{3}di}{18} + \frac{\sqrt{3}ei}{9} + \frac{\sqrt{3}fi}{18} - \frac{\sqrt{3}gi}{18}\right) + \ln\left(x + \frac{1}{2} + \frac{\sqrt{3}i}{2}\right)\left(\frac{d}{6} - \frac{f}{6} + \frac{\sqrt{3}di}{18} - \frac{\sqrt{3}ei}{9} + \frac{\sqrt{3}fi}{18} + \frac{\sqrt{3}gi}{18}\right)$$

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

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

**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}

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

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] := D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]
```

### Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] := Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

### Rule 1169

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

### Rule 1247

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

### Rule 1673

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

### Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := With[{d =
Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
+ b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
+ 7)*(b*d - 2*a*e)*x^2, x], x]] /; 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

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

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

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

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e\*x + f\*x^2 + g\*x^3 + 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

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

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

**giac** [A] time = 0.32, size = 155, normalized size = 0.83

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

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

$$\frac{\sqrt{3}\arctan\left(\frac{2x+1}{\sqrt{3}}\right)+\sqrt{3}\arctan\left(\frac{2x-1}{\sqrt{3}}\right)+\frac{d\ln(x^2+x+1)}{36}+\frac{d\ln(x^2-x+1)}{36}+2\sqrt{3}\arctan\left(\frac{2x+1}{\sqrt{3}}\right)+2\sqrt{3}\arctan\left(\frac{2x-1}{\sqrt{3}}\right)+\frac{\sqrt{3}\arctan\left(\frac{2x+1}{\sqrt{3}}\right)}{36}+\frac{\sqrt{3}\arctan\left(\frac{2x-1}{\sqrt{3}}\right)}{36}+\frac{f\ln(x^2-x+1)}{8}+\frac{f\ln(x^2+x+1)}{8}+\frac{\sqrt{3}\arctan\left(\frac{2x+1}{\sqrt{3}}\right)}{9}+\frac{\sqrt{3}\arctan\left(\frac{2x-1}{\sqrt{3}}\right)}{9}+\frac{\sqrt{3}\arctan\left(\frac{2x+1}{\sqrt{3}}\right)}{36}+\frac{\sqrt{3}\arctan\left(\frac{2x-1}{\sqrt{3}}\right)}{36}+\frac{h\ln(x^2-x+1)}{8}+\frac{h\ln(x^2+x+1)}{8}+\frac{\frac{1}{4}\left(\frac{1}{4}\left(\frac{1}{4}\left(\frac{1}{4}\left(\frac{1}{4}\right)+1\right)+1\right)+1\right)+1}{4^{2+4+4+4}}+\frac{\frac{1}{4}\left(\frac{1}{4}\left(\frac{1}{4}\left(\frac{1}{4}\left(\frac{1}{4}\right)+1\right)+1\right)+1\right)+1}{4^{(2+4+4+4)}}$$

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+x^2+1)^2,x)

[Out]  $1/4*((-1/3*d+2/3*f-1/3*g-1/3*e-1/3*h)*x-2/3*d+1/3*f-2/3*g+1/3*e+1/3*h)/(x^2+x+1)+1/4*d*\ln(x^2+x+1)-1/8*f*\ln(x^2+x+1)+1/8*\ln(x^2+x+1)*h+1/9*3^(1/2)*d*\arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*\arctan(1/3*(2*x+1)*3^(1/2))+1/36*3^(1/2)*f*\arctan(1/3*(2*x+1)*3^(1/2))+1/9*3^(1/2)*g*\arctan(1/3*(2*x+1)*3^(1/2))$

$$2)) + 1/36 \cdot 3^{1/2} \cdot h \cdot \arctan(1/3 \cdot (2x+1) \cdot 3^{1/2}) - 1/4 \cdot ((1/3 \cdot d - 2/3 \cdot f - 1/3 \cdot g - 1/3 \cdot e + 1/3 \cdot h) \cdot x - 2/3 \cdot d + 1/3 \cdot f + 2/3 \cdot g - 1/3 \cdot e + 1/3 \cdot h) / (x^2 - x + 1) - 1/4 \cdot d \cdot \ln(x^2 - x + 1) + 1/8 \cdot f \cdot \ln(x^2 - x + 1) - 1/8 \cdot \ln(x^2 - x + 1) \cdot h + 1/9 \cdot 3^{1/2} \cdot d \cdot \arctan(1/3 \cdot (2x-1) \cdot 3^{1/2}) + 2/9 \cdot 3^{1/2} \cdot e \cdot \arctan(1/3 \cdot (2x-1) \cdot 3^{1/2}) + 1/36 \cdot 3^{1/2} \cdot f \cdot \arctan(1/3 \cdot (2x-1) \cdot 3^{1/2}) - 1/9 \cdot 3^{1/2} \cdot g \cdot \arctan(1/3 \cdot (2x-1) \cdot 3^{1/2}) + 1/36 \cdot 3^{1/2} \cdot h \cdot \arctan(1/3 \cdot (2x-1) \cdot 3^{1/2})$$

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

**mupad [B]** time = 5.35, size = 1547, normalized size = 8.27

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

[Out]  $(e/6 - g/3 + x^2 \cdot (e/3 - g/6) + x \cdot (d/6 + f/6 - h/3) - x^3 \cdot (d/6 - f/3 + h/6)) / (x^2 + x^4 + 1) - \log(60 \cdot d \cdot g - 153 \cdot d \cdot f - 120 \cdot d \cdot e + 24 \cdot e \cdot f + 135 \cdot d \cdot h - 48 \cdot e \cdot h - 12 \cdot f \cdot g - 81 \cdot f \cdot h + 24 \cdot g \cdot h + 3^{1/2} \cdot d^2 \cdot 90i + 3^{1/2} \cdot f^2 \cdot 9i + 3^{1/2} \cdot h^2 \cdot 18i - 198 \cdot d^2 \cdot x - 36 \cdot f^2 \cdot x - 45 \cdot h^2 \cdot x + 126 \cdot d^2 + 45 \cdot f^2 + 36 \cdot h^2 + 3^{1/2} \cdot d \cdot e \cdot 56i - 3^{1/2} \cdot d \cdot f \cdot 63i - 3^{1/2} \cdot d \cdot g \cdot 28i - 3^{1/2} \cdot e \cdot f \cdot 40i + 3^{1/2} \cdot d \cdot h \cdot 81i + 3^{1/2} \cdot e \cdot h \cdot 32i + 3^{1/2} \cdot f \cdot g \cdot 20i - 3^{1/2} \cdot f \cdot h \cdot 27i - 3^{1/2} \cdot g \cdot h \cdot 16i - 24 \cdot d \cdot e \cdot x + 171 \cdot d \cdot f \cdot x + 12 \cdot d \cdot g \cdot x + 48 \cdot e \cdot f \cdot x - 189 \cdot d \cdot h \cdot x - 24 \cdot e \cdot h \cdot x - 24 \cdot f \cdot g \cdot x + 81 \cdot f \cdot h \cdot x + 12 \cdot g \cdot h \cdot x + 3^{1/2} \cdot d^2 \cdot x \cdot 18i + 3^{1/2} \cdot f^2 \cdot x \cdot 18i + 3^{1/2} \cdot h^2 \cdot x \cdot 9i - 3^{1/2} \cdot d \cdot f \cdot x \cdot 45i + 3^{1/2} \cdot d \cdot g \cdot x \cdot 44i + 3^{1/2} \cdot e \cdot f \cdot x \cdot 32i + 3^{1/2} \cdot d \cdot h \cdot x \cdot 27i - 3^{1/2} \cdot e \cdot h \cdot x \cdot 40i - 3^{1/2} \cdot f \cdot g \cdot x \cdot 16i - 3^{1/2} \cdot f \cdot h \cdot x \cdot 27i + 3^{1/2} \cdot g \cdot h \cdot x \cdot 20i - 3^{1/2} \cdot d \cdot e \cdot x \cdot 88i) \cdot (d/4 - f/8 + h/8 + (3^{1/2} \cdot d \cdot 1i)/18 + (3^{1/2} \cdot e \cdot 1i)/9 + (3^{1/2} \cdot f \cdot 1i)/72 - (3^{1/2} \cdot g \cdot 1i)/18 + (3^{1/2} \cdot h \cdot 1i)/72) - \log(120 \cdot d \cdot e - 153 \cdot d \cdot f - 60 \cdot d \cdot g - 24 \cdot e \cdot f + 135 \cdot d \cdot h + 48 \cdot e \cdot h + 12 \cdot f \cdot g - 81 \cdot f \cdot h - 24 \cdot g \cdot h - 3^{1/2} \cdot d^2 \cdot 90i - 3^{1/2} \cdot f^2 \cdot 9i - 3^{1/2} \cdot h^2 \cdot 18i + 198 \cdot d^2 \cdot x + 36 \cdot f^2 \cdot x + 45 \cdot h^2 \cdot x + 126 \cdot d^2 + 45 \cdot f^2 + 36 \cdot h^2 + 3^{1/2} \cdot d \cdot e \cdot 56i + 3^{1/2} \cdot d \cdot f \cdot 63i - 3^{1/2} \cdot d \cdot g \cdot 28i - 3^{1/2} \cdot e \cdot f \cdot 40i - 3^{1/2} \cdot d \cdot h \cdot 81i + 3^{1/2} \cdot e \cdot h \cdot 32i + 3^{1/2} \cdot f \cdot g \cdot 20i + 3^{1/2} \cdot f \cdot h \cdot 27i - 3^{1/2} \cdot g \cdot h \cdot 16i - 24 \cdot d \cdot e \cdot x - 171 \cdot d \cdot f \cdot x + 12 \cdot d \cdot g \cdot x + 48 \cdot e \cdot f \cdot x + 189 \cdot d \cdot h \cdot x - 24 \cdot e \cdot h \cdot x - 24 \cdot f \cdot g \cdot x - 81 \cdot f \cdot h \cdot x + 12 \cdot g \cdot h \cdot x + 3^{1/2} \cdot d^2 \cdot x \cdot 18i + 3^{1/2} \cdot f^2 \cdot x \cdot 18i + 3^{1/2} \cdot h^2 \cdot x \cdot 9i - 3^{1/2} \cdot d \cdot f \cdot x \cdot 45i - 3^{1/2} \cdot d \cdot g \cdot x \cdot 44i - 3^{1/2} \cdot e \cdot f \cdot x \cdot 32i$



$$\begin{aligned}
& + 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*x*90i + 3^{(1/2)}*f^2*x*9i + 3^{(1/2)}*h^2*x \\
& *18i + 198*d^2*x + 36*f^2*x + 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 - 3^{(1/2)} \\
& *d*e*56i - 3^{(1/2)}*d*f*63i + 3^{(1/2)}*d*g*28i + 3^{(1/2)}*e*f*40i + 3^{(1/2)}*d* \\
& h*81i - 3^{(1/2)}*e*h*32i - 3^{(1/2)}*f*g*20i - 3^{(1/2)}*f*h*27i + 3^{(1/2)}*g*h*1 \\
& 6i - 24*d*e*x - 171*d*f*x + 12*d*g*x + 48*e*f*x + 189*d*h*x - 24*e*h*x - 24 \\
& *f*g*x - 81*f*h*x + 12*g*h*x - 3^{(1/2)}*d^2*x*18i - 3^{(1/2)}*f^2*x*18i - 3^{(1/2)} \\
& *h^2*x*9i + 3^{(1/2)}*d*f*x*45i + 3^{(1/2)}*d*g*x*44i + 3^{(1/2)}*e*f*x*32i - \\
& 3^{(1/2)}*d*h*x*27i - 3^{(1/2)}*e*h*x*40i - 3^{(1/2)}*f*g*x*16i + 3^{(1/2)}*f*h*x*2 \\
& 7i + 3^{(1/2)}*g*h*x*20i - 3^{(1/2)}*d*e*x*88i)*(d/4 - f/8 + h/8 + (3^{(1/2)}*d*1 \\
& i)/18 - (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72 + (3^{(1/2)}*g*1i)/18 + (3^{(1/2)} \\
& *h*1i)/72) + \log(120*d*e + 153*d*f - 60*d*g - 24*e*f - 135*d*h + 48*e*h + 1 \\
& 2*f*g + 81*f*h - 24*g*h + 3^{(1/2)}*d^2*x*90i + 3^{(1/2)}*f^2*x*9i + 3^{(1/2)}*h^2*x*18 \\
& i + 198*d^2*x + 36*f^2*x + 45*h^2*x - 126*d^2 - 45*f^2 - 36*h^2 + 3^{(1/2)}*d \\
& *e*56i - 3^{(1/2)}*d*f*63i - 3^{(1/2)}*d*g*28i - 3^{(1/2)}*e*f*40i + 3^{(1/2)}*d*h* \\
& 81i + 3^{(1/2)}*e*h*32i + 3^{(1/2)}*f*g*20i - 3^{(1/2)}*f*h*27i - 3^{(1/2)}*g*h*16i \\
& + 24*d*e*x - 171*d*f*x - 12*d*g*x - 48*e*f*x + 189*d*h*x + 24*e*h*x + 24*f \\
& *g*x - 81*f*h*x - 12*g*h*x + 3^{(1/2)}*d^2*x*18i + 3^{(1/2)}*f^2*x*18i + 3^{(1/2)} \\
& *h^2*x*9i - 3^{(1/2)}*d*f*x*45i + 3^{(1/2)}*d*g*x*44i + 3^{(1/2)}*e*f*x*32i + 3^{(1/2)} \\
& *d*h*x*27i - 3^{(1/2)}*e*h*x*40i - 3^{(1/2)}*f*g*x*16i - 3^{(1/2)}*f*h*x*27i \\
& + 3^{(1/2)}*g*h*x*20i - 3^{(1/2)}*d*e*x*88i)*(f/8 - d/4 - h/8 + (3^{(1/2)}*d*1i) \\
& /18 + (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72 - (3^{(1/2)}*g*1i)/18 + (3^{(1/2)}*h \\
& *1i)/72)
\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}

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

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] := S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

### Rule 634

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

### Rule 1169

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

### Rule 1660

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

### Rule 1663

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

### Rule 1673

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

## Rule 1678

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := With[{d =
  Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3 + hx^4 + 35x^5}{(1 + x^2 + x^4)^2} dx &= \int \frac{x(e + gx^2 + 35x^4)}{(1 + x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^2} dx \\ &= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx \\ &= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{12} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx \\ &= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx \\ &= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} - \frac{1}{8} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx \\ &= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} - \frac{(4d - f + 2h)x^2}{8(1 + x^2 + x^4)} \end{aligned}$$

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

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

Warning: Unable to verify antiderivative.

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

[Out] ((6\*(e + i + d\*x + f\*x - 2\*h\*x + 2\*e\*x^2 - i\*x^2 - d\*x^3 + 2\*f\*x^3 - h\*x^3 - g\*(2 + x^2)))/(1 + x^2 + x^4) - (((-11\*I + Sqrt[3])\*d - 2\*(-2\*I + Sqrt[3])

```
) * f + (-5 * I + Sqrt[3]) * h) * ArcTan[((-I + Sqrt[3]) * x) / 2]) / Sqrt[(1 + I * Sqrt[3]) / 6] - (((11 * I + Sqrt[3]) * d - 2 * (2 * I + Sqrt[3]) * f + (5 * I + Sqrt[3]) * h) * ArcTan[((I + Sqrt[3]) * x) / 2]) / Sqrt[(1 - I * Sqrt[3]) / 6] - 4 * Sqrt[3] * (2 * e - g + 2 * i) * ArcTan[Sqrt[3] / (1 + 2 * x^2)]) / 36
```

**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

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

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)^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

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

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)
```



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

```

*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

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

**Rubi [A]** time = 0.74, antiderivative size = 330, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 20,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.450$ , Rules used = {1673, 12, 1092, 1166, 205, 1107, 614, 618, 206}

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

Antiderivative was successfully verified.

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

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

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] && (Gt

$Q[a, 0] \parallel LtQ[b, 0]$

### 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

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

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

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

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)) + (Sqrt[2]\*Sqrt[c]\*(b^2 - 12\*a\*c + b\*Sqrt[b^2 - 4\*a\*c])\*d\*ArcTan[(Sqrt[2]\*Sqrt[c]\*x)/Sqrt[b - Sqrt[b^2 - 4\*a\*c]])/(a\*(b^2 - 4\*a\*c)^(3/2)\*Sqrt[b - Sqrt[b^2 - 4\*a\*c]]) + (Sqrt[2]\*Sqrt[c]\*(-b^2 + 12\*a\*c + b\*Sqrt[b^2 - 4\*a\*c])\*d\*ArcTan[(Sqrt[2]\*Sqrt[c]\*x)/Sqrt[b + Sqrt[b^2 - 4\*a\*c]])/(a\*(b^2 - 4\*a\*c)^(3/2)\*Sqrt[b + Sqrt[b^2 - 4\*a\*c]]) - (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

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

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] 
$$\frac{1}{2} \cdot (b \cdot c \cdot d \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 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 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 (\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^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 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}}$$



```

*sqrt(b^2 - 4*a*c))*abs(a*b^2 - 4*a^2*c)*e - (a*b^5*c^2 - 8*a^2*b^3*c^3 - 2
*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 + (a*b^
4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(
x^2 + 1/2*(a*b^3 - 4*a^2*b*c + sqrt((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*
a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c
- 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(a*
b^2 - 4*a^2*c)) - 1/4*((b^3*c^2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c^4 - (b^2*c^2
- 4*a*c^3 - 2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c))*abs(a*b^2 - 4*a^2*c)*e - (a*b
^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3
*c^4 - 4*a^2*b*c^5 - (a*b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*
sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(a*b^3 - 4*a^2*b*c - sqrt((a*b^3 - 4*a^
2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c
^2))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c
^2 - 4*a^2*c^3)*c^2*abs(a*b^2 - 4*a^2*c))

```

**maple [B]** time = 0.14, size = 1237, normalized size = 3.75

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```

[Out] c/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*d*x*(-4*a*c+b^2)^(1/
2)-1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)/a*d*x*b^2*(-4*a
*c+b^2)^(1/2)-c/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*d*x*b+
1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)/a*d*x*b^3+2*c/(4*a
*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*e*a-1/2/(4*a*c-b^2)^2/(x^2
+1/2*b/c+1/2*(-4*a*c+b^2)^(1/2)/c)*e*b^2+c/(4*a*c-b^2)^2*e*(-4*a*c+b^2)^(1/
2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))+3*c^2/(4*a*c-b^2)^2*(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)*arct
an(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b*d+1/4*c/(4*a*c-b^2)^2/a*
2*(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*c*x)*b^3*d-c/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2
)/c)*d*x*(-4*a*c+b^2)^(1/2)+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)
^(1/2)/c)/a*d*x*b^2*(-4*a*c+b^2)^(1/2)-c/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4
*a*c+b^2)^(1/2)/c)*d*x*b+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1
/2)/c)/a*d*x*b^3+2*c/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*e
*a-1/2/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^(1/2)/c)*e*b^2-c/(4*a*c-
b^2)^2*e*(-4*a*c+b^2)^(1/2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))+3*c^2/(4*a*c-
b^2)^2*(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

```

$$\frac{1}{2} \sqrt{c} \sqrt{x} \sqrt{-4ac + b^2} \sqrt{b^2 d + c^2} / (4ac - b^2)^{3/2} / ((-b + (-4ac + b^2)^{1/2}) \sqrt{c})^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \sqrt{c})^{1/2} \sqrt{x}) \sqrt{b^2 d - 1/4c} / (4ac - b^2)^{3/2} / a^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \sqrt{c})^{1/2} \sqrt{x}) \sqrt{b^2 d}$$

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

[Out]  $\frac{1}{2} (b c d x^3 - 2 a c e x^2 - a b e + (b^2 - 2 a c) d x) / ((a b^2 c - 4 a^2 c^2) x^4 + a^2 b^2 - 4 a^3 c + (a b^3 - 4 a^2 b c) x^2) + \frac{1}{2} \operatorname{integrate}((b c d x^2 - 4 a c e x + (b^2 - 6 a c) d) / (c x^4 + b x^2 + a), x) / (a b^2 - 4 a^2 c)$

**mupad [B]** time = 1.50, size = 2382, normalized size = 7.22

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

[Out]  $((b e) / (2 (4 a c - b^2)) + (c e x^2) / (4 a c - b^2) + (d x (2 a c - b^2)) / (2 a (4 a c - b^2)) - (b c d x^3) / (2 a (4 a c - b^2))) / (a + b x^2 + c x^4) + \operatorname{symsum}(\log((5 b^3 c^4 d^3 - 96 a^2 c^5 d e^2 - 36 a b c^5 d^3 + 16 a b^2 c^4 d e^2) / (8 (a^2 b^6 - 64 a^5 c^3 - 12 a^3 b^4 c + 48 a^4 b^2 c^2)) - \operatorname{root}(1572864 a^8 b^2 c^5 z^4 - 983040 a^7 b^4 c^4 z^4 + 327680 a^6 b^6 c^3 z^4 - 61440 a^5 b^8 c^2 z^4 + 6144 a^4 b^{10} c z^4 - 1048576 a^9 c^6 z^4 - 256 a^3 b^{12} z^4 + 61440 a^5 b c^5 d^2 z^2 + 432 a b^9 c d^2 z^2 + 24576 a^5 b^2 c^4 e^2 z^2 - 6144 a^4 b^4 c^3 e^2 z^2 + 512 a^3 b^6 c^2 e^2 z^2 - 61440 a^4 b^3 c^4 d^2 z^2 + 24064 a^3 b^5 c^3 d^2 z^2 - 4608 a^2 b^7 c^2 d^2 z^2 - 32768 a^6 c^5 e^2 z^2 - 16 b^{11} d^2 z^2 - 672 a b^6 c^2 d^2 e z - 15872 a^3 b^2 c^4 d^2 e z + 4992 a^2 b^4 c^3 d^2 e z + 18432 a^4 c^5 d^2 e z + 32 b^8 c d^2 e z - 960 a^2 b c^4 d^2 e^2 + 240 a b^3 c^3 d^2 e^2 - 16 b^5 c^2 d^2 e^2 + 360 a b^2 c^4 d^4 - 256 a^3 c^4 e^4 - 25 b^4 c^3 d^4 - 1296 a^2 c^5 d^4, z, k) * (\operatorname{root}(1572864 a^8 b^2 c^5 z^4 - 983040 a^7 b^4 c^4 z^4 + 327680 a^6 b^6 c^3 z^4 - 61440 a^5 b^8 c^2 z^4 + 6144 a^4 b^{10} c z^4 - 1048576 a^9 c^6 z^4 - 256 a^3 b^{12} z^4 + 61440 a^5 b c^5 d^2 z^2 + 432 a b^9 c d^2 z^2 + 24576 a^5 b^2 c^4 e^2 z^2 - 6144 a^4 b^4 c^3 e^2 z^2 + 512 a^3 b^6 c^2 e^2 z^2 - 61440 a^4 b^3 c^4 d^2 z^2 + 24064 a^3 b^5 c^3 d^2 z^2 - 4608 a^2 b^7 c^2 d^2 z^2 - 32768 a^6 c^5 e^2 z^2 - 16 b^{11} d^2 z^2 - 672 a b^6 c^2 d^2 e z - 15872 a^3 b^2 c^4 d^2 e z + 4992 a^2 b^4 c^3 d^2 e z + 18432 a^4 c^5 d^2 e z + 32 b^8 c d^2 e z - 960 a^2 b c^4 d^2 e^2 + 240 a b^3 c^3 d^2 e^2 - 16 b^5 c^2 d^2 e^2 + 360 a b^2 c^4 d^4 - 256 a^3 c^4 e^4 - 25 b^4 c^3 d^4$

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d^4 - 1296*a^2*c^5*d^4, z, k)*((x*(1024*a^5*c^6*e - 16*a^2*b^6*c^3*e + 192*
a^3*b^4*c^4*e - 768*a^4*b^2*c^5*e))/(2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c
+ 48*a^4*b^2*c^2)) - (6144*a^5*c^6*d - 288*a^2*b^6*c^3*d + 1920*a^3*b^4*c^
4*d - 5632*a^4*b^2*c^5*d + 16*a*b^8*c^2*d)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^
3*b^4*c + 48*a^4*b^2*c^2)) + (root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4
*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c
*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 61440*a^5*b*c^5*d^2*z^2 + 4
32*a*b^9*c*d^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 +
512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^
2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*b^11*d^2*z^2
- 672*a*b^6*c^2*d^2*e*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*
e*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 960*a^2*b*c^4*d^2*e^2 + 24
0*a*b^3*c^3*d^2*e^2 - 16*b^5*c^2*d^2*e^2 + 360*a*b^2*c^4*d^4 - 256*a^3*c^4*
e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k))*x*(4096*a^6*b*c^6 + 16*a^2*b
^9*c^2 - 256*a^3*b^7*c^3 + 1536*a^4*b^5*c^4 - 4096*a^5*b^3*c^5))/(2*(a^2*b^
6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) + (32*a*b^5*c^3*d*e + 102
4*a^3*b*c^5*d*e - 384*a^2*b^3*c^4*d*e)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^
4*c + 48*a^4*b^2*c^2)) - (x*(288*a^3*c^6*d^2 - b^6*c^3*d^2 + 18*a*b^4*c^4*d
^2 - 64*a^3*b*c^5*e^2 - 128*a^2*b^2*c^5*d^2 + 16*a^2*b^3*c^4*e^2))/(2*(a^2*
b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) - (x*(16*a^2*c^5*e^3 -
b^3*c^4*d^2*e + 12*a*b*c^5*d^2*e))/(2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c
+ 48*a^4*b^2*c^2)))*root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 +
327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 104
8576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 61440*a^5*b*c^5*d^2*z^2 + 432*a*b^9*c
*d^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b
^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 46
08*a^2*b^7*c^2*d^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*b^11*d^2*z^2 - 672*a*b^
6*c^2*d^2*e*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z + 1843
2*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^
3*d^2*e^2 - 16*b^5*c^2*d^2*e^2 + 360*a*b^2*c^4*d^4 - 256*a^3*c^4*e^4 - 25*b
^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k), k, 1, 4)

```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] Timed out



$$3.37 \quad \int \frac{d+ex+fx^2}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=368

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c} \left( \frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} - 2af + bd \right) \tan^{-1} \left( \frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c} \left( -\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} \right)}{2\sqrt{2}a(b^2-4ac)}$$

**Rubi [A]** time = 0.87, 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}

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

Antiderivative was successfully verified.

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

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

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] && (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[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 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

$$\begin{aligned}
 \int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^2} dx &= \int \frac{ex}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^2} dx \\
 &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \int \frac{-b^2d + 6acd - abf - c(bd - 2af)x^2}{a + bx^2 + cx^4} dx + e \int \frac{x}{(a + bx^2 + cx^4)^2} dx \\
 &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} e \operatorname{Subst} \left( \int \frac{1}{(a + bx + cx^2)^2} dx, x, x^2 \right) + \frac{c}{2} \int \frac{1}{(a + bx^2 + cx^4)^2} dx \\
 &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)}{2\sqrt{2}a(b^2 - 4ac)} \\
 &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)}{2\sqrt{2}a(b^2 - 4ac)} \\
 &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)}{2\sqrt{2}a(b^2 - 4ac)}
 \end{aligned}$$

**Mathematica [A]** time = 1.17, size = 398, normalized size = 1.08

$$\frac{1}{4} \left( \frac{2ab(e + fx) + 4acx(d + x(e + fx)) - 2bdx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} + \frac{\sqrt{2}\sqrt{c} \left( b(d\sqrt{b^2 - 4ac} + 4af) - 2a(f\sqrt{b^2 - 4ac} + 6cd) + b^2d \right) \tan^{-1} \left( \frac{\sqrt{2}\sqrt{c}x}{\sqrt{a(b^2 - 4ac)}} \right)}{a(b^2 - 4ac)^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\sqrt{2}\sqrt{c} \left( bd\sqrt{b^2 - 4ac} - 2af\sqrt{b^2 - 4ac} - 4abf + 12acd + b^2(-d) \right) \tan^{-1} \left( \frac{\sqrt{2}\sqrt{c}x}{\sqrt{a(b^2 - 4ac)}} \right)}{a(b^2 - 4ac)^{3/2} \sqrt{b^2 - 4ac} + b} - \frac{4cx \log(\sqrt{b^2 - 4ac} - b - 2cx^2)}{(b^2 - 4ac)^{3/2}} + \frac{4cx \log(\sqrt{b^2 - 4ac} + b + 2cx^2)}{(b^2 - 4ac)^{3/2}} \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e\*x + f\*x^2)/(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

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

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

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

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]  $\frac{1}{2}*(b*c*d*x^3 - 2*a*c*f*x^3 - 2*a*c*x^2*e + b^2*d*x - 2*a*c*d*x - a*b*f*x - a*b*e)/((c*x^4 + b*x^2 + a)*(a*b^2 - 4*a^2*c)) + \frac{1}{16}*((2*b^3*c^2 - 8*a*b*c^3 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c))*b^3 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c))*a*b*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c))*b^2*c - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c))*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b^2 - 4*a^2*c)^2*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c))*a*b^2 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c))*a^2*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c))*a*b*c - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c))*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*(a*b^2 - 4*a^2*c)^2*f + 2*(\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c))*a*b^6 - 14*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c))*a^2*b^4*c - 2*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c))*a*b^5*c - 2*a$



$$\begin{aligned}
& t(b^2 - 4ac)c) a^2c + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& - 4ac)c) a^2c - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^2c^2 - 2(b^2 - 4ac)a^2c^2)(a^2b^2 - 4a^2c)^2f - 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^2c^3 - 10\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^2b^2c^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 \operatorname{abs}(a^2b^2 - 4a^2c) \\
& - 2(\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}) a^2b^5 - 8\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^3b^3c - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^2b^4c + 2a^2b^5c + 16\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^4b^2c^2 + 8\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^3b^2c^2 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^2b^3c^2 - 16a^3b^3c^2 - 4\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^3b^2c^3 + 32a^4b^2c^3 - 2(b^2 - 4ac) \\
& ) a^2b^3c + 8(b^2 - 4ac)a^3b^2c^2) f \operatorname{abs}(a^2b^2 - 4a^2c) + (2a^2b^7c^2 - 40a^3b^5c^3 + 224a^4b^3c^4 - 384a^5b^2c^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{b^2 - 4ac}} \\
& ) a^2b^5c^2 + 192\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^5b^2c^3 + 96\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^4b^2c^3 + 16\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^3b^3c^3 - 48\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^4b^2c^3 - 2(b^2 - 4ac)a^2b^5c^2 + 32(b^2 - 4ac)a^3b^3c^3 - 96(b^2 - 4ac)a^4b^2c^4) d + 4(2a^3b^6c^2 - 16a^4b^4c^3 + 32a^5b^2c^4 - \sqrt{2}) \\
& ) \sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^3b^6 + 8\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^4b^4c + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^3b^5c - 16\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^5b^2c^2 - 8\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^4b^3c^2 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^3b^4c^2 + 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
& ) a^4b^2c^3 - 2(b^2 - 4ac)a^3b^4c^2 + 8(b^2 - 4ac)a^4b^2c^3) f) \operatorname{arctan}(2\sqrt{1/2}) x / \sqrt{(a^2b^3 - 4a^2b^2c - \sqrt{(a^2b^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)(a^2b^2c - 4a^2c^2)})} / (a^2b^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^2c^3 - 8a^4b^2c^3 + 16a^5c^4) \operatorname{abs}(a^2b^2 - 4a^2c) \operatorname{abs}(c)) - 1/4((b^3c^2 - 4a^2b^2c^3 - 2b^2c^3 + b^2c^4 + (b^2c^2 - 4a^2c^3 - 2b^2c^3 + c^4) \sqrt{b^2 - 4ac})) \operatorname{abs}(a^2b^2
\end{aligned}$$

$$\begin{aligned}
& - 4a^2c) * e - (a^5b^2c^2 - 8a^2b^3c^3 - 2ab^4c^3 + 16a^3b^2c^4 + 8a^2b^2c^4 + ab^3c^4 - 4a^2b^2c^5 + (ab^4c^2 - 4a^2b^2c^3 - 2ab^3c^3 + ab^2c^4) * \sqrt{b^2 - 4ac}) * e) * \log(x^2 + 1/2(ab^3 - 4a^2b^2c + \sqrt{(ab^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)(ab^2c - 4a^2c^2)})) \\
& / (ab^2c - 4a^2c^2) / ((ab^4 - 8a^2b^2c - 2ab^3c + 16a^3c^2 + 8a^2b^2c^2 + ab^2c^2 - 4a^2c^3) * c^2 * \text{abs}(ab^2 - 4a^2c)) - 1/4 * ((b^3c^2 - 4ab^2c^3 - 2b^2c^3 + b^2c^4 - (b^2c^2 - 4ac^3 - 2b^2c^3 + c^4) * \sqrt{b^2 - 4ac}) * \text{abs}(ab^2 - 4a^2c) * e - (a^5b^2c^2 - 8a^2b^3c^3 - 2ab^4c^3 + 16a^3b^2c^4 + 8a^2b^2c^4 + ab^3c^4 - 4a^2b^2c^5 - (ab^4c^2 - 4a^2b^2c^3 - 2ab^3c^3 + ab^2c^4) * \sqrt{b^2 - 4ac}) * e) * \log(x^2 + 1/2(ab^3 - 4a^2b^2c - \sqrt{(ab^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)(ab^2c - 4a^2c^2)})) / (ab^2c - 4a^2c^2) / ((ab^4 - 8a^2b^2c - 2ab^3c + 16a^3c^2 + 8a^2b^2c^2 + ab^2c^2 - 4a^2c^3) * c^2 * \text{abs}(ab^2 - 4a^2c))
\end{aligned}$$

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

[Out] 
$$\begin{aligned}
& -1/4/(4ac-b^2)^2 * 2^{(1/2)} / ((b+(-4ac+b^2)^{(1/2)}) * c)^{(1/2)} * (-4ac+b^2)^{(1/2)} / a * b^2 * c * d * \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)} * \text{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)} * \text{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)} * \arctan(2^{(1/2)} / ((b+(-4ac+b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * (-4ac+b^2)^{(1/2)} * b * f - 2 * c^2 / (4ac-b^2)^2 * a * 2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)}) * c)^{(1/2)} * \text{arctanh}(2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * f + 1/2 * c / (4ac-b^2)^2 * 2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)}) * c)^{(1/2)} * \text{arctanh}(2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b^2 * f + 2 * c^2 / (4ac-b^2)^2 * a * 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) * f - 1/2 * c / (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^2 * f + 2 * c / (4ac-b^2)^2 / (x^2 + 1/2 * b/c + 1/2 * (-4ac+b^2)^{(1/2)} / c) * x * a * f + 2 * c / (4ac-b^2)^2 / (x^2 + 1/2 * b/c - 1/2 * (-4ac+b^2)^{(1/2)} / c) * x * a * f - 1/4 * c / (4ac-b^2)^2 / a * 2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)}) * c)^{(1/2)} * \text{arctanh}(2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b^3 * d - 1/2 / (4ac-b^2)^2 / (x^2 + 1/2 * b/c - 1/2 * (-4ac+b^2)^{(1/2)} / c) * x * b^2 * f + 1 / (4ac-b^2)^2 * (-4ac+b^2)^{(1/2)} * c * e * \ln(2 * c * x^2 + b + (-4ac+b^2)^{(1/2)}) + 2 / (4ac-b^2)^2 / (x^2 + 1/2 * b/c - 1/2 * (-4ac+b^2)^{(1/2)} / c) * a * c * e - 1 / (4ac-b^2)^2 * (-4ac+b^2)^{(1/2)} * c * e * \ln(-2 * c * x^2 - b + (-4ac+b^2)^{(1/2)}) - 1/4 / (4ac-b^2)^2 / (x^2 + 1/2 * b/c + 1/2 * (-4ac+b^2)^{(1/2)} / c) * e
\end{aligned}$$

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

**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] 
$$\begin{aligned} & -1/2*(2*a*c*e*x^2 - (b*c*d - 2*a*c*f)*x^3 + a*b*e + (a*b*f - (b^2 - 2*a*c)*d)*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)*x^2) - 1/2*\integrate((4*a*c*e*x - a*b*f - (b*c*d - 2*a*c*f)*x^2 - (b^2 - 6*a*c)*d)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c) \end{aligned}$$

**mupad** [B] time = 1.71, 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] 
$$\begin{aligned} & \text{symsum}(\log((5*b^3*c^4*d^3 + 8*a^3*c^4*f^3 - 96*a^2*c^5*d*e^2 + 72*a^2*c^5*d^2*f - 3*b^4*c^3*d^2*f + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + 16*a*b^2*c^4*d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 16*a^2*b*c^4*e^2*f)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - \text{root}(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 576*a^2*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2 + \end{aligned}$$





$$\begin{aligned}
& 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 - 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*(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 - 288*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 - 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 - 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
\end{aligned}$$

$$\begin{aligned}
& - 960*a^2*b^2*c^3*d^2*f^2 - 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9 \\
& *a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c^4*e^4 - 25* \\
& b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k), k, 1, 4) + ((b*e)/(2*(4*a*c - b^2)) \\
& + (c*e*x^2)/(4*a*c - b^2) + (x*(2*a*c*d - b^2*d + a*b*f))/(2*a*(4*a*c - b^2 \\
& )) - (c*x^3*(b*d - 2*a*f))/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4)
\end{aligned}$$

**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}

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c}\left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c}\left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b+\sqrt{b^2-4ac}}} - \frac{-2ag+x^2(2ce-bg)+bc}{2(b^2-4ac)(a+bx^2+cx^4)} + \frac{(2ce-bg)\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{(b^2-4ac)^{3/2}}$$

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] && 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^2} dx &= \int \frac{d + fx^2}{(a + bx^2 + cx^4)^2} dx + \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \text{Subst} \left( \int \frac{e + gx}{(a + bx + cx^2)^2} dx, x, x^2 \right) - \frac{1}{2} \int \frac{e + gx}{(a + bx + cx^2)^2} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{c(bd - 2af)}{2(b^2 - 4ac)} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)}{2\sqrt{b^2 - 4ac}} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)}{2\sqrt{b^2 - 4ac}}
\end{aligned}$$

**Mathematica [A]** time = 1.30, size = 421, normalized size = 1.09

$$\frac{1}{4} \left( \frac{-4a^2g + 2ab(e + x(f - gx)) + 4acx(d + x(e + fx)) - 2bfx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} + \frac{\sqrt{2}\sqrt{c}(b(a\sqrt{b^2 - 4ac} + 4af) - 2a(\sqrt{b^2 - 4ac} + 6cd) + b^2d)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b^2 - 4ac}}\right)}{a(b^2 - 4ac)^{3/2}\sqrt{b^2 - 4ac}} + \frac{\sqrt{2}\sqrt{c}(bd\sqrt{b^2 - 4ac} - 2af\sqrt{b^2 - 4ac} - 4abf + 12acd + b^2(-d))\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b^2 - 4ac}}\right)}{a(b^2 - 4ac)^{3/2}\sqrt{b^2 - 4ac} + b} + \frac{2(bg - 2ce)\log(\sqrt{b^2 - 4ac} - b - 2cx^2)}{(b^2 - 4ac)^{3/2}} - \frac{2(bg - 2ce)\log(\sqrt{b^2 - 4ac} + b + 2cx^2)}{(b^2 - 4ac)^{3/2}} \right)$$

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] ((-4\*a^2\*g - 2\*b\*d\*x\*(b + c\*x^2) + 4\*a\*c\*x\*(d + x\*(e + f\*x)) + 2\*a\*b\*(e + x\*(f - g\*x)))/(a\*(-b^2 + 4\*a\*c)\*(a + b\*x^2 + c\*x^4)) + (Sqrt[2]\*Sqrt[c]\*(b^2\*d + b\*(Sqrt[b^2 - 4\*a\*c]\*d + 4\*a\*f) - 2\*a\*(6\*c\*d + Sqrt[b^2 - 4\*a\*c]\*f))\*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]]) + (2\*(-2\*c\*e + b\*g)\*Log[-b + Sqrt[b^2 - 4\*a\*c] - 2\*c\*x^2])/(b^2 - 4\*a\*c)^(3/2) - (2\*(-2\*c\*e + b\*g)\*Log[b + Sqrt[b^2 - 4\*a\*c] + 2\*c\*x^2])/(b^2 - 4\*a\*c)^(3/2))/4

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]  $\frac{1}{2}*(b*c*d*x^3 - 2*a*c*f*x^3 + a*b*g*x^2 - 2*a*c*x^2*e + b^2*d*x - 2*a*c*d*x - a*b*f*x + 2*a^2*g - a*b*e)/((c*x^4 + b*x^2 + a)*(a*b^2 - 4*a^2*c)) + 1/16*((2*b^3*c^2 - 8*a*b*c^3 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^3 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^2*c - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b^2 - 4*a^2*c)^2*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b*c - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*(a*b^2 - 4*a^2*c)^2*f + 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^6 - 14*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^4*c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^5*c - 2*a*b^6*c + 64*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^2*c^2 + 20*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^4*c^2 + 28*a^2*b^4*c^2 - 96*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*c^3 - 48*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^3 - 10*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^2*c^$

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



$$\begin{aligned}
& ) * 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 * \text{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 * \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}} * c) * a^2 * b^7 + 20 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^3 * b^5 * c + 2 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^2 * b^6 * c - 112 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^4 * b^3 * c^2 - 32 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^3 * b^4 * c^2 - \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^2 * b^5 * c^2 + 192 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^5 * b * c^3 + 96 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^4 * b^2 * c^3 + 16 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^3 * b^3 * c^3 - 48 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^4 * b * c^4 - 2 * (b^2 - 4 * a * c) * a^2 * b^5 * c^2 + 32 * (b^2 - 4 * a * c) * a^3 * b^3 * c^3 - 96 * (b^2 - 4 * a * c) * a^4 * b * c^4 * d + 4 * (2 * a^3 * b^6 * c^2 - 16 * a^4 * b^4 * c^3 + 32 * a^5 * b^2 * c^4 - \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c) * a^3 * b^6 + 8 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^4 * b^4 * c + 2 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^3 * b^5 * c - 16 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^5 * b^2 * c^2 - 8 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^4 * b^3 * c^2 - \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^3 * b^4 * c^2 + 4 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c * a^4 * b^2 * c^3 - 2 * (b^2 - 4 * a * c) * a^3 * b^4 * c^2 + 8 * (b^2 - 4 * a * c) * a^4 * b^2 * c^3 * f * \arctan(2 * \sqrt{1/2} * x / \sqrt{(a * b^3 - 4 * a^2 * b * c - \sqrt{(a * b^3 - 4 * a^2 * b * c)^2 - 4 * (a^2 * b^2 - 4 * a^3 * c)} * (a * b^2 * c - 4 * a^2 * c^2)) / (a * b^2 * c - 4 * a^2 * c^2)) / ((a^3 * b^6 - 12 * a^4 * b^4 * c - 2 * a^3 * b^5 * c + 48 * a^5 * b^2 * c^2 + 16 * a^4 * b^3 * c^2 + a^3 * b^4 * c^2 - 64 * a^6 * c^3 - 32 * a^5 * b * c^3 - 8 * a^4 * b^2 * c^3 + 16 * a^5 * c^4) * \text{abs}(a * b^2 - 4 * a^2 * c) * \text{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 * \text{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}) * \text{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 -
\end{aligned}$$

$$2ab^4c^3 + 16a^3b^2c^4 + 8a^2b^2c^4 + ab^3c^4 - 4a^2b^2c^5 + (ab^4c^2 - 4a^2b^2c^3 - 2ab^3c^3 + ab^2c^4)\sqrt{b^2 - 4ac})e) \log(x^2 + 1/2(ab^3 - 4a^2b^2c + \sqrt{(ab^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)})(ab^2c - 4a^2c^2)))/(ab^2c - 4a^2c^2))/((ab^4 - 8a^2b^2c - 2ab^3c + 16a^3c^2 + 8a^2b^2c^2 + ab^2c^2 - 4a^2c^3)c^2 \operatorname{abs}(ab^2 - 4a^2c)) + 1/8((b^4c - 4ab^2c^2 - 2b^3c^2 + b^2c^3 - (b^3c - 4ab^2c - 2b^2c^2 + bc^3)\sqrt{b^2 - 4ac}))g \operatorname{abs}(ab^2 - 4a^2c) - 2(b^3c^2 - 4ab^2c^3 - 2b^2c^3 + bc^4 - (b^2c^2 - 4ac^3 - 2b^2c^3 + c^4)\sqrt{b^2 - 4ac})) \operatorname{abs}(ab^2 - 4a^2c)e - (ab^6c - 8a^2b^4c^2 - 2ab^5c^2 + 16a^3b^2c^3 + 8a^2b^3c^3 + ab^4c^3 - 4a^2b^2c^4 - (ab^5c - 4a^2b^3c^2 - 2ab^4c^2 + ab^3c^3)\sqrt{b^2 - 4ac}))g + 2(ab^5c^2 - 8a^2b^3c^3 - 2ab^4c^3 + 16a^3b^2c^4 + 8a^2b^2c^4 + ab^3c^4 - 4a^2b^2c^5 - (ab^4c^2 - 4a^2b^2c^3 - 2ab^3c^3 + ab^2c^4)\sqrt{b^2 - 4ac}))e) \log(x^2 + 1/2(ab^3 - 4a^2b^2c - \sqrt{(ab^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)})(ab^2c - 4a^2c^2)))/(ab^2c - 4a^2c^2))/((ab^4 - 8a^2b^2c - 2ab^3c + 16a^3c^2 + 8a^2b^2c^2 + ab^2c^2 - 4a^2c^3)c^2 \operatorname{abs}(ab^2 - 4a^2c))$$

**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]  $\operatorname{int}((gx^3+fx^2+ex+d)/(cx^4+bx^2+a)^2, x)$

[Out]  $-1/4/(4ac-b^2)^{2^{1/2}}/((b+(-4ac+b^2)^{1/2})c)^{1/2}*(-4ac+b^2)^{1/2}/ab^2cd \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) - 1/4c/(4ac-b^2)^{2/a^{1/2}}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) * (-4ac+b^2)^{1/2}b^2d - 1/2/(4ac-b^2)^{2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{1/2}/c)b^2e - 1/2/(4ac-b^2)^{2/(x^2+1/2b/c-1/2*(-4ac+b^2)^{1/2}/c)b^2e - c/(4ac-b^2)^{2^{1/2}}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) * (-4ac+b^2)^{1/2}bf - 1/(4ac-b^2)^{2^{1/2}}/((b+(-4ac+b^2)^{1/2})c)^{1/2} * (-4ac+b^2)^{1/2}b^2cf \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) - 2c^2/(4ac-b^2)^{2a^{1/2}}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) * f + 1/2c/(4ac-b^2)^{2^{1/2}}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) * b^2f + 2/(4ac-b^2)^{2^{1/2}}/((b+(-4ac+b^2)^{1/2})c)^{1/2} * ac^2f \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) - 1/2/(4ac-b^2)^{2^{1/2}}/((b+(-4ac+b^2)^{1/2})c)^{1/2}b^2cf \arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}cx) + 2/(4ac-b^2)^{2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{1/2}/c)ac^2fx + 2/(4ac-b^2)^{2/(x^2+1/2b/c-1/2*(-4ac+b^2)^{1/2}/c)ac^2fx - 1/4c/(4ac-b^2)^{2/a^{1/2}}/((-b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}cx) * b^3d - 1/2/(4ac-b^2)^{2/(x^2+1/2b/c-1/2*(-4ac+b^2)^{1/2}/c)b^2fx + 1/2/(4ac-b^2)^{2^{1/2}}$

$$n(-2cx^2-b+(-4ac+b^2)^{1/2}) * (-4ac+b^2)^{1/2} * b * g + 1/(4ac-b^2)^2 * (-4ac+b^2)^{1/2} * c * e * \ln(2cx^2+b+(-4ac+b^2)^{1/2}) + 2/(4ac-b^2)^2 / (x^2+1/2b/c-1/2 * (-4ac+b^2)^{1/2}/c) * ac * e - 1/(4ac-b^2)^2 * (-4ac+b^2)^{1/2} * c * e * \ln(-2cx^2-b+(-4ac+b^2)^{1/2}) - 1/4/(4ac-b^2)^2 / (x^2+1/2b/c+1/2 * (-4ac+b^2)^{1/2}/c) * (-4ac+b^2)^{1/2} / ab^2 * dx + 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} * cx) - 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} * cx) + 1/4/(4ac-b^2)^2 / (x^2+1/2b/c-1/2 * (-4ac+b^2)^{1/2}/c) * (-4ac+b^2)^{1/2} / ab^2 * dx + 3 * c^2 / (4ac-b^2)^2 * 2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) * c)^{1/2} * a * \operatorname{rctanh}(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} / ab^3 * c * d * \arctan(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) * c)^{1/2} * cx) + 2/(4ac-b^2)^2 / (x^2+1/2b/c+1/2 * (-4ac+b^2)^{1/2}/c) * ac * e - 1/2/(4ac-b^2)^2 / (x^2+1/2b/c+1/2 * (-4ac+b^2)^{1/2}/c) * b^2 * f * x + 1/4/c / (4ac-b^2)^2 / (x^2+1/2b/c-1/2 * (-4ac+b^2)^{1/2}/c) * b^3 * g - 1/(4ac-b^2)^2 / (x^2+1/2b/c+1/2 * (-4ac+b^2)^{1/2}/c) * (-4ac+b^2)^{1/2} * a * g - 1/(4ac-b^2)^2 / (x^2+1/2b/c-1/2 * (-4ac+b^2)^{1/2}/c) * a * b * g + 1/4/c / (4ac-b^2)^2 / (x^2+1/2b/c+1/2 * (-4ac+b^2)^{1/2}/c) * (-4ac+b^2)^{1/2} * b^2 * g - 1/4/c / (4ac-b^2)^2 / (x^2+1/2b/c-1/2 * (-4ac+b^2)^{1/2}/c) * (-4ac+b^2)^{1/2} * b^2 * g + 1/(4ac-b^2)^2 / (x^2+1/2b/c+1/2 * (-4ac+b^2)^{1/2}/c) * (-4ac+b^2)^{1/2} * c * d * x - 1/(4ac-b^2)^2 / (x^2+1/2b/c+1/2 * (-4ac+b^2)^{1/2}/c) * b * c * d * x + 1/4/(4ac-b^2)^2 / (x^2+1/2b/c+1/2 * (-4ac+b^2)^{1/2}/c) / ab^3 * d * x - 1/(4ac-b^2)^2 / (x^2+1/2b/c-1/2 * (-4ac+b^2)^{1/2}/c) * (-4ac+b^2)^{1/2} * c * d * x - 1/(4ac-b^2)^2 / (x^2+1/2b/c-1/2 * (-4ac+b^2)^{1/2}/c) * b * c * d * x + 1/4/(4ac-b^2)^2 / (x^2+1/2b/c-1/2 * (-4ac+b^2)^{1/2}/c) / ab^3 * d * x$$

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

$$\frac{(bcd - 2acf)x^3 - abe + 2a^2g - (2ace - abg)x^2 - (abf - (b^2 - 2ac)d)x}{2((ab^2c - 4a^2c^2)x^4 + a^2b^2 - 4a^3c + (ab^3 - 4a^2bc)x^2)} - \int \frac{abf + (bcd - 2acf)x^2 + (b^2 - 6ac)d - 2(2ace - abg)x}{cx^4 + bx^2 + a} dx$$

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^2*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$



$$\begin{aligned}
& 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 + 43 \\
& 2*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 - 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 + 128*a^3*b^8*g^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^ \\
& 2 - 16*b^11*d^2*z^2 + 384*a^2*b^6*c*d*f*g*z - 4096*a^4*b*c^4*d*e*f*z + 64*a \\
& *b^7*c*d*e*f*z + 2048*a^4*b^2*c^3*d*f*g*z - 1536*a^3*b^4*c^2*d*f*g*z + 3072 \\
& *a^3*b^3*c^3*d*e*f*z - 768*a^2*b^5*c^2*d*e*f*z + 1024*a^5*b*c^3*f^2*g*z + 1 \\
& 92*a^3*b^5*c*f^2*g*z - 9216*a^4*b*c^4*d^2*g*z + 32*a^2*b^6*c*e*f^2*z - 672* \\
& a*b^6*c^2*d^2*e*z + 336*a*b^7*c*d^2*g*z - 768*a^4*b^3*c^2*f^2*g*z + 7936*a^ \\
& 3*b^3*c^3*d^2*g*z - 2496*a^2*b^5*c^2*d^2*g*z + 1536*a^4*b^2*c^3*e*f^2*z - 3 \\
& 84*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e \\
& *z - 32*a*b^8*d*f*g*z - 16*a^2*b^7*f^2*g*z - 2048*a^5*c^4*e*f^2*z + 18432*a \\
& ^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 16*b^9*d^2*g*z - 768*a^3*b*c^3*d*e*f*g \\
& + 32*a*b^5*c*d*e*f*g - 192*a^2*b^3*c^2*d*e*f*g + 16*a^2*b^4*c*e*f^2*g + 48* \\
& a^2*b^4*c*d*f*g^2 - 240*a*b^4*c^2*d^2*e*g - 32*a*b^4*c^2*d*e^2*f + 192*a^3* \\
& b^2*c^2*e*f^2*g + 192*a^3*b^2*c^2*d*f*g^2 + 960*a^2*b^2*c^3*d^2*e*g + 192*a \\
& ^2*b^2*c^3*d*e^2*f - 48*a^3*b^3*c*f^2*g^2 - 192*a^3*b*c^3*e^2*f^2 + 198*a*b \\
& ^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3* \\
& c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 512*a^3*b*c^3*e^3*g + 128*a^3*b^3*c*e*g \\
& ^3 + 60*a*b^5*c*d^2*g^2 + 2016*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*f + 224* \\
& a^3*b*c^3*d*f^3 - 384*a^3*b^2*c^2*e^2*g^2 - 240*a^2*b^3*c^2*d^2*g^2 - 16*a^ \\
& 2*b^3*c^2*e^2*f^2 - 960*a^2*b^2*c^3*d^2*f^2 + 16*b^6*c*d^2*e*g - 8*a*b^6*d* \\
& f*g^2 - 18*a*b^5*c*d*f^3 - 4*a^2*b^5*f^2*g^2 - 288*a^3*c^4*d^2*f^2 - 16*b^5 \\
& *c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9* \\
& a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 4*b^7*d^2*g^2 - 16*a^4*c^3*f^4 - 16*a^3 \\
& *b^4*g^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*x*(81 \\
& 92*a^6*b*c^6 + 32*a^2*b^9*c^2 - 512*a^3*b^7*c^3 + 3072*a^4*b^5*c^4 - 8192*a \\
& ^5*b^3*c^5))/(4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) - \\
& (512*a^4*c^5*e*f - 32*a*b^5*c^3*d*e - 1024*a^3*b*c^5*d*e + 16*a*b^6*c^2*d*g \\
& - 256*a^4*b*c^4*f*g + 384*a^2*b^3*c^4*d*e - 192*a^2*b^4*c^3*d*g - 32*a^2*b \\
& ^4*c^3*e*f + 512*a^3*b^2*c^4*d*g + 16*a^2*b^5*c^2*f*g)/(8*(a^2*b^6 - 64*a^5 \\
& *c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) + (x*(2*b^6*c^3*d^2 - 576*a^3*c^6*d^ \\
& 2 + 64*a^4*c^5*f^2 - 36*a*b^4*c^4*d^2 + 128*a^3*b*c^5*e^2 + 256*a^2*b^2*c^5 \\
& *d^2 - 32*a^2*b^3*c^4*e^2 + 20*a^2*b^4*c^3*f^2 - 96*a^3*b^2*c^4*f^2 - 8*a^2 \\
& *b^5*c^2*g^2 + 32*a^3*b^3*c^3*g^2 + 4*a*b^5*c^3*d*f + 320*a^3*b*c^5*d*f - 9 \\
& 6*a^2*b^3*c^4*d*f + 32*a^2*b^4*c^3*e*g - 128*a^3*b^2*c^4*e*g))/(4*(a^2*b^6 \\
& - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) - (x*(32*a^2*c^5*e^3 - 2*b^ \\
& 3*c^4*d^2*e + b^4*c^3*d^2*g - 4*a^2*b^3*c^2*g^3 + 24*a*b*c^5*d^2*e - 48*a^2 \\
& *c^5*d*e*f - 12*a*b^2*c^4*d^2*g + 16*a^2*b*c^4*e*f^2 - 48*a^2*b*c^4*e^2*g + \\
& 24*a^2*b^2*c^3*e*g^2 - 8*a^2*b^2*c^3*f^2*g - 4*a*b^2*c^4*d*e*f + 2*a*b^3*c \\
& ^3*d*f*g + 24*a^2*b*c^4*d*f*g))/(4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 4 \\
& 8*a^4*b^2*c^2)))*root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 32
\end{aligned}$$

$$\begin{aligned}
& 7680a^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^4c^4e^2g^2z^2 - 512a^3b^7c^4e^2g^2z^2 + 576a^2b^8c^4d^2f^2z^2 - 24576a^5b^3c^3e^2g^2z^2 + 6144a^4b^5c^2e^2g^2z^2 + 24576a^5b^2c^4d^2f^2z^2 - 3072a^3b^6c^2d^2f^2z^2 + 2048a^4b^4c^3d^2f^2z^2 - 1536a^4b^6c^2g^2z^2 + 12288a^6b^4c^4f^2z^2 + 61440a^5b^4c^3d^2f^2z^2 - 49152a^6c^5d^2f^2z^2 + 432a^2b^9c^4d^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 - 32a^2b^10d^2f^2z^2 + 128a^3b^8g^2z^2 - 32768a^6c^5e^2z^2 - 16a^2b^9f^2z^2 - 16b^11d^2z^2 + 384a^2b^6c^4d^2f^2g^2z - 4096a^4b^4c^4d^2e^2f^2z + 64a^2b^7c^4d^2e^2f^2z + 2048a^4b^2c^3d^2f^2g^2z - 1536a^3b^4c^2d^2f^2g^2z + 3072a^3b^3c^3d^2e^2f^2z - 768a^2b^5c^2d^2e^2f^2z + 1024a^5b^3c^3f^2g^2z + 192a^3b^5c^4f^2g^2z - 9216a^4b^4c^4d^2g^2z + 32a^2b^6c^4e^2f^2z - 672a^2b^6c^2d^2e^2z + 336a^2b^7c^4d^2g^2z - 768a^4b^3c^2f^2g^2z + 7936a^3b^3c^3d^2g^2z - 2496a^2b^5c^2d^2g^2z + 1536a^4b^2c^3e^2f^2z - 384a^3b^4c^2e^2f^2z - 15872a^3b^2c^4d^2e^2z + 4992a^2b^4c^3d^2e^2z - 32a^2b^8d^2f^2g^2z - 16a^2b^7f^2g^2z - 2048a^5c^4e^2f^2z + 18432a^4c^5d^2e^2z + 32b^8c^4d^2e^2z - 16b^9d^2g^2z - 768a^3b^3c^3d^2e^2f^2g^2 + 32a^2b^5c^4d^2e^2f^2g^2 - 192a^2b^3c^2d^2e^2f^2g^2 + 16a^2b^4c^4e^2f^2g^2 + 48a^2b^4c^4d^2f^2g^2 - 240a^2b^4c^2d^2e^2g^2 - 32a^2b^4c^2d^2e^2f^2 + 192a^3b^2c^2e^2f^2g^2 + 192a^3b^2c^2d^2e^2f^2g^2 + 960a^2b^2c^3d^2e^2f^2g^2 + 192a^2b^2c^3d^2e^2f^2 - 48a^3b^3c^4f^2g^2 - 192a^3b^3c^3e^2f^2 + 198a^2b^4c^2d^2f^2 + 144a^2b^3c^2d^2f^3 - 960a^2b^3c^4d^2e^2 + 240a^2b^3c^3d^2e^2 + 768a^3c^4d^2e^2f^2 + 512a^3b^3c^3e^2f^2g^2 + 128a^3b^3c^3e^2f^2g^2 + 60a^2b^5c^4d^2g^2 + 2016a^2b^4c^4d^3f^2 - 496a^2b^3c^3d^3f^2 + 224a^3b^3c^3d^2f^3 - 384a^3b^2c^2e^2f^2g^2 - 240a^2b^3c^2d^2f^2g^2 - 16a^2b^3c^2e^2f^2 - 960a^2b^2c^3d^2f^2 + 16b^6c^4d^2e^2g^2 - 8a^2b^6d^2f^2g^2 - 18a^2b^5c^4d^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^2 - 9b^6c^4d^2f^2 - 9a^2b^4c^4f^4 + 360a^2b^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*e - 2*a*g)/(2*(4*a*c - b^2))) + (x^2*(2*c*e - b*g))/(2*(4*a*c - b^2)) + (x*(2*a*c*d - b^2*d + a*b*f))/(2*a*(4*a*c - b^2)) - (c*x^3*(b*d - 2*a*f))/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4)
\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

$$\frac{x(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right) \left(\frac{b^2(cd - ah) + 4abcf - 4ac(ah + 3cd)}{\sqrt{b^2 - 4ac}} + abh - 2acf\right)}{2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b - \sqrt{b^2 - 4ac}}}$$

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,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.229$ , Rules used = {1673, 1678, 1166, 205, 1247, 638, 618, 206}

$$\frac{x(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right) \left(\frac{b^2(cd - ah) + 4abcf - 4ac(ah + 3cd)}{\sqrt{b^2 - 4ac}} + abh - 2acf + bcd\right)}{2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b + \sqrt{b^2 - 4ac}}}\right) \left(-\frac{b^2(cd - ah) + 4abcf - 4ac(ah + 3cd)}{\sqrt{b^2 - 4ac}} + abh - 2acf + bcd\right)}{2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b + \sqrt{b^2 - 4ac}}} - \frac{-2bx + x^2(2ce - bx) + be}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{(2ce - bx) \tanh^{-1}\left(\frac{b+2x^2}{\sqrt{b^2 - 4ac}}\right)}{(b^2 - 4ac)^{3/2}}$$

Antiderivative was successfully verified.

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

[Out] -(b\*e - 2\*a\*g + (2\*c\*e - b\*g)\*x^2)/(2\*(b^2 - 4\*a\*c)\*(a + b\*x^2 + c\*x^4)) + (x\*(b^2\*d - a\*b\*f - 2\*a\*(c\*d - a\*h) + (b\*c\*d - 2\*a\*c\*f + a\*b\*h)\*x^2))/(2\*a\*(b^2 - 4\*a\*c)\*(a + b\*x^2 + c\*x^4)) + ((b\*c\*d - 2\*a\*c\*f + a\*b\*h + (4\*a\*b\*c\*f + b^2\*(c\*d - a\*h) - 4\*a\*c\*(3\*c\*d + a\*h))/Sqrt[b^2 - 4\*a\*c])\*ArcTan[(Sqrt[2]\*Sqrt[c]\*x)/Sqrt[b - Sqrt[b^2 - 4\*a\*c]])/(2\*Sqrt[2]\*a\*Sqrt[c]\*(b^2 - 4\*a\*c)\*Sqrt[b - Sqrt[b^2 - 4\*a\*c]]) + ((b\*c\*d - 2\*a\*c\*f + a\*b\*h - (4\*a\*b\*c\*f + b^2\*(c\*d - a\*h) - 4\*a\*c\*(3\*c\*d + a\*h))/Sqrt[b^2 - 4\*a\*c])\*ArcTan[(Sqrt[2]\*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)\*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 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]
```

2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4\*a\*c, 0] && LtQ[p, -1]

Rubi steps

$$\begin{aligned}
 \int \frac{d + ex + fx^2 + gx^3 + hx^4}{(a + bx^2 + cx^4)^2} dx &= \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^2} dx \\
 &= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \text{Subst} \left( \int \frac{e + gx^2}{(a + bx + c)} \right. \\
 &= -\frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
 &= -\frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
 &= -\frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}
 \end{aligned}$$

**Mathematica [A]** time = 1.88, size = 489, normalized size = 1.11

$$\frac{\sqrt{2} \tan^{-1} \left( \frac{-d + ex}{\sqrt{a + bx^2 + cx^4}} \right) \left( b(d\sqrt{b^2 - 4ac} + a\sqrt{b^2 - 4ac} + 4ef) - 2a(\sqrt{b^2 - 4ac} + 2bh + 6cd) + b^2(ad - ah) \right) + \sqrt{2} \tan^{-1} \left( \frac{-d + ex}{\sqrt{b^2 - 4ac}} \right) \left( b(d\sqrt{b^2 - 4ac} + a\sqrt{b^2 - 4ac} - 4ef) + 2a(-\sqrt{b^2 - 4ac} + 2bh + 6cd) + b^2(ad - ah) \right) + 2bh - 2a \log(\sqrt{b^2 - 4ac} - b - 2cx^2) + 2bh - 2a \log(\sqrt{b^2 - 4ac} + b + 2cx^2)}{2a^2(4ac - b^2)(a + bx^2 + cx^4)^2}$$

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] ((-4\*a^2\*(g + h\*x) - 2\*b\*d\*x\*(b + c\*x^2) + 4\*a\*c\*x\*(d + x\*(e + f\*x)) + 2\*a\*b\*(e + x\*(f - x\*(g + h\*x))))/(a\*(-b^2 + 4\*a\*c)\*(a + b\*x^2 + c\*x^4)) + (Sqrt[2]\*(b^2\*(c\*d - a\*h) - 2\*a\*c\*(6\*c\*d + Sqrt[b^2 - 4\*a\*c]\*f + 2\*a\*h) + b\*(c\*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)\*L



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

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

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



$$\begin{aligned} & 1/2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^2*f+2/(4*a*c-b^2)^2*2^{(1/2)}/( \\ & (b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*a*c^2*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) \\ & )*c)^{(1/2)}*c*x)-1/2/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)} \\ & )*b^2*c*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/4*c/(4*a*c \\ & -b^2)^2/a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b+(-4*a*c \\ & +b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^3*d+a/(4*a*c-b^2)^2*c*2^{(1/2)}/((-b+(-4*a*c \\ & +b^2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x \\ & )*b*h+1/2/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*b*g*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)} \\ & )+1/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*c*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)} \\ & )-1/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*c*e*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)} \\ & )+3/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)} \\ & )*c^2*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/(4*a*c-b^2)^2*2^{(1/2)}/ \\ & ((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b*c^2*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)} \\ & )*c*x)+3*c^2/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/ \\ & ((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*d+c^2/(4*a*c-b^2)^2*2^{(1/2)}/ \\ & ((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*d+1/4/(4*a*c-b^2)^2*2^{(1/2)}/ \\ & ((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}/a*b^3*c*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/4/(4*a*c-b^2)^2*2^{(1/2)}/ \\ & ((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^3*h-1/2/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*b*g*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)} \\ & )+a/(4*a*c-b^2)^2*c*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*h-a/(4*a*c-b^2)^2*c*2^{(1/2)}/ \\ & ((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*h+a/(4*a*c-b^2)^2*c*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*h+1/4/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^3*h \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((h\*x^4+g\*x^3+f\*x^2+e\*x+d)/(c\*x^4+b\*x^2+a)^2,x, algorithm="maxima")

[Out]  $\frac{1}{2} * ((b*c*d - 2*a*c*f + a*b*h)*x^3 - a*b*e + 2*a^2*g - (2*a*c*e - a*b*g)*x^2 - (a*b*f - 2*a^2*h - (b^2 - 2*a*c)*d)*x) / ((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)*x^2) + \frac{1}{2} * \text{integrate}((a*b*f - 2*a^2*h + (b*c*d - 2*a*c*f + a*b*h)*x^2 + (b^2 - 6*a*c)*d - 2*(2*a*c*e - a*b*g)*x) / (c*x^4 + b*x^2 + a), x) / (a*b^2 - 4*a^2*c)$

**mupad** [B] time = 2.31, size = 13024, normalized size = 29.67

result too large to display



Verification of antiderivative is not currently implemented for this CAS.

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

[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) + \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*a^3*b^3*c^4*h^3 - 4*a^4*b*c^2*h^3 - 3*b^4*c^3*d^2*f - 32*a^3*c^4*e^2*h + b^5*c^2*d^2*h + 8*a^4*c^3*f*h^2 + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + a*b^5*c*d*h^2 + 48*a^3*c^4*d*f*h + 16*a*b^2*c^4*d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 4*a*b^4*c^2*d*g^2 + 16*a^2*b*c^4*e^2*f - a*b^3*c^3*d^2*h - 60*a^2*b*c^4*d^2*h - 28*a^3*b*c^3*d*h^2 + a^2*b^4*c*f*h^2 - 28*a^3*b*c^3*f^2*h - 24*a^2*b^2*c^3*d*g^2 - 9*a^2*b^3*c^2*d*h^2 + 4*a^2*b^3*c^2*f*g^2 - 5*a^2*b^3*c^2*f^2*h + 18*a^3*b^2*c^2*f*h^2 - 8*a^3*b^2*c^2*g^2*h - 16*a*b^3*c^3*d*e*g + 96*a^2*b*c^4*d*e*g - 4*a*b^4*c^2*d*f*h + 32*a^3*b*c^3*e*g*h + 52*a^2*b^2*c^3*d*f*h - 16*a^2*b^2*c^3*e*f*g)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - \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 + 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*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$

$$\begin{aligned}
& ^4c^3*ef^2*z + 32*a^2*b^6*c^2*ef^2*z - 15872*a^3*b^2*c^5*d^2*ez + 4992* \\
& a^2*b^4*c^4*d^2*ez + 16*a^3*b^7*gh^2*z + 2048*a^6*c^4*eh^2*z - 2048*a^5* \\
& c^5*ef^2*z + 32*b^8*c^2*d^2*ez + 18432*a^4*c^6*d^2*ez - 16*b^9*c^d^2*gz \\
& - 256*a^4*b*c^3*ef*gh - 768*a^3*b*c^4*d*ef*g + 32*a*b^5*c^2*d*ef*g - 1 \\
& 92*a^3*b^3*c^2*ef*gh + 896*a^3*b^2*c^3*d*ef*gh - 96*a^2*b^4*c^2*d*ef*gh - \\
& 192*a^2*b^3*c^3*d*ef*g + 48*a^3*b^4*c*f*g^2*h + 16*a^3*b^4*c*ef*gh^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*ef^2*h - 240*a*b^4 \\
& *c^3*d^2*ef*g - 32*a*b^4*c^3*d*ef^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*ef*gh^2 - 224*a^3*b^3*c^2*d*g^ \\
& 2*h + 192*a^3*b^2*c^3*ef^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*ef^2*g + 144*a^2*b^3*c^3*d^2*f*h + 16*a^2*b^4*c^2 \\
& *ef^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*ef^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a^2*b^2*c^4*d^2*ef*g + 192*a^2*b^2* \\
& c^4*d*ef^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*ef^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*ef*g^3 - 192*a^3*b*c^4*ef^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*ef^2 + 240*a*b^3*c^4*d^2*ef^2 + 256*a^4*c^4*ef^2*f*h - 192*a^4*c \\
& ^4*d*f^2*h + 16*b^6*c^2*d^2*ef*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*ef^2*f + 512*a^3*b*c \\
& ^4*ef^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*ef^2*h^2 - 464*a^3*b^2*c^3*d^2*h^2 - 384*a^3*b^2*c^3*ef^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*ef^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*ef^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*ef^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^6*d^4 - a^2*b^6*f \\
& ^2*h^2 - b^8*d^2*h^2, z, k)*(root(1572864*a^8*b^2*c^6*z^4 - 983040*a^7*b^4* \\
& c^5*z^4 + 327680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^10*c^ \\
& 2*z^4 - 256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 192*a^3*b^8*c*f*h*z^2 + \\
& 57344*a^6*b*c^5*d*h*z^2 + 32768*a^6*b*c^5*ef*gh*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*ef*gh*z^2 + 15360*a^4*b^5*c^3* \\
& d*h*z^2 + 6144*a^4*b^5*c^3*ef*gh*z^2 - 2048*a^3*b^7*c^2*d*h*z^2 - 512*a^3*b^7 \\
& *c^2*ef*gh*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6*c^3*d*f*z^2 + 2048* \\
& a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 12288*a^7*b*c^4*h^2*z^2 + 1 \\
& 28*a^3*b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^2 - 16*a^2*b^9*c*f^2*z^2 + 614 \\
& 40*a^5*b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 - 16384*a^7*c^5*f*h*z^2 - 4915 \\
& 2*a^6*c^6*d*f*z^2 - 8192*a^6*b^3*c^3*h^2*z^2 + 1536*a^5*b^5*c^2*h^2*z^2 - 8
\end{aligned}$$

$$\begin{aligned}
& 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 - 16a^3b^9h^2z^2 - 32768a^6c^6e^2z^2 - 16b^{11}c^d^2z^2 - 6144a^5b^c^4d^2g^2h^2z + 96a^2b^7c^d^2g^2h^2z - 4096a^4b^c^5d^2e^2f^2z + 64a^2b^7c^2d^2e^2f^2z - 32a^2b^8c^d^2f^2g^2z + 4608a^4b^3c^3d^2g^2h^2z - 1152a^3b^5c^2d^2g^2h^2z - 9216a^4b^2c^4d^2e^2h^2z + 2304a^3b^4c^3d^2e^2h^2z + 2048a^4b^2c^4d^2f^2g^2z - 1536a^3b^4c^3d^2f^2g^2z + 384a^2b^6c^2d^2f^2g^2z - 192a^2b^6c^2d^2e^2h^2z + 3072a^3b^3c^4d^2e^2f^2z - 768a^2b^5c^3d^2e^2f^2z - 1024a^6b^c^3g^2h^2z - 192a^4b^5c^2g^2h^2z + 1024a^5b^c^4f^2g^2z - 32a^3b^6c^2e^2h^2z - 16a^2b^7c^2f^2g^2z - 9216a^4b^c^5d^2g^2z + 336a^2b^7c^2d^2g^2z - 672a^2b^6c^3d^2e^2z + 12288a^5c^5d^2e^2h^2z + 768a^5b^3c^2g^2h^2z - 1536a^5b^2c^3e^2h^2z - 768a^4b^3c^3f^2g^2z + 384a^4b^4c^2e^2h^2z + 192a^3b^5c^2f^2g^2z + 7936a^3b^3c^4d^2g^2z - 2496a^2b^5c^3d^2g^2z + 1536a^4b^2c^4e^2f^2z - 384a^3b^4c^3e^2f^2z + 32a^2b^6c^2e^2f^2z - 15872a^3b^2c^5d^2e^2z + 4992a^2b^4c^4d^2e^2z + 16a^3b^7g^2h^2z + 2048a^6c^4e^2h^2z - 2048a^5c^5e^2f^2z + 32b^8c^2d^2e^2z + 18432a^4c^6d^2e^2z - 16b^9c^d^2g^2z - 256a^4b^c^3e^2f^2g^2h - 768a^3b^c^4d^2e^2f^2g + 32a^2b^5c^2d^2e^2f^2g - 192a^3b^3c^2e^2f^2g^2h + 896a^3b^2c^3d^2e^2g^2h - 96a^2b^4c^2d^2e^2g^2h - 192a^2b^3c^3d^2e^2f^2g + 48a^3b^4c^2f^2g^2h + 16a^3b^4c^2e^2g^2h^2 + 24a^2b^5c^2d^2g^2h^2 + 2208a^3b^c^4d^2f^2h + 800a^4b^c^3d^2f^2h^2 - 102a^2b^5c^2d^2f^2h - 30a^2b^5c^2d^2f^2h^2 - 896a^3b^c^4d^2e^2h - 240a^2b^4c^3d^2e^2g - 32a^2b^4c^3d^2e^2f + 12a^2b^6c^2d^2f^2h - 8a^2b^6c^2d^2f^2g^2 + 64a^4b^2c^2f^2g^2h + 192a^4b^2c^2e^2g^2h^2 - 224a^3b^3c^2d^2g^2h + 192a^3b^2c^3e^2f^2h - 864a^3b^2c^3d^2f^2h + 336a^3b^3c^2d^2f^2h^2 + 192a^3b^2c^3e^2f^2g + 144a^2b^3c^3d^2f^2h + 16a^2b^4c^2e^2f^2g - 12a^2b^4c^2d^2f^2h + 192a^3b^2c^3d^2f^2g^2 + 96a^2b^3c^3d^2e^2h + 48a^2b^4c^2d^2f^2g^2 + 960a^2b^2c^4d^2e^2g + 192a^2b^2c^4d^2e^2f - 48a^4b^3c^2g^2h^2 + 80a^3b^3c^2f^3h - 42a^3b^4c^2f^2h^2 - 192a^4b^c^3e^2h^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^c^4e^2f^2 + 60a^2b^5c^2d^2g^2 + 198a^2b^4c^3d^2f^2 + 144a^2b^3c^3d^2f^3 - 960a^2b^c^5d^2e^2 + 240a^2b^3c^4d^2e^2 + 256a^4c^4e^2f^2h - 192a^4c^4d^2f^2h + 16b^6c^2d^2e^2g + 96a^5b^c^2f^2h^3 + 96a^4b^c^3f^3h + 80a^4b^3c^2f^3h^3 + 6a^2b^5c^2f^3h + 768a^3c^5d^2e^2f + 512a^3b^c^4e^3g + 132a^2b^4c^3d^3h - 28a^3b^4c^2d^3h^3 + 12a^2b^6c^2d^2h^2 + 2016a^2b^c^5d^3f - 496a^2b^3c^4d^3f + 224a^3b^c^4d^2f^3 - 18a^2b^5c^2d^2f^3 - 192a^4b^2c^2f^2h^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 - 2a^2b^7d^2f^2h^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 - 10b^6c^2d^3h +
\end{aligned}$$

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

$$\begin{aligned}
& 208a^3b^4c^4d^2f^2h + 800a^4b^4c^3d^2f^2h^2 - 102a^5b^4c^2d^2f^2h - 30a^2b^5c^4d^2f^2h^2 - 896a^3b^4c^4d^2e^2h - 240a^4b^4c^3d^2e^2fg - 32a^4b^4c^3d^2e^2f + 12a^4b^6c^4d^2f^2h - 8a^4b^6c^4d^2fg^2 + 64a^4b^2c^2d^2fg^2h + 192a^4b^2c^2d^2e^2fg^2h - 224a^3b^3c^2d^2fg^2h + 192a^3b^2c^3e^2f^2h - 864a^3b^2c^3d^2f^2h + 336a^3b^3c^2d^2f^2h^2 + 192a^3b^2c^3e^2f^2hg + 144a^2b^3c^3d^2f^2h + 16a^2b^4c^2e^2f^2hg - 12a^2b^4c^2d^2f^2hg + 192a^3b^2c^3d^2fg^2 + 96a^2b^3c^3d^2e^2h + 48a^2b^4c^2d^2fg^2 + 960a^2b^2c^4d^2e^2fg + 192a^2b^2c^4d^2e^2f - 48a^4b^3c^2fg^2h^2 + 80a^3b^3c^2f^3h - 42a^3b^4c^2f^2h^2 - 192a^4b^3c^3e^2h^2 - 4a^2b^5c^2f^2g^2 - 192a^4b^2c^2d^2h^3 - 192a^2b^2c^4d^3h + 128a^3b^3c^2e^2fg^3 - 192a^3b^3c^4e^2f^2 + 60a^4b^5c^2d^2fg^2 + 198a^4b^4c^3d^2f^2 + 144a^2b^3c^3d^2f^3 - 960a^2b^3c^5d^2e^2 + 240a^4b^3c^4d^2e^2 + 256a^4c^4e^2f^2h - 192a^4c^4d^2f^2h + 16b^6c^2d^2e^2fg + 96a^5b^4c^2f^2h^3 + 96a^4b^4c^3f^3h + 80a^4b^3c^3f^3h + 6a^2b^5c^2f^3h + 768a^3c^5d^2e^2f + 512a^3b^4c^4e^3fg + 132a^4b^4c^3d^3h - 28a^3b^4c^4d^3h + 12a^4b^6c^4d^2h^2 + 2016a^2b^3c^5d^3f - 496a^4b^3c^4d^3f + 224a^3b^4c^4d^3f - 18a^4b^5c^2d^2f^3 - 192a^4b^2c^2f^2h^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 - 2a^4b^7d^2f^2h^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 - 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^3h^3 - 24a^5b^2c^4h^4 - 16a^3b^4c^4g^4 + 360a^4b^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 - b^8d^2h^2, \\
& z, k) * x * (8192a^6b^6c^6 + 32a^2b^9c^2 - 512a^3b^7c^3 + 3072a^4b^5c^4 - 8192a^5b^3c^5) / (4(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) - (512a^4c^5e^2f - 32a^4b^5c^3d^2e - 1024a^3b^4c^5d^2e + 16a^4b^6c^2d^2fg - 512a^4b^4c^4e^2h - 256a^4b^4c^4f^2g + 384a^2b^3c^4d^2e - 192a^2b^4c^3d^2fg - 32a^2b^4c^3e^2f + 512a^3b^2c^4d^2fg + 16a^2b^5c^2f^2fg + 128a^3b^3c^3e^2h - 64a^3b^4c^2g^2h + 256a^4b^2c^3g^2h) / (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 - 64a^5c^4h^2 - 36a^4b^4c^4d^2 + 128a^3b^4c^5e^2 + 2a^2b^6c^4h^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 - 4a^3b^4c^2h^2 - 384a^4c^5d^2h + 4a^4b^5c^3d^2f + 320a^3b^4c^5d^2f + 64a^4b^4c^4f^2h - 96a^2b^3c^4d^2f + 8a^2b^4c^3d^2h + 32a^2b^4c^3e^2fg + 64a^3b^2c^4d^2h - 128a^3b^2c^4e^2fg - 12a^2b^5c^2f^2h + 32a^3b^3c^3f^2h) / (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^2fg - 4a^2b^3c^2g^3 + 24a^4b^5c^5d^2e - 48a^2c^5d^2e^2f - 16a^3c^4e^2f^2h - 12a^4b^2c^4d^2fg + 16a^2b^4c^4e^2fg - 48a^2b^4c^4e^2fg + 8a^3b^4c^3e^2h^2 - a^2b^4c^4g^2h^2 + 24a^2b^2c^3e^2fg^2 - 8a^2b^2c^3f^2fg + 2
\end{aligned}$$

$$\begin{aligned}
& *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)))*\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 \\
& + 6144*a^4*b^10*c^2*z^4 - 256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 192*a \\
& ^3*b^8*c*f*h*z^2 + 57344*a^6*b*c^5*d*h*z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a \\
& ^2*b^9*c*d*h*z^2 - 32*a*b^10*c*d*f*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^ \\
& 4*b^6*c^2*f*h*z^2 - 49152*a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g*z^2 + \\
& 15360*a^4*b^5*c^3*d*h*z^2 + 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*c^2*d* \\
& h*z^2 - 512*a^3*b^7*c^2*e*g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6* \\
& c^3*d*f*z^2 + 2048*a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 12288*a^ \\
& 7*b*c^4*h^2*z^2 + 128*a^3*b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^2 - 16*a^2* \\
& b^9*c*f^2*z^2 + 61440*a^5*b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 - 16384*a^7 \\
& *c^5*f*h*z^2 - 49152*a^6*c^6*d*f*z^2 - 8192*a^6*b^3*c^3*h^2*z^2 + 1536*a^5* \\
& b^5*c^2*h^2*z^2 - 8192*a^6*b^2*c^4*g^2*z^2 + 6144*a^5*b^4*c^3*g^2*z^2 - 153 \\
& 6*a^4*b^6*c^2*g^2*z^2 - 8192*a^5*b^3*c^4*f^2*z^2 + 1536*a^4*b^5*c^3*f^2*z^2 \\
& + 24576*a^5*b^2*c^5*e^2*z^2 - 6144*a^4*b^4*c^4*e^2*z^2 + 512*a^3*b^6*c^3*e \\
& ^2*z^2 - 61440*a^4*b^3*c^5*d^2*z^2 + 24064*a^3*b^5*c^4*d^2*z^2 - 4608*a^2*b \\
& ^7*c^3*d^2*z^2 - 16*a^3*b^9*h^2*z^2 - 32768*a^6*c^6*e^2*z^2 - 16*b^11*c*d^2 \\
& *z^2 - 6144*a^5*b*c^4*d*g*h*z + 96*a^2*b^7*c*d*g*h*z - 4096*a^4*b*c^5*d*e*f \\
& *z + 64*a*b^7*c^2*d*e*f*z - 32*a*b^8*c*d*f*g*z + 4608*a^4*b^3*c^3*d*g*h*z - \\
& 1152*a^3*b^5*c^2*d*g*h*z - 9216*a^4*b^2*c^4*d*e*h*z + 2304*a^3*b^4*c^3*d*e \\
& *h*z + 2048*a^4*b^2*c^4*d*f*g*z - 1536*a^3*b^4*c^3*d*f*g*z + 384*a^2*b^6*c^ \\
& 2*d*f*g*z - 192*a^2*b^6*c^2*d*e*h*z + 3072*a^3*b^3*c^4*d*e*f*z - 768*a^2*b^ \\
& 5*c^3*d*e*f*z - 1024*a^6*b*c^3*g*h^2*z - 192*a^4*b^5*c*g*h^2*z + 1024*a^5*b \\
& *c^4*f^2*g*z - 32*a^3*b^6*c*e*h^2*z - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*c^5 \\
& *d^2*g*z + 336*a*b^7*c^2*d^2*g*z - 672*a*b^6*c^3*d^2*e*z + 12288*a^5*c^5*d* \\
& e*h*z + 768*a^5*b^3*c^2*g*h^2*z - 1536*a^5*b^2*c^3*e*h^2*z - 768*a^4*b^3*c^ \\
& 3*f^2*g*z + 384*a^4*b^4*c^2*e*h^2*z + 192*a^3*b^5*c^2*f^2*g*z + 7936*a^3*b^ \\
& 3*c^4*d^2*g*z - 2496*a^2*b^5*c^3*d^2*g*z + 1536*a^4*b^2*c^4*e*f^2*z - 384*a \\
& ^3*b^4*c^3*e*f^2*z + 32*a^2*b^6*c^2*e*f^2*z - 15872*a^3*b^2*c^5*d^2*e*z + 4 \\
& 992*a^2*b^4*c^4*d^2*e*z + 16*a^3*b^7*g*h^2*z + 2048*a^6*c^4*e*h^2*z - 2048* \\
& a^5*c^5*e*f^2*z + 32*b^8*c^2*d^2*e*z + 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2 \\
& *g*z - 256*a^4*b*c^3*e*f*g*h - 768*a^3*b*c^4*d*e*f*g + 32*a*b^5*c^2*d*e*f*g \\
& - 192*a^3*b^3*c^2*e*f*g*h + 896*a^3*b^2*c^3*d*e*g*h - 96*a^2*b^4*c^2*d*e*g \\
& *h - 192*a^2*b^3*c^3*d*e*f*g + 48*a^3*b^4*c*f*g^2*h + 16*a^3*b^4*c*e*g*h^2 \\
& + 24*a^2*b^5*c*d*g^2*h + 2208*a^3*b*c^4*d^2*f*h + 800*a^4*b*c^3*d*f*h^2 - 1 \\
& 02*a*b^5*c^2*d^2*f*h - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h - 240*a \\
& *b^4*c^3*d^2*e*g - 32*a*b^4*c^3*d*e^2*f + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d* \\
& f*g^2 + 64*a^4*b^2*c^2*f*g^2*h + 192*a^4*b^2*c^2*e*g*h^2 - 224*a^3*b^3*c^2* \\
& d*g^2*h + 192*a^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 336*a^3*b^3*c \\
& ^2*d*f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2*b^3*c^3*d^2*f*h + 16*a^2*b^4 \\
& *c^2*e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^3*b^2*c^3*d*f*g^2 + 96*a^2*b^ \\
& 3*c^3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a^2*b^2*c^4*d^2*e*g + 192*a^2*
\end{aligned}$$

$$\begin{aligned}
& b^2c^4de^2f - 48a^4b^3c^2g^2h^2 + 80a^3b^3c^2f^3h - 42a^3b^4c^2f^2h^2 - 192a^4b^3c^3e^2h^2 - 4a^2b^5c^2f^2g^2 - 192a^4b^2c^2d^2h^3 - 192a^2b^2c^4d^3h + 128a^3b^3c^2e^2g^3 - 192a^3b^3c^4e^2f^2 + 60ab^5c^2d^2g^2 + 198a^2b^4c^3d^2f^2 + 144a^2b^3c^3d^2f^3 - 960a^2b^3c^5d^2e^2 + 240a^2b^3c^4d^2e^2 + 256a^4c^4e^2f^2h - 192a^4c^4d^2f^2h + 16b^6c^2d^2e^2g + 96a^5b^3c^2f^2h^3 + 96a^4b^3c^3f^3h + 80a^4b^3c^2f^2h^3 + 6a^2b^5c^2f^3h + 768a^3c^5d^2e^2f + 512a^3b^3c^4e^3g + 132a^2b^4c^3d^3h - 28a^3b^4c^2d^2h^3 + 12a^2b^6c^2d^2h^2 + 2016a^2b^3c^5d^3f - 496a^2b^3c^4d^3f + 224a^3b^3c^4d^2f^3 - 18a^2b^5c^2d^2f^3 - 192a^4b^2c^2f^2h^2 - 48a^3b^3c^2f^2g^2 - 16a^3b^3c^2e^2h^2 - 464a^3b^2c^3d^2h^2 - 384a^3b^2c^3e^2g^2 + 42a^2b^4c^2d^2h^2 - 240a^2b^3c^3d^2g^2 - 16a^2b^3c^3e^2f^2 - 960a^2b^2c^4d^2f^2 + 6b^7c^2d^2f^2h - 2a^2b^7d^2f^2h^2 - 32a^5c^3f^2h^2 - 4a^3b^5g^2h^2 - 864a^4c^4d^2h^2 - 9b^6c^2d^2f^2 - 288a^3c^5d^2f^2 - 16b^5c^3d^2e^2 - 24a^3b^2c^3f^4 - 9a^2b^4c^2f^4 - 10b^6c^2d^3h + 6a^3b^5f^2h^3 - 1728a^3c^5d^3h - 192a^5c^3d^2h^3 - 4b^7c^2d^2g^2 + 30b^5c^3d^3f + 6a^2b^6d^2h^3 - 24a^5b^2c^2h^4 - 16a^3b^4c^2g^4 + 360a^2b^2c^5d^4 - 16a^6c^2h^4 - 9a^4b^4h^4 - 16a^4c^4f^4 - 256a^3c^5e^4 - 25b^4c^4d^4 - 1296a^2c^6d^4 - a^2b^6f^2h^2 - b^8d^2h^2, z, k), k, 1, 4)
\end{aligned}$$

**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((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

$$\frac{-\left(x^2(-2aci + b^2i - bcg + 2c^2e)\right) - b(ai + ce) + 2acg}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x\left(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d\right)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{x}}{\sqrt{b^2-4ac}}\right)\left(\frac{b^2(cd-ah)+4abf-4ac(ah+3cd)}{\sqrt{b^2-4ac}} + abh - 2acf + bcd\right)}{2\sqrt{2}a\sqrt{c}(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{x}}{\sqrt{b^2-4ac}}\right)\left(\frac{b^2(cd-ah)+4abf-4ac(ah+3cd)}{\sqrt{b^2-4ac}} + abh - 2acf + bcd\right)}{2\sqrt{2}a\sqrt{c}(b^2-4ac)\sqrt{\sqrt{b^2-4ac}+b}} + \frac{\tanh^{-1}\left(\frac{bx^2}{\sqrt{b^2-4ac}}\right)(2ai - bg + 2ce)}{(b^2 - 4ac)^{3/2}}$$

**Rubi [A]** time = 1.12, antiderivative size = 468, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 9, integrand size = 40,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.225$ , Rules used = {1673, 1678, 1166, 205, 1663, 1660, 12, 618, 206}

$$\frac{x^2(-2aci + b^2i - bcg + 2c^2e) - b(ai + ce) + 2acg}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{x}}{\sqrt{b^2-4ac}}\right)\left(\frac{b^2(cd-ah)+4abf-4ac(ah+3cd)}{\sqrt{b^2-4ac}} + abh - 2acf + bcd\right)}{2\sqrt{2}a\sqrt{c}(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{x}}{\sqrt{b^2-4ac}}\right)\left(\frac{b^2(cd-ah)+4abf-4ac(ah+3cd)}{\sqrt{b^2-4ac}} + abh - 2acf + bcd\right)}{2\sqrt{2}a\sqrt{c}(b^2-4ac)\sqrt{\sqrt{b^2-4ac}+b}} + \frac{\tanh^{-1}\left(\frac{bx^2}{\sqrt{b^2-4ac}}\right)(2ai - bg + 2ce)}{(b^2 - 4ac)^{3/2}}$$

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] && (Gt



Q[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] && 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 40x^5}{(a + bx^2 + cx^4)^2} dx &= \int \frac{x(e + gx^2 + 40x^4)}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \text{Subst} \left( \int \frac{e -}{(a} \right. \\
&= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf -}{2a} \\
&= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf -}{2a} \\
&= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf -}{2a} \\
&= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf -}{2a}
\end{aligned}$$

**Mathematica [A]** time = 2.11, size = 524, normalized size = 1.12

$$\frac{2 \sqrt{c} (b^2 - 2ac + ab + a^2) \sqrt{a^2 + b^2 + c^2} + 2 \sqrt{c} (b^2 + ab + a^2) \sqrt{a^2 + b^2 + c^2} + 2 \sqrt{c} (b^2 + ab + a^2) \sqrt{a^2 + b^2 + c^2}}{a^2 (b^2 - 4ac)^2 \sqrt{a^2 + b^2 + c^2}} + \frac{\sqrt{2} \tan^{-1} \left( \frac{\sqrt{2} x}{\sqrt{a^2 + b^2 + c^2}} \right) \left( b \left( a \sqrt{b^2 - 4ac} + a \sqrt{b^2 - 4ac} + 4ac \right) - 2c \left( \sqrt{b^2 - 4ac} + 2ab + 6a \right) + b^2 (ad - ab) \right)}{c \sqrt{c} (b^2 - 4ac)^2 \sqrt{a^2 + b^2 + c^2}} + \frac{\sqrt{2} \tan^{-1} \left( \frac{\sqrt{2} x}{\sqrt{a^2 + b^2 + c^2}} \right) \left( b \left( a \sqrt{b^2 - 4ac} + a \sqrt{b^2 - 4ac} - 4ac \right) + 2c \left( -\sqrt{b^2 - 4ac} + 2ab + 6a \right) + b^2 (ab - ad) \right)}{a^2 \sqrt{c} (b^2 - 4ac)^2 \sqrt{a^2 + b^2 + c^2}} + \frac{2 \sqrt{c} (\sqrt{b^2 - 4ac} - b - 2c^2) (2ab + 6a - 2c)}{(b^2 - 4ac)^2} + \frac{2 \sqrt{c} (\sqrt{b^2 - 4ac} + b + 2c^2) (2ab - 6a + 2c)}{(b^2 - 4ac)^2}$$

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.



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

**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((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] 
$$\begin{aligned} & -1/2*(a*b*c*e - 2*a^2*c*g + a^2*b*i - (b*c^2*d - 2*a*c^2*f + a*b*c*h)*x^3 + \\ & (2*a*c^2*e - a*b*c*g + (a*b^2 - 2*a^2*c)*i)*x^2 + (a*b*c*f - 2*a^2*c*h - ( \\ & b^2*c - 2*a*c^2)*d)*x)/(a^2*b^2*c - 4*a^3*c^2 + (a*b^2*c^2 - 4*a^2*c^3)*x^4 \\ & + (a*b^3*c - 4*a^2*b*c^2)*x^2) + 1/2*\integrate((a*b*f - 2*a^2*h + (b*c*d - \\ & 2*a*c*f + a*b*h)*x^2 + (b^2 - 6*a*c)*d - 2*(2*a*c*e - a*b*g + 2*a^2*i)*x)/ \\ & (c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c) \end{aligned}$$

**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] 
$$\begin{aligned} & ((b*c*e - 2*a*c*g + a*b*i)/(2*c*(4*a*c - b^2)) - (x*(b^2*d + 2*a^2*h - 2*a*c*d - a*b*f))/(2*a*(4*a*c - b^2)) + (x^2*(2*c^2*e + b^2*i - b*c*g - 2*a*c*i \\ & ))/(2*c*(4*a*c - b^2)) - (x^3*(b*c*d - 2*a*c*f + a*b*h))/(2*a*(4*a*c - b^2)) \\ & ))/(a + b*x^2 + c*x^4) + \text{symsum}(\log((5*b^3*c^4*d^3 + 8*a^3*c^4*f^3 - 96*a^2*c^5*d*e^2 + 72*a^2*c^5*d^2*f - 3*a^3*b^3*c*h^3 - 4*a^4*b*c^2*h^3 - 3*b^4*c^3*d^2*f - 32*a^3*c^4*e^2*h - 96*a^4*c^3*d*i^2 + b^5*c^2*d^2*h + 8*a^4*c^3*f*h^2 - 32*a^5*c^2*h*i^2 + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + a*b^5*c*d*h^2 - 192*a^3*c^4*d*e*i + 48*a^3*c^4*d*f*h - 64*a^4*c^3*e*h*i + 16*a*b^2*c^4*d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 4*a*b^4*c^2*d*g^2 + 16*a^2*b*c^4*e^2*f - a*b^3*c^3*d^2*h - 60*a^2*b*c^4*d^2*h - \end{aligned}$$

$$\begin{aligned}
& 28a^3b^3c^3d^2h^2 + a^2b^4c^3f^2h^2 - 28a^3b^3c^3f^2h + 16a^4b^3c^2f \\
& *i^2 - 24a^2b^2c^3d^2g^2 - 9a^2b^3c^2d^2h^2 + 4a^2b^3c^2f^2g^2 + 1 \\
& 6a^3b^2c^2d^2i^2 - 5a^2b^3c^2f^2h + 18a^3b^2c^2f^2h^2 - 8a^3b^2 \\
& c^2g^2h - 16a^2b^3c^3d^2e^2g + 96a^2b^3c^4d^2e^2g - 4a^2b^4c^2d^2f^2h + \\
& 96a^3b^3c^3d^2g^2i + 32a^3b^3c^3e^2f^2i + 32a^3b^3c^3e^2g^2h + 32a^4b^3c^ \\
& 2g^2h^2i + 32a^2b^2c^3d^2e^2i + 52a^2b^2c^3d^2f^2h - 16a^2b^2c^3e^2f^2 \\
& g - 16a^2b^3c^2d^2g^2i - 16a^3b^2c^2f^2g^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^3c^4g^2 \\
& i^2z^2 - 512a^4b^7c^2g^2i^2z^2 + 192a^3b^8c^2f^2h^2z^2 + 57344a^6b^3c^5d^2h \\
& ^2z^2 + 32768a^6b^3c^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^4 \\
& e^2i^2z^2 - 12288a^5b^4c^3e^2i^2z^2 + 6144a^5b^4c^3f^2h^2z^2 - 2048a^4b^ \\
& b^6c^2f^2h^2z^2 + 1024a^4b^6c^2e^2i^2z^2 - 49152a^5b^3c^4d^2h^2z^2 - 24 \\
& 576a^5b^3c^4e^2g^2z^2 + 15360a^4b^5c^3d^2h^2z^2 + 6144a^4b^5c^3e^2g^2 \\
& z^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^3c^4h^2z^2 + 128a^3b^ \\
& b^8c^2g^2z^2 + 12288a^6b^3c^5f^2z^2 - 16a^2b^9c^2f^2z^2 + 61440a^5b^ \\
& b^3c^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 - 8192 \\
& a^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^3 \\
& c^5d^2z^2 + 24064a^3b^5c^4d^2z^2 - 4608a^2b^7c^3d^2z^2 - 32768 \\
& a^8c^4i^2z^2 - 16a^3b^9h^2z^2 - 32768a^6c^6e^2z^2 - 16b^11c^d \\
& ^2z^2 - 192a^3b^6c^2d^2h^2i^2z - 6144a^5b^3c^4d^2g^2h^2z - 4096a^5b^3c^4d^2 \\
& f^2i^2z + 96a^2b^7c^2d^2g^2h^2z + 64a^2b^7c^2d^2f^2i^2z - 4096a^4b^3c^5d^2e^2f^2 \\
& z + 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^2 \\
& i^2z - 1152a^3b^5c^2d^2g^2h^2z - 768a^3b^5c^2d^2f^2i^2z - 9216a^4b^2c^4 \\
& d^2e^2h^2z + 2304a^3b^4c^3d^2e^2h^2z + 2048a^4b^2c^4d^2f^2g^2z - 1536a^3b \\
& ^4c^3d^2f^2g^2z + 384a^2b^6c^2d^2f^2g^2z - 192a^2b^6c^2d^2e^2h^2z + 3072a \\
& ^3b^3c^4d^2e^2f^2z - 768a^2b^5c^3d^2e^2f^2z + 384a^5b^4c^2h^2i^2z - 1024 \\
& a^6b^3c^3g^2h^2z - 192a^4b^5c^2g^2h^2z + 32a^3b^6c^2f^2i^2z + 1024a^ \\
& 5b^3c^4f^2g^2z - 32a^3b^6c^2e^2h^2z - 16a^2b^7c^2f^2g^2z - 9216a^4b^3 \\
& c^5d^2g^2z + 336a^2b^7c^2d^2g^2z - 672a^2b^6c^3d^2e^2z + 12288a^6c^4 \\
& d^2h^2i^2z + 12288a^5c^5d^2e^2h^2z + 32a^2b^8c^2d^2i^2z - 1536a^6b^2c^2h^ \\
& 2i^2z + 1536a^5b^2c^3f^2i^2z + 768a^5b^3c^2g^2h^2z - 384a^4b^4c^ \\
& 2f^2i^2z - 15872a^4b^2c^4d^2i^2z + 4992a^3b^4c^3d^2i^2z - 1536a^5 \\
& b^2c^3e^2h^2z - 768a^4b^3c^3f^2g^2z - 672a^2b^6c^2d^2i^2z + 384a^ \\
& a^4b^4c^2e^2h^2z + 192a^3b^5c^2f^2g^2z + 7936a^3b^3c^4d^2g^2z - \\
& 2496a^2b^5c^3d^2g^2z + 1536a^4b^2c^4e^2f^2z - 384a^3b^4c^3e^2f^2z
\end{aligned}$$

$$\begin{aligned}
& *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^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 + 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^2*i + 96*a^4*b^3*c*d*h^2*i + 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 \\
& 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 \\
& 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^2*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 \\
& 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 \\
& c^2*d*f*i^2 + 192*a^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 480*a^2*b^3 \\
& c^3*d^2*e*i + 336*a^3*b^3*c^2*d*f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2 \\
& b^3*c^3*d^2*f*h + 16*a^2*b^4*c^2*e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^3 \\
& b^2*c^3*d*f*g^2 + 96*a^2*b^3*c^3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a^2 \\
& b^2*c^4*d^2*e*g + 192*a^2*b^2*c^4*d*e^2*f - 384*a^5*b^2*c*g^2*i^2 - 192 \\
& a^5*b*c^2*f^2*i^2 - 48*a^4*b^3*c*g^2*h^2 - 16*a^4*b^3*c*f^2*i^2 + 80*a^3*b^3 \\
& c^2*f^3*h - 42*a^3*b^4*c*f^2*h^2 - 960*a^4*b*c^3*d^2*i^2 - 192*a^4*b*c^3 \\
& e^2*h^2 - 16*a^2*b^5*c*d^2*i^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h^3 \\
& - 192*a^2*b^2*c^4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2 \\
& + 60*a*b^5*c^2*d^2*g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 96 \\
& 0*a^2*b*c^5*d^2*e^2 + 240*a*b^3*c^4*d^2*e^2 + 256*a^6*c^2*f*h^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^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*
\end{aligned}$$

$$\begin{aligned}
& e^2 - 24a^3b^2c^3f^4 - 9a^2b^4c^2f^4 - 1024a^6c^2e^i^3 - 1024a^4c^4e^3i - 10b^6c^2d^3h + 6a^3b^5f^h^3 - 1728a^3c^5d^3h - 192a^5c^3d^h^3 - 4b^7c^d^2g^2 + 30b^5c^3d^3f + 6a^2b^6d^h^3 - 24a^5b^2c^h^4 - 16a^3b^4c^g^4 + 360a^*b^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^i^4 - b^8d^2h^2, z, l) * ((32a^*b^5c^3d^e - 512a^5c^4f^i - 512a^4c^5e^*f + 1024a^3b^*c^5d^*e - 16a^*b^6c^2d^*g + 1024a^4b^*c^4d^*i + 512a^4b^*c^4e^*h + 256a^4b^*c^4f^*g + 512a^5b^*c^3h^*i - 384a^2b^3c^4d^*e + 192a^2b^4c^3d^*g + 32a^2b^4c^3e^*f - 512a^3b^2c^4d^*g + 32a^2b^5c^2d^*i - 16a^2b^5c^2f^*g - 384a^3b^3c^3d^*i - 128a^3b^3c^3e^*h + 32a^3b^4c^2f^*i + 64a^3b^4c^2g^*h - 256a^4b^2c^3g^*h - 128a^4b^3c^2h^*i) / (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^z^4 - 1048576a^9c^7z^4 + 32768a^7b^*c^4g^*i z^2 - 512a^4b^7c^*g^*i z^2 + 192a^3b^8c^*f^*h z^2 + 57344a^6b^*c^5d^*h z^2 + 32768a^6b^*c^5e^*g z^2 + 96a^2b^9c^*d^*h z^2 - 32a^*b^10c^*d^*f z^2 - 24576a^6b^3c^3g^*i z^2 + 6144a^5b^5c^2g^*i z^2 + 49152a^6b^2c^4e^*i z^2 - 12288a^5b^4c^3e^*i z^2 + 6144a^5b^4c^3f^*h z^2 - 2048a^4b^6c^2f^*h z^2 + 1024a^4b^6c^2e^*i z^2 - 49152a^5b^3c^4d^*h z^2 - 24576a^5b^3c^4e^*g z^2 + 15360a^4b^5c^3d^*h z^2 + 6144a^4b^5c^3e^*g z^2 - 2048a^3b^7c^2d^*h z^2 - 512a^3b^7c^2e^*g z^2 + 24576a^5b^2c^5d^*f z^2 - 3072a^3b^6c^3d^*f z^2 + 2048a^4b^4c^4d^*f z^2 + 576a^2b^8c^2d^*f z^2 + 512a^5b^6c^i^2z^2 + 12288a^7b^*c^4h^2z^2 + 128a^3b^8c^*g^2z^2 + 12288a^6b^*c^5f^2z^2 - 16a^2b^9c^*f^2z^2 + 61440a^5b^*c^6d^2z^2 + 432a^*b^9c^2d^2z^2 - 65536a^7c^5e^*i z^2 - 16384a^7c^5f^*h z^2 - 49152a^6c^6d^*f z^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^d^2z^2 - 192a^3b^6c^d^*h^*i z - 6144a^5b^*c^4d^*g^*h z - 4096a^5b^*c^4d^*f^*i z + 96a^2b^7c^*d^*g^*h z + 64a^2b^7c^*d^*f^*i z - 4096a^4b^*c^5d^*e^*f z + 64a^*b^7c^2d^*e^*f z - 32a^*b^8c^*d^*f^*g z - 9216a^5b^2c^3d^*h^*i z + 2304a^4b^4c^2d^*h^*i z + 4608a^4b^3c^3d^*g^*h z + 3072a^4b^3c^3d^*f^*i z - 1152a^3b^5c^2d^*g^*h z - 768a^3b^5c^2d^*f^*i z - 9216a^4b^2c^4d^*e^*h z + 2304a^3b^4c^3d^*e^*h z + 2048a^4b^2c^4d^*f^*g z - 1536a^3b^4c^3d^*f^*g z + 384a^2b^6c^2d^*f^*g z - 192a^2b^6c^2d^*e^*h z + 3072a^3b^3c^4d^*e^*f z - 768a^2b^5c^3d^*e^*f z + 384a^5b^4c^*h^2i z - 1024a^6b^*c^3g^*h^2z - 192a^4b^5c^*g^*h^2z + 32a^3b^6c^*f^2i z + 1024a^5b^*c^4f^2g^*z - 32a^3b^6c^*e^*h^2z - 16a^2b^7c^*f^2g^*z - 9216a^4b^*c^5d^2g^*z + 336a^*b^7c^2d^2g^*z - 672a^*b^6c^3d^2e^*z + 12288a^6c^4d^*h^*i z + 12288a^5c^5d^*e^*h z + 32a^*b^8c^*d^2i z - 1536a^6b^2c^2h^2
\end{aligned}$$



$$\begin{aligned}
& 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 - 2 \\
& 496*a^2*b^5*c^3*d^2*g*z + 1536*a^4*b^2*c^4*e*f^2*z - 384*a^3*b^4*c^3*e*f^2* \\
& z + 32*a^2*b^6*c^2*e*f^2*z - 15872*a^3*b^2*c^5*d^2*e*z + 4992*a^2*b^4*c^4*d \\
& ^2*e*z + 2048*a^7*c^3*h^2*i*z - 32*a^4*b^6*h^2*i*z - 2048*a^6*c^4*f^2*i*z + \\
& 16*a^3*b^7*g*h^2*z + 18432*a^5*c^5*d^2*i*z + 2048*a^6*c^4*e*h^2*z - 2048*a \\
& ^5*c^5*e*f^2*z + 32*b^8*c^2*d^2*e*z + 18432*a^4*c^6*d^2*e*z - 16*b^9*c^d^2* \\
& g*z - 256*a^5*b*c^2*f*g*h*i - 192*a^4*b^3*c*f*g*h*i - 96*a^3*b^4*c*d*g*h*i \\
& - 1792*a^4*b*c^3*d*e*h*i - 768*a^4*b*c^3*d*f*g*i - 256*a^4*b*c^3*e*f*g*h + \\
& 32*a^2*b^5*c*d*f*g*i - 768*a^3*b*c^4*d*e*f*g + 32*a*b^5*c^2*d*e*f*g + 896*a \\
& ^4*b^2*c^2*d*g*h*i + 384*a^4*b^2*c^2*e*f*h*i - 192*a^3*b^3*c^2*e*f*g*h - 19 \\
& 2*a^3*b^3*c^2*d*f*g*i + 192*a^3*b^3*c^2*d*e*h*i + 896*a^3*b^2*c^3*d*e*g*h + \\
& 384*a^3*b^2*c^3*d*e*f*i - 96*a^2*b^4*c^2*d*e*g*h - 64*a^2*b^4*c^2*d*e*f*i \\
& - 192*a^2*b^3*c^3*d*e*f*g + 192*a^5*b^2*c*g*h^2*i + 192*a^5*b^2*c*f*h*i^2 - \\
& 384*a^5*b*c^2*e*h^2*i - 32*a^4*b^3*c*e*h^2*i + 16*a^3*b^4*c*f^2*g*i + 1536 \\
& *a^5*b*c^2*e*g*i^2 + 1536*a^4*b*c^3*e^2*g*i - 896*a^5*b*c^2*d*h*i^2 + 96*a^ \\
& 4*b^3*c*d*h*i^2 + 48*a^3*b^4*c*f*g^2*h - 384*a^4*b*c^3*e*f^2*i + 16*a^3*b^4 \\
& *c*e*g*h^2 - 32*a^3*b^4*c*d*f*i^2 + 24*a^2*b^5*c*d*g^2*h + 2208*a^3*b*c^4*d \\
& ^2*f*h - 1920*a^3*b*c^4*d^2*e*i + 800*a^4*b*c^3*d*f*h^2 - 102*a*b^5*c^2*d^2 \\
& *f*h - 32*a*b^5*c^2*d^2*e*i - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h \\
& - 240*a*b^4*c^3*d^2*e*g - 32*a*b^4*c^3*d*e^2*f + 512*a^5*c^3*e*f*h*i + 1536 \\
& *a^4*c^4*d*e*f*i + 16*a*b^6*c^d^2*g*i + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*f* \\
& g^2 + 192*a^4*b^2*c^2*f^2*g*i - 768*a^4*b^2*c^2*e*g^2*i + 64*a^4*b^2*c^2*f* \\
& g^2*h + 960*a^3*b^2*c^3*d^2*g*i - 240*a^2*b^4*c^2*d^2*g*i + 192*a^4*b^2*c^2 \\
& *e*g*h^2 - 32*a^3*b^3*c^2*e*f^2*i - 224*a^3*b^3*c^2*d*g^2*h + 192*a^4*b^2*c \\
& ^2*d*f*i^2 + 192*a^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 480*a^2*b^ \\
& 3*c^3*d^2*e*i + 336*a^3*b^3*c^2*d*f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2 \\
& *b^3*c^3*d^2*f*h + 16*a^2*b^4*c^2*e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^ \\
& 3*b^2*c^3*d*f*g^2 + 96*a^2*b^3*c^3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a \\
& ^2*b^2*c^4*d^2*e*g + 192*a^2*b^2*c^4*d*e^2*f - 384*a^5*b^2*c*g^2*i^2 - 192* \\
& a^5*b*c^2*f^2*i^2 - 48*a^4*b^3*c*g^2*h^2 - 16*a^4*b^3*c*f^2*i^2 + 80*a^3*b^ \\
& 3*c^2*f^3*h - 42*a^3*b^4*c*f^2*h^2 - 960*a^4*b*c^3*d^2*i^2 - 192*a^4*b*c^3* \\
& e^2*h^2 - 16*a^2*b^5*c*d^2*i^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h^ \\
& 3 - 192*a^2*b^2*c^4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2 + \\
& 60*a*b^5*c^2*d^2*g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 960 \\
& *a^2*b*c^5*d^2*e^2 + 240*a*b^3*c^4*d^2*e^2 + 256*a^6*c^2*f*h*i^2 + 16*a^4*b \\
& ^4*g*h^2*i + 768*a^5*c^3*d*f*i^2 + 256*a^4*c^4*e^2*f*h - 192*a^6*b*c^h^2*i^ \\
& 2 - 192*a^4*c^4*d*f^2*h + 128*a^4*b^3*c*g^3*i + 16*b^6*c^2*d^2*e*g + 96*a^5 \\
& *b*c^2*f*h^3 + 96*a^4*b*c^3*f^3*h + 80*a^4*b^3*c*f*h^3 + 6*a^2*b^5*c*f^3*h \\
& + 768*a^3*c^5*d*e^2*f + 512*a^3*b*c^4*e^3*g + 132*a*b^4*c^3*d^3*h - 28*a^3* \\
& b^4*c*d*h^3 + 12*a*b^6*c^d^2*h^2 + 2016*a^2*b*c^5*d^3*f - 496*a*b^3*c^4*d^3 \\
& *f + 224*a^3*b*c^4*d*f^3 - 18*a*b^5*c^2*d*f^3 - 192*a^4*b^2*c^2*f^2*h^2 + 2 \\
& 40*a^3*b^3*c^2*d^2*i^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*b^3*c^2*e^2*h^2 -
\end{aligned}$$

$$\begin{aligned}
& 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^d^2f^h + 512a^6b^c^g^i^3 - 2a^b^7d^f^h^2 - 16a^5b^3h^2i^2 \\
& - 1536a^5c^3e^2i^2 - 32a^5c^3f^2h^2 - 4a^3b^5g^2h^2 - 864a^4 \\
& c^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^i^3 - 1024a^4 \\
& c^4e^3i - 10b^6c^2d^3h + 6a^3b^5f^h^3 - 1728a^3c^5d^3h - 192a^5 \\
& c^3d^h^3 - 4b^7c^d^2g^2 + 30b^5c^3d^3f + 6a^2b^6d^h^3 - 24a^5 \\
& b^2c^h^4 - 16a^3b^4c^g^4 + 360a^b^2c^5d^4 - 16a^6c^2h^4 - 9a^4 \\
& b^4h^4 - 16a^4c^4f^4 - 256a^3c^5e^4 - 25b^4c^4d^4 - 1296a^2c^6 \\
& d^4 - a^2b^6f^2h^2 - 256a^7c^i^4 - b^8d^2h^2, z, l) * ((x*(2048a^5c^6 \\
& e + 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^c^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 \\
& + 16a^b^8c^2d - 1024a^5b^c^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^*z^4 - 104 \\
& 8576a^9c^7z^4 + 32768a^7b^c^4g^i^z^2 - 512a^4b^7c^g^i^z^2 + 192a^3 \\
& b^8c^f^h^z^2 + 57344a^6b^c^5d^h^z^2 + 32768a^6b^c^5e^g^z^2 + 96a^2 \\
& b^9c^d^h^z^2 - 32a^b^10c^d^f^z^2 - 24576a^6b^3c^3g^i^z^2 + 6144a^5 \\
& b^5c^2g^i^z^2 + 49152a^6b^2c^4e^i^z^2 - 12288a^5b^4c^3e^i^z^2 + \\
& 6144a^5b^4c^3f^h^z^2 - 2048a^4b^6c^2f^h^z^2 + 1024a^4b^6c^2e^i \\
& z^2 - 49152a^5b^3c^4d^h^z^2 - 24576a^5b^3c^4e^g^z^2 + 15360a^4b^5 \\
& c^3d^h^z^2 + 6144a^4b^5c^3e^g^z^2 - 2048a^3b^7c^2d^h^z^2 - 512a^3 \\
& b^7c^2e^g^z^2 + 24576a^5b^2c^5d^f^z^2 - 3072a^3b^6c^3d^f^z^2 + \\
& 2048a^4b^4c^4d^f^z^2 + 576a^2b^8c^2d^f^z^2 + 512a^5b^6c^i^2z^2 \\
& + 12288a^7b^c^4h^2z^2 + 128a^3b^8c^g^2z^2 + 12288a^6b^c^5f^2z^2 \\
& - 16a^2b^9c^f^2z^2 + 61440a^5b^c^6d^2z^2 + 432a^b^9c^2d^2z^2 \\
& - 65536a^7c^5e^i^z^2 - 16384a^7c^5f^h^z^2 - 49152a^6c^6d^f^z^2 + 2 \\
& 4576a^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^3 \\
& g^2z^2 - 1536a^4b^6c^2g^2z^2 - 8192a^5b^3c^4f^2z^2 + 1536a^4b^5 \\
& c^3f^2z^2 + 24576a^5b^2c^5e^2z^2 - 6144a^4b^4c^4e^2z^2 + 51 \\
& 2a^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^d^2z^2 - 192a^3b^6c^d^h^i^z - 6144a^5 \\
& b^c^4d^g^h^z - 4096a^5b^c^4d^f^i^z + 96a^2b^7c^d^g^h^z + 64a^2b^7 \\
& c^d^f^i^z - 4096a^4b^c^5d^e^f^z + 64a^b^7c^2d^e^f^z - 32a^b^8c^d^f^g^z \\
& - 9216a^5b^2c^3d^h^i^z + 2304a^4b^4c^2d^h^i^z + 4608a^4b^3c^3 \\
& d^g^h^z + 3072a^4b^3c^3d^f^i^z - 1152a^3b^5c^2d^g^h^z - 768a^3 \\
& b^5c^2d^f^i^z - 9216a^4b^2c^4d^e^h^z + 2304a^3b^4c^3d^e^h^z +
\end{aligned}$$

$$\begin{aligned}
& 2048a^4b^2c^4d^2fg^2z - 1536a^3b^4c^3d^2fg^2z + 384a^2b^6c^2d^2fg^2z - 192a^2b^6c^2d^2e^2h^2z + 3072a^3b^3c^4d^2e^2f^2z - 768a^2b^5c^3d^2e^2f^2z + 384a^5b^4c^2h^2i^2z - 1024a^6b^3c^3g^2h^2z - 192a^4b^5c^2g^2h^2z + 32a^3b^6c^2f^2i^2z + 1024a^5b^3c^4f^2g^2z - 32a^3b^6c^2e^2h^2z - 16a^2b^7c^2f^2g^2z - 9216a^4b^3c^5d^2g^2z + 336a^2b^7c^2d^2g^2z - 672a^2b^6c^3d^2e^2z + 12288a^6c^4d^2h^2i^2z + 12288a^5c^5d^2e^2h^2z + 32a^2b^8c^2d^2i^2z - 1536a^6b^2c^2h^2i^2z + 1536a^5b^2c^3f^2i^2z + 768a^5b^3c^2g^2h^2z - 384a^4b^4c^2f^2i^2z - 15872a^4b^2c^4d^2i^2z + 4992a^3b^4c^3d^2i^2z - 1536a^5b^2c^3e^2h^2z - 768a^4b^3c^3f^2g^2z - 672a^2b^6c^2d^2i^2z + 384a^4b^4c^2e^2h^2z + 192a^3b^5c^2f^2g^2z + 7936a^3b^3c^4d^2g^2z - 2496a^2b^5c^3d^2g^2z + 1536a^4b^2c^4e^2f^2z - 384a^3b^4c^3e^2f^2z + 32a^2b^6c^2e^2f^2z - 15872a^3b^2c^5d^2e^2z + 4992a^2b^4c^4d^2e^2z + 2048a^7c^3h^2i^2z - 32a^4b^6h^2i^2z - 2048a^6c^4f^2i^2z + 16a^3b^7g^2h^2z + 18432a^5c^5d^2i^2z + 2048a^6c^4e^2h^2z - 2048a^5c^5e^2f^2z + 32b^8c^2d^2e^2z + 18432a^4c^6d^2e^2z - 16b^9c^2d^2g^2z - 256a^5b^3c^2f^2g^2h^2i - 192a^4b^3c^2f^2g^2h^2i - 96a^3b^4c^2d^2g^2h^2i - 1792a^4b^3c^3d^2e^2h^2i - 768a^4b^3c^3d^2f^2g^2i - 256a^4b^3c^3e^2f^2g^2h + 32a^2b^5c^2d^2f^2g^2i - 768a^3b^3c^4d^2e^2f^2g + 32a^2b^5c^2d^2e^2f^2g + 896a^4b^2c^2d^2g^2h^2i + 384a^4b^2c^2e^2f^2h^2i - 192a^3b^3c^2e^2f^2g^2h - 192a^3b^3c^2d^2f^2g^2i + 192a^3b^3c^2d^2e^2h^2i + 896a^3b^2c^3d^2e^2g^2h + 384a^3b^2c^3d^2e^2f^2i - 96a^2b^4c^2d^2e^2g^2h - 64a^2b^4c^2d^2e^2f^2i - 192a^2b^3c^3d^2e^2f^2g + 192a^5b^2c^2g^2h^2i + 192a^5b^2c^2f^2h^2i^2 - 384a^5b^2c^2e^2h^2i - 32a^4b^3c^2e^2h^2i + 16a^3b^4c^2f^2g^2i + 1536a^5b^2c^2e^2g^2i^2 + 1536a^4b^3c^3e^2d^2g^2i - 896a^5b^2c^2d^2h^2i^2 + 96a^4b^3c^2d^2h^2i^2 + 48a^3b^4c^2f^2g^2h - 384a^4b^3c^3e^2f^2i + 16a^3b^4c^2e^2g^2h^2 - 32a^3b^4c^2d^2f^2i^2 + 24a^2b^5c^2d^2g^2h + 2208a^3b^3c^4d^2f^2h - 1920a^3b^3c^4d^2e^2i + 800a^4b^3c^3d^2f^2h^2 - 102a^2b^5c^2d^2f^2h - 32a^2b^5c^2d^2e^2i - 30a^2b^5c^2d^2f^2h^2 - 896a^3b^3c^4d^2e^2h - 240a^2b^4c^3d^2e^2g - 32a^2b^4c^3d^2e^2f + 512a^5c^3e^2f^2h^2i + 1536a^4c^4d^2e^2f^2i + 16a^2b^6c^2d^2g^2i + 12a^2b^6c^2d^2f^2h - 8a^2b^6c^2d^2f^2g^2 + 192a^4b^2c^2f^2g^2i - 768a^4b^2c^2e^2g^2i + 64a^4b^2c^2f^2g^2h + 960a^3b^2c^3d^2g^2i - 240a^2b^4c^2d^2g^2i + 192a^4b^2c^2e^2g^2h^2 - 32a^3b^3c^2e^2f^2i - 224a^3b^3c^2d^2g^2h + 192a^4b^2c^2d^2f^2i^2 + 192a^3b^2c^3e^2f^2h - 864a^3b^2c^3d^2f^2h + 480a^2b^3c^3d^2e^2i + 336a^3b^3c^2d^2f^2h^2 + 192a^3b^2c^3e^2f^2g + 144a^2b^3c^3d^2f^2h + 16a^2b^4c^2e^2f^2g - 12a^2b^4c^2d^2f^2h + 192a^3b^2c^3d^2f^2g^2 + 96a^2b^3c^3d^2e^2h + 48a^2b^4c^2d^2f^2g^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^2h^2 - 42a^3b^4c^2f^2h^2 - 960a^4b^3c^3d^2i^2 - 192a^4b^3c^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^3c^4e^2f^2 + 60a^2b^5c^2d^2g^2 + 198a^2b^4c^3d^2f^2 + 144a^2b^3c^3d^2f^3 - 960a^2b^3c^5d^2e^2 + 240a^2b^3c^4d^2e^2 + 256a^6c^2f^2h^2i^2 + 16a^4b^4g^2h^2i + 768a^5c^3d^2f^2i^2 + 25
\end{aligned}$$

$$\begin{aligned}
& 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 \\
& *a*b^2*c^4*d*e*f + 2*a*b^3*c^3*d*f*g + 32*a^2*b*c^4*d*e*h + 24*a^2*b*c^4*d* \\
& f*g + 32*a^3*b*c^3*d*h*i - 96*a^3*b*c^3*e*g*i + 8*a^3*b*c^3*f*g*h - 4*a^2*b \\
& ^2*c^3*d*f*i - 16*a^2*b^2*c^3*d*g*h - 12*a^2*b^2*c^3*e*f*h + 6*a^2*b^3*c^2* \\
& f*g*h - 12*a^3*b^2*c^2*f*h*i))/(4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48 \\
& *a^4*b^2*c^2)))*root(1572864*a^8*b^2*c^6*z^4 - 983040*a^7*b^4*c^5*z^4 + 327 \\
& 680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^10*c^2*z^4 - 256*a \\
& ^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 32768*a^7*b*c^4*g*i*z^2 - 512*a^4*b^7 \\
& *c*g*i*z^2 + 192*a^3*b^8*c*f*h*z^2 + 57344*a^6*b*c^5*d*h*z^2 + 32768*a^6*b* \\
& c^5*e*g*z^2 + 96*a^2*b^9*c*d*h*z^2 - 32*a*b^10*c*d*f*z^2 - 24576*a^6*b^3*c^
\end{aligned}$$

$$\begin{aligned}
& 3*g*i*z^2 + 6144*a^5*b^5*c^2*g*i*z^2 + 49152*a^6*b^2*c^4*e*i*z^2 - 12288*a^5*b^4*c^3*e*i*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*b^6*c^2*f*h*z^2 + 1024*a^4*b^6*c^2*e*i*z^2 - 49152*a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g*z^2 + 15360*a^4*b^5*c^3*d*h*z^2 + 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*c^2*d*h*z^2 - 512*a^3*b^7*c^2*e*g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6*c^3*d*f*z^2 + 2048*a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 512*a^5*b^6*c*i^2*z^2 + 12288*a^7*b*c^4*h^2*z^2 + 128*a^3*b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^2 - 16*a^2*b^9*c*f^2*z^2 + 61440*a^5*b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 - 65536*a^7*c^5*e*i*z^2 - 16384*a^7*c^5*f*h*z^2 - 49152*a^6*c^6*d*f*z^2 + 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 - 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
\end{aligned}$$

$$\begin{aligned}
& + 1536a^4b^3c^3e^2g^2i - 896a^5b^3c^2d^2h^2i^2 + 96a^4b^3c^3d^2h^2i^2 + \\
& 48a^3b^4c^3f^2g^2h - 384a^4b^3c^3e^2f^2i + 16a^3b^4c^3e^2g^2h^2 - 32a^3b^4c^3d^2f^2i^2 + 24a^2b^5c^3d^2g^2h + 2208a^3b^3c^4d^2f^2h - 1920a^3b^3c^4d^2e^2i + 800a^4b^3c^3d^2f^2h^2 - 102a^5b^3c^2d^2f^2h - 32a^5b^3c^2d^2e^2i - 30a^2b^5c^3d^2f^2h^2 - 896a^3b^3c^4d^2e^2h - 240a^5b^3c^3d^2e^2g - 32a^5b^3c^3d^2e^2f + 512a^5c^3e^2f^2h^2i + 1536a^4c^4d^2e^2f^2i + \\
& 16a^5b^6c^3d^2g^2i + 12a^5b^6c^3d^2f^2h - 8a^5b^6c^3d^2f^2g^2 + 192a^4b^2c^2f^2g^2i - 768a^4b^2c^2e^2g^2i + 64a^4b^2c^2f^2g^2h + 960a^3b^2c^3d^2g^2i - 240a^2b^4c^2d^2g^2i + 192a^4b^2c^2e^2g^2h^2 - 32a^3b^3c^2e^2f^2i - 224a^3b^3c^2d^2g^2h + 192a^4b^2c^2d^2f^2i^2 + 192a^3b^2c^3e^2f^2h - 864a^3b^2c^3d^2f^2h + 480a^2b^3c^3d^2e^2i + 336a^3b^3c^2d^2f^2h^2 + 192a^3b^2c^3e^2f^2g + 144a^2b^3c^3d^2f^2h + 16a^2b^4c^2e^2f^2g - 12a^2b^4c^2d^2f^2h + 192a^3b^2c^3d^2f^2g^2 + 96a^2b^3c^3d^2e^2h + 48a^2b^4c^2d^2f^2g^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^2h^3 - 42a^3b^4c^2f^2h^2 - 960a^4b^3c^3d^2i^2 - 192a^4b^3c^3e^2h^2 - 16a^2b^5c^3d^2i^2 - 4a^2b^5c^3f^2g^2 - 192a^4b^2c^2d^2h^3 - 192a^2b^2c^4d^3h + 128a^3b^3c^2e^2g^3 - 192a^3b^3c^4e^2f^2 + 60a^5b^3c^2d^2g^2 + 198a^5b^3c^4d^2e^2 + 144a^2b^3c^3d^2f^3 - 960a^2b^3c^5d^2e^2 + 240a^5b^3c^4d^2e^2 + 256a^6c^2f^2h^2i^2 + 16a^4b^4g^2h^2i + 768a^5c^3d^2f^2i^2 + 256a^4c^4e^2f^2h - 192a^6b^3c^2h^2i^2 - 192a^4c^4d^2f^2h + 128a^4b^3c^3g^3i + 16b^6c^2d^2e^2g + 96a^5b^3c^2f^2h^3 + 96a^4b^3c^3f^3h + 80a^4b^3c^3f^2h^3 + 6a^2b^5c^3f^3h + 768a^3c^5d^2e^2f + 512a^3b^3c^4e^3g + 132a^5b^4c^3d^3h - 28a^3b^4c^3d^2h^3 + 12a^5b^6c^3d^2h^2 + 2016a^2b^3c^5d^3f - 496a^5b^3c^4d^3f + 224a^3b^3c^4d^2f^3 - 18a^5b^3c^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^3d^2f^2h + 512a^6b^3c^3g^2i^3 - 2a^5b^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^3d^2g^2 + 30b^5c^3d^3f + 6a^2b^6d^2h^3 - 24a^5b^2c^3h^4 - 16a^3b^4c^3g^4 + 360a^5b^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^4i^4 - b^8d^2h^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

$$\frac{x \left( - \left( b^2 \left( a^2 m + c^2 d \right) \right) + x^2 \left( -bc \left( -3a^2 m + ach + c^2 d \right) - ab^3 m + ab^2 ck + 2ac^2 (cf - ak) \right) + 2ac \left( a^2 m - ach + c^2 d \right) \right)}{2ac^2 \left( b^2 - 4ac \right) \left( a + bx^2 + cx^4 \right)}$$

**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}

$$\frac{\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{(a+bx^2+cx^4)^2} dx}{\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{(a+bx^2+cx^4)^2} dx} = 1.00$$

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\*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)/(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\*1 - 6\*a\*b\*c\*1)\*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] && (Gt
Q[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] := S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

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

Rule 1166

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

Rule 1660

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

Rule 1663

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

### Rule 1673

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

### Rule 1676

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

### Rule 1678

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :=> With[{d =
Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
+ b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
+ 7)*(b*d - 2*a*e)*x^2, x], x]] /; 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{(a + bx^2 + cx^4)^2} dx &= \int \frac{x(e + gx^2 + jx^4 + lx^6)}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2 + hx^4 + kx^6}{(a + bx^2 + cx^4)^2} dx \\
&= -\frac{x(abc(cf + ak) - b^2(c^2d + a^2m) + 2ac(c^2d - ach))}{2ac^2(b^2 - 4ac)} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg + ah))}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{mx}{c^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg + ah))}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{mx}{c^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg + ah))}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{mx}{c^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg + ah))}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

**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\*(

$$\begin{aligned}
& -(\text{Sqrt}[b^2 - 4*a*c]*k) + 19*a*m)) * \text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]] / (a*(b^2 - 4*a*c)^{(3/2)} * \text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) - (\text{Sqrt}[2]*(3*a*b^4*m + 2*a*c^2*(-6*c^2*d + c*\text{Sqrt}[b^2 - 4*a*c]*f - 2*a*c*h + 3*a*\text{Sqrt}[b^2 - 4*a*c]*k + 10*a^2*m) + a*b^3*(-(c*k) + 3*\text{Sqrt}[b^2 - 4*a*c]*m) - b*c*(c^2*(\text{Sqrt}[b^2 - 4*a*c]*d - 4*a*f) + a*c*(\text{Sqrt}[b^2 - 4*a*c]*h - 8*a*k) + 13*a^2*\text{Sqrt}[b^2 - 4*a*c]*m) + b^2*c*(c^2*d - a*c*h - a*(\text{Sqrt}[b^2 - 4*a*c]*k + 19*a*m))) * \text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]] / (a*(b^2 - 4*a*c)^{(3/2)} * \text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) + (\text{Sqrt}[c]*(-4*c^3*e + 2*c^2*(b*g - 2*a*j) + b^2*(-b + \text{Sqrt}[b^2 - 4*a*c])*1 + a*c*(6*b*1 - 4*\text{Sqrt}[b^2 - 4*a*c]*1)) * \text{Log}[-b + \text{Sqrt}[b^2 - 4*a*c] - 2*c*x^2]) / (b^2 - 4*a*c)^{(3/2)} + (\text{Sqrt}[c]*(4*c^3*e + c^2*(-2*b*g + 4*a*j) + b^2*(b + \text{Sqrt}[b^2 - 4*a*c])*1 - 2*a*c*(3*b + 2*\text{Sqrt}[b^2 - 4*a*c])*1) * \text{Log}[b + \text{Sqrt}[b^2 - 4*a*c] + 2*c*x^2]) / (b^2 - 4*a*c)^{(3/2)}) / (4*c^{(5/2)})
\end{aligned}$$

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

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

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]  $\text{int}((m*x^8+1*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2, x)$

[Out] 
$$-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)}*\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/(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)}*\operatorname{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)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*h+1/2/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*b*g*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})+1/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*c*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})-1/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*c*e*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})+c/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x*d+1/c/(c*x^4+b*x^2+a)/(4*a*c-b^2)*a^2*1-1/(c*x^4+b*x^2+a)*a/(4*a*c-b^2)*x^3*k-1/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^2*a*j-1/2/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^2*b*g-1/(c*x^4+b*x^2+a)*a/(4*a*c-b^2)*x*h-1/2/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^3*b*h+1/2/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x*b*f+1/4/c^2/(4*a*c-b^2)^2*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*b^4*1-a/(4*a*c-b^2)^2*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*(-4*a*c+b^2)^{(1/2)}*j+a/(4*a*c-b^2)^2*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*(-4*a*c+b^2)^{(1/2)}*j+1/4/c^2/(4*a*c-b^2)^2*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*b^4*1+3/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}$$

$$\begin{aligned}
& /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)} * \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 * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x) + 3/2 / c / (c * x^4 + b * x^2 + a) * a / (4*a*c-b^2) * x^3 * b * m - 1/2 * c / (c * x^4 + b * x^2 + a) / a / (4*a*c-b^2) * x^3 * b * \\
& d + 3/2 / c / (c * x^4 + b * x^2 + a) / (4*a*c-b^2) * x^2 * a * b * l + 1/2 / c / (c * x^4 + b * x^2 + a) * a / (4*a * \\
& c-b^2) * x * b * k - 1/2 / c^2 / (c * x^4 + b * x^2 + a) * a / (4*a*c-b^2) * x * b^2 * m - 5 * a^2 / (4*a*c-b^2 \\
& )^2 * 2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * \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)} * m + 13 * a^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 * m + 5/2 * a / (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 * k - 13 * a^2 / ( \\
& 4*a*c-b^2)^2 * 2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b+(-4*a * \\
& c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x) * b * m - 5/2 * a / (4*a*c-b^2)^2 * 2^{(1/2)} / ((b+(-4*a*c \\
& +b^2)^{(1/2)})) * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x) * \\
& b^2 * k - 5 * a^2 / (4*a*c-b^2)^2 * 2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * \arctan(2 \\
& ^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x) * (-4*a*c+b^2)^{(1/2)} * m + 3/2 / c * a / ( \\
& 4*a*c-b^2)^2 * \ln(-2 * c * x^2 - b + (-4*a*c+b^2)^{(1/2)}) * (-4*a*c+b^2)^{(1/2)} * b * l - 6 * c * a \\
& ^2 / (4*a*c-b^2)^2 * 2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / \\
& ((-b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x) * k - 3/2 / c * a / (4*a*c-b^2)^2 * \ln(2 * c * x^2 + b \\
& + (-4*a*c+b^2)^{(1/2)}) * (-4*a*c+b^2)^{(1/2)} * b * l + 6 * c * a^2 / (4*a*c-b^2)^2 * 2^{(1/2)} / ( \\
& (b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} \\
& * c * x) * k + 3/4 / c^2 / (4*a*c-b^2)^2 * 2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} \\
& * \operatorname{arctanh}(2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x) * b^5 * m - 1/4 / c / (4*a*c- \\
& b^2)^2 * 2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b+(-4*a \\
& *c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x) * b^4 * k + 1/4 / c / (4*a*c-b^2)^2 * 2^{(1/2)} / ((b+(-4*a*c+ \\
& b^2)^{(1/2)})) * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x) * b \\
& ^4 * k - 1/4 / (4*a*c-b^2)^2 * 2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} \\
& / ((-b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x) * b^3 * h - 1/2 / (4*a*c-b^2)^2 * (-4*a * \\
& c+b^2)^{(1/2)} * b * g * \ln(2 * c * x^2 + b + (-4*a*c+b^2)^{(1/2)}) + 19/4 / c * a / (4*a*c-b^2)^2 * 2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * \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 * m + 19/4 / c * a / (4*a*c-b^2)^2 * 2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x) * (-4*a*c+b^2)^{(1/2)} * b^2 * m + 1 / (4*a*c-b^2)^2 * 2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * (-4*a*c+b^2)^{(1/2)} * a * c * h * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x) - 1 / (4*a*c-b^2)^2 * 2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * a * b * c * h * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x) + a / (4*a*c-b^2)^2 * c^2 * 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)} * h + c / (c * x^4 + b * x^2 + a) / (4*a*c-b^2) * x^2 * e + c / (c * x^4 + b * x^2 + a) / (4*a*c-b^2) * x^3 * f + 1/4 / (4*a*c-b^2)^2 * 2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * b^3 * h * \arctan(2^{(1/2)} / ((b+(-4*a*c+b^2)^{(1/2)})) * c)^{(1/2)} * c * x)
\end{aligned}$$

$$\begin{aligned}
& ) * c)^{(1/2)} * c * x) - 25/4 / c * a / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} \\
& ) * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b^3 * m + 25/4 / c * a \\
& / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctan}(2^{(1/2)} / ((b + \\
& (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b^3 * m - 3/4 / c^2 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((-b + \\
& (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \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^4 * m - 3/4 / c^2 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c \\
& + b^2)^{(1/2)}) * c)^{(1/2)} * \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)} * b^4 * m + 1/4 / c / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) \\
& ) * c)^{(1/2)} * \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^3 * k - 2 * a / (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 * k - 2 * a / (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) * (-4 * a * c + b^2)^{(1/2)} * b * k + 1/4 / c / (4 * a \\
& * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \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)} * b^3 * k - 1/2 / (c * x^4 + b * x^2 + a) / a \\
& / (4 * a * c - b^2) * x * b^2 * d - 1/2 / c^2 / (c * x^4 + b * x^2 + a) / (4 * a * c - b^2) * x^2 * b^3 * l - 1/2 / c^2 / \\
& (c * x^4 + b * x^2 + a) / (4 * a * c - b^2) * x^3 * b^3 * m - 1/2 / c^2 / (c * x^4 + b * x^2 + a) / (4 * a * c - b^2) * a \\
& * b^2 * l + 1/2 / c / (c * x^4 + b * x^2 + a) / (4 * a * c - b^2) * x^2 * b^2 * j + 1/2 / c / (c * x^4 + b * x^2 + a) * a^2 / \\
& (4 * a * c - b^2) * x * m + 1/2 / c / (c * x^4 + b * x^2 + a) / (4 * a * c - b^2) * a * b * j + 1/2 / c / (c * x^4 + b * x^2 + a) \\
& ) / (4 * a * c - b^2) * x^3 * b^2 * k - 1/4 / c^2 / (4 * a * c - b^2)^2 * \ln(-2 * c * x^2 - b + (-4 * a * c + b^2)^{(1/2)}) * \\
& (-4 * a * c + b^2)^{(1/2)} * b^3 * l + 1/4 / c^2 / (4 * a * c - b^2)^2 * \ln(2 * c * x^2 + b + (-4 * a * c + b^2)^{(1/2)}) * \\
& (-4 * a * c + b^2)^{(1/2)} * b^3 * l - 2 / c * a / (4 * a * c - b^2)^2 * \ln(-2 * c * x^2 - b + (-4 * a \\
& * c + b^2)^{(1/2)}) * b^2 * l - 2 / c * a / (4 * a * c - b^2)^2 * \ln(2 * c * x^2 + b + (-4 * a * c + b^2)^{(1/2)}) * b \\
& ^2 * l
\end{aligned}$$

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

$$\frac{abc^2 - 2a^2c^2g + a^2bc - (bc^2d - 2ac^2f + abc^2h - (ab^2c - 2a^2c^2)k + (ab^3 - 3a^2b^2c)m)^2 + (2ac^2g - abc^2h + (ab^2c - 2a^2c^2)k - (ab^3 - 3a^2b^2c)m)^2 - (a^2b^2c^2 - 2a^2c^2)g + (abc^2f - 2a^2c^2h + a^2bc^2k - (b^2c^2 - 2a^2c^3)d - (a^2b^2c^2 - 2a^2c^3)c)m}{2(ab^2c^2 - 4a^2c^2 + (ab^2c - 4a^2c^2)k + (ab^3 - 4a^2b^2c)m)} + \frac{m}{c^2} - \frac{\int \frac{ab^2c^2 - 2a^2c^2g + a^2bc - (bc^2d - 2ac^2f + abc^2h - (ab^2c - 2a^2c^2)k + (ab^3 - 3a^2b^2c)m)^2 + (2ac^2g - abc^2h + (ab^2c - 2a^2c^2)k - (ab^3 - 3a^2b^2c)m)^2 - (a^2b^2c^2 - 2a^2c^2)g + (abc^2f - 2a^2c^2h + a^2bc^2k - (b^2c^2 - 2a^2c^3)d - (a^2b^2c^2 - 2a^2c^3)c)m}{2(ab^2c^2 - 4a^2c^2 + (ab^2c - 4a^2c^2)k + (ab^3 - 4a^2b^2c)m)} dx}{2(ab^2c^2 - 4a^2c^2)}$$

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, algorithm="maxima")

[Out]  $-1/2 * (a * b * c^2 * e - 2 * a^2 * c^2 * g + a^2 * b * c * j - (b * c^3 * d - 2 * a * c^3 * f + a * b * c^2 * h - (a * b^2 * c - 2 * a^2 * c^2) * k + (a * b^3 - 3 * a^2 * b^2 * c) * m) * x^3 + (2 * a * c^3 * e - a * b * c^2 * g + (a * b^2 * c - 2 * a^2 * c^2) * j - (a * b^3 - 3 * a^2 * b^2 * c) * l) * x^2 - (a^2 * b^2 * c - 2 * a^3 * c) * l + (a * b * c^2 * f - 2 * a^2 * c^2 * h + a^2 * b * c * k - (b^2 * c^2 - 2 * a * c^3) * d - (a^2 * b^2 * c - 2 * a^3 * c) * m) * x) / (a^2 * b^2 * c^2 - 4 * a^3 * c^3 + (a * b^2 * c^3 - 4 * a^2 * c^4) * x^4 + (a * b^3 * c^2 - 4 * a^2 * b * c^3) * x^2) + m * x / c^2 - 1/2 * \operatorname{integrate}(- (a * b * c^2 * f - 2 * a^2 * c^2 * h + a^2 * b * c * k + 2 * (a * b^2 * c - 4 * a^2 * c^2) * l * x^3 + (b * c^3 * d - 2 * a * c^3 * f + a * b * c^2 * h + (a * b^2 * c - 6 * a^2 * c^2) * k - (3 * a * b^3 - 13 * a^2 * b^2 * c) * m) * x^2 + (b^2 * c^2 - 6 * a * c^3) * d - (3 * a^2 * b^2 - 10 * a^3 * c) * m - 2 * (2 * a * c^3 * e - a * b * c^2 * g + 2 * a^2 * c^2 * j - a^2 * b * c * l) * x) / (c * x^4 + b * x^2 + a), x) / (a * b^2 * c^2 - 4 * a^2 * c^3)$

**mupad [B]** time = 13.91, size = 82785, normalized size = 107.51

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In]  $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a + b*x^2 + c*x^4)^2, x)$

[Out]  $\text{symsum}(\log(\text{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^1*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 -$



$$\begin{aligned}
& 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^6 \\
& *b^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^7 \\
& *g^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^5 \\
& *b^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^2 \\
& *z^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^*c^5h^*l^*m^*z \\
& - 96a^3b^{10}c^*g^*k^*m^*z + 90112a^7b^*c^6e^*k^*m^*z + 36864a^7b^*c^6f^*j^*m^*z - 16384a^7b^*c^6g^*j^*l^*z + 14336a^7b^*c^6d^*l^*m^*z - 10240a^7b^*c^6f^*k^* \\
& *l^*z + 4096a^7b^*c^6h^*j^*k^*z + 10240a^7b^*c^6g^*h^*m^*z - 47104a^6b^*c^7d^*h^*l^*z + 36864a^6b^*c^7e^*f^*m^*z + 30720a^6b^*c^7d^*g^*m^*z - 16384a^6b^*c^7 \\
& *e^*g^*l^*z + 6144a^6b^*c^7f^*g^*k^*z + 4096a^6b^*c^7e^*h^*k^*z + 32a^*b^{10}c^3 \\
& *d^*f^*l^*z - 4096a^5b^*c^8d^*f^*j^*z - 6144a^5b^*c^8d^*g^*h^*z - 32a^*b^8c^5d^* \\
& *f^*g^*z - 4096a^4b^*c^9d^*e^*f^*z + 64a^*b^7c^6d^*e^*f^*z + 110592a^8b^2c^4 \\
& *k^*l^*m^*z - 36864a^7b^4c^3k^*l^*m^*z + 5376a^6b^6c^2k^*l^*m^*z - 79872a^7 \\
& *b^3c^4j^*k^*m^*z + 26112a^6b^5c^3j^*k^*m^*z - 3712a^5b^7c^2j^*k^*m^*z - 1 \\
& 3824a^7b^3c^4h^*l^*m^*z + 3456a^6b^5c^3h^*l^*m^*z - 288a^5b^7c^2h^*l^*m^* \\
& *z - 45056a^7b^2c^5g^*k^*m^*z + 39936a^6b^4c^4g^*k^*m^*z + 30720a^7b^2c^5 \\
& *f^*l^*m^*z - 18432a^7b^2c^5h^*k^*l^*z - 13056a^5b^6c^3g^*k^*m^*z - 7680a^6 \\
& *b^4c^4f^*l^*m^*z + 5376a^6b^4c^4h^*j^*m^*z + 4608a^6b^4c^4h^*k^*l^*z + \\
& 3072a^7b^2c^5h^*j^*m^*z - 1984a^5b^6c^3h^*j^*m^*z + 1856a^4b^8c^2g^*k^* \\
& *m^*z + 640a^5b^6c^3f^*l^*m^*z - 384a^5b^6c^3h^*k^*l^*z + 192a^4b^8c^2h^* \\
& *j^*m^*z - 79872a^6b^3c^5e^*k^*m^*z - 27648a^6b^3c^5f^*j^*m^*z + 26112a^5 \\
& *b^5c^4e^*k^*m^*z + 12288a^6b^3c^5g^*j^*l^*z - 10752a^6b^3c^5d^*l^*m^*z + \\
& 7680a^6b^3c^5f^*k^*l^*z + 6912a^5b^5c^4f^*j^*m^*z - 3712a^4b^7c^3e^*k^* \\
& *m^*z - 3072a^6b^3c^5h^*j^*k^*z - 3072a^5b^5c^4g^*j^*l^*z + 2688a^5b^5c^4 \\
& *d^*l^*m^*z - 1920a^5b^5c^4f^*k^*l^*z + 768a^5b^5c^4h^*j^*k^*z - 576a^4b^7 \\
& *c^3f^*j^*m^*z + 256a^4b^7c^3g^*j^*l^*z - 224a^4b^7c^3d^*l^*m^*z + 192a^3 \\
& *b^9c^2e^*k^*m^*z + 160a^4b^7c^3f^*k^*l^*z - 64a^4b^7c^3h^*j^*k^*z - 2688a^5 \\
& *b^5c^4g^*h^*m^*z - 1536a^6b^3c^5g^*h^*m^*z + 992a^4b^7c^3g^*h^*m^*z - \\
& 96a^3b^9c^2g^*h^*m^*z - 65536a^6b^2c^6d^*k^*l^*z + 46080a^6b^2c^6d^*j^* \\
& *m^*z - 24576a^6b^2c^6e^*j^*l^*z + 21504a^5b^4c^5d^*k^*l^*z - 11520a^5b^4 \\
& *c^5d^*j^*m^*z + 9216a^6b^2c^6f^*j^*k^*z + 6144a^5b^4c^5e^*j^*l^*z - 3072a^4 \\
& *b^6c^4d^*k^*l^*z - 2304a^5b^4c^5f^*j^*k^*z + 960a^4b^6c^4d^*j^*m^*z - 5 \\
& 12a^4b^6c^4e^*j^*l^*z + 192a^4b^6c^4f^*j^*k^*z + 160a^3b^8c^3d^*k^*l^*z - \\
& 18432a^6b^2c^6f^*g^*m^*z + 13824a^5b^4c^5f^*g^*m^*z + 5376a^5b^4c^5e^* \\
& *h^*m^*z - 3456a^4b^6c^4f^*g^*m^*z + 3072a^6b^2c^6e^*h^*m^*z - 3072a^5b^4 \\
& *c^5f^*h^*l^*z - 2048a^6b^2c^6g^*h^*k^*z - 1984a^4b^6c^4e^*h^*m^*z + 1536a^5 \\
& *b^4c^5g^*h^*k^*z + 1024a^4b^6c^4f^*h^*l^*z - 384a^4b^6c^4g^*h^*k^*z + \\
& 288a^3b^8c^3f^*g^*m^*z + 192a^3b^8c^3e^*h^*m^*z - 96a^3b^8c^3f^*h^*l^*z
\end{aligned}$$

$$\begin{aligned}
& + 32*a^3*b^8*c^3*g*h*k*z + 41472*a^5*b^3*c^6*d*h*l*z - 27648*a^5*b^3*c^6*e* \\
& f*m*z - 23040*a^5*b^3*c^6*d*g*m*z - 13440*a^4*b^5*c^5*d*h*l*z + 12288*a^5*b \\
& ^3*c^6*e*g*l*z + 6912*a^4*b^5*c^5*e*f*m*z + 5760*a^4*b^5*c^5*d*g*m*z - 4608 \\
& *a^5*b^3*c^6*f*g*k*z - 3072*a^5*b^3*c^6*e*h*k*z - 3072*a^4*b^5*c^5*e*g*l*z \\
& + 1888*a^3*b^7*c^4*d*h*l*z + 1152*a^4*b^5*c^5*f*g*k*z + 768*a^4*b^5*c^5*e*h \\
& *k*z - 576*a^3*b^7*c^4*e*f*m*z - 480*a^3*b^7*c^4*d*g*m*z + 256*a^3*b^7*c^4* \\
& e*g*l*z - 96*a^3*b^7*c^4*f*g*k*z - 96*a^2*b^9*c^3*d*h*l*z - 64*a^3*b^7*c^4* \\
& e*h*k*z + 46080*a^5*b^2*c^7*d*e*m*z - 11520*a^4*b^4*c^6*d*e*m*z + 9216*a^5* \\
& b^2*c^7*e*f*k*z - 9216*a^5*b^2*c^7*d*h*j*z - 6656*a^4*b^4*c^6*d*f*l*z - 614 \\
& 4*a^5*b^2*c^7*d*f*l*z + 3456*a^3*b^6*c^5*d*f*l*z - 2304*a^4*b^4*c^6*e*f*k*z \\
& + 2304*a^4*b^4*c^6*d*h*j*z + 960*a^3*b^6*c^5*d*e*m*z - 576*a^2*b^8*c^4*d*f \\
& *l*z + 192*a^3*b^6*c^5*e*f*k*z - 192*a^3*b^6*c^5*d*h*j*z + 3072*a^4*b^3*c^7 \\
& *d*f*j*z - 768*a^3*b^5*c^6*d*f*j*z + 64*a^2*b^7*c^5*d*f*j*z + 4608*a^4*b^3* \\
& c^7*d*g*h*z - 1152*a^3*b^5*c^6*d*g*h*z + 96*a^2*b^7*c^5*d*g*h*z - 9216*a^4* \\
& b^2*c^8*d*e*h*z + 2304*a^3*b^4*c^7*d*e*h*z + 2048*a^4*b^2*c^8*d*f*g*z - 153 \\
& 6*a^3*b^4*c^7*d*f*g*z + 384*a^2*b^6*c^6*d*f*g*z - 192*a^2*b^6*c^6*d*e*h*z + \\
& 3072*a^3*b^3*c^8*d*e*f*z - 768*a^2*b^5*c^7*d*e*f*z - 288*a^5*b^8*c*k*l*m*z \\
& + 90112*a^8*b*c^5*j*k*m*z + 192*a^4*b^9*c*j*k*m*z + 138240*a^9*b*c^4*l*m^2 \\
& *z - 7344*a^6*b^7*c*l*m^2*z + 5088*a^5*b^8*c*j*m^2*z - 3072*a^8*b*c^5*k^2*l \\
& *z - 49152*a^8*b*c^5*j*l^2*z - 128*a^4*b^9*c*j*l^2*z - 25600*a^8*b*c^5*g*m^ \\
& 2*z - 9216*a^7*b*c^6*h^2*l*z - 2544*a^4*b^9*c*g*m^2*z + 64*a^3*b^10*c*g*l^2 \\
& *z + 9216*a^7*b*c^6*g*k^2*z - 3072*a^6*b*c^7*f^2*l*z - 288*a^3*b^10*c*e*m^2 \\
& *z - 49152*a^7*b*c^6*e*l^2*z - 58368*a^5*b*c^8*d^2*l*z - 432*a*b^9*c^4*d^2* \\
& l*z - 1024*a^6*b*c^7*g*h^2*z + 32*a*b^8*c^5*d^2*j*z + 1024*a^5*b*c^8*f^2*g* \\
& z - 9216*a^4*b*c^9*d^2*g*z + 336*a*b^7*c^6*d^2*g*z - 672*a*b^6*c^7*d^2*e*z \\
& - 122880*a^9*c^5*k*l*m*z - 40960*a^8*c^6*f*l*m*z + 24576*a^8*c^6*h*k*l*z - \\
& 20480*a^8*c^6*h*j*m*z + 73728*a^7*c^7*d*k*l*z - 61440*a^7*c^7*d*j*m*z + 327 \\
& 68*a^7*c^7*e*j*l*z - 12288*a^7*c^7*f*j*k*z - 20480*a^7*c^7*e*h*m*z + 8192*a \\
& ^7*c^7*f*h*l*z - 61440*a^6*c^8*d*e*m*z + 24576*a^6*c^8*d*f*l*z - 12288*a^6* \\
& c^8*e*f*k*z + 12288*a^6*c^8*d*h*j*z + 12288*a^5*c^9*d*e*h*z - 131328*a^8*b^ \\
& 3*c^3*l*m^2*z + 46656*a^7*b^5*c^2*l*m^2*z - 142848*a^8*b^2*c^4*j*m^2*z + 10 \\
& 6368*a^7*b^4*c^3*j*m^2*z - 34208*a^6*b^6*c^2*j*m^2*z + 2304*a^7*b^3*c^4*k^2 \\
& *l*z - 576*a^6*b^5*c^3*k^2*l*z + 48*a^5*b^7*c^2*k^2*l*z + 45056*a^7*b^3*c^4 \\
& *j*l^2*z - 15360*a^6*b^5*c^3*j*l^2*z - 12288*a^7*b^2*c^5*j^2*l*z + 3072*a^6 \\
& *b^4*c^4*j^2*l*z + 2304*a^5*b^7*c^2*j*l^2*z - 256*a^5*b^6*c^3*j^2*l*z + 158 \\
& 72*a^7*b^2*c^5*j*k^2*z - 4992*a^6*b^4*c^4*j*k^2*z + 672*a^5*b^6*c^3*j*k^2*z \\
& - 32*a^4*b^8*c^2*j*k^2*z + 71424*a^7*b^3*c^4*g*m^2*z - 53184*a^6*b^5*c^3*g \\
& *m^2*z + 17104*a^5*b^7*c^2*g*m^2*z + 6912*a^6*b^3*c^5*h^2*l*z - 1728*a^5*b^ \\
& 5*c^4*h^2*l*z + 144*a^4*b^7*c^3*h^2*l*z + 24576*a^7*b^2*c^5*g*l^2*z - 22528 \\
& *a^6*b^4*c^4*g*l^2*z + 7680*a^5*b^6*c^3*g*l^2*z + 4096*a^6*b^2*c^6*g^2*l*z \\
& - 3072*a^5*b^4*c^5*g^2*l*z - 1152*a^4*b^8*c^2*g*l^2*z + 768*a^4*b^6*c^4*g^2 \\
& *l*z - 64*a^3*b^8*c^3*g^2*l*z - 142848*a^7*b^2*c^5*e*m^2*z + 106368*a^6*b^4 \\
& *c^4*e*m^2*z - 34208*a^5*b^6*c^3*e*m^2*z - 7936*a^6*b^3*c^5*g*k^2*z + 5088* \\
& a^4*b^8*c^2*e*m^2*z + 2496*a^5*b^5*c^4*g*k^2*z - 1536*a^6*b^2*c^6*h^2*j*z + \\
& 1280*a^5*b^3*c^6*f^2*l*z + 384*a^5*b^4*c^5*h^2*j*z - 336*a^4*b^7*c^3*g*k^2
\end{aligned}$$

$\begin{aligned}
& *z + 192*a^4*b^5*c^5*f^2*1*z - 144*a^3*b^7*c^4*f^2*1*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*1*z + 45056*a^6*b^3*c^5* \\
& e^1^2*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 - 153 \\
& 6*a^5*b^2*c^7*e*h^2*z - 768*a^4*b^3*c^7*f^2*g*z + 384*a^4*b^4*c^6*e*h^2*z + \\
& 192*a^3*b^5*c^6*f^2*g*z - 32*a^3*b^6*c^5*e*h^2*z - 16*a^2*b^7*c^5*f^2*g*z \\
& + 7936*a^3*b^3*c^8*d^2*g*z - 2496*a^2*b^5*c^7*d^2*g*z + 1536*a^4*b^2*c^8*e* \\
& f^2*z - 384*a^3*b^4*c^7*e*f^2*z + 32*a^2*b^6*c^6*e*f^2*z - 15872*a^3*b^2*c^ \\
& 9*d^2*e*z + 4992*a^2*b^4*c^8*d^2*e*z - 61440*a^8*b^2*c^4*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 - 20 \\
& 48*a^6*c^8*f^2*j*z + 18432*a^5*c^9*d^2*j*z + 192*a^5*b^8*c^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 \\
& - 5376*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 \\
& - 96*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 - 69 \\
& 12*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 - 53 \\
& 76*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 - 15 \\
& 36*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 \\
& - 1824*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 + 3 \\
& 84*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 \\
& - 160*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
\end{aligned}$

$$\begin{aligned}
& *f*g*l*m + 492*a^4*b^6*c^2*f*h*k*m + 416*a^5*b^4*c^3*g*h*j*m + 384*a^6*b^2*c^4*g*h*j*m + 384*a^6*b^2*c^4*e*h*l*m - 288*a^5*b^4*c^3*g*h*k*k*1 - 288*a^5*b^4*c^3*e*h*l*m - 96*a^4*b^6*c^2*g*h*j*m + 2112*a^5*b^3*c^4*d*j*k*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 - 4800*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*b^8*c^2*d*f*k*m + 224*a^4*b^4*c^4*d*e*1*m - 160*a^4*b^4*c^4*e*f*k*1 - 96*a^4*b^4*c^4*f*g*j*k + 96*a^3*b^6*c^3*d*h*j*1 + 80*a^3*b^6*c^3*d*g*k*1 - 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*1 + 384*a^5*b^2*c^5*e*g*h*m + 224*a^4*b^4*c^4*f*g*h*1 - 96*a^3*b^6*c^3*e*g*h*m - 48*a^3*b^6*c^3*f*g*h*1 + 2112*a^4*b^3*c^5*d*e*k*1 - 960*a^4*b^3*c^5*d*f*j*1 + 960*a^4*b^3*c^5*d*e*j*m + 384*a^3*b^5*c^4*d*f*j*1 + 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*f*j*1 - 32*a^2*b^7*c^3*d*f*j*1 + 7392*a^4*b^3*c^5*d*f*h*m - 2496*a^4*b^3*c^5*d*g*h*1 - 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*1 - 448*a^4*b^3*c^5*e*f*h*1 + 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*1 - 48*a^2*b^7*c^3*d*g*h*1 + 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*1 - 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*1 + 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*1 + 600*a^3*b^4*c^5*d*f*h*k + 480*a^3*b^4*c^5*d*f*g*1 - 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*1 - 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*1 + 12*a^2*b^6*c^4*d*f*h*k - 960*a^3*b^3*c^6*d*e*f*1 + 384*a^2*b^5*c^5*d*e*f*1 + 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*1^2*m - 4752*a^7*b^4*c*j*1*m^2 + 96*a^5*b^6*c*j^2*k*m - 6144*a^8*b*c^3*h*1^2*m - 168*a^6*b^5*c*h*1^2*m + 6400*a^8*b*c^3*g*1*m^2 - 2862*a^6*b^5*c*h*k*m^2 + 2376*a^6*b^5*c*g*1*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*1^2 + 56*a^5*b^6*c*f*1^2*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*1 - 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
\end{aligned}$$

$$\begin{aligned}
& *l^m^2 + 60*a^4*b^7*c*f*k^2*m + 6*a^2*b^9*c*f^2*k*m - 13312*a^7*b*c^4*d*l^2 \\
& *m + 2048*a^7*b*c^4*g*j*l^2 - 1024*a^7*b*c^4*f*k*l^2 + 64*a^4*b^7*c*g*j*l^2 \\
& + 56*a^4*b^7*c*d*l^2*m - 40*a^4*b^7*c*f*k*l^2 + 13440*a^7*b*c^4*e*j*m^2 - \\
& 8928*a^5*b*c^6*d^2*k*m - 6240*a^7*b*c^4*d*k*m^2 + 1614*a^4*b^7*c*d*k*m^2 - \\
& 288*a^4*b^7*c*e*j*m^2 - 170*a*b^9*c^2*d^2*k*m + 60*a^3*b^8*c*d*k^2*m + 4608 \\
& *a^6*b*c^5*e*j^2*l + 4608*a^5*b*c^6*e^2*j*l - 2432*a^6*b*c^5*d*j^2*m + 1440 \\
& *a^7*b*c^4*f*h*m^2 - 896*a^6*b*c^5*f*j^2*k - 864*a^6*b*c^5*f*h^2*m - 558*a^ \\
& 4*b^7*c*f*h*m^2 + 256*a^6*b*c^5*g*h^2*l - 40*a^3*b^8*c*d*k*l^2 - 1920*a^6*b \\
& *c^5*e*j*k^2 - 384*a^5*b*c^6*e^2*h*m + 24*a^3*b^8*c*f*h*l^2 - 16*a*b^8*c^3* \\
& d^2*j*l + 2208*a^6*b*c^5*f*h*k^2 - 1044*a^3*b^8*c*d*h*m^2 + 800*a^5*b*c^6*f \\
& ^2*h*k - 256*a^5*b*c^6*f^2*g*l + 144*a^3*b^8*c*e*g*m^2 - 116*a*b^8*c^3*d^2* \\
& h*m + 8192*a^6*b*c^5*d*h*l^2 + 2048*a^6*b*c^5*e*g*l^2 + 24*a^2*b^9*c*d*h*l^ \\
& 2 - 5856*a^4*b*c^7*d^2*f*m + 4896*a^4*b*c^7*d^2*h*k + 2720*a^6*b*c^5*d*f*m^ \\
& 2 + 2304*a^4*b*c^7*d^2*g*l + 1824*a^5*b*c^6*d*h^2*k + 438*a*b^7*c^4*d^2*f*m \\
& - 384*a^5*b*c^6*e*h^2*j + 318*a^2*b^9*c*d*f*m^2 - 168*a*b^7*c^4*d^2*g*l + \\
& 42*a*b^7*c^4*d^2*h*k - 36*a*b^8*c^3*d*f^2*m - 2432*a^4*b*c^7*d*e^2*m + 1536 \\
& *a^5*b*c^6*e*g*j^2 + 1536*a^4*b*c^7*e^2*g*j - 896*a^5*b*c^6*d*h*j^2 - 896*a \\
& ^4*b*c^7*e^2*f*k + 4896*a^5*b*c^6*d*f*k^2 + 1824*a^4*b*c^7*d*f^2*k - 384*a^ \\
& 4*b*c^7*e*f^2*j + 336*a*b^6*c^5*d^2*e*l - 156*a*b^6*c^5*d^2*f*k + 16*a*b^6* \\
& c^5*d^2*g*j + 12*a*b^7*c^4*d*f^2*k - 2*a*b^9*c^2*d*f*k^2 - 1920*a^3*b*c^8*d \\
& ^2*e*j - 32*a*b^5*c^6*d^2*e*j + 2208*a^3*b*c^8*d^2*f*h + 800*a^4*b*c^7*d*f* \\
& h^2 - 102*a*b^5*c^6*d^2*f*h + 12*a*b^6*c^5*d*f^2*h - 2*a*b^7*c^4*d*f*h^2 - \\
& 896*a^3*b*c^8*d*e^2*h - 8*a*b^6*c^5*d*f*g^2 - 240*a*b^4*c^7*d^2*e*g - 32*a* \\
& b^4*c^7*d*e^2*f + 5120*a^8*c^4*h*j*l*m + 15360*a^7*c^5*d*j*l*m - 7680*a^7*c \\
& ^5*e*j*k*m + 3072*a^7*c^5*f*j*k*l + 5120*a^7*c^5*e*h*l*m + 1920*a^7*c^5*f*h \\
& *k*m + 15360*a^6*c^6*d*e*l*m + 5760*a^6*c^6*d*f*k*m + 3072*a^6*c^6*e*f*k*l \\
& - 3072*a^6*c^6*d*h*j*l - 2560*a^6*c^6*e*f*j*m + 1536*a^6*c^6*e*h*j*k + 4608 \\
& *a^5*c^7*d*e*j*k - 3072*a^5*c^7*d*e*h*l - 1152*a^5*c^7*d*f*h*k + 512*a^5*c^ \\
& 7*e*f*h*j + 1536*a^4*c^8*d*e*f*j - 8*a*b^10*c*d*f*l^2 - 5568*a^8*b^2*c^2*k* \\
& l^2*m + 15552*a^8*b^2*c^2*j*l*m^2 + 4800*a^7*b^2*c^3*j^2*k*m - 1280*a^6*b^4 \\
& *c^2*j^2*k*m + 2080*a^7*b^3*c^2*h*l^2*m - 1088*a^7*b^2*c^3*j*k^2*l + 48*a^6 \\
& *b^4*c^2*j*k^2*l - 8544*a^7*b^2*c^3*h*k^2*m - 7776*a^7*b^3*c^2*g*l*m^2 + 76 \\
& 32*a^7*b^3*c^2*h*k*m^2 + 3600*a^6*b^3*c^3*h^2*k*m + 2484*a^6*b^4*c^2*h*k^2* \\
& m - 918*a^5*b^5*c^2*h^2*k*m + 4800*a^7*b^2*c^3*h*k*l^2 - 1424*a^6*b^4*c^2*h \\
& *k*l^2 + 1200*a^5*b^4*c^3*g^2*k*m - 960*a^6*b^2*c^4*g^2*k*m - 528*a^6*b^4*c \\
& ^2*f*l^2*m - 416*a^6*b^3*c^3*h*j^2*m - 320*a^4*b^6*c^2*g^2*k*m + 192*a^7*b^ \\
& 2*c^3*f*l^2*m + 96*a^5*b^5*c^2*h*j^2*m + 15552*a^7*b^2*c^3*e*l*m^2 - 6720*a \\
& ^7*b^2*c^3*g*j*m^2 + 6160*a^6*b^4*c^2*g*j*m^2 - 4752*a^6*b^4*c^2*e*l*m^2 - \\
& 2016*a^7*b^2*c^3*f*k*m^2 - 1164*a^6*b^4*c^2*f*k*m^2 + 1104*a^5*b^3*c^4*f^2* \\
& k*m + 1008*a^6*b^3*c^3*f*k^2*m + 960*a^6*b^2*c^4*h^2*j*l - 678*a^5*b^5*c^2* \\
& f*k^2*m + 544*a^6*b^3*c^3*g*k^2*l - 144*a^5*b^4*c^3*h^2*j*l - 102*a^4*b^5*c \\
& ^3*f^2*k*m - 62*a^3*b^7*c^2*f^2*k*m - 24*a^5*b^5*c^2*g*k^2*l + 6432*a^6*b^3 \\
& *c^3*d*l^2*m + 4800*a^5*b^2*c^5*e^2*k*m - 2304*a^6*b^2*c^4*g*j^2*l + 1920*a \\
& ^6*b^3*c^3*g*j*l^2 + 1728*a^6*b^2*c^4*f*j^2*m - 1280*a^4*b^4*c^4*e^2*k*m + \\
& 1152*a^5*b^3*c^4*g^2*j*l - 1032*a^5*b^5*c^2*d*l^2*m - 864*a^6*b^3*c^3*f*k*l
\end{aligned}$$

$$\begin{aligned}
&^2 - 768*a^5*b^5*c^2*g*j*1^2 + 408*a^5*b^5*c^2*f*k*1^2 + 384*a^5*b^4*c^3*g* \\
&j^2*1 - 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*1 + 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*1 + 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*1^2 - 5136*a^5*b^4*c^3*d*k*1^2 - 3840 \\
&*a^6*b^2*c^4*e*j*1^2 + 1536*a^5*b^4*c^3*e*j*1^2 + 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*1 + 768*a^4*b^6*c^2*d*k* \\
&1^2 - 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*1 + 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*1^2 + 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*1 - 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*1^2 + 576*a^6*b^2*c^4*f*h*1^2 + 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*1^2 + 1 \\
&92*a^5*b^2*c^5*g^2*h*k + 96*a^3*b^5*c^4*e^2*h*m - 72*a^3*b^6*c^3*f*g^2*m + \\
&48*a^4*b^4*c^4*g^2*h*k - 32*a^4*b^5*c^3*e*j*k^2 - 8*a^3*b^6*c^3*g^2*h*k + 2 \\
&4768*a^6*b^2*c^4*d*h*m^2 - 21108*a^5*b^4*c^3*d*h*m^2 - 10048*a^4*b^2*c^6*d^ \\
&2*h*m + 7218*a^4*b^6*c^2*d*h*m^2 - 6720*a^6*b^2*c^4*e*g*m^2 + 6160*a^5*b^4* \\
&c^3*e*g*m^2 - 2592*a^5*b^2*c^5*d*h^2*m - 1680*a^4*b^6*c^2*e*g*m^2 + 1068*a^ \\
&3*b^4*c^5*d^2*h*m + 960*a^5*b^2*c^5*e*h^2*1 - 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*1 - 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 - 2*a^2*b^7*c^3*f^2*h*k - 9312*a^5*b^3*c^4*d*h*1^2 + 3288*a^4*b^5*c^3*d*h \\
&*1^2 - 2304*a^4*b^2*c^6*e^2*g*1 + 1920*a^5*b^3*c^4*e*g*1^2 + 1728*a^4*b^2*c \\
&^6*e^2*f*m + 1152*a^4*b^3*c^5*e*g^2*1 - 768*a^4*b^5*c^3*e*g*1^2 - 608*a^4*b \\
&^3*c^5*d*g^2*m - 472*a^3*b^7*c^2*d*h*1^2 + 384*a^3*b^4*c^5*e^2*g*1 - 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*1 + 120*a^3*b^5*c^4*d*g^2*m + \\
&64*a^3*b^7*c^2*e*g*1^2 - 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*1 - 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*1 - 1152*a^4*b^2*c^6*d*f^2*m + 960 \\
&*a^5*b^2*c^5*e*g*k^2 - 496*a^3*b^3*c^6*d^2*h*k + 462*a^2*b^6*c^4*d*f^2*m +
\end{aligned}$$

$$\begin{aligned}
& 432a^4b^3c^5d^2h^2k - 240a^4b^4c^4eg^2k^2 - 222a^2b^5c^5d^2h^2k \\
& + 192a^4b^2c^6f^2g^2j + 192a^4b^2c^6ef^2l - 174a^3b^5c^4d^2h^2k \\
& - 156a^3b^6c^3d^2h^2k^2 + 48a^3b^4c^5ef^2l - 32a^4b^3c^5eh^2j \\
& + 16a^3b^6c^3eg^2k^2 + 16a^3b^4c^5f^2g^2j - 16a^2b^6c^4ef^2l \\
& + 12a^2b^7c^3d^2h^2k + 6a^2b^8c^2d^2h^2k^2 + 1728a^5b^2c^5d^2f^2l \\
& + 1392a^4b^4c^4d^2f^2l^2 - 840a^3b^6c^3d^2f^2l^2 - 768a^4b^2c^6eg^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^6ef^2j - 320a^3b^2c^7d^2e^2k \\
& + 192a^4b^2c^6eg^2h^2 + 192a^4b^2c^6d^2f^2j^2 - 32a^3b^4c^5d^2f^2j^2 \\
& + 16a^3b^4c^5eg^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^7ef^2g + 144a^2b^3c^7d^2f^2h \\
& - 30a^2b^5c^5d^2f^2h^2 + 16a^2b^4c^6ef^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^3c^2l^2m^2 \\
& + 3152a^8b^3c^1l^2m^2 + 2070a^7b^4c^k^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^3l^3 - 256a^6b^3c^3j^3l^3 \\
& - 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 \\
& - 36a^4b^7c^3h^2l^2 - 3072a^7b^2c^3g^3l^3 + 2096a^7b^3c^2f^3m^3 \\
& + 1088a^6b^4c^2g^3l^3 - 496a^6b^3c^3h^2k^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^2k^3 \\
& - 18a^4b^5c^3h^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^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^3 \\
& - 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^5b^9c^2d^2l^2 - 1680a^5b^3c^4d^2k^3 \\
& - 1680a^2b^3c^7d^3k + 222a^4b^5c^3d^2k^3 + 30a^8b^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^6eg^3 \\
& - 28a^3b^4c^5d^2h^3 + 12a^5b^6c^5d^2h^2 + 6a^2b^6c^4d^2h^3 \\
& - 192a^3b^3c^8e^2f^2 + 60a^5b^5c^6d^2g^2 + 198a^5b^4c^7d^2f^2 \\
& + 144a^2b^3c^7d^2f^3 - 960a^2b^3c^9d^2e^2 + 240a^5b^3c^
\end{aligned}$$

$$\begin{aligned}
& 8*d^2*e^2 + 15360*a^9*c^3*k^1*l^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*1 + 2880*a^8*c^4*h^k^2*m + \\
& 5120*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*1 + 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^1^2 + 320*a^6*c^6*f^2*h^m - 90*a^3*b^9*d^k^m^2 + 15200*a^9*b^c^2*k^m^3 \\
& - 6192*a^8*b^3*c^k^m^3 + 5472*a^8*b^c^3*k^3*m - 4608*a^5*c^7*d^2*j^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*1 - 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*1 - 1280*a^5*c^7*e^2*f^m + 768*a^5*c^7*e^2*h^k + 256*a^6*c^6*f^h^j^2 + 192*a^6*b^5*c^j^1^3 + 54*a^2*b^10*d^h^m^2 \\
& - 18*b^9*c^3*d^2*f^m + 8*b^9*c^3*d^2*g^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^
\end{aligned}$$



$$\begin{aligned}
& 4*g^2*h^2 + 240*a^3*b^3*c^6*d^2*j^2 - 192*a^4*b^2*c^6*f^2*h^2 - 42*a^3*b^4*c^5*f^2*h^2 - 16*a^2*b^5*c^5*d^2*j^2 - 48*a^3*b^3*c^6*f^2*g^2 - 16*a^3*b^3*c^6*e^2*h^2 - 4*a^2*b^5*c^5*f^2*g^2 - 464*a^3*b^2*c^7*d^2*h^2 - 384*a^3*b^2*c^7*e^2*g^2 + 42*a^2*b^4*c^6*d^2*h^2 - 240*a^2*b^3*c^7*d^2*g^2 - 16*a^2*b^3*c^7*e^2*f^2 - 960*a^2*b^2*c^8*d^2*f^2 + 6*b^11*c*d^2*k*m - 18*a*b^11*d*f*m^2 - 7200*a^9*c^3*k^2*m^2 - 324*a^7*b^5*l^2*m^2 - 225*a^6*b^6*k^2*m^2 - 2048*a^8*c^4*j^2*l^2 - 144*a^5*b^7*j^2*m^2 - 2400*a^8*c^4*h^2*m^2 - 81*a^4*b^8*h^2*m^2 - 800*a^7*c^5*f^2*m^2 - 288*a^7*c^5*h^2*k^2 - 36*a^3*b^9*g^2*m^2 - 9*a^2*b^10*f^2*m^2 - 21600*a^6*c^6*d^2*m^2 - 2048*a^6*c^6*e^2*l^2 - 864*a^6*c^6*f^2*k^2 - 2592*a^5*c^7*d^2*k^2 - 1536*a^5*c^7*e^2*j^2 + 1536*a^8*b^2*c^2*l^4 - 32*a^5*c^7*f^2*h^2 + 360*a^7*b^2*c^3*k^4 - 25*a^6*b^4*c^2*k^4 - 864*a^4*c^8*d^2*h^2 - 4*b^7*c^5*d^2*g^2 - 9*b^6*c^6*d^2*f^2 - 288*a^3*c^9*d^2*f^2 - 24*a^5*b^2*c^5*h^4 - 16*b^5*c^7*d^2*e^2 - 9*a^4*b^4*c^4*h^4 - 16*a^3*b^4*c^5*g^4 - 24*a^3*b^2*c^7*f^4 - 9*a^2*b^4*c^6*f^4 - a^2*b^8*c^2*f^2*k^2 - a^2*b^6*c^4*f^2*h^2 + 630*a^7*b^5*k*m^3 + 8000*a^9*c^3*h*m^3 + 320*a^7*c^5*h^3*m - 378*a^6*b^6*h*m^3 + 126*a^5*b^7*f*m^3 + 30*b^8*c^4*d^3*m + 24000*a^8*c^4*d*m^3 + 8640*a^4*c^8*d^3*m - 1728*a^7*c^5*f*k^3 - 192*a^5*c^7*f^3*k - 4*b^11*c*d^2*l^2 + 126*a^4*b^8*d*m^3 - 10*b^7*c^5*d^3*k + 4200*a^9*b^2*c*m^4 - 1024*a^6*c^6*e*j^3 - 1024*a^4*c^8*e^3*j - 144*a^7*b^4*c*l^4 - 10*b^6*c^6*d^3*h - 1728*a^3*c^9*d^3*h - 192*a^5*c^7*d*h^3 + 30*b^5*c^7*d^3*f + 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
\end{aligned}$$

$$\begin{aligned}
& *c^3*1*z^3 + 1048576*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 + 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*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 + 30720*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 - 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*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 + 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*1^2*z^2 - 288768*a^7*b^4*c^5*1^2*z^2 + 88576*a^6*b^6*c^4*1^2*z^2 - 15744*a^5*b^8*c^3*1^2*z^2 + 1536*a^4*b^10*c^2*1^2*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*1^2*z^2 -
\end{aligned}$$

$$\begin{aligned}
& 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^5c^5h^1m^2z - 96a^3b^{10}c^5g^5k^1m^2z + 90112a^7b^6c^6e^5k^1m^2z + 36864a^7b^6c^6f^5j^1m^2z - 16384a^7b^6c^6g^5j^1l^2z + 14336a^7b^6c^6d^5l^1m^2z - 10240a^7b^6c^6f^5k^1l^2z + 4096a^7b^6c^6h^5j^1k^2z + 10240a^7b^6c^6g^5h^1m^2z - 47104a^6b^6c^7d^5h^1l^2z + 36864a^6b^6c^7e^5f^1m^2z + 30720a^6b^6c^7d^5g^1m^2z - 16384a^6b^6c^7e^5g^1l^2z + 6144a^6b^6c^7f^5g^1k^2z + 4096a^6b^6c^7e^5h^1k^2z + 32a^6b^{10}c^3d^5f^1l^2z - 4096a^5b^6c^8d^5f^1j^2z - 6144a^5b^6c^8d^5g^1h^2z - 32a^6b^8c^5d^5f^1g^2z - 4096a^4b^6c^9d^5e^1f^2z + 64a^6b^7c^6d^5e^1f^2z + 110592a^8b^2c^4k^1l^1m^2z - 36864a^7b^4c^3k^1l^1m^2z + 5376a^6b^6c^2k^1l^1m^2z - 79872a^7b^3c^4j^1k^1m^2z + 26112a^6b^5c^3j^1k^1m^2z - 3712a^5b^7c^2j^1k^1m^2z - 13824a^7b^3c^4h^1l^1m^2z + 3456a^6b^5c^3h^1l^1m^2z - 288a^5b^7c^2h^1l^1m^2z - 45056a^7b^2c^5g^5k^1m^2z + 39936a^6b^4c^4g^5k^1m^2z + 30720a^7b^2c^5f^1l^1m^2z - 18432a^7b^2c^5h^1k^1l^2z - 13056a^5b^6c^3g^5k^1m^2z - 7680a^6b^4c^4f^1l^1m^2z + 5376a^6b^4c^4h^1j^1m^2z + 4608a^6b^4c^4h^1k^1l^2z + 3072a^7b^2c^5h^1j^1m^2z - 1984a^5b^6c^3h^1j^1m^2z + 1856a^4b^8c^2g^5k^1m^2z + 640a^5b^6c^3f^1l^1m^2z - 384a^5b^6c^3h^1k^1l^2z + 192a^4b^8c^2h^1j^1m^2z - 79872a^6b^3c^5e^5k^1m^2z - 27648a^6b^3c^5f^1j^1m^2z + 26112a^5b^5c^4e^5k^1m^2z + 12288a^6b^3c^5g^5j^1l^2z - 10752a^6b^3c^5d^1l^1m^2z + 7680a^6b^3c^5f^1k^1l^2z + 6912a^5b^5c^4f^1j^1m^2z - 3712a^4b^7c^3e^5k^1m^2z - 3072a^6b^3c^5h^1j^1k^2z - 3072a^5b^5c^4g^5j^1l^2z + 2688a^5b^5c^4d^1l^1m^2z - 1920a^5b^5c^4f^1k^1l^2z + 768a^5b^5c^4h^1j^1k^2z - 576a^4b^7c^3f^1j^1m^2z + 256a^4b^7c^3g^5j^1l^2z - 224a^4b^7c^3d^1l^1m^2z + 192a^3b^9c^2e^5k^1m^2z + 160a^4b^7c^3f^1k^1l^2z - 64a^4b^7c^3h^1j^1k^2z - 2688a^5b^5c^4g^5h^1m^2z - 1536a^6b^3c^5g^5h^1m^2z + 992a^4b^7c^3g^5h^1m^2z - 96a^3b^9c^2g^5h^1m^2z - 65536a^6b^2c^6d^5k^1l^2z + 46080a^6b^2c^6d^5j^1m^2z - 24576a^6b^2c^6e^5j^1l^2z + 21504a^5b^4c^5d^5k^1l^2z - 11520a^5b^4c^5d^5j^1m^2z + 9216a^6b^2c^6f^1j^1k^2z + 6144a^5b^4c^5e^5j^1l^2z - 3072a^4b^6c^4d^5k^1l^2z - 2304a^5b^4c^5f^1j^1k^2z + 960a^4b^6c^4d^5j^1m^2z - 512a^4b^6c^4e^5j^1l^2z + 192a^4b^6c^4f^1j^1k^2z + 160a^3b^8c^3d^5k^1l^2z - 18432a^6b^2c^6f^1g^1m^2z + 13824a^5b^4c^5f^1g^1m^2z + 5376a^5b^4c^5e^5h^1m^2z - 3456a^4b^6c^4f^1g^1m^2z + 3072a^6b^2c^6e^5h^1m^2z - 3072a^5b^4c^5f^1h^1l^2z - 2048a^6b^2c^6g^5h^1k^2z - 1984a^4b^6c^4e^5h^1m^2z + 1536a^5b^4c^5g^5h^1k^2z + 1024a^4b^6c^4f^1h^1l^2z - 384a^4b^6c^4g^5h^1k^2z + 288a^3b^8c^3f^1g^1m^2z + 192a^3b^8c^3e^5h^1m^2z - 96a^3b^8c^3f^1h^1l^2z + 32a^3b^8c^3g^5h^1k^2z + 41472a^5b^3c^6d^5h^1l^2z - 27648a^5b^3c^6e^5f^1m^2z - 23040a^5b^3c^6d^5g^1m^2z - 13440a^4b^5c^5d^5h^1l^2z + 12288a^5b^3c^6e^5g^1l^2z + 6912a^4b^5c^5e^5f^1m^2z + 5760a^4b^5c^5d^5g^1m^2z - 4608a^5b^3c^6f^1g^1k^2z - 3072a^5b^3c^6e^5h^1k^2z - 3072a^4b^5c^5e^5g^1l^2z + 1888a^3b^7c^4d^5h^1l^2z + 1152a^4b^5c^5f^1g^1k^2z + 768a^4b^5c^5e^5h^1k^2z - 576a^3b^7c^4e^5f^1m^2z - 480a^3b^7c^4d^5g^1m^2z + 256a^3b^7c^4e^5g^1l^2z - 96a^3b^7c^4f^1g^1k^2z - 96a^2b^9c^3d^5h^1l^2z - 64a^3b^7c^4e^5h^1k^2z + 46080a^5b^2c^7d^5e^1m^2z - 11520a^4b^4c^6d^5e^1m^2z + 9216a^5b^2c^7e^5f^1k^2z - 9216a^5b^2c^7d^5h^1j^2z - 6656a^4b^4c^6d^5f^1l^2z - 6144a^5b^2c^7d^5f^1l^2z + 3456a^3b^6c^5d^5f^1l^2z - 2304a^4b^4c^6e^5f^1k^2z + 2304a^4b^4c^6d^5h^1j^2z + 960
\end{aligned}$$

$a^3b^6c^5d^5e^5m^5z - 576a^2b^8c^4d^5f^5l^5z + 192a^3b^6c^5e^5f^5k^5z -$   
 $192a^3b^6c^5d^5h^5j^5z + 3072a^4b^3c^7d^5f^5j^5z - 768a^3b^5c^6d^5f^5j^5z$   
 $+ 64a^2b^7c^5d^5f^5j^5z + 4608a^4b^3c^7d^5g^5h^5z - 1152a^3b^5c^6d^5g^5h^5z$   
 $+ 96a^2b^7c^5d^5g^5h^5z - 9216a^4b^2c^8d^5e^5h^5z + 2304a^3b^4c^7d^5e^5h^5z$   
 $+ 2048a^4b^2c^8d^5f^5g^5z - 1536a^3b^4c^7d^5f^5g^5z + 384a^2b^6c^6d^5f^5g^5z$   
 $- 192a^2b^6c^6d^5e^5h^5z + 3072a^3b^3c^8d^5e^5f^5z - 768a^2b^5c^7d^5e^5f^5z$   
 $- 288a^5b^8c^5k^5l^5m^5z + 90112a^8b^5c^5j^5k^5m^5z + 192a^4b^9c^5j^5k^5m^5z$   
 $+ 138240a^9b^5c^4l^5m^5z - 7344a^6b^7c^5l^5m^5z + 5088a^5b^8c^5j^5m^5z$   
 $- 3072a^8b^5c^5k^5l^5z - 49152a^8b^5c^5j^5l^5z - 1288a^4b^9c^5j^5l^5z$   
 $- 25600a^8b^5c^5g^5m^5z - 9216a^7b^5c^6h^5l^5z - 2544a^4b^9c^5g^5m^5z$   
 $+ 64a^3b^10c^5g^5l^5z + 9216a^7b^5c^6g^5k^5l^5z - 3072a^6b^5c^7f^5l^5z$   
 $- 288a^3b^10c^5e^5m^5z - 49152a^7b^5c^6e^5l^5z - 58368a^5b^5c^8d^5l^5z$   
 $- 432a^5b^9c^4d^5l^5z - 1024a^6b^5c^7g^5h^5l^5z + 32a^5b^8c^5d^5j^5z$   
 $+ 1024a^5b^5c^8f^5l^5g^5z - 9216a^4b^5c^9d^5g^5z + 336a^5b^7c^6d^5l^5g^5z$   
 $- 672a^5b^6c^7d^5l^5e^5z - 122880a^9c^5k^5l^5m^5z - 40960a^8c^6f^5l^5m^5z$   
 $+ 24576a^8c^6h^5k^5l^5z - 20480a^8c^6h^5j^5m^5z + 73728a^7c^7d^5k^5l^5z$   
 $- 61440a^7c^7d^5j^5m^5z + 32768a^7c^7e^5j^5l^5z - 12288a^7c^7f^5j^5k^5z$   
 $- 20480a^7c^7e^5h^5m^5z + 8192a^7c^7f^5h^5l^5z - 61440a^6c^8d^5e^5m^5z$   
 $+ 24576a^6c^8d^5f^5l^5z - 12288a^6c^8e^5f^5k^5z + 12288a^6c^8d^5h^5j^5z$   
 $+ 12288a^5c^9d^5e^5h^5z - 131328a^8b^3c^3l^5m^5z + 46656a^7b^5c^2l^5m^5z$   
 $- 142848a^8b^2c^4j^5m^5z + 106368a^7b^4c^3j^5m^5z - 34208a^6b^6c^2j^5m^5z$   
 $+ 2304a^7b^3c^4k^5l^5z - 576a^6b^5c^3k^5l^5z + 48a^5b^7c^2k^5l^5z$   
 $+ 45056a^7b^3c^4j^5l^5z - 15360a^6b^5c^3j^5l^5z - 12288a^7b^2c^5j^5l^5z$   
 $+ 3072a^6b^4c^4j^5l^5z + 2304a^5b^7c^2j^5l^5z - 256a^5b^6c^3j^5l^5z$   
 $+ 15872a^7b^2c^5j^5k^5l^5z - 4992a^6b^4c^4j^5k^5l^5z + 672a^5b^6c^3j^5k^5l^5z$   
 $- 32a^4b^8c^2j^5k^5l^5z + 71424a^7b^3c^4g^5m^5z - 53184a^6b^5c^3g^5m^5z$   
 $+ 17104a^5b^7c^2g^5m^5z + 6912a^6b^3c^5h^5l^5z - 1728a^5b^5c^4h^5l^5z$   
 $+ 144a^4b^7c^3h^5l^5z + 24576a^7b^2c^5g^5l^5z - 22528a^6b^4c^4g^5l^5z$   
 $+ 7680a^5b^6c^3g^5l^5z + 4096a^6b^2c^6g^5l^5z - 3072a^5b^4c^5g^5l^5z$   
 $- 1152a^4b^8c^2g^5l^5z + 768a^4b^6c^4g^5l^5z - 64a^3b^8c^3g^5l^5z - 142848a^7b^2c^5e^5m^5z$   
 $+ 106368a^6b^4c^4e^5m^5z - 34208a^5b^6c^3e^5m^5z - 7936a^6b^3c^5g^5k^5l^5z$   
 $+ 5088a^4b^8c^2e^5m^5z + 2496a^5b^5c^4g^5k^5l^5z - 1536a^6b^2c^6h^5l^5j^5z$   
 $+ 1280a^5b^3c^6f^5l^5z + 384a^5b^4c^5h^5l^5j^5z - 336a^4b^7c^3g^5k^5l^5z$   
 $+ 192a^4b^5c^5f^5l^5z - 144a^3b^7c^4f^5l^5z - 32a^4b^6c^4h^5l^5j^5z$   
 $+ 16a^3b^9c^2g^5k^5l^5z + 16a^2b^9c^3f^5l^5z + 45056a^6b^3c^5e^5l^5z$   
 $- 15360a^5b^5c^4e^5l^5z - 12288a^5b^2c^7e^5l^5z + 3072a^4b^4c^6e^5l^5z$   
 $+ 2304a^4b^7c^3e^5l^5z - 256a^3b^6c^5e^5l^5z - 128a^3b^9c^2e^5l^5z$   
 $+ 59136a^4b^3c^7d^5l^5z - 23488a^3b^5c^6d^5l^5z + 15872a^6b^2c^6e^5k^5l^5z$   
 $- 4992a^5b^4c^5e^5k^5l^5z + 4560a^2b^7c^5d^5l^5z + 1536a^5b^2c^7f^5l^5j^5z$   
 $+ 672a^4b^6c^4e^5k^5l^5z - 384a^4b^4c^6f^5l^5j^5z - 32a^3b^8c^3e^5k^5l^5z$   
 $+ 32a^3b^6c^5f^5l^5j^5z + 768a^5b^3c^6g^5h^5l^5z - 192a^4b^5c^5g^5h^5l^5z$   
 $+ 16a^3b^7c^4g^5h^5l^5z - 15872a^4b^2c^8d^5l^5j^5z + 4992a^3b^4c^7d^5l^5j^5z$   
 $- 672a^2b^6c^6d^5l^5j^5z - 1536a^5b^2c^7e^5h^5l^5z - 768a^4b^5$

$$\begin{aligned}
&^3c^7f^2gz + 384a^4b^4c^6eh^2z + 192a^3b^5c^6f^2gz - 32a^3 \\
&*b^6c^5eh^2z - 16a^2b^7c^5f^2gz + 7936a^3b^3c^8d^2gz - 2496 \\
&*a^2b^5c^7d^2gz + 1536a^4b^2c^8ef^2z - 384a^3b^4c^7ef^2z + \\
&32a^2b^6c^6ef^2z - 15872a^3b^2c^9d^2ez + 4992a^2b^4c^8d^2 \\
&ez - 61440a^8b^2c^4l^3z + 21504a^7b^4c^3l^3z - 3328a^6b^6c^2 \\
&l^3z + 432a^5b^9lm^2z + 51200a^9c^5jm^2z + 16384a^8c^6j^2l^3z \\
&- 288a^4b^10jm^2z - 18432a^8c^6jk^2z + 144a^3b^11gm^2z + 51 \\
&200a^8c^6em^2z + 2048a^7c^7h^2jz + 16384a^6c^8e^2lz + 16b^1 \\
&1c^3d^2l^3z - 18432a^7c^7ek^2z - 2048a^6c^8f^2jz + 18432a^5c^ \\
&9d^2jz + 192a^5b^8c^1l^3z + 2048a^6c^8eh^2z - 16b^9c^5d^2gz \\
&- 2048a^5c^9ef^2z + 32b^8c^6d^2ez + 18432a^4c^10d^2ez + 655 \\
&36a^9c^5l^3z - 11008a^8b^3c^3jklm - 288a^6b^5c^3jklm + 144a^ \\
&5b^6c^3gk^2lm - 11008a^7b^3c^4ek^2lm - 5376a^7b^3c^4fj^2lm + 3840a^ \\
&^7b^3c^4gj^2km - 3328a^7b^3c^4hj^2km - 96a^4b^7c^3gj^2km - 2560a^7 \\
&*b^3c^4gh^2lm - 36a^3b^8c^3fh^2km - 6912a^6b^3c^5d^2jklm - 7872a^6b^ \\
&*c^5d^2h^2km - 7680a^6b^3c^5d^2g^2lm - 5376a^6b^3c^5ef^2lm + 3840a^6b^ \\
&*c^5ef^2km - 3328a^6b^3c^5eh^2km - 1536a^6b^3c^5fg^2km + 1280a^6b^ \\
&*c^5fg^2jm - 768a^6b^3c^5gh^2jk - 768a^6b^3c^5fh^2jl - 768a^6b^3c^ \\
&5eh^2jm - 36a^2b^9c^3d^2h^2km - 6912a^5b^3c^6d^2ek^2lm - 4864a^5b^3c^6 \\
&d^2ej^2lm - 2304a^5b^3c^6d^2gj^2k - 1792a^5b^3c^6ef^2jk - 1280a^5b^3c^6 \\
&d^2f^2jl - 4544a^5b^3c^6d^2fh^2km + 1536a^5b^3c^6d^2g^2h^2lm + 1280a^5b^3c^6 \\
&ef^2gm - 768a^5b^3c^6eg^2hk - 768a^5b^3c^6ef^2hl - 256a^5b^3c^6f^2g \\
&*hj + 12a^2b^9c^2d^2fh^2km + 16a^2b^8c^3d^2fg^2lm - 4a^2b^8c^3d^2fh^2k - \\
&2304a^4b^3c^7d^2eg^2k - 1792a^4b^3c^7d^2eh^2j - 1280a^4b^3c^7d^2ef^2l - \\
&768a^4b^3c^7d^2fg^2j - 32a^2b^7c^4d^2ef^2l - 256a^4b^3c^7ef^2gh - 768a^ \\
&^3b^3c^8d^2ef^2g + 32a^2b^5c^6d^2ef^2g + 12a^2b^10c^3d^2fk^2lm + 3648a^7b^ \\
&^3c^2j^2klm + 5504a^7b^2c^3g^2klm - 1824a^6b^4c^2g^2klm + 384a^ \\
&^7b^2c^3h^2j^2lm - 288a^6b^4c^2h^2j^2lm - 4800a^6b^3c^3g^2j^2km + \\
&3648a^6b^3c^3ek^2lm + 1280a^5b^5c^2g^2j^2km + 1088a^6b^3c^3f^2j^ \\
&lm + 576a^6b^3c^3h^2j^2klm - 288a^5b^5c^2ek^2lm - 192a^6b^3c^3g^ \\
&*h^2lm + 144a^5b^5c^2g^2h^2lm + 9600a^6b^2c^4ej^2km - 4224a^6b^2c^ \\
&^4d^2j^2lm - 2560a^5b^4c^3ej^2km + 384a^6b^2c^4f^2j^2klm + 224a^5b^ \\
&^4c^3d^2j^2lm + 192a^4b^6c^2ej^2km - 160a^5b^4c^3f^2j^2klm - 4608a^ \\
&^6b^2c^4f^2hk^2lm + 2688a^6b^2c^4f^2g^2lm + 1664a^6b^2c^4g^2hk^2lm - \\
&744a^5b^4c^3f^2hk^2lm - 544a^5b^4c^3fg^2lm + 492a^4b^6c^2f^2hk^2 \\
&lm + 416a^5b^4c^3g^2hj^2lm + 384a^6b^2c^4g^2hj^2lm + 384a^6b^2c^4eh^ \\
&*lm - 288a^5b^4c^3g^2hk^2lm - 288a^5b^4c^3eh^2lm - 96a^4b^6c^2g^ \\
&*hj^2lm + 2112a^5b^3c^4d^2j^2klm - 160a^4b^5c^3d^2j^2klm + 16992a^5b^3 \\
&*c^4d^2hk^2lm - 6252a^4b^5c^3d^2hk^2lm - 4800a^5b^3c^4eg^2km + 2112a^ \\
&^5b^3c^4d^2g^2lm - 1728a^5b^3c^4fg^2jm + 1280a^4b^5c^3eg^2km + \\
&1088a^5b^3c^4ef^2lm - 832a^5b^3c^4eh^2jm + 816a^3b^7c^2d^2hk^2 \\
&lm + 576a^5b^3c^4eh^2k^2lm - 448a^5b^3c^4fh^2jl + 288a^4b^5c^3fg^ \\
&*jm - 192a^5b^3c^4g^2hj^2k - 192a^5b^3c^4fg^2kl + 192a^4b^5c^3e \\
&^2hk^2lm - 112a^4b^5c^3d^2g^2lm + 96a^4b^5c^3f^2hj^2lm - 96a^3b^7c^2 \\
&*eg^2km + 80a^4b^5c^3fg^2kl + 32a^4b^5c^3g^2hj^2k - 11456a^5b^2*
\end{aligned}$$

$$\begin{aligned}
& 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 + 2 \\
& 432*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*b^8*c^2*d*f*k*m + 224*a^4*b^4 \\
& *c^4*d*e*1*m - 160*a^4*b^4*c^4*e*f*k*1 - 96*a^4*b^4*c^4*f*g*j*k + 96*a^3*b^6*c^3*d*h*j*1 + 80*a^3*b^6*c^3*d*g*k*1 - 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*1 + 384*a^5*b^2*c^5*e*g*h*m + 224*a^4*b^4*c^4*f*g*h*1 - 96*a^3*b^6*c^3*e*g*h*m - 48*a^3 \\
& *b^6*c^3*f*g*h*1 + 2112*a^4*b^3*c^5*d*e*k*1 - 960*a^4*b^3*c^5*d*f*j*1 + 960*a^4*b^3*c^5*d*e*j*m + 384*a^3*b^5*c^4*d*f*j*1 + 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*1 - 32*a^2*b^7*c^3*d*f*j*1 + 7392*a^4*b^3*c^5*d*f*h*m - 2496*a^4*b^3*c^5*d*g*h*1 - 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*1 - 448*a^4*b^3*c^5*e*f*h*1 + 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*1 - 48*a^2*b^7*c^3*d*g*h*1 + 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*1 - 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*1 + 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*1 + 600*a^3*b^4*c^5*d*f*h*k + 480*a^3*b^4*c^5*d*f*g*1 - 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*1 - 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*1 + 12*a^2*b^6*c^4*d*f*h*k - 960*a^3*b^3*c^6*d*e*f*1 + 384*a^2*b^5*c^5*d \\
& e*f*1 + 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*1^2*m - 4752*a^7*b^4 \\
& *c*j*1*m^2 + 96*a^5*b^6*c*j^2*k*m - 6144*a^8*b*c^3*h*1^2*m - 168*a^6*b^5 \\
& *c*h*1^2*m + 6400*a^8*b*c^3*g*1*m^2 - 2862*a^6*b^5*c*h*k*m^2 + 2376*a^6*b^5 \\
& *c*g*1*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 \\
& *1^2 + 56*a^5*b^6*c*f*1^2*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*1 - 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*1*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*1^2*m + 2048*a^7*b*c^4*g*j*1^2 - 102 \\
& 4*a^7*b*c^4*f*k*1^2 + 64*a^4*b^7*c*g*j*1^2 + 56*a^4*b^7*c*d*1^2*m - 40*a^4*b^7 \\
& *c*f*k*1^2 + 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*1 + 4608*a^5*b*c^6 \\
& *e^2*j*1 - 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*1 - 40*a^3*b^8*c*d*k*1^2 - 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*1^2 - 16*a*b^8*c^3*d^2*j*1 + 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*g*1 +
\end{aligned}$$

$$\begin{aligned}
& 144a^3b^8c^*eg^*m^2 - 116a^*b^8c^3d^2h^*m + 8192a^6b^*c^5d^*h^1^2 + 20 \\
& 48a^6b^*c^5e^*g^1^2 + 24a^2b^9c^*d^*h^1^2 - 5856a^4b^*c^7d^2f^*m + 4896 \\
& *a^4b^*c^7d^2h^*k + 2720a^6b^*c^5d^*f^*m^2 + 2304a^4b^*c^7d^2g^*1 + 1824 \\
& *a^5b^*c^6d^*h^2^*k + 438a^*b^7c^4d^2f^*m - 384a^5b^*c^6e^*h^2^*j + 318a^ \\
& 2b^9c^*d^*f^*m^2 - 168a^*b^7c^4d^2g^*1 + 42a^*b^7c^4d^2h^*k - 36a^*b^8c^ \\
& ^3d^*f^2^*m - 2432a^4b^*c^7d^*e^2^*m + 1536a^5b^*c^6e^*g^*j^2 + 1536a^4b^*c^ \\
& ^7e^2^*g^*j - 896a^5b^*c^6d^*h^*j^2 - 896a^4b^*c^7e^2^*f^*k + 4896a^5b^*c^6 \\
& *d^*f^*k^2 + 1824a^4b^*c^7d^*f^2^*k - 384a^4b^*c^7e^*f^2^*j + 336a^*b^6c^5d^ \\
& ^2e^*1 - 156a^*b^6c^5d^2f^*k + 16a^*b^6c^5d^2g^*j + 12a^*b^7c^4d^*f^2^*k \\
& k - 2a^*b^9c^2d^*f^*k^2 - 1920a^3b^*c^8d^2e^*j - 32a^*b^5c^6d^2e^*j + 2 \\
& 208a^3b^*c^8d^2f^*h + 800a^4b^*c^7d^*f^*h^2 - 102a^*b^5c^6d^2f^*h + 12 \\
& a^*b^6c^5d^*f^2^*h - 2a^*b^7c^4d^*f^*h^2 - 896a^3b^*c^8d^*e^2^*h - 8a^*b^6c^ \\
& ^5d^*f^*g^2 - 240a^*b^4c^7d^2e^*g - 32a^*b^4c^7d^*e^2^*f + 5120a^8c^4h^* \\
& j^*1^*m + 15360a^7c^5d^*j^*1^*m - 7680a^7c^5e^*j^*k^*m + 3072a^7c^5f^*j^*k^*1 \\
& + 5120a^7c^5e^*h^*1^*m + 1920a^7c^5f^*h^*k^*m + 15360a^6c^6d^*e^*1^*m + 57 \\
& 60a^6c^6d^*f^*k^*m + 3072a^6c^6e^*f^*k^*1 - 3072a^6c^6d^*h^*j^*1 - 2560a^6 \\
& *c^6e^*f^*j^*m + 1536a^6c^6e^*h^*j^*k + 4608a^5c^7d^*e^*j^*k - 3072a^5c^7d^ \\
& *e^*h^*1 - 1152a^5c^7d^*f^*h^*k + 512a^5c^7e^*f^*h^*j + 1536a^4c^8d^*e^*f^*j \\
& - 8a^*b^10c^*d^*f^*1^2 - 5568a^8b^2c^2k^1^2^*m + 15552a^8b^2c^2j^*1^*m^2 \\
& + 4800a^7b^2c^3j^2k^*m - 1280a^6b^4c^2j^2k^*m + 2080a^7b^3c^2h^ \\
& *1^2^*m - 1088a^7b^2c^3j^*k^2^*1 + 48a^6b^4c^2j^*k^2^*1 - 8544a^7b^2c^ \\
& ^3h^*k^2^*m - 7776a^7b^3c^2g^*1^*m^2 + 7632a^7b^3c^2h^*k^*m^2 + 3600a^6 \\
& *b^3c^3h^2k^*m + 2484a^6b^4c^2h^*k^2^*m - 918a^5b^5c^2h^2k^*m + 480 \\
& 0a^7b^2c^3h^*k^1^2 - 1424a^6b^4c^2h^*k^1^2 + 1200a^5b^4c^3g^2k^*m \\
& - 960a^6b^2c^4g^2k^*m - 528a^6b^4c^2f^*1^2^*m - 416a^6b^3c^3h^*j^ \\
& 2^*m - 320a^4b^6c^2g^2k^*m + 192a^7b^2c^3f^*1^2^*m + 96a^5b^5c^2h^* \\
& j^2^*m + 15552a^7b^2c^3e^*1^*m^2 - 6720a^7b^2c^3g^*j^*m^2 + 6160a^6b^4 \\
& *c^2g^*j^*m^2 - 4752a^6b^4c^2e^*1^*m^2 - 2016a^7b^2c^3f^*k^*m^2 - 1164a^ \\
& ^6b^4c^2f^*k^*m^2 + 1104a^5b^3c^4f^2k^*m + 1008a^6b^3c^3f^*k^2^*m + \\
& 960a^6b^2c^4h^2j^*1 - 678a^5b^5c^2f^*k^2^*m + 544a^6b^3c^3g^*k^2^*1 \\
& - 144a^5b^4c^3h^2j^*1 - 102a^4b^5c^3f^2k^*m - 62a^3b^7c^2f^2k^ \\
& *m - 24a^5b^5c^2g^*k^2^*1 + 6432a^6b^3c^3d^*1^2^*m + 4800a^5b^2c^5e^ \\
& ^2k^*m - 2304a^6b^2c^4g^*j^2^*1 + 1920a^6b^3c^3g^*j^*1^2 + 1728a^6b^2 \\
& *c^4f^*j^2^*m - 1280a^4b^4c^4e^2k^*m + 1152a^5b^3c^4g^2j^*1 - 1032a^ \\
& ^5b^5c^2d^*1^2^*m - 864a^6b^3c^3f^*k^1^2 - 768a^5b^5c^2g^*j^*1^2 + 40 \\
& 8a^5b^5c^2f^*k^1^2 + 384a^5b^4c^3g^*j^2^*1 - 288a^5b^4c^3f^*j^2^*m + \\
& 192a^6b^2c^4h^*j^2^*k - 192a^4b^5c^3g^2j^*1 + 96a^3b^6c^3e^2k^*m \\
& - 32a^5b^4c^3h^*j^2^*k - 21120a^6b^2c^4d^*k^2^*m + 20880a^6b^3c^3d^ \\
& *k^*m^2 + 19760a^4b^3c^5d^2k^*m - 12320a^6b^3c^3e^*j^*m^2 - 9750a^5b^ \\
& ^5c^2d^*k^*m^2 - 9390a^3b^5c^4d^2k^*m + 8460a^5b^4c^3d^*k^2^*m + 3360 \\
& *a^5b^5c^2e^*j^*m^2 + 1860a^2b^7c^3d^2k^*m - 1218a^4b^6c^2d^*k^2^*m \\
& - 1088a^6b^2c^4e^*k^2^*1 + 960a^6b^2c^4g^*j^*k^2 - 240a^5b^4c^3g^*j^* \\
& k^2 + 192a^5b^2c^5f^2j^*1 - 104a^4b^5c^3g^2h^*m - 96a^5b^3c^4g^ \\
& 2h^*m + 48a^5b^4c^3e^*k^2^*1 + 48a^4b^4c^4f^2j^*1 + 24a^3b^7c^2g^ \\
& 2h^*m + 16a^4b^6c^2g^*j^*k^2 - 16a^3b^6c^3f^2j^*1 + 13376a^6b^2c^4
\end{aligned}$$

$$\begin{aligned}
& *d*k*1^2 - 5136*a^5*b^4*c^3*d*k*1^2 - 3840*a^6*b^2*c^4*e*j*1^2 + 1536*a^5*b^4*c^3*e*j*1^2 + 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*1 + 768*a^4*b^6*c^2*d*k*1^2 - 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*1 + 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*1^2 + 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*1 - 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*1^2 + 576*a^6*b^2*c^4*f*h*1^2 + 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*1^2 + 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*1 - 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*1 - 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 - 2*a^2*b^7*c^3*f^2*h*k - 9312*a^5*b^3*c^4*d*h*1^2 + 3288*a^4*b^5*c^3*d*h*1^2 - 2304*a^4*b^2*c^6*e^2*g*1 + 1920*a^5*b^3*c^4*e*g*1^2 + 1728*a^4*b^2*c^6*e^2*f*m + 1152*a^4*b^3*c^5*e*g^2*1 - 768*a^4*b^5*c^3*e*g*1^2 - 608*a^4*b^3*c^5*d*g^2*m - 472*a^3*b^7*c^2*d*h*1^2 + 384*a^3*b^4*c^5*e^2*g*1 - 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*1 + 120*a^3*b^5*c^4*d*g^2*m + 64*a^3*b^7*c^2*e*g*1^2 - 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*1 - 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*1 - 1152*a^4*b^2*c^6*d*f^2*m + 960*a^5*b^2*c^5*e*g*k^2 - 496*a^3*b^3*c^6*d^2*h*k + 462*a^2*b^6*c^4*d*f^2*m + 432*a^4*b^3*c^5*d*h^2*k - 240*a^4*b^4*c^4*e*g*k^2 - 222*a^2*b^5*c^5*d^2*h*k + 192*a^4*b^2*c^6*f^2*g*j + 192*a^4*b^2*c^6*e*f^2*1 - 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*1 - 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*1 + 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*1^2 + 1392*a^4*b^4*c^4*d*f*1^2 - 840*a^3*b^6*c^3*d*f*1^2 - 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*1^2 + 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*1 - 3552*a^3*b^2*c^7*d^2*f*k - 2448*a^2*b^4*c^6*d^2*e*1 + 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*
\end{aligned}$$



$$\begin{aligned}
& b^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^2d^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^3l^3 - 256a^6b^3c^3j^3l^3 - 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 - 36a^4b^7c^3h^2l^2 - 3072a^7b^2c^3g^3l^3 + 2096a^7b^3c^2f^3m^3 + 1088a^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^3h^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 + 132a^5b^4c^3f^3k^3 + 128a^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^3c^6f^2j^2 + 108a^4b^9c^2d^2l^2 - 1680a^5b^3c^4d^3k^3 - 1680a^2b^3c^7d^3k + 222a^4b^5c^3d^3k^3 + 30a^4b^8c^3d^2k^2 - 10a^3b^7c^2d^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 - 192a^4b^2c^6d^3h^3 - 192a^2b^2c^8d^3h + 128a^3b^3c^6e^2g^3 - 28a^3b^4c^5d^3h^3 + 12a^4b^6c^5d^2h^2 + 6a^2b^6c^4d^3h^3 - 192a^3b^3c^8e^2f^2 + 60a^4b^5c^6d^2g^2 + 198a^4b^4c^7d^2f^2 + 144a^2b^3c^7d^2f^3 - 960a^2b^3c^9d^2e^2 + 240a^4b^3c^8d^2e^2 + 15360a^9c^3k^2l^2m^2 - 12800a^9c^3j^2l^2m^2 - 3840a^8c^4j^2k^2m + 432a^6b^6j^2l^2m^2 + 4608a^8c^4j^2k^2l^2 + 2880a^8c^4h^3k^2m + 5120a^8c^4f^3l^2m - 3072a^8c^4h^3k^2l^2 + 270a^5b^7h^3k^2m^2 - 216a^5b^7g^3l^2m^2 - 12800a^8c^4e^3l^2m^2 - 4800a^8c^4f^3k^2m^2 - 512a^7c^5h^2j^2l^2 - 3840a^6c^6e^2k^2m - 1280a^7c^5f^3j^2m + 768a^7c^5h^3j^2k + 144a^4b^8g^3j^2m^2 - 90a^4b^8f^3k^2m^2 + 8640a^7c^5d^3k^2m + 4608a^7c^5e^3k^2l^2 + 512a^6c^6f^2j^2l^2 - 9216a^7c^5d^3k^2l^2 - 4096a^7c^5e^3j^2l^2 + 320a^6c^6f^2h^3m - 90a^3b^9d^3k^2m^2 + 15200a^9b^3c^2k^2m^3 - 6192a^8b^3c^3k^2m^3 + 5472a^8b^3c^3k^3m - 4608a^5c^7d^2j^2l^2 - 1024a^7c^5f^3h^2l^2 + 150a^6b^5c^3k^3m + 54a^3b^9f^3h^2m^2 + 6b^10c^2d^2h^3m - 14400a^7c^5d^3h^2m^2 + 8
\end{aligned}$$

$$\begin{aligned}
& 640*a^5*c^7*d^2*h*m + 2880*a^6*c^6*d*h^2*m + 2304*a^6*c^6*d*j^2*k - 512*a^6 \\
& *c^6*e*h^2*1 - 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*1 - 1280*a^5*c^7*e^2*f*m + 768*a^5*c^7*e^2*h*k + 256*a^6*c^6*f*h*j^2 + \\
& 192*a^6*b^5*c*j*1^3 + 54*a^2*b^10*d*h*m^2 - 18*b^9*c^3*d^2*f*m + 8*b^9*c^3* \\
& d^2*g*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 + 2 \\
& 24*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 - 1 \\
& 920*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 + 168 \\
& 0*a^4*b^5*c^3*e^2*m^2 - 240*a^5*b^3*c^4*g^2*k^2 - 240*a^5*b^3*c^4*f^2*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 + 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*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 + 3
\end{aligned}$$

$$\begin{aligned}
& 60a^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^3m^3 + 8000a^9c^3h^3m^3 + 320a^7c^5h^3m^3 - 378a^6b^6h^3m^3 + 126a^5b^7f^3m^3 + 30b^8c^4d^3m^3 + 24000a^8c^4d^3m^3 + 8640a^4c^8d^3m^3 - 1728a^7c^5f^3k^3 - 192a^5c^7f^3k^3 - 4b^11c^d^2l^2 + 126a^4b^8d^3m^3 - 10b^7c^5d^3k^3 + 4200a^9b^2c^3m^4 - 1024a^6c^6e^3j^3 - 1024a^4c^8e^3j^3 - 144a^7b^4c^3l^4 - 10b^6c^6d^3h^3 - 1728a^3c^9d^3h^3 - 192a^5c^7d^3h^3 + 30b^5c^7d^3f^3 + 360a^2b^2c^9d^4 - 9b^12d^2m^2 - 10000a^10c^2m^4 - 4096a^9c^3l^4 - 441a^8b^4m^4 - 1296a^8c^4k^4 - 256a^7c^5j^4 - 16a^6c^6h^4 - 16a^4c^8f^4 - 256a^3c^9e^4 - 25b^4c^8d^4 - 1296a^2c^10d^4 - b^10c^2d^2k^2 - b^8c^4d^2h^2, \\
& z, k1) * ((6144a^5c^9d + 2048a^6c^8h - 10240a^7c^7m - 288a^2b^6c^6d + 1920a^3b^4c^7d - 5632a^4b^2c^8d + 16a^2b^7c^5f - 192a^3b^5c^6f + 768a^4b^3c^7f - 32a^3b^6c^5h + 384a^4b^4c^6h - 1536a^5b^2c^7h + 16a^3b^7c^4k - 192a^4b^5c^5k + 768a^5b^3c^6k - 48a^3b^8c^3m + 736a^4b^6c^4m - 4224a^5b^4c^5m + 10752a^6b^2c^6m + 16a^2b^8c^5d - 1024a^5b^6c^8f - 1024a^6b^5c^7k) / (8 * (64a^5c^6 - a^2b^6c^3 + 12a^3b^4c^4 - 48a^4b^2c^5)) + (x * (32a^2b^6c^6e - 2048a^6c^8j - 2048a^5c^9e - 384a^3b^4c^7e + 1536a^4b^2c^8e - 16a^2b^7c^5g + 192a^3b^5c^6g - 768a^4b^3c^7g + 32a^3b^6c^5j - 384a^4b^4c^6j + 1536a^5b^2c^7j + 32a^2b^9c^3l - 528a^3b^7c^4l + 3264a^4b^5c^5l - 8960a^5b^3c^6l + 1024a^5b^6c^8g + 9216a^6b^5c^7l)) / (4 * (64a^5c^6 - a^2b^6c^3 + 12a^3b^4c^4 - 48a^4b^2c^5)) - (\text{root}(1572864a^8b^2c^10z^4 - 983040a^7b^4c^9z^4 + 327680a^6b^6c^8z^4 - 61440a^5b^8c^7z^4 + 6144a^4b^10c^6z^4 - 256a^3b^12c^5z^4 - 1048576a^9c^11z^4 - 1572864a^8b^2c^8l^3z^3 + 983040a^7b^4c^7l^3z^3 - 327680a^6b^6c^6l^3z^3 + 61440a^5b^8c^5l^3z^3 - 6144a^4b^10c^4l^3z^3 + 256a^3b^12c^3l^3z^3 + 1048576a^9c^9l^3z^3 + 96a^3b^12c^3k^3m^2z^2 + 98304a^8b^6c^7j^3l^2z^2 + 24576a^8b^6c^7h^3m^2z^2 + 155648a^7b^6c^8d^3m^2z^2 + 98304a^7b^6c^8e^3l^2z^2 + 57344a^7b^6c^8f^3k^2z^2 + 32768a^7b^6c^8g^3j^2z^2 + 57344a^6b^6c^9d^3h^2z^2 + 32768a^6b^6c^9e^3g^2z^2 - 32a^2b^10c^5d^3f^2z^2 - 491520a^8b^2c^6k^3m^2z^2 + 358400a^7b^4c^5k^3m^2z^2 - 129024a^6b^6c^4k^3m^2z^2 + 24768a^5b^8c^3k^3m^2z^2 - 2432a^4b^10c^2k^3m^2z^2 - 90112a^7b^3c^6j^3l^2z^2 + 30720a^6b^5c^5j^3l^2z^2 - 4608a^5b^7c^4j^3l^2z^2 + 256a^4b^9c^3j^3l^2z^2 - 21504a^6b^5c^5h^3m^2z^2 + 9216a^5b^7c^4h^3m^2z^2 + 8192a^7b^3c^6h^3m^2z^2 - 1568a^4b^9c^3h^3m^2z^2 + 96a^3b^11c^2h^3m^2z^2 - 172032a^7b^2c^7f^3m^2z^2 + 116736a^6b^4c^6f^3m^2z^2 - 49152a^7b^2c^7g^3l^2z^2 + 45056a^6b^4c^6g^3l^2z^2 - 35840a^5b^6c^5f^3m^2z^2 + 24576a^7b^2c^7h^3k^2z^2 - 15360a^5b^6c^5g^3l^2z^2 + 5184a^4b^8c^4f^3m^2z^2 - 3072a^5b^6c^5h^3k^2z^2 + 2304a^4b^8c^4g^3l^2z^2 + 2048a^6b^4c^6h^3k^2z^2 + 576a^4b^8c^4h^3k^2z^2 - 288a^3b^10c^3f^3m^2z^2 - 128a^3b^10c^3g^3l^2z^2 - 32a^3b^10c^3h^3k^2z^2 - 147456a^6b^3c^7d^3m^2z^2 - 90112a^6b^3c^7e^3l^2z^2 + 52224a^5b^5c^6d^3
\end{aligned}$$

$$\begin{aligned}
& m^2z^2 - 49152a^6b^3c^7f^*k^*z^2 + 30720a^5b^5c^6e^*l^*z^2 - 24576a^6b^3c^7g^*j^*z^2 + 15360a^5b^5c^6f^*k^*z^2 - 8192a^4b^7c^5d^*m^*z^2 + 6144a^5b^5c^6g^*j^*z^2 - 4608a^4b^7c^5e^*l^*z^2 - 2048a^4b^7c^5f^*k^*z^2 - 512a^4b^7c^5g^*j^*z^2 + 480a^3b^9c^4d^*m^*z^2 + 256a^3b^9c^4e^*l^*z^2 + 96a^3b^9c^4f^*k^*z^2 + 131072a^6b^2c^8d^*k^*z^2 + 49152a^6b^2c^8e^*j^*z^2 - 43008a^5b^4c^7d^*k^*z^2 - 12288a^5b^4c^7e^*j^*z^2 + 6144a^4b^6c^6d^*k^*z^2 + 1024a^4b^6c^6e^*j^*z^2 - 320a^3b^8c^5d^*k^*z^2 + 6144a^5b^4c^7f^*h^*z^2 - 2048a^4b^6c^6f^*h^*z^2 + 192a^3b^8c^5f^*h^*z^2 - 49152a^5b^3c^8d^*h^*z^2 - 24576a^5b^3c^8e^*g^*z^2 + 15360a^4b^5c^7d^*h^*z^2 + 6144a^4b^5c^7e^*g^*z^2 - 2048a^3b^7c^6d^*h^*z^2 - 512a^3b^7c^6e^*g^*z^2 + 96a^2b^9c^5d^*h^*z^2 + 24576a^5b^2c^9d^*f^*z^2 - 3072a^3b^6c^7d^*f^*z^2 + 2048a^4b^4c^8d^*f^*z^2 + 576a^2b^8c^6d^*f^*z^2 - 430080a^9b^c^6m^2z^2 + 3408a^4b^11c^m^2z^2 - 64a^3b^12c^l^2z^2 + 61440a^8b^c^7k^2z^2 + 12288a^7b^c^8h^2z^2 + 12288a^6b^c^9f^2z^2 + 61440a^5b^c^10d^2z^2 + 432a^ab^9c^6d^2z^2 + 245760a^9c^7k^m^*z^2 + 81920a^8c^8f^*m^*z^2 - 49152a^8c^8h^*k^*z^2 - 147456a^7c^9d^*k^*z^2 - 65536a^7c^9e^*j^*z^2 - 16384a^7c^9f^*h^*z^2 - 49152a^6c^10d^*f^*z^2 + 716800a^8b^3c^5m^2z^2 - 483840a^7b^5c^4m^2z^2 + 170496a^6b^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^3l^2z^2 + 1536a^4b^10c^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^11c^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 - 6140a^4b^3c^9d^2z^2 + 24064a^3b^5c^8d^2z^2 - 4608a^2b^7c^7d^2z^2 - 393216a^9c^7l^2z^2 - 144a^3b^13m^2z^2 - 32768a^8c^8j^2z^2 - 32768a^6c^10e^2z^2 - 16b^11c^5d^2z^2 + 18432a^8b^c^5h^*l^*m^*z - 96a^3b^10c^*g^*k^*m^*z + 90112a^7b^c^6e^*k^*m^*z + 36864a^7b^c^6f^*j^*m^*z - 16384a^7b^c^6g^*j^*l^*z + 14336a^7b^c^6d^*l^*m^*z - 10240a^7b^c^6f^*k^*l^*z + 4096a^7b^c^6h^*j^*k^*z + 10240a^7b^c^6g^*h^*m^*z - 47104a^6b^c^7d^*h^*l^*z + 36864a^6b^c^7e^*f^*m^*z + 30720a^6b^c^7d^*g^*m^*z - 16384a^6b^c^7e^*g^*l^*z + 6144a^6b^c^7f^*g^*k^*z + 4096a^6b^c^7e^*h^*k^*z + 32a^b^10c^3d^*f^*l^*z - 4096a^5b^c^8d^*f^*j^*z - 6144a^5b^c^8d^*g^*h^*z - 32a^b^8c^5d^*f^*g^*z - 4096a^4b^c^9d^*e^*f^*z + 64a^a^b^7c^6d^*e^*f^*z + 110592a^8b^2c^4k^*l^*m^*z - 36864a^7b^4c^3k^*l^*m^*z + 5376a^6b^6c^2k^*l^*m^*z - 79872a^7b^3c^4j^*k^*m^*z + 26112a^6b^5c^3j^*k^*m^*z - 3712a^5b^7c^2j^*k^*m^*z - 13824a^7b^3c^4h^*l^*m^*z + 3456a^6b^5c^3h^*l^*m^*z - 288a^5b^7c^2h^*l^*m^*z - 45056a^7b^2c^5g^*k^*m^*z + 39936a^6b^4c^4g^*k^*m^*z + 30720a^7b^2c^5f^*l^*m^*z - 18432a^7b^2c^5h^*k^*l^*z - 13056a^5b^6c^3g^*k^*m^*z - 7680a^6b^4c^4f^*l^*m^*z + 5376a^6b^4c^4h^*j^*m^*z + 4608a^6b^4c^4h^*k^*l^*z + 3072a^7b^2c^5h^*j^*m^*z - 1984a^5b^6c^3h^*j^*m^*z + 1856a^4b^8c^2g^*k^*m^*z
\end{aligned}$$

$$\begin{aligned}
& z + 640a^5b^6c^3f^1m^*z - 384a^5b^6c^3h^*k^*l^*z + 192a^4b^8c^2h^*j^*m^*z - 79872a^6b^3c^5e^*k^*m^*z - 27648a^6b^3c^5f^*j^*m^*z + 26112a^5b^5c^4e^*k^*m^*z + 12288a^6b^3c^5g^*j^*l^*z - 10752a^6b^3c^5d^*l^*m^*z + 7680a^6b^3c^5f^*k^*l^*z + 6912a^5b^5c^4f^*j^*m^*z - 3712a^4b^7c^3e^*k^*m^*z \\
& - 3072a^6b^3c^5h^*j^*k^*z - 3072a^5b^5c^4g^*j^*l^*z + 2688a^5b^5c^4d^*l^*m^*z - 1920a^5b^5c^4f^*k^*l^*z + 768a^5b^5c^4h^*j^*k^*z - 576a^4b^7c^3f^*j^*m^*z + 256a^4b^7c^3g^*j^*l^*z - 224a^4b^7c^3d^*l^*m^*z + 192a^3b^9c^2e^*k^*m^*z + 160a^4b^7c^3f^*k^*l^*z - 64a^4b^7c^3h^*j^*k^*z - 2688a^5b^5c^4g^*h^*m^*z - 1536a^6b^3c^5g^*h^*m^*z + 992a^4b^7c^3g^*h^*m^*z - 96a^3b^9c^2g^*h^*m^*z - 65536a^6b^2c^6d^*k^*l^*z + 46080a^6b^2c^6d^*j^*m^*z - 24576a^6b^2c^6e^*j^*l^*z + 21504a^5b^4c^5d^*k^*l^*z - 11520a^5b^4c^5d^*j^*m^*z + 9216a^6b^2c^6f^*j^*k^*z + 6144a^5b^4c^5e^*j^*l^*z - 3072a^4b^6c^4d^*k^*l^*z - 2304a^5b^4c^5f^*j^*k^*z + 960a^4b^6c^4d^*j^*m^*z - 512a^4b^6c^4e^*j^*l^*z + 192a^4b^6c^4f^*j^*k^*z + 160a^3b^8c^3d^*k^*l^*z - 18432a^6b^2c^6f^*g^*m^*z + 13824a^5b^4c^5f^*g^*m^*z + 5376a^5b^4c^5e^*h^*m^*z - 3456a^4b^6c^4f^*g^*m^*z + 3072a^6b^2c^6e^*h^*m^*z - 3072a^5b^4c^5f^*h^*l^*z - 2048a^6b^2c^6g^*h^*k^*z - 1984a^4b^6c^4e^*h^*m^*z + 1536a^5b^4c^5g^*h^*k^*z + 1024a^4b^6c^4f^*h^*l^*z - 384a^4b^6c^4g^*h^*k^*z + 288a^3b^8c^3f^*g^*m^*z + 192a^3b^8c^3e^*h^*m^*z - 96a^3b^8c^3f^*h^*l^*z + 32a^3b^8c^3g^*h^*k^*z + 41472a^5b^3c^6d^*h^*l^*z - 27648a^5b^3c^6e^*f^*m^*z - 23040a^5b^3c^6d^*g^*m^*z - 13440a^4b^5c^5d^*h^*l^*z + 12288a^5b^3c^6e^*g^*l^*z + 6912a^4b^5c^5e^*f^*m^*z + 5760a^4b^5c^5d^*g^*m^*z - 4608a^5b^3c^6f^*g^*k^*z - 3072a^5b^3c^6e^*h^*k^*z - 3072a^4b^5c^5e^*g^*l^*z + 1888a^3b^7c^4d^*h^*l^*z + 1152a^4b^5c^5f^*g^*k^*z + 768a^4b^5c^5e^*h^*k^*z - 576a^3b^7c^4e^*f^*m^*z - 480a^3b^7c^4d^*g^*m^*z + 256a^3b^7c^4e^*g^*l^*z - 96a^3b^7c^4f^*g^*k^*z - 96a^2b^9c^3d^*h^*l^*z - 64a^3b^7c^4e^*h^*k^*z + 46080a^5b^2c^7d^*e^*m^*z - 11520a^4b^4c^6d^*e^*m^*z + 9216a^5b^2c^7e^*f^*k^*z - 9216a^5b^2c^7d^*h^*j^*z - 6656a^4b^4c^6d^*f^*l^*z - 6144a^5b^2c^7d^*f^*l^*z + 3456a^3b^6c^5d^*f^*l^*z - 2304a^4b^4c^6e^*f^*k^*z + 2304a^4b^4c^6d^*h^*j^*z + 960a^3b^6c^5d^*e^*m^*z - 576a^2b^8c^4d^*f^*l^*z + 192a^3b^6c^5e^*f^*k^*z - 192a^3b^6c^5d^*h^*j^*z + 3072a^4b^3c^7d^*f^*j^*z - 768a^3b^5c^6d^*f^*j^*z + 64a^2b^7c^5d^*f^*j^*z + 4608a^4b^3c^7d^*g^*h^*z - 1152a^3b^5c^6d^*g^*h^*z + 96a^2b^7c^5d^*g^*h^*z - 9216a^4b^2c^8d^*e^*h^*z + 2304a^3b^4c^7d^*e^*h^*z + 2048a^4b^2c^8d^*f^*g^*z - 1536a^3b^4c^7d^*f^*g^*z + 384a^2b^6c^6d^*f^*g^*z - 192a^2b^6c^6d^*e^*h^*z + 3072a^3b^3c^8d^*e^*f^*z - 768a^2b^5c^7d^*e^*f^*z - 288a^5b^8c^*k^*l^*m^*z + 90112a^8b^*c^5j^*k^*m^*z + 192a^4b^9c^*j^*k^*m^*z + 138240a^9b^*c^4l^*m^2z - 7344a^6b^7c^*l^*m^2z + 5088a^5b^8c^*j^*m^2z - 3072a^8b^*c^5k^2l^*z - 49152a^8b^*c^5j^*l^2z - 128a^4b^9c^*j^*l^2z - 25600a^8b^*c^5g^*m^2z - 9216a^7b^*c^6h^2l^*z - 2544a^4b^9c^*g^*m^2z + 64a^3b^10c^*g^*l^2z + 9216a^7b^*c^6g^*k^2z - 3072a^6b^*c^7f^2l^*z - 288a^3b^10c^*e^*m^2z - 49152a^7b^*c^6e^*l^2z - 58368a^5b^*c^8d^2l^*z - 432a^*b^9c^4d^2l^*z - 1024a^6b^*c^7g^*h^2z + 32a^*b^8c^5d^2j^*z + 1024a^5b^*c^8f^2g^*z - 9216a^4b^*c^9d^2g^*z + 336a^*b^7c^6d^2g^*z - 672a^*b^6c^7d^2e^*z - 122880a^9c^5k^*l^*m^*z - 40960a^8c^6f^*l^*m^*z + 24576a^8c^6h^*k^*l^*z - 204
\end{aligned}$$

$80*a^8*c^6*h*j*m*z + 73728*a^7*c^7*d*k*l*z - 61440*a^7*c^7*d*j*m*z + 32768*a^7*c^7*e*j*l*z - 12288*a^7*c^7*f*j*k*z - 20480*a^7*c^7*e*h*m*z + 8192*a^7*c^7*f*h*l*z - 61440*a^6*c^8*d*e*m*z + 24576*a^6*c^8*d*f*l*z - 12288*a^6*c^8*e*f*k*z + 12288*a^6*c^8*d*h*j*z + 12288*a^5*c^9*d*e*h*z - 131328*a^8*b^3*c^3*l*m^2*z + 46656*a^7*b^5*c^2*l*m^2*z - 142848*a^8*b^2*c^4*j*m^2*z + 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 - 7680*a^6*b*c^5*d*g*l*m - 5376*$

$$\begin{aligned}
& a^6 b^5 c^5 e f^2 m + 3840 a^6 b^5 c^5 e g^2 k m - 3328 a^6 b^5 c^5 e h^2 k m - 1536 a^6 b^5 c^5 f^2 g^2 k m + 1280 a^6 b^5 c^5 f^2 g^2 j m - 768 a^6 b^5 c^5 g^2 h^2 j k - 768 a^6 b^5 c^5 f^2 h^2 j k - 768 a^6 b^5 c^5 e^2 h^2 j m - 36 a^2 b^9 c^5 d^2 h^2 k m - 6912 a^5 b^5 c^6 d^2 e^2 k m - 4864 a^5 b^5 c^6 d^2 e^2 j m - 2304 a^5 b^5 c^6 d^2 g^2 j k - 1792 a^5 b^5 c^6 e^2 f^2 j k - 1280 a^5 b^5 c^6 d^2 f^2 j k - 4544 a^5 b^5 c^6 d^2 f^2 h^2 m + 1536 a^5 b^5 c^6 d^2 g^2 h^2 m + 1280 a^5 b^5 c^6 e^2 f^2 g^2 m - 768 a^5 b^5 c^6 e^2 g^2 h^2 k - 768 a^5 b^5 c^6 e^2 f^2 h^2 m - 256 a^5 b^5 c^6 f^2 g^2 h^2 j + 12 a^2 b^9 c^2 d^2 f^2 h^2 m + 16 a^2 b^8 c^3 d^2 f^2 g^2 m - 4 a^2 b^8 c^3 d^2 f^2 h^2 k - 2304 a^4 b^5 c^7 d^2 e^2 g^2 k - 1792 a^4 b^5 c^7 d^2 e^2 h^2 j - 1280 a^4 b^5 c^7 d^2 e^2 f^2 m - 768 a^4 b^5 c^7 d^2 f^2 g^2 j - 32 a^2 b^7 c^4 d^2 e^2 f^2 m - 256 a^4 b^5 c^7 e^2 f^2 g^2 h - 768 a^3 b^5 c^8 d^2 e^2 f^2 g + 32 a^2 b^5 c^6 d^2 e^2 f^2 g + 12 a^2 b^10 c^2 d^2 f^2 k m + 3648 a^7 b^3 c^2 j^2 k m + 5504 a^7 b^2 c^3 g^2 k m - 1824 a^6 b^4 c^2 g^2 k m + 384 a^7 b^2 c^3 h^2 j m - 288 a^6 b^4 c^2 h^2 j m - 4800 a^6 b^3 c^3 g^2 j k m + 3648 a^6 b^3 c^3 e^2 k m + 1280 a^5 b^5 c^2 g^2 j k m + 1088 a^6 b^3 c^3 f^2 j m + 576 a^6 b^3 c^3 h^2 j k m - 288 a^5 b^5 c^2 e^2 k m - 192 a^6 b^3 c^3 g^2 h^2 m + 144 a^5 b^5 c^2 g^2 h^2 m + 9600 a^6 b^2 c^4 e^2 j k m - 4224 a^6 b^2 c^4 d^2 j m - 2560 a^5 b^4 c^3 e^2 j k m + 384 a^6 b^2 c^4 f^2 j k m + 224 a^5 b^4 c^3 d^2 j m + 192 a^4 b^6 c^2 e^2 j k m - 160 a^5 b^4 c^3 f^2 j k m - 4608 a^6 b^2 c^4 f^2 h^2 k m + 2688 a^6 b^2 c^4 f^2 g^2 m + 1664 a^6 b^2 c^4 g^2 h^2 k m - 744 a^5 b^4 c^3 f^2 h^2 k m - 544 a^5 b^4 c^3 f^2 g^2 m + 492 a^4 b^6 c^2 f^2 h^2 k m + 416 a^5 b^4 c^3 g^2 h^2 j m + 384 a^6 b^2 c^4 g^2 h^2 j m + 384 a^6 b^2 c^4 e^2 h^2 m - 288 a^5 b^4 c^3 g^2 h^2 k m - 288 a^5 b^4 c^3 e^2 h^2 m - 96 a^4 b^6 c^2 g^2 h^2 j m + 2112 a^5 b^3 c^4 d^2 j k m - 160 a^4 b^5 c^3 d^2 j k m + 16992 a^5 b^3 c^4 d^2 h^2 k m - 6252 a^4 b^5 c^3 d^2 h^2 k m - 4800 a^5 b^3 c^4 e^2 g^2 k m + 2112 a^5 b^3 c^4 d^2 g^2 m - 1728 a^5 b^3 c^4 f^2 g^2 j m + 1280 a^4 b^5 c^3 e^2 g^2 k m + 1088 a^5 b^3 c^4 e^2 f^2 m - 832 a^5 b^3 c^4 e^2 h^2 j m + 816 a^3 b^7 c^2 d^2 h^2 k m + 576 a^5 b^3 c^4 e^2 h^2 k m - 448 a^5 b^3 c^4 f^2 h^2 j m + 288 a^4 b^5 c^3 f^2 g^2 j m - 192 a^5 b^3 c^4 g^2 h^2 j k - 192 a^5 b^3 c^4 f^2 g^2 k m + 192 a^4 b^5 c^3 e^2 h^2 j m - 112 a^4 b^5 c^3 d^2 g^2 m + 96 a^4 b^5 c^3 f^2 h^2 j m - 96 a^3 b^7 c^2 e^2 g^2 k m + 80 a^4 b^5 c^3 f^2 g^2 k m + 32 a^4 b^5 c^3 g^2 h^2 j k - 11456 a^5 b^2 c^5 d^2 f^2 k m + 4992 a^5 b^2 c^5 d^2 h^2 j m - 4608 a^5 b^2 c^5 e^2 g^2 j m - 4224 a^5 b^2 c^5 d^2 e^2 m + 3456 a^5 b^2 c^5 e^2 f^2 j m + 3456 a^5 b^2 c^5 d^2 g^2 k m + 2432 a^5 b^2 c^5 d^2 g^2 j m - 1312 a^4 b^4 c^4 d^2 h^2 j m + 1272 a^3 b^6 c^3 d^2 f^2 k m - 1056 a^4 b^4 c^4 d^2 g^2 k m + 896 a^5 b^2 c^5 f^2 g^2 j k + 768 a^4 b^4 c^4 e^2 g^2 j m - 576 a^4 b^4 c^4 e^2 f^2 j m - 480 a^4 b^4 c^4 d^2 g^2 j m + 384 a^5 b^2 c^5 e^2 h^2 j k + 384 a^5 b^2 c^5 e^2 f^2 k m - 232 a^2 b^8 c^2 d^2 f^2 k m + 224 a^4 b^4 c^4 d^2 e^2 m - 160 a^4 b^4 c^4 e^2 f^2 k m - 96 a^4 b^4 c^4 f^2 g^2 j k + 96 a^3 b^6 c^3 d^2 h^2 j m + 80 a^3 b^6 c^3 d^2 g^2 k m - 64 a^4 b^4 c^4 e^2 h^2 j k - 24 a^4 b^4 c^4 d^2 f^2 k m + 416 a^4 b^4 c^4 e^2 g^2 h^2 m + 384 a^5 b^2 c^5 f^2 g^2 h^2 m + 384 a^5 b^2 c^5 e^2 g^2 h^2 m + 224 a^4 b^4 c^4 f^2 g^2 h^2 m - 96 a^3 b^6 c^3 e^2 g^2 h^2 m - 48 a^3 b^6 c^3 f^2 g^2 h^2 m + 2112 a^4 b^3 c^5 d^2 e^2 k m - 960 a^4 b^3 c^5 d^2 f^2 j m + 960 a^4 b^3 c^5 d^2 e^2 j m + 384 a^3 b^5 c^4 d^2 f^2 j m + 320 a^4 b^3 c^5 d^2 g^2 j k + 192 a^4 b^3 c^5 e^2 f^2 j k - 160 a^3 b^5 c^4 d^2 e^2 k m - 32 a^2 b^7 c^3 d^2 f^2 j m + 7392 a^4 b^3 c^5 d^2 f^2 h^2 m - 2496 a^4 b^3 c^5 d^2 g^2 h^2 m - 1728 a^4 b^3 c^5 e^2 f^2 g^2 m - 1500 a^3 b^5 c^4 d^2 f^2 h^2 m + 656 a^3 b^5 c^4 d^2 g^2 h^2 m - 448 a^4 b^3 c^5 e^2 f^2 h^2 m + 288 a^3 b^5 c^4 e^2 f^2 g^2 m - 192 a^4
\end{aligned}$$

$$\begin{aligned}
& 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 - 3
\end{aligned}$$



$$\begin{aligned}
& 072*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*1^2 - 5568*a^8*b^2*c^2*k*1^2 *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*1^2*m - 1088*a^7*b^2*c^3*j*k^2*1 + 48*a^6*b^4*c^2*j*k^2*1 - 8544*a^7*b^2*c^3*h*k^2*m - 7776*a^7*b^3*c^2*g*1*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*1^2 - 1424*a^6*b^4*c^2*h*k*1^2 + 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*1^2*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*1^2*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*1 - 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*1 + 6432*a^6*b^3*c^3*d*1^2*m + 4800*a^5*b^2*c^5*e^2*k*m - 2304*a^6*b^2*c^4*g*j^2*1 + 1920*a^6*b^3*c^3*g*j*1^2 + 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*1^2*m - 864*a^6*b^3*c^3*f*k*1^2 - 768*a^5*b^5*c^2*g*j*1^2 + 408*a^5*b^5*c^2*f*k*1^2 + 384*a^5*b^4*c^3*g*j^2*1 - 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*1 + 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*1 + 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*1^2 - 5136*a^5*b^4*c^3*d*k*1^2 - 3840*a^6*b^2*c^4*e*j*1^2 + 1536*a^5*b^4*c^3*e*j*1^2 + 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*1 + 768*a^4*b^6*c^2*d*k*1^2 - 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*1 + 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*1^2 + 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*1 - 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*1^2 + 576*a^6*b^2*c^4*f*h*1^2 + 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*1^2 + 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
\end{aligned}$$

$$\begin{aligned}
& ^4c^5d^2h^m + 960a^5b^2c^5e^h^2l - 876a^4b^4c^4d^h^2m - 864a^5b^2c^5f^h^2k + 546a^2b^6c^4d^2h^m + 432a^3b^6c^3d^h^2m + 336 \\
& *a^4b^3c^5f^2h^k - 320a^5b^2c^5d^j^2k + 192a^5b^2c^5g^h^2j + 144a^5b^3c^4f^h^k^2 - 144a^4b^4c^4e^h^2l - 102a^4b^5c^3f^h^k^2 \\
& - 96a^4b^3c^5f^2g^l - 36a^2b^8c^2d^h^2m - 30a^3b^5c^4f^2h^k - 24a^3b^5c^4f^2g^l + 16a^4b^4c^4g^h^2j - 12a^4b^4c^4f^h^2k \\
& + 12a^3b^6c^3f^h^2k + 8a^2b^7c^3f^2g^l + 6a^3b^7c^2f^h^k^2 - 2a^2b^7c^3f^2h^k - 9312a^5b^3c^4d^h^1^2 + 3288a^4b^5c^3d^h^1^2 \\
& - 2304a^4b^2c^6e^2g^l + 1920a^5b^3c^4e^g^1^2 + 1728a^4b^2c^6e^2f^m + 1152a^4b^3c^5e^g^2l - 768a^4b^5c^3e^g^1^2 - 608a^4b^3c^5d^g^2m \\
& - 472a^3b^7c^2d^h^1^2 + 384a^3b^4c^5e^2g^l - 288a^3b^4c^5e^2f^m - 224a^4b^3c^5f^g^2k + 192a^5b^2c^5f^h^j^2 + 192a^4b^2c^6e^2h^k \\
& - 192a^3b^5c^4e^g^2l + 120a^3b^5c^4d^g^2m + 64a^3b^7c^2e^g^1^2 - 32a^3b^4c^5e^2h^k + 24a^3b^5c^4f^g^2k + 9936a^3b^3c^6d^2f^m \\
& + 3786a^4b^5c^3d^f^m^2 - 3552a^5b^2c^5d^h^k^2 - 3486a^2b^5c^5d^2f^m - 3424a^3b^3c^6d^2g^l - 1868a^3b^7c^2d^f^m^2 \\
& + 1332a^4b^4c^4d^h^k^2 - 1296a^5b^3c^4d^f^m^2 - 1236a^3b^4c^5d^f^2m + 1224a^2b^5c^5d^2g^l - 1152a^4b^2c^6d^f^2m \\
& + 960a^5b^2c^5e^g^k^2 - 496a^3b^3c^6d^2h^k + 462a^2b^6c^4d^f^2m + 432a^4b^3c^5d^h^2k - 240a^4b^4c^4e^g^k^2 \\
& - 222a^2b^5c^5d^2h^k + 192a^4b^2c^6f^2g^j + 192a^4b^2c^6e^f^2l - 174a^3b^5c^4d^h^2k - 156a^3b^6c^3d^h^k^2 \\
& + 48a^3b^4c^5e^f^2l - 32a^4b^3c^5e^h^2j + 16a^3b^6c^3e^g^k^2 + 16a^3b^4c^5f^2g^j - 16a^2b^6c^4e^f^2l + 12a^2b^7c^3d^h^2k \\
& + 6a^2b^8c^2d^h^k^2 + 1728a^5b^2c^5d^f^1^2 + 1392a^4b^4c^4d^f^1^2 - 840a^3b^6c^3d^f^1^2 - 768a^4b^2c^6e^g^2j \\
& + 576a^4b^2c^6d^g^2k + 480a^3b^3c^6d^e^2m + 144a^2b^8c^2d^f^1^2 + 96a^4b^3c^5d^h^j^2 + 96a^3b^3c^6e^2f^k \\
& - 80a^3b^4c^5d^g^2k + 6848a^3b^2c^7d^2e^l - 3552a^3b^2c^7d^2f^k - 2448a^2b^4c^6d^2e^l + 1332a^2b^4c^6d^2f^k \\
& + 960a^3b^2c^7d^2g^j - 496a^4b^3c^5d^f^k^2 + 432a^3b^3c^6d^f^2k - 240a^2b^4c^6d^2g^j - 222a^3b^5c^4d^f^k^2 \\
& - 174a^2b^5c^5d^f^2k + 64a^4b^2c^6f^g^2h + 48a^3b^4c^5f^g^2h + 42a^2b^7c^3d^f^k^2 - 32a^3b^3c^6e^f^2j \\
& - 320a^3b^2c^7d^e^2k + 192a^4b^2c^6e^g^h^2 + 192a^4b^2c^6d^f^j^2 - 32a^3b^4c^5d^f^j^2 + 16a^3b^4c^5e^g^h^2 \\
& + 480a^2b^3c^7d^2e^j - 224a^3b^3c^6d^g^2h + 192a^3b^2c^7e^2f^h + 24a^2b^5c^5d^g^2h - 864a^3b^2c^7d^f^2h \\
& + 336a^3b^3c^6d^f^h^2 + 192a^3b^2c^7e^f^2g + 144a^2b^3c^7d^2f^h - 30a^2b^5c^5d^f^h^2 + 16a^2b^4c^6e^f^2g \\
& - 12a^2b^4c^6d^f^2h + 192a^3b^2c^7d^f^g^2 + 96a^2b^3c^7d^e^2h + 48a^2b^4c^6d^f^g^2 + 960a^2b^2c^8d^2e^g \\
& + 192a^2b^2c^8d^e^2f - 7680a^9b^c^2l^2m^2 + 3152a^8b^3c^1^2m^2 + 2070a^7b^4c^k^2m^2 - 1840a^7b^3c^2k^3m \\
& + 6720a^8b^c^3j^2m^2 - 3072a^8b^c^3k^2l^2 + 1680a^6b^5c^j^2m^2 - 100a^6b^5c^k^2l^2 - 2176a^7b^3c^2j^1^3 \\
& - 256a^6b^3c^3j^3l - 64a^5b^6c^j^2l^2 - 12480a^8b^2c^2h^m^3 + 972a^5b^6c^h^2m^2 - 960a^7b^c^4j^2k^2 \\
& - 252a^5b^4c^3h^3m - 192a^6b^2c^4h^3m + 54a^4b^6c^2h^3m + 1536a^7b^c^4h^2l
\end{aligned}$$

$$\begin{aligned}
&^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^3h^2k^3 - \\
&192a^4b^4c^4g^3l + 176a^4b^3c^5f^3m + 144a^5b^3c^4h^3k + 78 \\
&a^3b^8c^2f^2m^2 + 54a^3b^5c^4f^3m + 32a^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^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^2c^6d^2l^2 - 960a \\
&^5b^2c^6e^2k^2 - 192a^5b^2c^6f^2j^2 + 108a^2b^9c^2d^2l^2 - 1680a^ \\
&5b^3c^4d^2k^3 - 1680a^2b^3c^7d^3k + 222a^4b^5c^3d^2k^3 + 30a^2b^8 \\
&c^3d^2k^2 - 10a^3b^7c^2d^2k^3 - 960a^4b^2c^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^2c^7e^2h^2 - 192a^4b^2c^6d^2h^3 - 192a^2b^2c^8d^3h + 1 \\
&28a^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^2c^9d^2e^2 + 240a^2b^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^4h^2k^2m + 51 \\
&20a^8c^4f^2l^2m - 3072a^8c^4h^2k^2l^2 + 270a^5b^7h^2k^2m^2 - 216a^5b \\
&^7g^2l^2m^2 - 12800a^8c^4e^2l^2m^2 - 4800a^8c^4f^2k^2m^2 - 512a^7c^5h^2 \\
&j^2l - 3840a^6c^6e^2k^2m - 1280a^7c^5f^2j^2m + 768a^7c^5h^2j^2k + \\
&144a^4b^8g^2j^2m^2 - 90a^4b^8f^2k^2m^2 + 8640a^7c^5d^2k^2m + 4608a^7c \\
&^5e^2k^2l + 512a^6c^6f^2j^2l - 9216a^7c^5d^2k^2l^2 - 4096a^7c^5e^2j \\
&^2l^2 + 320a^6c^6f^2h^2m - 90a^3b^9d^2k^2m^2 + 15200a^9b^2c^2k^2m^3 - 6 \\
&192a^8b^3c^2k^2m^3 + 5472a^8b^2c^3k^3m - 4608a^5c^7d^2j^2l - 1024a^ \\
&7c^5f^2h^2l^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^2h^2m + 2880a^6c^6d^2h^2m + \\
&2304a^6c^6d^2j^2k - 512a^6c^6e^2h^2l - 192a^6c^6f^2h^2k + 6144a^8 \\
&b^3c^3j^2l^3 + 1536a^7b^2c^4j^3l - 1280a^5c^7e^2f^2m + 768a^5c^7e^ \\
&2h^2k + 256a^6c^6f^2h^2j^2 + 192a^6b^5c^2j^2l^3 + 54a^2b^10d^2h^2m^2 - 1 \\
&8b^9c^3d^2f^2m + 8b^9c^3d^2g^2l - 2b^9c^3d^2h^2k + 4068a^7b^4c^2c \\
&^2h^2m^3 - 1728a^6c^6d^2h^2k^2 + 960a^5c^7d^2f^2m + 512a^5c^7e^2f^2l - \\
&3072a^6c^6d^2f^2l^2 - 16b^8c^4d^2e^2l + 6b^8c^4d^2f^2k - 4608a^4c^ \\
&8d^2e^2l + 2400a^8b^2c^3f^2m^3 + 2016a^7b^2c^4h^2k^3 - 1728a^4c^8d^2f \\
&^2k - 1146a^6b^5c^2f^2m^3 + 224a^6b^2c^5h^3k - 96a^5b^6c^2g^2l^3 + 96a \\
&^5b^2c^6f^3m + 2304a^4c^8d^2e^2k + 768a^5c^7d^2f^2j^2 + 6144a^7b^2c \\
&^4e^2l^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^6b^2c^5d^2k^3 + 4320a^3b^2c^8 \\
&d^3k + 222a^2b^5c^6d^3k + 16b^6c^6d^2e^2g + 96a^5b^2c^6f^2h^3 + 96 \\
&a^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^8d^3f + 224a^3b^2c^8d^3f^3
\end{aligned}$$

$$\begin{aligned}
& - 18*a*b^5*c^6*d*f^3 - 3264*a^8*b^2*c^2*k^2*m^2 - 6160*a^7*b^3*c^2*j^2*m^2 \\
& + 1104*a^7*b^3*c^2*k^2*l^2 - 1920*a^7*b^2*c^3*j^2*l^2 + 768*a^6*b^4*c^2*j^2 \\
& *l^2 + 3888*a^7*b^2*c^3*h^2*m^2 - 3510*a^6*b^4*c^2*h^2*m^2 + 240*a^6*b^3*c^3 \\
& *j^2*k^2 - 16*a^5*b^5*c^2*j^2*k^2 + 1680*a^6*b^3*c^3*g^2*m^2 - 1648*a^6*b^3 \\
& *c^3*h^2*l^2 - 1540*a^5*b^5*c^2*g^2*m^2 + 444*a^5*b^5*c^2*h^2*l^2 - 960*a^6 \\
& *b^2*c^4*h^2*k^2 - 576*a^6*b^2*c^4*f^2*m^2 - 512*a^6*b^2*c^4*g^2*l^2 - 480 \\
& *a^5*b^4*c^3*g^2*l^2 + 198*a^5*b^4*c^3*h^2*k^2 + 192*a^4*b^6*c^2*g^2*l^2 - \\
& 186*a^5*b^4*c^3*f^2*m^2 - 97*a^4*b^6*c^2*f^2*m^2 - 9*a^4*b^6*c^2*h^2*k^2 - \\
& 6160*a^5*b^3*c^4*e^2*m^2 + 1680*a^4*b^5*c^3*e^2*m^2 - 240*a^5*b^3*c^4*g^2*k \\
& ^2 - 240*a^5*b^3*c^4*f^2*l^2 - 144*a^3*b^7*c^2*e^2*m^2 + 60*a^4*b^5*c^3*g^2 \\
& *k^2 - 36*a^4*b^5*c^3*f^2*l^2 + 36*a^3*b^7*c^2*f^2*l^2 - 16*a^5*b^3*c^4*h^2 \\
& *j^2 - 4*a^3*b^7*c^2*g^2*k^2 + 38512*a^5*b^2*c^5*d^2*m^2 - 32310*a^4*b^4*c^4 \\
& *d^2*m^2 + 12720*a^3*b^6*c^3*d^2*m^2 - 2500*a^2*b^8*c^2*d^2*m^2 - 1920*a^5 \\
& *b^2*c^5*e^2*l^2 + 768*a^4*b^4*c^4*e^2*l^2 - 464*a^5*b^2*c^5*f^2*k^2 - 384* \\
& a^5*b^2*c^5*g^2*j^2 - 64*a^3*b^6*c^3*e^2*l^2 + 42*a^4*b^4*c^4*f^2*k^2 + 12* \\
& a^3*b^6*c^3*f^2*k^2 - 13104*a^4*b^3*c^5*d^2*l^2 + 5628*a^3*b^5*c^4*d^2*l^2 \\
& - 1128*a^2*b^7*c^3*d^2*l^2 + 240*a^4*b^3*c^5*e^2*k^2 - 16*a^4*b^3*c^5*f^2*j \\
& ^2 - 16*a^3*b^5*c^4*e^2*k^2 - 2880*a^4*b^2*c^6*d^2*k^2 + 1750*a^3*b^4*c^5*d \\
& ^2*k^2 - 345*a^2*b^6*c^4*d^2*k^2 - 48*a^4*b^3*c^5*g^2*h^2 - 4*a^3*b^5*c^4*g \\
& ^2*h^2 + 240*a^3*b^3*c^6*d^2*j^2 - 192*a^4*b^2*c^6*f^2*h^2 - 42*a^3*b^4*c^5 \\
& *f^2*h^2 - 16*a^2*b^5*c^5*d^2*j^2 - 48*a^3*b^3*c^6*f^2*g^2 - 16*a^3*b^3*c^6 \\
& *e^2*h^2 - 4*a^2*b^5*c^5*f^2*g^2 - 464*a^3*b^2*c^7*d^2*h^2 - 384*a^3*b^2*c^7 \\
& *e^2*g^2 + 42*a^2*b^4*c^6*d^2*h^2 - 240*a^2*b^3*c^7*d^2*g^2 - 16*a^2*b^3*c^7 \\
& *e^2*f^2 - 960*a^2*b^2*c^8*d^2*f^2 + 6*b^11*c*d^2*k*m - 18*a*b^11*d*f*m^2 \\
& - 7200*a^9*c^3*k^2*m^2 - 324*a^7*b^5*l^2*m^2 - 225*a^6*b^6*k^2*m^2 - 2048* \\
& a^8*c^4*j^2*l^2 - 144*a^5*b^7*j^2*m^2 - 2400*a^8*c^4*h^2*m^2 - 81*a^4*b^8*h \\
& ^2*m^2 - 800*a^7*c^5*f^2*m^2 - 288*a^7*c^5*h^2*k^2 - 36*a^3*b^9*g^2*m^2 - 9 \\
& *a^2*b^10*f^2*m^2 - 21600*a^6*c^6*d^2*m^2 - 2048*a^6*c^6*e^2*l^2 - 864*a^6* \\
& c^6*f^2*k^2 - 2592*a^5*c^7*d^2*k^2 - 1536*a^5*c^7*e^2*j^2 + 1536*a^8*b^2*c^2 \\
& *l^4 - 32*a^5*c^7*f^2*h^2 + 360*a^7*b^2*c^3*k^4 - 25*a^6*b^4*c^2*k^4 - 864 \\
& *a^4*c^8*d^2*h^2 - 4*b^7*c^5*d^2*g^2 - 9*b^6*c^6*d^2*f^2 - 288*a^3*c^9*d^2* \\
& f^2 - 24*a^5*b^2*c^5*h^4 - 16*b^5*c^7*d^2*e^2 - 9*a^4*b^4*c^4*h^4 - 16*a^3* \\
& b^4*c^5*g^4 - 24*a^3*b^2*c^7*f^4 - 9*a^2*b^4*c^6*f^4 - a^2*b^8*c^2*f^2*k^2 \\
& - a^2*b^6*c^4*f^2*h^2 + 630*a^7*b^5*k*m^3 + 8000*a^9*c^3*h*m^3 + 320*a^7*c^5 \\
& *h^3*m - 378*a^6*b^6*h*m^3 + 126*a^5*b^7*f*m^3 + 30*b^8*c^4*d^3*m + 24000* \\
& a^8*c^4*d*m^3 + 8640*a^4*c^8*d^3*m - 1728*a^7*c^5*f*k^3 - 192*a^5*c^7*f^3*k \\
& - 4*b^11*c*d^2*l^2 + 126*a^4*b^8*d*m^3 - 10*b^7*c^5*d^3*k + 4200*a^9*b^2*c \\
& *m^4 - 1024*a^6*c^6*e*j^3 - 1024*a^4*c^8*e^3*j - 144*a^7*b^4*c*l^4 - 10*b^6 \\
& *c^6*d^3*h - 1728*a^3*c^9*d^3*h - 192*a^5*c^7*d^3*h^3 + 30*b^5*c^7*d^3*f + 36 \\
& 0*a*b^2*c^9*d^4 - 9*b^12*d^2*m^2 - 10000*a^10*c^2*m^4 - 4096*a^9*c^3*l^4 - \\
& 441*a^8*b^4*m^4 - 1296*a^8*c^4*k^4 - 256*a^7*c^5*j^4 - 16*a^6*c^6*h^4 - 16* \\
& a^4*c^8*f^4 - 256*a^3*c^9*e^4 - 25*b^4*c^8*d^4 - 1296*a^2*c^10*d^4 - b^10*c \\
& ^2*d^2*k^2 - b^8*c^4*d^2*h^2, z, k1)*x*(8192*a^6*b*c^9 + 32*a^2*b^9*c^5 - 5 \\
& 12*a^3*b^7*c^6 + 3072*a^4*b^5*c^7 - 8192*a^5*b^3*c^8))/(4*(64*a^5*c^6 - a^2 \\
& *b^6*c^3 + 12*a^3*b^4*c^4 - 48*a^4*b^2*c^5))) + (x*(2*b^6*c^6*d^2 - 576*a^3
\end{aligned}$$

$$\begin{aligned}
& *c^9*d^2 + 64*a^4*c^8*f^2 - 64*a^5*c^7*h^2 + 576*a^6*c^6*k^2 + 18*a^2*b^10* \\
& m^2 - 1600*a^7*c^5*m^2 - 36*a*b^4*c^7*d^2 + 128*a^3*b*c^8*e^2 + 128*a^5*b*c \\
& ^6*j^2 + 8*a^2*b^9*c^1^2 + 3072*a^6*b*c^5*1^2 - 300*a^3*b^8*c*m^2 + 256*a^2 \\
& *b^2*c^8*d^2 - 32*a^2*b^3*c^7*e^2 + 20*a^2*b^4*c^6*f^2 - 96*a^3*b^2*c^7*f^2 \\
& - 8*a^2*b^5*c^5*g^2 + 32*a^3*b^3*c^6*g^2 + 2*a^2*b^6*c^4*h^2 - 4*a^3*b^4*c \\
& ^5*h^2 - 32*a^4*b^3*c^5*j^2 + 2*a^2*b^8*c^2*k^2 - 40*a^3*b^6*c^3*k^2 + 276* \\
& a^4*b^4*c^4*k^2 - 736*a^5*b^2*c^5*k^2 - 136*a^3*b^7*c^2*1^2 + 888*a^4*b^5*c \\
& ^3*1^2 - 2656*a^5*b^3*c^4*1^2 + 1874*a^4*b^6*c^2*m^2 - 5284*a^5*b^4*c^3*m^2 \\
& + 6144*a^6*b^2*c^4*m^2 - 384*a^4*c^8*d*h + 1920*a^5*c^7*d*m - 1024*a^5*c^7 \\
& *e*1 + 384*a^5*c^7*f*k + 640*a^6*c^6*h*m - 1024*a^6*c^6*j*1 + 4*a*b^5*c^6*d \\
& *f + 320*a^3*b*c^8*d*f + 64*a^4*b*c^7*f*h + 576*a^4*b*c^7*d*k + 256*a^4*b*c \\
& ^7*e*j - 1472*a^5*b*c^6*f*m + 512*a^5*b*c^6*g*1 + 64*a^5*b*c^6*h*k - 12*a^2 \\
& *b^9*c*k*m - 3776*a^6*b*c^5*k*m - 96*a^2*b^3*c^7*d*f + 8*a^2*b^4*c^6*d*h + \\
& 32*a^2*b^4*c^6*e*g + 64*a^3*b^2*c^7*d*h - 128*a^3*b^2*c^7*e*g - 12*a^2*b^5* \\
& c^5*f*h + 32*a^3*b^3*c^6*f*h + 20*a^2*b^5*c^5*d*k - 224*a^3*b^3*c^6*d*k - 6 \\
& 4*a^3*b^3*c^6*e*j - 60*a^2*b^6*c^4*d*m - 12*a^2*b^6*c^4*f*k + 632*a^3*b^4*c \\
& ^5*d*m - 32*a^3*b^4*c^5*e*1 + 152*a^3*b^4*c^5*f*k + 32*a^3*b^4*c^5*g*j - 20 \\
& 48*a^4*b^2*c^6*d*m + 384*a^4*b^2*c^6*e*1 - 512*a^4*b^2*c^6*f*k - 128*a^4*b^ \\
& 2*c^6*g*j + 36*a^2*b^7*c^3*f*m + 4*a^2*b^7*c^3*h*k - 396*a^3*b^5*c^4*f*m + \\
& 16*a^3*b^5*c^4*g*1 - 44*a^3*b^5*c^4*h*k + 1376*a^4*b^3*c^5*f*m - 192*a^4*b^ \\
& 3*c^5*g*1 + 96*a^4*b^3*c^5*h*k - 12*a^2*b^8*c^2*h*m + 112*a^3*b^6*c^3*h*m - \\
& 248*a^4*b^4*c^4*h*m - 192*a^5*b^2*c^5*h*m - 32*a^4*b^4*c^4*j*1 + 384*a^5*b \\
& ^2*c^5*j*1 + 220*a^3*b^7*c^2*k*m - 1436*a^4*b^5*c^3*k*m + 3936*a^5*b^3*c^4* \\
& k*m))/((4*(64*a^5*c^6 - a^2*b^6*c^3 + 12*a^3*b^4*c^4 - 48*a^4*b^2*c^5))) - ( \\
& 5*b^3*c^7*d^3 + 8*a^3*c^7*f^3 + 216*a^6*c^4*k^3 - 63*a^5*b^5*m^3 - 96*a^2*c \\
& ^8*d*e^2 + 72*a^2*c^8*d^2*f - 4*a^4*b*c^5*h^3 - 3*b^4*c^6*d^2*f - 32*a^3*c^ \\
& 7*e^2*h + b^5*c^5*d^2*h - 96*a^4*c^6*d*j^2 + 8*a^4*c^6*f*h^2 + 216*a^3*c^7* \\
& d^2*k + 573*a^6*b^3*c*m^3 - 1300*a^7*b*c^2*m^3 + 384*a^5*c^5*d*1^2 + b^6*c^ \\
& 4*d^2*k + 72*a^4*c^6*f^2*k + 216*a^5*c^5*f*k^2 + 9*a^2*b^8*f*m^2 + 160*a^4* \\
& c^6*e^2*m - 32*a^5*c^5*h*j^2 - 3*b^7*c^3*d^2*m + 24*a^5*c^5*h^2*k + 200*a^6 \\
& *c^4*f*m^2 - 27*a^3*b^7*h*m^2 + 128*a^6*c^4*h*1^2 + 45*a^4*b^6*k*m^2 + 160* \\
& a^6*c^4*j^2*m + 600*a^7*c^3*k*m^2 - 640*a^7*c^3*1^2*m + 6*a^2*b^2*c^6*f^3 - \\
& 3*a^3*b^3*c^4*h^3 + 5*a^4*b^4*c^2*k^3 - 66*a^5*b^2*c^3*k^3 - 36*a*b*c^8*d^ \\
& 3 + 9*a*b^9*d*m^2 + 4*a*b^8*c*d*1^2 + 48*a^3*c^7*d*f*h - 192*a^3*c^7*d*e*j \\
& - 240*a^4*c^6*d*f*m + 144*a^4*c^6*d*h*k - 128*a^4*c^6*e*f*1 - 64*a^4*c^6*e* \\
& h*j - 80*a^5*c^5*f*h*m - 720*a^5*c^5*d*k*m + 320*a^5*c^5*e*j*m - 384*a^5*c^ \\
& 5*e*k*1 - 128*a^5*c^5*f*j*1 - 240*a^6*c^4*h*k*m - 384*a^6*c^4*j*k*1 + 16*a* \\
& b^2*c^7*d*e^2 + 18*a*b^2*c^7*d^2*f + 3*a*b^3*c^6*d*f^2 - 60*a^2*b*c^7*d*f^2 \\
& + 4*a*b^4*c^5*d*g^2 + 16*a^2*b*c^7*e^2*f - a*b^3*c^6*d^2*h + a*b^5*c^4*d*h \\
& ^2 - 60*a^2*b*c^7*d^2*h - 28*a^3*b*c^6*d*h^2 - 28*a^3*b*c^6*f^2*h - 10*a*b^ \\
& 4*c^5*d^2*k + a*b^7*c^2*d*k^2 - 396*a^4*b*c^5*d*k^2 + 16*a^3*b*c^6*e^2*k + \\
& 16*a^4*b*c^5*f*j^2 + 25*a*b^5*c^4*d^2*m - 159*a^2*b^7*c*d*m^2 - 348*a^3*b*c \\
& ^6*d^2*m + 1460*a^5*b*c^4*d*m^2 + 4*a^2*b^7*c*f*1^2 + 128*a^5*b*c^4*f*1^2 - \\
& 78*a^3*b^6*c*f*m^2 - 76*a^4*b*c^5*f^2*m - 204*a^5*b*c^4*h*k^2 - 12*a^3*b^6 \\
& *c*h*1^2 + 279*a^4*b^5*c*h*m^2 - 12*a^5*b*c^4*h^2*m + 16*a^5*b*c^4*j^2*k +
\end{aligned}$$

$$\begin{aligned}
& 420a^6b^3c^3h^2m^2 + 20a^4b^5c^3k^2l^2 + 512a^6b^3c^3k^2l^2 - 30a^4b^5 \\
& *c^3k^2m - 402a^5b^4c^3k^2m^2 - 924a^6b^3c^3k^2m - 28a^5b^4c^3l^2m - \\
& 24a^2b^2c^6d^2g^2 - 9a^2b^3c^5d^2h^2 + 4a^2b^3c^5f^2g^2 - 5a^2b^3 \\
& ^3c^5f^2h + a^2b^4c^4f^2h^2 + 16a^3b^2c^5d^2j^2 + 18a^3b^2c^5f^2 \\
& h^2 - 6a^2b^2c^6d^2k - 21a^2b^5c^3d^2k^2 - 8a^3b^2c^5g^2h + 15 \\
& 5a^3b^3c^4d^2k^2 - 72a^2b^6c^2d^2l^2 + 436a^3b^4c^3d^2l^2 - 952a^4 \\
& b^2c^4d^2l^2 + 23a^2b^3c^5d^2m - 5a^2b^4c^4f^2k + a^2b^6c^2f^2 \\
& k^2 + 26a^3b^2c^5f^2k - 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 + 4a^3 \\
& b^3c^4g^2k - 36a^3b^5c^2f^2l^2 + 52a^4b^3c^3f^2l^2 + 15a^2b^5 \\
& c^3f^2m - 53a^3b^3c^4f^2m - 6a^3b^4c^3h^2k - 3a^3b^5c^2h^2k \\
& k^2 + 42a^4b^2c^4h^2k + 51a^4b^3c^3h^2k^2 + 133a^4b^4c^2f^2m^2 + \\
& 114a^5b^2c^3f^2m^2 - 12a^3b^4c^3g^2m + 40a^4b^2c^4g^2m + 128a^4 \\
& b^4c^2h^2l^2 - 360a^5b^2c^3h^2l^2 + 18a^3b^5c^2h^2m - 81a^4b^3 \\
& c^3h^2m - 801a^5b^3c^2h^2m^2 - 48a^5b^2c^3j^2m - 204a^5b^3c^2 \\
& ^2k^2l^2 + 339a^5b^3c^2k^2m + 762a^6b^2c^2k^2m^2 + 264a^6b^2c^2 \\
& l^2m - 6a^8c^3d^2k^2m - 16a^3b^3c^6d^2e^2g + 96a^2b^3c^7d^2e^2g - 4a^3 \\
& b^4c^5d^2f^2h + 32a^3b^3c^6e^2g^2h + 16a^3b^5c^4d^2e^2l - 4a^3b^5 \\
& c^4d^2f^2k + 544a^3b^3c^6d^2e^2l - 312a^3b^3c^6d^2f^2k + 96a^3b^3c^6 \\
& d^2g^2j + 32a^3b^3c^6e^2f^2j + 12a^3b^6c^3d^2f^2m - 8a^3b^6c^3d^2 \\
& g^2l + 2a^3b^6c^3d^2h^2k - 6a^3b^7c^2d^2h^2m - 152a^4b^3c^5d^2h^2m \\
& - 160a^4b^3c^5e^2g^2m + 224a^4b^3c^5e^2h^2l + 64a^4b^3c^5f^2g^2l \\
& - 152a^4b^3c^5f^2h^2k + 32a^4b^3c^5g^2h^2j + 544a^4b^3c^5d^2j^2l \\
& + 32a^4b^3c^5e^2j^2k - 6a^2b^7c^2f^2k^2m + 32a^5b^3c^4e^2 \\
& l^2m - 536a^5b^3c^4f^2k^2m - 160a^5b^3c^4g^2j^2m + 192a^5b^3c^4g^2 \\
& k^2l + 224a^5b^3c^4h^2j^2l + 18a^3b^6c^3h^2k^2m + 32a^6b^3c^3j^2l^2 \\
& m + 52a^2b^2c^6d^2f^2h - 16a^2b^2c^6e^2f^2g + 32a^2b^2c^6d^2e^2j \\
& - 192a^2b^3c^5d^2e^2l + 70a^2b^3c^5d^2f^2k - 16a^2b^3c^5d^2g^2j \\
& - 190a^2b^4c^4d^2f^2m + 96a^2b^4c^4d^2g^2l - 30a^2b^4c^4d^2h^2k + 16a^2 \\
& b^4c^4e^2f^2l + 676a^3b^2c^5d^2f^2m - 272a^3b^2c^5d^2g^2l + 100a^3b^2 \\
& c^5d^2h^2k - 48a^3b^2c^5e^2f^2l - 16a^3b^2c^5e^2g^2k - 16a^3b^2c^5 \\
& f^2g^2j + 80a^2b^5c^3d^2h^2m - 8a^2b^5c^3f^2g^2l + 2a^2b^5c^3f^2h^2k \\
& - 210a^3b^3c^4d^2h^2m + 48a^3b^3c^4e^2g^2m - 48a^3b^3c^4e^2h^2l + 24a^3 \\
& b^3c^4f^2g^2l + 6a^3b^3c^4f^2h^2k + 16a^2b^5c^3d^2j^2l - 192a^3b^3c^4 \\
& d^2j^2l - 6a^2b^6c^2f^2h^2m - 28a^3b^4c^3f^2h^2m + 24a^3b^4c^3g^2h^2l \\
& + 276a^4b^2c^4f^2h^2m - 112a^4b^2c^4g^2h^2l + 116a^2b^6c^2d^2k^2m \\
& - 780a^3b^4c^3d^2k^2m + 16a^3b^4c^3f^2j^2l + 1876a^4b^2c^4d^2k^2m \\
& - 96a^4b^2c^4e^2j^2m + 80a^4b^2c^4e^2k^2l - 48a^4b^2c^4f^2j^2l - 16a^4 \\
& b^2c^4g^2j^2k + 62a^3b^5c^2f^2k^2m - 42a^4b^3c^3f^2k^2m + 48a^4b^3 \\
& c^3g^2j^2m - 40a^4b^3c^3g^2k^2l - 48a^4b^3c^3h^2j^2l - 246a^4b^4c^2 \\
& h^2k^2m - 16a^5b^2c^3g^2l^2m + 804a^5b^2c^3h^2k^2m + 80a^5b^2c^3 \\
& j^2k^2l)/(8*(64a^5c^6 - a^2b^6c^3 + 12a^3b^4c^4 - 48a^4b^2c^5)) + \\
& (x*(32a^2c^8e^3 + 32a^5c^5j^3 - 2b^3c^7d^2e + b^4c^6d^2g - 12a^4 \\
& b^5c^1^3 - 320a^6b^3c^3l^3 + 96a^3c^7e^2j + 96a^4c^6e^2j^2 + 144a^3 \\
& c^7d^2l + 128a^5c^5e^2l^2 - b^6c^4d^2l - 16a^4c^6f^2l - 9a^2b^8g^2m^2 \\
& + 16a^5c^5h^2l + 18a^3b^7j^2m^2 + 128a^6c^4j^2l^2 - 144a^6c^4k^2l \\
& - 27a^4b^6l^2)
\end{aligned}$$

$$\begin{aligned}
& m^2 + 400a^7c^3l^2m^2 - 4a^2b^3c^5g^3 + 124a^5b^3c^2l^3 + 24a^*b^* \\
& c^8d^2e - 48a^2c^8d^*e^*f - 16a^3c^7e^*f^*h - 144a^3c^7d^*e^*k - 48a^ \\
& 3c^7d^*f^*j + 96a^4c^6d^*h^*l + 80a^4c^6e^*f^*m - 48a^4c^6e^*h^*k - 16a^ \\
& ^4c^6f^*h^*j - 144a^4c^6d^*j^*k - 480a^5c^5d^*l^*m + 240a^5c^5e^*k^*m + \\
& 80a^5c^5f^*j^*m - 96a^5c^5f^*k^*l - 48a^5c^5h^*j^*k - 160a^6c^4h^*l^*m \\
& + 240a^6c^4j^*k^*m - 12a^*b^2c^7d^2g + 16a^2b^*c^7e^*f^2 - 48a^2b^*c^ \\
& 7e^2g + 8a^3b^*c^6e^*h^2 - 2a^*b^3c^6d^2j + 24a^2b^*c^7d^2j + 18a^ \\
& *b^4c^5d^2l + 16a^3b^*c^6f^2j + 96a^4b^*c^5e^*k^2 - 176a^3b^*c^6e^ \\
& ^2l - 48a^4b^*c^5g^*j^2 + 18a^2b^7c^*e^*m^2 + 8a^4b^*c^5h^2j - 520a^5 \\
& *b^c^4e^*m^2 - 4a^2b^7c^*g^*l^2 - 64a^5b^*c^4g^*l^2 + 96a^3b^6c^*g^*m^2 \\
& + 96a^5b^*c^4j^*k^2 + 8a^3b^6c^*j^*l^2 - 176a^5b^*c^4j^2l - 192a^4b^ \\
& ^5c^*j^*m^2 - 520a^6b^*c^3j^*m^2 + 270a^5b^4c^*l^*m^2 + 24a^2b^2c^6e^*g^ \\
& ^2 - 8a^2b^2c^6f^2g + 2a^2b^3c^5e^*h^2 - a^2b^4c^4g^*h^2 - 4a^3b^ \\
& ^2c^5g^*h^2 - 100a^2b^2c^6d^2l + 2a^2b^5c^3e^*k^2 - 28a^3b^3c^4 \\
& *e^*k^2 + 32a^2b^3c^5e^2l + 8a^2b^6c^2e^*l^2 + 24a^3b^2c^5g^2j \\
& - 88a^3b^4c^3e^*l^2 + 216a^4b^2c^4e^*l^2 - a^2b^4c^4f^2l - a^2b^ \\
& ^6c^2g^*k^2 + 2a^3b^3c^4h^2j + 14a^3b^4c^3g^*k^2 - 192a^3b^5c^2e^ \\
& *m^2 - 48a^4b^2c^4g^*k^2 + 614a^4b^3c^3e^*m^2 + 8a^2b^5c^3g^2l \\
& - 44a^3b^3c^4g^2l + 44a^3b^5c^2g^*l^2 - 108a^4b^3c^3g^*l^2 - 12a^ \\
& ^4b^2c^4h^2l - 307a^4b^4c^2g^*m^2 + 260a^5b^2c^3g^*m^2 + 2a^3b^ \\
& ^5c^2j^*k^2 - 28a^4b^3c^3j^*k^2 + 32a^4b^3c^3j^2l - 88a^4b^4c^2 \\
& *j^*l^2 + 216a^5b^2c^3j^*l^2 - 3a^4b^4c^2k^2l + 40a^5b^2c^3k^2l \\
& + 614a^5b^3c^2j^*m^2 - 756a^6b^2c^2l^*m^2 - 4a^*b^2c^7d^*e^*f + 2a^* \\
& b^3c^6d^*f^*g + 32a^2b^*c^7d^*e^*h + 24a^2b^*c^7d^*f^*g + 8a^3b^*c^6f^*g^*h \\
& - 2a^*b^5c^4d^*f^*l + 272a^3b^*c^6d^*e^*m - 8a^3b^*c^6d^*f^*l + 72a^3b^*c^ \\
& ^6d^*g^*k + 32a^3b^*c^6d^*h^*j + 80a^3b^*c^6e^*f^*k - 96a^3b^*c^6e^*g^*j + 6 \\
& 4a^4b^*c^5e^*h^*m - 40a^4b^*c^5f^*g^*m + 8a^4b^*c^5f^*h^*l + 24a^4b^*c^5g^ \\
& *h^*k + 272a^4b^*c^5d^*j^*m + 72a^4b^*c^5d^*k^*l - 352a^4b^*c^5e^*j^*l + 80a^ \\
& ^4b^*c^5f^*j^*k + 6a^2b^7c^*g^*k^*m + 248a^5b^*c^4f^*l^*m - 120a^5b^*c^4g^ \\
& *k^*m + 64a^5b^*c^4h^*j^*m + 56a^5b^*c^4h^*k^*l - 12a^3b^6c^*j^*k^*m + 18a^ \\
& ^4b^5c^*k^*l^*m + 584a^6b^*c^3k^*l^*m - 16a^2b^2c^6d^*g^*h - 12a^2b^2c^6 \\
& *e^*f^*h + 20a^2b^2c^6d^*e^*k - 4a^2b^2c^6d^*f^*j + 6a^2b^3c^5f^*g^*h - \\
& 60a^2b^3c^5d^*e^*m + 18a^2b^3c^5d^*f^*l - 10a^2b^3c^5d^*g^*k - 12a^ \\
& ^2b^3c^5e^*f^*k + 30a^2b^4c^4d^*g^*m + 6a^2b^4c^4d^*h^*l + 36a^2b^4c^ \\
& ^4e^*f^*m - 32a^2b^4c^4e^*g^*l + 4a^2b^4c^4e^*h^*k + 6a^2b^4c^4f^*g^*k \\
& - 136a^3b^2c^5d^*g^*m - 64a^3b^2c^5d^*h^*l - 180a^3b^2c^5e^*f^*m + 1 \\
& 76a^3b^2c^5e^*g^*l - 20a^3b^2c^5e^*h^*k - 40a^3b^2c^5f^*g^*k - 12a^3 \\
& *b^2c^5f^*h^*j + 20a^3b^2c^5d^*j^*k - 12a^2b^5c^3e^*h^*m - 18a^2b^5c^ \\
& ^3f^*g^*m - 2a^2b^5c^3g^*h^*k + 40a^3b^3c^4e^*h^*m + 90a^3b^3c^4f^*g^*m \\
& + 6a^3b^3c^4f^*h^*l + 10a^3b^3c^4g^*h^*k - 60a^3b^3c^4d^*j^*m - 10a^ \\
& ^3b^3c^4d^*k^*l + 64a^3b^3c^4e^*j^*l - 12a^3b^3c^4f^*j^*k + 6a^2b^6 \\
& *c^2g^*h^*m - 20a^3b^4c^3g^*h^*m - 32a^4b^2c^4g^*h^*m - 12a^2b^6c^2e^ \\
& *k^*m + 148a^3b^4c^3e^*k^*m + 36a^3b^4c^3f^*j^*m - 32a^3b^4c^3g^*j^*l \\
& + 4a^3b^4c^3h^*j^*k + 104a^4b^2c^4d^*l^*m - 476a^4b^2c^4e^*k^*m - 180 \\
& *a^4b^2c^4f^*j^*m + 8a^4b^2c^4f^*k^*l + 176a^4b^2c^4g^*j^*l - 20a^4b^
\end{aligned}$$

$$\begin{aligned}
& ^2c^4*h*j*k - 74*a^3*b^5*c^2*g*k*m - 12*a^3*b^5*c^2*h*j*m - 54*a^4*b^3*c^3 \\
& *f*l*m + 238*a^4*b^3*c^3*g*k*m + 40*a^4*b^3*c^3*h*j*m - 6*a^4*b^3*c^3*h*k*l \\
& + 18*a^4*b^4*c^2*h*l*m - 48*a^5*b^2*c^3*h*l*m + 148*a^4*b^4*c^2*j*k*m - 47 \\
& 6*a^5*b^2*c^3*j*k*m - 210*a^5*b^3*c^2*k*l*m)) / (4*(64*a^5*c^6 - a^2*b^6*c^3 \\
& + 12*a^3*b^4*c^4 - 48*a^4*b^2*c^5)) * \text{root}(1572864*a^8*b^2*c^{10}*z^4 - 983040 \\
& *a^7*b^4*c^9*z^4 + 327680*a^6*b^6*c^8*z^4 - 61440*a^5*b^8*c^7*z^4 + 6144*a^ \\
& 4*b^{10}*c^6*z^4 - 256*a^3*b^{12}*c^5*z^4 - 1048576*a^9*c^{11}*z^4 - 1572864*a^8* \\
& b^2*c^8*l*z^3 + 983040*a^7*b^4*c^7*l*z^3 - 327680*a^6*b^6*c^6*l*z^3 + 61440 \\
& *a^5*b^8*c^5*l*z^3 - 6144*a^4*b^{10}*c^4*l*z^3 + 256*a^3*b^{12}*c^3*l*z^3 + 104 \\
& 8576*a^9*c^9*l*z^3 + 96*a^3*b^{12}*c*k*m*z^2 + 98304*a^8*b*c^7*j*l*z^2 + 2457 \\
& 6*a^8*b*c^7*h*m*z^2 + 155648*a^7*b*c^8*d*m*z^2 + 98304*a^7*b*c^8*e*l*z^2 + \\
& 57344*a^7*b*c^8*f*k*z^2 + 32768*a^7*b*c^8*g*j*z^2 + 57344*a^6*b*c^9*d*h*z^2 \\
& + 32768*a^6*b*c^9*e*g*z^2 - 32*a*b^{10}*c^5*d*f*z^2 - 491520*a^8*b^2*c^6*k*m \\
& *z^2 + 358400*a^7*b^4*c^5*k*m*z^2 - 129024*a^6*b^6*c^4*k*m*z^2 + 24768*a^5* \\
& b^8*c^3*k*m*z^2 - 2432*a^4*b^{10}*c^2*k*m*z^2 - 90112*a^7*b^3*c^6*j*l*z^2 + 3 \\
& 0720*a^6*b^5*c^5*j*l*z^2 - 4608*a^5*b^7*c^4*j*l*z^2 + 256*a^4*b^9*c^3*j*l*z \\
& ^2 - 21504*a^6*b^5*c^5*h*m*z^2 + 9216*a^5*b^7*c^4*h*m*z^2 + 8192*a^7*b^3*c^ \\
& 6*h*m*z^2 - 1568*a^4*b^9*c^3*h*m*z^2 + 96*a^3*b^{11}*c^2*h*m*z^2 - 172032*a^7 \\
& *b^2*c^7*f*m*z^2 + 116736*a^6*b^4*c^6*f*m*z^2 - 49152*a^7*b^2*c^7*g*l*z^2 + \\
& 45056*a^6*b^4*c^6*g*l*z^2 - 35840*a^5*b^6*c^5*f*m*z^2 + 24576*a^7*b^2*c^7* \\
& h*k*z^2 - 15360*a^5*b^6*c^5*g*l*z^2 + 5184*a^4*b^8*c^4*f*m*z^2 - 3072*a^5*b \\
& ^6*c^5*h*k*z^2 + 2304*a^4*b^8*c^4*g*l*z^2 + 2048*a^6*b^4*c^6*h*k*z^2 + 576* \\
& a^4*b^8*c^4*h*k*z^2 - 288*a^3*b^{10}*c^3*f*m*z^2 - 128*a^3*b^{10}*c^3*g*l*z^2 - \\
& 32*a^3*b^{10}*c^3*h*k*z^2 - 147456*a^6*b^3*c^7*d*m*z^2 - 90112*a^6*b^3*c^7*e \\
& *l*z^2 + 52224*a^5*b^5*c^6*d*m*z^2 - 49152*a^6*b^3*c^7*f*k*z^2 + 30720*a^5* \\
& b^5*c^6*e*l*z^2 - 24576*a^6*b^3*c^7*g*j*z^2 + 15360*a^5*b^5*c^6*f*k*z^2 - 8 \\
& 192*a^4*b^7*c^5*d*m*z^2 + 6144*a^5*b^5*c^6*g*j*z^2 - 4608*a^4*b^7*c^5*e*l*z \\
& ^2 - 2048*a^4*b^7*c^5*f*k*z^2 - 512*a^4*b^7*c^5*g*j*z^2 + 480*a^3*b^9*c^4*d \\
& *m*z^2 + 256*a^3*b^9*c^4*e*l*z^2 + 96*a^3*b^9*c^4*f*k*z^2 + 131072*a^6*b^2* \\
& c^8*d*k*z^2 + 49152*a^6*b^2*c^8*e*j*z^2 - 43008*a^5*b^4*c^7*d*k*z^2 - 12288 \\
& *a^5*b^4*c^7*e*j*z^2 + 6144*a^4*b^6*c^6*d*k*z^2 + 1024*a^4*b^6*c^6*e*j*z^2 \\
& - 320*a^3*b^8*c^5*d*k*z^2 + 6144*a^5*b^4*c^7*f*h*z^2 - 2048*a^4*b^6*c^6*f*h \\
& *z^2 + 192*a^3*b^8*c^5*f*h*z^2 - 49152*a^5*b^3*c^8*d*h*z^2 - 24576*a^5*b^3* \\
& c^8*e*g*z^2 + 15360*a^4*b^5*c^7*d*h*z^2 + 6144*a^4*b^5*c^7*e*g*z^2 - 2048*a \\
& ^3*b^7*c^6*d*h*z^2 - 512*a^3*b^7*c^6*e*g*z^2 + 96*a^2*b^9*c^5*d*h*z^2 + 245 \\
& 76*a^5*b^2*c^9*d*f*z^2 - 3072*a^3*b^6*c^7*d*f*z^2 + 2048*a^4*b^4*c^8*d*f*z^ \\
& 2 + 576*a^2*b^8*c^6*d*f*z^2 - 430080*a^9*b*c^6*m^2*z^2 + 3408*a^4*b^{11}*c*m^ \\
& 2*z^2 - 64*a^3*b^{12}*c^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 \\
& 096*a^8*b^2*c^6*l^2*z^2 - 288768*a^7*b^4*c^5*l^2*z^2 + 88576*a^6*b^6*c^4*l^ \\
& 2*z^2 - 15744*a^5*b^8*c^3*l^2*z^2 + 1536*a^4*b^{10}*c^2*l^2*z^2 - 61440*a^7*b
\end{aligned}$$



$$\begin{aligned}
&^3c^6k^2z^2 + 24064a^6b^5c^5k^2z^2 - 4608a^5b^7c^4k^2z^2 + 432 \\
&a^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^2 \\
&z^2 + 1536a^5b^5c^6h^2z^2 - 16a^3b^9c^4h^2z^2 - 8192a^6b^2c^8 \\
&*g^2z^2 + 6144a^5b^4c^7g^2z^2 - 1536a^4b^6c^6g^2z^2 + 128a^3b^8 \\
&c^5g^2z^2 - 8192a^5b^3c^8f^2z^2 + 1536a^4b^5c^7f^2z^2 - 16a^2 \\
&b^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^2 \\
&z^2 - 4608a^2b^7c^7d^2z^2 - 393216a^9c^7l^2z^2 - 144a^3b^{13}m^2 \\
&z^2 - 32768a^8c^8j^2z^2 - 32768a^6c^{10}e^2z^2 - 16b^{11}c^5d^2z^2 \\
&+ 18432a^8b^5c^5h^1m^2z - 96a^3b^{10}c^5g^1k^1m^2z + 90112a^7b^5c^6e^1k^1m^2 \\
&z + 36864a^7b^5c^6f^1j^1m^2z - 16384a^7b^5c^6g^1j^1k^1m^2z + 14336a^7b^5c^6d^1 \\
&m^2z - 10240a^7b^5c^6f^1k^1m^2z + 4096a^7b^5c^6h^1j^1k^1m^2z + 10240a^7b^5c^6g^1 \\
&*h^1m^2z - 47104a^6b^5c^7d^1h^1m^2z + 36864a^6b^5c^7e^1f^1m^2z + 30720a^6b^5c^7 \\
&*d^1g^1m^2z - 16384a^6b^5c^7e^1g^1k^1m^2z + 6144a^6b^5c^7f^1g^1k^1m^2z + 4096a^6b^5c^7 \\
&*e^1h^1k^1m^2z + 32a^5b^{10}c^3d^1f^1m^2z - 4096a^5b^5c^8d^1f^1j^1m^2z - 6144a^5b^5c^8 \\
&*d^1g^1h^1m^2z - 32a^5b^8c^5d^1f^1g^1m^2z - 4096a^4b^5c^9d^1e^1f^1m^2z + 64a^5b^7c^6d^1 \\
&*e^1f^1m^2z + 110592a^8b^2c^4k^1l^1m^2z - 36864a^7b^4c^3k^1l^1m^2z + 5376a^6b^6 \\
&*c^2k^1l^1m^2z - 79872a^7b^3c^4j^1k^1m^2z + 26112a^6b^5c^3j^1k^1m^2z - 37 \\
&12a^5b^7c^2j^1k^1m^2z - 13824a^7b^3c^4h^1l^1m^2z + 3456a^6b^5c^3h^1l^1m^2 \\
&z - 288a^5b^7c^2h^1l^1m^2z - 45056a^7b^2c^5g^1k^1m^2z + 39936a^6b^4c^4 \\
&*g^1k^1m^2z + 30720a^7b^2c^5f^1l^1m^2z - 18432a^7b^2c^5h^1k^1l^1m^2z - 13056a^5 \\
&b^6c^3g^1k^1m^2z - 7680a^6b^4c^4f^1l^1m^2z + 5376a^6b^4c^4h^1j^1m^2z + \\
&4608a^6b^4c^4h^1k^1l^1m^2z + 3072a^7b^2c^5h^1j^1m^2z - 1984a^5b^6c^3h^1j^1 \\
&m^2z + 1856a^4b^8c^2g^1k^1m^2z + 640a^5b^6c^3f^1l^1m^2z - 384a^5b^6c^3h^1 \\
&>k^1l^1m^2z + 192a^4b^8c^2h^1j^1m^2z - 79872a^6b^3c^5e^1k^1m^2z - 27648a^6b^3 \\
&>c^5f^1j^1m^2z + 26112a^5b^5c^4e^1k^1m^2z + 12288a^6b^3c^5g^1j^1l^1m^2z - 10 \\
&752a^6b^3c^5d^1l^1m^2z + 7680a^6b^3c^5f^1k^1l^1m^2z + 6912a^5b^5c^4f^1j^1m^2 \\
&z - 3712a^4b^7c^3e^1k^1m^2z - 3072a^6b^3c^5h^1j^1k^1m^2z - 3072a^5b^5c^4 \\
&>*g^1j^1l^1m^2z + 2688a^5b^5c^4d^1l^1m^2z - 1920a^5b^5c^4f^1k^1l^1m^2z + 768a^5b^5 \\
&>c^4h^1j^1k^1m^2z - 576a^4b^7c^3f^1j^1m^2z + 256a^4b^7c^3g^1j^1l^1m^2z - 224a^4 \\
&>b^7c^3d^1l^1m^2z + 192a^3b^9c^2e^1k^1m^2z + 160a^4b^7c^3f^1k^1l^1m^2z - 64a^4 \\
&>b^7c^3h^1j^1k^1m^2z - 2688a^5b^5c^4g^1h^1m^2z - 1536a^6b^3c^5g^1h^1m^2z + \\
&992a^4b^7c^3g^1h^1m^2z - 96a^3b^9c^2g^1h^1m^2z - 65536a^6b^2c^6d^1k^1l^1 \\
&z + 46080a^6b^2c^6d^1j^1m^2z - 24576a^6b^2c^6e^1j^1l^1m^2z + 21504a^5b^4c^5 \\
&>d^1k^1l^1m^2z - 11520a^5b^4c^5d^1j^1m^2z + 9216a^6b^2c^6f^1j^1k^1m^2z + 6144a^5 \\
&>b^4c^5e^1j^1l^1m^2z - 3072a^4b^6c^4d^1k^1l^1m^2z - 2304a^5b^4c^5f^1j^1k^1m^2z + 9 \\
&60a^4b^6c^4d^1j^1m^2z - 512a^4b^6c^4e^1j^1l^1m^2z + 192a^4b^6c^4f^1j^1k^1m^2z \\
&+ 160a^3b^8c^3d^1k^1l^1m^2z - 18432a^6b^2c^6f^1g^1m^2z + 13824a^5b^4c^5f^1 \\
&>*g^1m^2z + 5376a^5b^4c^5e^1h^1m^2z - 3456a^4b^6c^4f^1g^1m^2z + 3072a^6b^2 \\
&>*c^6e^1h^1m^2z - 3072a^5b^4c^5f^1h^1l^1m^2z - 2048a^6b^2c^6g^1h^1k^1m^2z - 1984a^4 \\
&>b^6c^4e^1h^1m^2z + 1536a^5b^4c^5g^1h^1k^1m^2z + 1024a^4b^6c^4f^1h^1l^1m^2z - \\
&384a^4b^6c^4g^1h^1k^1m^2z + 288a^3b^8c^3f^1g^1m^2z + 192a^3b^8c^3e^1h^1m^2z \\
&- 96a^3b^8c^3f^1h^1l^1m^2z + 32a^3b^8c^3g^1h^1k^1m^2z + 41472a^5b^3c^6d^1h^1 \\
&l^1m^2z - 27648a^5b^3c^6e^1f^1m^2z - 23040a^5b^3c^6d^1g^1m^2z - 13440a^4b^5
\end{aligned}$$

$$\begin{aligned}
& *c^5*d*h*1*z + 12288*a^5*b^3*c^6*e*g*1*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*1*z + 1888*a^3*b^7*c^4*d*h*1*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*1*z - 96*a^3*b^7*c^4*f*g*k*z - 96*a^2*b^9*c^3 \\
& *d*h*1*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*1*z - 6144*a^5*b^2*c^7*d*f*1*z + 3456*a^3*b^6*c^5*d*f*1*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*1*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*1*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*1*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*1*z - 49152*a^8*b*c^5*j*1^2*z - 128*a^4*b^9*c*j*1^ \\
& 2*z - 25600*a^8*b*c^5*g*m^2*z - 9216*a^7*b*c^6*h^2*1*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* \\
& 1*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*1*z - 432*a*b^9*c^4*d^2*1*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 - 6 \\
& 1440*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 - 2048 \\
& 0*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*1*m^2*z + 46656*a^7*b^5*c^2*1*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*1*z - 576*a^6*b^5*c^3*k^2*1*z + 48*a^5*b^7*c^2*k \\
& ^2*1*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*1*z + 3072*a^6*b^4*c^4*j^2*1*z + 2304*a^5*b^7*c^2*j*1^2*z - 256 \\
& *a^5*b^6*c^3*j^2*1*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*1*z - 1728*a^5*b^5*c^4*h^2*1*z + 144*a^4*b^7*c^3*h^2*1*z + 24576*a \\
& ^7*b^2*c^5*g*1^2*z - 22528*a^6*b^4*c^4*g*1^2*z + 7680*a^5*b^6*c^3*g*1^2*z + \\
& 4096*a^6*b^2*c^6*g^2*1*z - 3072*a^5*b^4*c^5*g^2*1*z - 1152*a^4*b^8*c^2*g*1 \\
& ^2*z + 768*a^4*b^6*c^4*g^2*1*z - 64*a^3*b^8*c^3*g^2*1*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*1*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*1*z - 144*a^3*b^7*c^4*f^ \\
& 2*1*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^
\end{aligned}$$

$$\begin{aligned}
& 2*1*z + 45056*a^6*b^3*c^5*e*1^2*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 + 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*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 - 5376*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 - 96*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 - 7 \\
& 680*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 - 3 \\
& 328*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 - 7 \\
& 68*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 - 1824*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 - 25 \\
& 60*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 - 160*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
\end{aligned}$$

$$\begin{aligned}
& ^4c^3g^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 - 6 \\
& 252*a^4*b^5*c^3*d*h*k*m - 4800*a^5*b^3*c^4*e*g*k*m + 2112*a^5*b^3*c^4*d*g*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 \\
& ^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 + 49 \\
& 92*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*b^8*c^2*d*f*k*m + 224*a^4*b^4*c^4*d*e*1*m - 1 \\
& 60*a^4*b^4*c^4*e*f*k*1 - 96*a^4*b^4*c^4*f*g*j*k + 96*a^3*b^6*c^3*d*h*j*1 + \\
& 80*a^3*b^6*c^3*d*g*k*1 - 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*1 + 384*a^5*b^2*c^5*e*g^h*m \\
& + 224*a^4*b^4*c^4*f*g^h*1 - 96*a^3*b^6*c^3*e*g^h*m - 48*a^3*b^6*c^3*f*g^h* \\
& 1 + 2112*a^4*b^3*c^5*d*e*k*1 - 960*a^4*b^3*c^5*d*f*j*1 + 960*a^4*b^3*c^5*d* \\
& e*j*m + 384*a^3*b^5*c^4*d*f*j*1 + 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*1 - 32*a^2*b^7*c^3*d*f*j*1 + 7392*a^4*b^3*c^5 \\
& *d*f*h*m - 2496*a^4*b^3*c^5*d*g^h*1 - 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*1 - 448*a^4*b^3*c^5*e*f*h*1 + 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*1 - 48*a^2*b^7*c^3*d*g^h*1 + 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*1 \\
& - 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*1 + 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*1 + 600*a^3*b^4*c^5*d*f*h*k + 480*a^3*b^4*c^5*d*f*g*1 - 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*1 - 96*a^3*b^4 \\
& ^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*1 + 12*a^2*b^6 \\
& ^6*c^4*d*f*h*k - 960*a^3*b^3*c^6*d*e*f*1 + 384*a^2*b^5*c^5*d*e*f*1 + 320*a^3 \\
& *b^3*c^6*d*e*g*k - 192*a^3*b^3*c^6*d*f*g*j + 192*a^3*b^3*c^6*d*e*h*j + 32* \\
& a^2*b^5*c^5*d*f*g*j - 192*a^3*b^3*c^6*e*f*g^h + 384*a^3*b^2*c^7*d*e*f*j - 6 \\
& 4*a^2*b^4*c^6*d*e*f*j + 896*a^3*b^2*c^7*d*e*g^h - 96*a^2*b^4*c^6*d*e*g^h - \\
& 192*a^2*b^3*c^7*d*e*f*g + 496*a^7*b^4*c*k*1^2*m - 4752*a^7*b^4*c*j*1*m^2 + \\
& 96*a^5*b^6*c*j^2*k*m - 6144*a^8*b*c^3*h*1^2*m - 168*a^6*b^5*c*h*1^2*m + 640 \\
& 0*a^8*b*c^3*g*1*m^2 - 2862*a^6*b^5*c*h*k*m^2 + 2376*a^6*b^5*c*g*1*m^2 - 163 \\
& 2*a^7*b*c^4*h^2*k*m - 480*a^8*b*c^3*h*k*m^2 - 180*a^5*b^6*c*h*k^2*m + 54*a^4 \\
& *b^7*c*h^2*k*m - 384*a^7*b*c^4*h*j^2*m + 120*a^5*b^6*c*h*k*1^2 + 56*a^5*b^6 \\
& *c*f*1^2*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*1 - 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*1*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*1^2*m + 2048*a^7*b*c^4*g*j*1^2 - 1024*a^7*b*c^4*f*k*
\end{aligned}$$

$$\begin{aligned}
& l^2 + 64a^4b^7c^*g*j^*l^2 + 56a^4b^7c^*d^*l^2*m - 40a^4b^7c^*f^*k^*l^2 + \\
& 13440a^7b^*c^4e^*j^*m^2 - 8928a^5b^*c^6d^2*k^*m - 6240a^7b^*c^4d^*k^*m^2 + \\
& 1614a^4b^7c^*d^*k^*m^2 - 288a^4b^7c^*e^*j^*m^2 - 170a^*b^9c^2d^2*k^*m + 6 \\
& 0a^3b^8c^*d^*k^2*m + 4608a^6b^*c^5e^*j^2*1 + 4608a^5b^*c^6e^2*j^*1 - 243 \\
& 2a^6b^*c^5d^*j^2*m + 1440a^7b^*c^4f^*h^*m^2 - 896a^6b^*c^5f^*j^2*k - 864a^6b^*c^5f^*h^2*m \\
& - 558a^4b^7c^*f^*h^*m^2 + 256a^6b^*c^5g^*h^2*1 - 40a^3b^8c^*d^*k^*1^2 - 1920a^6b^*c^5e^*j^*k^2 \\
& - 384a^5b^*c^6e^2*h^*m + 24a^3b^8c^*f^*h^*1^2 - 16a^*b^8c^3d^2*j^*1 + 2208a^6b^*c^5f^*h^*k^2 - 1044a^3b^8c^* \\
& *d^*h^*m^2 + 800a^5b^*c^6f^2*h^*k - 256a^5b^*c^6f^2*g^*1 + 144a^3b^8c^*e^* \\
& g^*m^2 - 116a^*b^8c^3d^2*h^*m + 8192a^6b^*c^5d^*h^*1^2 + 2048a^6b^*c^5e^*g^* \\
& *1^2 + 24a^2b^9c^*d^*h^*1^2 - 5856a^4b^*c^7d^2*f^*m + 4896a^4b^*c^7d^2*h^* \\
& *k + 2720a^6b^*c^5d^*f^*m^2 + 2304a^4b^*c^7d^2*g^*1 + 1824a^5b^*c^6d^*h^2 \\
& *k + 438a^*b^7c^4d^2*f^*m - 384a^5b^*c^6e^*h^2*j + 318a^2b^9c^*d^*f^*m^2 \\
& - 168a^*b^7c^4d^2*g^*1 + 42a^*b^7c^4d^2*h^*k - 36a^*b^8c^3d^*f^2*m - 243 \\
& 2a^4b^*c^7d^*e^2*m + 1536a^5b^*c^6e^*g^*j^2 + 1536a^4b^*c^7e^2*g^*j - 896 \\
& *a^5b^*c^6d^*h^*j^2 - 896a^4b^*c^7e^2*f^*k + 4896a^5b^*c^6d^*f^*k^2 + 1824a^4b^*c^7d^*f^2*k \\
& - 384a^4b^*c^7e^*f^2*j + 336a^*b^6c^5d^2*e^*1 - 156a^*b^6c^5d^2*f^*k + 16a^*b^6c^5d^2*g^*j \\
& + 12a^*b^7c^4d^*f^2*k - 2a^*b^9c^2d^*f^*k^2 - 1920a^3b^*c^8d^2*e^*j - 32a^*b^5c^6d^2*e^*j + 2208a^3b^*c^8d^2 \\
& *f^*h + 800a^4b^*c^7d^*f^*h^2 - 102a^*b^5c^6d^2*f^*h + 12a^*b^6c^5d^*f^2*h - 2a^*b^7c^4d^*f^*h^2 \\
& - 896a^3b^*c^8d^*e^2*h - 8a^*b^6c^5d^*f^*g^2 - 240a^*b^4c^7d^2*e^*g - 32a^*b^4c^7d^2*e^2*f \\
& + 5120a^8c^4*h^*j^*1*m + 15360a^7c^5d^*j^*1*m - 7680a^7c^5e^*j^*k^*m + 3072a^7c^5f^*j^*k^*1 \\
& + 5120a^7c^5e^*h^*1*m + 1920a^7c^5f^*h^*k^*m + 15360a^6c^6d^*e^*1*m + 5760a^6c^6d^*f^*k^* \\
& *m + 3072a^6c^6e^*f^*k^*1 - 3072a^6c^6d^*h^*j^*1 - 2560a^6c^6e^*f^*j^*m + 1 \\
& 536a^6c^6e^*h^*j^*k + 4608a^5c^7d^*e^*j^*k - 3072a^5c^7d^*e^*h^*1 - 1152a^5c^7d^*f^*h^*k \\
& + 512a^5c^7e^*f^*h^*j + 1536a^4c^8d^*e^*f^*j - 8a^*b^10c^*d^*f^*1^2 - 5568a^8b^2c^2k^1^2*m \\
& + 15552a^8b^2c^2j^*1*m^2 + 4800a^7b^2c^3j^2*k^*m - 1280a^6b^4c^2j^2*k^*m + 2080a^7b^3c^2h^1^2*m \\
& - 1088a^7b^2c^3j^*k^2*1 + 48a^6b^4c^2j^*k^2*1 - 8544a^7b^2c^3h^*k^2*m - 777 \\
& 6a^7b^3c^2g^*1*m^2 + 7632a^7b^3c^2h^*k^*m^2 + 3600a^6b^3c^3h^2*k^*m + 2484a^6b^4c^2h^*k^2*m \\
& - 918a^5b^5c^2h^2*k^*m + 4800a^7b^2c^3h^*k^1^2 - 1424a^6b^4c^2h^*k^*1^2 + 1200a^5b^4c^3g^2*k^*m \\
& - 960a^6b^2c^4g^2*k^*m - 528a^6b^4c^2f^*1^2*m - 416a^6b^3c^3h^*j^2*m - 320a^4b^6c^2g^2*k^*m \\
& + 192a^7b^2c^3f^*1^2*m + 96a^5b^5c^2h^*j^2*m + 15552a^7b^2c^3e^*1*m^2 - 6720a^7b^2c^3g^*j^*m^2 \\
& + 6160a^6b^4c^2g^*j^*m^2 - 4752a^6b^4c^2e^*1*m^2 - 2016a^7b^2c^3f^*k^*m^2 - 1164a^6b^4c^2f^*k^*m^2 \\
& + 1104a^5b^3c^4f^2*k^*m + 1008a^6b^3c^3f^*k^2*m + 960a^6b^2c^4h^2*j^*1 - 678a^5b^5c^2f^*k^2*m \\
& + 544a^6b^3c^3g^*k^2*1 - 144a^5b^4c^3h^2*j^*1 - 102a^4b^5c^3f^2*k^*m - 62a^3b^7c^2f^2*k^*m \\
& - 24a^5b^5c^2g^*k^2*1 + 6432a^6b^3c^3d^*1^2*m + 4800a^5b^2c^5e^2*k^*m - 2304a^6b^2c^4g^*j^2*1 \\
& + 1920a^6b^3c^3g^*j^*1^2 + 1728a^6b^2c^4f^*j^2*m - 1280a^4b^4c^4e^2*k^*m + 1152a^5b^3c^4g^2*j^*1 \\
& - 1032a^5b^5c^2d^*1^2*m - 864a^6b^3c^3f^*k^*1^2 - 768a^5b^5c^2g^*j^*1^2 + 408a^5b^5c^2f^*k^*1^2 \\
& + 384a^5b^4c^3g^*j^2*1 - 288a^5b^4c^3f^*j^2*m + 192a^6b^2c^4
\end{aligned}$$

$$\begin{aligned}
& *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*1 + 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*1 + 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*1^2 - 5136* \\
& a^5*b^4*c^3*d*k*1^2 - 3840*a^6*b^2*c^4*e*j*1^2 + 1536*a^5*b^4*c^3*e*j*1^2 + \\
& 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*1 + 768*a^4*b^6*c^2*d*k*1^2 - 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*1 + 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*1^2 + 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*1 - 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*1^2 + 576*a^6 \\
& *b^2*c^4*f*h*1^2 + 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 - 2 \\
& 56*a^4*b^6*c^2*f*h*1^2 + 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*1 - 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*1 - 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 - 2*a^2*b^7*c^3*f^2*h*k - 9312*a^5*b^3*c^4*d*h* \\
& 1^2 + 3288*a^4*b^5*c^3*d*h*1^2 - 2304*a^4*b^2*c^6*e^2*g*1 + 1920*a^5*b^3*c^ \\
& ^4*e*g*1^2 + 1728*a^4*b^2*c^6*e^2*f*m + 1152*a^4*b^3*c^5*e*g^2*1 - 768*a^4*b \\
& ^5*c^3*e*g*1^2 - 608*a^4*b^3*c^5*d*g^2*m - 472*a^3*b^7*c^2*d*h*1^2 + 384*a^ \\
& ^3*b^4*c^5*e^2*g*1 - 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*1 + \\
& 120*a^3*b^5*c^4*d*g^2*m + 64*a^3*b^7*c^2*e*g*1^2 - 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*1 - 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*1 - 1152 \\
& *a^4*b^2*c^6*d*f^2*m + 960*a^5*b^2*c^5*e*g*k^2 - 496*a^3*b^3*c^6*d^2*h*k + \\
& 462*a^2*b^6*c^4*d*f^2*m + 432*a^4*b^3*c^5*d*h^2*k - 240*a^4*b^4*c^4*e*g*k^2 \\
& - 222*a^2*b^5*c^5*d^2*h*k + 192*a^4*b^2*c^6*f^2*g*j + 192*a^4*b^2*c^6*e*f^
\end{aligned}$$

$$\begin{aligned}
& 2*1 - 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*1 - 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*1 + 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*1^2 + 1392*a^4*b^4*c^4*d*f*1^2 - 840*a^3*b^6*c^ \\
& 3*d*f*1^2 - 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*1^2 + 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*1 - 3552*a^ \\
& 3*b^2*c^7*d^2*f*k - 2448*a^2*b^4*c^6*d^2*e*1 + 1332*a^2*b^4*c^6*d^2*f*k + 9 \\
& 60*a^3*b^2*c^7*d^2*g*j - 496*a^4*b^3*c^5*d*f*k^2 + 432*a^3*b^3*c^6*d*f^2*k \\
& - 240*a^2*b^4*c^6*d^2*g*j - 222*a^3*b^5*c^4*d*f*k^2 - 174*a^2*b^5*c^5*d*f^2 \\
& *k + 64*a^4*b^2*c^6*f*g^2*h + 48*a^3*b^4*c^5*f*g^2*h + 42*a^2*b^7*c^3*d*f*k \\
& ^2 - 32*a^3*b^3*c^6*e*f^2*j - 320*a^3*b^2*c^7*d*e^2*k + 192*a^4*b^2*c^6*e*g \\
& *h^2 + 192*a^4*b^2*c^6*d*f*j^2 - 32*a^3*b^4*c^5*d*f*j^2 + 16*a^3*b^4*c^5*e* \\
& g*h^2 + 480*a^2*b^3*c^7*d^2*e*j - 224*a^3*b^3*c^6*d*g^2*h + 192*a^3*b^2*c^7 \\
& *e^2*f*h + 24*a^2*b^5*c^5*d*g^2*h - 864*a^3*b^2*c^7*d*f^2*h + 336*a^3*b^3*c \\
& ^6*d*f*h^2 + 192*a^3*b^2*c^7*e*f^2*g + 144*a^2*b^3*c^7*d^2*f*h - 30*a^2*b^5 \\
& *c^5*d*f*h^2 + 16*a^2*b^4*c^6*e*f^2*g - 12*a^2*b^4*c^6*d*f^2*h + 192*a^3*b^ \\
& 2*c^7*d*f*g^2 + 96*a^2*b^3*c^7*d*e^2*h + 48*a^2*b^4*c^6*d*f*g^2 + 960*a^2*b \\
& ^2*c^8*d^2*e*g + 192*a^2*b^2*c^8*d*e^2*f - 7680*a^9*b*c^2*1^2*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*1^2 + 1680*a^6*b^5*c*j^2*m^2 - 100*a^6 \\
& *b^5*c*k^2*1^2 - 2176*a^7*b^3*c^2*j*1^3 - 256*a^6*b^3*c^3*j^3*1 - 64*a^5*b^ \\
& 6*c*j^2*1^2 - 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*1^2 + 420*a^4*b^7*c*g^2*m^2 - 36*a^4*b^7*c*h^2* \\
& 1^2 - 3072*a^7*b^2*c^3*g*1^3 + 2096*a^7*b^3*c^2*f*m^3 + 1088*a^6*b^4*c^2*g* \\
& 1^3 - 496*a^6*b^3*c^3*h*k^3 - 192*a^4*b^4*c^4*g^3*1 + 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*1 + 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*1^2 + 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*1^2 - 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*1 - 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 + 1 \\
& 0752*a^5*b*c^6*d^2*1^2 - 960*a^5*b*c^6*e^2*k^2 - 192*a^5*b*c^6*f^2*j^2 + 10 \\
& 8*a*b^9*c^2*d^2*1^2 - 1680*a^5*b^3*c^4*d*k^3 - 1680*a^2*b^3*c^7*d^3*k + 222 \\
& *a^4*b^5*c^3*d*k^3 + 30*a*b^8*c^3*d^2*k^2 - 10*a^3*b^7*c^2*d*k^3 - 960*a^4* \\
& b*c^7*d^2*j^2 + 80*a^4*b^3*c^5*f*h^3 + 80*a^3*b^3*c^6*f^3*h + 6*a^3*b^5*c^4 \\
& *f*h^3 + 6*a^2*b^5*c^5*f^3*h - 192*a^4*b*c^7*e^2*h^2 - 192*a^4*b^2*c^6*d*h^ \\
& 3 - 192*a^2*b^2*c^8*d^3*h + 128*a^3*b^3*c^6*e*g^3 - 28*a^3*b^4*c^5*d*h^3 + \\
& 12*a*b^6*c^5*d^2*h^2 + 6*a^2*b^6*c^4*d*h^3 - 192*a^3*b*c^8*e^2*f^2 + 60*a*b \\
& ^5*c^6*d^2*g^2 + 198*a*b^4*c^7*d^2*f^2 + 144*a^2*b^3*c^7*d*f^3 - 960*a^2*b* \\
& c^9*d^2*e^2 + 240*a*b^3*c^8*d^2*e^2 + 15360*a^9*c^3*k*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*
\end{aligned}$$

$$\begin{aligned}
& 1 + 2880*a^8*c^4*h*k^2*m + 5120*a^8*c^4*f*l^2*m - 3072*a^8*c^4*h*k*l^2 + 27 \\
& 0*a^5*b^7*h*k*m^2 - 216*a^5*b^7*g*l*m^2 - 12800*a^8*c^4*e*l*m^2 - 4800*a^8* \\
& c^4*f*k*m^2 - 512*a^7*c^5*h^2*j*l - 3840*a^6*c^6*e^2*k*m - 1280*a^7*c^5*f*j \\
& ^2*m + 768*a^7*c^5*h*j^2*k + 144*a^4*b^8*g*j*m^2 - 90*a^4*b^8*f*k*m^2 + 864 \\
& 0*a^7*c^5*d*k^2*m + 4608*a^7*c^5*e*k^2*l + 512*a^6*c^6*f^2*j*l - 9216*a^7*c \\
& ^5*d*k*l^2 - 4096*a^7*c^5*e*j*l^2 + 320*a^6*c^6*f^2*h*m - 90*a^3*b^9*d*k*m^ \\
& 2 + 15200*a^9*b*c^2*k*m^3 - 6192*a^8*b^3*c*k*m^3 + 5472*a^8*b*c^3*k^3*m - 4 \\
& 608*a^5*c^7*d^2*j*l - 1024*a^7*c^5*f*h*l^2 + 150*a^6*b^5*c*k^3*m + 54*a^3*b \\
& ^9*f*h*m^2 + 6*b^10*c^2*d^2*h*m - 14400*a^7*c^5*d*h*m^2 + 8640*a^5*c^7*d^2* \\
& h*m + 2880*a^6*c^6*d*h^2*m + 2304*a^6*c^6*d*j^2*k - 512*a^6*c^6*e*h^2*l - 1 \\
& 92*a^6*c^6*f*h^2*k + 6144*a^8*b*c^3*j*l^3 + 1536*a^7*b*c^4*j^3*l - 1280*a^5 \\
& *c^7*e^2*f*m + 768*a^5*c^7*e^2*h*k + 256*a^6*c^6*f*h*j^2 + 192*a^6*b^5*c*j* \\
& l^3 + 54*a^2*b^10*d*h*m^2 - 18*b^9*c^3*d^2*f*m + 8*b^9*c^3*d^2*g*l - 2*b^9* \\
& c^3*d^2*h*k + 4068*a^7*b^4*c*h*m^3 - 1728*a^6*c^6*d*h*k^2 + 960*a^5*c^7*d*f \\
& ^2*m + 512*a^5*c^7*e*f^2*l - 3072*a^6*c^6*d*f*l^2 - 16*b^8*c^4*d^2*e*l + 6* \\
& b^8*c^4*d^2*f*k - 4608*a^4*c^8*d^2*e*l + 2400*a^8*b*c^3*f*m^3 + 2016*a^7*b* \\
& c^4*h*k^3 - 1728*a^4*c^8*d^2*f*k - 1146*a^6*b^5*c*f*m^3 + 224*a^6*b*c^5*h^3 \\
& *k - 96*a^5*b^6*c*g*l^3 + 96*a^5*b*c^6*f^3*m + 2304*a^4*c^8*d*e^2*k + 768*a \\
& ^5*c^7*d*f*j^2 + 6144*a^7*b*c^4*e*l^3 - 2280*a^5*b^6*c*d*m^3 + 1536*a^4*b*c \\
& ^7*e^3*l - 616*a*b^6*c^5*d^3*m + 512*a^6*b*c^5*g*j^3 + 256*a^4*c^8*e^2*f*h \\
& + 240*a*b^10*c*d^2*m^2 + 6*b^7*c^5*d^2*f*h - 192*a^4*c^8*d*f^2*h + 4320*a^6 \\
& *b*c^5*d*k^3 + 4320*a^3*b*c^8*d^3*k + 222*a*b^5*c^6*d^3*k + 16*b^6*c^6*d^2* \\
& e*g + 96*a^5*b*c^6*f*h^3 + 96*a^4*b*c^7*f^3*h + 768*a^3*c^9*d*e^2*f + 512*a \\
& ^3*b*c^8*e^3*g + 132*a*b^4*c^7*d^3*h + 2016*a^2*b*c^9*d^3*f - 496*a*b^3*c^8 \\
& *d^3*f + 224*a^3*b*c^8*d*f^3 - 18*a*b^5*c^6*d*f^3 - 3264*a^8*b^2*c^2*k^2*m^ \\
& 2 - 6160*a^7*b^3*c^2*j^2*m^2 + 1104*a^7*b^3*c^2*k^2*l^2 - 1920*a^7*b^2*c^3* \\
& j^2*l^2 + 768*a^6*b^4*c^2*j^2*l^2 + 3888*a^7*b^2*c^3*h^2*m^2 - 3510*a^6*b^4 \\
& *c^2*h^2*m^2 + 240*a^6*b^3*c^3*j^2*k^2 - 16*a^5*b^5*c^2*j^2*k^2 + 1680*a^6* \\
& b^3*c^3*g^2*m^2 - 1648*a^6*b^3*c^3*h^2*l^2 - 1540*a^5*b^5*c^2*g^2*m^2 + 444 \\
& *a^5*b^5*c^2*h^2*l^2 - 960*a^6*b^2*c^4*h^2*k^2 - 576*a^6*b^2*c^4*f^2*m^2 - \\
& 512*a^6*b^2*c^4*g^2*l^2 - 480*a^5*b^4*c^3*g^2*l^2 + 198*a^5*b^4*c^3*h^2*k^2 \\
& + 192*a^4*b^6*c^2*g^2*l^2 - 186*a^5*b^4*c^3*f^2*m^2 - 97*a^4*b^6*c^2*f^2*m \\
& ^2 - 9*a^4*b^6*c^2*h^2*k^2 - 6160*a^5*b^3*c^4*e^2*m^2 + 1680*a^4*b^5*c^3*e^ \\
& 2*m^2 - 240*a^5*b^3*c^4*g^2*k^2 - 240*a^5*b^3*c^4*f^2*l^2 - 144*a^3*b^7*c^2 \\
& *e^2*m^2 + 60*a^4*b^5*c^3*g^2*k^2 - 36*a^4*b^5*c^3*f^2*l^2 + 36*a^3*b^7*c^2 \\
& *f^2*l^2 - 16*a^5*b^3*c^4*h^2*j^2 - 4*a^3*b^7*c^2*g^2*k^2 + 38512*a^5*b^2*c \\
& ^5*d^2*m^2 - 32310*a^4*b^4*c^4*d^2*m^2 + 12720*a^3*b^6*c^3*d^2*m^2 - 2500*a \\
& ^2*b^8*c^2*d^2*m^2 - 1920*a^5*b^2*c^5*e^2*l^2 + 768*a^4*b^4*c^4*e^2*l^2 - 4 \\
& 64*a^5*b^2*c^5*f^2*k^2 - 384*a^5*b^2*c^5*g^2*j^2 - 64*a^3*b^6*c^3*e^2*l^2 + \\
& 42*a^4*b^4*c^4*f^2*k^2 + 12*a^3*b^6*c^3*f^2*k^2 - 13104*a^4*b^3*c^5*d^2*l^ \\
& 2 + 5628*a^3*b^5*c^4*d^2*l^2 - 1128*a^2*b^7*c^3*d^2*l^2 + 240*a^4*b^3*c^5*e \\
& ^2*k^2 - 16*a^4*b^3*c^5*f^2*j^2 - 16*a^3*b^5*c^4*e^2*k^2 - 2880*a^4*b^2*c^6 \\
& *d^2*k^2 + 1750*a^3*b^4*c^5*d^2*k^2 - 345*a^2*b^6*c^4*d^2*k^2 - 48*a^4*b^3* \\
& c^5*g^2*h^2 - 4*a^3*b^5*c^4*g^2*h^2 + 240*a^3*b^3*c^6*d^2*j^2 - 192*a^4*b^2 \\
& *c^6*f^2*h^2 - 42*a^3*b^4*c^5*f^2*h^2 - 16*a^2*b^5*c^5*d^2*j^2 - 48*a^3*b^3
\end{aligned}$$



```

*c^6*f^2*g^2 - 16*a^3*b^3*c^6*e^2*h^2 - 4*a^2*b^5*c^5*f^2*g^2 - 464*a^3*b^2
*c^7*d^2*h^2 - 384*a^3*b^2*c^7*e^2*g^2 + 42*a^2*b^4*c^6*d^2*h^2 - 240*a^2*b
^3*c^7*d^2*g^2 - 16*a^2*b^3*c^7*e^2*f^2 - 960*a^2*b^2*c^8*d^2*f^2 + 6*b^11*
c*d^2*k*m - 18*a*b^11*d*f*m^2 - 7200*a^9*c^3*k^2*m^2 - 324*a^7*b^5*l^2*m^2
- 225*a^6*b^6*k^2*m^2 - 2048*a^8*c^4*j^2*l^2 - 144*a^5*b^7*j^2*m^2 - 2400*a
^8*c^4*h^2*m^2 - 81*a^4*b^8*h^2*m^2 - 800*a^7*c^5*f^2*m^2 - 288*a^7*c^5*h^2
*k^2 - 36*a^3*b^9*g^2*m^2 - 9*a^2*b^10*f^2*m^2 - 21600*a^6*c^6*d^2*m^2 - 20
48*a^6*c^6*e^2*l^2 - 864*a^6*c^6*f^2*k^2 - 2592*a^5*c^7*d^2*k^2 - 1536*a^5*
c^7*e^2*j^2 + 1536*a^8*b^2*c^2*l^4 - 32*a^5*c^7*f^2*h^2 + 360*a^7*b^2*c^3*k
^4 - 25*a^6*b^4*c^2*k^4 - 864*a^4*c^8*d^2*h^2 - 4*b^7*c^5*d^2*g^2 - 9*b^6*c
^6*d^2*f^2 - 288*a^3*c^9*d^2*f^2 - 24*a^5*b^2*c^5*h^4 - 16*b^5*c^7*d^2*e^2
- 9*a^4*b^4*c^4*h^4 - 16*a^3*b^4*c^5*g^4 - 24*a^3*b^2*c^7*f^4 - 9*a^2*b^4*c
^6*f^4 - a^2*b^8*c^2*f^2*k^2 - a^2*b^6*c^4*f^2*h^2 + 630*a^7*b^5*k*m^3 + 80
00*a^9*c^3*h*m^3 + 320*a^7*c^5*h^3*m - 378*a^6*b^6*h*m^3 + 126*a^5*b^7*f*m^
3 + 30*b^8*c^4*d^3*m + 24000*a^8*c^4*d*m^3 + 8640*a^4*c^8*d^3*m - 1728*a^7*
c^5*f*k^3 - 192*a^5*c^7*f^3*k - 4*b^11*c*d^2*l^2 + 126*a^4*b^8*d*m^3 - 10*b
^7*c^5*d^3*k + 4200*a^9*b^2*c*m^4 - 1024*a^6*c^6*e*j^3 - 1024*a^4*c^8*e^3*j
- 144*a^7*b^4*c*l^4 - 10*b^6*c^6*d^3*h - 1728*a^3*c^9*d^3*h - 192*a^5*c^7*
d*h^3 + 30*b^5*c^7*d^3*f + 360*a*b^2*c^9*d^4 - 9*b^12*d^2*m^2 - 10000*a^10*
c^2*m^4 - 4096*a^9*c^3*l^4 - 441*a^8*b^4*m^4 - 1296*a^8*c^4*k^4 - 256*a^7*c
^5*j^4 - 16*a^6*c^6*h^4 - 16*a^4*c^8*f^4 - 256*a^3*c^9*e^4 - 25*b^4*c^8*d^4
- 1296*a^2*c^10*d^4 - b^10*c^2*d^2*k^2 - b^8*c^4*d^2*h^2, z, k1), k1, 1, 4
) + ((b*c^2*e - 2*a*c^2*g - a*b^2*l + 2*a^2*c*l + a*b*c*j)/(2*(4*a*c - b^2)
) + (x^2*(2*c^3*e - b^3*l - b*c^2*g - 2*a*c^2*j + b^2*c*j + 3*a*b*c*l))/(2*
(4*a*c - b^2)) + (x*(2*a*c^3*d - 2*a^2*c^2*h - a^2*b^2*m - b^2*c^2*d + 2*a^
3*c*m + a*b*c^2*f + a^2*b*c*k))/(2*a*(4*a*c - b^2)) - (x^3*(2*a^2*c^2*k + b
*c^3*d - 2*a*c^3*f + a*b^3*m + a*b*c^2*h - a*b^2*c*k - 3*a^2*b*c*m))/(2*a*(
4*a*c - b^2)))/(a*c^2 + c^3*x^4 + b*c^2*x^2) + (m*x)/c^2

```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x**8+l*x**7+k*x**6+j*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+
b*x**2+a)**2,x)
```

```
[Out] Timed out
```

$$3.42 \quad \int \frac{d+ex}{(4-5x^2+x^4)^3} dx$$

**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] /; Free

$Q[\{a, b, c\}, x] \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{NeQ}[p, -3/2] \ \&\& \ \text{IntegerQ}[4*p]$

### Rule 616

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

### Rule 1092

$\text{Int}[\{(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4\}^{(p_)}, x\_Symbol] \ :> \ -\text{Simp}[(x*(b^2 - 2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^{(p+1)})/(2*a*(p+1)*(b^2 - 4*a*c)), x] + \text{Dist}[1/(2*a*(p+1)*(b^2 - 4*a*c)), \text{Int}[(b^2 - 2*a*c + 2*(p+1)*(b^2 - 4*a*c) + b*c*(4*p+7)*x^2)*(a + b*x^2 + c*x^4)^{(p+1)}, x], x] \ /; \ \text{FreeQ}[\{a, b, c\}, x] \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{IntegerQ}[2*p]$

### Rule 1107

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

### 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

$\text{Int}[\{(d_) + (e_.)*(x_)^2\}*\{(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4\}^{(p_)}, x\_Symbol] \ :> \ \text{Simp}[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 + c*x^4)^{(p+1)})/(2*a*(p+1)*(b^2 - 4*a*c)), x] + \text{Dist}[1/(2*a*(p+1)*(b^2 - 4*a*c)), \text{Int}[\text{Simp}[(2*p+3)*d*b^2 - a*b*e - 2*a*c*d*(4*p+5) + (4*p+7)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^{(p+1)}, x], x] \ /; \ \text{FreeQ}[\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0] \ \&\& \ \text{NeQ}[c*d^2 - b*d*e + a*e^2, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{IntegerQ}[2*p]$

### Rule 1673

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

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

### Rubi steps

$$\begin{aligned}
 \int \frac{d + ex}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{d}{(4 - 5x^2 + x^4)^3} dx + \int \frac{ex}{(4 - 5x^2 + x^4)^3} dx \\
 &= d \int \frac{1}{(4 - 5x^2 + x^4)^3} dx + e \int \frac{x}{(4 - 5x^2 + x^4)^3} dx \\
 &= \frac{dx(17 - 5x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144}d \int \frac{-19 + 25x^2}{(4 - 5x^2 + x^4)^2} dx + \frac{1}{2}e \text{Subst} \left[ \int \frac{1}{(4 - 5x + x^2)^3} dx, x, 2x \right] \\
 &= \frac{dx(17 - 5x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} - \frac{dx(59 - 35x^2)}{3456(4 - 5x^2 + x^4)} + \frac{d \int \frac{519 + 105x^2}{4 - 5x^2 + x^4} dx}{10368} - \frac{1}{6} \\
 &= \frac{dx(17 - 5x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} - \frac{dx(59 - 35x^2)}{3456(4 - 5x^2 + x^4)} - \frac{e(5 - 2x^2)}{54(4 - 5x^2 + x^4)} \\
 &= \frac{dx(17 - 5x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} - \frac{dx(59 - 35x^2)}{3456(4 - 5x^2 + x^4)} - \frac{e(5 - 2x^2)}{54(4 - 5x^2 + x^4)} \\
 &= \frac{dx(17 - 5x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} - \frac{dx(59 - 35x^2)}{3456(4 - 5x^2 + x^4)} - \frac{e(5 - 2x^2)}{54(4 - 5x^2 + x^4)}
 \end{aligned}$$

**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

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]  $\frac{1}{41472} * (420 * d * x^7 + 1536 * e * x^6 - 2808 * d * x^5 - 11520 * e * x^4 + 3780 * d * x^3 + 23040 * e * x^2 + 2064 * d * x - ((313 * d - 512 * e) * x^8 - 10 * (313 * d - 512 * e) * x^6 + 33 * (313 * d - 512 * e) * x^4 - 40 * (313 * d - 512 * e) * x^2 + 5008 * d - 8192 * e) * \log(x + 2) + 32 * ((13 * d - 16 * e) * x^8 - 10 * (13 * d - 16 * e) * x^6 + 33 * (13 * d - 16 * e) * x^4 - 40 * (13 * d - 16 * e) * x^2 + 208 * d - 256 * e) * \log(x + 1) - 32 * ((13 * d + 16 * e) * x^8 - 10 * (13 * d + 16 * e) * x^6 + 33 * (13 * d + 16 * e) * x^4 - 40 * (13 * d + 16 * e) * x^2 + 208 * d + 256 * e) * \log(x - 1) + ((313 * d + 512 * e) * x^8 - 10 * (313 * d + 512 * e) * x^6 + 33 * (313 * d + 512 * e) * x^4 - 40 * (313 * d + 512 * e) * x^2 + 5008 * d + 8192 * e) * \log(x - 2) - 960 * e) / (x^8 - 10 * x^6 + 33 * x^4 - 40 * x^2 + 16)$

**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]  $-1/41472 * (313 * d - 512 * e) * \log(\text{abs}(x + 2)) + 1/1296 * (13 * d - 16 * e) * \log(\text{abs}(x + 1)) - 1/1296 * (13 * d + 16 * e) * \log(\text{abs}(x - 1)) + 1/41472 * (313 * d + 512 * e) * \log(\text{abs}(x - 2)) + 1/3456 * (35 * d * x^7 + 128 * x^6 * e - 234 * d * x^5 - 960 * x^4 * e + 315 * d * x^3 + 1920 * x^2 * e + 172 * d * x - 800 * e) / (x^4 - 5 * x^2 + 4)^2$

**maple** [A] time = 0.02, size = 186, normalized size = 1.30

$$\frac{313 \ln(x+2)}{41472} - \frac{313 \ln(x-2)}{41472} - \frac{13 \ln(x-1)}{1296} + \frac{13 \ln(x+1)}{1296} + \frac{e \ln(x+2)}{81} - \frac{e \ln(x-2)}{81} - \frac{e \ln(x-1)}{81} + \frac{e \ln(x+1)}{81} + \frac{19d}{6912(x-2)} - \frac{d}{3456(x-2)^2} + \frac{d}{432(x+432)} - \frac{d}{432(x+1)^2} + \frac{d}{432(x-432)} - \frac{d}{432(x-1)^2} + \frac{19e}{6912(x+2)} + \frac{e}{3456(x+2)^2} + \frac{17e}{3456(x-2)} - \frac{e}{1728(x-2)^2} - \frac{e}{144(x+1)} + \frac{e}{432(x+1)^2} - \frac{e}{144(x-1)} + \frac{e}{432(x-1)^2} + \frac{17e}{3456(x+2)} - \frac{e}{1728(x+2)^2}$$

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

$$\ln(x+1)\left(\frac{13d}{1296}-\frac{e}{81}\right)-\ln(x-1)\left(\frac{13d}{1296}+\frac{e}{81}\right)+\ln(x-2)\left(\frac{313d}{41472}+\frac{e}{81}\right)-\ln(x+2)\left(\frac{313d}{41472}-\frac{e}{81}\right)+\frac{\frac{35dx^7}{3456}+\frac{ex^6}{27}-\frac{13dx^5}{192}-\frac{5ex^4}{18}+\frac{35dx^3}{384}+\frac{5ex^2}{9}+\frac{43dx}{864}-\frac{25e}{108}}{x^8-10x^6+33x^4-40x^2+16}$$

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]  $(13*d - 16*e)*\log(x + (-1106258459719280*d**4*e - 13113710954343*d**4*(13*d - 16*e) - 817263343042560*d**2*e**3 + 153628968222720*d**2*e**2*(13*d - 16*e) + 9530197557248*d**2*e*(13*d - 16*e)**2 + 88038005760*d**2*(13*d - 16*e)**3 + 5035763255214080*e**5 + 142661633703936*e**4*(13*d - 16*e) - 1967095$

$$\begin{aligned}
& 0215680e^{*3}(13*d - 16*e)^{**2} - 557272006656e^{*2}(13*d - 16*e)^{**3})/(229412 \\
& 56248261*d^{**5} - 2312740746035200*d^{**3}e^{*2} + 4473912813420544*d*e^{*4}))/1296 \\
& - (13*d + 16*e)*\log(x + (-1106258459719280*d^{**4}e + 13113710954343*d^{**4}*(1 \\
& 3*d + 16*e) - 817263343042560*d^{**2}e^{*3} - 153628968222720*d^{**2}e^{*2}*(13*d + \\
& 16*e) + 9530197557248*d^{**2}e*(13*d + 16*e)^{**2} - 88038005760*d^{**2}*(13*d + 1 \\
& 6*e)^{**3} + 5035763255214080e^{*5} - 142661633703936e^{*4}*(13*d + 16*e) - 1967 \\
& 0950215680e^{*3}(13*d + 16*e)^{**2} + 557272006656e^{*2}*(13*d + 16*e)^{**3})/(229 \\
& 41256248261*d^{**5} - 2312740746035200*d^{**3}e^{*2} + 4473912813420544*d*e^{*4}))/1 \\
& 296 - (313*d - 512*e)*\log(x + (-1106258459719280*d^{**4}e + 13113710954343*d^{* \\
& *4}*(313*d - 512*e)/32 - 817263343042560*d^{**2}e^{*3} - 4800905256960*d^{**2}e^{*2} \\
& *(313*d - 512*e) + 9306833552*d^{**2}e*(313*d - 512*e)^{**2} - 85974615*d^{**2}*(31 \\
& 3*d - 512*e)^{**3}/32 + 5035763255214080e^{*5} - 4458176053248e^{*4}*(313*d - 51 \\
& 2*e) - 19209912320e^{*3}*(313*d - 512*e)^{**2} + 17006592e^{*2}*(313*d - 512*e)* \\
& *3)/(22941256248261*d^{**5} - 2312740746035200*d^{**3}e^{*2} + 4473912813420544*d* \\
& e^{*4}))/41472 + (313*d + 512*e)*\log(x + (-1106258459719280*d^{**4}e - 13113710 \\
& 954343*d^{**4}*(313*d + 512*e)/32 - 817263343042560*d^{**2}e^{*3} + 4800905256960* \\
& d^{**2}e^{*2}*(313*d + 512*e) + 9306833552*d^{**2}e*(313*d + 512*e)^{**2} + 85974615 \\
& *d^{**2}*(313*d + 512*e)^{**3}/32 + 5035763255214080e^{*5} + 4458176053248e^{*4}*(3 \\
& 13*d + 512*e) - 19209912320e^{*3}*(313*d + 512*e)^{**2} - 17006592e^{*2}*(313*d \\
& + 512*e)^{**3})/(22941256248261*d^{**5} - 2312740746035200*d^{**3}e^{*2} + 4473912813 \\
& 420544*d*e^{*4}))/41472 + (35*d*x^{**7} - 234*d*x^{**5} + 315*d*x^{**3} + 172*d*x + 12 \\
& 8*e*x^{**6} - 960*e*x^{**4} + 1920*e*x^{**2} - 800*e)/(3456*x^{**8} - 34560*x^{**6} + 1140 \\
& 48*x^{**4} - 138240*x^{**2} + 55296)
\end{aligned}$$

$$3.43 \quad \int \frac{d+ex+fx^2}{(4-5x^2+x^4)^3} dx$$

**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\_))^(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)^(-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] && 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

$$\begin{aligned}
\int \frac{d + ex + fx^2}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{ex}{(4 - 5x^2 + x^4)^3} dx + \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 5(5d + 8f)x^2}{(4 - 5x^2 + x^4)^2} dx + e \int \frac{x}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} + \frac{\int \frac{3(173d + 260f) + 105(d + 4f)x^2}{4 - 5x^2 + x^4} dx}{10368} \\
&= \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} - \frac{e}{10368} \\
&= \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{e(5 - 2x^2)}{54(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} \\
&= \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{e(5 - 2x^2)}{54(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} \\
&= \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{e(5 - 2x^2)}{54(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)}
\end{aligned}$$

**Mathematica [A]** time = 0.13, size = 161, normalized size = 0.92

$$\frac{12(d(35x^2-59)+64(2x^2-5)+20f(7x^2-19))}{x^4-5x^2+4} + \frac{288(-5dx^3+17dx+(20-8x^2)-8fx^3+20fx)}{(x^4-5x^2+4)^2} - 32\log(1-x)(13d+16e+25f) + \log(2-x)(313d+512e+820f) + 32\log(x+1)(13d-16e+25f) + \log(x+2)(-313d+512e-820f)$$

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]  $\frac{1}{41472} \cdot (420 \cdot (d + 4 \cdot f) \cdot x^7 + 1536 \cdot e \cdot x^6 - 216 \cdot (13 \cdot d + 60 \cdot f) \cdot x^5 - 11520 \cdot e \cdot x^4 + 756 \cdot (5 \cdot d + 36 \cdot f) \cdot x^3 + 23040 \cdot e \cdot x^2 + 48 \cdot (43 \cdot d - 260 \cdot f) \cdot x - ((313 \cdot d - 512 \cdot e + 820 \cdot f) \cdot x^8 - 10 \cdot (313 \cdot d - 512 \cdot e + 820 \cdot f) \cdot x^6 + 33 \cdot (313 \cdot d - 512 \cdot e + 820 \cdot f) \cdot x^4 - 40 \cdot (313 \cdot d - 512 \cdot e + 820 \cdot f) \cdot x^2 + 5008 \cdot d - 8192 \cdot e + 13120 \cdot f) \cdot \log(x + 2) + 32 \cdot ((13 \cdot d - 16 \cdot e + 25 \cdot f) \cdot x^8 - 10 \cdot (13 \cdot d - 16 \cdot e + 25 \cdot f) \cdot x^6 + 33 \cdot (13 \cdot d - 16 \cdot e + 25 \cdot f) \cdot x^4 - 40 \cdot (13 \cdot d - 16 \cdot e + 25 \cdot f) \cdot x^2 + 208 \cdot d - 256 \cdot e + 400 \cdot f) \cdot \log(x + 1) - 32 \cdot ((13 \cdot d + 16 \cdot e + 25 \cdot f) \cdot x^8 - 10 \cdot (13 \cdot d + 16 \cdot e + 25 \cdot f) \cdot x^6 + 33 \cdot (13 \cdot d + 16 \cdot e + 25 \cdot f) \cdot x^4 - 40 \cdot (13 \cdot d + 16 \cdot e + 25 \cdot f) \cdot x^2 + 208 \cdot d + 256 \cdot e + 400 \cdot f) \cdot \log(x - 1) + ((313 \cdot d + 512 \cdot e + 820 \cdot f) \cdot x^8 - 10 \cdot (313 \cdot d + 512 \cdot e + 820 \cdot f) \cdot x^6 + 33 \cdot (313 \cdot d + 512 \cdot e + 820 \cdot f) \cdot x^4 - 40 \cdot (313 \cdot d + 512 \cdot e + 820 \cdot f) \cdot x^2 + 5008 \cdot d + 8192 \cdot e + 13120 \cdot f) \cdot \log(x - 2) - 9600 \cdot e) / (x^8 - 10 \cdot x^6 + 33 \cdot x^4 - 40 \cdot x^2 + 16)$

**giac** [A] time = 0.35, size = 157, normalized size = 0.90

$$\frac{1}{41472} (313d + 820f - 512e) \log(x + 2) + \frac{1}{1296} (13d + 25f - 16e) \log(x + 1) - \frac{1}{1296} (13d + 25f + 16e) \log(x - 1) + \frac{1}{41472} (313d + 820f + 512e) \log(x - 2) + \frac{35dx^7 + 140fx^7 + 128x^6e - 234dx^5 - 1080fx^5 - 960x^4e + 315d^3 + 2268fx^3 + 1920x^2e + 172dx - 1040fx - 800e}{3456(x^4 - 5x^2 + 4)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out]  $-1/41472 \cdot (313 \cdot d + 820 \cdot f - 512 \cdot e) \cdot \log(\text{abs}(x + 2)) + 1/1296 \cdot (13 \cdot d + 25 \cdot f - 16 \cdot e) \cdot \log(\text{abs}(x + 1)) - 1/1296 \cdot (13 \cdot d + 25 \cdot f + 16 \cdot e) \cdot \log(\text{abs}(x - 1)) + 1/41472 \cdot (313 \cdot d + 820 \cdot f + 512 \cdot e) \cdot \log(\text{abs}(x - 2)) + 1/3456 \cdot (35 \cdot d \cdot x^7 + 140 \cdot f \cdot x^7 + 128 \cdot x^6 \cdot e - 234 \cdot d \cdot x^5 - 1080 \cdot f \cdot x^5 - 960 \cdot x^4 \cdot e + 315 \cdot d \cdot x^3 + 2268 \cdot f \cdot x^3 + 1920 \cdot x^2 \cdot e + 172 \cdot d \cdot x - 1040 \cdot f \cdot x - 800 \cdot e) / (x^4 - 5 \cdot x^2 + 4)^2$

**maple** [A] time = 0.02, size = 278, normalized size = 1.59

$$\frac{35d^3x^7 + 140fx^7 + 128x^6e - 234dx^5 - 1080fx^5 - 960x^4e + 315d^3 + 2268fx^3 + 1920x^2e + 172dx - 1040fx - 800e}{3456(x^4 - 5x^2 + 4)^2}$$

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

$$\ln(x+1)\left(\frac{13d}{1296} - \frac{e}{81} + \frac{25f}{1296}\right) - \ln(x-1)\left(\frac{13d}{1296} + \frac{e}{81} + \frac{25f}{1296}\right) + \ln(x-2)\left(\frac{313d}{41472} + \frac{e}{81} + \frac{205f}{10368}\right) - \ln(x+2)\left(\frac{313d}{41472} - \frac{e}{81} + \frac{205f}{10368}\right) + \frac{\left(\frac{35d}{3456} + \frac{35f}{864}\right)x^7 + \frac{e^6}{27} + \left(\frac{13d}{192} - \frac{5f}{16}\right)x^5 - \frac{5ex^4}{18} + \left(\frac{35d}{384} + \frac{21f}{32}\right)x^3 + \frac{5ex^2}{9} + \left(\frac{43d}{864} - \frac{65f}{216}\right)x - \frac{25e}{108}}{x^8 - 10x^6 + 33x^4 - 40x^2 + 16}$$

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]  $(13*d - 16*e + 25*f)*\log(x + (-1106258459719280*d**5*e - 13113710954343*d**5*(13*d - 16*e + 25*f) - 12929482401572800*d**4*e*f - 107063904267900*d**4*$

$$\begin{aligned}
& f*(13*d - 16*e + 25*f) - 817263343042560*d**3*e**3 + 153628968222720*d**3*e \\
& **2*(13*d - 16*e + 25*f) - 59478343838144000*d**3*e*f**2 + 9530197557248*d* \\
& *3*e*(13*d - 16*e + 25*f)**2 - 324891412840800*d**3*f**2*(13*d - 16*e + 25* \\
& f) + 88038005760*d**3*(13*d - 16*e + 25*f)**3 - 2885705898393600*d**2*e**3* \\
& f + 1014848673546240*d**2*e**2*f*(13*d - 16*e + 25*f) - 134905286808320000*d \\
& **2*e*f**3 + 63469758382080*d**2*e*f*(13*d - 16*e + 25*f)**2 - 42297272452 \\
& 8000*d**2*f**3*(13*d - 16*e + 25*f) + 364616847360*d**2*f*(13*d - 16*e + 25 \\
& *f)**3 + 5035763255214080*d*e**5 + 142661633703936*d*e**4*(13*d - 16*e + 25 \\
& *f) - 2138314899456000*d*e**3*f**2 - 19670950215680*d*e**3*(13*d - 16*e + 2 \\
& 5*f)**2 + 2257033730457600*d*e**2*f**2*(13*d - 16*e + 25*f) - 557272006656* \\
& d*e**2*(13*d - 16*e + 25*f)**3 - 151082645593600000*d*e*f**4 + 141056507904 \\
& 000*d*e*f**2*(13*d - 16*e + 25*f)**2 - 167683154400000*d*f**4*(13*d - 16*e \\
& + 25*f) + 339373670400*d*f**2*(13*d - 16*e + 25*f)**3 + 10643272556871680*e \\
& **5*f + 214404767416320*e**4*f*(13*d - 16*e + 25*f) + 529992253440000*e**3* \\
& f**3 - 41575283425280*e**3*f*(13*d - 16*e + 25*f)**2 + 1671759396864000*e** \\
& 2*f**3*(13*d - 16*e + 25*f) - 837518622720*e**2*f*(13*d - 16*e + 25*f)**3 - \\
& 66895452108800000*e*f**5 + 104485486592000*e*f**3*(13*d - 16*e + 25*f)**2 \\
& + 51041923200000*f**5*(13*d - 16*e + 25*f) - 80289792000*f**3*(13*d - 16*e \\
& + 25*f)**3)/(22941256248261*d**6 + 197271407316645*d**5*f - 231274074603520 \\
& 0*d**4*e**2 + 612862910928900*d**4*f**2 - 20566607354920960*d**3*e**2*f + 7 \\
& 67363353812000*d**3*f**3 + 4473912813420544*d**2*e**4 - 68552762169753600*d \\
& **2*e**2*f**2 + 197499222000000*d**2*f**4 + 20324472439439360*d*e**4*f - 10 \\
& 1559983669248000*d*e**2*f**3 - 182883938400000*d*f**5 + 22539988369408000*e \\
& **4*f**2 - 56422196838400000*e**2*f**4 + 21520080000000*f**6)/1296 - (13*d \\
& + 16*e + 25*f)*log(x + (-1106258459719280*d**5*e + 13113710954343*d**5*(13 \\
& *d + 16*e + 25*f) - 12929482401572800*d**4*e*f + 107063904267900*d**4*f*(13 \\
& *d + 16*e + 25*f) - 817263343042560*d**3*e**3 - 153628968222720*d**3*e**2*( \\
& 13*d + 16*e + 25*f) - 59478343838144000*d**3*e*f**2 + 9530197557248*d**3*e* \\
& (13*d + 16*e + 25*f)**2 + 324891412840800*d**3*f**2*(13*d + 16*e + 25*f) - \\
& 88038005760*d**3*(13*d + 16*e + 25*f)**3 - 2885705898393600*d**2*e**3*f - 1 \\
& 014848673546240*d**2*e**2*f*(13*d + 16*e + 25*f) - 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**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**
\end{aligned}$$

$$\begin{aligned}
& 4e^{**2} + 612862910928900*d^{**4}*f^{**2} - 20566607354920960*d^{**3}*e^{**2}*f + 767363 \\
& 353812000*d^{**3}*f^{**3} + 4473912813420544*d^{**2}*e^{**4} - 68552762169753600*d^{**2}*e \\
& **2*f^{**2} + 197499222000000*d^{**2}*f^{**4} + 20324472439439360*d*e^{**4}*f - 1015599 \\
& 83669248000*d*e^{**2}*f^{**3} - 182883938400000*d*f^{**5} + 22539988369408000*e^{**4}*f \\
& **2 - 56422196838400000*e^{**2}*f^{**4} + 21520080000000*f^{**6})/1296 - (313*d - 5 \\
& 12*e + 820*f)*\log(x + (-1106258459719280*d^{**5}*e + 13113710954343*d^{**5}*(313* \\
& d - 512*e + 820*f)/32 - 12929482401572800*d^{**4}*e*f + 26765976066975*d^{**4}*f* \\
& (313*d - 512*e + 820*f)/8 - 817263343042560*d^{**3}*e^{**3} - 4800905256960*d^{**3}* \\
& e^{**2}*(313*d - 512*e + 820*f) - 59478343838144000*d^{**3}*e*f^{**2} + 9306833552*d \\
& **3*e*(313*d - 512*e + 820*f)**2 + 10152856651275*d^{**3}*f^{**2}*(313*d - 512*e \\
& + 820*f) - 85974615*d^{**3}*(313*d - 512*e + 820*f)**3/32 - 2885705898393600*d \\
& **2*e^{**3}*f - 31714021048320*d^{**2}*e^{**2}*f*(313*d - 512*e + 820*f) - 134905286 \\
& 808320000*d^{**2}*e*f^{**3} + 61982185920*d^{**2}*e*f*(313*d - 512*e + 820*f)**2 + 1 \\
& 3217897641500*d^{**2}*f^{**3}*(313*d - 512*e + 820*f) - 89017785*d^{**2}*f*(313*d - \\
& 512*e + 820*f)**3/8 + 5035763255214080*d*e^{**5} - 4458176053248*d*e^{**4}*(313*d \\
& - 512*e + 820*f) - 2138314899456000*d*e^{**3}*f^{**2} - 19209912320*d*e^{**3}*(313* \\
& d - 512*e + 820*f)**2 - 70532304076800*d*e^{**2}*f^{**2}*(313*d - 512*e + 820*f) \\
& + 17006592*d*e^{**2}*(313*d - 512*e + 820*f)**3 - 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 \\
& 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
\end{aligned}$$

$$\begin{aligned}
& - 5240098575000*d*f**4*(313*d + 512*e + 820*f) + 20713725*d*f**2*(313*d + 512*e + 820*f)**3/2 + 10643272556871680*e**5*f + 6700148981760*e**4*f*(313*d + 512*e + 820*f) + 529992253440000*e**3*f**3 - 40600862720*e**3*f*(313*d + 512*e + 820*f)**2 + 52242481152000*e**2*f**3*(313*d + 512*e + 820*f) - 25559040*e**2*f*(313*d + 512*e + 820*f)**3 - 66895452108800000*e*f**5 + 102036608000*e*f**3*(313*d + 512*e + 820*f)**2 + 1595060100000*f**5*(313*d + 512*e + 820*f) - 2450250*f**3*(313*d + 512*e + 820*f)**3)/(22941256248261*d**6 + 197271407316645*d**5*f - 2312740746035200*d**4*e**2 + 612862910928900*d**4*f**2 - 20566607354920960*d**3*e**2*f + 767363353812000*d**3*f**3 + 4473912813420544*d**2*e**4 - 68552762169753600*d**2*e**2*f**2 + 197499222000000*d**2*f**4 + 20324472439439360*d*e**4*f - 101559983669248000*d*e**2*f**3 - 182883938400000*d*f**5 + 22539988369408000*e**4*f**2 - 56422196838400000*e**2*f**4 + 21520080000000*f**6))/41472 + (128*e*x**6 - 960*e*x**4 + 1920*e*x**2 - 800*e + x**7*(35*d + 140*f) + x**5*(-234*d - 1080*f) + x**3*(315*d + 2268*f) + x*(172*d - 1040*f))/(3456*x**8 - 34560*x**6 + 114048*x**4 - 138240*x**2 + 55296)
\end{aligned}$$

$$3.44 \quad \int \frac{d+ex+fx^2+gx^3}{(4-5x^2+x^4)^3} dx$$

**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\_))^-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 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^3} dx + \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 5(5d + 8f)x^2}{(4 - 5x^2 + x^4)^2} dx + \frac{1}{2} \text{Subst} \left( \int \right) \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{x(59d + 380f - 35(d + 4f))}{3456(4 - 5x^2 + x^4)} \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)(5 - 2x^2)}{108(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f))}{3456(4 - 5x^2 + x^4)} \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)(5 - 2x^2)}{108(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f))}{3456(4 - 5x^2 + x^4)} \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)(5 - 2x^2)}{108(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f))}{3456(4 - 5x^2 + x^4)}
\end{aligned}$$

**Mathematica [A]** time = 0.08, size = 193, normalized size = 0.95

$$\frac{12(d(35x^2-59)+64(2x^2-5)+20f(x^2-19)+160g(2x^2-5))}{x^4-5x^2+4} + \frac{28(-5dx^3+17dx+(20-8f^2)-8f^2+20f+4g(5x^2-8))}{(x^4-5x^2+4)^2} - 32 \log(1-x)(13d+16e+25f+40g) + \log(2-x)(313d+512e+820f+1280g) + 32 \log(x+1)(13d-16e+25f-40g) + \log(x+2)(-313d+512e-820f+1280g)$$

41472

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]  $\frac{1}{41472} \cdot (420 \cdot (d + 4 \cdot f) \cdot x^7 + 768 \cdot (2 \cdot e + 5 \cdot g) \cdot x^6 - 216 \cdot (13 \cdot d + 60 \cdot f) \cdot x^5 - 5760 \cdot (2 \cdot e + 5 \cdot g) \cdot x^4 + 756 \cdot (5 \cdot d + 36 \cdot f) \cdot x^3 + 11520 \cdot (2 \cdot e + 5 \cdot g) \cdot x^2 + 48 \cdot (4 \cdot 3 \cdot d - 260 \cdot f) \cdot x - ((313 \cdot d - 512 \cdot e + 820 \cdot f - 1280 \cdot g) \cdot x^8 - 10 \cdot (313 \cdot d - 512 \cdot e + 820 \cdot f - 1280 \cdot g) \cdot x^6 + 33 \cdot (313 \cdot d - 512 \cdot e + 820 \cdot f - 1280 \cdot g) \cdot x^4 - 40 \cdot (313 \cdot d - 512 \cdot e + 820 \cdot f - 1280 \cdot g) \cdot x^2 + 5008 \cdot d - 8192 \cdot e + 13120 \cdot f - 20480 \cdot g) \cdot \log(x + 2) + 32 \cdot ((13 \cdot d - 16 \cdot e + 25 \cdot f - 40 \cdot g) \cdot x^8 - 10 \cdot (13 \cdot d - 16 \cdot e + 25 \cdot f - 40 \cdot g) \cdot x^6 + 33 \cdot (13 \cdot d - 16 \cdot e + 25 \cdot f - 40 \cdot g) \cdot x^4 - 40 \cdot (13 \cdot d - 16 \cdot e + 25 \cdot f - 40 \cdot g) \cdot x^2 + 208 \cdot d - 256 \cdot e + 400 \cdot f - 640 \cdot g) \cdot \log(x + 1) - 32 \cdot ((13 \cdot d + 16 \cdot e + 25 \cdot f + 40 \cdot g) \cdot x^8 - 10 \cdot (13 \cdot d + 16 \cdot e + 25 \cdot f + 40 \cdot g) \cdot x^6 + 33 \cdot (13 \cdot d + 16 \cdot e + 25 \cdot f + 40 \cdot g) \cdot x^4 - 40 \cdot (13 \cdot d + 16 \cdot e + 25 \cdot f + 40 \cdot g) \cdot x^2 + 208 \cdot d + 256 \cdot e + 400 \cdot f + 640 \cdot g) \cdot \log(x - 1) + ((313 \cdot d + 512 \cdot e + 820 \cdot f + 1280 \cdot g) \cdot x^8 - 10 \cdot (313 \cdot d + 512 \cdot e + 820 \cdot f + 1280 \cdot g) \cdot x^6 + 33 \cdot (313 \cdot d + 512 \cdot e + 820 \cdot f + 1280 \cdot g) \cdot x^4 - 40 \cdot (313 \cdot d + 512 \cdot e + 820 \cdot f + 1280 \cdot g) \cdot x^2 + 5008 \cdot d + 8192 \cdot e + 13120 \cdot f + 20480 \cdot g) \cdot \log(x - 2) - 9600 \cdot e - 29184 \cdot g) / (x^8 - 10 \cdot x^6 + 33 \cdot x^4 - 40 \cdot x^2 + 16)$

**giac** [A] time = 0.39, size = 190, normalized size = 0.93

$\frac{\frac{1}{41472} (13 \cdot d + 820 \cdot f - 1280 \cdot g - 512 \cdot e) \log(x + 2) + \frac{1}{1296} (13 \cdot d + 25 \cdot f - 40 \cdot g - 16 \cdot e) \log(x + 1) - \frac{1}{1296} (13 \cdot d + 25 \cdot f + 40 \cdot g + 16 \cdot e) \log(x - 1) + \frac{1}{41472} (313 \cdot d + 820 \cdot f + 1280 \cdot g + 512 \cdot e) \log(x - 2) + \frac{35 \cdot d^2 + 140 \cdot f \cdot d + 320 \cdot g \cdot d + 128 \cdot x^6 \cdot e - 234 \cdot d \cdot e^2 - 1080 \cdot f \cdot e^2 - 2400 \cdot g \cdot e^2 - 960 \cdot x^4 \cdot e + 315 \cdot d \cdot e^3 + 2268 \cdot f \cdot e^3 + 4800 \cdot g \cdot e^3 + 1920 \cdot x^2 \cdot e + 172 \cdot d \cdot e - 1040 \cdot f \cdot e - 2432 \cdot g \cdot e - 800 \cdot e)}{3456 \cdot (x^4 - 5 \cdot x^2 + 4)^2}$

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)^3,x, algorithm="giac")

[Out]  $-1/41472 \cdot (313 \cdot d + 820 \cdot f - 1280 \cdot g - 512 \cdot e) \cdot \log(\text{abs}(x + 2)) + 1/1296 \cdot (13 \cdot d + 25 \cdot f - 40 \cdot g - 16 \cdot e) \cdot \log(\text{abs}(x + 1)) - 1/1296 \cdot (13 \cdot d + 25 \cdot f + 40 \cdot g + 16 \cdot e) \cdot \log(\text{abs}(x - 1)) + 1/41472 \cdot (313 \cdot d + 820 \cdot f + 1280 \cdot g + 512 \cdot e) \cdot \log(\text{abs}(x - 2)) + 1/3456 \cdot (35 \cdot d \cdot x^7 + 140 \cdot f \cdot x^7 + 320 \cdot g \cdot x^6 + 128 \cdot x^6 \cdot e - 234 \cdot d \cdot x^5 - 1080 \cdot f \cdot x^5 - 2400 \cdot g \cdot x^4 - 960 \cdot x^4 \cdot e + 315 \cdot d \cdot x^3 + 2268 \cdot f \cdot x^3 + 4800 \cdot g \cdot x^2 + 1920 \cdot x^2 \cdot e + 172 \cdot d \cdot x - 1040 \cdot f \cdot x - 2432 \cdot g - 800 \cdot e) / (x^4 - 5 \cdot x^2 + 4)^2$

**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

$$\frac{-\frac{1}{41472}(313d-512e+820f-1280g)\log(x+2)+\frac{1}{1296}(13d-16e+25f-40g)\log(x+1)-\frac{1}{1296}(13d+16e+25f+40g)\log(x-1)+\frac{1}{41472}(313d+512e+820f+1280g)\log(x-2)+\frac{35(d+4f)^2+64(2e+5g)^2-18(13d+60f)^2-480(2e+5g)^2+63(5d+36f)^2+960(2e+5g)^2+4(43d-260f)^2-800e-2432g}{3456(x^8-10x^6+33x^4-40x^2+16)}}$$

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

$$\frac{\left(\frac{35d}{3456} + \frac{35f}{864}\right)x^7 + \left(\frac{e}{27} + \frac{5g}{54}\right)x^6 + \left(\frac{13d}{192} - \frac{5f}{16}\right)x^5 + \left(-\frac{5e}{18} - \frac{25g}{36}\right)x^4 + \left(\frac{35d}{384} + \frac{21f}{32}\right)x^3 + \left(\frac{5e}{9} + \frac{25g}{18}\right)x^2 + \left(\frac{43d}{864} - \frac{65f}{216}\right)x - \frac{25e}{108} - \frac{19g}{27}}{x^8 - 10x^6 + 33x^4 - 40x^2 + 16} - \ln(x-1) \left(\frac{13d}{1296} - \frac{e}{81} + \frac{25f}{1296} + \frac{5g}{162}\right) + \ln(x+1) \left(\frac{13d}{1296} - \frac{e}{81} + \frac{25f}{1296} - \frac{5g}{162}\right) + \ln(x-2) \left(\frac{313d}{41472} + \frac{e}{81} + \frac{205f}{10368} - \frac{5g}{162}\right) - \ln(x+2) \left(\frac{313d}{41472} - \frac{e}{81} + \frac{205f}{10368} - \frac{5g}{162}\right)$$

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]  $(x^3*((35*d)/384 + (21*f)/32) - (19*g)/27 - x^5*((13*d)/192 + (5*f)/16) - (25*e)/108 + x^7*((35*d)/3456 + (35*f)/864) + x^2*((5*e)/9 + (25*g)/18) - x^4*((5*e)/18 + (25*g)/36) + x^6*(e/27 + (5*g)/54) + x*((43*d)/864 - (65*f)/216))/(33*x^4 - 40*x^2 - 10*x^6 + x^8 + 16) - \log(x - 1)*((13*d)/1296 + e/81 + (25*f)/1296 + (5*g)/162) + \log(x + 1)*((13*d)/1296 - e/81 + (25*f)/1296 - (5*g)/162) + \log(x - 2)*((313*d)/41472 + e/81 + (205*f)/10368 + (5*g)/162) - \log(x + 2)*((313*d)/41472 - e/81 + (205*f)/10368 - (5*g)/162)$

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] 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

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(-(x^2(5d+8f+20h))+17d+20f+32h) \tanh^{-1}\left(\frac{x}{2}\right)}{144(x^4-5x^2+4)^2}$$

**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}

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-5d+8f+20h)+17d+20f+32h) \tanh^{-1}\left(\frac{x}{2}\right)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)(313d+820f+1936h)}{20736} + \frac{1}{648} \frac{\tanh^{-1}(x)(13d+25f+61h)}{\tanh^{-1}(x)} - \frac{(5-2x^2)(2e+5g)}{108(x^4-5x^2+4)} + \frac{x^2(-2e+5g)+5e+8g}{36(x^4-5x^2+4)^2} - \frac{1}{162}(2e+5g)\log(1-x^2) + \frac{1}{162}(2e+5g)\log(4-x^2)$$

Antiderivative was successfully verified.

[In] Int[(d + e\*x + f\*x^2 + g\*x^3 + 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)^(-1), x_Symbol] := With[{q = Rt[b^2
- 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
Int[1/Simp[b/2 + q/2 + c*x, x], x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] := Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

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

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

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

Rule 1673

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

&& !PolyQ[Pq, x^2]

### Rule 1678

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :> With[{d =
  Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3 + hx^4}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^3} dx \\ &= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 32h + 5(5d + 8f + 20h)x^2}{(4 - 5x^2 + x^4)^3} dx \\ &= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{x(59d + 102f + 164h - (59d + 102f + 164h)x^2)}{108(4 - 5x^2 + x^4)^3} \\ &= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)x^3}{108(4 - 5x^2 + x^4)^3} \\ &= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)x^3}{108(4 - 5x^2 + x^4)^3} \\ &= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)x^3}{108(4 - 5x^2 + x^4)^3} \end{aligned}$$

**Mathematica [A]** time = 0.12, size = 231, normalized size = 1.03

$$\frac{-5d^2 + 17d^2x - 8e^2 + 20e - 8f^2 + 20f - 20gx^2 + 32g - 20hx^3 + 32hx^4}{144(4 - 5x^2 + x^4)^3} + \frac{35d^2x - 99dx + 128e^2 - 320x + 140fx^3 - 380fx + 320gx^2 - 800g + 320hx^3 - 848hx}{3456(4 - 5x^2 + x^4)^2} + \frac{\log(1 - x)(-13d - 16e - 25f - 40g - 61h)}{1296} + \frac{\log(2 - x)(313d + 512e + 820f + 1280g + 1936h)}{41472} + \frac{\log(x + 1)(13d - 16e + 25f - 40g + 61h)}{1296} + \frac{\log(x + 2)(-313d + 512e + 820f + 1280g - 1936h)}{41472}$$

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\*(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 + 33\*(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(x + 2) + 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 + 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 + 976\*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 + 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(x - 2) - 9600\*e - 29184\*g)/(x^8 - 10\*x^6 + 33\*x^4 - 40\*x^2 + 16)

**giac [A]** time = 0.33, size = 224, normalized size = 1.00

$$\frac{1}{4172} (313d + 820f - 1280g + 1936h - 512e) \log(x+2) + \frac{1}{1296} (13d + 25f - 40g + 61h - 16e) \log(x+1) + \frac{1}{1296} (13d + 25f + 40g + 61h - 16e) \log(x-1) + \frac{1}{4172} (313d + 820f + 1280g + 1936h + 512e) \log(x-2) + \frac{35d^7 + 140d^6f + 320d^5f^2 + 320d^4f^3 + 128d^3f^4 - 2448d^2f^5 - 2400d^2f^6 - 960d^2f^7 + 3540d^2f^8 + 5040d^3f^9 + 4800d^3f^{10} + 1920d^3f^{11} + 1728d^3f^{12} - 2624d^4f^{13} - 800d^4f^{14}}{3456(x^2 - 5x^2 + 4)^7}$$

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

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

$$\frac{1}{4172} (313d - 92e + 820f - 1280g + 1936h) \log(x+2) + \frac{1}{1296} (13d - 16e + 25f - 40g + 61h) \log(x+1) + \frac{1}{1296} (13d + 16e + 25f + 40g + 61h) \log(x-1) + \frac{1}{4172} (313d + 92e + 820f + 1280g + 1936h) \log(x-2) + \frac{3(7d + 28f + 64g)^2 + 64(2e + 5g)^2 - 18(13d + 60f + 136h)^2 - 480(2e + 5g)^4 + 63(5d + 36f + 80g)^2 + 960(2e + 5g)^2 + 4(43d - 260f - 656h) - 800e - 2432g}{3456(x^2 - 5x^2 + 4)^7}$$

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")



$$3.46 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(4-5x^2+x^4)^3} dx$$

**Optimal.** Leaf size=239

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(-(x^2(5d+8f+20h))+17d+20f+32h) \tanh^{-1}\left(\frac{x}{2}\right)}{144(x^4-5x^2+4)^2}$$

**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}

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-5d+8f+20h)+17d+20f+32h) \tanh^{-1}\left(\frac{x}{2}\right)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)(313d+820f+1936h)}{20736} + \frac{1}{648} \tanh^{-1}(x)(13d+25f+61h) - \frac{(5-2x^2)(2e+5g+11i)}{108(x^4-5x^2+4)} + \frac{x^2(-2e+5g+17i)+5e+8g+20i}{36(x^4-5x^2+4)^2} - \frac{1}{162} \log(1-x^2)(2e+5g+11i) + \frac{1}{162} \log(4-x^2)(2e+5g+11i)$$

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] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

### Rule 616

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

### Rule 1166

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

### Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/((2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x]] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

### Rule 1660

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

### Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
```

```
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

### Rule 1673

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

### Rule 1678

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

### Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 46x^5}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2 + 46x^4)}{(4 - 5x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 32h - (5d + 8f + 20h)x^2}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2}
\end{aligned}$$

**Mathematica [A]** time = 0.13, size = 261, normalized size = 1.09

$$\frac{-5d^2 + 17d + 8e^2 + 20e - 8f(e^2 + 20f) + 20g(e^2 + 32g) + 32h(e^2 + 68h) + 80i}{144(4 - 5x^2 + x^4)} + \frac{35d^2 - 96d + 126e^2 - 320e + 140f(e^2 + 320g) - 800g + 320h^2 - 848h + 704i^2 - 1760i}{3456(4 - 5x^2 + x^4)} + \frac{\log(1 - (13M - 16e - 25f - 40g - 61h - 88i))}{1296} + \frac{\log(2 - (313M + 512e + 820f + 1280g + 1936h + 2816i))}{41472} + \frac{\log(1 + 101M - 16e + 25f - 40g + 61h - 88i)}{1296} + \frac{\log(1 + 21(-313M + 512e + 820f + 1280g + 1936h + 2816i))}{41472}$$

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])/41472 + ((13\*d - 16\*e + 25\*f - 40\*g + 61\*h - 88\*i)\*Log[1 + x])/1296 + ((-313\*d + 512\*e - 820\*f + 1280\*g - 1936\*h + 2816\*i)\*Log[2 + x])/41472

**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





```
[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

$\ln(x+1) \left( \frac{13d}{1296} - \frac{e}{81} + \frac{25f}{1296} - \frac{5g}{162} + \frac{61h}{1296} - \frac{11i}{162} \right) - \ln(x-1) \left( \frac{13d}{1296} + \frac{e}{81} + \frac{25f}{1296} + \frac{5g}{162} + \frac{61h}{1296} + \frac{11i}{162} \right) - \frac{\left( \frac{313d}{41472} - \frac{512e}{41472} + \frac{820f}{41472} - \frac{1280g}{41472} + \frac{1936h}{41472} - \frac{2816i}{41472} \right) \ln(x-2) + \frac{\left( \frac{313d}{41472} + \frac{512e}{41472} + \frac{820f}{41472} + \frac{1280g}{41472} + \frac{1936h}{41472} + \frac{2816i}{41472} \right) \ln(x+2)}{x^8 - 10x^6 + 33x^4 - 40x^2 + 16}$

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 - (1
1*i)/162) - log(x - 1)*((13*d)/1296 + e/81 + (25*f)/1296 + (5*g)/162 + (61*
h)/1296 + (11*i)/162) - ((25*e)/108 + (19*g)/27 + (40*i)/27 + x*((65*f)/216
- (43*d)/864 + (41*h)/54) + x^5*((13*d)/192 + (5*f)/16 + (17*h)/24) - x^3*
((35*d)/384 + (21*f)/32 + (35*h)/24) - x^7*((35*d)/3456 + (35*f)/864 + (5*h
)/54) - x^2*((5*e)/9 + (25*g)/18 + (26*i)/9) - x^6*(e/27 + (5*g)/54 + (11*i
)/54) + x^4*((5*e)/18 + (25*g)/36 + (55*i)/36))/(33*x^4 - 40*x^2 - 10*x^6 +
x^8 + 16) + log(x - 2)*((313*d)/41472 + e/81 + (205*f)/10368 + (5*g)/162 +
(121*h)/2592 + (11*i)/162) - log(x + 2)*((313*d)/41472 - e/81 + (205*f)/10
368 - (5*g)/162 + (121*h)/2592 - (11*i)/162)
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

$$3.47 \quad \int \frac{d+ex}{(1+x^2+x^4)^3} dx$$

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[(d + e*x^2)*(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] && IntegerQ[p]
```

- 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

$$\begin{aligned}
 \int \frac{d + ex}{(1 + x^2 + x^4)^3} dx &= \int \frac{d}{(1 + x^2 + x^4)^3} dx + \int \frac{ex}{(1 + x^2 + x^4)^3} dx \\
 &= d \int \frac{1}{(1 + x^2 + x^4)^3} dx + e \int \frac{x}{(1 + x^2 + x^4)^3} dx \\
 &= \frac{dx(1 - x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12}d \int \frac{11 - 5x^2}{(1 + x^2 + x^4)^2} dx + \frac{1}{2}e \operatorname{Subst} \left( \int \frac{1}{(1 + x + x^2)^3} dx, x, x^2 \right) \\
 &= \frac{dx(1 - x^2)}{12(1 + x^2 + x^4)^2} + \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{dx(2 - 7x^2)}{24(1 + x^2 + x^4)} + \frac{1}{72}d \int \frac{60 - 21x^2}{1 + x^2 + x^4} dx + \frac{1}{2}e \\
 &= \frac{dx(1 - x^2)}{12(1 + x^2 + x^4)^2} + \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{dx(2 - 7x^2)}{24(1 + x^2 + x^4)} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{1}{144}d \int \frac{1}{1 + x^2 + x^4} dx \\
 &= \frac{dx(1 - x^2)}{12(1 + x^2 + x^4)^2} + \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{dx(2 - 7x^2)}{24(1 + x^2 + x^4)} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{1}{96}(13d) \int \frac{1}{1 + x^2 + x^4} dx \\
 &= \frac{dx(1 - x^2)}{12(1 + x^2 + x^4)^2} + \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{dx(2 - 7x^2)}{24(1 + x^2 + x^4)} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{2e \tan^{-1} \left( \frac{x^2 + 1}{\sqrt{3}x} \right)}{3\sqrt{3}} \\
 &= \frac{dx(1 - x^2)}{12(1 + x^2 + x^4)^2} + \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{dx(2 - 7x^2)}{24(1 + x^2 + x^4)} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} - \frac{13d \tan^{-1} \left( \frac{x^2 + 1}{\sqrt{3}x} \right)}{48\sqrt{3}}
 \end{aligned}$$

**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

$$\frac{84d^2 - 96e^2 + 60d^2 - 144e^2 + 84d^2 - 192e^2 - 2\sqrt{3}(13d - 32e) + 2(13d - 32e)^2 + 3(13d - 32e)^2 + 2(13d - 32e)^2 + 13d - 32e}{288(x^2 + 2x + 1)^2} \arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) - 2\sqrt{3}(13d + 32e) + 2(13d + 32e)^2 + 3(13d + 32e)^2 + 2(13d + 32e)^2 + 13d + 32e}{288(x^2 - 2x + 1)^2} \arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) - 48d - 81(d^2 + 2d^2 + 3d^2 + 2d^2 + d)\log(x^2 + x + 1) + 81(d^2 + 2d^2 + 3d^2 + 2d^2 + d)\log(x^2 - x + 1) - 72e$$

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]  $\frac{1}{144}\sqrt{3}*(13*d - 32*e)*\arctan(1/3*\sqrt{3}*(2*x + 1)) + \frac{1}{144}\sqrt{3}*(13*d + 32*e)*\arctan(1/3*\sqrt{3}*(2*x - 1)) + \frac{9}{32}d*\log(x^2 + x + 1) - \frac{9}{32}d*\log(x^2 - x + 1) - \frac{1}{24}*(7*d*x^7 - 8*x^6*e + 5*d*x^5 - 12*x^4*e + 7*d*x^3 - 16*x^2*e - 4*d*x - 6*e)/(x^4 + x^2 + 1)^2$

**maple [A]** time = 0.02, size = 180, normalized size = 0.97

$$\frac{13\sqrt{3}d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144} + \frac{13\sqrt{3}d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144} - \frac{9d \ln(x^2-x+1)}{32} + \frac{9d \ln(x^2+x+1)}{32} - \frac{2\sqrt{3}e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9} + \frac{2\sqrt{3}e \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9} + \frac{-6dx^2 + \left(-\frac{7d}{3} - \frac{4e}{3}\right)x^3 - 4d + 2e + \left(-\frac{20d}{3} + \frac{5e}{3}\right)x}{16(x^2+x+1)^2} - \frac{-6dx^2 + \left(\frac{7d}{3} - \frac{4e}{3}\right)x^3 - 4d - 2e + \left(\frac{20d}{3} + \frac{5e}{3}\right)x}{16(x^2-x+1)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e\*x+d)/(x^4+x^2+1)^3,x)

[Out]  $\frac{1}{16}*((-7/3*d-4/3*e)*x^3-6*d*x^2+(-20/3*d+1/3*e)*x-4*d+2*e)/(x^2+x+1)^2+9/32*d*\ln(x^2+x+1)+13/144*3^{(1/2)}*d*\arctan(1/3*(2*x+1)*3^{(1/2)})-2/9*3^{(1/2)}*e*\arctan(1/3*(2*x+1)*3^{(1/2)})-1/16*((7/3*d-4/3*e)*x^3-6*d*x^2+(20/3*d+1/3*e)*x-4*d-2*e)/(x^2-x+1)^2-9/32*d*\ln(x^2-x+1)+13/144*3^{(1/2)}*d*\arctan(1/3*(2*x-1)*3^{(1/2)})+2/9*3^{(1/2)}*e*\arctan(1/3*(2*x-1)*3^{(1/2)})$

**maxima [A]** time = 2.55, size = 137, normalized size = 0.74

$$\frac{1}{144}\sqrt{3}(13d-32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{9}{32}d\log(x^2+x+1) - \frac{9}{32}d\log(x^2-x+1) - \frac{7dx^7-8ex^6+5dx^5-12ex^4+7dx^3-16ex^2-4dx-6e}{24(x^6+2x^6+3x^4+2x^2+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e\*x+d)/(x^4+x^2+1)^3,x, algorithm="maxima")

[Out]  $\frac{1}{144}\sqrt{3}*(13*d - 32*e)*\arctan(1/3*\sqrt{3}*(2*x + 1)) + \frac{1}{144}\sqrt{3}*(13*d + 32*e)*\arctan(1/3*\sqrt{3}*(2*x - 1)) + \frac{9}{32}d*\log(x^2 + x + 1) - \frac{9}{32}d*\log(x^2 - x + 1) - \frac{1}{24}*(7*d*x^7 - 8*e*x^6 + 5*d*x^5 - 12*e*x^4 + 7*d*x^3 - 16*e*x^2 - 4*d*x - 6*e)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)$

**mupad [B]** time = 0.26, size = 185, normalized size = 1.00

$$\frac{\frac{7d^2}{24} + \frac{e^6}{3} - \frac{5d^2e^3}{24} + \frac{e^4}{2} - \frac{7d^2e^3}{24} + \frac{2ex^2}{3} + \frac{dx}{6} + \frac{c}{4}}{x^8 + 2x^6 + 3x^4 + 2x^2 + 1} - \ln\left(x - \frac{1}{2} - \frac{\sqrt{3}11}{2}\right)\left(\frac{9d}{32} + \frac{\sqrt{3}d13i}{288} + \frac{\sqrt{3}e11}{9}\right) + \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}11}{2}\right)\left(\frac{9d}{32} - \frac{\sqrt{3}d13i}{288} + \frac{\sqrt{3}e11}{9}\right) + \ln\left(x - \frac{1}{2} + \frac{\sqrt{3}11}{2}\right)\left(-\frac{9d}{32} + \frac{\sqrt{3}d13i}{288} + \frac{\sqrt{3}e11}{9}\right) + \ln\left(x + \frac{1}{2} + \frac{\sqrt{3}11}{2}\right)\left(-\frac{9d}{32} - \frac{\sqrt{3}d13i}{288} - \frac{\sqrt{3}e11}{9}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e\*x)/(x^2 + x^4 + 1)^3,x)

[Out]  $(e/4 + (d*x)/6 - (7*d*x^3)/24 - (5*d*x^5)/24 - (7*d*x^7)/24 + (2*e*x^2)/3 + (e*x^4)/2 + (e*x^6)/3)/(2*x^2 + 3*x^4 + 2*x^6 + x^8 + 1) - \log(x - (3^{(1/2)})*1i)/2 - 1/2)*((9*d)/32 + (3^{(1/2)}*d*13i)/288 + (3^{(1/2)}*e*1i)/9) + \log(x$

$$\begin{aligned}
& - (3^{(1/2)}*1i)/2 + 1/2)*((9*d)/32 - (3^{(1/2)}*d*13i)/288 + (3^{(1/2)}*e*1i)/9) \\
& + \log(x + (3^{(1/2)}*1i)/2 - 1/2)*((3^{(1/2)}*d*13i)/288 - (9*d)/32 + (3^{(1/2)} \\
& *e*1i)/9) + \log(x + (3^{(1/2)}*1i)/2 + 1/2)*((9*d)/32 + (3^{(1/2)}*d*13i)/288 - \\
& (3^{(1/2)}*e*1i)/9)
\end{aligned}$$

**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 - 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)) + (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$



$$+ 48x^{**2} + 24)$$

$$3.48 \quad \int \frac{d+ex+fx^2}{(1+x^2+x^4)^3} dx$$

Optimal. Leaf size=223

$$-\frac{1}{32}(9d-4f) \log(x^2-x+1) + \frac{1}{32}(9d-4f) \log(x^2+x+1) + \frac{x(-7x^2(d-f)+2d+3f)}{24(x^4+x^2+1)} + \frac{x(-(x^2(d-2f))+d+)}{12(x^4+x^2+1)^2}$$

**Rubi [A]** time = 0.21, antiderivative size = 223, normalized size of antiderivative = 1.00, number of steps used = 18, number of rules used = 10, integrand size = 21,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.476$ , Rules used = {1673, 1178, 1169, 634, 618, 204, 628, 12, 1107, 614}

$$\frac{x(-7x^2(d-f)+2d+3f)}{24(x^4+x^2+1)} + \frac{x(x^2(-(d-2f))+d+f)}{12(x^4+x^2+1)^2} - \frac{1}{32}(9d-4f) \log(x^2-x+1) + \frac{1}{32}(9d-4f) \log(x^2+x+1) - \frac{(13d+2f) \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{(13d+2f) \tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{e(2x^2+1)}{6(x^4+x^2+1)} + \frac{e(2x^2+1)}{12(x^4+x^2+1)^2} + \frac{2e \tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

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[(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_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

$$\begin{aligned}
 \int \frac{d + ex + fx^2}{(1 + x^2 + x^4)^3} dx &= \int \frac{ex}{(1 + x^2 + x^4)^3} dx + \int \frac{d + fx^2}{(1 + x^2 + x^4)^3} dx \\
 &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f - 5(d - 2f)x^2}{(1 + x^2 + x^4)^2} dx + e \int \frac{x}{(1 + x^2 + x^4)^3} dx \\
 &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} + \frac{1}{72} \int \frac{15(4d - f) - 21(d - f)x^2}{1 + x^2 + x^4} dx \\
 &= \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} + \frac{1}{144} \int \frac{15(4d - f) - 21(d - f)x^2}{1 + x^2 + x^4} dx \\
 &= \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
 &= \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
 &= \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)}
 \end{aligned}$$

**Mathematica [C]** time = 0.59, size = 235, normalized size = 1.05

$$\frac{1}{144} \left( \frac{12(x(-dx^2 + d + 2fx^2 + f) + 2ex^2 + e)}{(x^4 + x^2 + 1)^2} + \frac{6(-7dx^3 + 2dx + e(8x^2 + 4) + 7fx^3 + 3fx)}{x^4 + x^2 + 1} - \frac{((7\sqrt{3} - 47i)d + (-7\sqrt{3} + 17i)f) \tan^{-1}\left(\frac{1}{2}(\sqrt{3} - i)x\right)}{\sqrt{\frac{1}{2}(1 + i\sqrt{3})}} - \frac{((7\sqrt{3} + 47i)d - (7\sqrt{3} + 17i)f) \tan^{-1}\left(\frac{1}{2}(\sqrt{3} + i)x\right)}{\sqrt{\frac{1}{2}(1 - i\sqrt{3})}} - 32\sqrt{3}e \tan^{-1}\left(\frac{\sqrt{3}}{2x^2 + 1}\right) \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e\*x + 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[3])

$t[(1 + I\sqrt{3})/6] - (((47*I + 7*\sqrt{3})*d - (17*I + 7*\sqrt{3})*f)*\text{ArcTan}(((I + \sqrt{3})*x)/2))/\sqrt{(1 - I*\sqrt{3})/6} - 32*\sqrt{3}*e*\text{ArcTan}[\sqrt{3}/(1 + 2*x^2)]/144$

**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

$\frac{1}{144} \sqrt{3} (13d + 2f - 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 2f + 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{32} (9d - 4f) \log(x^2 + x + 1) - \frac{1}{32} (9d - 4f) \log(x^2 - x + 1) - \frac{7dx^7 - 7fx^7 - 8x^6e + 5dx^5 - 10fx^5 - 12x^4e + 7dx^3 - 14fx^3 - 16x^2e - 4dx - 5fx - 6e}{24(x^4 + x^2 + 1)^2}$

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="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

$$\frac{13\sqrt{3}d \arctan\left(\frac{2x-1}{\sqrt{3}}\right)}{144} - \frac{13\sqrt{3}d \arctan\left(\frac{2x+1}{\sqrt{3}}\right)}{144} + \frac{9e \ln(x^2-x+1)}{32} + \frac{9e \ln(x^2+x+1)}{32} - \frac{2\sqrt{3}e \arctan\left(\frac{2x-1}{\sqrt{3}}\right)}{9} + \frac{2\sqrt{3}e \arctan\left(\frac{2x+1}{\sqrt{3}}\right)}{9} + \frac{\sqrt{3}f \arctan\left(\frac{2x-1}{\sqrt{3}}\right)}{72} + \frac{\sqrt{3}f \arctan\left(\frac{2x+1}{\sqrt{3}}\right)}{72} + \frac{f \ln(x^2-x+1)}{8} + \frac{f \ln(x^2+x+1)}{8} + \frac{\left(\frac{2}{3} - \frac{e}{f} + \frac{2d}{f}\right)x^4 + (-6d+4f)x^3 - 4d+2e + \left(\frac{2e}{f} + \frac{2d}{f}\right)x + \left(\frac{2e}{f} - \frac{2}{3} - \frac{2d}{f}\right)}{16(x^2-x+1)^2} + \frac{\left(\frac{2}{3} - \frac{e}{f} + \frac{2d}{f}\right)x^4 + (-6d+4f)x^3 - 4d-2e + \left(\frac{2e}{f} + \frac{2d}{f}\right)x + \left(\frac{2e}{f} - \frac{2}{3} - \frac{2d}{f}\right)}{16(x^2+x+1)^2}$$

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))+1/72\*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

$$\frac{1}{144}\sqrt{3}(13d-32e+2f)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(13d+32e+2f)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{32}(9d-4f)\log(x^2+x+1) - \frac{1}{32}(9d-4f)\log(x^2-x+1) - \frac{7(d-f)x^7-8ex^6+5(d-2f)x^5-12ex^4+7(d-2f)x^3-16ex^2-(4d+5f)x-6e}{24(x^2+x+1)^2+24(x^2-x+1)^2}$$

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^8 + 2\*x^6 + 3\*x^4 + 2\*x^2 + 1)

**mupad [B]** time = 1.01, size = 249, normalized size = 1.12

$$\frac{\left(\frac{2}{3} - \frac{e}{f} + \frac{2d}{f}\right)x^4 + (-6d+4f)x^3 - 4d+2e + \left(\frac{2e}{f} + \frac{2d}{f}\right)x + \left(\frac{2e}{f} - \frac{2}{3} - \frac{2d}{f}\right)}{x^2+2x^2+3x^2+2x^2+1} - \ln\left(x + \frac{1}{2} + \frac{\sqrt{3}i}{2}\right)\left(\frac{9d}{32} - \frac{f}{8} + \frac{\sqrt{3}d13i}{288} + \frac{\sqrt{3}e11}{9} + \frac{\sqrt{3}f11}{144}\right) - \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}i}{2}\right)\left(\frac{9d}{32} - \frac{f}{8} + \frac{\sqrt{3}d13i}{288} - \frac{\sqrt{3}e11}{9} + \frac{\sqrt{3}f11}{144}\right) + \ln\left(x - \frac{1}{2} + \frac{\sqrt{3}i}{2}\right)\left(\frac{9d}{32} - \frac{f}{8} + \frac{\sqrt{3}d13i}{288} + \frac{\sqrt{3}e11}{9} + \frac{\sqrt{3}f11}{144}\right) + \ln\left(x - \frac{1}{2} - \frac{\sqrt{3}i}{2}\right)\left(\frac{9d}{32} - \frac{f}{8} + \frac{\sqrt{3}d13i}{288} - \frac{\sqrt{3}e11}{9} + \frac{\sqrt{3}f11}{144}\right)$$

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 +

$(3^{(1/2)*i})/2 + 1/2)*((9*d)/32 - f/8 + (3^{(1/2)*d*13i})/288 - (3^{(1/2)*e*1i})/9 + (3^{(1/2)*f*1i})/144)$

**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*($

$$\begin{aligned}
& 13*d + 32*e + 2*f)/288) - 431308800*d**3*e**3 - 3143688192*d**3*e**2*(-9*d/ \\
& 32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288) - 1598857120*d**3*e*f**2 + 99 \\
& 17005824*d**3*e*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**2 - 94 \\
& 4300160*d**3*f**2*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288) + 118 \\
& 78244352*d**3*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**3 + 2331 \\
& 64800*d**2*e**3*f + 4409634816*d**2*e**2*f*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d \\
& + 32*e + 2*f)/288) + 662937520*d**2*e*f**3 - 13004623872*d**2*e*f*(-9*d/32 \\
& + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**2 + 231796080*d**2*f**3*(-9*d/ \\
& 32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288) - 10089639936*d**2*f*(-9*d/32 \\
& + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**3 + 142606336*d*e**5 + 7549747 \\
& 20*d*e**4*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288) - 1843200*d*e \\
& **3*f**2 + 3850371072*d*e**3*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f) \\
& /288)**2 - 1926291456*d*e**2*f**2*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + \\
& 2*f)/288) + 20384317440*d*e**2*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2 \\
& *f)/288)**3 - 146756960*d*e*f**4 + 5813379072*d*e*f**2*(-9*d/32 + f/8 + \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 - 9 \\
& 44300160*d**3*f**2*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288) + 118 \\
& 78244352*d**3*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**3 + 23316 \\
& 4800*d**2*e**3*f + 4409634816*d**2*e**2*f*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - \\
& 32*e + 2*f)/288) + 662937520*d**2*e*f**3 - 13004623872*d**2*e*f*(9*d/32 - \\
& f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**2 + 231796080*d**2*f**3*(9*d/32 - \\
& f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288) - 10089639936*d**2*f*(9*d/32 - f/ \\
& 8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**3 + 142606336*d*e**5 + 754974720*d* \\
& e**4*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288) - 1843200*d*e**3*f* \\
& *2 + 3850371072*d*e**3*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)** \\
& 2 - 1926291456*d*e**2*f**2*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/28
\end{aligned}$$



$$\begin{aligned}
& 8) + 20384317440*d*e**2*(9*d/32 - f/8 - \sqrt{3})*I*(13*d - 32*e + 2*f)/288)* \\
& *3 - 146756960*d*e*f**4 + 5813379072*d*e*f**2*(9*d/32 - f/8 - \sqrt{3})*I*(13 \\
& *d - 32*e + 2*f)/288)**2 + 12679200*d*f**4*(9*d/32 - f/8 - \sqrt{3})*I*(13*d \\
& - 32*e + 2*f)/288) + 1116758016*d*f**2*(9*d/32 - f/8 - \sqrt{3})*I*(13*d - 32 \\
& *e + 2*f)/288)**3 - 79691776*e**5*f - 188743680*e**4*f*(9*d/32 - f/8 - \sqrt{ \\
& 3})*I*(13*d - 32*e + 2*f)/288) - 7372800*e**3*f**3 - 2151677952*e**3*f*(9*d \\
& /32 - f/8 - \sqrt{3})*I*(13*d - 32*e + 2*f)/288)**2 + 287096832*e**2*f**3*(9* \\
& d/32 - f/8 - \sqrt{3})*I*(13*d - 32*e + 2*f)/288) - 5096079360*e**2*f*(9*d/32 \\
& - f/8 - \sqrt{3})*I*(13*d - 32*e + 2*f)/288)**3 + 14093632*e*f**5 - 85952102 \\
& 4*e*f**3*(9*d/32 - f/8 - \sqrt{3})*I*(13*d - 32*e + 2*f)/288)**2 - 7648128*f* \\
& *5*(9*d/32 - f/8 - \sqrt{3})*I*(13*d - 32*e + 2*f)/288) + 453869568*f**3*(9*d \\
& /32 - f/8 - \sqrt{3})*I*(13*d - 32*e + 2*f)/288)**3)/(217696167*d**6 - 301346 \\
& 487*d**5*f - 1217128448*d**4*e**2 + 130506255*d**4*f**2 + 2181281792*d**3*e \\
& **2*f - 5619240*d**3*f**3 - 617611264*d**2*e**4 - 1450149888*d**2*e**2*f**2 \\
& - 8036820*d**2*f**4 + 495976448*d*e**4*f + 430088192*d*e**2*f**3 + 783648* \\
& d*f**5 - 114294784*e**4*f**2 - 47771648*e**2*f**4 + 188352*f**6)) + (9*d/32 \\
& - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288)*\log(x + (-1025428432*d**5*e - 3 \\
& 34752912*d**5*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288) + 20089613 \\
& 60*d**4*e*f + 1151575920*d**4*f*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2* \\
& f)/288) - 431308800*d**3*e**3 - 3143688192*d**3*e**2*(9*d/32 - f/8 + \sqrt{3} \\
& )*I*(13*d - 32*e + 2*f)/288) - 1598857120*d**3*e*f**2 + 9917005824*d**3*e*( \\
& 9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288)**2 - 944300160*d**3*f**2* \\
& (9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288) + 11878244352*d**3*(9*d/ \\
& 32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288)**3 + 233164800*d**2*e**3*f + \\
& 4409634816*d**2*e**2*f*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288) + \\
& 662937520*d**2*e*f**3 - 13004623872*d**2*e*f*(9*d/32 - f/8 + \sqrt{3})*I*(13 \\
& *d - 32*e + 2*f)/288)**2 + 231796080*d**2*f**3*(9*d/32 - f/8 + \sqrt{3})*I*(1 \\
& 3*d - 32*e + 2*f)/288) - 10089639936*d**2*f*(9*d/32 - f/8 + \sqrt{3})*I*(13*d \\
& - 32*e + 2*f)/288)**3 + 142606336*d*e**5 + 754974720*d*e**4*(9*d/32 - f/8 \\
& + \sqrt{3})*I*(13*d - 32*e + 2*f)/288) - 1843200*d*e**3*f**2 + 3850371072*d*e \\
& **3*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288)**2 - 1926291456*d*e* \\
& *2*f**2*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288) + 20384317440*d* \\
& e**2*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288)**3 - 146756960*d*e* \\
& f**4 + 5813379072*d*e*f**2*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/28 \\
& 8)**2 + 12679200*d*f**4*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288) \\
& + 1116758016*d*f**2*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288)**3 - \\
& 79691776*e**5*f - 188743680*e**4*f*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e \\
& + 2*f)/288) - 7372800*e**3*f**3 - 2151677952*e**3*f*(9*d/32 - f/8 + \sqrt{3}) \\
& *I*(13*d - 32*e + 2*f)/288)**2 + 287096832*e**2*f**3*(9*d/32 - f/8 + \sqrt{3} \\
& )*I*(13*d - 32*e + 2*f)/288) - 5096079360*e**2*f*(9*d/32 - f/8 + \sqrt{3})*I* \\
& (13*d - 32*e + 2*f)/288)**3 + 14093632*e*f**5 - 859521024*e*f**3*(9*d/32 - \\
& f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288)**2 - 7648128*f**5*(9*d/32 - f/8 + \\
& \sqrt{3})*I*(13*d - 32*e + 2*f)/288) + 453869568*f**3*(9*d/32 - f/8 + \sqrt{3}) \\
& *I*(13*d - 32*e + 2*f)/288)**3)/(217696167*d**6 - 301346487*d**5*f - 121712 \\
& 8448*d**4*e**2 + 130506255*d**4*f**2 + 2181281792*d**3*e**2*f - 5619240*d**
\end{aligned}$$

$$\begin{aligned} & 3f^3 - 617611264d^2e^4 - 1450149888d^2e^2f^2 - 8036820d^2f^4 \\ & + 495976448de^4f + 430088192de^2f^3 + 783648df^5 - 114294784 \\ & e^4f^2 - 47771648e^2f^4 + 188352f^6) + (8ex^6 + 12ex^4 + 16 \\ & ex^2 + 6e + x^7(-7d + 7f) + x^5(-5d + 10f) + x^3(-7d + 14f) \\ & + x(4d + 5f))/(24x^8 + 48x^6 + 72x^4 + 48x^2 + 24) \end{aligned}$$

$$3.49 \quad \int \frac{d+ex+fx^2+gx^3}{(1+x^2+x^4)^3} dx$$

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,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.385$ , Rules used = {1673, 1178, 1169, 634, 618, 204, 628, 1247, 638, 614}

$$\frac{x(-7x^2(d-f)+2d+3f)}{24(x^4+x^2+1)} + \frac{x(x^2-(d-2f))+d+f}{12(x^4+x^2+1)^2} - \frac{1}{32}(9d-4f)\log(x^2-x+1) + \frac{1}{32}(9d-4f)\log(x^2+x+1) - \frac{(13d+2f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{(13d+2f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{(2x^2+1)(2e-g)}{12(x^4+x^2+1)} + \frac{x^2(2e-g)+e-2g}{12(x^4+x^2+1)^2} + \frac{(2e-g)\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

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

$x] \&\& \text{NeQ}[b^2 - 4*a*c, 0]$

### Rule 628

$\text{Int}[\frac{(d_.) + (e_.)*(x_.)}{(a_.) + (b_.)*(x_.) + (c_.)*(x_.)^2}, x\_Symbol] \rightarrow \text{Simp}[(d*\text{Log}[\text{RemoveContent}[a + b*x + c*x^2, x]])/b, x] /; \text{FreeQ}[\{a, b, c, d, e\}, x] \&\& \text{EqQ}[2*c*d - b*e, 0]$

### Rule 634

$\text{Int}[\frac{(d_.) + (e_.)*(x_.)}{(a_.) + (b_.)*(x_.) + (c_.)*(x_.)^2}, x\_Symbol] \rightarrow \text{Dist}[(2*c*d - b*e)/(2*c), \text{Int}[1/(a + b*x + c*x^2), x], x] + \text{Dist}[e/(2*c), \text{Int}[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; \text{FreeQ}[\{a, b, c, d, e\}, x] \&\& \text{NeQ}[2*c*d - b*e, 0] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{!NiceSqrtQ}[b^2 - 4*a*c]$

### Rule 638

$\text{Int}[\frac{(d_.) + (e_.)*(x_.)}{(a_.) + (b_.)*(x_.) + (c_.)*(x_.)^2}^{(p_.)}, x\_Symbol] \rightarrow \text{Simp}[\frac{(b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^{(p+1)}}{(p+1)*(b^2 - 4*a*c)}, x] - \text{Dist}[\frac{(2*p+3)*(2*c*d - b*e)}{(p+1)*(b^2 - 4*a*c)}, \text{Int}[(a + b*x + c*x^2)^{(p+1)}, x], x] /; \text{FreeQ}[\{a, b, c, d, e\}, x] \&\& \text{NeQ}[2*c*d - b*e, 0] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1] \&\& \text{NeQ}[p, -3/2]$

### Rule 1169

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

### Rule 1178

$\text{Int}[\frac{(d_.) + (e_.)*(x_.)^2}{(a_.) + (b_.)*(x_.)^2 + (c_.)*(x_.)^4}^{(p_.)}, x\_Symbol] \rightarrow \text{Simp}[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 + c*x^4)^{(p+1)}}{2*a*(p+1)*(b^2 - 4*a*c)}, x] + \text{Dist}[1/(2*a*(p+1)*(b^2 - 4*a*c)), \text{Int}[\text{Simp}[(2*p+3)*d*b^2 - a*b*e - 2*a*c*d*(4*p+5) + (4*p+7)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^{(p+1)}, x], x] /; \text{FreeQ}[\{a, b, c, d, e\}, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{NeQ}[c*d^2 - b*d*e + a*e^2, 0] \&\& \text{LtQ}[p, -1] \&\& \text{IntegerQ}[2*p]$

### Rule 1247

$\text{Int}[(x_.) * \frac{(d_.) + (e_.)*(x_.)^2}{(a_.) + (b_.)*(x_.)^2 + (c_.)*(x_.)^4}^{(q_.)}, x\_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(d + e*x)^q*(a + b*x + c*x^2)^p, x],$

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

### Rule 1673

```
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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{(1 + x^2 + x^4)^3} dx &= \int \frac{d + fx^2}{(1 + x^2 + x^4)^3} dx + \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^3} dx \\ &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f - 5(d - 2f)x^2}{(1 + x^2 + x^4)^2} dx + \frac{1}{2} \text{Subst} \left( \int \frac{e + gx^2}{(1 + x + x^2)^3} dx \right) \\ &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} + \frac{1}{72} \int \frac{11d - f - 5(d - 2f)x^2}{(1 + x^2 + x^4)^2} dx \\ &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\ &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\ &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \end{aligned}$$

**Mathematica [C]** time = 0.66, size = 259, normalized size = 1.07

$$\frac{1}{144} \left( \frac{12(-dx^2 + d + 2fx^2 + f) + 2x^2 + e - g(x^2 + 2)}{(x^4 + x^2 + 1)^2} + \frac{6(-7dx^3 + 2dx + e(8x^2 + 4) + 7fx^3 + 3fx - 2g(2x^2 + 1))}{x^4 + x^2 + 1} - \frac{((7\sqrt{3} - 47i)d + (-7\sqrt{3} + 17i)f) \tan^{-1}\left(\frac{1}{2}(\sqrt{3} - i)x\right)}{\sqrt{\frac{1}{2}(1 + i\sqrt{3})}} - \frac{((7\sqrt{3} + 47i)d - (7\sqrt{3} + 17i)f) \tan^{-1}\left(\frac{1}{2}(\sqrt{3} + i)x\right)}{\sqrt{\frac{1}{2}(1 - i\sqrt{3})}} - 16\sqrt{3}(2e - g) \tan^{-1}\left(\frac{\sqrt{3}}{2x^2 + 1}\right) \right)$$

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

$$\frac{1}{144} \sqrt{5}(13d + 2f + 16g - 32e) \arctan\left(\frac{1}{3}\sqrt{5}(2x+1)\right) + \frac{1}{144} \sqrt{5}(13d + 2f - 16g + 32e) \arctan\left(\frac{1}{3}\sqrt{5}(2x-1)\right) + \frac{1}{32}(9d - 4f) \log(x^2 + x + 1) - \frac{1}{32}(9d - 4f) \log(x^2 - x + 1) - \frac{7dx^7 - 7fx^6 + 4gx^5 - 8x^4e + 5dx^3 - 10fx^2 + 6gx - 12x^2e + 7dx - 14fx^3 + 8gx^2 - 16x^2e - 4dx - 5fx + 6g - 6e}{24(x^4 + x^2 + 1)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g\*x^3+f\*x^2+e\*x+d)/(x^4+x^2+1)^3,x, algorithm="giac")

[Out]  $1/144*\sqrt{3}*(13*d + 2*f + 16*g - 32*e)*\arctan(1/3*\sqrt{3}*(2*x + 1)) + 1/144*\sqrt{3}*(13*d + 2*f - 16*g + 32*e)*\arctan(1/3*\sqrt{3}*(2*x - 1)) + 1/32*(9*d - 4*f)*\log(x^2 + x + 1) - 1/32*(9*d - 4*f)*\log(x^2 - x + 1) - 1/24*(7*d*x^7 - 7*f*x^7 + 4*g*x^6 - 8*x^6*e + 5*d*x^5 - 10*f*x^5 + 6*g*x^4 - 12*x^4*e + 7*d*x^3 - 14*f*x^3 + 8*g*x^2 - 16*x^2*e - 4*d*x - 5*f*x + 6*g - 6*e)/(x^4 + x^2 + 1)^2$

**maple [A]** time = 0.02, size = 322, normalized size = 1.33

$\frac{13\sqrt{3}d\arctan\left(\frac{2x+1}{3}\right) + 13\sqrt{3}d\arctan\left(\frac{2x-1}{3}\right) + 9d\ln(x^2+x+1) - 9d\ln(x^2-x+1) - 2\sqrt{3}e\arctan\left(\frac{2x+1}{3}\right) - 2\sqrt{3}e\arctan\left(\frac{2x-1}{3}\right) + \sqrt{3}f\arctan\left(\frac{2x+1}{3}\right) + \sqrt{3}f\arctan\left(\frac{2x-1}{3}\right) + \sqrt{3}g\arctan\left(\frac{2x+1}{3}\right) + \sqrt{3}g\arctan\left(\frac{2x-1}{3}\right) + \left(\frac{7}{2}d - \frac{7}{2}f\right)x^7 + (4d - 4f - 2g)x^6 - 4d^2x^5 + \frac{7}{2}d^2x^4 + \frac{7}{2}d^2x^3 - 14d^2x^2 + 2d^2x + \frac{6}{2}d^2 - \frac{6}{2}d^2}{144(x^4+x^2+1)^2}$

Verification of antiderivative is not currently implemented for this CAS.

[In]  $\text{int}((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3, x)$

[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

$\frac{1}{144}\sqrt{5}(13d-32e+2f+16g)\arctan\left(\frac{1}{3}\sqrt{5}(2x+1)\right) + \frac{1}{144}\sqrt{5}(13d+32e+2f-16g)\arctan\left(\frac{1}{3}\sqrt{5}(2x-1)\right) + \frac{1}{32}(9d-4f)\log(x^2+x+1) - \frac{1}{32}(9d-4f)\log(x^2-x+1) - \frac{7(d-f)x^7-4(2e-g)x^6+5(d-2f)x^5-6(2e-g)x^4+7(d-2f)x^3-8(2e-g)x^2-(4d+5f)x-6e+6g}{24(x^4+2x^2+1)^2}$

Verification of antiderivative is not currently implemented for this CAS.

[In]  $\text{integrate}((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3, x, \text{algorithm}="maxima")$

[Out]  $1/144*\sqrt{3}*(13*d - 32*e + 2*f + 16*g)*\arctan(1/3*\sqrt{3}*(2*x + 1)) + 1/144*\sqrt{3}*(13*d + 32*e + 2*f - 16*g)*\arctan(1/3*\sqrt{3}*(2*x - 1)) + 1/32*(9*d - 4*f)*\log(x^2 + x + 1) - 1/32*(9*d - 4*f)*\log(x^2 - x + 1) - 1/24*(7*(d - f)*x^7 - 4*(2*e - g)*x^6 + 5*(d - 2*f)*x^5 - 6*(2*e - g)*x^4 + 7*(d - 2*f)*x^3 - 8*(2*e - g)*x^2 - (4*d + 5*f)*x - 6*e + 6*g)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)$

**mupad [B]** time = 1.17, size = 295, normalized size = 1.21

$\frac{\left(\frac{7}{2}d - \frac{7}{2}f\right)x^7 + (4d - 4f - 2g)x^6 + 5(d - 2f)x^5 + \left(\frac{7}{2}d - \frac{7}{2}f\right)x^4 + \left(\frac{7}{2}d - \frac{7}{2}f\right)x^3 + \left(\frac{7}{2}d - \frac{7}{2}f\right)x^2 + \left(\frac{7}{2}d - \frac{7}{2}f\right)x + \frac{6}{2}d^2 - \frac{6}{2}d^2}{144(x^4+x^2+1)^2} + \frac{9d}{32}\ln\left(\frac{x^2+x+1}{x^2-x+1}\right) + \frac{\sqrt{3}d}{144}\arctan\left(\frac{2x+1}{3}\right) + \frac{\sqrt{3}d}{144}\arctan\left(\frac{2x-1}{3}\right) + \frac{\sqrt{3}f}{9}\arctan\left(\frac{2x+1}{3}\right) + \frac{\sqrt{3}f}{9}\arctan\left(\frac{2x-1}{3}\right) + \frac{\sqrt{3}g}{144}\arctan\left(\frac{2x+1}{3}\right) + \frac{\sqrt{3}g}{144}\arctan\left(\frac{2x-1}{3}\right) + \ln\left(\frac{1}{3}\sqrt{5}\right)\left(\frac{9d}{32}\ln\left(\frac{x^2+x+1}{x^2-x+1}\right) + \frac{\sqrt{5}d}{144}\arctan\left(\frac{2x+1}{3}\right) + \frac{\sqrt{5}d}{144}\arctan\left(\frac{2x-1}{3}\right) + \frac{\sqrt{5}f}{9}\arctan\left(\frac{2x+1}{3}\right) + \frac{\sqrt{5}f}{9}\arctan\left(\frac{2x-1}{3}\right) + \frac{\sqrt{5}g}{144}\arctan\left(\frac{2x+1}{3}\right) + \frac{\sqrt{5}g}{144}\arctan\left(\frac{2x-1}{3}\right)\right)$

Verification of antiderivative is not currently implemented for this CAS.

[In]  $\text{int}((d + e*x + f*x^2 + g*x^3)/(x^2 + x^4 + 1)^3, x)$

```
[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)^(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},

$x] \&\& \text{NeQ}[b^2 - 4*a*c, 0]$

### Rule 628

$\text{Int}[\frac{(d_.) + (e_.)*(x_.)}{(a_.) + (b_.)*(x_.) + (c_.)*(x_.)^2}, x\_Symbol] \rightarrow \text{Simp}[(d*\text{Log}[\text{RemoveContent}[a + b*x + c*x^2, x]])/b, x] /; \text{FreeQ}[\{a, b, c, d, e\}, x] \&\& \text{EqQ}[2*c*d - b*e, 0]$

### Rule 634

$\text{Int}[\frac{(d_.) + (e_.)*(x_.)}{(a_.) + (b_.)*(x_.) + (c_.)*(x_.)^2}, x\_Symbol] \rightarrow \text{Dist}[(2*c*d - b*e)/(2*c), \text{Int}[1/(a + b*x + c*x^2), x], x] + \text{Dist}[e/(2*c), \text{Int}[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; \text{FreeQ}[\{a, b, c, d, e\}, x] \&\& \text{NeQ}[2*c*d - b*e, 0] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{!NiceSqrtQ}[b^2 - 4*a*c]$

### Rule 638

$\text{Int}[\frac{(d_.) + (e_.)*(x_.)}{(a_.) + (b_.)*(x_.) + (c_.)*(x_.)^2}^{(p_.)}, x\_Symbol] \rightarrow \text{Simp}[\frac{(b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^{(p+1)}}{(p+1)*(b^2 - 4*a*c)}, x] - \text{Dist}[\frac{(2*p+3)*(2*c*d - b*e)}{(p+1)*(b^2 - 4*a*c)}, \text{Int}[(a + b*x + c*x^2)^{(p+1)}, x], x] /; \text{FreeQ}[\{a, b, c, d, e\}, x] \&\& \text{NeQ}[2*c*d - b*e, 0] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1] \&\& \text{NeQ}[p, -3/2]$

### Rule 1169

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

### Rule 1178

$\text{Int}[\frac{(d_.) + (e_.)*(x_.)^2}{(a_.) + (b_.)*(x_.)^2 + (c_.)*(x_.)^4}^{(p_.)}, x\_Symbol] \rightarrow \text{Simp}[\frac{x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2*(a + b*x^2 + c*x^4)^{(p+1)}}{2*a*(p+1)*(b^2 - 4*a*c)}, x] + \text{Dist}[1/(2*a*(p+1)*(b^2 - 4*a*c)), \text{Int}[\text{Simp}[(2*p+3)*d*b^2 - a*b*e - 2*a*c*d*(4*p+5) + (4*p+7)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^{(p+1)}, x], x] /; \text{FreeQ}[\{a, b, c, d, e\}, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{NeQ}[c*d^2 - b*d*e + a*e^2, 0] \&\& \text{LtQ}[p, -1] \&\& \text{IntegerQ}[2*p]$

### Rule 1247

$\text{Int}[(x_.) * \frac{(d_.) + (e_.)*(x_.)^2}{(a_.) + (b_.)*(x_.)^2 + (c_.)*(x_.)^4}^{(q_.)}, x\_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(d + e*x)^q*(a + b*x + c*x^2)^p, x],$

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

### Rule 1673

```
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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(1 + x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^3} dx \\
&= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f + 2h - 5(d - 2f + h)x^2}{(1 + x^2 + x^4)^2} dx + \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d + 3f - h - (7d - 7f + 2h)x^2)}{24(1 + x^2 + x^4)^2} + \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} +
\end{aligned}$$

**Mathematica [C]** time = 0.90, size = 303, normalized size = 1.15

$$\frac{1}{144} \left( \frac{6(e(7d^2 - 2d - 7f^2 - 3f + 4g^2 + h) - 4e(2x^2 + 1) + g(4x^2 + 2))}{x^4 + x^2 + 1} + \frac{12(e(-dx^2 + d + 2f^2 + f - h(x^2 + 2)) + 2ex^2 + e - g(x^2 + 2))}{(x^4 + x^2 + 1)^2} - \frac{\tan^{-1}\left(\frac{1}{2}(\sqrt{3} - i)\right)((2\sqrt{3} - 47)d + (-7\sqrt{3} + 17)f + 2(2\sqrt{3} - 7)h)}{\sqrt{\frac{1}{2}(1 + i\sqrt{3})}} - \frac{\tan^{-1}\left(\frac{1}{2}(\sqrt{3} + i)\right)((2\sqrt{3} + 47)d - (7\sqrt{3} + 17)f + 2(2\sqrt{3} + 7)h)}{\sqrt{\frac{1}{2}(1 - i\sqrt{3})}} - 16\sqrt{3}(2e - g)\tan^{-1}\left(\frac{\sqrt{3}}{2x^2 + 1}\right) \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e\*x + f\*x^2 + g\*x^3 + 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] 
$$\begin{aligned} & -1/288*(12*(7*d - 7*f + 4*h)*x^7 - 48*(2*e - g)*x^6 + 60*(d - 2*f + h)*x^5 \\ & - 72*(2*e - g)*x^4 + 84*(d - 2*f + h)*x^3 - 96*(2*e - g)*x^2 - 2*\sqrt{3}*(( \\ & 13*d - 32*e + 2*f + 16*g + h)*x^8 + 2*(13*d - 32*e + 2*f + 16*g + h)*x^6 + \\ & 3*(13*d - 32*e + 2*f + 16*g + h)*x^4 + 2*(13*d - 32*e + 2*f + 16*g + h)*x^2 \\ & + 13*d - 32*e + 2*f + 16*g + h)*\arctan(1/3*\sqrt{3}*(2*x + 1)) - 2*\sqrt{3}* \\ & ((13*d + 32*e + 2*f - 16*g + h)*x^8 + 2*(13*d + 32*e + 2*f - 16*g + h)*x^6 \\ & + 3*(13*d + 32*e + 2*f - 16*g + h)*x^4 + 2*(13*d + 32*e + 2*f - 16*g + h)*x \\ & ^2 + 13*d + 32*e + 2*f - 16*g + h)*\arctan(1/3*\sqrt{3}*(2*x - 1)) - 12*(4*d \\ & + 5*f - 5*h)*x - 9*((9*d - 4*f + 3*h)*x^8 + 2*(9*d - 4*f + 3*h)*x^6 + 3*(9*d \\ & - 4*f + 3*h)*x^4 + 2*(9*d - 4*f + 3*h)*x^2 + 9*d - 4*f + 3*h)*\log(x^2 + x \\ & + 1) + 9*((9*d - 4*f + 3*h)*x^8 + 2*(9*d - 4*f + 3*h)*x^6 + 3*(9*d - 4*f + \\ & 3*h)*x^4 + 2*(9*d - 4*f + 3*h)*x^2 + 9*d - 4*f + 3*h)*\log(x^2 - x + 1) - 7 \\ & 2*e + 72*g)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1) \end{aligned}$$

**giac** [A] time = 0.39, size = 228, normalized size = 0.87

$$\frac{1}{144}\sqrt{3}(13d+2f+16g+h-32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)+\frac{1}{144}\sqrt{3}(13d+2f-16g+h+32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{1}{32}(9d-4f+3h)\log(x^2+x+1)-\frac{1}{32}(9d-4f+3h)\log(x^2-x+1)-\frac{7d^2-7f^2+4h^2+4ge-8f^2e+5d^2-10f^2+53h^2+6ge^2-12f^2e+7d^2-14f^2+7h^2+8g^2-16f^2e-4dx-5fx+5hx+6g-6e}{24(x^2+1)^2}$$

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+x^2+1)^3,x, algorithm="giac")

[Out] 
$$\begin{aligned} & 1/144*\sqrt{3}*(13*d + 2*f + 16*g + h - 32*e)*\arctan(1/3*\sqrt{3}*(2*x + 1)) \\ & + 1/144*\sqrt{3}*(13*d + 2*f - 16*g + h + 32*e)*\arctan(1/3*\sqrt{3}*(2*x - 1)) \\ & ) + 1/32*(9*d - 4*f + 3*h)*\log(x^2 + x + 1) - 1/32*(9*d - 4*f + 3*h)*\log(x^2 \\ & - x + 1) - 1/24*(7*d*x^7 - 7*f*x^7 + 4*h*x^7 + 4*g*x^6 - 8*x^6*e + 5*d*x^5 \\ & - 10*f*x^5 + 5*h*x^5 + 6*g*x^4 - 12*x^4*e + 7*d*x^3 - 14*f*x^3 + 7*h*x^3 \\ & + 8*g*x^2 - 16*x^2*e - 4*d*x - 5*f*x + 5*h*x + 6*g - 6*e)/(x^4 + x^2 + 1)^2 \end{aligned}$$

**maple [A]** time = 0.02, size = 396, normalized size = 1.51

$\int \frac{(h x^4 + g x^3 + f x^2 + e x + d)}{(x^4 + x^2 + 1)^3} dx$

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]  $\frac{1}{16} \left( (-\frac{7}{3}d + \frac{7}{3}f - \frac{4}{3}h - \frac{4}{3}e - \frac{1}{3}g) x^3 + (-6d + 4f - 2h - 2g) x^2 + (-\frac{20}{3}d + \frac{13}{3}f - \frac{5}{3}h + \frac{1}{3}e - \frac{8}{3}g) x - 4d + \frac{4}{3}f + 2e - 2g \right) / (x^2 + x + 1)^2 + \frac{9}{32} d \ln(x^2 + x + 1) - \frac{1}{8} f \ln(x^2 + x + 1) + \frac{3}{32} h \ln(x^2 + x + 1) + \frac{13}{144} 3^{1/2} d \arctan(1/3(2x+1) 3^{1/2}) - \frac{2}{9} 3^{1/2} e \arctan(1/3(2x+1) 3^{1/2}) + \frac{1}{72} 3^{1/2} f \arctan(1/3(2x+1) 3^{1/2}) + \frac{1}{9} 3^{1/2} g \arctan(1/3(2x+1) 3^{1/2}) + \frac{1}{144} 3^{1/2} h \arctan(1/3(2x+1) 3^{1/2}) - \frac{1}{16} \left( (\frac{7}{3}d - \frac{7}{3}f + \frac{4}{3}h - \frac{4}{3}e - \frac{1}{3}g) x^3 + (-6d + 4f - 2h + 2g) x^2 + (\frac{20}{3}d - \frac{13}{3}f + \frac{5}{3}h + \frac{1}{3}e - \frac{8}{3}g) x - 4d + \frac{4}{3}f - 2e + 2g \right) / (x^2 - x + 1)^2 - \frac{9}{32} d \ln(x^2 - x + 1) + \frac{1}{8} f \ln(x^2 - x + 1) - \frac{3}{32} h \ln(x^2 - x + 1) + \frac{13}{144} 3^{1/2} d \arctan(1/3(2x-1) 3^{1/2}) + \frac{2}{9} 3^{1/2} e \arctan(1/3(2x-1) 3^{1/2}) + \frac{1}{72} 3^{1/2} f \arctan(1/3(2x-1) 3^{1/2}) - \frac{1}{9} 3^{1/2} g \arctan(1/3(2x-1) 3^{1/2}) + \frac{1}{144} 3^{1/2} h \arctan(1/3(2x-1) 3^{1/2})$

**maxima [A]** time = 3.15, size = 217, normalized size = 0.83

$\frac{1}{144} \sqrt{13d - 32e + 2f + 16g + h} \arctan\left(\frac{1}{3} \sqrt{2x+1}\right) + \frac{1}{144} \sqrt{13d + 32e + 2f - 16g + h} \arctan\left(\frac{1}{3} \sqrt{2x-1}\right) + \frac{1}{32} (9d - 4f + 3h) \log(x^2 + x + 1) - \frac{1}{32} (9d - 4f + 3h) \log(x^2 - x + 1) - \frac{(7d - 7f + 4h)x^2 - 4(2e - g)x^2 + 5(d - 2f + h)x^2 - 6(2e - g)x + 7(d - 2f + h)x^2 - 8(2e - g)x^2 - (4d + 5f - 5h)x - 6e + 6g}{24(x^2 + 2x + 3x^2 + 2x^2 + 1)}$

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)^3,x, algorithm="maxima")`

[Out]  $\frac{1}{144} \sqrt{3} (13d - 32e + 2f + 16g + h) \arctan(1/3 \sqrt{3} (2x + 1)) + \frac{1}{144} \sqrt{3} (13d + 32e + 2f - 16g + h) \arctan(1/3 \sqrt{3} (2x - 1)) + \frac{1}{32} (9d - 4f + 3h) \log(x^2 + x + 1) - \frac{1}{32} (9d - 4f + 3h) \log(x^2 - x + 1) - \frac{1}{24} \left( (7d - 7f + 4h) x^7 - 4(2e - g) x^6 + 5(d - 2f + h) x^5 - 6(2e - g) x^4 + 7(d - 2f + h) x^3 - 8(2e - g) x^2 - (4d + 5f - 5h) x - 6e + 6g \right) / (x^8 + 2x^6 + 3x^4 + 2x^2 + 1)$

**mupad [B]** time = 5.45, size = 1611, normalized size = 6.13

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

[Out]  $(e/4 - g/4 + x^2((2e)/3 - g/3) + x^4(e/2 - g/4) + x^6(e/3 - g/6) + x(d/6 + (5f)/24 - (5h)/24) - x^7((7d)/24 - (7f)/24 + h/6) - x^5((5d)/24 - (5f)/12 + (5h)/24) - x^3((7d)/24 - (7f)/12 + (7h)/24)) / (2x^2 + 3x^4 + 2x^6 + x^8 + 1) - \log(960d*g - 2763d*f - 1920d*e + 480e*f + 1971d*h - 480e*h - 240f*g - 981f*h + 240g*h + 3^{1/2}d^2*1620i + 3^{1/2}*$

$$\begin{aligned}
& f^2*180i + 3^{(1/2)}*h^2*135i - 3807*d^2*x - 612*f^2*x - 378*h^2*x + 2754*d^2 \\
& + 684*f^2 + 351*h^2 + 3^{(1/2)}*d*e*1088i - 3^{(1/2)}*d*f*1125i - 3^{(1/2)}*d*g* \\
& 544i - 3^{(1/2)}*e*f*608i + 3^{(1/2)}*d*h*945i + 3^{(1/2)}*e*h*416i + 3^{(1/2)}*f*g \\
& *304i - 3^{(1/2)}*f*h*315i - 3^{(1/2)}*g*h*208i - 672*d*e*x + 3069*d*f*x + 336* \\
& d*g*x + 672*e*f*x - 2403*d*h*x - 384*e*h*x - 336*f*g*x + 963*f*h*x + 192*g* \\
& h*x + 3^{(1/2)}*d^2*x*567i + 3^{(1/2)}*f^2*x*252i + 3^{(1/2)}*h^2*x*108i - 3^{(1/2)} \\
& )*d*f*x*819i + 3^{(1/2)}*d*g*x*752i + 3^{(1/2)}*e*f*x*544i + 3^{(1/2)}*d*h*x*513i \\
& - 3^{(1/2)}*e*h*x*448i - 3^{(1/2)}*f*g*x*272i - 3^{(1/2)}*f*h*x*333i + 3^{(1/2)}*g \\
& *h*x*224i - 3^{(1/2)}*d*e*x*1504i)*((9*d)/32 - f/8 + (3*h)/32 + (3^{(1/2)}*d*13 \\
& i)/288 + (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/144 - (3^{(1/2)}*g*1i)/18 + (3^{(1/2)} \\
& )*h*1i)/288) - \log(1920*d*e - 2763*d*f - 960*d*g - 480*e*f + 1971*d*h + 48 \\
& 0*e*h + 240*f*g - 981*f*h - 240*g*h - 3^{(1/2)}*d^2*1620i - 3^{(1/2)}*f^2*180i \\
& - 3^{(1/2)}*h^2*135i + 3807*d^2*x + 612*f^2*x + 378*h^2*x + 2754*d^2 + 684*f^2 \\
& + 351*h^2 + 3^{(1/2)}*d*e*1088i + 3^{(1/2)}*d*f*1125i - 3^{(1/2)}*d*g*544i - 3^{(1/2)} \\
& )*e*f*608i - 3^{(1/2)}*d*h*945i + 3^{(1/2)}*e*h*416i + 3^{(1/2)}*f*g*304i + 3 \\
& ^{(1/2)}*f*h*315i - 3^{(1/2)}*g*h*208i - 672*d*e*x - 3069*d*f*x + 336*d*g*x + 6 \\
& 72*e*f*x + 2403*d*h*x - 384*e*h*x - 336*f*g*x - 963*f*h*x + 192*g*h*x + 3^{(1/2)} \\
& )*d^2*x*567i + 3^{(1/2)}*f^2*x*252i + 3^{(1/2)}*h^2*x*108i - 3^{(1/2)}*d*f*x*8 \\
& 19i - 3^{(1/2)}*d*g*x*752i - 3^{(1/2)}*e*f*x*544i + 3^{(1/2)}*d*h*x*513i + 3^{(1/2)} \\
& )*e*h*x*448i + 3^{(1/2)}*f*g*x*272i - 3^{(1/2)}*f*h*x*333i - 3^{(1/2)}*g*h*x*224i \\
& + 3^{(1/2)}*d*e*x*1504i)*(f/8 - (9*d)/32 - (3*h)/32 + (3^{(1/2)}*d*13i)/288 - \\
& (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/144 + (3^{(1/2)}*g*1i)/18 + (3^{(1/2)}*h*1i)/ \\
& 288) + \log(1920*d*e - 2763*d*f - 960*d*g - 480*e*f + 1971*d*h + 480*e*h + 2 \\
& 40*f*g - 981*f*h - 240*g*h + 3^{(1/2)}*d^2*1620i + 3^{(1/2)}*f^2*180i + 3^{(1/2)} \\
& )*h^2*135i + 3807*d^2*x + 612*f^2*x + 378*h^2*x + 2754*d^2 + 684*f^2 + 351*h \\
& ^2 - 3^{(1/2)}*d*e*1088i - 3^{(1/2)}*d*f*1125i + 3^{(1/2)}*d*g*544i + 3^{(1/2)}*e*f \\
& *608i + 3^{(1/2)}*d*h*945i - 3^{(1/2)}*e*h*416i - 3^{(1/2)}*f*g*304i - 3^{(1/2)}*f* \\
& h*315i + 3^{(1/2)}*g*h*208i - 672*d*e*x - 3069*d*f*x + 336*d*g*x + 672*e*f*x \\
& + 2403*d*h*x - 384*e*h*x - 336*f*g*x - 963*f*h*x + 192*g*h*x - 3^{(1/2)}*d^2* \\
& x*567i - 3^{(1/2)}*f^2*x*252i - 3^{(1/2)}*h^2*x*108i + 3^{(1/2)}*d*f*x*819i + 3^{(1/2)} \\
& )*d*g*x*752i + 3^{(1/2)}*e*f*x*544i - 3^{(1/2)}*d*h*x*513i - 3^{(1/2)}*e*h*x*4 \\
& 48i - 3^{(1/2)}*f*g*x*272i + 3^{(1/2)}*f*h*x*333i + 3^{(1/2)}*g*h*x*224i - 3^{(1/2)} \\
& )*d*e*x*1504i)*((9*d)/32 - f/8 + (3*h)/32 + (3^{(1/2)}*d*13i)/288 - (3^{(1/2)}* \\
& e*1i)/9 + (3^{(1/2)}*f*1i)/144 + (3^{(1/2)}*g*1i)/18 + (3^{(1/2)}*h*1i)/288) + \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*1 \\
& 504i)*(f/8 - (9*d)/32 - (3*h)/32 + (3^{(1/2)}*d*13i)/288 + (3^{(1/2)}*e*1i)/9 +
\end{aligned}$$

$(3^{1/2}*f*1i)/144 - (3^{1/2}*g*1i)/18 + (3^{1/2}*h*1i)/288$   
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

$$-\frac{1}{32} \log(x^2 - x + 1)(9d-4f+3h) + \frac{1}{32} \log(x^2 + x + 1)(9d-4f+3h) + \frac{x(-x^2(7d-7f+4h) + 2d + 3f - h)}{24(x^4 + x^2 + 1)} + \dots$$

**Rubi [A]** time = 0.29, antiderivative size = 269, normalized size of antiderivative = 1.00, number of steps used = 18, number of rules used = 12, integrand size = 36,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$ , Rules used = {1673, 1678, 1178, 1169, 634, 618, 204, 628, 1663, 1660, 12, 614}

$$\frac{x(x^2(-7d-7f+4h)+2d+3f-h)}{24(x^4+x^2+1)} + \frac{x(x^2(-d-2f+h)+d+f-2h)}{12(x^4+x^2+1)^2} - \frac{1}{32} \log(x^2-x+1)(9d-4f+3h) + \frac{1}{32} \log(x^2+x+1)(9d-4f+3h) - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(13d+2f+h)}{48\sqrt{3}} + \frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(13d+2f+h)}{48\sqrt{3}} + \frac{(2x^2+1)(2e-g+i)}{12(x^4+x^2+1)} + \frac{x^2(2e-g-i)+e-2g+i}{12(x^4+x^2+1)^2} + \frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(2e-g+i)}{3\sqrt{3}}$$

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] && 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 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\_)

```
(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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 51x^5}{(1 + x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2 + 51x^4)}{(1 + x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^3} dx \\
&= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f + 2h - 5(d - 2f + h)x^2}{(1 + x^2 + x^4)^2} dx \\
&= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d - f + 2h - 5(d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} \\
&= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d - f + 2h - 5(d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} \\
&= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d - f + 2h - 5(d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} \\
&= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d - f + 2h - 5(d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} \\
&= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d - f + 2h - 5(d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} \\
&= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d - f + 2h - 5(d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2}
\end{aligned}$$

**Mathematica [C]** time = 0.98, size = 325, normalized size = 1.21

$$\frac{1}{144} \left( \frac{12(-dx^5 + dx + 2ax^2 + e + 2f/x^2 + fx - g(x^2 + 2) - hx^3 - 2ix - ix^2 + j)}{(x^4 + x^2 + 1)^3} + \frac{e(-7dx^5 + 2dx + e(8x^2 + 4) + 7f/x^3 + 3f/x - 2g(2x^2 + 1) - 4hx^3 - hx + 4ix^2 + 2j)}{x^4 + x^2 + 1} + \frac{\tan^{-1}\left(\frac{1}{2}(\sqrt{3} - i)\right)((7\sqrt{3} - 47)d + (-7\sqrt{3} + 17)f + 2(2\sqrt{3} - 7)h)}{\sqrt{\frac{1}{2}(1 + i\sqrt{3})}} + \frac{\tan^{-1}\left(\frac{1}{2}(\sqrt{3} + i)\right)((7\sqrt{3} + 47)d - (7\sqrt{3} + 17)f + 2(2\sqrt{3} + 7)h)}{\sqrt{\frac{1}{2}(1 - i\sqrt{3})}} - 16\sqrt{3} \tan^{-1}\left(\frac{\sqrt{3}}{2x^2 + 1}\right)(2e - g + i) \right)$$

Warning: Unable to verify antiderivative.

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

[Out] ((12\*(e + i + d\*x + f\*x - 2\*h\*x + 2\*e\*x^2 - i\*x^2 - d\*x^3 + 2\*f\*x^3 - h\*x^3 - g\*(2 + x^2)))/(1 + x^2 + x^4)^2 + (6\*(2\*i + 2\*d\*x + 3\*f\*x - h\*x + 4\*i\*x^2 - 7\*d\*x^3 + 7\*f\*x^3 - 4\*h\*x^3 - 2\*g\*(1 + 2\*x^2) + e\*(4 + 8\*x^2)))/(1 + x^2 + x^4) - (((-47\*I + 7\*sqrt[3])\*d + (17\*I - 7\*sqrt[3])\*f + 2\*(-7\*I + 2\*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

$$\frac{1}{144}\sqrt{3}(3d+2f+16g+h-16i)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{144}\sqrt{3}(3d+2f-16g+h+16i)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{32}(9d-4f+3h)\log(x^2+x+1) - \frac{1}{32}(9d-4f+3h)\log(x^2-x+1) - \frac{7d^2-2f^2+4h^2+4g^2-4i^2-8f^2+5d^2-10f^2+8h^2+6g^2-6i^2-12f^2+7d^2-14f^2+7h^2+8g^2-4i^2-16f^2-4d^2-5fx+5hx+6g-4i-6e}{24(x^2+1)}$$

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)^3,x, algorithm="giac")

```
[Out] 1/144*sqrt(3)*(13*d + 2*f + 16*g + h - 16*i - 32*e)*arctan(1/3*sqrt(3)*(2*x
+ 1)) + 1/144*sqrt(3)*(13*d + 2*f - 16*g + h + 16*i + 32*e)*arctan(1/3*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
```

**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] 1/16*((-7/3*d+7/3*f-4/3*h-4/3*e-1/3*g+1/3*i)*x^3+(-6*d+4*f-2*h-2*g+2*i)*x^2
+(-20/3*d+13/3*f-5/3*h+1/3*e-8/3*g+7/3*i)*x-4*d+4/3*f+2*e-2*g+4/3*i)/(x^2+x
+1)^2+9/32*d*ln(x^2+x+1)-1/8*f*ln(x^2+x+1)+3/32*h*ln(x^2+x+1)+13/144*3^(1/2
)*d*arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))+1
/72*3^(1/2)*f*arctan(1/3*(2*x+1)*3^(1/2))+1/9*3^(1/2)*g*arctan(1/3*(2*x+1)*
3^(1/2))+1/144*3^(1/2)*h*arctan(1/3*(2*x+1)*3^(1/2))-1/9*3^(1/2)*i*arctan(1
/3*(2*x+1)*3^(1/2))-1/16*((7/3*d-7/3*f+4/3*h-4/3*e-1/3*g+1/3*i)*x^3+(-6*d+4
*f-2*h+2*g-2*i)*x^2+(20/3*d-13/3*f+5/3*h+1/3*e-8/3*g+7/3*i)*x-4*d+4/3*f-2*e
+2*g-4/3*i)/(x^2-x+1)^2-9/32*d*ln(x^2-x+1)+1/8*f*ln(x^2-x+1)-3/32*h*ln(x^2-
x+1)+13/144*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(1/2)*e*arctan(1/3*
(2*x-1)*3^(1/2))+1/72*3^(1/2)*f*arctan(1/3*(2*x-1)*3^(1/2))-1/9*3^(1/2)*g*a
rctan(1/3*(2*x-1)*3^(1/2))+1/144*3^(1/2)*h*arctan(1/3*(2*x-1)*3^(1/2))+1/9*
3^(1/2)*i*arctan(1/3*(2*x-1)*3^(1/2))
```

**maxima** [A] time = 2.12, size = 229, normalized size = 0.85

$$\frac{1}{144}\sqrt{3}(13d-32e+2f+16g+h-16i)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)+\frac{1}{144}\sqrt{3}(13d+32e+2f-16g+h+16i)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{1}{32}(9d-4f+3h)\log(x^2+x+1)-\frac{1}{32}(9d-4f+3h)\log(x^2-x+1)-\frac{(7d-7f+4h)x^7-4(2e-g+i)x^6+5(d-2f+h)x^5-6(2e-g+i)x^4+7(d-2f+h)x^3-4(4e-2g+i)x^2-(4d+5f-5h)x-6e+6g-4i}{24(x^2+2x^2+3x^2+1)}$$

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="maxim
a")
```

```
[Out] 1/144*sqrt(3)*(13*d - 32*e + 2*f + 16*g + h - 16*i)*arctan(1/3*sqrt(3)*(2*x
+ 1)) + 1/144*sqrt(3)*(13*d + 32*e + 2*f - 16*g + h + 16*i)*arctan(1/3*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]  $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^2 + x^4 + 1)^3, x)$

[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*4$

$$\begin{aligned}
& 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

$$\frac{dx \left( 3bcx^2 (b^2 - 8ac) + (b^2 - 7ac) (3b^2 - 4ac) \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} + \frac{3\sqrt{c} d \left( 56a^2c^2 - 10ab^2c + b(b^2 - 8ac) \sqrt{b^2 - 4ac} + b^4 \right) \tan^{-1} \left( \frac{\sqrt{2}\sqrt{a}}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{8\sqrt{2}a^2 (b^2 - 4ac)^{5/2} \sqrt{b - \sqrt{b^2 - 4ac}}}$$

**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}

$$\frac{3\sqrt{c}d \left( 56a^2c^2 - 10ab^2c + b(b^2 - 8ac) \sqrt{b^2 - 4ac} + b^4 \right) \tan^{-1} \left( \frac{\sqrt{2}\sqrt{a}}{\sqrt{b-\sqrt{b^2-4ac}}} \right) + 3\sqrt{c}d \left( \frac{56a^2c^2 - 10ab^2c + b^4}{\sqrt{b^2-4ac}} - 8abc + b^3 \right) \tan^{-1} \left( \frac{\sqrt{2}\sqrt{a}}{\sqrt{b^2-4ac}} \right) + \frac{dx \left( 3bcx^2 (b^2 - 8ac) + (b^2 - 7ac) (3b^2 - 4ac) \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} - \frac{6c^2e \tanh^{-1} \left( \frac{b+2cx^2}{\sqrt{b^2-4ac}} \right)}{(b^2-4ac)^{3/2}} + \frac{dx (-2ac + b^2 + bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)} + \frac{3cx(b+2cx^2)}{2(b^2-4ac)^2(a+bx^2+cx^4)} - \frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2}$$

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] && 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 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

$$\begin{aligned}
 \int \frac{d + ex}{(a + bx^2 + cx^4)^3} dx &= \int \frac{d}{(a + bx^2 + cx^4)^3} dx + \int \frac{ex}{(a + bx^2 + cx^4)^3} dx \\
 &= d \int \frac{1}{(a + bx^2 + cx^4)^3} dx + e \int \frac{x}{(a + bx^2 + cx^4)^3} dx \\
 &= \frac{dx(b^2 - 2ac + bcx^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{d \int \frac{b^2 - 2ac - 4(b^2 - 4ac) - 5bcx^2}{(a + bx^2 + cx^4)^2} dx}{4a(b^2 - 4ac)} + \frac{1}{2} e \operatorname{Subst} \left( \int \frac{1}{(a + bx + cx^2)^3} dx \right) \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{dx(b^2 - 2ac + bcx^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{dx((b^2 - 7ac)(3b^2 - 4ac))}{8a^2(b^2 - 4ac)^2} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{dx(b^2 - 2ac + bcx^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3ce(b + 2cx^2)}{2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{dx(b^2 - 2ac + bcx^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3ce(b + 2cx^2)}{2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{dx(b^2 - 2ac + bcx^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3ce(b + 2cx^2)}{2(b^2 - 4ac)^2(a + bx^2 + cx^4)}
 \end{aligned}$$

**Mathematica [A]** time = 1.91, size = 488, normalized size = 1.03

$$\frac{1}{16} \left( \frac{8a^2(3be + c(7d + 6cx)) - 2abcd(25b + 24cx^2) + 6b^2d(b + cx^2)}{a^2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{3\sqrt{2}\sqrt{d}(56a^2c^2 - 10ab^2c - 8abc\sqrt{b^2 - 4ac} + b^2\sqrt{b^2 - 4ac} + b^3)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{d}}{\sqrt{b^2 - 4ac}}\right)}{a^2(b^2 - 4ac)^{3/2}\sqrt{b^2 - 4ac}} + \frac{3\sqrt{2}\sqrt{d}(56a^2c^2 - 10ab^2c + 8abc\sqrt{b^2 - 4ac} - b^2\sqrt{b^2 - 4ac} + b^3)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{d}}{\sqrt{b^2 - 4ac}}\right)}{a^2(b^2 - 4ac)^{3/2}\sqrt{b^2 - 4ac} + b} + \frac{48c^2 \log(\sqrt{b^2 - 4ac} - b - 2cx^2)}{(b^2 - 4ac)^{5/2}} - \frac{48c^2 \log(\sqrt{b^2 - 4ac} + b + 2cx^2)}{(b^2 - 4ac)^{5/2}} + \frac{4abc + 8ac(d + cx) - 4bdx(b + cx^2)}{a(4ac - b^2)(b + bx^2 + cx^4)} \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e\*x)/(a + b\*x^2 + c\*x^4)^3,x]

[Out] 
$$\begin{aligned} & ((4*a*b*e + 8*a*c*x*(d + e*x) - 4*b*d*x*(b + c*x^2))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (6*b^3*d*x*(b + c*x^2) - 2*a*b*c*d*x*(25*b + 24*c*x^2) + 8*a^2*c*(3*b*e + c*x*(7*d + 6*e*x)))/(a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (3*sqrt[2]*sqrt[c]*(b^4 - 10*a*b^2*c + 56*a^2*c^2 + b^3*sqrt[b^2 - 4*a*c] - 8*a*b*c*sqrt[b^2 - 4*a*c])*d*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]]])/(a^2*(b^2 - 4*a*c)^(5/2)*sqrt[b - sqrt[b^2 - 4*a*c]]) - (3*sqrt[2]*sqrt[c]*(b^4 - 10*a*b^2*c + 56*a^2*c^2 - b^3*sqrt[b^2 - 4*a*c] + 8*a*b*c*sqrt[b^2 - 4*a*c])*d*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]]])/(a^2*(b^2 - 4*a*c)^(5/2)*sqrt[b + sqrt[b^2 - 4*a*c]]) + (48*c^2*e*Log[-b + sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(5/2) - (48*c^2*e*Log[b + sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(5/2))/16 \end{aligned}$$

**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] 3/32*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*b^8 - 17*sqrt(2)*sqrt(b*c + s
qrt(b^2 - 4*a*c))*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 + sqr
t(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)*
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 - 8
8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*b^3*c^2 - 2
2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*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*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)*sq
rt(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*arctan(2*sqrt(1/2)*x/sqrt((a^2*b^5 - 8*a^3
*b^3*c + 16*a^4*b*c^2 + sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(
a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3
))))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((a^3*b^8 - 16*a^4*b^6*c - 2
*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^
3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*
b^2*c^4 - 64*a^6*c^5)*abs(c)) + 3/32*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*
c)*b^8 - 17*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*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*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
```

$$\begin{aligned}
& (b^2 - 4ac)c) * a^2 b^4 c^2 + \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} \\
& - 4ac)c) * b^5 c^2 - 176 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} \\
& * a^3 b^3 c^3 - 88 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} \\
& * a^2 b^2 c^3 - 11 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} \\
& * a^2 b^3 c^3 + 44 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} \\
& * a^2 b^4 c^4 - 2(b^2 - 4ac) b^6 c + 26(b^2 - 4ac) a^2 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^2 b^3 c^3 + 224(b^2 - 4ac) \\
& * a^3 c^4 + 88(b^2 - 4ac) a^2 b^4 c^4) * d * \arctan(2 \sqrt{1/2} * x / \sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2 - \sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2)^2 - 4(a^3 b^4 - 8a^4 b^2 c + 16a^5 c^2)(a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)})}) / (a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)) / ((a^3 b^8 - 16a^4 b^6 c - 2a^3 b^7 c + 96a^5 b^4 c^2 + 24a^4 b^5 c^2 + a^3 b^6 c^2 - 256a^6 b^2 c^3 - 96a^5 b^3 c^3 - 12a^4 b^4 c^3 + 256a^7 c^4 + 128a^6 b^2 c^4 + 48a^5 b^2 c^4 - 64a^6 c^5) * \text{abs}(c)) - 3(b^2 c^4 - 4a^2 c^5 - 2b^2 c^5 + c^6) * \sqrt{b^2 - 4ac} * e * \log(x^2 + 1/2(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2 + \sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2)^2 - 4(a^3 b^4 - 8a^4 b^2 c + 16a^5 c^2)(a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)})) / (a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)) / ((b^8 - 16a^2 b^6 c - 2b^7 c + 96a^2 b^4 c^2 + 24a^2 b^5 c^2 + b^6 c^2 - 256a^3 b^2 c^3 - 96a^2 b^3 c^3 - 12a^2 b^4 c^3 + 256a^4 c^4 + 128a^3 b^2 c^4 + 48a^2 b^2 c^4 - 64a^3 c^5) * c^2) + 3(b^2 c^4 - 4a^2 c^5 - 2b^2 c^5 + c^6) * \sqrt{b^2 - 4ac} * e * \log(x^2 + 1/2(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2 - \sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2)^2 - 4(a^3 b^4 - 8a^4 b^2 c + 16a^5 c^2)(a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)})) / (a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)) / ((b^8 - 16a^2 b^6 c - 2b^7 c + 96a^2 b^4 c^2 + 24a^2 b^5 c^2 + b^6 c^2 - 256a^3 b^2 c^3 - 96a^2 b^3 c^3 - 12a^2 b^4 c^3 + 256a^4 c^4 + 128a^3 b^2 c^4 + 48a^2 b^2 c^4 - 64a^3 c^5) * c^2) + 1/8(3b^3 c^2 d x^7 - 24a^2 b^3 c^2 d x^7 + 24a^2 c^3 x^6 e + 6b^4 c d x^5 - 49a^2 b^2 c^2 d x^5 + 28a^2 c^3 d x^5 + 36a^2 b^2 c^2 x^4 e + 3b^5 d x^3 - 20a^2 b^3 c^2 d x^3 - 4a^2 b^2 c^2 d x^3 + 8a^2 b^2 c^2 x^2 e + 40a^3 c^2 x^2 e + 5a^2 b^4 d x - 37a^2 b^2 c^2 d x + 44a^3 c^2 d x - 2a^2 b^3 e + 20a^3 b^2 c^2 e) / ((a^2 b^4 - 8a^3 b^2 c + 16a^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]  $\frac{3}{16} \frac{c}{(16a^2c^2 - 8a^2b^2c + b^4)} \frac{1}{(4ac - b^2)} \frac{1}{a^2} \frac{1}{2} \frac{1}{((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \text{arctanh}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * x) * (-4ac + b^2)^{1/2} * b^4 d - 15/8 c^2 / (16a^2c^2 - 8a^2b^2c + b^4) / (4ac - b^2) / a^2} \frac{1}{2} \frac{1}{((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \text{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * x) * (-4ac + b^2)^{1/2} * b^2 d + 3/16} \frac{c}{(16a^2c^2 - 8a^2b^2c + b^4)}$



$$\begin{aligned} & b^2)^{(1/2)}/c)^2*d*a*x+4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b \\ & /c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*x*b^2-4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a* \\ & c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*e*(-4*a*c+b^2)^{(1/2)*a+3*c/ \\ & (16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/ \\ & c)^2*e*a*b+9/4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(- \\ & 4*a*c+b^2)^{(1/2)}/c)^2/a*d*x^3*b^3+5/4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b \\ & ^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*x*b*(-4*a*c+b^2)^{(1/2)+9/4*c \\ & / (16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2) \\ & /c)^2/a*d*x^3*b^3-5/4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c \\ & +1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*x*b*(-4*a*c+b^2)^{(1/2)+21/2*c^3/(16*a^2*c^2- \\ & 8*a*b^2*c+b^4)/(4*a*c-b^2)*^2(1/2)/((b+(-4*a*c+b^2)^{(1/2))*c)^{(1/2)*arctan( \\ & 2^{(1/2)/((b+(-4*a*c+b^2)^{(1/2))*c)^{(1/2)*c*x)*(-4*a*c+b^2)^{(1/2)*d-6*c^3/(1 \\ & 6*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)*^2(1/2)/((b+(-4*a*c+b^2)^{(1/2))*c)^{(1/ \\ & 2)*arctan(2^{(1/2)/((b+(-4*a*c+b^2)^{(1/2))*c)^{(1/2)*c*x)*b*d+21/2*c^3/(16*a^ \\ & 2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)*^2(1/2)/((-b+(-4*a*c+b^2)^{(1/2))*c)^{(1/2)* \\ & arctanh(2^{(1/2)/((-b+(-4*a*c+b^2)^{(1/2))*c)^{(1/2)*c*x)*(-4*a*c+b^2)^{(1/2)*d \\ & +3/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^ \\ & (1/2)}/c)^2/a^2*d*x^3*(-4*a*c+b^2)^{(1/2)*b^4+5/16/(16*a^2*c^2-8*a*b^2*c+b^4) \\ & / (4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d/a*x*b^3*(-4*a*c+b^2 \\ & )^{(1/2)-3/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a* \\ & c+b^2)^{(1/2)}/c)^2/a^2*d*x^3*(-4*a*c+b^2)^{(1/2)*b^4-5/16/(16*a^2*c^2-8*a*b^2 \\ & *c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d/a*x*b^3*(-4* \\ & a*c+b^2)^{(1/2)+6*c^3/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)*^2(1/2)/((-b+(- \\ & 4*a*c+b^2)^{(1/2))*c)^{(1/2)*arctanh(2^{(1/2)/((-b+(-4*a*c+b^2)^{(1/2))*c)^{(1/2) \\ & )*c*x)*b*d} \end{aligned}$$

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

$$\frac{24a^2c^3ex^6 + 36a^2bc^2ex^4 + 3(b^3c^2 - 8abc^2)dx^7 + (6b^4c - 49ab^2c^2 + 28a^2c^3)dx^5 + (3b^5 - 20ab^3c - 4a^2bc^2)dx^3 + 8(a^2b^2c + 5a^2c^2)ex^2 + (5ab^4 - 37a^2b^2c + 44a^2c^2)dx - 2(a^2b^3 - 10a^3bc)e - 3 \int \frac{16a^2cx + (b^3c - 8abc^2)dx^2 + (b^4 - 9ab^2c + 28a^2c^2)dx}{c^3 + b^2c^2 + a} dx}{8((a^2b^4c^2 - 8a^3b^2c^2 + 16a^4c^4)x^8 + a^4b^4 - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4bc^3)x^6 + (a^2b^6 - 6a^3b^4c + 32a^5c^3)x^4 + 2(a^3b^5 - 8a^4b^3c + 16a^5b^2c^2)x^2) + 2(a^3b^5 - 8a^4b^3c + 16a^5b^2c^2)x^2)}{8(a^2b^4 - 8a^3b^2c + 16a^4c^2)}$$

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]  $\frac{1}{8}*(24*a^2*c^3*e*x^6 + 36*a^2*b*c^2*e*x^4 + 3*(b^3*c^2 - 8*a*b*c^3)*d*x^7 + (6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3)*d*x^5 + (3*b^5 - 20*a*b^3*c - 4*a^2*b*c^2)*d*x^3 + 8*(a^2*b^2*c + 5*a^3*c^2)*e*x^2 + (5*a*b^4 - 37*a^2*b^2*c + 44*a^3*c^2)*d*x - 2*(a^2*b^3 - 10*a^3*b*c)*e)/((a^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4)*x^8 + a^4*b^4 - 8*a^5*b^2*c + 16*a^6*c^2 + 2*(a^2*b^5*c - 8*a^3*b^3*c^2 + 16*a^4*b*c^3)*x^6 + (a^2*b^6 - 6*a^3*b^4*c + 32*a^5*c^3)*x^4 + 2*(a^3*b^5 - 8*a^4*b^3*c + 16*a^5*b^2*c^2)*x^2) - 3/8*integrate(-(16*a^2*c^2*e*x + (b^3*c - 8*a*b*c^2)*d*x^2 + (b^4 - 9*a*b^2*c + 28*a^2*c^2)*d)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)$

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

[Out]  $\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 + 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)*(\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*(786432*a^9*c^9*e - 768*a^4*b^{10}*c^4*e + 15360*a^5*b^8*c^5*e - 122880*a^6*b^6*c^6*e + 491520*a^7*b^4*c^7*e - 983040*a^8*b^2*c^8*e))/(32*(a^4*b^{12} + 4096*a^{10}*c^6 - 24*a^5*b^{10}*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - (3*(7340032*a^9*c^9*d - 256*a^2*b^{14}*c^2*d + 7424*a^3*b^{12}*c^3*d - 94208*a^4*b^{10}*c^4*d + 675840*a^5*b^8*c^5*d - 2$

$$\begin{aligned}
& 949120*a^6*b^6*c^6*d + 7798784*a^7*b^4*c^7*d - 11534336*a^8*b^2*c^8*d) / (51 \\
& 2*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6 \\
& 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 - 17179869 \\
& 1840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6 \\
& ^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - \\
& 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 + 6 \\
& 936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280 \\
& *a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7 \\
& d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054 \\
& 656*a^5*b^9*c^5*d^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^1 \\
& 1*c^4*d^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 \\
& - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 120795955 \\
& 2*a^10*c^9*e^2*z^2 + 2304*b^19*d^2*z^2 - 428544*a*b^12*c^3*d^2*e*z + 102275 \\
& 4816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6 \\
& c^6*d^2*e*z - 46725120*a^3*b^8*c^5*d^2*e*z + 5930496*a^2*b^10*c^4*d^2*e*z \\
& - 693633024*a^7*c^9*d^2*e*z + 13824*b^14*c^2*d^2*e*z + 34836480*a^4*b*c^8* \\
& d^2*e^2 - 435456*a*b^7*c^5*d^2*e^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104 \\
& *a^2*b^5*c^6*d^2*e^2 + 20736*b^9*c^4*d^2*e^2 - 27433728*a^3*b^2*c^8*d^4 + 6 \\
& 446304*a^2*b^4*c^7*d^4 - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 5308 \\
& 416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*x*(4194304*a^11*b*c^9 - 256*a^4*b \\
& ^15*c^2 + 7168*a^5*b^13*c^3 - 86016*a^6*b^11*c^4 + 573440*a^7*b^9*c^5 - 22 \\
& 93760*a^8*b^7*c^6 + 5505024*a^9*b^5*c^7 - 7340032*a^10*b^3*c^8)) / (32*(a^4*b \\
& ^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + \\
& 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (3*(1081344*a^6*b*c^8*d*e + 1536*a \\
& ^2*b^9*c^4*d*e - 29184*a^3*b^7*c^5*d*e + 227328*a^4*b^5*c^6*d*e - 811008*a^ \\
& 5*b^3*c^7*d*e)) / (512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^ \\
& 8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - (x*(2257 \\
& 92*a^6*c^9*d^2 + 9*b^12*c^3*d^2 - 252*a*b^10*c^4*d^2 - 36864*a^6*b*c^8*e^2 \\
& + 3114*a^2*b^8*c^5*d^2 - 21312*a^3*b^6*c^6*d^2 + 88128*a^4*b^4*c^7*d^2 - 21 \\
& 1968*a^5*b^2*c^8*d^2 - 2304*a^4*b^5*c^6*e^2 + 18432*a^5*b^3*c^7*e^2)) / (32*( \\
& a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c \\
& ^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (3*(3456*a*b^5*c^6*d^3 - 189* \\
& b^7*c^5*d^3 + 56448*a^3*b*c^8*d^3 + 64512*a^4*c^8*d*e^2 - 22608*a^2*b^3*c^7 \\
& *d^3 + 2304*a^2*b^4*c^6*d*e^2 - 20736*a^3*b^2*c^7*d*e^2)) / (512*(a^4*b^12 + \\
& 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a \\
& ^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(6912*a^4*c^8*e^3 - 27*b^7*c^5*d^2*e + \\
& 486*a*b^5*c^6*d^2*e + 12096*a^3*b*c^8*d^2*e - 3672*a^2*b^3*c^7*d^2*e)) / (32 \\
& *(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6 \\
& *c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)))*\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 - 17179869184 \\
& 0*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6* \\
& c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 262 \\
& 1440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 + 6936 \\
& 330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^
\end{aligned}$$

$$\begin{aligned}
& 9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656 \\
& *a^5*b^9*c^5*d^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - \\
& 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 2304*b^19*d^2*z^2 - 428544*a*b^12*c^3*d^2*e*z + 102275481 \\
& 6*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z - 46725120*a^3*b^8*c^5*d^2*e*z + 5930496*a^2*b^10*c^4*d^2*e*z - \\
& 693633024*a^7*c^9*d^2*e*z + 13824*b^14*c^2*d^2*e*z + 34836480*a^4*b*c^8*d^2*e^2 - 435456*a*b^7*c^5*d^2*e^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 20736*b^9*c^4*d^2*e^2 - 27433728*a^3*b^2*c^8*d^4 + 6446 \\
& 304*a^2*b^4*c^7*d^4 - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k), k, 1, 4) + ((x^2*(5*a*c^2*e + b^2*c*e))/(b^4 + 16*a^2*c^2 - 8*a*b^2*c) - (b^3*e - 10*a*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*c^3*e*x^6)/(b^4 + 16*a^2*c^2 - 8*a*b^2*c) + (9*b*c^2*e*x^4)/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (d*x^3*(4*a^2*b*c^2 - 3*b^5 + 20*a*b^3*c))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (d*x*(5*b^4 + 44*a^2*c^2 - 37*a*b^2*c))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (d*x^5*(6*b^4*c + 28*a^2*c^3 - 49*a*b^2*c^2))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*c*d*x^7*(b^3*c - 8*a*b*c^2))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6)
\end{aligned}$$

**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)\*\*3,x)

[Out] Timed out

$$3.53 \quad \int \frac{d+ex+fx^2}{(a+bx^2+cx^4)^3} dx$$

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,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$ , Rules used = {1673, 1178, 1166, 205, 12, 1107, 614, 618, 206}

$$\frac{c \left( 20a^2cf + ab^2f - 24abcd + 3b^3d \right) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} + \frac{\sqrt{c} \left( -\frac{-52a^2bcf + 168a^2c^2d + \dots}{\sqrt{b^2 - 4ac}} \right)}{\dots}$$

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

$$\begin{aligned}
\int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^3} dx &= \int \frac{ex}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{\int \frac{-3b^2d + 14acd - abf - 5c(bd - 2af)x^2}{(a + bx^2 + cx^4)^2} dx}{4a(b^2 - 4ac)} + e \int \frac{1}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3b^4d - 25ab^2cd + 28a^2c^2d + ab^3f + 8a^2bcf)}{8a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3b^4d - 25ab^2cd + 28a^2c^2d + ab^3f + 8a^2bcf)}{8a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3ce(b^4d - 25ab^2cd + 28a^2c^2d + ab^3f + 8a^2bcf)}{2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3ce(b^4d - 25ab^2cd + 28a^2c^2d + ab^3f + 8a^2bcf)}{2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3ce(b^4d - 25ab^2cd + 28a^2c^2d + ab^3f + 8a^2bcf)}{2(b^2 - 4ac)^2(a + bx^2 + cx^4)}
\end{aligned}$$

**Mathematica [A]** time = 3.61, size = 625, normalized size = 1.01

$$\frac{1}{4} \frac{e x^2 (b^2 d - 2 a c d - a b f + c (b d - 2 a f) x^2)}{(b^2 - 4 a c)^2 (a + b x^2 + c x^4)^2} - \frac{e x (b^2 d - 2 a c d - a b f + c (b d - 2 a f) x^2)}{4 a (b^2 - 4 a c) (a + b x^2 + c x^4)^2} + \frac{e (b + 2 c x^2)}{4 (b^2 - 4 a c) (a + b x^2 + c x^4)^2} + \frac{3 c e (b^4 d - 25 a b^2 c d + 28 a^2 c^2 d + a b^3 f + 8 a^2 b c f)}{2 (b^2 - 4 a c)^2 (a + b x^2 + c x^4)}$$

Antiderivative was successfully verified.

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

[Out] 
$$\frac{\left(\left(4ab(e+fx) - 4bdx(b+cx^2) + 8acx(d+x(e+fx))\right)\left(-b^2+4ac\right)\left(a+bx^2+cx^4\right)^2 + \left(6b^3d(b+cx^2) + 2abx(-25bcd + b^2f - 24c^2dx^2 + bcfx^2) + 8a^2c(b(3e+2fx) + cx(7d+6ex+5fx^2))\right)\left(a^2(b^2-4ac)\right)^2\left(a+bx^2+cx^4\right) + \left(\sqrt{2}\sqrt{c}\left(3b^4d + b^3(3\sqrt{b^2-4ac}d + af) - 4ab^2c(6\sqrt{b^2-4ac}d + 13af) + ab^2(-30cd + \sqrt{b^2-4ac}f) + 4a^2c(42cd + 5\sqrt{b^2-4ac}f)\right)\text{ArcTan}\left[\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right]\right)\left(a^2(b^2-4ac)\right)^{5/2}\sqrt{b-\sqrt{b^2-4ac}} + \left(\sqrt{2}\sqrt{c}\left(-3b^4d + b^3(3\sqrt{b^2-4ac}d - af) + 4ab^2c(-6\sqrt{b^2-4ac}d + 13af) + ab^2(30cd + \sqrt{b^2-4ac}f) + 4a^2c(-42cd + 5\sqrt{b^2-4ac}f)\right)\text{ArcTan}\left[\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}}\right]\right)\left(a^2(b^2-4ac)\right)^{5/2}\sqrt{b+\sqrt{b^2-4ac}} + \left(48c^2e\text{Log}\left[-b+\sqrt{b^2-4ac}-2cx^2\right]\right)\left(b^2-4ac\right)^{5/2} - \left(48c^2e\text{Log}\left[b+\sqrt{b^2-4ac}+2cx^2\right]\right)\left(b^2-4ac\right)^{5/2}\right)/16$$

**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)*c)*b^8 - 17*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6
*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^7*c - 2*b^8*c + 116*sqrt(2
)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + 26*sqrt(2)*sqrt(b*c + sqrt(
b^2 - 4*a*c)*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^6*c^2
+ 34*a*b^6*c^2 + 2*b^7*c^2 - 368*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 - 13*s
qrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^3 - 232*a^2*b^4*c^3 - 30*a*b
^5*c^3 + 448*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*c^4 + 224*sqrt(2)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 64*sqrt(2)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176*a^2*b^3*c^4 - 112*sqrt(2)*s
qrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^5 - 896*a^4*c^5 - 352*a^3*b*c^5 - sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^7 + 15*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c + 2*sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^6*c - 88*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 - 22*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sq
rt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^2 + 176*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 + 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 11*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 - 44*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
+ sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 + 2*(b^2 - 4*a*c)*b^6*c - 26*(b^2 - 4*a*c)
*a*b^4*c^2 - 2*(b^2 - 4*a*c)*b^5*c^2 + 128*(b^2 - 4*a*c)*a^2*b^2*c^3 + 22*(
b^2 - 4*a*c)*a*b^3*c^3 - 224*(b^2 - 4*a*c)*a^3*c^4 - 88*(b^2 - 4*a*c)*a^2*b
*c^4)*d + (sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^7 - 24*sqrt(2)*sqrt(
b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*
c)*c)*a*b^6*c - 2*a*b^7*c + 144*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3
*b^3*c^2 + 40*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + sqrt(2)
*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + 48*a^2*b^5*c^2 + 2*a*b^6*c^2 -
256*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b*c^3 - 128*sqrt(2)*sqrt(b
*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 20*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*
a*c)*c)*a^2*b^3*c^3 - 288*a^3*b^3*c^3 - 44*a^2*b^4*c^3 + 64*sqrt(2)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 512*a^4*b*c^4 + 64*a^3*b^2*c^4 + 320*a
```



$$\begin{aligned}
&^4c^5 - \sqrt{2}*\sqrt{b^2 - 4ac}*\sqrt{bc + \sqrt{b^2 - 4ac}}*c)*a*b^6 + \\
&22*\sqrt{2}*\sqrt{b^2 - 4ac}*\sqrt{bc + \sqrt{b^2 - 4ac}}*c)*a^2*b^4c + 2* \\
&\sqrt{2}*\sqrt{b^2 - 4ac}*\sqrt{bc + \sqrt{b^2 - 4ac}}*c)*a*b^5c - 32*\sqrt{2} \\
&*\sqrt{b^2 - 4ac}*\sqrt{bc + \sqrt{b^2 - 4ac}}*c)*a^3*b^2c^2 - 36*\sqrt{2} \\
&*\sqrt{b^2 - 4ac}*\sqrt{bc + \sqrt{b^2 - 4ac}}*c)*a^2*b^3c^2 - \sqrt{2} \\
&*\sqrt{b^2 - 4ac}*\sqrt{bc + \sqrt{b^2 - 4ac}}*c)*a*b^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^3*b*c^3 + 18*\sqrt{2}*\sqrt{ \\
&(b^2 - 4ac)*\sqrt{bc + \sqrt{b^2 - 4ac}}*c)*a^2*b^2*c^3 + 40*\sqrt{2}*\sqrt{ \\
&(b^2 - 4ac)*\sqrt{bc + \sqrt{b^2 - 4ac}}*c)*a^3*c^4 + 2*(b^2 - 4ac)*a*b^5 \\
&c - 40*(b^2 - 4ac)*a^2*b^3*c^2 - 2*(b^2 - 4ac)*a*b^4*c^2 + 128*(b^2 - \\
&4ac)*a^3*b*c^3 + 36*(b^2 - 4ac)*a^2*b^2*c^3 + 80*(b^2 - 4ac)*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^4c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4c - 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{bc - \sqrt{b^2 - 4ac}}*c)*b^8 - 17*\sqrt{2}*\sqrt{ \\
&bc - \sqrt{b^2 - 4ac}}*c)*a*b^6c - 2*\sqrt{2}*\sqrt{bc - \sqrt{b^2 - 4ac}}* \\
&c)*b^7c + 2*b^8c + 116*\sqrt{2}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a^2*b^4c^ \\
&2 + 26*\sqrt{2}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a*b^5c^2 + \sqrt{2}*\sqrt{bc \\
&- \sqrt{b^2 - 4ac}}*c)*b^6c^2 - 34*a*b^6c^2 - 2*b^7c^2 - 368*\sqrt{2}*\sqrt{ \\
&bc - \sqrt{b^2 - 4ac}}*c)*a^3*b^2c^3 - 128*\sqrt{2}*\sqrt{bc - \sqrt{b^2 - \\
&4ac}}*c)*a^2*b^3c^3 - 13*\sqrt{2}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a*b^4 \\
&c^3 + 232*a^2*b^4c^3 + 30*a*b^5c^3 + 448*\sqrt{2}*\sqrt{bc - \sqrt{b^2 - 4 \\
&ac}}*c)*a^4c^4 + 224*\sqrt{2}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a^3*b*c^4 + \\
&64*\sqrt{2}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a^2*b^2c^4 - 736*a^3*b^2c^4 - \\
&176*a^2*b^3c^4 - 112*\sqrt{2}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a^3*c^5 + 896 \\
&a^4c^5 + 352*a^3*b*c^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*b^5c - 2*\sqrt{2}*\sqrt{b^2 - 4ac}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*b^6 \\
&c + 88*\sqrt{2}*\sqrt{b^2 - 4ac}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a^2*b^3c \\
&^2 + 22*\sqrt{2}*\sqrt{b^2 - 4ac}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a*b^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^3*b*c^3 - 88*\sqrt{2} \\
&*\sqrt{b^2 - 4ac}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a^2*b^2c^3 - 11*\sqrt{2} \\
&*\sqrt{b^2 - 4ac}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a*b^3c^3 + 44*\sqrt{2} \\
&*\sqrt{b^2 - 4ac}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a^2*b*c^4 - 2*(b^2 - \\
&4ac)*b^6c + 26*(b^2 - 4ac)*a*b^4c^2 + 2*(b^2 - 4ac)*b^5c^2 - 128*( \\
&b^2 - 4ac)*a^2*b^2c^3 - 22*(b^2 - 4ac)*a*b^3c^3 + 224*(b^2 - 4ac)*a \\
&^3c^4 + 88*(b^2 - 4ac)*a^2*b*c^4)*d + (\sqrt{2}*\sqrt{bc - \sqrt{b^2 - 4a \\
&c}}*c)*a*b^7 - 24*\sqrt{2}*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a^2*b^5c - 2*\sqrt{2} \\
&*\sqrt{bc - \sqrt{b^2 - 4ac}}*c)*a*b^6c + 2*a*b^7c + 144*\sqrt{2}*\sqrt{ \\
&bc - \sqrt{b^2 - 4ac}}*c)*a^3*b^3c^2 + 40*\sqrt{2}*\sqrt{bc - \sqrt{b^2 -
\end{aligned}$$

$$\begin{aligned}
& 4*a*c)*c)*a^2*b^4*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c - \text{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*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))* \\
& *a^4*b*c^3 - 128*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a^3*b^2*c^3 - 20* \\
& \text{qrt}(2)*\text{sqrt}(b*c - \text{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*\text{sqrt}(2)*\text{sqrt}(b*c - \text{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 + \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c \\
& - \text{sqrt}(b^2 - 4*a*c))*a*b^6 - 22*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt} \\
& (b^2 - 4*a*c))*a^2*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))*a*b^5*c + 32*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - \\
& 4*a*c))*a^3*b^2*c^2 + 36*\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 + \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 + 160*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a* \\
& c))*a^4*c^3 + 80*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))* \\
& )*a^3*b*c^3 - 18*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))* \\
& a^2*b^2*c^3 - 40*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{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*\text{sqrt}(1/2)*x/\text{sqrt}((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)))/((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)) + 1/8*(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)
\end{aligned}$$

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

[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]  $\frac{1}{8}(24a^2c^3ex^6 + 36a^2b^2c^2ex^4 + (3(b^3c^2 - 8ab^2c^3)d + (ab^2c^2 + 20a^2c^3)f)x^7 + ((6b^4c - 49ab^2c^2 + 28a^2c^3)d + 2(ab^3c + 14a^2b^2c^2)f)x^5 + 8(a^2b^2c + 5a^3c^2)ex^2 + ((3b^5 - 20ab^3c - 4a^2b^2c^2)d + (ab^4 + 5a^2b^2c + 36a^3c^2)f)x^3 - 2(a^2b^3 - 10a^3b^2c)e + ((5ab^4 - 37a^2b^2c + 44a^3c^2)d - (a^2b^3 - 16a^3b^2c)f)x) / ((a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)x^8 + a^4b^4 - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4b^2c^3)x^6 + (a^2b^6 - 6a^3b^4c + 32a^5c^3)x^4 + 2(a^3b^5 - 8a^4b^3c + 16a^5b^2c^2)x^2) + \frac{1}{8} \int (48a^2c^2ex + (3(b^3c - 8ab^2c^2)d + (ab^2c + 20a^2c^2)f)x^2 + 3(b^4 - 9ab^2c + 28a^2c^2)d + (ab^3 - 16a^2b^2c)f) / (c^2x^4 + b^2x^2 + a), x) / (a^2b^4 - 8a^3b^2c + 16a^4c^2)$

**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]  $\frac{(x^2(5ac^2e + b^2ce)) / (b^4 + 16a^2c^2 - 8ab^2c) - (b^3e - 10ab^2ce) / (4(b^4 + 16a^2c^2 - 8ab^2c)) + (x^5(28a^2c^3d + 6b^4cd + 2ab^3cf - 49ab^2c^2d + 28a^2b^2c^2f)) / (8a^2(b^4 + 16a^2c^2 - 8ab^2c)) + (x(5b^4d + 44a^2c^2d - ab^3f - 37ab^2cd + 16a^2b^2cf)) / (8a(b^4 + 16a^2c^2 - 8ab^2c)) + (3c^3ex^6) / (b^4 + 16a^2c^2 - 8ab^2c) + (x^3(3b^5d + 36a^3c^2f + ab^4f - 20ab^3cd - 4a^2b^2c^2d + 5a^2b^2c^2f)) / (8a^2(b^4 + 16a^2c^2 - 8ab^2c)) + (9b^2c^2ex^4) / (2(b^4 + 16a^2c^2 - 8ab^2c)) + (c^2x^7(20a^2c^2f + 3b^3cd - 24ab^2c^2d + ab^2cf)) / (8a^2(b^4 + 16a^2c^2 - 8ab^2c))}{(x^4(2ac + b^2) + a^2 + c^2x^8 + 2abx^2 + 2b^2cx^6) + \text{symsum}(\log(\text{root}(56371445760a^{11}b^8c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^2z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - 73728a^2b^{16}c^4d^2fz^2 - 1321205760a^9b^2c^8d^2fz^2 + 732168192a^7b^6c^6d^2fz^2 - 366280704a^6b^8c^5d^2fz^2 - 330301440a^8b^4c^7d^2fz^2 + 96583680a^5b^{10}c^4d^2fz^2 - 15175680a^4b^{12}c^3d^2fz^2 + 1428480a^3b^{14}c^2d^2fz^2 - 440401920a^{10}b^2c^8f^2z^2 + 1761607680a^{10}c^9d^2fz^2 - 14080a^3b^{15}c^2f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^2c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^8b^{17}c^4d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 + 1$

$$\begin{aligned}
& 1206656a^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^{10}c^9e^2z^2 + 25 \\
& 6a^2b^17f^2z^2 + 2304b^19d^2z^2 + 169869312a^7b^*c^8d^*e^*f^*z + 9216 \\
& *a^*b^13c^2d^*e^*f^*z - 221773824a^6b^3c^7d^*e^*f^*z + 117964800a^5b^5c^6 \\
& *d^*e^*f^*z - 32440320a^4b^7c^5d^*e^*f^*z + 4792320a^3b^9c^4d^*e^*f^*z - 350 \\
& 208a^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^2e^*z - 7127040a^5b^6c^5e^*f^2z + 1013760a^4b^8c^4e^*f^2 \\
& *z - 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 + 13 \\
& 824b^14c^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^3 \\
& *b^3c^7d^3f + 3870720a^5b^*c^7e^2f^2 + 34836480a^4b^*c^8d^2e^2 - 8 \\
& 068032a^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^4d^*f^3 - 435456a^*b^7c^5d^2e^2 - 75188736a^4b^*c^8d^3f - 15482880a^5c^8d^*e^2f - 4262400 \\
& *a^5b^*c^7d^*f^3 + 852768a^*b^7c^5d^3f + 7350a^*b^9c^3d^*f^3 + 35525376 \\
& *a^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^10c^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^*b^6c^6d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k)*(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 - 73728a^2b^16c^*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 + 96583680a^5b^10c^4d^*f^*z^2 - 15175680a^4b^12c^3d^*f^*z^2 + 1428480a^3b^14c^2d^*f^*z^2 - 440401920a^10b^*c^8f^2z^2 + 1761607680a^10c^9d^*f^*z^2 - 14080a^3b^15c^*f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^*c^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 + 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^
\end{aligned}$$

$$\begin{aligned}
& 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)*((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*(786432*a^9*c^9*e - 768*a^4*b^{10}*c^4*e + 15360*a^5*b^8*c^5*e - 122880*a^6*b^6*c^6*e + 491520*a^7*b^4*c^7*e - 983040*a^8*b^2*c^8*e))/(32*(a^4*b^{12} + 4096*a^{10}*c^6 - 24*a^5*b^{10}*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (root(56371445760*a^{11}*b^8*c^6*z^4 - 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
\end{aligned}$$

$$\begin{aligned}
&^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 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^13*c^2*d*e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^5*b^5*c^6*d*e*f*z - 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)*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))) + (3244032*a^6*b*c^8*d*e - 983040*a^7*c^8*e*f + 4608*a^2*b^9*c^4*d*e - 87552*a^3*b^7*c^5*d*e + 681984*a^4*b^5*c^6*d*e - 2433024*a^5*b^3*c^7*d*e + 1536*a^3*b^8*c^4*e*f - 39936*a^4*b^6*c^5*e*f + 184320*a^5*b^4*c^6*e*f + 49152*a^6*b^2*c^7*e*f)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - (x*(225792*a^6*c^9*d^2 + 9*b^12*c^3*d^2 - 12800*a^7*c^8*f^2 - 252*a*b^10*c^4*d^2 - 36864*a^6*b*c^8*e^2 + 3114*a^2*b^8*c^5*d^2 - 21312*a^3*b^6*c^6*d^2 + 88128*a^4*b^4*c^7*d^2 - 211968*a^5*b^2*c^8*d^2 - 2304*a^4*b^5*c^6*e^2 + 18432*a^5*b^3*c^7*e^2 + a^2*b^10*c^3*f^2 - 42*a^3*b^8*c^4*f^2 + 1760*a^4*b^6*c^5*f^2 - 13120*a^5*b^4*c^6*f^2 + 29952*a^6*b^2*c^7*f^2 + 6*a*b^
\end{aligned}$$

$$\begin{aligned}
& 11c^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^4b^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 - 84a^3b^4c^5f^3 + 12720a^4b^2c^6f^3 + 6237a^5b^6c^5d^2f - 210a^6b^7c^4d^2f^2 - 116160a^4b^8c^7d^2f^2 + 36864a^4b^6c^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^2 + 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^8c^8d^2e + 3120a^4b^6c^7e^2f - 3672a^2b^3c^7d^2e - 3a^2b^5c^5e^2f + 96a^3b^3c^6e^2f - 18a^6b^6c^5d^2e^2 + 450a^2b^4c^6d^2e^2 - 2448a^3b^2c^7d^2e^2)) / (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^2z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - 73728a^2b^{16}c^2d^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^8b^{18}d^2fz^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^8c^8d^2e^2fz + 9216a^8b^{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^8b^{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^
\end{aligned}$$

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^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 373
10976*a^3*b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^
2*e^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3
*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 4354
56*a*b^7*c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f
- 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 +
35525376*a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*
c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 287
0784*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c
^6*d^2*e^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c
^4*d^2*e^2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^
6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b
^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*
d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k),
k, 1, 4)

```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] Timed out



$$3.54 \quad \int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=646

$$\frac{x \left( cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d \right) \sqrt{c} \left( -\frac{-52a^2bcf+168a^2c^2d}{\sqrt{b}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} +$$

**Rubi [A]** time = 3.30, antiderivative size = 646, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 30,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$ , Rules used = {1673, 1178, 1166, 205, 1247, 638, 614, 618, 206}

$$\frac{(c^2(20a^2f+ab^2f-24abcd+3b^3d)+8a^2bcf+28a^2c^2d+ab^3f-25ab^2cd+3b^4d)\sqrt{c}\left(-\frac{-52a^2bcf+168a^2c^2d}{\sqrt{b}}\right)}{8a^2(b^2-4ac)^2(a+bx^2+cx^4)} + \frac{\sqrt{c}\left(-\frac{-52a^2bcf+168a^2c^2d}{\sqrt{b}}\right)}{8a^2(b^2-4ac)^2\sqrt{b-4ac}}$$

Antiderivative was successfully verified.

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

[Out] (x\*(b^2\*d - 2\*a\*c\*d - a\*b\*f + c\*(b\*d - 2\*a\*f)\*x^2))/(4\*a\*(b^2 - 4\*a\*c)\*(a + b\*x^2 + c\*x^4)^2) - (b\*e - 2\*a\*g + (2\*c\*e - b\*g)\*x^2)/(4\*(b^2 - 4\*a\*c)\*(a + b\*x^2 + c\*x^4)^2) + (3\*(2\*c\*e - b\*g)\*(b + 2\*c\*x^2))/(4\*(b^2 - 4\*a\*c)^2\*(a + b\*x^2 + c\*x^4)) + (x\*(3\*b^4\*d - 25\*a\*b^2\*c\*d + 28\*a^2\*c^2\*d + a\*b^3\*f + 8\*a^2\*b\*c\*f + c\*(3\*b^3\*d - 24\*a\*b\*c\*d + a\*b^2\*f + 20\*a^2\*c\*f)\*x^2))/(8\*a^2\*(b^2 - 4\*a\*c)^2\*(a + b\*x^2 + c\*x^4)) + (Sqrt[c]\*(3\*b^4\*d + b^3\*(3\*Sqrt[b^2 - 4\*a\*c]\*d + a\*f) - 4\*a\*b\*c\*(6\*Sqrt[b^2 - 4\*a\*c]\*d + 13\*a\*f) - a\*b^2\*(30\*c\*d - Sqrt[b^2 - 4\*a\*c]\*f) + 4\*a^2\*c\*(42\*c\*d + 5\*Sqrt[b^2 - 4\*a\*c]\*f))\*ArcTan[(Sqrt[2]\*Sqrt[c]\*x)/Sqrt[b - Sqrt[b^2 - 4\*a\*c]]]/(8\*Sqrt[2]\*a^2\*(b^2 - 4\*a\*c)^(5/2)\*Sqrt[b - Sqrt[b^2 - 4\*a\*c]]) + (Sqrt[c]\*(3\*b^3\*d - 24\*a\*b\*c\*d + a\*b^2\*f + 20\*a^2\*c\*f - (3\*b^4\*d - 30\*a\*b^2\*c\*d + 168\*a^2\*c^2\*d + a\*b^3\*f - 52\*a^2\*b\*c\*f)/Sqrt[b^2 - 4\*a\*c])\*ArcTan[(Sqrt[2]\*Sqrt[c]\*x)/Sqrt[b + Sqrt[b^2 - 4\*a\*c]]]/(8\*Sqrt[2]\*a^2\*(b^2 - 4\*a\*c)^2\*Sqrt[b + Sqrt[b^2 - 4\*a\*c]]) - (3\*c\*(2\*c\*e - b\*g)\*ArcTanh[(b + 2\*c\*x^2)/Sqrt[b^2 - 4\*a\*c]])/(b^2 - 4\*a\*c)^(5/2)

Rule 205

Int[((a\_) + (b\_)\*(x\_)^2)^(-1), x\_Symbol] := Simp[(Rt[a/b, 2]\*ArcTan[x/Rt[a/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]

Rule 206

Int[((a\_) + (b\_)\*(x\_)^2)^(-1), x\_Symbol] := Simp[(1\*ArcTanh[(Rt[-b, 2]\*x)/Rt[a, 2]])/(Rt[a, 2]\*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt

Q[a, 0] || LtQ[b, 0])

### Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

### Rule 618

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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^3} dx &= \int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx + \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^3} dx \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{1}{2} \text{Subst} \left( \int \frac{e + gx}{(a + bx + cx^2)^3} dx, x, x^2 \right) - \frac{1}{2} \int \frac{e + gx}{(a + bx + cx^2)^3} dx \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3b^4d - 12ab^2c + 3a^2c^2)}{4(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - bg)x^3}{4(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - bg)x^3}{4(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - bg)x^3}{4(b^2 - 4ac)^2(a + bx^2 + cx^4)} \end{aligned}$$

**Mathematica [A]** time = 4.29, size = 661, normalized size = 1.02

Integrate[(d + e\*x^2)^(q)\*(a + b\*x^2 + c\*x^4)^p, x] /; FreeQ[{a, b, c, d, e, p, q}, x] && PolyQ[a + b\*x^2 + c\*x^4, x] && !PolyQ[a + b\*x^2 + c\*x^4, x^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] 
$$\frac{((-8*a^2*g - 4*b*d*x*(b + c*x^2) + 8*a*c*x*(d + x*(e + f*x)) + 4*a*b*(e + x*(f - g*x)))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (2*(3*b^3*d*x*(b + c*x^2) + a*b*x*(-25*b*c*d + b^2*f - 24*c^2*d*x^2 + b*c*f*x^2) + a^2*(-6*b^2*g + 4*c^2*x*(7*d + 6*e*x + 5*f*x^2) + 4*b*c*(3*e + 2*f*x - 3*g*x^2)))}{(a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (\text{Sqrt}[2]*\text{Sqrt}[c]*(3*b^4*d + b^3*(3*\text{Sqrt}[b^2 - 4*a*c]*d + a*f) - 4*a*b*c*(6*\text{Sqrt}[b^2 - 4*a*c]*d + 13*a*f) + a*b^2*(-30*c*d + \text{Sqrt}[b^2 - 4*a*c]*f) + 4*a^2*c*(42*c*d + 5*\text{Sqrt}[b^2 - 4*a*c]*f))*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]])]/(a^2*(b^2 - 4*a*c)^{5/2}*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + (\text{Sqrt}[2]*\text{Sqrt}[c]*(-3*b^4*d + b^3*(3*\text{Sqrt}[b^2 - 4*a*c]*d - a*f) + 4*a*b*c*(-6*\text{Sqrt}[b^2 - 4*a*c]*d + 13*a*f) + a*b^2*(30*c*d + \text{Sqrt}[b^2 - 4*a*c]*f) + 4*a^2*c*(-42*c*d + 5*\text{Sqrt}[b^2 - 4*a*c]*f))*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]])]/(a^2*(b^2 - 4*a*c)^{5/2}*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) - (24*c*(-2*c*e + b*g)*\text{Log}[-b + \text{Sqrt}[b^2 - 4*a*c] - 2*c*x^2)]/(b^2 - 4*a*c)^{5/2} + (24*c*(-2*c*e + b*g)*\text{Log}[b + \text{Sqrt}[b^2 - 4*a*c] + 2*c*x^2)]/(b^2 - 4*a*c)^{5/2})/16$$

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] 1/32*(3*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*b^8 - 17*sqrt(2)*sqrt(b*c
+ sqrt(b^2 - 4*a*c))*c)*a*b^6*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*
b^7*c - 2*b^8*c + 116*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^2*b^4*c^2 +
26*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c +
sqrt(b^2 - 4*a*c))*c)*b^6*c^2 + 34*a*b^6*c^2 + 2*b^7*c^2 - 368*sqrt(2)*sqrt(
b*c + sqrt(b^2 - 4*a*c))*c)*a^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 -
4*a*c))*c)*a^2*b^3*c^3 - 13*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a*b^4*c^
3 - 232*a^2*b^4*c^3 - 30*a*b^5*c^3 + 448*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*
c))*c)*a^4*c^4 + 224*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^3*b*c^4 + 64*
sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176
*a^2*b^3*c^4 - 112*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^3*c^5 - 896*a^
4*c^5 - 352*a^3*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c))*c)*b^7 + 15*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a
*b^5*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*b^6*c
- 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^2*b^3*c^2
- 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a*b^4*c^2 -
sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*b^5*c^2 + 176*sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^3*b*c^3 + 88*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^2*b^2*c^3 + 11*sqrt(
2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a*b^3*c^3 - 44*sqrt(2)
*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^2*b*c^4 + 2*(b^2 - 4*a
*c)*b^6*c - 26*(b^2 - 4*a*c)*a*b^4*c^2 - 2*(b^2 - 4*a*c)*b^5*c^2 + 128*(b^2
- 4*a*c)*a^2*b^2*c^3 + 22*(b^2 - 4*a*c)*a*b^3*c^3 - 224*(b^2 - 4*a*c)*a^3*
c^4 - 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)
)*c)*a*b^7 - 24*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^2*b^5*c - 2*sqrt(2
)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a*b^6*c - 2*a*b^7*c + 144*sqrt(2)*sqrt(b*
c + sqrt(b^2 - 4*a*c))*c)*a^3*b^3*c^2 + 40*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a
*c))*c)*a^2*b^4*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a*b^5*c^2 + 48
*a^2*b^5*c^2 + 2*a*b^6*c^2 - 256*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^
4*b*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^3*b^2*c^3 - 20*sqrt
(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^2*b^3*c^3 - 288*a^3*b^3*c^3 - 44*a^2*
b^4*c^3 + 64*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^3*b*c^4 + 512*a^4*b*
c^4 + 64*a^3*b^2*c^4 + 320*a^4*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + s
qrt(b^2 - 4*a*c))*c)*a*b^6 + 22*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^
2 - 4*a*c))*c)*a^2*b^4*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 -
4*a*c))*c)*a*b^5*c - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c))*c)*a^3*b^2*c^2 - 36*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c))*c)*a^2*b^3*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)
)*c)*a*b^4*c^2 - 160*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*
c)*a^4*c^3 - 80*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a
^3*b*c^3 + 18*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^2
*b^2*c^3 + 40*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^3
*c^4 + 2*(b^2 - 4*a*c)*a*b^5*c - 40*(b^2 - 4*a*c)*a^2*b^3*c^2 - 2*(b^2 - 4*
a*c)*a*b^4*c^2 + 128*(b^2 - 4*a*c)*a^3*b*c^3 + 36*(b^2 - 4*a*c)*a^2*b^2*c^3
+ 80*(b^2 - 4*a*c)*a^3*c^4)*f)*arctan(2*sqrt(1/2)*x/sqrt((a^2*b^5 - 8*a^3*
```

$$\begin{aligned}
& b^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^5b^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) \cdot \text{abs}(c)) + 1/32 \cdot (3 \cdot (\sqrt{2}) \cdot \sqrt{b^2 - 4ac} \\
& ) \cdot b^8 - 17 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot a \cdot b^6c - 2 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot b^7c + 2 \cdot b^8c + 116 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot a^2b^4c^2 \\
& + 26 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot a^2b^5c^2 + \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot b^6c^2 - 34 \cdot a \cdot b^6c^2 - 2 \cdot b^7c^2 - 368 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot a^3b^2c^3 \\
& - 128 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot a^2b^3c^3 - 13 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot a^2b^4c^3 + 232 \cdot a^2b^4c^3 + 30 \cdot a \cdot b^5c^3 + 448 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \\
& \cdot a^4c^4 + 224 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot a^3b^2c^4 + 64 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot a^2b^2c^4 - 736 \cdot a^3b^2c^4 - 176 \cdot a^2b^3c^4 - 112 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \\
& \cdot a^3c^5 + 896 \cdot a^4c^5 + 352 \cdot a^3b^2c^5 + \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot b^7 - 15 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \\
& \cdot a \cdot b^5c - 2 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot b^6c + 88 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^2b^3c^2 + 22 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \\
& \cdot a \cdot b^4c^2 + \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot b^5c^2 - 176 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^3b^2c^3 - 88 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \\
& \cdot a^2b^2c^3 - 11 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a \cdot b^3c^3 + 44 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^2b^3c^4 - 2 \cdot (b^2 - 4ac) \cdot b^6c + 26 \cdot (b^2 - 4ac) \cdot a \cdot b^4c^2 \\
& + 2 \cdot (b^2 - 4ac) \cdot b^5c^2 - 128 \cdot (b^2 - 4ac) \cdot a^2b^2c^3 - 22 \cdot (b^2 - 4ac) \cdot a^3c^3 + 224 \cdot (b^2 - 4ac) \cdot a^3c^4 + 88 \cdot (b^2 - 4ac) \cdot a^2b^2c^4) \cdot d + (\sqrt{2} \cdot \sqrt{b^2 - 4ac} \\
& \cdot \sqrt{b^2 - 4ac} \cdot a \cdot b^7 - 24 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^2b^5c - 2 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a \cdot b^6c + 2 \cdot a \cdot b^7c \\
& + 144 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^3b^3c^2 + 40 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^2b^4c^2 + \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a \cdot b^5c^2 \\
& - 48 \cdot a^2b^5c^2 - 2 \cdot a \cdot b^6c^2 - 256 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^4b^2c^3 - 128 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^3b^2c^3 \\
& - 20 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^2b^3c^3 + 288 \cdot a^3b^3c^3 + 44 \cdot a^2b^4c^3 + 64 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^3b^2c^4 - 512 \cdot a^4b^2c^4 \\
& - 64 \cdot a^3b^2c^4 - 320 \cdot a^4c^5 + \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a \cdot b^6 - 22 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^2b^4c - 2 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \\
& \cdot \sqrt{b^2 - 4ac} \cdot a \cdot b^5c + 32 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^3b^2c^2 + 36 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^2b^3c^2 + \sqrt{2} \cdot \sqrt{b^2 - 4ac} \\
& \cdot \sqrt{b^2 - 4ac} \cdot a \cdot b^4c^2 + 160 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^4c^3 + 80 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^4c^3 + 80 \cdot \sqrt{2} \cdot \sqrt{b^2 - 4ac} \cdot \sqrt{b^2 - 4ac} \cdot a^4c^3
\end{aligned}$$

$$\begin{aligned} & \text{rt}(b*c - \sqrt{b^2 - 4*a*c})*c)*a^3*b*c^3 - 18*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{ \\ & (b*c - \sqrt{b^2 - 4*a*c})*c)*a^2*b^2*c^3 - 40*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{ \\ & (b*c - \sqrt{b^2 - 4*a*c})*c)*a^3*c^4 - 2*(b^2 - 4*a*c)*a*b^5*c + 40*(b^2 - 4 \\ & *a*c)*a^2*b^3*c^2 + 2*(b^2 - 4*a*c)*a*b^4*c^2 - 128*(b^2 - 4*a*c)*a^3*b*c^3 \\ & - 36*(b^2 - 4*a*c)*a^2*b^2*c^3 - 80*(b^2 - 4*a*c)*a^3*c^4)*f)*\arctan(2*\sqrt{ \\ & t(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)) + 3/2*((b^3*c^3 \\ & - 4*a*b*c^4 - 2*b^2*c^4 + b*c^5)*\sqrt{b^2 - 4*a*c}*g - 2*(b^2*c^4 - 4*a*c^ \\ & 5 - 2*b*c^5 + c^6)*\sqrt{b^2 - 4*a*c})*e)*\log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3* \\ & c + 16*a^4*b*c^2 + \sqrt{(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b \\ & ^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/( \\ & a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96* \\ & a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 1 \\ & 2*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^ \\ & 2) - 3/2*((b^3*c^3 - 4*a*b*c^4 - 2*b^2*c^4 + b*c^5)*\sqrt{b^2 - 4*a*c}*g - 2 \\ & *(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*\sqrt{b^2 - 4*a*c})*e)*\log(x^2 + 1/2*(a^ \\ & 2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - \sqrt{(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b \\ & *c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 \\ & + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^6 \\ & *c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - \\ & 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^ \\ & 4 - 64*a^3*c^5)*c^2) + 1/8*(3*b^3*c^2*d*x^7 - 24*a*b*c^3*d*x^7 + a*b^2*c^2* \\ & f*x^7 + 20*a^2*c^3*f*x^7 - 12*a^2*b*c^2*g*x^6 + 24*a^2*c^3*x^6*e + 6*b^4*c* \\ & d*x^5 - 49*a*b^2*c^2*d*x^5 + 28*a^2*c^3*d*x^5 + 2*a*b^3*c*f*x^5 + 28*a^2*b* \\ & c^2*f*x^5 - 18*a^2*b^2*c*g*x^4 + 36*a^2*b*c^2*x^4*e + 3*b^5*d*x^3 - 20*a*b^ \\ & 3*c*d*x^3 - 4*a^2*b*c^2*d*x^3 + a*b^4*f*x^3 + 5*a^2*b^2*c*f*x^3 + 36*a^3*c^ \\ & 2*f*x^3 - 4*a^2*b^3*g*x^2 - 20*a^3*b*c*g*x^2 + 8*a^2*b^2*c*x^2*e + 40*a^3*c \\ & ^2*x^2*e + 5*a*b^4*d*x - 37*a^2*b^2*c*d*x + 44*a^3*c^2*d*x - a^2*b^3*f*x + \\ & 16*a^3*b*c*f*x - 2*a^3*b^2*g - 16*a^4*c*g - 2*a^2*b^3*e + 20*a^3*b*c*e)/(a \\ & ^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)*(c*x^4 + b*x^2 + a)^2) \end{aligned}$$

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

[Out]  $\frac{1}{8}((3(b^3c^2 - 8ab^2c^3)d + (ab^2c^2 + 20a^2c^3)f)x^7 + 12(2a^2c^3e - a^2b^2c^2g)x^6 + ((6b^4c - 49ab^2c^2 + 28a^2c^3)d + 2(ab^3c + 14a^2b^2c^2)f)x^5 + 18(2a^2b^2c^2e - a^2b^2c^2g)x^4 + ((3b^5 - 20ab^3c - 4a^2b^2c^2)d + (ab^4 + 5a^2b^2c + 36a^3c^2)f)x^3 + 4(2(a^2b^2c + 5a^3c^2)e - (a^2b^3 + 5a^3b^2c)g)x^2 - 2(a^2b^3 - 10a^3b^2c)e - 2(a^3b^2 + 8a^4c)g + ((5ab^4 - 37a^2b^2c + 44a^3c^2)d - (a^2b^3 - 16a^3b^2c)f)x) / ((a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)x^8 + a^4b^4 - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4b^2c^3)x^6 + (a^2b^6 - 6a^3b^4c + 32a^5c^3)x^4 + 2(a^3b^5 - 8a^4b^3c + 16a^5b^2c^2)x^2) + \frac{1}{8} \int \frac{(3(b^3c - 8ab^2c^2)d + (ab^2c + 20a^2c^2)f)x^2 + 3(b^4 - 9ab^2c + 28a^2c^2)d + (ab^3 - 16a^2b^2c)f + 24(2a^2c^2e - a^2b^2c^2g)x}{(c^4 + b^2x^2 + a)^3} dx$

**mupad [B]** time = 4.56, size = 13431, normalized size = 20.79

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

[Out]  $\frac{\text{symsum}(\log((x(13824a^4c^8e^3 - 54b^7c^5d^2e + 27b^8c^4d^2g - 1728a^4b^3c^5g^3 - 20160a^4c^8d^2ef + 972ab^5c^6d^2e + 24192a^3b^2c^8d^2e - 486ab^6c^5d^2g + 6240a^4b^2c^7ef^2 - 20736a^4b^2c^7e^2g - 7344a^2b^3c^7d^2e + 3672a^2b^4c^6d^2g - 6a^2b^5c^5ef^2 - 12096a^3b^2c^7d^2g + 192a^3b^3c^6ef^2 + 10368a^4b^2c^6efg^2 + 3a^2b^6c^4f^2g - 96a^3b^4c^5f^2g - 3120a^4b^2c^6f^2g - 36ab^6c^5d^2ef + 18ab^7c^4d^2fg + 10080a^4b^2c^7d^2fg + 900a^2b^4c^6d^2ef - 4896a^3b^2c^7d^2ef - 450a^2b^5c^5d^2fg + 2448a^3b^3c^6d^2fg)) / (64(a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) - \text{root}(56371445760a^{11}b^8c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^2z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - 73728a^2b^{16}c^4d^2fz^2 + 1509949440a^9b^3c^7efgz^2 - 1321205760a^9b^2c^8d^2fz^2 - 754974720a^8b^5c^6efgz^2 + 732168192a^7b^6c^6d^2fz^2 - 366280704a^6b^8c^5d^2fz^2 - 330301440a^8b^4c^7d^2fz^2 + 188743680a^7b^7c^5efgz^2 + 96583680a^5b^{10}c^4d^2fz^2 - 23592960a^6b^9c^4efgz^2 + 1179648a^5b^{11}c^3efgz^2 - 15175680a^4$



$$\begin{aligned}
& b^{12}c^3d^2f^2z^2 + 1428480a^3b^{14}c^2d^2f^2z^2 - 1207959552a^{10}b^8c^8e^2g^2z^2 - 440401920a^{10}b^8c^8f^2z^2 + 1761607680a^{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^8c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^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^8b^{18}d^2f^2z^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^8c^8d^2e^2f^2z^2 + 9216a^8b^{13}c^2d^2e^2f^2z^2 - 4608a^8b^{14}c^2d^2e^2f^2z^2 - 221773824a^6b^3c^7d^2e^2f^2z^2 + 110886912a^6b^4c^6d^2e^2f^2z^2 - 84934656a^7b^2c^7d^2e^2f^2z^2 + 117964800a^5b^5c^6d^2e^2f^2z^2 - 58982400a^5b^6c^5d^2e^2f^2z^2 + 16220160a^4b^8c^4d^2e^2f^2z^2 - 2396160a^3b^{10}c^3d^2e^2f^2z^2 + 175104a^2b^{12}c^2d^2e^2f^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^2e^2f^2z^2 - 19660800a^8b^8c^7d^2e^2f^2z^2 - 768a^2b^{13}c^2f^2g^2z^2 + 214272a^8b^{13}c^2d^2e^2g^2z^2 - 428544a^8b^{12}c^3d^2e^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 + 25362432a^7b^3c^6f^2g^2z^2 - 50724864a^7b^2c^7e^2f^2z^2 - 13271040a^6b^5c^5f^2g^2z^2 + 3563520a^5b^7c^4f^2g^2z^2 - 506880a^4b^9c^3f^2g^2z^2 + 34560a^3b^{11}c^2f^2g^2z^2 + 26542080a^6b^4c^6e^2f^2z^2 + 23362560a^3b^9c^4d^2g^2z^2 - 46725120a^3b^8c^5d^2e^2z^2 - 7127040a^5b^6c^5e^2f^2z^2 - 2965248a^2b^{11}c^3d^2g^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^2z^2 - 693633024a^7c^9d^2e^2z^2 + 39321600a^8c^8e^2f^2z^2 + 13824b^{14}c^2d^2e^2z^2 - 6912b^{15}c^2d^2g^2z^2 + 15482880a^5b^8c^7d^2e^2f^2g^2 - 13824a^8b^9c^3d^2e^2f^2g^2 + 7741440a^4b^3c^6d^2e^2f^2g^2 - 2903040a^3b^5c^5d^2e^2f^2g^2 + 387072a^2b^7c^4d^2e^2f^2g^2 + 3456a^8b^{10}c^2d^2e^2f^2g^2 + 435456a^8b^8c^4d^2e^2g^2 + 13824a^8b^8c^4d^2e^2f^2 - 3870720a^5b^2c^6e^2f^2g^2 - 34836480a^4b^2c^7d^2e^2g^2 - 645120a^4b^4c^5e^2f^2g^2 + 80640a^3b^6c^4e^2f^2g^2 - 2304a^2b^8c^3e^2f^2g^2 - 3870720a^5b^2c^6d^2e^2f^2g^2 - 1935360a^4b^4c^5d^2e^2f^2g^2 + 725760a^3b^6c^4d^2e^2f^2g^2 + 17418240a^3b^4c^6d^2e^2g^2 - 96768a^2b^8c^3d^2e^2f^2g^2 - 3919104a^2b^6c^5d^2e^2g^2 - 7741440a^4b^2c^7d^2e^2f^2 + 2903040a^3b^4c^6d^2e^2f^2 - 3870720a^2b^6c^5d^2e^2f^2 + 37310976a^3b^3c^7d^3f^2 - 2654208a^5b^3c^5e^2g^3 + 3870720a^5b^8c^7e^2f^2 + 34836480a^4b^8c^8d^2e^2 - 108864a^8b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f^2 - 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 - 20736b^{10}c^3d^2e^2g^2 - 75188736a^4b^8c^8
\end{aligned}$$

$$\begin{aligned}
& *d^3*f - 15482880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 4262400*a^5* \\
& b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 967680*a^5*b^ \\
& 3*c^5*f^2*g^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 57 \\
& 6*a^2*b^9*c^2*f^2*g^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7* \\
& d^2*f^2 + 8709120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 97977 \\
& 6*a^2*b^7*c^4*d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2* \\
& f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2 \\
& *b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e \\
& ^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f \\
& ^2 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^ \\
& 4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - \\
& 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - \\
& 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416 \\
& *a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*((983040*a^7*c^8*e*f - 3244032*a^6* \\
& b*c^8*d*e - 491520*a^7*b*c^7*f*g - 4608*a^2*b^9*c^4*d*e + 87552*a^3*b^7*c^5 \\
& *d*e - 681984*a^4*b^5*c^6*d*e + 2433024*a^5*b^3*c^7*d*e + 2304*a^2*b^10*c^3 \\
& *d*g - 43776*a^3*b^8*c^4*d*g - 1536*a^3*b^8*c^4*e*f + 340992*a^4*b^6*c^5*d* \\
& g + 39936*a^4*b^6*c^5*e*f - 1216512*a^5*b^4*c^6*d*g - 184320*a^5*b^4*c^6*e* \\
& f + 1622016*a^6*b^2*c^7*d*g - 49152*a^6*b^2*c^7*e*f + 768*a^3*b^9*c^3*f*g - \\
& 19968*a^4*b^7*c^4*f*g + 92160*a^5*b^5*c^5*f*g + 24576*a^6*b^3*c^6*f*g)/(51 \\
& 2*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^ \\
& 6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - \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 - 171798691 \\
& 840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^ \\
& 6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2 \\
& 621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 73 \\
& 728*a^2*b^16*c*d*f*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1321205760*a^9*b^ \\
& 2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a^7*b^6*c^6*d*f*z \\
& ^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 188743 \\
& 680*a^7*b^7*c^5*e*g*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 23592960*a^6*b^9* \\
& c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 \\
& + 1428480*a^3*b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 440401920* \\
& a^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2 \\
& + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 396361 \\
& 7280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^ \\
& 5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 73 \\
& 0054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9 \\
& *b^4*c^6*g^2*z^2 + 301989888*a^10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g \\
& ^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 14 \\
& 6165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 + 5898240*a^6*b \\
& ^10*c^3*g^2*z^2 - 294912*a^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^ \\
& 2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^ \\
& 5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^ \\
& 2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536* \\
& a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*
\end{aligned}$$

$$\begin{aligned}
& b^{19}d^2z^2 + 169869312a^7b^8c^8d^8efz + 9216ab^{13}c^2d^8efz - 4608 \\
& *ab^{14}c^d^f^g^z - 221773824a^6b^3c^7d^8efz + 110886912a^6b^4c^6d^8 \\
& *f^g^z - 84934656a^7b^2c^7d^8efg^z + 117964800a^5b^5c^6d^8efz - 589 \\
& 82400a^5b^6c^5d^8efg^z + 16220160a^4b^8c^4d^8efg^z - 2396160a^3b^{10} \\
& *c^3d^8efg^z + 175104a^2b^{12}c^2d^8efg^z - 32440320a^4b^7c^5d^8efz + \\
& 4792320a^3b^9c^4d^8efz - 350208a^2b^{11}c^3d^8efz + 346816512a^7* \\
& b^8c^d^2g^z - 19660800a^8b^8c^7f^2g^z - 768a^2b^{13}c^f^2g^z + 21427 \\
& 2ab^{13}c^2d^2g^z - 428544ab^{12}c^3d^2e^z + 1022754816a^6b^2c^8d^2 \\
& ^2e^z - 642318336a^5b^4c^7d^2e^z - 511377408a^6b^3c^7d^2g^z + 32 \\
& 1159168a^5b^5c^6d^2g^z + 223395840a^4b^6c^6d^2e^z - 111697920a^4 \\
& *b^7c^5d^2g^z + 25362432a^7b^3c^6f^2g^z - 50724864a^7b^2c^7ef^2 \\
& ^2z - 13271040a^6b^5c^5f^2g^z + 3563520a^5b^7c^4f^2g^z - 506880a^4 \\
& ^4b^9c^3f^2g^z + 34560a^3b^{11}c^2f^2g^z + 26542080a^6b^4c^6ef^2 \\
& ^2z + 23362560a^3b^9c^4d^2g^z - 46725120a^3b^8c^5d^2e^z - 7127040 \\
& *a^5b^6c^5ef^2z - 2965248a^2b^{11}c^3d^2g^z + 1013760a^4b^8c^4e \\
& *f^2z - 69120a^3b^{10}c^3ef^2z + 1536a^2b^{12}c^2ef^2z + 5930496a^2 \\
& ^2b^{10}c^4d^2e^z - 693633024a^7c^9d^2e^z + 39321600a^8c^8ef^2z \\
& + 13824b^{14}c^2d^2e^z - 6912b^{15}c^d^2g^z + 15482880a^5b^8c^7d^8efg \\
& - 13824ab^9c^3d^8efg + 7741440a^4b^3c^6d^8efg - 2903040a^3b^5c^5 \\
& ^5d^8efg + 387072a^2b^7c^4d^8efg + 3456ab^{10}c^2d^8fg^2 + 435456 \\
& *ab^8c^4d^2e^g + 13824ab^8c^4d^2e^2f - 3870720a^5b^2c^6ef^2g \\
& - 34836480a^4b^2c^7d^2e^g - 645120a^4b^4c^5ef^2g + 80640a^3b^6 \\
& *c^4ef^2g - 2304a^2b^8c^3ef^2g - 3870720a^5b^2c^6d^8fg^2 - 193 \\
& 5360a^4b^4c^5d^8fg^2 + 725760a^3b^6c^4d^8fg^2 + 17418240a^3b^4c^6 \\
& ^6d^2e^g - 96768a^2b^8c^3d^8fg^2 - 3919104a^2b^6c^5d^2e^g - 77414 \\
& 40a^4b^2c^7d^2e^2f + 2903040a^3b^4c^6d^2e^2f - 387072a^2b^6c^5d^2 \\
& *e^2f + 37310976a^3b^3c^7d^3f - 2654208a^5b^3c^5e^g^3 + 3870720a^5 \\
& ^5b^8c^7e^2f^2 + 34836480a^4b^8c^8d^2e^2 - 108864ab^9c^3d^2g^2 - \\
& 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^3f + 1737792a^3b^5c^5 \\
& *d^3f - 260190ab^8c^4d^2f^2 - 211680a^2b^7c^4d^3f - 435456ab^7 \\
& *c^5d^2e^2 - 20736b^{10}c^3d^2e^g - 75188736a^4b^8c^8d^3f - 15482880 \\
& *a^5c^8d^2e^2f - 10616832a^5b^8c^7e^3g - 4262400a^5b^8c^7d^3f + 852 \\
& 768ab^7c^5d^3f + 7350ab^9c^3d^3f + 967680a^5b^3c^5f^2g^2 + 1 \\
& 61280a^4b^5c^4f^2g^2 - 20160a^3b^7c^3f^2g^2 + 576a^2b^9c^2f^2 \\
& *g^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c^7d^2f^2 + 8709120 \\
& *a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 979776a^2b^7c^4d^2 \\
& *g^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7 \\
& ^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 + 5184b^{11}c^2 \\
& ^2d^2g^2 + 11025b^{10}c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 20736b^9c^4 \\
& ^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^4 + 351456a^4b^4 \\
& ^4c^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 - 734832ab^6c^6 \\
& *d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35 \\
& 721b^8c^5d^4, z, k) * ((768a^2b^{14}c^2d - 22020096a^9c^9d - 22272a^
\end{aligned}$$

$$\begin{aligned}
& 3*b^{12}*c^3*d + 282624*a^4*b^{10}*c^4*d - 2027520*a^5*b^8*c^5*d + 8847360*a^6* \\
& b^6*c^6*d - 23396352*a^7*b^4*c^7*d + 34603008*a^8*b^2*c^8*d + 256*a^3*b^{13}* \\
& c^2*f - 9216*a^4*b^{11}*c^3*f + 122880*a^5*b^9*c^4*f - 819200*a^6*b^7*c^5*f + \\
& 2949120*a^7*b^5*c^6*f - 5505024*a^8*b^3*c^7*f + 4194304*a^9*b*c^8*f)/(512* \\
& (a^4*b^{12} + 4096*a^{10}*c^6 - 24*a^5*b^{10}*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6* \\
& c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(1572864*a^9*c^9*e - 1536* \\
& a^4*b^{10}*c^4*e + 30720*a^5*b^8*c^5*e - 245760*a^6*b^6*c^6*e + 983040*a^7*b^ \\
& 4*c^7*e - 1966080*a^8*b^2*c^8*e + 768*a^4*b^{11}*c^3*g - 15360*a^5*b^9*c^4*g \\
& + 122880*a^6*b^7*c^5*g - 491520*a^7*b^5*c^6*g + 983040*a^8*b^3*c^7*g - 7864 \\
& 32*a^9*b*c^8*g))/(64*(a^4*b^{12} + 4096*a^{10}*c^6 - 24*a^5*b^{10}*c + 240*a^6*b^ \\
& 8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (root(56 \\
& 371445760*a^{11}*b^8*c^6*z^4 - 503316480*a^8*b^{14}*c^3*z^4 + 47185920*a^7*b^{16} \\
& *c^2*z^4 - 171798691840*a^{14}*b^2*c^9*z^4 + 193273528320*a^{13}*b^4*c^8*z^4 - \\
& 128849018880*a^{12}*b^6*c^7*z^4 - 16911433728*a^{10}*b^{10}*c^5*z^4 + 3523215360* \\
& a^9*b^{12}*c^4*z^4 - 2621440*a^6*b^{18}*c*z^4 + 68719476736*a^{15}*c^{10}*z^4 + 655 \\
& 36*a^5*b^{20}*z^4 - 73728*a^2*b^{16}*c*d*f*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 \\
& - 1321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 7321681 \\
& 92*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4* \\
& c^7*d*f*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 + 96583680*a^5*b^{10}*c^4*d*f*z^2 \\
& - 23592960*a^6*b^9*c^4*e*g*z^2 + 1179648*a^5*b^{11}*c^3*e*g*z^2 - 15175680*a \\
& ^4*b^{12}*c^3*d*f*z^2 + 1428480*a^3*b^{14}*c^2*d*f*z^2 - 1207959552*a^{10}*b*c^8* \\
& e*g*z^2 - 440401920*a^{10}*b*c^8*f^2*z^2 + 1761607680*a^{10}*c^9*d*f*z^2 - 1408 \\
& 0*a^3*b^{15}*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7* \\
& c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 \\
& - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^{17}*c*d^2*z^2 + 754974720*a^8* \\
& b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2 \\
& *z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^{10}*b^2*c^7*g^2*z^2 + 188 \\
& 743680*a^8*b^6*c^5*g^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7* \\
& b^6*c^6*e^2*z^2 + 146165760*a^4*b^{11}*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2 \\
& *z^2 + 5898240*a^6*b^{10}*c^3*g^2*z^2 - 294912*a^5*b^{12}*c^2*g^2*z^2 + 1120665 \\
& 6*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5* \\
& e^2*z^2 - 2600960*a^5*b^{11}*c^3*f^2*z^2 + 291840*a^4*b^{13}*c^2*f^2*z^2 - 1986 \\
& 0480*a^3*b^{13}*c^3*d^2*z^2 - 1179648*a^5*b^{10}*c^4*e^2*z^2 + 1771776*a^2*b^{15} \\
& *c^2*d^2*z^2 + 1536*a*b^{18}*d*f*z^2 + 1207959552*a^{10}*c^9*e^2*z^2 + 256*a^2* \\
& b^{17}*f^2*z^2 + 2304*b^{19}*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^{1 \\
& 3}*c^2*d*e*f*z - 4608*a*b^{14}*c*d*f*g*z - 221773824*a^6*b^3*c^7*d*e*f*z + 110 \\
& 886912*a^6*b^4*c^6*d*f*g*z - 84934656*a^7*b^2*c^7*d*f*g*z + 117964800*a^5*b \\
& ^5*c^6*d*e*f*z - 58982400*a^5*b^6*c^5*d*f*g*z + 16220160*a^4*b^8*c^4*d*f*g* \\
& z - 2396160*a^3*b^{10}*c^3*d*f*g*z + 175104*a^2*b^{12}*c^2*d*f*g*z - 32440320*a \\
& ^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^{11}*c^3*d*e* \\
& f*z + 346816512*a^7*b*c^8*d^2*g*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^ \\
& 13*c*f^2*g*z + 214272*a*b^{13}*c^2*d^2*g*z - 428544*a*b^{12}*c^3*d^2*e*z + 1022 \\
& 754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6* \\
& b^3*c^7*d^2*g*z + 321159168*a^5*b^5*c^6*d^2*g*z + 223395840*a^4*b^6*c^6*d^2 \\
& *e*z - 111697920*a^4*b^7*c^5*d^2*g*z + 25362432*a^7*b^3*c^6*f^2*g*z - 50724
\end{aligned}$$

$$\begin{aligned}
& 864a^7b^2c^7ef^2z - 13271040a^6b^5c^5f^2gz + 3563520a^5b^7c^4f^2gz - 506880a^4b^9c^3f^2gz + 34560a^3b^11c^2f^2gz + 26542080a^6b^4c^6ef^2z + 23362560a^3b^9c^4d^2gz - 46725120a^3b^8c^5d^2ez - 7127040a^5b^6c^5ef^2z - 2965248a^2b^11c^3d^2gz + 1013760a^4b^8c^4ef^2z - 69120a^3b^10c^3ef^2z + 1536a^2b^12c^2ef^2z + 5930496a^2b^10c^4d^2ez - 693633024a^7c^9d^2ez + 39321600a^8c^8ef^2z + 13824b^14c^2d^2ez - 6912b^15cd^2gz + 15482880a^5b^c^7d^efg - 13824a^b^9c^3d^efg + 7741440a^4b^3c^6d^efg - 2903040a^3b^5c^5d^efg + 387072a^2b^7c^4d^efg + 3456a^b^10c^2d^f^2g + 435456a^b^8c^4d^2e^fg + 13824a^b^8c^4d^e^2f - 3870720a^5b^2c^6ef^2g - 34836480a^4b^2c^7d^2e^fg - 645120a^4b^4c^5ef^2g + 80640a^3b^6c^4ef^2g - 2304a^2b^8c^3ef^2g - 3870720a^5b^2c^6d^f^2g - 1935360a^4b^4c^5d^f^2g + 725760a^3b^6c^4d^f^2g + 17418240a^3b^4c^6d^2e^fg - 96768a^2b^8c^3d^f^2g - 3919104a^2b^6c^5d^2e^fg - 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 - 108864a^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^4d^f^3 - 435456a^b^7c^5d^2e^2 - 20736b^10c^3d^2e^fg - 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^5b^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 + 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 + 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^b^6c^6d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k) * x * (8388608a^11b^c^9 - 512a^4b^15c^2 + 14336a^5b^13c^3 - 172032a^6b^11c^4 + 1146880a^7b^9c^5 - 4587520a^8b^7c^6 + 11010048a^9b^5c^7 - 14680064a^10b^3c^8) / (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)) + (x * (451584a^6c^9d^2 + 18b^12c^3d^2 - 25600a^7c^8f^2 - 504a^b^10c^4d^2 - 73728a^6b^c^8e^2 + 6228a^2b^8c^5d^2 - 42624a^3b^6c^6d^2 + 176256a^4b^4c^7d^2 - 423936a^5b^2c^8d^2 - 4608a^4b^5c^6e^2 + 36864a^5b^3c^7e^2 + 2a^2b^10c^3f^2 - 84a^3b^8c^4f^2 + 3520a^4b^6c^5f^2 - 26240a^5b^4c^6f^2 + 59904a^6b^2c^7f^2 - 1152a^4b^7c^4g^2 + 9216a^5b^5c^5g^2 - 18432a^6b^3c^6g^2 + 12a^b^11c^3d^f - 218112a^6b^c^8d^f - 420a^2b^9c^4d^f + 4992a^3b^7c^5d^f - 36480a^4b^5c^6d^f + 144384a^
\end{aligned}$$

$$\begin{aligned}
& 5*b^3*c^7*d*f + 4608*a^4*b^6*c^5*e*g - 36864*a^5*b^4*c^6*e*g + 73728*a^6*b^2*c^7*e*g) / (64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 \\
& - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - (567*b^7*c^5 \\
& *d^3 + 8000*a^5*c^7*f^3 - 10368*a*b^5*c^6*d^3 - 169344*a^3*b*c^8*d^3 - 1935 \\
& 36*a^4*c^8*d*e^2 + 141120*a^4*c^8*d^2*f - 315*b^8*c^4*d^2*f + 67824*a^2*b^3 \\
& *c^7*d^3 - 35*a^2*b^6*c^4*f^3 - 84*a^3*b^4*c^5*f^3 + 12720*a^4*b^2*c^6*f^3 \\
& + 6237*a*b^6*c^5*d^2*f - 210*a*b^7*c^4*d*f^2 - 116160*a^4*b*c^7*d*f^2 + 368 \\
& 64*a^4*b*c^7*e^2*f - 6912*a^2*b^4*c^6*d*e^2 + 62208*a^3*b^2*c^7*d*e^2 - 423 \\
& 72*a^2*b^4*c^6*d^2*f + 1764*a^2*b^5*c^5*d*f^2 + 96048*a^3*b^2*c^7*d^2*f + 4 \\
& 608*a^3*b^3*c^6*d*f^2 - 1728*a^2*b^6*c^4*d*g^2 - 2304*a^3*b^3*c^6*e^2*f + 1 \\
& 5552*a^3*b^4*c^5*d*g^2 - 48384*a^4*b^2*c^6*d*g^2 - 576*a^3*b^5*c^4*f*g^2 + \\
& 9216*a^4*b^3*c^5*f*g^2 + 193536*a^4*b*c^7*d*e*g + 6912*a^2*b^5*c^5*d*e*g - \\
& 62208*a^3*b^3*c^6*d*e*g + 2304*a^3*b^4*c^5*e*f*g - 36864*a^4*b^2*c^6*e*f*g) \\
& / (512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7 \\
& *b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) * \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 - 171798 \\
& 691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12 \\
& *b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 \\
& - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - \\
& 73728*a^2*b^16*c*d*f*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1321205760*a^9 \\
& *b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a^7*b^6*c^6*d* \\
& f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 188 \\
& 743680*a^7*b^7*c^5*e*g*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 23592960*a^6*b \\
& ^9*c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 - 15175680*a^4*b^12*c^3*d*f*z \\
& ^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 4404019 \\
& 20*a^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2* \\
& z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 396 \\
& 3617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7 \\
& *b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - \\
& 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360* \\
& a^9*b^4*c^6*g^2*z^2 + 301989888*a^10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^ \\
& 5*g^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + \\
& 146165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 + 5898240*a^ \\
& 6*b^10*c^3*g^2*z^2 - 294912*a^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2 \\
& *z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960 \\
& *a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3 \\
& *d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 15 \\
& 36*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 256*a^2*b^17*f^2*z^2 + 23 \\
& 04*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^13*c^2*d*e*f*z - 4 \\
& 608*a*b^14*c*d*f*g*z - 221773824*a^6*b^3*c^7*d*e*f*z + 110886912*a^6*b^4*c^ \\
& 6*d*f*g*z - 84934656*a^7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z - \\
& 58982400*a^5*b^6*c^5*d*f*g*z + 16220160*a^4*b^8*c^4*d*f*g*z - 2396160*a^3*b \\
& ^10*c^3*d*f*g*z + 175104*a^2*b^12*c^2*d*f*g*z - 32440320*a^4*b^7*c^5*d*e*f* \\
& z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a \\
& ^7*b*c^8*d^2*g*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z + 21
\end{aligned}$$

$$\begin{aligned}
& 4272*a*b^{13}*c^2*d^2*g*z - 428544*a*b^{12}*c^3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + \\
& 321159168*a^5*b^5*c^6*d^2*g*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*a^4*b^7*c^5*d^2*g*z + 25362432*a^7*b^3*c^6*f^2*g*z - 50724864*a^7*b^2*c^7*e \\
& *f^2*z - 13271040*a^6*b^5*c^5*f^2*g*z + 3563520*a^5*b^7*c^4*f^2*g*z - 50688 \\
& 0*a^4*b^9*c^3*f^2*g*z + 34560*a^3*b^{11}*c^2*f^2*g*z + 26542080*a^6*b^4*c^6*e \\
& *f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7127 \\
& 040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^{11}*c^3*d^2*g*z + 1013760*a^4*b^8*c^4 \\
& *e*f^2*z - 69120*a^3*b^{10}*c^3*e*f^2*z + 1536*a^2*b^{12}*c^2*e*f^2*z + 593049 \\
& 6*a^2*b^{10}*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f^2 \\
& *z + 13824*b^{14}*c^2*d^2*e*z - 6912*b^{15}*c*d^2*g*z + 15482880*a^5*b*c^7*d*e \\
& *f*g - 13824*a*b^9*c^3*d*e*f*g + 7741440*a^4*b^3*c^6*d*e*f*g - 2903040*a^3*b \\
& ^5*c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g + 3456*a*b^{10}*c^2*d*f*g^2 + 435 \\
& 456*a*b^8*c^4*d^2*e*g + 13824*a*b^8*c^4*d*e^2*f - 3870720*a^5*b^2*c^6*e*f^2 \\
& *g - 34836480*a^4*b^2*c^7*d^2*e*g - 645120*a^4*b^4*c^5*e*f^2*g + 80640*a^3* \\
& b^6*c^4*e*f^2*g - 2304*a^2*b^8*c^3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - \\
& 1935360*a^4*b^4*c^5*d*f*g^2 + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^4 \\
& *c^6*d^2*e*g - 96768*a^2*b^8*c^3*d*f*g^2 - 3919104*a^2*b^6*c^5*d^2*e*g - 77 \\
& 41440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5 \\
& *d*e^2*f + 37310976*a^3*b^3*c^7*d^3*f - 2654208*a^5*b^3*c^5*e*g^3 + 387072 \\
& 0*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2 \\
& - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5* \\
& c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a* \\
& b^7*c^5*d^2*e^2 - 20736*b^{10}*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 15482 \\
& 880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 4262400*a^5*b*c^7*d*f^3 + \\
& 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 967680*a^5*b^3*c^5*f^2*g^2 \\
& + 161280*a^4*b^5*c^4*f^2*g^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2* \\
& f^2*g^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 + 8709 \\
& 120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4* \\
& d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2 \\
& *b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f \\
& ^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 5184*b^{11} \\
& *c^2*d^2*g^2 + 11025*b^{10}*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9 \\
& *c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4 \\
& *b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3* \\
& b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6* \\
& c^6*d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + \\
& 35721*b^8*c^5*d^4, z, k), k, 1, 4) + ((9*x^4*(2*b*c^2*e - b^2*c*g))/(4*(b^4 \\
& + 16*a^2*c^2 - 8*a*b^2*c)) - (x^2*(b^3*g - 10*a*c^2*e - 2*b^2*c*e + 5*a*b \\
& *c*g))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (b^3*e + a*b^2*g + 8*a^2*c*g - \\
& 10*a*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^5*(28*a^2*c^3*d + 6*b^4 \\
& *c*d + 2*a*b^3*c*f - 49*a*b^2*c^2*d + 28*a^2*b*c^2*f))/(8*a^2*(b^4 + 16*a^2 \\
& *c^2 - 8*a*b^2*c)) + (x*(5*b^4*d + 44*a^2*c^2*d - a*b^3*f - 37*a*b^2*c*d + \\
& 16*a^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^3*(3*b^5*d + 36*a^ \\
& 3*c^2*f + a*b^4*f - 20*a*b^3*c*d - 4*a^2*b*c^2*d + 5*a^2*b^2*c*f))/(8*a^2*(
\end{aligned}$$

$$b^4 + 16a^2c^2 - 8ab^2c) + (3c^2x^6(2ce - bg))/(2(b^4 + 16a^2c^2 - 8ab^2c)) + (cx^7(20a^2c^2f + 3b^3cd - 24abc^2d + ab^2cf))/(8a^2(b^4 + 16a^2c^2 - 8ab^2c)))/(x^4(2ac + b^2) + a^2 + c^2x^8 + 2abx^2 + 2bcx^6)$$

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] Timed out



$$3.55 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=679

$$\frac{x \left( cx^2 (20a^2cf + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

**Rubi [A]** time = 4.18, antiderivative size = 679, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, integrand size = 35, number of rules / integrand size = 0.286, Rules used = {1673, 1678, 1178, 1166, 205, 1247, 638, 614, 618, 206}

$$\frac{(c^2(20a^2f + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d) \sqrt{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{b-4ac}}\right)} + 20a^2cf - 12ab(ah + 2cd) + 3b^3d}{8a^2(b^2 - 4ac)^2 \sqrt{b - 4ac}} + \frac{(c^2(20a^2f + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d) \sqrt{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{b-4ac}}\right)} + 20a^2cf - 12ab(ah + 2cd) + 3b^3d}{8a^2(b^2 - 4ac)^2 \sqrt{b - 4ac}} + \frac{(c^2(20a^2f + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d) \sqrt{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{b-4ac}}\right)} + 20a^2cf - 12ab(ah + 2cd) + 3b^3d}{8a^2(b^2 - 4ac)^2 \sqrt{b - 4ac}} + \frac{(c^2(20a^2f + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d) \sqrt{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{b-4ac}}\right)} + 20a^2cf - 12ab(ah + 2cd) + 3b^3d}{8a^2(b^2 - 4ac)^2 \sqrt{b - 4ac}} + \frac{(c^2(20a^2f + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d) \sqrt{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{b-4ac}}\right)} + 20a^2cf - 12ab(ah + 2cd) + 3b^3d}{8a^2(b^2 - 4ac)^2 \sqrt{b - 4ac}} + \frac{(c^2(20a^2f + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d) \sqrt{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{b-4ac}}\right)} + 20a^2cf - 12ab(ah + 2cd) + 3b^3d}{8a^2(b^2 - 4ac)^2 \sqrt{b - 4ac}} + \frac{(c^2(20a^2f + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d) \sqrt{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{b-4ac}}\right)} + 20a^2cf - 12ab(ah + 2cd) + 3b^3d}{8a^2(b^2 - 4ac)^2 \sqrt{b - 4ac}} + \frac{(c^2(20a^2f + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d) \sqrt{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{b-4ac}}\right)} + 20a^2cf - 12ab(ah + 2cd) + 3b^3d}{8a^2(b^2 - 4ac)^2 \sqrt{b - 4ac}}$$

Antiderivative was successfully verified.

[In] Int[(d + e\*x + f\*x^2 + g\*x^3 + h\*x^4)/(a + b\*x^2 + c\*x^4)^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[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 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] := Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

### Rule 1166

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

### Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

### Rule 1247

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

### Rule 1673

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

### Rule 1678

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

### Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(a + bx^2 + cx^4)^3} dx &= \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{1}{2} \text{Subst} \left( \int \frac{e + gx^2}{(a + bx^2 + cx^4)^3} dx \right) \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}
\end{aligned}$$

**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] 
$$\begin{aligned}
& -1/4*(-(a*b*e) + 2*a^2*g + b^2*d*x - 2*a*c*d*x - a*b*f*x + 2*a^2*h*x - 2*a*c*e*x^2 + a*b*g*x^2 + b*c*d*x^3 - 2*a*c*f*x^3 + a*b*h*x^3)/(a*(-b^2 + 4*a*c) \\
& )*(a + b*x^2 + c*x^4)^2) + (12*a^2*b*c*e - 6*a^2*b^2*g + 3*b^4*d*x - 25*a*b^2*c*d*x + 28*a^2*c^2*d*x + a*b^3*f*x + 8*a^2*b*c*f*x - 7*a^2*b^2*h*x + 4*a^3*c*h*x + 24*a^2*c^2*e*x^2 - 12*a^2*b*c*g*x^2 + 3*b^3*c*d*x^3 - 24*a*b*c^2*d*x^3 + a*b^2*c*f*x^3 + 20*a^2*c^2*f*x^3 - 12*a^2*b*c*h*x^3)/(8*a^2*(-b^2 + 4*a*c)^2*(a + b*x^2 + c*x^4)) + (Sqrt[c]*(3*b^4*d - 30*a*b^2*c*d + 168*a^2*c^2*d + 3*b^3*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c*Sqrt[b^2 - 4*a*c]*d + a*b^3*f - 52*a^2*b*c*f + a*b^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c*Sqrt[b^2 - 4*a*c]*f
\end{aligned}$$

+ 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)))

**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))\*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(

$$\begin{aligned}
& b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b^2*c^3 - 128*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^3*c^3 - 13*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^4*c^3 \\
& - 232*a^2*b^4*c^3 - 30*a*b^5*c^3 + 448*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^4*c^4 + 224*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b*c^4 + 64* \\
& \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176*a^2*b^3*c^4 - 112*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*c^5 - 896*a^4*c^5 \\
& - 352*a^3*b*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b^7 + 15*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a \\
& *b^5*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b^6*c - 88*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^3*c^2 \\
& - 22*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^4*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b^5*c^2 + 176*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b*c^3 + 88*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^2*c^3 + 11*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^3*c^3 - 44*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b*c^4 + 2*(b^2 - 4*a*c)*b^6*c - 26*(b^2 - 4*a*c)*a*b^4*c^2 - 2*(b^2 - 4*a*c)*b^5*c^2 + 128*(b^2 - 4*a*c)*a^2*b^2*c^3 + 22*(b^2 - 4*a*c)*a*b^3*c^3 - 224*(b^2 - 4*a*c)*a^3*c^4 - 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^7 - 24*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^5*c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^6*c - 2*a*b^7*c + 144*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b^3*c^2 + 40*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^4*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^5*c^2 + 48*a^2*b^5*c^2 + 2*a*b^6*c^2 - 256*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^4*b*c^3 - 128*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b^2*c^3 - 20*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^3*c^3 - 288*a^3*b^3*c^3 - 44*a^2*b^4*c^3 + 64*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b*c^4 + 512*a^4*b*c^4 + 64*a^3*b^2*c^4 + 320*a^4*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^6 + 22*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^4*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^5*c - 32*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b^2*c^2 - 36*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^3*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^4*c^2 - 160*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^4*c^3 - 80*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b*c^3 + 18*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^2*c^3 + 40*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*c^4 + 2*(b^2 - 4*a*c)*a*b^5*c - 40*(b^2 - 4*a*c)*a^2*b^3*c^2 - 2*(b^2 - 4*a*c)*a*b^4*c^2 + 128*(b^2 - 4*a*c)*a^3*b*c^3 + 36*(b^2 - 4*a*c)*a^2*b^2*c^3 + 80*(b^2 - 4*a*c)*a^3*c^4)*f + 3*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^6 - 4*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b^4*c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^5*c - 2*a^2*b^6*c - 16*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^4*b^2*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^4*c^2 + 8*a^3*b^4*c^2 + 2*a^2*b^5*c^2 + 64*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^5*c^3 + 32*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^4
\end{aligned}$$

$$\begin{aligned}
& *b^3c^3 + 32a^4b^2c^3 + 16a^3b^3c^3 - 16\sqrt{2}\sqrt{b^2 - 4ac} *c *a^4c^4 - 128a^5c^4 - 96a^4b^3c^4 - \sqrt{2}\sqrt{b^2 - 4ac} \\
& * \sqrt{b^2 - 4ac} *c *a^2b^5 - 8\sqrt{2}\sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} *c *a^3b^3c + 2\sqrt{2}\sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} *c *a^2b^4c \\
& + 48\sqrt{2}\sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} *c *a^4b^2c^2 + 24\sqrt{2}\sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} *c *a^3b^2c^2 - \sqrt{2}\sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} *c *a^2b^3c^2 \\
& - 12\sqrt{2}\sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} *c *a^3b^3c^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) *h) * \arctan \\
& (2\sqrt{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) * \text{abs}(c)) + 1/32 * \\
& (3 * (\sqrt{2}\sqrt{b^2 - 4ac} *c) *b^8 - 17\sqrt{2}\sqrt{b^2 - 4ac} *c) *b^7c + 2 * (\sqrt{2}\sqrt{b^2 - 4ac} *c) *a^2b^4c^2 + 26\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 + 30 * 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^3c^4 + 64\sqrt{2}\sqrt{b^2 - 4ac} *c) *a^2b^2c^4 - 736a^3b^2c^4 - 176a^2b^3c^4 - 112\sqrt{2}\sqrt{b^2 - 4ac} *c) *a^3c^5 + 896a^4c^5 + 352a^3b^3c^5 + \sqrt{2}\sqrt{b^2 - 4ac} * \sqrt{b^2 - 4ac} *c) *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^3c^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^4 - 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^3c^4) *d + (\sqrt{2}\sqrt{b^2 - 4ac} *c) *a^2b^7 - 24\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 - 48a^2b^5c^2 - 2 * a^2b^6c^2 - 256\sqrt{2}\sqrt{b^2 - 4ac} *c) *a^4b^3c^3
\end{aligned}$$

$$\begin{aligned}
&^3 - 128\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^2*c^3 - 20\sqrt{2}*s \\
&qrt(b*c - \sqrt{b^2 - 4*a*c})*c)*a^2*b^3*c^3 + 288*a^3*b^3*c^3 + 44*a^2*b^4*c \\
&^3 + 64\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^4 - 512*a^4*b*c^4 - \\
&64*a^3*b^2*c^4 - 320*a^4*c^5 + \sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - \sqrt{b^2 - 4*a* \\
&^2 - 4*a*c}}*c)*a*b^6 - 22\sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - \sqrt{b^2 - 4*a* \\
&*c}}*c)*a^2*b^4*c - 2\sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - \sqrt{b^2 - 4*a* \\
&c}}*c)*a*b^5*c + 32\sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c \\
&)*a^3*b^2*c^2 + 36\sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c \\
&)*a^2*b^3*c^2 + \sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a \\
&*b^4*c^2 + 160\sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^ \\
&4*c^3 + 80\sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b* \\
&c^3 - 18\sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^2* \\
&c^3 - 40\sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*c^4 \\
&- 2*(b^2 - 4*a*c)*a*b^5*c + 40*(b^2 - 4*a*c)*a^2*b^3*c^2 + 2*(b^2 - 4*a*c)* \\
&a*b^4*c^2 - 128*(b^2 - 4*a*c)*a^3*b*c^3 - 36*(b^2 - 4*a*c)*a^2*b^2*c^3 - 80 \\
&*(b^2 - 4*a*c)*a^3*c^4)*f + 3*(\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2* \\
&b^6 - 4\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^4*c - 2\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^5*c \\
&+ 2*a^2*b^6*c - 16\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^4*b^2*c^2 + \sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)* \\
&a^2*b^4*c^2 - 8*a^3*b^4*c^2 - 2*a^2*b^5*c^2 + 64\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^5*c^3 + 32\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^4*b*c^ \\
&3 - 32*a^4*b^2*c^3 - 16*a^3*b^3*c^3 - 16\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a* \\
&c}}*c)*a^4*c^4 + 128*a^5*c^4 + 96*a^4*b*c^4 + \sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^5 \\
&+ 8\sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^3*c - 2\sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - s \\
&qrt(b^2 - 4*a*c}}*c)*a^2*b^4*c - 48\sqrt{2}\sqrt{b^2 - 4*a*c}\sqrt{b*c - s \\
&qrt(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}}*c)*a^2*b^3*c^2 + 12\sqrt{2}\sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^3 - 2*(b^2 - 4*a*c)*a^2*b^4*c + 2*(b^2 - 4*a*c)*a^2*b^3*c^2 + 32*(b^2 - 4*a*c)*a^4*c^3 + 24*(b^2 - 4*a*c)*a^3*b*c^3)*h)*\arctan(2* \\
&\sqrt{1/2}*x/\sqrt{((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - \sqrt{((a^2*b^5 - 8* \\
&a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c - 2*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*b^2*c^4 - 64*a^6*c^5)*\text{abs}(c)) + 3/2*((b^3*c^3 - 4*a*b*c^4 - 2*b^2*c^4 + b*c^5)*\sqrt{b^2 - 4*a*c})*g - 2*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*\sqrt{b^2 - 4*a*c})*e)*\log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + \sqrt{((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^2) - 3/2*((b^3*c^3 - 4*a*b*c^4 - 2*b^2*c^4 + b*c^5)*\sqrt{b^2 - 4*a*c})*g
\end{aligned}$$



$$\begin{aligned}
& - 2*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*\sqrt{b^2 - 4*a*c}*e*\log(x^2 + 1/2* \\
& (a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - \sqrt{(a^2*b^5 - 8*a^3*b^3*c + 16*a^4* \\
& 4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2* \\
& c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a* \\
& b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 \\
& - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2 \\
& *c^4 - 64*a^3*c^5)*c^2) + 1/8*(3*b^3*c^2*d*x^7 - 24*a*b*c^3*d*x^7 + a*b^2*c \\
& ^2*f*x^7 + 20*a^2*c^3*f*x^7 - 12*a^2*b*c^2*h*x^7 - 12*a^2*b*c^2*g*x^6 + 24* \\
& a^2*c^3*x^6*e + 6*b^4*c*d*x^5 - 49*a*b^2*c^2*d*x^5 + 28*a^2*c^3*d*x^5 + 2*a \\
& *b^3*c*f*x^5 + 28*a^2*b*c^2*f*x^5 - 19*a^2*b^2*c*h*x^5 + 4*a^3*c^2*h*x^5 - \\
& 18*a^2*b^2*c*g*x^4 + 36*a^2*b*c^2*x^4*e + 3*b^5*d*x^3 - 20*a*b^3*c*d*x^3 - \\
& 4*a^2*b*c^2*d*x^3 + a*b^4*f*x^3 + 5*a^2*b^2*c*f*x^3 + 36*a^3*c^2*f*x^3 - 5* \\
& a^2*b^3*h*x^3 - 16*a^3*b*c*h*x^3 - 4*a^2*b^3*g*x^2 - 20*a^3*b*c*g*x^2 + 8*a \\
& ^2*b^2*c*x^2*e + 40*a^3*c^2*x^2*e + 5*a*b^4*d*x - 37*a^2*b^2*c*d*x + 44*a^3 \\
& *c^2*d*x - a^2*b^3*f*x + 16*a^3*b*c*f*x - 3*a^3*b^2*h*x - 12*a^4*c*h*x - 2* \\
& a^3*b^2*g - 16*a^4*c*g - 2*a^2*b^3*e + 20*a^3*b*c*e)/((a^2*b^4 - 8*a^3*b^2* \\
& c + 16*a^4*c^2)*(c*x^4 + b*x^2 + a)^2)
\end{aligned}$$

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

[Out] 
$$\begin{aligned}
& -15/2/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+ \\
& b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x) \\
& *(-4*a*c+b^2)^{(1/2)}*b^2*d+3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2 \\
& )*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2) \\
& ^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^4*d+3/4/a^2/(16*a^2*c^2-8*a*b^2* \\
& c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2 \\
& ^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^4*d+1/4/ \\
& a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2) \\
& )*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c \\
& +b^2)^{(1/2)}*b^3*f+1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2) \\
& }/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c) \\
& ^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^3*f-15/2/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/ \\
& (16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+ \\
& (-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*d+(-1/8*c^2*(12*a^ \\
& 2*b*h-20*a^2*c*f-a*b^2*f+24*a*b*c*d-3*b^3*d)/a^2/(16*a^2*c^2-8*a*b^2*c+b^4) \\
& *x^7-3/2*c^2*(b*g-2*c*e)/(16*a^2*c^2-8*a*b^2*c+b^4)*x^6+1/8/a^2*c*(4*a^3*c* \\
& h-19*a^2*b^2*h+28*a^2*b*c*f+28*a^2*c^2*d+2*a*b^3*f-49*a*b^2*c*d+6*b^4*d)/(1 \\
& 6*a^2*c^2-8*a*b^2*c+b^4)*x^5-9/4*b*c*(b*g-2*c*e)/(16*a^2*c^2-8*a*b^2*c+b^4) \\
& *x^4-1/8*(16*a^3*b*c*h-36*a^3*c^2*f+5*a^2*b^3*h-5*a^2*b^2*c*f+4*a^2*b*c^2*d \\
& -a*b^4*f+20*a*b^3*c*d-3*b^5*d)/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*x^3-1/2*(5*a*
\end{aligned}$$

$$\begin{aligned}
& c+b^2)*(b*g-2*c*e)/(16*a^2*c^2-8*a*b^2*c+b^4)*x^2-1/8*(12*a^3*c*h+3*a^2*b^2 \\
& *h-16*a^2*b*c*f-44*a^2*c^2*d+a*b^3*f+37*a*b^2*c*d-5*b^4*d)/(16*a^2*c^2-8*a* \\
& b^2*c+b^4)/a*x-1/4*(8*a^2*c*g+a*b^2*g-10*a*b*c*e+b^3*e)/(16*a^2*c^2-8*a*b^2 \\
& *c+b^4))/(c*x^4+b*x^2+a)^2-4/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)* \\
& 2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2) \\
& )*c)^(1/2)*c*x)*b^2*f-24/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2 \\
& ^{(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2) \\
& )*c)^(1/2)*c*x)*b*d+4/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/ \\
& 2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2) \\
& )*c)^(1/2)*c*x)*b^2*f+24/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^( \\
& 1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2) \\
& )*c)^(1/2)*c*x)*b*d+3/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2) \\
& )/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c) \\
& )^(1/2)*c*x)*b^3*h+20*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/ \\
& 2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))* \\
& c)^(1/2)*c*x)*f-20*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/2)/ \\
& ((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))* \\
& c)^(1/2)*c*x)*f-3/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((-b+ \\
& (-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1 \\
& /2)*c*x)*b^3*h+42/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/2)/((- \\
& b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^( \\
& 1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d+42/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4 \\
& *b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b \\
& ^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*d+6/(16*a^2*c^2-8*a*b^2*c+b^4)* \\
& c/(16*a*c-4*b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b*g-6 \\
& /((16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2) \\
& ))*(-4*a*c+b^2)^(1/2)*b*g-12*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2) \\
& )*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1 \\
& /2))*c)^(1/2)*c*x)*b*h+9/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)* \\
& 2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1 \\
& /2))*c)^(1/2)*c*x)*b^3*d-9/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)* \\
& 2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2) \\
& ^{(1/2))*c)^(1/2)*c*x)*b^3*d-1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^ \\
& 2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2) \\
& ^{(1/2))*c)^(1/2)*c*x)*b^4*f+3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4* \\
& b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c \\
& +b^2)^(1/2))*c)^(1/2)*c*x)*b^5*d-13/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c- \\
& 4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a \\
& *c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b*f+9/2/(16*a^2*c^2-8*a*b^2 \\
& *c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh( \\
& 2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*h+9/2 \\
& /((16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2) \\
& )*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2) \\
& )^(1/2)*b^2*h-13/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((b+ \\
& (-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)
\end{aligned}$$

$$) * c * x) * (-4 * a * c + b^2)^{(1/2)} * b * f - 3/4 / a^2 / (16 * a^2 * c^2 - 8 * a * b^2 * c + b^4) * c / (16 * a * c - 4 * b^2) * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \arctan(2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b^5 * d + 1/4 / a / (16 * a^2 * c^2 - 8 * a * b^2 * c + b^4) * c / (16 * a * c - 4 * b^2) * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b^4 * f + 6 * a / (16 * a^2 * c^2 - 8 * a * b^2 * c + b^4) * c^2 / (16 * a * c - 4 * b^2) * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * (-4 * a * c + b^2)^{(1/2)} * h + 12 * a / (16 * a^2 * c^2 - 8 * a * b^2 * c + b^4) * c^2 / (16 * a * c - 4 * b^2) * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b * h + 6 * a / (16 * a^2 * c^2 - 8 * a * b^2 * c + b^4) * c^2 / (16 * a * c - 4 * b^2) * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctan}(2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * (-4 * a * c + b^2)^{(1/2)} * h - 12 / (16 * a^2 * c^2 - 8 * a * b^2 * c + b^4) * c^2 / (16 * a * c - 4 * b^2) * \ln(-2 * c * x^2 - b + (-4 * a * c + b^2)^{(1/2)}) * (-4 * a * c + b^2)^{(1/2)} * e + 12 / (16 * a^2 * c^2 - 8 * a * b^2 * c + b^4) * c^2 / (16 * a * c - 4 * b^2) * \ln(2 * c * x^2 + b + (-4 * a * c + b^2)^{(1/2)}) * (-4 * a * c + b^2)^{(1/2)} * e$$

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] 
$$-1/8 * ((12 * a^2 * b * c^2 * h - 3 * (b^3 * c^2 - 8 * a * b * c^3) * d - (a * b^2 * c^2 + 20 * a^2 * c^3) * f) * x^7 - 12 * (2 * a^2 * c^3 * e - a^2 * b * c^2 * g) * x^6 - ((6 * b^4 * c - 49 * a * b^2 * c^2 + 28 * a^2 * c^3) * d + 2 * (a * b^3 * c + 14 * a^2 * b * c^2) * f - (19 * a^2 * b^2 * c - 4 * a^3 * c^2) * h) * x^5 - 18 * (2 * a^2 * b * c^2 * e - a^2 * b^2 * c * g) * x^4 - ((3 * b^5 - 20 * a * b^3 * c - 4 * a^2 * b * c^2) * d + (a * b^4 + 5 * a^2 * b^2 * c + 36 * a^3 * c^2) * f - (5 * a^2 * b^3 + 16 * a^3 * b * c) * h) * x^3 - 4 * (2 * (a^2 * b^2 * c + 5 * a^3 * c^2) * e - (a^2 * b^3 + 5 * a^3 * b * c) * g) * x^2 + 2 * (a^2 * b^3 - 10 * a^3 * b * c) * e + 2 * (a^3 * b^2 + 8 * a^4 * c) * g - ((5 * a * b^4 - 37 * a^2 * b^2 * c + 44 * a^3 * c^2) * d - (a^2 * b^3 - 16 * a^3 * b * c) * f - 3 * (a^3 * b^2 + 4 * a^4 * c) * h) * x) / ((a^2 * b^4 * c^2 - 8 * a^3 * b^2 * c^3 + 16 * a^4 * c^4) * x^8 + a^4 * b^4 - 8 * a^5 * b^2 * c + 16 * a^6 * c^2 + 2 * (a^2 * b^5 * c - 8 * a^3 * b^3 * c^2 + 16 * a^4 * b * c^3) * x^6 + (a^2 * b^6 - 6 * a^3 * b^4 * c + 32 * a^5 * c^3) * x^4 + 2 * (a^3 * b^5 - 8 * a^4 * b^3 * c + 16 * a^5 * b * c^2) * x^2) - 1/8 * \operatorname{integrate}(((12 * a^2 * b * c * h - 3 * (b^3 * c - 8 * a * b * c^2) * d - (a * b^2 * c + 20 * a^2 * c^2) * f) * x^2 - 3 * (b^4 - 9 * a * b^2 * c + 28 * a^2 * c^2) * d - (a * b^3 - 16 * a^2 * b * c) * f - 3 * (a^2 * b^2 + 4 * a^3 * c) * h - 24 * (2 * a^2 * c^2 * e - a^2 * b * c * g) * x) / (c * x^4 + b * x^2 + a), x) / (a^2 * b^4 - 8 * a^3 * b^2 * c + 16 * a^4 * c^2)$$

**mupad [B]** time = 5.35, size = 23811, normalized size = 35.07

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] ((9*x^4*(2*b*c^2*e - b^2*c*g))/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (x^2*(b^3*g - 10*a*c^2*e - 2*b^2*c*e + 5*a*b*c*g))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (b^3*e + a*b^2*g + 8*a^2*c*g - 10*a*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^5*(28*a^2*c^3*d + 4*a^3*c^2*h + 6*b^4*c*d + 2*a*b^3*c*f - 49*a*b^2*c^2*d + 28*a^2*b*c^2*f - 19*a^2*b^2*c*h))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^3*(3*b^5*d + 36*a^3*c^2*f - 5*a^2*b^3*h + a*b^4*f - 20*a*b^3*c*d - 16*a^3*b*c*h - 4*a^2*b*c^2*d + 5*a^2*b^2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (x*(3*a^2*b^2*h - 44*a^2*c^2*d - 5*b^4*d + a*b^3*f + 12*a^3*c*h + 37*a*b^2*c*d - 16*a^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*c^2*x^6*(2*c*e - b*g))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^7*(20*a^2*c^2*f + 3*b^3*c*d - 24*a*b*c^2*d + a*b^2*c*f - 12*a^2*b*c*h))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6) + symsum(log((10368*a*b^5*c^6*d^3 - 8000*a^5*c^7*f^3 - 567*b^7*c^5*d^3 + 169344*a^3*b*c^8*d^3 + 193536*a^4*c^8*d*e^2 - 141120*a^4*c^8*d^2*f + 1728*a^6*b*c^5*h^3 + 315*b^8*c^4*d^2*f + 27648*a^5*c^7*e^2*h - 135*b^9*c^3*d^2*h - 2880*a^6*c^6*f*h^2 - 67824*a^2*b^3*c^7*d^3 + 35*a^2*b^6*c^4*f^3 + 84*a^3*b^4*c^5*f^3 - 12720*a^4*b^2*c^6*f^3 + 540*a^4*b^5*c^3*h^3 + 4320*a^5*b^3*c^4*h^3 - 40320*a^5*c^7*d*f*h - 6237*a*b^6*c^5*d^2*f + 210*a*b^7*c^4*d*f^2 + 116160*a^4*b*c^7*d*f^2 - 36864*a^4*b*c^7*e^2*f + 2430*a*b^7*c^4*d^2*h + 133056*a^4*b*c^7*d^2*h + 27648*a^5*b*c^6*d*h^2 + 26880*a^5*b*c^6*f^2*h + 6912*a^2*b^4*c^6*d*e^2 - 62208*a^3*b^2*c^7*d*e^2 + 42372*a^2*b^4*c^6*d^2*f - 1764*a^2*b^5*c^5*d*f^2 - 96048*a^3*b^2*c^7*d^2*f - 4608*a^3*b^3*c^6*d*f^2 + 1728*a^2*b^6*c^4*d*g^2 + 2304*a^3*b^3*c^6*e^2*f - 15552*a^3*b^4*c^5*d*g^2 + 48384*a^4*b^2*c^6*d*g^2 - 13716*a^2*b^5*c^5*d^2*h + 405*a^2*b^7*c^3*d*h^2 + 12096*a^3*b^3*c^6*d^2*h - 5400*a^3*b^5*c^4*d*h^2 + 28944*a^4*b^3*c^5*d*h^2 + 576*a^3*b^5*c^4*f*g^2 + 6912*a^4*b^2*c^6*e^2*h - 9216*a^4*b^3*c^5*f*g^2 - 15*a^2*b^7*c^3*f^2*h - 360*a^3*b^5*c^4*f^2*h + 135*a^3*b^6*c^3*f*h^2 + 15696*a^4*b^3*c^5*f^2*h - 5580*a^4*b^4*c^4*f*h^2 - 20592*a^5*b^2*c^5*f*h^2 + 1728*a^4*b^4*c^4*g^2*h + 6912*a^5*b^2*c^5*g^2*h - 193536*a^4*b*c^7*d*e*g - 90*a*b^8*c^3*d*f*h - 27648*a^5*b*c^6*e*g*h - 6912*a^2*b^5*c^5*d*e*g + 62208*a^3*b^3*c^6*d*e*g - 270*a^2*b^6*c^4*d*f*h + 16056*a^3*b^4*c^5*d*f*h - 2304*a^3*b^4*c^5*e*f*g - 127008*a^4*b^2*c^6*d*f*h + 36864*a^4*b^2*c^6*e*f*g - 6912*a^4*b^3*c^5*e*g*h)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 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 - 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 - 456130560*a^9*b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c^5*d*h*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 254017536*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680*a^
```

$$\begin{aligned}
& 10*b^2*c^7*f*h*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 - 61931520*a^7*b^8*c^4*f \\
& *h*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + 614 \\
& 4000*a^6*b^10*c^3*f*h*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^9*c \\
& ^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 + 3 \\
& 68640*a^5*b^11*c^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^ \\
& 14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 440401920*a^10*b*c^8*f^2*z \\
& ^2 - 188743680*a^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 + 46080*a^5 \\
& *b^13*c*h^2*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 \\
& + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 15099494 \\
& 40*a^9*b^2*c^8*e^2*z^2 + 251658240*a^11*c^8*f*h*z^2 + 1536*a^3*b^16*f*h*z^2 \\
& + 4608*a^2*b^17*d*h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c* \\
& d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 4 \\
& 77102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^ \\
& 10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^10*b^3*c^6 \\
& *h^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + \\
& 146165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 - 26542080*a^ \\
& 8*b^7*c^4*h^2*z^2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5*c^5*h^2*z \\
& ^2 - 1290240*a^6*b^11*c^2*h^2*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 294912*a \\
& ^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^ \\
& 2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 29184 \\
& 0*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c \\
& ^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 120795955 \\
& 2*a^10*c^9*e^2*z^2 + 2304*a^4*b^15*h^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^ \\
& 19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 99090432*a^8*b*c^7*d*g*h*z - 460 \\
& 8*a^3*b^12*c*f*g*h*z - 9437184*a^8*b*c^7*e*f*h*z - 13824*a^2*b^13*c*d*g*h*z \\
& + 9216*a*b^13*c^2*d*e*f*z - 4608*a*b^14*c*d*f*g*z + 219414528*a^7*b^2*c^7* \\
& d*e*h*z - 221773824*a^6*b^3*c^7*d*e*f*z - 109707264*a^7*b^3*c^6*d*g*h*z + 1 \\
& 10886912*a^6*b^4*c^6*d*f*g*z - 88473600*a^6*b^4*c^6*d*e*h*z - 84934656*a^7* \\
& b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z + 44236800*a^6*b^5*c^5*d*g* \\
& h*z - 5898240*a^7*b^4*c^5*f*g*h*z + 4718592*a^8*b^2*c^6*f*g*h*z + 2949120*a \\
& ^6*b^6*c^4*f*g*h*z - 737280*a^5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g*h* \\
& z - 58982400*a^5*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^6*e*f*h*z - 6635520*a \\
& ^5*b^7*c^4*d*g*h*z - 5898240*a^6*b^5*c^5*e*f*h*z + 1474560*a^5*b^7*c^4*e*f* \\
& h*z - 276480*a^4*b^9*c^3*d*g*h*z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a^3* \\
& b^11*c^2*d*g*h*z + 9216*a^3*b^11*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*g*z \\
& + 13271040*a^5*b^6*c^5*d*e*h*z - 2396160*a^3*b^10*c^3*d*f*g*z + 552960*a^4 \\
& *b^8*c^4*d*e*h*z - 359424*a^3*b^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f*g* \\
& z + 27648*a^2*b^12*c^2*d*e*h*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3 \\
& *b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2*g* \\
& z + 7077888*a^9*b*c^6*g*h^2*z - 6912*a^4*b^11*c*g*h^2*z - 19660800*a^8*b*c^ \\
& 7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z + 214272*a*b^13*c^2*d^2*g*z - 428544*a*b \\
& ^12*c^3*d^2*e*z - 198180864*a^8*c^8*d*e*h*z + 1022754816*a^6*b^2*c^8*d^2*e* \\
& z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 3211591 \\
& 68*a^5*b^5*c^6*d^2*g*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*a^4*b^7* \\
& c^5*d^2*g*z - 8847360*a^8*b^3*c^5*g*h^2*z + 4423680*a^7*b^5*c^4*g*h^2*z - 1
\end{aligned}$$

$105920a^6b^7c^3g^2h^2z + 138240a^5b^9c^2g^2h^2z + 25362432a^7b^3c^6f^2g^2z + 17694720a^8b^2c^6e^2h^2z - 50724864a^7b^2c^7e^2f^2z -$   
 $13271040a^6b^5c^5f^2g^2z - 8847360a^7b^4c^5e^2h^2z + 3563520a^5b^7c^4f^2g^2z + 2211840a^6b^6c^4e^2h^2z - 506880a^4b^9c^3f^2g^2z -$   
 $276480a^5b^8c^3e^2h^2z + 34560a^3b^11c^2f^2g^2z + 13824a^4b^10c^2e^2h^2z + 26542080a^6b^4c^6e^2f^2z + 23362560a^3b^9c^4d^2g^2z -$   
 $46725120a^3b^8c^5d^2e^2z - 7127040a^5b^6c^5e^2f^2z - 2965248a^2b^11c^3d^2g^2z + 1013760a^4b^8c^4e^2f^2z - 69120a^3b^10c^3e^2f^2z +$   
 $1536a^2b^12c^2e^2f^2z + 5930496a^2b^10c^4d^2e^2z - 693633024a^7c^9d^2e^2z - 14155776a^9c^7e^2h^2z + 39321600a^8c^8e^2f^2z + 13824b^14c^2d^2e^2z -$   
 $6912b^15c^4d^2g^2z + 2211840a^6b^6c^6e^2f^2g^2h + 15482880a^5b^6c^7d^2e^2f^2g - 13824a^6b^9c^3d^2e^2f^2g + 4423680a^5b^3c^5e^2f^2g^2h +$   
 $138240a^4b^5c^4e^2f^2g^2h - 13824a^3b^7c^3e^2f^2g^2h - 16588800a^5b^2c^6d^2e^2g^2h + 1658880a^4b^4c^5d^2e^2g^2h + 124416a^3b^6c^4d^2e^2g^2h - 4$   
 $1472a^2b^8c^3d^2e^2g^2h + 7741440a^4b^3c^6d^2e^2f^2g - 2903040a^3b^5c^5d^2e^2f^2g + 387072a^2b^7c^4d^2e^2f^2g - 37062144a^5b^6c^7d^2f^2h - 59857$   
 $92a^6b^6c^6d^2f^2h^2 + 206010a^6b^9c^3d^2f^2h - 6300a^6b^10c^2d^2f^2h + 16588800a^5b^6c^7d^2e^2h + 3456a^6b^10c^2d^2f^2g^2 + 435456a^6b^8c^4d^2$   
 $2e^2g + 13824a^6b^8c^4d^2e^2f + 1350a^6b^11c^2d^2f^2h^2 - 1105920a^5b^4c^4f^2g^2h - 552960a^6b^2c^5f^2g^2h - 34560a^4b^6c^3f^2g^2h + 3456a^3b^8c^2f^2g^2h -$   
 $1658880a^6b^2c^5e^2g^2h^2 - 829440a^5b^4c^4e^2g^2h^2 - 20736a^4b^6c^3e^2g^2h^2 - 4423680a^5b^2c^6e^2f^2h + 4147200a^5b^3c^5d^2g^2h - 414720a^4b^5c^4d^2g^2h - 138240a^4b^4c^5e^2f^2h -$   
 $31104a^3b^7c^3d^2g^2h + 13824a^3b^6c^4e^2f^2h + 10368a^2b^9c^2d^2g^2h + 15630336a^5b^2c^6d^2f^2h - 14459904a^4b^3c^6d^2f^2h + 96$   
 $30144a^3b^5c^5d^2f^2h - 8764416a^5b^3c^5d^2f^2h^2 - 3870720a^5b^2c^6e^2f^2g + 2867328a^4b^4c^5d^2f^2h - 2095200a^2b^7c^4d^2f^2h - 14$   
 $14080a^3b^6c^4d^2f^2h - 34836480a^4b^2c^7d^2e^2g - 645120a^4b^4c^5e^2f^2g + 306720a^3b^7c^3d^2f^2h^2 + 197820a^2b^8c^3d^2f^2h + 1468$   
 $80a^4b^5c^4d^2f^2h^2 + 80640a^3b^6c^4e^2f^2g - 55350a^2b^9c^2d^2f^2h^2 - 2304a^2b^8c^3e^2f^2g - 3870720a^5b^2c^6d^2f^2g^2 - 1935360a^4b^4c^5d^2f^2g^2 -$   
 $1658880a^4b^3c^6d^2e^2h + 725760a^3b^6c^4d^2f^2g^2 + 17418240a^3b^4c^6d^2e^2g - 124416a^3b^5c^5d^2e^2h - 96768a^2b^8c^3d^2f^2g^2 + 41472a^2b^7c^4d^2e^2h - 3919104a^2b^6c^5d^2e^2g - 77$   
 $41440a^4b^2c^7d^2e^2f + 2903040a^3b^4c^6d^2e^2f - 387072a^2b^6c^5d^2e^2f - 1648128a^5b^3c^5f^3h - 898560a^6b^3c^4f^2h^3 - 354240a^5b^5c^3f^2h^3 - 354240a^4b^5c^4f^3h + 43680a^3b^7c^3f^3h - 216$   
 $00a^4b^7c^2f^2h^3 - 1050a^2b^9c^2f^3h + 225a^2b^10c^2f^2h^2 + 16$   
 $58880a^6b^6c^6e^2h^2 + 16547328a^4b^2c^7d^3h - 12306816a^3b^4c^6d^3h + 37310976a^3b^3c^7d^3f + 3037824a^2b^6c^5d^3h - 2654208a^5b^3c^5e^2g^3 + 1949184a^6b^2c^5d^2h^3 + 1296000a^5b^4c^4d^2h^3 -$   
 $155520a^4b^6c^3d^2h^3 - 40500a^6b^10c^2d^2h^2 - 8100a^3b^8c^2d^2h^3 + 3870720a^5b^6c^7e^2f^2 + 34836480a^4b^6c^8d^2e^2 - 108864a^6b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^2f^3 + 173779$   
 $2a^3b^5c^5d^2f^3 - 260190a^6b^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 -$

$$\begin{aligned}
& 435456*a*b^7*c^5*d^2*e^2 - 2211840*a^6*c^7*e^2*f*h - 9450*b^11*c^2*d^2*f*h \\
& + 1612800*a^6*c^7*d*f^2*h - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f \\
& - 883200*a^6*b*c^6*f^3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f*h^3 \\
& - 15482880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c^4*d^3*h \\
& + 4050*a^2*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f \\
& + 7350*a*b^9*c^3*d*f^3 + 414720*a^6*b^3*c^4*g^2*h^2 + 207360*a^5*b^5*c^3*g^2*h^2 \\
& + 5184*a^4*b^7*c^2*g^2*h^2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 1264320*a^5*b^4*c^4*f^2*h^2 \\
& + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 + 967680*a^5*b^3*c^5*f^2*g^2 \\
& + 829440*a^5*b^3*c^5*e^2*h^2 + 161280*a^4*b^5*c^4*f^2*g^2 + 20736*a^4*b^5*c^4*e^2*h^2 \\
& - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2*c^6*d^2*h^2 \\
& + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - 1412640*a^3*b^6*c^4*d^2*h^2 \\
& + 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*c^3*d^2*h^2 + 8709120*a^4*b^3*c^6*d^2*g^2 \\
& - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*d^2*g^2 + 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) * ((983040*a^7*c^8*e*f - 3244032*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 - 184320*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 - 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 - 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 - 456130560*a^9*b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c^
\end{aligned}$$

$$\begin{aligned}
& 5*d*h*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + \\
& 254017536*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680* \\
& a^10*b^2*c^7*f*h*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 - 61931520*a^7*b^8*c^4 \\
& *f*h*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + 6 \\
& 144000*a^6*b^10*c^3*f*h*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^9 \\
& *c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 + \\
& 368640*a^5*b^11*c^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3* \\
& b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 440401920*a^10*b*c^8*f^2 \\
& *z^2 - 188743680*a^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 + 46080*a \\
& ^5*b^13*c*h^2*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z \\
& ^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 150994 \\
& 9440*a^9*b^2*c^8*e^2*z^2 + 251658240*a^11*c^8*f*h*z^2 + 1536*a^3*b^16*f*h*z \\
& ^2 + 4608*a^2*b^17*d*h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17* \\
& c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + \\
& 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888* \\
& a^10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^10*b^3*c \\
& ^6*h^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 \\
& + 146165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 - 26542080* \\
& a^8*b^7*c^4*h^2*z^2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5*c^5*h^2 \\
& *z^2 - 1290240*a^6*b^11*c^2*h^2*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 294912 \\
& *a^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4* \\
& f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291 \\
& 840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10 \\
& *c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959 \\
& 552*a^10*c^9*e^2*z^2 + 2304*a^4*b^15*h^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304* \\
& b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 99090432*a^8*b*c^7*d*g*h*z - 4 \\
& 608*a^3*b^12*c*f*g*h*z - 9437184*a^8*b*c^7*e*f*h*z - 13824*a^2*b^13*c*d*g*h \\
& *z + 9216*a*b^13*c^2*d*e*f*z - 4608*a*b^14*c*d*f*g*z + 219414528*a^7*b^2*c^ \\
& 7*d*e*h*z - 221773824*a^6*b^3*c^7*d*e*f*z - 109707264*a^7*b^3*c^6*d*g*h*z + \\
& 110886912*a^6*b^4*c^6*d*f*g*z - 88473600*a^6*b^4*c^6*d*e*h*z - 84934656*a^ \\
& 7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z + 44236800*a^6*b^5*c^5*d* \\
& g*h*z - 5898240*a^7*b^4*c^5*f*g*h*z + 4718592*a^8*b^2*c^6*f*g*h*z + 2949120 \\
& *a^6*b^6*c^4*f*g*h*z - 737280*a^5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g* \\
& h*z - 58982400*a^5*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^6*e*f*h*z - 6635520 \\
& *a^5*b^7*c^4*d*g*h*z - 5898240*a^6*b^5*c^5*e*f*h*z + 1474560*a^5*b^7*c^4*e* \\
& f*h*z - 276480*a^4*b^9*c^3*d*g*h*z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a^ \\
& 3*b^11*c^2*d*g*h*z + 9216*a^3*b^11*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*g \\
& *z + 13271040*a^5*b^6*c^5*d*e*h*z - 2396160*a^3*b^10*c^3*d*f*g*z + 552960*a \\
& ^4*b^8*c^4*d*e*h*z - 359424*a^3*b^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f* \\
& g*z + 27648*a^2*b^12*c^2*d*e*h*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a \\
& ^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2* \\
& g*z + 7077888*a^9*b*c^6*g*h^2*z - 6912*a^4*b^11*c*g*h^2*z - 19660800*a^8*b* \\
& c^7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z + 214272*a*b^13*c^2*d^2*g*z - 428544*a \\
& *b^12*c^3*d^2*e*z - 198180864*a^8*c^8*d*e*h*z + 1022754816*a^6*b^2*c^8*d^2* \\
& e*z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 32115
\end{aligned}$$



$$\begin{aligned}
& 9168a^5b^5c^6d^2g^*z + 223395840a^4b^6c^6d^2e^*z - 111697920a^4b^7c^5d^2g^*z - 8847360a^8b^3c^5g^*h^2z + 4423680a^7b^5c^4g^*h^2z - \\
& 1105920a^6b^7c^3g^*h^2z + 138240a^5b^9c^2g^*h^2z + 25362432a^7b^3c^6f^2g^*z + 17694720a^8b^2c^6e^*h^2z - 50724864a^7b^2c^7e^*f^2z \\
& - 13271040a^6b^5c^5f^2g^*z - 8847360a^7b^4c^5e^*h^2z + 3563520a^5b^7c^4f^2g^*z + 2211840a^6b^6c^4e^*h^2z - 506880a^4b^9c^3f^2g^*z \\
& - 276480a^5b^8c^3e^*h^2z + 34560a^3b^11c^2f^2g^*z + 13824a^4b^10c^2e^*h^2z + 26542080a^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^11c^3d^2g^*z + 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 - 14155776a^9c^7e^*h^2z + 39321600a^8c^8e^*f^2z + 13824b^14c^2d^2e^*z \\
& - 6912b^15c^d^2g^*z + 2211840a^6b^c^6e^*f^*g^*h + 15482880a^5b^c^7d^*e^*f^*g - 13824a^*b^9c^3d^*e^*f^*g + 4423680a^5b^3c^5e^*f^*g^*h + 138240a^4b^5c^4e^*f^*g^*h \\
& - 13824a^3b^7c^3e^*f^*g^*h - 16588800a^5b^2c^6d^*e^*g^*h + 1658880a^4b^4c^5d^*e^*g^*h + 124416a^3b^6c^4d^*e^*g^*h - 41472a^2b^8c^3d^*e^*g^*h \\
& + 7741440a^4b^3c^6d^*e^*f^*g - 2903040a^3b^5c^5d^*e^*f^*g + 387072a^2b^7c^4d^*e^*f^*g - 37062144a^5b^c^7d^2*f^*h - 5985792a^6b^c^6d^*f^*h^2 \\
& + 206010a^*b^9c^3d^2*f^*h - 6300a^*b^10c^2d^*f^2*h + 16588800a^5b^c^7d^*e^2*h + 3456a^*b^10c^2d^*f^*g^2 + 435456a^*b^8c^4d^2*e^*g \\
& + 13824a^*b^8c^4d^*e^2*f + 1350a^*b^11c^d^*f^*h^2 - 1105920a^5b^4c^4*f^*g^2*h - 552960a^6b^2c^5*f^*g^2*h - 34560a^4b^6c^3*f^*g^2*h + 3456a^3b^8c^2*f^*g^2*h \\
& - 1658880a^6b^2c^5e^*g^*h^2 - 829440a^5b^4c^4e^*g^*h^2 - 20736a^4b^6c^3e^*g^*h^2 - 4423680a^5b^2c^6e^2*f^*h + 4147200a^5b^3c^5d^*g^2*h \\
& - 414720a^4b^5c^4d^*g^2*h - 138240a^4b^4c^5e^2*f^*h - 31104a^3b^7c^3d^*g^2*h + 13824a^3b^6c^4e^2*f^*h + 10368a^2b^9c^2d^*g^2*h \\
& + 15630336a^5b^2c^6d^*f^2*h - 14459904a^4b^3c^6d^2*f^*h + 9630144a^3b^5c^5d^2*f^*h - 8764416a^5b^3c^5d^*f^*h^2 - 3870720a^5b^2c^6e^*f^2*g \\
& + 2867328a^4b^4c^5d^*f^2*h - 2095200a^2b^7c^4d^2*f^*h - 1414080a^3b^6c^4d^*f^2*h - 34836480a^4b^2c^7d^2e^*g - 645120a^4b^4c^5e^*f^2*g \\
& + 306720a^3b^7c^3d^*f^*h^2 + 197820a^2b^8c^3d^*f^2*h + 146880a^4b^5c^4d^*f^*h^2 + 80640a^3b^6c^4e^*f^2*g - 55350a^2b^9c^2d^*f^*h^2 \\
& - 2304a^2b^8c^3e^*f^2*g - 3870720a^5b^2c^6d^*f^*g^2 - 1935360a^4b^4c^5d^*f^*g^2 - 1658880a^4b^3c^6d^*e^2*h + 725760a^3b^6c^4d^*f^*g^2 \\
& + 17418240a^3b^4c^6d^2e^*g - 124416a^3b^5c^5d^*e^2*h - 96768a^2b^8c^3d^*f^*g^2 + 41472a^2b^7c^4d^*e^2*h - 3919104a^2b^6c^5d^2e^*g \\
& - 7741440a^4b^2c^7d^*e^2*f + 2903040a^3b^4c^6d^*e^2*f - 387072a^2b^6c^5d^*e^2*f - 1648128a^5b^3c^5f^3*h - 898560a^6b^3c^4f^*h^3 - 354240a^5b^5c^3f^*h^3 \\
& - 354240a^4b^5c^4f^3*h + 43680a^3b^7c^3f^3*h - 21600a^4b^7c^2f^*h^3 - 1050a^2b^9c^2f^3*h + 225a^2b^10c^f^2*h^2 + 1658880a^6b^c^6e^2*h^2 \\
& + 16547328a^4b^2c^7d^3*h - 12306816a^3b^4c^6d^3*h + 37310976a^3b^3c^7d^3*f + 3037824a^2b^6c^5d^3*h - 2654208a^5b^3c^5e^*g^3 \\
& + 1949184a^6b^2c^5d^*h^3 + 1296000a^5b^4c^4d^*h^3 - 155520a^4b^6c^3d^*h^3 - 40500a^*b^10c^2d^2*h^2 - 8100a^3b^8c^2d^*h^3 \\
& + 3870720a^5b^c^7e^2*f^2 + 34836480a^4b^c^8d^2e^2 - 108864a^*b^9
\end{aligned}$$

$$\begin{aligned}
& *c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737 \\
& 792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 \\
& - 435456*a*b^7*c^5*d^2*e^2 - 2211840*a^6*c^7*e^2*f*h - 9450*b^11*c^2*d^2*f \\
& *h + 1612800*a^6*c^7*d*f^2*h - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8* \\
& d^3*f - 883200*a^6*b*c^6*f^3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f* \\
& h^3 - 15482880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c^ \\
& 4*d^3*h + 4050*a^2*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^ \\
& 5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 414720*a^6*b^3*c^4*g^2*h^2 + 207360*a^5*b^ \\
& 5*c^3*g^2*h^2 + 5184*a^4*b^7*c^2*g^2*h^2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 12 \\
& 64320*a^5*b^4*c^4*f^2*h^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2* \\
& f^2*h^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c^5*e^2*h^2 + 161280* \\
& a^4*b^5*c^4*f^2*g^2 + 20736*a^4*b^5*c^4*e^2*h^2 - 20160*a^3*b^7*c^3*f^2*g^2 \\
& + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2*c^6*d^2*h^2 + 7962624*a^5*b^2 \\
& *c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - 1412640*a^3*b^6*c^4*d^2*h^2 + \\
& 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*c^3*d^2*h^2 + 8709120*a^4*b^3* \\
& c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*d^2*g^2 + 64 \\
& 5120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2 \\
& *f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - 1741824 \\
& 0*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 115200*a^7*c^6*f^2*h^ \\
& 2 + 6096384*a^6*c^7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^ \\
& 2 + 5644800*a^5*c^8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*h \\
& ^4 + 32400*a^5*b^6*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 \\
& + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 \\
& + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 \\
& + 28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 58 \\
& 0608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 2025*a^4*b^8*c*h^4 - 734832*a*b^ \\
& 6*c^6*d^4 + 20736*a^8*c^5*h^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + \\
& 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*((768*a^2*b^14*c^2*d - 3145 \\
& 728*a^10*c^8*h - 22020096*a^9*c^9*d - 22272*a^3*b^12*c^3*d + 282624*a^4*b^1 \\
& 0*c^4*d - 2027520*a^5*b^8*c^5*d + 8847360*a^6*b^6*c^6*d - 23396352*a^7*b^4* \\
& c^7*d + 34603008*a^8*b^2*c^8*d + 256*a^3*b^13*c^2*f - 9216*a^4*b^11*c^3*f + \\
& 122880*a^5*b^9*c^4*f - 819200*a^6*b^7*c^5*f + 2949120*a^7*b^5*c^6*f - 5505 \\
& 024*a^8*b^3*c^7*f + 768*a^4*b^12*c^2*h - 12288*a^5*b^10*c^3*h + 61440*a^6*b \\
& ^8*c^4*h - 983040*a^8*b^4*c^6*h + 3145728*a^9*b^2*c^7*h + 4194304*a^9*b*c^8 \\
& *f)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280 \\
& *a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(1572864*a^9*c^9* \\
& e - 1536*a^4*b^10*c^4*e + 30720*a^5*b^8*c^5*e - 245760*a^6*b^6*c^6*e + 9830 \\
& 40*a^7*b^4*c^7*e - 1966080*a^8*b^2*c^8*e + 768*a^4*b^11*c^3*g - 15360*a^5*b \\
& ^9*c^4*g + 122880*a^6*b^7*c^5*g - 491520*a^7*b^5*c^6*g + 983040*a^8*b^3*c^7 \\
& *g - 786432*a^9*b*c^8*g))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 2 \\
& 40*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + \\
& (\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 + 35 \\
& 23215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*
\end{aligned}$$

$$\begin{aligned}
& z^4 + 65536a^5b^{20}z^4 - 46080a^4b^{14}c^2f^2h^2z^2 - 105984a^3b^{15}c^2d^2h^2z^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 - 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 + 6144000a^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^3c^9d^2z^2 - 1509949440a^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^2b^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^6h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^11c^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^11c^2h^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 + 1536a^2b^18d^2f^2z^2 + 1207959552a^10c^9e^2z^2 + 2304a^4b^15h^2z^2 + 256a^2b^17f^2z^2 + 2304b^19d^2z^2 + 169869312a^7b^2c^8d^2e^2f^2z^2 + 99090432a^8b^2c^7d^2g^2h^2z^2 - 4608a^3b^12c^2f^2g^2h^2z^2 - 9437184a^8b^2c^7e^2f^2h^2z^2 - 13824a^2b^13c^2d^2g^2h^2z^2 + 9216a^2b^13c^2d^2e^2f^2z^2 - 4608a^2b^14c^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^10c^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^11c^2d^2g^2h^2z^2 + 9216a^3b^11c^2e^2f^2h^2z^2 + 16220160a^4b^8c^4d^2f^2g^2z^2 + 13271040a^5b^6c^5d^2e^2h^2z^2 - 2396160a^3b^10c^3d^2f^2g^2z^2 + 552960a^4b^8c^4d^2e^2h^2z^2 - 359424a^3b^10c^3d^2e^2h^2z^2 + 175104a^2b^12c^2d^2f^2g^2z^2 + 27648a^2b^12c^2d^2e^2h^2z^2 - 32440320a^4b^7c^5d^2e^2f^2z^2 + 4792320a^3b^9c^4d^2e^2f^2z^2
\end{aligned}$$

$$\begin{aligned}
& - 350208a^2b^{11}c^3d^2ef^2z + 346816512a^7b^8c^8d^2g^2z + 7077888a^9b^8c^6g^2h^2z - 6912a^4b^{11}c^2g^2h^2z - 19660800a^8b^8c^7f^2g^2z - 768a^2b^{13}c^2f^2g^2z + 214272a^2b^{13}c^2d^2g^2z - 428544a^2b^{12}c^3d^2e^2z \\
& - 198180864a^8c^8d^2e^2h^2z + 1022754816a^6b^2c^8d^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^4b^7c^5d^2g^2z - 8847360a^8b^3c^5g^2h^2z + 4423680a^7b^5c^4g^2h^2z - 1105920a^6b^7c^3g^2h^2z + 138240a^5b^9c^2g^2h^2z + 25362432a^7b^3c^6f^2g^2z + 17694720a^8b^2c^6e^2h^2z - 50724864a^7b^2c^7e^2f^2z - 13271040a^6b^5c^5f^2g^2z - 8847360a^7b^4c^5e^2h^2z + 3563520a^5b^7c^4f^2g^2z + 2211840a^6b^6c^4e^2h^2z - 506880a^4b^9c^3f^2g^2z - 276480a^5b^8c^3e^2h^2z + 34560a^3b^{11}c^2f^2g^2z + 13824a^4b^{10}c^2e^2h^2z + 26542080a^6b^4c^6e^2f^2z + 23362560a^3b^9c^4d^2g^2z - 46725120a^3b^8c^5d^2e^2z - 7127040a^5b^6c^5e^2f^2z - 2965248a^2b^{11}c^3d^2g^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 - 14155776a^9c^7e^2h^2z + 39321600a^8c^8e^2f^2z + 13824b^{14}c^2d^2e^2z - 6912b^{15}c^2d^2g^2z + 2211840a^6b^8c^6e^2f^2g^2h + 15482880a^5b^8c^7d^2e^2f^2g - 13824a^2b^9c^3d^2e^2f^2g + 4423680a^5b^3c^5e^2f^2g^2h + 138240a^4b^5c^4e^2f^2g^2h - 13824a^3b^7c^3e^2f^2g^2h - 16588800a^5b^2c^6d^2e^2g^2h + 1658880a^4b^4c^5d^2e^2g^2h + 124416a^3b^6c^4d^2e^2g^2h - 41472a^2b^8c^3d^2e^2g^2h + 7741440a^4b^3c^6d^2e^2f^2g - 2903040a^3b^5c^5d^2e^2f^2g + 387072a^2b^7c^4d^2e^2f^2g - 37062144a^5b^8c^7d^2f^2h - 5985792a^6b^8c^6d^2f^2h^2 + 206010a^2b^9c^3d^2f^2h - 6300a^2b^{10}c^2d^2f^2h + 16588800a^5b^8c^7d^2e^2h + 3456a^2b^{10}c^2d^2f^2g^2 + 435456a^2b^8c^4d^2e^2g + 13824a^2b^8c^4d^2e^2f + 1350a^2b^{11}c^2d^2f^2h^2 - 1105920a^5b^4c^4d^2f^2g^2h - 552960a^6b^2c^5d^2f^2g^2h - 34560a^4b^6c^3d^2f^2g^2h + 3456a^3b^8c^2d^2f^2g^2h - 1658880a^6b^2c^5d^2e^2g^2h^2 - 829440a^5b^4c^4d^2e^2g^2h - 20736a^4b^6c^3d^2e^2g^2h - 4423680a^5b^2c^6d^2e^2f^2h + 4147200a^5b^3c^5d^2g^2h - 414720a^4b^5c^4d^2g^2h - 138240a^4b^4c^5d^2e^2f^2h - 31104a^3b^7c^3d^2g^2h + 13824a^3b^6c^4d^2e^2f^2h + 10368a^2b^9c^2d^2g^2h + 15630336a^5b^2c^6d^2f^2h - 14459904a^4b^3c^6d^2f^2h + 9630144a^3b^5c^5d^2f^2h - 8764416a^5b^3c^5d^2f^2h^2 - 3870720a^5b^2c^6d^2e^2f^2g + 2867328a^4b^4c^5d^2f^2h - 2095200a^2b^7c^4d^2f^2h - 1414080a^3b^6c^4d^2f^2h - 34836480a^4b^2c^7d^2e^2g - 645120a^4b^4c^5d^2e^2f^2g + 306720a^3b^7c^3d^2f^2h^2 + 197820a^2b^8c^3d^2f^2h + 146880a^4b^5c^4d^2f^2h^2 + 80640a^3b^6c^4d^2e^2f^2g - 55350a^2b^9c^2d^2f^2h^2 - 2304a^2b^8c^3d^2e^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 - 1648128a^5b^3c^5d^2f^3h - 898560a^6b^3c^4d^2f^3h - 354240a^5b^5c^3d^2f^3h - 354240a^4b^5c^4d^2f^3h + 43680a^3b^7c^3d^2f^3h - 21600a^4b^7c^2d^2f^3h - 1050a^2b^9c^2d^2f^3h + 225a^2b^{10}c^2d^2f^3h^2 + 1658880a^6b^8c^6
\end{aligned}$$

$$\begin{aligned}
& e^2 h^2 + 16547328 a^4 b^2 c^7 d^3 h - 12306816 a^3 b^4 c^6 d^3 h + 3731097 \\
& 6 a^3 b^3 c^7 d^3 f + 3037824 a^2 b^6 c^5 d^3 h - 2654208 a^5 b^3 c^5 e g^3 \\
& + 1949184 a^6 b^2 c^5 d h^3 + 1296000 a^5 b^4 c^4 d h^3 - 155520 a^4 b^6 c \\
& ^3 d h^3 - 40500 a b^{10} c^2 d^2 h^2 - 8100 a^3 b^8 c^2 d h^3 + 3870720 a^5 * \\
& b c^7 e^2 f^2 + 34836480 a^4 b c^8 d^2 e^2 - 108864 a b^9 c^3 d^2 g^2 - 806 \\
& 8032 a^2 b^5 c^6 d^3 f - 5623296 a^4 b^3 c^6 d f^3 + 1737792 a^3 b^5 c^5 d * \\
& f^3 - 260190 a b^8 c^4 d^2 f^2 - 211680 a^2 b^7 c^4 d f^3 - 435456 a b^7 c^ \\
& 5 d^2 e^2 - 2211840 a^6 c^7 e^2 f h - 9450 b^{11} c^2 d^2 f h + 1612800 a^6 c \\
& ^7 d f^2 h - 20736 b^{10} c^3 d^2 e g - 75188736 a^4 b c^8 d^3 f - 883200 a^6 \\
& * b c^6 f^3 h - 317952 a^7 b c^5 f h^3 + 1350 a^3 b^9 c f h^3 - 15482880 a^5 \\
& * c^8 d e^2 f - 10616832 a^5 b c^7 e^3 g - 345060 a b^8 c^4 d^3 h + 4050 a^2 \\
& * b^{10} c d h^3 - 4262400 a^5 b c^7 d f^3 + 852768 a b^7 c^5 d^3 f + 7350 a b \\
& ^9 c^3 d f^3 + 414720 a^6 b^3 c^4 g^2 h^2 + 207360 a^5 b^5 c^3 g^2 h^2 + 51 \\
& 84 a^4 b^7 c^2 g^2 h^2 + 1684224 a^6 b^2 c^5 f^2 h^2 + 1264320 a^5 b^4 c^4 * \\
& f^2 h^2 + 126720 a^4 b^6 c^3 f^2 h^2 - 13950 a^3 b^8 c^2 f^2 h^2 + 967680 a \\
& ^5 b^3 c^5 f^2 g^2 + 829440 a^5 b^3 c^5 e^2 h^2 + 161280 a^4 b^5 c^4 f^2 g^ \\
& 2 + 20736 a^4 b^5 c^4 e^2 h^2 - 20160 a^3 b^7 c^3 f^2 g^2 + 576 a^2 b^9 c^2 \\
& * f^2 g^2 + 11487744 a^5 b^2 c^6 d^2 h^2 + 7962624 a^5 b^2 c^6 e^2 g^2 + 355 \\
& 25376 a^4 b^2 c^7 d^2 f^2 - 1412640 a^3 b^6 c^4 d^2 h^2 + 461376 a^4 b^4 c^ \\
& 5 d^2 h^2 + 375030 a^2 b^8 c^3 d^2 h^2 + 8709120 a^4 b^3 c^6 d^2 g^2 - 4354 \\
& 560 a^3 b^5 c^5 d^2 g^2 + 979776 a^2 b^7 c^4 d^2 g^2 + 645120 a^4 b^3 c^6 e \\
& ^2 f^2 - 80640 a^3 b^5 c^5 e^2 f^2 + 2304 a^2 b^7 c^4 e^2 f^2 - 15269184 a^ \\
& 3 b^4 c^6 d^2 f^2 + 2870784 a^2 b^6 c^5 d^2 f^2 - 17418240 a^3 b^3 c^7 d^2 * \\
& e^2 + 3919104 a^2 b^5 c^6 d^2 e^2 + 115200 a^7 c^6 f^2 h^2 + 6096384 a^6 c^ \\
& 7 d^2 h^2 + 5184 b^{11} c^2 d^2 g^2 + 11025 b^{10} c^3 d^2 f^2 + 5644800 a^5 c^ \\
& 8 d^2 f^2 + 142560 a^6 b^4 c^3 h^4 + 103680 a^7 b^2 c^4 h^4 + 32400 a^5 b^6 \\
& * c^2 h^4 + 20736 b^9 c^4 d^2 e^2 + 331776 a^5 b^4 c^4 g^4 + 492800 a^5 b^2 * \\
& c^6 f^4 + 351456 a^4 b^4 c^5 f^4 - 43120 a^3 b^6 c^4 f^4 + 1225 a^2 b^8 c^3 \\
& * f^4 - 27433728 a^3 b^2 c^8 d^4 + 6446304 a^2 b^4 c^7 d^4 + 28449792 a^5 c^ \\
& 8 d^3 h + 17010 b^{10} c^3 d^3 h + 2025 b^{12} c d^2 h^2 + 580608 a^7 c^6 d h^3 \\
& - 39690 b^9 c^4 d^3 f + 2025 a^4 b^8 c h^4 - 734832 a b^6 c^6 d^4 + 20736 * \\
& a^8 c^5 h^4 + 49787136 a^4 c^9 d^4 + 160000 a^6 c^7 f^4 + 5308416 a^5 c^8 e \\
& ^4 + 35721 b^8 c^5 d^4, z, k) * x * (8388608 a^{11} b c^9 - 512 a^4 b^{15} c^2 + 14 \\
& 336 a^5 b^{13} c^3 - 172032 a^6 b^{11} c^4 + 1146880 a^7 b^9 c^5 - 4587520 a^8 * \\
& b^7 c^6 + 11010048 a^9 b^5 c^7 - 14680064 a^{10} b^3 c^8) / (64 * (a^4 b^{12} + 40 \\
& 96 a^{10} c^6 - 24 a^5 b^{10} c + 240 a^6 b^8 c^2 - 1280 a^7 b^6 c^3 + 3840 a^8 \\
& * b^4 c^4 - 6144 a^9 b^2 c^5)) + (x * (451584 a^6 c^9 d^2 + 18 b^{12} c^3 d^2 - \\
& 25600 a^7 c^8 f^2 + 9216 a^8 c^7 h^2 - 504 a b^{10} c^4 d^2 - 73728 a^6 b c^ \\
& 8 e^2 + 6228 a^2 b^8 c^5 d^2 - 42624 a^3 b^6 c^6 d^2 + 176256 a^4 b^4 c^7 d \\
& ^2 - 423936 a^5 b^2 c^8 d^2 - 4608 a^4 b^5 c^6 e^2 + 36864 a^5 b^3 c^7 e^2 \\
& + 2 a^2 b^{10} c^3 f^2 - 84 a^3 b^8 c^4 f^2 + 3520 a^4 b^6 c^5 f^2 - 26240 a^ \\
& 5 b^4 c^6 f^2 + 59904 a^6 b^2 c^7 f^2 - 1152 a^4 b^7 c^4 g^2 + 9216 a^5 b^5 \\
& * c^5 g^2 - 18432 a^6 b^3 c^6 g^2 + 468 a^4 b^8 c^3 h^2 - 3456 a^5 b^6 c^4 h \\
& ^2 + 5760 a^6 b^4 c^5 h^2 + 129024 a^7 c^8 d h + 12 a b^{11} c^3 d f - 218112 \\
& * a^6 b c^8 d f - 9216 a^7 b c^7 f h - 420 a^2 b^9 c^4 d f + 4992 a^3 b^7 c^
\end{aligned}$$

$$\begin{aligned}
& 5*d*f - 36480*a^4*b^5*c^6*d*f + 144384*a^5*b^3*c^7*d*f + 36*a^2*b^10*c^3*d* \\
& h - 360*a^3*b^8*c^4*d*h + 3456*a^4*b^6*c^5*d*h + 4608*a^4*b^6*c^5*e*g - 115 \\
& 20*a^5*b^4*c^6*d*h - 36864*a^5*b^4*c^6*e*g - 27648*a^6*b^2*c^7*d*h + 73728* \\
& a^6*b^2*c^7*e*g + 12*a^3*b^9*c^3*f*h - 2304*a^4*b^7*c^4*f*h + 17280*a^5*b^5 \\
& *c^5*f*h - 30720*a^6*b^3*c^6*f*h)) / (64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b \\
& ^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^ \\
& 2*c^5))) + (x*(13824*a^4*c^8*e^3 - 54*b^7*c^5*d^2*e + 27*b^8*c^4*d^2*g - 17 \\
& 28*a^4*b^3*c^5*g^3 - 20160*a^4*c^8*d*e*f - 2880*a^5*c^7*e*f*h + 972*a*b^5*c \\
& ^6*d^2*e + 24192*a^3*b*c^8*d^2*e - 486*a*b^6*c^5*d^2*g + 6240*a^4*b*c^7*e*f \\
& ^2 - 20736*a^4*b*c^7*e^2*g + 1728*a^5*b*c^6*e*h^2 - 7344*a^2*b^3*c^7*d^2*e \\
& + 3672*a^2*b^4*c^6*d^2*g - 6*a^2*b^5*c^5*e*f^2 - 12096*a^3*b^2*c^7*d^2*g + \\
& 192*a^3*b^3*c^6*e*f^2 + 10368*a^4*b^2*c^6*e*g^2 + 3*a^2*b^6*c^4*f^2*g - 96* \\
& a^3*b^4*c^5*f^2*g - 3120*a^4*b^2*c^6*f^2*g + 1296*a^4*b^3*c^5*e*h^2 - 648*a \\
& ^4*b^4*c^4*g*h^2 - 864*a^5*b^2*c^5*g*h^2 - 36*a*b^6*c^5*d*e*f + 18*a*b^7*c^ \\
& 4*d*f*g + 15552*a^4*b*c^7*d*e*h + 10080*a^4*b*c^7*d*f*g + 1440*a^5*b*c^6*f* \\
& g*h + 900*a^2*b^4*c^6*d*e*f - 4896*a^3*b^2*c^7*d*e*f - 108*a^2*b^5*c^5*d*e* \\
& h - 450*a^2*b^5*c^5*d*f*g + 2448*a^3*b^3*c^6*d*f*g + 54*a^2*b^6*c^4*d*g*h - \\
& 36*a^3*b^4*c^5*e*f*h - 7776*a^4*b^2*c^6*d*g*h - 6048*a^4*b^2*c^6*e*f*h + 1 \\
& 8*a^3*b^5*c^4*f*g*h + 3024*a^4*b^3*c^5*f*g*h)) / (64*(a^4*b^12 + 4096*a^10*c^ \\
& 6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - \\
& 6144*a^9*b^2*c^5))) * root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14 \\
& *c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 1932 \\
& 73528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^1 \\
& 0*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 687 \\
& 19476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 46080*a^4*b^14*c*f*h*z^2 - 10 \\
& 5984*a^3*b^15*c*d*h*z^2 - 73728*a^2*b^16*c*d*f*z^2 + 2548039680*a^9*b^3*c^7 \\
& *d*h*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*z^2 \\
& - 1321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 73216819 \\
& 2*a^7*b^6*c^6*d*f*z^2 - 456130560*a^9*b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c \\
& ^5*d*h*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 \\
& + 254017536*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680 \\
& *a^10*b^2*c^7*f*h*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 - 61931520*a^7*b^8*c^ \\
& 4*f*h*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + \\
& 6144000*a^6*b^10*c^3*f*h*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^ \\
& 9*c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 \\
& + 368640*a^5*b^11*c^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3 \\
& *b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 440401920*a^10*b*c^8*f^ \\
& 2*z^2 - 188743680*a^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 + 46080* \\
& a^5*b^13*c*h^2*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2* \\
& z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 15099 \\
& 49440*a^9*b^2*c^8*e^2*z^2 + 251658240*a^11*c^8*f*h*z^2 + 1536*a^3*b^16*f*h* \\
& z^2 + 4608*a^2*b^17*d*h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17 \\
& *c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 \\
& + 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888 \\
& *a^10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^10*b^3*
\end{aligned}$$

$$\begin{aligned}
& c^6 h^2 z^2 - 174325760 a^8 b^5 c^6 f^2 z^2 - 188743680 a^7 b^6 c^6 e^2 z^2 \\
& + 146165760 a^4 b^{11} c^4 d^2 z^2 - 47185920 a^7 b^8 c^4 g^2 z^2 - 26542080 \\
& a^8 b^7 c^4 h^2 z^2 + 9584640 a^7 b^9 c^3 h^2 z^2 - 2359296 a^9 b^5 c^5 h^2 \\
& z^2 - 1290240 a^6 b^{11} c^2 h^2 z^2 + 5898240 a^6 b^{10} c^3 g^2 z^2 - 29491 \\
& 2 a^5 b^{12} c^2 g^2 z^2 + 11206656 a^7 b^7 c^5 f^2 z^2 + 8929280 a^6 b^9 c^4 \\
& f^2 z^2 + 23592960 a^6 b^8 c^5 e^2 z^2 - 2600960 a^5 b^{11} c^3 f^2 z^2 + 29 \\
& 1840 a^4 b^{13} c^2 f^2 z^2 - 19860480 a^3 b^{13} c^3 d^2 z^2 - 1179648 a^5 b^1 \\
& 0 c^4 e^2 z^2 + 1771776 a^2 b^{15} c^2 d^2 z^2 + 1536 a b^{18} d^2 f z^2 + 120795 \\
& 9552 a^{10} c^9 e^2 z^2 + 2304 a^4 b^{15} h^2 z^2 + 256 a^2 b^{17} f^2 z^2 + 2304 \\
& b^{19} d^2 z^2 + 169869312 a^7 b^6 c^8 d^2 e f z + 99090432 a^8 b^6 c^7 d^2 g^2 h z - \\
& 4608 a^3 b^{12} c^2 f^2 g^2 h z - 9437184 a^8 b^6 c^7 e f^2 h z - 13824 a^2 b^{13} c^2 d^2 g^2 \\
& h z + 9216 a b^{13} c^2 d^2 e f^2 z - 4608 a b^{14} c^2 d^2 f^2 g^2 z + 219414528 a^7 b^2 c^7 \\
& d^2 e^2 h z - 221773824 a^6 b^3 c^7 d^2 e f^2 z - 109707264 a^7 b^3 c^6 d^2 g^2 h z \\
& + 110886912 a^6 b^4 c^6 d^2 f^2 g^2 z - 88473600 a^6 b^4 c^6 d^2 e^2 h z - 84934656 a^7 \\
& b^2 c^7 d^2 f^2 g^2 z + 117964800 a^5 b^5 c^6 d^2 e f^2 z + 44236800 a^6 b^5 c^5 d^2 \\
& g^2 h z - 5898240 a^7 b^4 c^5 f^2 g^2 h z + 4718592 a^8 b^2 c^6 f^2 g^2 h z + 294912 \\
& 0 a^6 b^6 c^4 f^2 g^2 h z - 737280 a^5 b^8 c^3 f^2 g^2 h z + 92160 a^4 b^{10} c^2 f^2 g^2 \\
& h z - 58982400 a^5 b^6 c^5 d^2 f^2 g^2 z + 11796480 a^7 b^3 c^6 e f^2 h z - 663552 \\
& 0 a^5 b^7 c^4 d^2 g^2 h z - 5898240 a^6 b^5 c^5 e f^2 h z + 1474560 a^5 b^7 c^4 e \\
& f^2 h z - 276480 a^4 b^9 c^3 d^2 g^2 h z - 184320 a^4 b^9 c^3 e f^2 h z + 179712 a^3 \\
& b^{11} c^2 d^2 g^2 h z + 9216 a^3 b^{11} c^2 e f^2 h z + 16220160 a^4 b^8 c^4 d^2 f^2 \\
& g^2 z + 13271040 a^5 b^6 c^5 d^2 e^2 h z - 2396160 a^3 b^{10} c^3 d^2 f^2 g^2 z + 552960 a^4 \\
& b^8 c^4 d^2 e^2 h z - 359424 a^3 b^{10} c^3 d^2 e^2 h z + 175104 a^2 b^{12} c^2 d^2 f^2 \\
& g^2 z + 27648 a^2 b^{12} c^2 d^2 e^2 h z - 32440320 a^4 b^7 c^5 d^2 e f^2 z + 4792320 a^3 \\
& b^9 c^4 d^2 e f^2 z - 350208 a^2 b^{11} c^3 d^2 e f^2 z + 346816512 a^7 b^6 c^8 d^2 \\
& g^2 z + 7077888 a^9 b^6 c^6 g^2 h^2 z - 6912 a^4 b^{11} c^2 g^2 h^2 z - 19660800 a^8 b^6 \\
& c^7 f^2 g^2 z - 768 a^2 b^{13} c^2 f^2 g^2 z + 214272 a b^{13} c^2 d^2 g^2 z - 428544 a \\
& b^{12} c^3 d^2 e^2 z - 198180864 a^8 c^8 d^2 e^2 h z + 1022754816 a^6 b^2 c^8 d^2 \\
& e^2 z - 642318336 a^5 b^4 c^7 d^2 e^2 z - 511377408 a^6 b^3 c^7 d^2 g^2 z + 3211 \\
& 59168 a^5 b^5 c^6 d^2 g^2 z + 223395840 a^4 b^6 c^6 d^2 e^2 z - 111697920 a^4 b^7 \\
& c^5 d^2 g^2 z - 8847360 a^8 b^3 c^5 g^2 h^2 z + 4423680 a^7 b^5 c^4 g^2 h^2 z \\
& - 1105920 a^6 b^7 c^3 g^2 h^2 z + 138240 a^5 b^9 c^2 g^2 h^2 z + 25362432 a^7 b^3 \\
& c^6 f^2 g^2 z + 17694720 a^8 b^2 c^6 e^2 h^2 z - 50724864 a^7 b^2 c^7 e f^2 z \\
& z - 13271040 a^6 b^5 c^5 f^2 g^2 z - 8847360 a^7 b^4 c^5 e^2 h^2 z + 3563520 a^5 \\
& b^7 c^4 f^2 g^2 z + 2211840 a^6 b^6 c^4 e^2 h^2 z - 506880 a^4 b^9 c^3 f^2 g^2 z \\
& z - 276480 a^5 b^8 c^3 e^2 h^2 z + 34560 a^3 b^{11} c^2 f^2 g^2 z + 13824 a^4 b^1 \\
& 0 c^2 e^2 h^2 z + 26542080 a^6 b^4 c^6 e f^2 z + 23362560 a^3 b^9 c^4 d^2 g^2 z \\
& - 46725120 a^3 b^8 c^5 d^2 e^2 z - 7127040 a^5 b^6 c^5 e f^2 z - 2965248 a^2 \\
& b^{11} c^3 d^2 g^2 z + 1013760 a^4 b^8 c^4 e f^2 z - 69120 a^3 b^{10} c^3 e f^2 z \\
& z + 1536 a^2 b^{12} c^2 e f^2 z + 5930496 a^2 b^{10} c^4 d^2 e^2 z - 693633024 a^7 \\
& c^9 d^2 e^2 z - 14155776 a^9 c^7 e^2 h^2 z + 39321600 a^8 c^8 e f^2 z + 13824 \\
& b^{14} c^2 d^2 e^2 z - 6912 b^{15} c^2 d^2 g^2 z + 2211840 a^6 b^6 c^6 e f^2 g^2 h + 15482 \\
& 880 a^5 b^6 c^7 d^2 e f^2 g - 13824 a^6 b^9 c^3 d^2 e f^2 g + 4423680 a^5 b^3 c^5 e f^2 g \\
& h + 138240 a^4 b^5 c^4 e f^2 g^2 h - 13824 a^3 b^7 c^3 e f^2 g^2 h - 16588800 a^5 b^2 \\
& c^6 d^2 e^2 g^2 h + 1658880 a^4 b^4 c^5 d^2 e^2 g^2 h + 124416 a^3 b^6 c^4 d^2 e^2 g^2 h
\end{aligned}$$

$$\begin{aligned}
& - 41472a^2b^8c^3d^2efgh + 7741440a^4b^3c^6d^2efg - 2903040a^3b^5 \\
& *c^5d^2efg + 387072a^2b^7c^4d^2efg - 37062144a^5b^3c^7d^2f^2h - 59 \\
& 85792a^6b^3c^6d^2f^2h + 206010a^2b^9c^3d^2f^2h - 6300a^2b^10c^2d^2f^2h \\
& + 16588800a^5b^3c^7d^2e^2h + 3456a^2b^10c^2d^2f^2g^2 + 435456a^2b^8c^4 \\
& *d^2efg + 13824a^2b^8c^4d^2e^2f + 1350a^2b^11c^2d^2f^2h - 1105920a^5b^4 \\
& *c^4d^2f^2g^2h - 552960a^6b^2c^5d^2f^2g^2h - 34560a^4b^6c^3d^2f^2g^2h + 34 \\
& 56a^3b^8c^2d^2f^2g^2h - 1658880a^6b^2c^5d^2efgh^2 - 829440a^5b^4c^4d^2e \\
& *fgh^2 - 20736a^4b^6c^3d^2efgh^2 - 4423680a^5b^2c^6d^2efgh + 4147200a^5 \\
& *b^3c^5d^2efgh^2 - 414720a^4b^5c^4d^2efgh^2 - 138240a^4b^4c^5d^2efgh^2 \\
& *h - 31104a^3b^7c^3d^2efgh^2 + 13824a^3b^6c^4d^2efgh^2 + 10368a^2b^9c^2 \\
& *d^2efgh^2 + 15630336a^5b^2c^6d^2efgh^2 - 14459904a^4b^3c^6d^2efgh + \\
& 9630144a^3b^5c^5d^2efgh - 8764416a^5b^3c^5d^2efgh^2 - 3870720a^5b^2 \\
& *c^6d^2efgh^2 + 2867328a^4b^4c^5d^2efgh^2 - 2095200a^2b^7c^4d^2efgh - \\
& 1414080a^3b^6c^4d^2efgh^2 - 34836480a^4b^2c^7d^2efgh - 645120a^4b^4 \\
& *c^5d^2efgh^2 + 306720a^3b^7c^3d^2efgh^2 + 197820a^2b^8c^3d^2efgh^2 + 1 \\
& 46880a^4b^5c^4d^2efgh^2 + 80640a^3b^6c^4d^2efgh^2 - 55350a^2b^9c^2d^2 \\
& *efgh^2 - 2304a^2b^8c^3d^2efgh^2 - 3870720a^5b^2c^6d^2efgh^2 - 1935360a^4 \\
& *b^4c^5d^2efgh^2 - 1658880a^4b^3c^6d^2efgh^2 + 725760a^3b^6c^4d^2efgh^2 \\
& + 17418240a^3b^4c^6d^2efgh - 124416a^3b^5c^5d^2efgh^2 - 96768a^2b^8 \\
& *c^3d^2efgh^2 + 41472a^2b^7c^4d^2efgh^2 - 3919104a^2b^6c^5d^2efgh - \\
& 7741440a^4b^2c^7d^2efgh + 2903040a^3b^4c^6d^2efgh - 387072a^2b^6 \\
& *c^5d^2efgh - 1648128a^5b^3c^5d^2efgh^3 - 898560a^6b^3c^4d^2efgh^3 - 35424 \\
& 0a^5b^5c^3d^2efgh^3 - 354240a^4b^5c^4d^2efgh^3 + 43680a^3b^7c^3d^2efgh^3 - \\
& 21600a^4b^7c^2d^2efgh^3 - 1050a^2b^9c^2d^2efgh^3 + 225a^2b^10c^2d^2efgh^2 + \\
& 1658880a^6b^3c^6d^2efgh^2 + 16547328a^4b^2c^7d^2efgh^3 - 12306816a^3b^4c^6 \\
& *d^2efgh^3 + 37310976a^3b^3c^7d^2efgh + 3037824a^2b^6c^5d^2efgh^3 - 265420 \\
& 8a^5b^3c^5d^2efgh^3 + 1949184a^6b^2c^5d^2efgh^3 + 1296000a^5b^4c^4d^2efgh^3 \\
& - 155520a^4b^6c^3d^2efgh^3 - 40500a^2b^10c^2d^2efgh^2 - 8100a^3b^8c^2d^2 \\
& *efgh^3 + 3870720a^5b^3c^7d^2efgh^2 + 34836480a^4b^3c^8d^2efgh^2 - 108864a^2b^9 \\
& *c^3d^2efgh^2 - 8068032a^2b^5c^6d^2efgh^3 - 5623296a^4b^3c^6d^2efgh^3 + 173 \\
& 7792a^3b^5c^5d^2efgh^3 - 260190a^2b^8c^4d^2efgh^2 - 211680a^2b^7c^4d^2efgh^3 \\
& - 435456a^2b^7c^5d^2efgh^2 - 2211840a^6c^7d^2efgh^2 - 9450a^11c^2d^2efgh \\
& + 1612800a^6c^7d^2efgh^2 - 20736a^10c^3d^2efgh - 75188736a^4b^3c^8 \\
& *d^2efgh^3 - 883200a^6b^3c^6d^2efgh^3 - 317952a^7b^3c^5d^2efgh^3 + 1350a^3b^9c^2 \\
& *efgh^3 - 15482880a^5c^8d^2efgh^2 - 10616832a^5b^3c^7d^2efgh^3 - 345060a^2b^8c^4 \\
& *d^2efgh^3 + 4050a^2b^10c^2d^2efgh^3 - 4262400a^5b^3c^7d^2efgh^3 + 852768a^2b^7c^5 \\
& *d^2efgh^3 + 7350a^2b^9c^3d^2efgh^3 + 414720a^6b^3c^4d^2efgh^2 + 207360a^5b^5 \\
& *c^3d^2efgh^2 + 5184a^4b^7c^2d^2efgh^2 + 1684224a^6b^2c^5d^2efgh^2 + 1 \\
& 264320a^5b^4c^4d^2efgh^2 + 126720a^4b^6c^3d^2efgh^2 - 13950a^3b^8c^2 \\
& *d^2efgh^2 + 967680a^5b^3c^5d^2efgh^2 + 829440a^5b^3c^5d^2efgh^2 + 161280 \\
& *a^4b^5c^4d^2efgh^2 + 20736a^4b^5c^4d^2efgh^2 - 20160a^3b^7c^3d^2efgh^2 \\
& + 576a^2b^9c^2d^2efgh^2 + 11487744a^5b^2c^6d^2efgh^2 + 7962624a^5b^2 \\
& *c^6d^2efgh^2 + 35525376a^4b^2c^7d^2efgh^2 - 1412640a^3b^6c^4d^2efgh^2 \\
& + 461376a^4b^4c^5d^2efgh^2 + 375030a^2b^8c^3d^2efgh^2 + 8709120a^4b^3 \\
& *c^6d^2efgh^2 - 4354560a^3b^5c^5d^2efgh^2 + 979776a^2b^7c^4d^2efgh^2 + 6
\end{aligned}$$



$$\begin{aligned}
& 45120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - 174182 \\
& 40*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 115200*a^7*c^6*f^2*h^2 + 6096384*a^6*c^7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2 \\
& + 5644800*a^5*c^8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*h^4 + 32400*a^5*b^6*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 \\
& + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 \\
& + 28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 580608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 2025*a^4*b^8*c*h^4 - 734832*a*b^6*c^6*d^4 \\
& + 20736*a^8*c^5*h^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k), k, 1, 4)
\end{aligned}$$

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((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}

$$\frac{x \left( 20a^2cf + ab^2f - 12ab(ah + 2cd) + 3b^3d \right) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d}{8a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)}$$

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] && 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 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[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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 56x^5}{(a + bx^2 + cx^4)^3} dx &= \int \frac{x(e + gx^2 + 56x^4)}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{1}{2} \text{Subst} \left( \int \frac{e}{(a + bx^2 + cx^4)^3} dx \right) \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}
\end{aligned}$$

**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)) + (Sqrt[c]*(3*b^4*d - 30*a*b^2*c*d + 168*a^
2*c^2*d + 3*b^3*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c*Sqrt[b^2 - 4*a*c]*d + a*b^3*
f - 52*a^2*b*c*f + a*b^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c*Sqrt[b^2 - 4*a*c]*f
+ 18*a^2*b^2*h + 24*a^3*c*h - 12*a^2*b*Sqrt[b^2 - 4*a*c]*h)*ArcTan[(Sqrt[2
]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5/
2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[c]*(-3*b^4*d + 30*a*b^2*c*d - 168*a
^2*c^2*d + 3*b^3*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c*Sqrt[b^2 - 4*a*c]*d - a*b^3
*f + 52*a^2*b*c*f + a*b^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c*Sqrt[b^2 - 4*a*c]*
f - 18*a^2*b^2*h - 24*a^3*c*h - 12*a^2*b*Sqrt[b^2 - 4*a*c]*h)*ArcTan[(Sqrt[
2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5
/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((6*c^2*e - 3*b*c*g + b^2*i + 2*a*c*i)*L
og[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2)) + ((-6*c^2*e
+ 3*b*c*g - b^2*i - 2*a*c*i)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(2*(b^2
- 4*a*c)^(5/2))

```

**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="f
ricas")
```

```
[Out] Timed out
```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

```
maple [B] time = 0.06, size = 3824, normalized size = 5.25
```

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -15/2/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+  
b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)  
*(-4*a*c+b^2)^(1/2)*b^2*d+3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^  
2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)  
^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^4*d+3/4/a^2/(16*a^2*c^2-8*a*b^2*  
c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2  
^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^4*d+1/4/  
a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^(1/  
2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c  
+b^2)^(1/2)*b^3*f+1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^(1/2)  
/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)  
^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^3*f-15/2/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/  
(16*a*c-4*b^2)*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+  
(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*d-4*a/(16*a^2*c^2-  
8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b  
^2)^(1/2)*i+4*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*ln(2*c*x^2+b+(-  
4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*i+(-1/8*c^2*(12*a^2*b*h-20*a^2*c*f-a*b  
^2*f+24*a*b*c*d-3*b^3*d)/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*x^7+1/2*c*(2*a*c*i+  
b^2*i-3*b*c*g+6*c^2*e)/(16*a^2*c^2-8*a*b^2*c+b^4)*x^6+1/8/a^2*c*(4*a^3*c*h-  
19*a^2*b^2*h+28*a^2*b*c*f+28*a^2*c^2*d+2*a*b^3*f-49*a*b^2*c*d+6*b^4*d)/(16*  
a^2*c^2-8*a*b^2*c+b^4)*x^5+3/4*b*(2*a*c*i+b^2*i-3*b*c*g+6*c^2*e)/(16*a^2*c^  
2-8*a*b^2*c+b^4)*x^4-1/8*(16*a^3*b*c*h-36*a^3*c^2*f+5*a^2*b^3*h-5*a^2*b^2*c  
*f+4*a^2*b*c^2*d-a*b^4*f+20*a*b^3*c*d-3*b^5*d)/a^2/(16*a^2*c^2-8*a*b^2*c+b^  
4)*x^3-1/2*(2*a^2*c*i-5*a*b^2*i+5*a*b*c*g-10*a*c^2*e+b^3*g-2*b^2*c*e)/(16*a  
^2*c^2-8*a*b^2*c+b^4)*x^2-1/8*(12*a^3*c*h+3*a^2*b^2*h-16*a^2*b*c*f-44*a^2*c  
^2*d+a*b^3*f+37*a*b^2*c*d-5*b^4*d)/(16*a^2*c^2-8*a*b^2*c+b^4)/a*x+1/4*(6*a^  
2*b*i-8*a^2*c*g-a*b^2*g+10*a*b*c*e-b^3*e)/(16*a^2*c^2-8*a*b^2*c+b^4))/(c*x^  
4+b*x^2+a)^2-4/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^(1/2)/((b+(-  
4*a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*  
c*x)*b^2*f-24/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^(1/2)/((b+(-4  
a*c+b^2)^(1/2))*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c
```

$$\begin{aligned}
& *x)*b*d+4/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x) \\
& *b^2*f+24/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x) \\
& *b*d+3/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b \\
& ^3*h+20*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)* \\
& f-20*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)* \\
& f-3/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^3*h \\
& +42/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4 \\
& *a*c+b^2)^{(1/2)}*d+42/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x) \\
& *(-4*a*c+b^2)^{(1/2)}*d+6/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*(-4*a*c+b^2)^{(1/2)}*b*g-6/(16*a^2*c^2-8 \\
& *a*b^2*c+b^4)*c/(16*a*c-4*b^2)*ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*(-4*a*c+b^2)^{(1/2)}*b*g-12*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((b+ \\
& (-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^3*d-9/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x) \\
& *b^3*d-1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^4*f+3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/( \\
& (-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^5*d-13/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x) \\
& *(-4*a*c+b^2)^{(1/2)}*b*f+9/2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x) \\
& *(-4*a*c+b^2)^{(1/2)}*b^2*h+9/2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*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)}*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)}*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)}*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)}*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/
\end{aligned}$$



$$\begin{aligned} & (16ac-4b^2)^2 \sqrt{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} * cx) * bh + 6a / (16a^2c^2 - 8ab^2c + b^4) * c^2 \\ & / (16ac-4b^2)^2 \sqrt{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} * cx) * (-4ac+b^2)^{1/2} * h - 12 / (16a^2c^2 - 8ab^2c + b^4) * c^2 \\ & / (16ac-4b^2) * \ln(-2cx^2 - b + (-4ac+b^2)^{1/2}) * (-4ac+b^2)^{1/2} * e + 12 / (16a^2c^2 - 8ab^2c + b^4) * c^2 / (16ac-4b^2) * \ln(2cx^2 + b + (-4ac+b^2)^{1/2}) * (-4ac+b^2)^{1/2} * e \\ & + 2 / (16a^2c^2 - 8ab^2c + b^4) / (16ac-4b^2) * \ln(2cx^2 + b + (-4ac+b^2)^{1/2}) * (-4ac+b^2)^{1/2} * b^2 * i - 2 / (16a^2c^2 - 8ab^2c + b^4) / (16ac-4b^2) * \ln(-2cx^2 - b + (-4ac+b^2)^{1/2}) * (-4ac+b^2)^{1/2} * b^2 * i \end{aligned}$$

**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((i\*x^5+h\*x^4+g\*x^3+f\*x^2+e\*x+d)/(c\*x^4+b\*x^2+a)^3,x, algorithm="maxima")

[Out] 
$$\begin{aligned} & -1/8 * ((12a^2b^2c^2h - 3(b^3c^2 - 8ab^2c^3)d - (ab^2c^2 + 20a^2c^3)f) * x^7 - 4(6a^2c^3e - 3a^2b^2c^2g + (a^2b^2c + 2a^3c^2)i) * x^6 \\ & - 12a^4b^2i - ((6b^4c - 49ab^2c^2 + 28a^2c^3)d + 2(ab^3c + 14a^2b^2c^2)f - (19a^2b^2c - 4a^3c^2)h) * x^5 - 6(6a^2b^2c^2e - 3a^2b^2c^2g + (a^2b^3 + 2a^3b^2c)i) * x^4 \\ & - ((3b^5 - 20ab^3c - 4a^2b^2c^2)d + (ab^4 + 5a^2b^2c + 36a^3c^2)f - (5a^2b^3 + 16a^3b^2c)h) * x^3 - 4(2(a^2b^2c + 5a^3c^2)e - (a^2b^3 + 5a^3b^2c)g + (5a^3b^2 - 2a^4c)i) * x^2 \\ & + 2(a^2b^3 - 10a^3b^2c)e + 2(a^3b^2 + 8a^4c)g - (5ab^4 - 37a^2b^2c + 44a^3c^2)d - (a^2b^3 - 16a^3b^2c)f - 3(a^3b^2 + 4a^4c)h) * x) / ((a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4) * x^8 + a^4b^4 \\ & - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4b^2c^3) * x^6 + (a^2b^6 - 6a^3b^4c + 32a^5c^3) * x^4 + 2(a^3b^5 - 8a^4b^3c + 16a^5b^2c^2) * x^2) - 1/8 * \int ((12a^2b^2c^2h - 3(b^3c^2 - 8ab^2c^3)d - (ab^2c^2 + 20a^2c^3)f) * x^2 \\ & - (a^2b^3 - 16a^2b^2c)f - 3(a^2b^2 + 4a^3c)h - 8(6a^2c^2e - 3a^2b^2c^2g + (a^2b^2 + 2a^3c)i) * x) / (c * x^4 + b * x^2 + a), x) / (a^2b^4 - 8a^3b^2c + 16a^4c^2) \end{aligned}$$

**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] 
$$\frac{(x^5(28a^2c^3d + 4a^3c^2h + 6b^4cd + 2ab^3cf - 49ab^2c^2d + 28a^2b^2c^2f - 19a^2b^2c^2h)) / (8a^2(b^4 + 16a^2c^2 - 8ab^2c))}{(a + b * x^2 + c * x^4)^3}$$

$$\begin{aligned}
& ) - (x^2*(b^3*g - 10*a*c^2*e - 2*b^2*c*e - 5*a*b^2*i + 2*a^2*c*i + 5*a*b*c*g))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (b^3*e + a*b^2*g + 8*a^2*c*g - 6*a^2*b*i - 10*a*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*b*x^4*(6*c^2*e + b^2*i - 3*b*c*g + 2*a*c*i))/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^6*(6*c^2*e + b^2*i - 3*b*c*g + 2*a*c*i))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + \\
& (x^3*(3*b^5*d + 36*a^3*c^2*f - 5*a^2*b^3*h + a*b^4*f - 20*a*b^3*c*d - 16*a^3*b*c*h - 4*a^2*b*c^2*d + 5*a^2*b^2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (x*(3*a^2*b^2*h - 44*a^2*c^2*d - 5*b^4*d + a*b^3*f + 12*a^3*c*h + 37*a*b^2*c*d - 16*a^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^7*(20*a^2*c^2*f + 3*b^3*c*d - 24*a*b*c^2*d + a*b^2*c*f - 12*a^2*b*c*h))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6) + \text{symsum}(\log((10368*a*b^5*c^6*d^3 - 8000*a^5*c^7*f^3 - 567*b^7*c^5*d^3 + 169344*a^3*b*c^8*d^3 + 193536*a^4*c^8*d*e^2 - 141120*a^4*c^8*d^2*f + 1728*a^6*b*c^5*h^3 + 315*b^8*c^4*d^2*f + 27648*a^5*c^7*e^2*h + 21504*a^6*c^6*d*i^2 - 135*b^9*c^3*d^2*h - 2880*a^6*c^6*f*h^2 + 3072*a^7*c^5*h*i^2 - 67824*a^2*b^3*c^7*d^3 + 35*a^2*b^6*c^4*f^3 + 84*a^3*b^4*c^5*f^3 - 12720*a^4*b^2*c^6*f^3 + 540*a^4*b^5*c^3*h^3 + 4320*a^5*b^3*c^4*h^3 + 129024*a^5*c^7*d*e*i - 40320*a^5*c^7*d*f*h + 18432*a^6*c^6*e*h*i - 6237*a*b^6*c^5*d^2*f + 210*a*b^7*c^4*d*f^2 + 116160*a^4*b*c^7*d*f^2 - 36864*a^4*b*c^7*e^2*f + 2430*a*b^7*c^4*d^2*h + 133056*a^4*b*c^7*d^2*h + 27648*a^5*b*c^6*d*h^2 + 26880*a^5*b*c^6*f^2*h - 4096*a^6*b*c^5*f*i^2 + 6912*a^2*b^4*c^6*d*e^2 - 62208*a^3*b^2*c^7*d*e^2 + 42372*a^2*b^4*c^6*d^2*f - 1764*a^2*b^5*c^5*d*f^2 - 96048*a^3*b^2*c^7*d^2*f - 4608*a^3*b^3*c^6*d*f^2 + 1728*a^2*b^6*c^4*d*g^2 + 2304*a^3*b^3*c^6*e^2*f - 15552*a^3*b^4*c^5*d*g^2 + 48384*a^4*b^2*c^6*d*g^2 - 13716*a^2*b^5*c^5*d^2*h + 405*a^2*b^7*c^3*d*h^2 + 12096*a^3*b^3*c^6*d^2*h - 5400*a^3*b^5*c^4*d*h^2 + 28944*a^4*b^3*c^5*d*h^2 + 192*a^2*b^8*c^2*d*i^2 + 576*a^3*b^5*c^4*f*g^2 - 960*a^3*b^6*c^3*d*i^2 + 6912*a^4*b^2*c^6*e^2*h - 9216*a^4*b^3*c^5*f*g^2 - 768*a^4*b^4*c^4*d*i^2 + 14592*a^5*b^2*c^5*d*i^2 - 15*a^2*b^7*c^3*f^2*h - 360*a^3*b^5*c^4*f^2*h + 135*a^3*b^6*c^3*f*h^2 + 15696*a^4*b^3*c^5*f^2*h - 5580*a^4*b^4*c^4*f*h^2 - 20592*a^5*b^2*c^5*f*h^2 + 64*a^3*b^7*c^2*f*i^2 + 1728*a^4*b^4*c^4*g^2*h - 768*a^4*b^5*c^3*f*i^2 + 6912*a^5*b^2*c^5*g^2*h - 3840*a^5*b^3*c^4*f*i^2 + 192*a^4*b^6*c^2*h*i^2 + 1536*a^5*b^4*c^3*h*i^2 + 3840*a^6*b^2*c^4*h*i^2 - 193536*a^4*b*c^7*d*e*g - 90*a*b^8*c^3*d*f*h - 64512*a^5*b*c^6*d*g*i - 24576*a^5*b*c^6*e*f*i - 27648*a^5*b*c^6*e*g*h - 9216*a^6*b*c^5*g*h*i - 6912*a^2*b^5*c^5*d*e*g + 62208*a^3*b^3*c^6*d*e*g + 2304*a^2*b^6*c^4*d*e*i - 270*a^2*b^6*c^4*d*f*h - 16128*a^3*b^4*c^5*d*e*i + 16056*a^3*b^4*c^5*d*f*h - 2304*a^3*b^4*c^5*e*f*g + 23040*a^4*b^2*c^6*d*e*i - 127008*a^4*b^2*c^6*d*f*h + 36864*a^4*b^2*c^6*e*f*g - 1152*a^2*b^7*c^3*d*g*i + 8064*a^3*b^5*c^4*d*g*i + 768*a^3*b^5*c^4*e*f*i - 11520*a^4*b^3*c^5*d*g*i - 10752*a^4*b^3*c^5*e*f*i - 6912*a^4*b^3*c^5*e*g*h - 384*a^3*b^6*c^3*f*g*i + 2304*a^4*b^4*c^4*e*h*i + 5376*a^4*b^4*c^4*f*g*i + 13824*a^5*b^2*c^5*e*h*i + 12288*a^5*b^2*c^5*f*g*i - 1152*a^4*b^5*c^3*g*h*i - 6912*a^5*b^3*c^4*g*h*i)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + \text{root}(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*
\end{aligned}$$

$$\begin{aligned}
& b^{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 + 3523215 \\
& 360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^3z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 + 196608a^5b^{13}c^3g^2z^2 - 46080a^4b^{14}c^3f^2z^2 - 105984a^3b^{15}c^3d^2h^2z^2 - 73728a^2b^{16}c^3d^2f^2z^2 + 2548039680a^9b^3 \\
& c^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 + 7321 \\
& 68192a^7b^6c^6d^2f^2z^2 - 603979776a^{10}b^2c^7e^2i^2z^2 - 456130560a^9b^4c^6f^2h^2z^2 + 390463488a^7b^7c^5d^2h^2z^2 + 301989888a^{10}b^3c^6g^2i^2z^2 - 366280704a^6b^8c^5d^2f^2z^2 - 330301440a^8b^4c^7d^2f^2z^2 + 254 \\
& 017536a^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 + 125829120a^8b^6c^5e^2i^2z^2 - 62914560a^8b^7c^4g^2i^2z^2 - 61931520a^7b^8c^4f^2h^2z^2 + 23592 \\
& 960a^7b^9c^3g^2i^2z^2 - 47185920a^7b^8c^4e^2i^2z^2 - 3538944a^6b^{11}c^2g^2i^2z^2 + 96583680a^5b^{10}c^4d^2f^2z^2 - 51609600a^6b^9c^4d^2h^2z^2 + 7077888a^6b^{10}c^3e^2i^2z^2 + 6144000a^6b^{10}c^3f^2h^2z^2 - 393216a^5b^{12}c^2e^2i^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 - 402653184a^{11}b^2c^7g^2i^2z^2 - 44040 \\
& 1920a^{10}b^2c^8f^2z^2 - 188743680a^{11}b^2c^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^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 - 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^2b^{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^2c^8d^2e^2f^2z^2 + 99090432a^8b^2c^7d^2g^2h^2z^2 - 3145728a^9b^2c^6f^2h^2i^2z^2 - 27648a^4b^{11}c^3f^2h^2i^2z^2 + 56623104a^8b^2c^7d^2f^2i^2z^2 - 50688a^3b^{12}c^3d^2h^2i^2z^2 - 4608a^3b^{12}c^3f^2g^2h^2z^2 - 9437184a^8b^2c^7e^2f^2h^2z^2 - 55296a^2b^{13}c^3d^2f^2i^2z^2 - 13824a^2b^{13}c^3d^2g^2h^2z^2 + 9216a^2b^{13}c^2d^2e^2f^2z^2
\end{aligned}$$

$$\begin{aligned}
& *z - 4608*a*b^{14}*c*d*f*g*z + 219414528*a^7*b^2*c^7*d*e*h*z - 221773824*a^6* \\
& b^3*c^7*d*e*f*z - 109707264*a^7*b^3*c^6*d*g*h*z + 110886912*a^6*b^4*c^6*d*f \\
& *g*z + 40108032*a^8*b^2*c^6*d*h*i*z + 2359296*a^8*b^3*c^5*f*h*i*z - 491520* \\
& a^6*b^7*c^3*f*h*i*z + 184320*a^5*b^9*c^2*f*h*i*z - 88473600*a^6*b^4*c^6*d*e \\
& *h*z - 84934656*a^7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z - 45613 \\
& 056*a^7*b^3*c^6*d*f*i*z + 44236800*a^6*b^5*c^5*d*g*h*z - 10321920*a^6*b^6*c \\
& ^4*d*h*i*z + 7077888*a^7*b^4*c^5*d*h*i*z - 5898240*a^7*b^4*c^5*f*g*h*z + 47 \\
& 18592*a^8*b^2*c^6*f*g*h*z + 2949120*a^6*b^6*c^4*f*g*h*z + 2396160*a^5*b^8*c \\
& ^3*d*h*i*z - 737280*a^5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g*h*z - 2764 \\
& 8*a^4*b^10*c^2*d*h*i*z - 58982400*a^5*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^ \\
& 6*e*f*h*z + 8847360*a^5*b^7*c^4*d*f*i*z - 6635520*a^5*b^7*c^4*d*g*h*z - 589 \\
& 8240*a^6*b^5*c^5*e*f*h*z - 3809280*a^4*b^9*c^3*d*f*i*z + 2359296*a^6*b^5*c^ \\
& 5*d*f*i*z + 1474560*a^5*b^7*c^4*e*f*h*z + 681984*a^3*b^11*c^2*d*f*i*z - 276 \\
& 480*a^4*b^9*c^3*d*g*h*z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a^3*b^11*c^2* \\
& d*g*h*z + 9216*a^3*b^11*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*g*z + 132710 \\
& 40*a^5*b^6*c^5*d*e*h*z - 2396160*a^3*b^10*c^3*d*f*g*z + 552960*a^4*b^8*c^4* \\
& d*e*h*z - 359424*a^3*b^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f*g*z + 27648 \\
& *a^2*b^12*c^2*d*e*h*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4* \\
& d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2*g*z - 41472 \\
& *a^5*b^10*c^h^2*i*z + 7077888*a^9*b*c^6*g*h^2*z - 11008*a^3*b^12*c^f^2*i*z \\
& - 6912*a^4*b^11*c*g*h^2*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^13*c^f^2 \\
& *g*z + 214272*a*b^13*c^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z - 198180864*a^ \\
& 8*c^8*d*e*h*z - 66060288*a^9*c^7*d*h*i*z + 1536*a^3*b^13*f*h*i*z + 4608*a^2 \\
& *b^14*d*h*i*z - 66816*a*b^14*c*d^2*i*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 6 \\
& 42318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 321159168*a^ \\
& 5*b^5*c^6*d^2*g*z + 225312768*a^7*b^2*c^7*d^2*i*z + 223395840*a^4*b^6*c^6*d \\
& ^2*e*z - 111697920*a^4*b^7*c^5*d^2*g*z + 3538944*a^9*b^2*c^5*h^2*i*z - 7372 \\
& 80*a^7*b^6*c^3*h^2*i*z + 276480*a^6*b^8*c^2*h^2*i*z - 10354688*a^8*b^2*c^6* \\
& f^2*i*z - 43646976*a^6*b^4*c^6*d^2*i*z - 8847360*a^8*b^3*c^5*g*h^2*z + 4423 \\
& 680*a^7*b^5*c^4*g*h^2*z + 2048000*a^6*b^6*c^4*f^2*i*z - 1105920*a^6*b^7*c^3 \\
& *g*h^2*z - 849920*a^5*b^8*c^3*f^2*i*z + 393216*a^7*b^4*c^5*f^2*i*z + 145920 \\
& *a^4*b^10*c^2*f^2*i*z + 138240*a^5*b^9*c^2*g*h^2*z - 32587776*a^5*b^6*c^5*d \\
& ^2*i*z + 25362432*a^7*b^3*c^6*f^2*g*z + 21657600*a^4*b^8*c^4*d^2*i*z + 1769 \\
& 4720*a^8*b^2*c^6*e*h^2*z - 50724864*a^7*b^2*c^7*e*f^2*z - 13271040*a^6*b^5* \\
& c^5*f^2*g*z - 8847360*a^7*b^4*c^5*e*h^2*z - 5810688*a^3*b^10*c^3*d^2*i*z + \\
& 3563520*a^5*b^7*c^4*f^2*g*z + 2211840*a^6*b^6*c^4*e*h^2*z + 845568*a^2*b^12 \\
& *c^2*d^2*i*z - 506880*a^4*b^9*c^3*f^2*g*z - 276480*a^5*b^8*c^3*e*h^2*z + 34 \\
& 560*a^3*b^11*c^2*f^2*g*z + 13824*a^4*b^10*c^2*e*h^2*z + 26542080*a^6*b^4*c^ \\
& 6*e*f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7 \\
& 127040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1013760*a^4*b^8 \\
& *c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 593 \\
& 0496*a^2*b^10*c^4*d^2*e*z + 1536*a*b^15*d*f*i*z - 693633024*a^7*c^9*d^2*e*z \\
& - 231211008*a^8*c^8*d^2*i*z - 4718592*a^10*c^6*h^2*i*z + 2304*a^4*b^12*h^2 \\
& *i*z + 13107200*a^9*c^7*f^2*i*z + 256*a^2*b^14*f^2*i*z - 14155776*a^9*c^7*e \\
& *h^2*z + 39321600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z - 6912*b^15*c*d^
\end{aligned}$$

$$\begin{aligned}
& 2*g*z + 2304*b^{16}d^2i*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
\end{aligned}$$

$$\begin{aligned}
& *e*f^2*g - 3193344*a^3*b^5*c^5*d^2*e*i + 2867328*a^4*b^4*c^5*d*f^2*h - 2095 \\
& 200*a^2*b^7*c^4*d^2*f*h - 1414080*a^3*b^6*c^4*d*f^2*h - 34836480*a^4*b^2*c^ \\
& 7*d^2*e*g + 1016064*a^2*b^7*c^4*d^2*e*i - 645120*a^4*b^4*c^5*e*f^2*g + 3067 \\
& 20*a^3*b^7*c^3*d*f*h^2 + 197820*a^2*b^8*c^3*d*f^2*h + 146880*a^4*b^5*c^4*d* \\
& f*h^2 + 80640*a^3*b^6*c^4*e*f^2*g - 55350*a^2*b^9*c^2*d*f*h^2 - 2304*a^2*b^ \\
& 8*c^3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2 - \\
& 1658880*a^4*b^3*c^6*d*e^2*h + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^ \\
& 4*c^6*d^2*e*g - 124416*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b^8*c^3*d*f*g^2 + 41 \\
& 472*a^2*b^7*c^4*d*e^2*h - 3919104*a^2*b^6*c^5*d^2*e*g - 7741440*a^4*b^2*c^7 \\
& *d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 18432 \\
& 0*a^8*b*c^4*h^2*i^2 + 25344*a^5*b^7*c*h^2*i^2 - 884736*a^6*b^3*c^4*g^3*i - \\
& 589824*a^7*b^3*c^3*g*i^3 - 442368*a^5*b^5*c^3*g^3*i - 294912*a^6*b^5*c^2*g* \\
& i^3 + 430080*a^7*b*c^5*f^2*i^2 - 1984*a^3*b^9*c*f^2*i^2 + 3538944*a^5*b^2*c \\
& ^6*e^3*i - 1648128*a^5*b^3*c^5*f^3*h + 1179648*a^7*b^2*c^4*e*i^3 - 898560*a \\
& ^6*b^3*c^4*f*h^3 + 589824*a^6*b^4*c^3*e*i^3 - 354240*a^5*b^5*c^3*f*h^3 - 35 \\
& 4240*a^4*b^5*c^4*f^3*h + 98304*a^5*b^6*c^2*e*i^3 + 43680*a^3*b^7*c^3*f^3*h \\
& - 21600*a^4*b^7*c^2*f*h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2 \\
& + 3870720*a^6*b*c^6*d^2*i^2 + 1658880*a^6*b*c^6*e^2*h^2 + 16547328*a^4*b^2 \\
& *c^7*d^3*h - 12306816*a^3*b^4*c^6*d^3*h + 37310976*a^3*b^3*c^7*d^3*f + 3037 \\
& 824*a^2*b^6*c^5*d^3*h - 2654208*a^5*b^3*c^5*e*g^3 + 1949184*a^6*b^2*c^5*d*h \\
& ^3 + 1296000*a^5*b^4*c^4*d*h^3 - 155520*a^4*b^6*c^3*d*h^3 - 40500*a*b^10*c^ \\
& 2*d^2*h^2 - 8100*a^3*b^8*c^2*d*h^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a \\
& ^4*b*c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5 \\
& 623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2 \\
& *f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 245760*a^8*c^5 \\
& *f*h*i^2 + 384*a^3*b^10*f*h*i^2 + 1152*a^2*b^11*d*h*i^2 - 2211840*a^6*c^7*e \\
& ^2*f*h - 1720320*a^7*c^6*d*f*i^2 - 9450*b^11*c^2*d^2*f*h + 6912*b^11*c^2*d^ \\
& 2*e*i + 1612800*a^6*c^7*d*f^2*h - 393216*a^8*b*c^4*g*i^3 - 49152*a^5*b^7*c* \\
& g*i^3 - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 883200*a^6*b*c^ \\
& 6*f^3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f*h^3 - 15482880*a^5*c^8* \\
& d*e^2*f - 9792*a*b^11*c*d^2*i^2 - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c \\
& ^4*d^3*h + 4050*a^2*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c \\
& ^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 276480*a^7*b^3*c^3*h^2*i^2 + 140544*a^6*b \\
& ^5*c^2*h^2*i^2 + 884736*a^7*b^2*c^4*g^2*i^2 + 884736*a^6*b^4*c^3*g^2*i^2 + \\
& 221184*a^5*b^6*c^2*g^2*i^2 + 501760*a^6*b^3*c^4*f^2*i^2 + 414720*a^6*b^3*c^ \\
& 4*g^2*h^2 + 207360*a^5*b^5*c^3*g^2*h^2 + 170240*a^5*b^5*c^3*f^2*i^2 + 9216* \\
& a^4*b^7*c^2*f^2*i^2 + 5184*a^4*b^7*c^2*g^2*h^2 + 3538944*a^6*b^2*c^5*e^2*i^ \\
& 2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 1264320*a^5*b^4*c^4*f^2*h^2 + 884736*a^5* \\
& b^4*c^4*e^2*i^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 + \\
& 1935360*a^5*b^3*c^5*d^2*i^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c \\
& ^5*e^2*h^2 - 532224*a^4*b^5*c^4*d^2*i^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 9676 \\
& 8*a^3*b^7*c^3*d^2*i^2 + 62784*a^2*b^9*c^2*d^2*i^2 + 20736*a^4*b^5*c^4*e^2*h \\
& ^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2 \\
& *c^6*d^2*h^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - \\
& 1412640*a^3*b^6*c^4*d^2*h^2 + 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*
\end{aligned}$$

$$\begin{aligned}
& c^3 d^2 h^2 + 8709120 a^4 b^3 c^6 d^2 g^2 - 4354560 a^3 b^5 c^5 d^2 g^2 + 9 \\
& 79776 a^2 b^7 c^4 d^2 g^2 + 645120 a^4 b^3 c^6 e^2 f^2 - 80640 a^3 b^5 c^5 e^2 f^2 + 2304 a^2 b^7 c^4 e^2 f^2 - 15269184 a^3 b^4 c^6 d^2 f^2 + 2870784 \\
& a^2 b^6 c^5 d^2 f^2 - 17418240 a^3 b^3 c^7 d^2 e^2 + 3919104 a^2 b^5 c^6 d^2 e^2 - 3456 b^{12} c^2 d^2 g^2 i + 384 a^2 b^{12} d^2 f^2 i^2 + 576 a^4 b^9 h^2 i^2 + 3 \\
& 538944 a^7 c^6 e^2 i^2 + 115200 a^7 c^6 f^2 h^2 + 64 a^2 b^{11} f^2 i^2 + 609 \\
& 6384 a^6 c^7 d^2 h^2 + 5184 b^{11} c^2 d^2 g^2 + 131072 a^8 b^2 c^3 i^4 + 983 \\
& 04 a^7 b^4 c^2 i^4 + 11025 b^{10} c^3 d^2 f^2 + 5644800 a^5 c^8 d^2 f^2 + 142 \\
& 560 a^6 b^4 c^3 h^4 + 103680 a^7 b^2 c^4 h^4 + 32400 a^5 b^6 c^2 h^4 + 2073 \\
& 6 b^9 c^4 d^2 e^2 + 331776 a^5 b^4 c^4 g^4 + 492800 a^5 b^2 c^6 f^4 + 35145 \\
& 6 a^4 b^4 c^5 f^4 - 43120 a^3 b^6 c^4 f^4 + 1225 a^2 b^8 c^3 f^4 - 27433728 \\
& a^3 b^2 c^8 d^4 + 6446304 a^2 b^4 c^7 d^4 + 7077888 a^6 c^7 e^3 i + 786432 \\
& a^8 c^5 e^3 i^3 + 28449792 a^5 c^8 d^3 h + 17010 b^{10} c^3 d^3 h + 2025 b^{12} c^2 d^2 h^2 + 580608 a^7 c^6 d^2 h^3 - 39690 b^9 c^4 d^3 f + 32768 a^6 b^6 c^2 i^4 \\
& + 2025 a^4 b^8 c^2 h^4 - 734832 a^2 b^6 c^6 d^4 + 576 b^{13} d^2 i^2 + 65536 a^9 c^4 i^4 + 20736 a^8 c^5 h^4 + 4096 a^5 b^8 i^4 + 49787136 a^4 c^9 d^4 + 1 \\
& 60000 a^6 c^7 f^4 + 5308416 a^5 c^8 e^4 + 35721 b^8 c^5 d^4, z, l) \cdot (\text{root}(56 \\
& 371445760 a^{11} b^8 c^6 z^4 - 503316480 a^8 b^{14} c^3 z^4 + 47185920 a^7 b^{16} \\
& c^2 z^4 - 171798691840 a^{14} b^2 c^9 z^4 + 193273528320 a^{13} b^4 c^8 z^4 - \\
& 128849018880 a^{12} b^6 c^7 z^4 - 16911433728 a^{10} b^{10} c^5 z^4 + 3523215360 a^9 b^{12} c^4 z^4 - 2621440 a^6 b^{18} c^2 z^4 + 68719476736 a^{15} c^{10} z^4 + 655 \\
& 36 a^5 b^{20} z^4 + 196608 a^5 b^{13} c^2 g^2 i z^2 - 46080 a^4 b^{14} c^2 f^2 h z^2 - 10 \\
& 5984 a^3 b^{15} c^2 d^2 h z^2 - 73728 a^2 b^{16} c^2 d^2 f^2 z^2 + 2548039680 a^9 b^3 c^7 \\
& d^2 h z^2 + 1509949440 a^9 b^3 c^7 e^2 g^2 z^2 - 1401421824 a^8 b^5 c^6 d^2 h z^2 \\
& - 1321205760 a^9 b^2 c^8 d^2 f^2 z^2 - 754974720 a^8 b^5 c^6 e^2 g^2 z^2 + 73216819 \\
& 2 a^7 b^6 c^6 d^2 f^2 z^2 - 603979776 a^{10} b^2 c^7 e^2 i z^2 - 456130560 a^9 b^4 c^6 f^2 h z^2 + 390463488 a^7 b^7 c^5 d^2 h z^2 + 301989888 a^{10} b^3 c^6 g^2 i z^2 \\
& - 366280704 a^6 b^8 c^5 d^2 f^2 z^2 - 330301440 a^8 b^4 c^7 d^2 f^2 z^2 + 2540175 \\
& 36 a^8 b^6 c^5 f^2 h z^2 - 1887436800 a^{10} b^2 c^8 d^2 h z^2 + 188743680 a^{10} b^2 \\
& c^7 f^2 h z^2 + 188743680 a^7 b^7 c^5 e^2 g^2 z^2 + 125829120 a^8 b^6 c^5 e^2 i z^2 \\
& - 62914560 a^8 b^7 c^4 g^2 i z^2 - 61931520 a^7 b^8 c^4 f^2 h z^2 + 23592960 a^7 b^9 c^3 g^2 i z^2 - 47185920 a^7 b^8 c^4 e^2 i z^2 - 3538944 a^6 b^{11} c^2 g^2 \\
& i z^2 + 96583680 a^5 b^{10} c^4 d^2 f^2 z^2 - 51609600 a^6 b^9 c^4 d^2 h z^2 + 707 \\
& 7888 a^6 b^{10} c^3 e^2 i z^2 + 6144000 a^6 b^{10} c^3 f^2 h z^2 - 393216 a^5 b^{12} c^2 e^2 i z^2 + 61440 a^5 b^{12} c^2 f^2 h z^2 - 23592960 a^6 b^9 c^4 e^2 g^2 z^2 + 1 \\
& 179648 a^5 b^{11} c^3 e^2 g^2 z^2 + 829440 a^4 b^{13} c^2 d^2 h z^2 + 368640 a^5 b^{11} \\
& c^3 d^2 h z^2 - 15175680 a^4 b^{12} c^3 d^2 f^2 z^2 + 1428480 a^3 b^{14} c^2 d^2 f^2 z^2 \\
& - 1207959552 a^{10} b^2 c^8 e^2 g^2 z^2 - 402653184 a^{11} b^2 c^7 g^2 i z^2 - 440401920 \\
& a^{10} b^2 c^8 f^2 z^2 - 188743680 a^{11} b^2 c^7 h^2 z^2 + 1761607680 a^{10} c^9 d^2 f^2 z^2 + 524288 a^6 b^{12} c^2 i^2 z^2 + 46080 a^5 b^{13} c^2 h^2 z^2 - 14080 a^3 b^{15} c^2 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^2 c^8 e^2 z^2 + 251658240 a^{11} c^8 f^2 h z^2 + 1536 a^3 b^{16} f^2 h z^2 + 4608 a^2 b^{17} d^2 h z^2 - 5400428544 a^7 b^5 c^7 d^2 z^2 - 94464 a^2 b^{17} c^2 d^2 z^2 + 754974720 a^8 b^4 c^7 e^2 z^2 - 730054656 a^5 b^9 c^5 d^2 z^2 + 47
\end{aligned}$$

$7102080a^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^6h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^11c^4d^2z^2 - 50331648a^10b^4c^5i^2z^2 - 33554432a^11b^2c^6i^2z^2 + 20971520a^9b^6c^4i^2z^2 - 47185920a^7b^8c^4g^2z^2 - 26542080a^8b^7c^4h^2z^2 - 2752512a^7b^10c^2i^2z^2 + 2621440a^8b^8c^3i^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2z^2 - 1290240a^6b^11c^2h^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 + 1536a^*b^18d^*f^*z^2 + 1207959552a^10c^9e^2z^2 + 134217728a^12c^7i^2z^2 - 32768a^5b^14i^2z^2 + 2304a^4b^15h^2z^2 + 256a^2b^17f^2z^2 + 2304b^19d^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^11c^*f^*h^*i^*z + 56623104a^8b^*c^7d^*f^*i^*z - 50688a^3b^12c^*d^*h^*i^*z - 4608a^3b^12c^*f^*g^*h^*z - 9437184a^8b^*c^7e^*f^*h^*z - 55296a^2b^13c^*d^*f^*i^*z - 13824a^2b^13c^*d^*g^*h^*z + 9216a^*b^13c^2d^*e^*f^*z - 4608a^*b^14c^*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^10c^2f^*g^*h^*z - 27648a^4b^10c^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 - 5898240a^6b^5c^5e^*f^*h^*z - 3809280a^4b^9c^3d^*f^*i^*z + 2359296a^6b^5c^5d^*f^*i^*z + 1474560a^5b^7c^4e^*f^*h^*z + 681984a^3b^11c^2d^*f^*i^*z - 276480a^4b^9c^3d^*g^*h^*z - 184320a^4b^9c^3e^*f^*h^*z + 179712a^3b^11c^2d^*g^*h^*z + 9216a^3b^11c^2e^*f^*h^*z + 16220160a^4b^8c^4d^*f^*g^*z + 13271040a^5b^6c^5d^*e^*h^*z - 2396160a^3b^10c^3d^*f^*g^*z + 552960a^4b^8c^4d^*e^*h^*z - 359424a^3b^10c^3d^*e^*h^*z + 175104a^2b^12c^2d^*f^*g^*z + 27648a^2b^12c^2d^*e^*h^*z - 32440320a^4b^7c^5d^*e^*f^*z + 4792320a^3b^9c^4d^*e^*f^*z - 350208a^2b^11c^3d^*e^*f^*z + 346816512a^7b^*c^8d^2g^*z - 41472a^5b^10c^*h^2i^*z + 7077888a^9b^*c^6g^*h^2z - 11008a^3b^12c^*f^2i^*z - 6912a^4b^11c^*g^*h^2z - 19660800a^8b^*c^7f^2g^*z - 768a^2b^13c^*f^2g^*z + 214272a^*b^13c^2d^2g^*z - 428544a^*b^12c^3d^2e^*z - 198180864a^8c^8d^*e^*h^*z - 66060288a^9c^7d^*h^*i^*z + 1536a^3b^13f^*h^*i^*z + 4608a^2b^14d^*h^*i^*z - 66816a^*b^14c^*d^2i^*z + 1022754816a^6b^2c^8d^2e^*z - 642318336a^5b^4c^7d^2e^*z - 511377408a^6b^3c^7d^2g^*z + 321159168a^5b^5c^6d^2g^*z + 225312768a^7b^2c^7d^2i^*z + 223395840a^4b^6c^6d^2e^*z - 111697920a^4b^7c^5d^2g^*z + 3538944a^9b^2c^5h^2i^*z - 737280a^$



$$\begin{aligned}
& 7*b^6*c^3*h^2*i*z + 276480*a^6*b^8*c^2*h^2*i*z - 10354688*a^8*b^2*c^6*f^2* \\
& i*z - 43646976*a^6*b^4*c^6*d^2*i*z - 8847360*a^8*b^3*c^5*g*h^2*z + 4423680* \\
& a^7*b^5*c^4*g*h^2*z + 2048000*a^6*b^6*c^4*f^2*i*z - 1105920*a^6*b^7*c^3*g*h \\
& ^2*z - 849920*a^5*b^8*c^3*f^2*i*z + 393216*a^7*b^4*c^5*f^2*i*z + 145920*a^4 \\
& *b^10*c^2*f^2*i*z + 138240*a^5*b^9*c^2*g*h^2*z - 32587776*a^5*b^6*c^5*d^2*i \\
& *z + 25362432*a^7*b^3*c^6*f^2*g*z + 21657600*a^4*b^8*c^4*d^2*i*z + 17694720 \\
& *a^8*b^2*c^6*e*h^2*z - 50724864*a^7*b^2*c^7*e*f^2*z - 13271040*a^6*b^5*c^5* \\
& f^2*g*z - 8847360*a^7*b^4*c^5*e*h^2*z - 5810688*a^3*b^10*c^3*d^2*i*z + 3563 \\
& 520*a^5*b^7*c^4*f^2*g*z + 2211840*a^6*b^6*c^4*e*h^2*z + 845568*a^2*b^12*c^2 \\
& *d^2*i*z - 506880*a^4*b^9*c^3*f^2*g*z - 276480*a^5*b^8*c^3*e*h^2*z + 34560* \\
& a^3*b^11*c^2*f^2*g*z + 13824*a^4*b^10*c^2*e*h^2*z + 26542080*a^6*b^4*c^6*e* \\
& f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 71270 \\
& 40*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1013760*a^4*b^8*c^4 \\
& *e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930496 \\
& *a^2*b^10*c^4*d^2*e*z + 1536*a*b^15*d*f*i*z - 693633024*a^7*c^9*d^2*e*z - 2 \\
& 31211008*a^8*c^8*d^2*i*z - 4718592*a^10*c^6*h^2*i*z + 2304*a^4*b^12*h^2*i*z \\
& + 13107200*a^9*c^7*f^2*i*z + 256*a^2*b^14*f^2*i*z - 14155776*a^9*c^7*e*h^2 \\
& *z + 39321600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z - 6912*b^15*c*d^2*g* \\
& z + 2304*b^16*d^2*i*z + 737280*a^7*b*c^5*f*g*h*i - 2304*a^3*b^9*c*f*g*h*i - \\
& 6912*a^2*b^10*c*d*g*h*i + 11059200*a^6*b*c^6*d*e*h*i + 5160960*a^6*b*c^6*d \\
& *f*g*i + 2211840*a^6*b*c^6*e*f*g*h + 4608*a*b^10*c^2*d*e*f*i + 15482880*a^5 \\
& *b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g - 2304*a*b^11*c*d*f*g*i + 1843200* \\
& a^6*b^3*c^4*f*g*h*i + 783360*a^5*b^5*c^3*f*g*h*i + 18432*a^4*b^7*c^2*f*g*h* \\
& i - 5529600*a^6*b^2*c^5*d*g*h*i - 3686400*a^6*b^2*c^5*e*f*h*i - 2211840*a^5 \\
& *b^4*c^4*d*g*h*i - 1566720*a^5*b^4*c^4*e*f*h*i + 317952*a^4*b^6*c^3*d*g*h*i \\
& - 36864*a^4*b^6*c^3*e*f*h*i + 6912*a^3*b^8*c^2*d*g*h*i + 4608*a^3*b^8*c^2* \\
& e*f*h*i + 5160960*a^5*b^3*c^5*d*f*g*i + 4423680*a^5*b^3*c^5*e*f*g*h + 44236 \\
& 80*a^5*b^3*c^5*d*e*h*i - 635904*a^4*b^5*c^4*d*e*h*i - 354816*a^3*b^7*c^3*d* \\
& f*g*i + 322560*a^4*b^5*c^4*d*f*g*i + 138240*a^4*b^5*c^4*e*f*g*h + 59904*a^2 \\
& *b^9*c^2*d*f*g*i - 13824*a^3*b^7*c^3*e*f*g*h - 13824*a^3*b^7*c^3*d*e*h*i + \\
& 13824*a^2*b^9*c^2*d*e*h*i - 16588800*a^5*b^2*c^6*d*e*g*h - 10321920*a^5*b^2 \\
& *c^6*d*e*f*i + 1658880*a^4*b^4*c^5*d*e*g*h + 709632*a^3*b^6*c^4*d*e*f*i - 6 \\
& 45120*a^4*b^4*c^5*d*e*f*i + 124416*a^3*b^6*c^4*d*e*g*h - 119808*a^2*b^8*c^3 \\
& *d*e*f*i - 41472*a^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 290304 \\
& 0*a^3*b^5*c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g - 3456*a^4*b^8*c*g*h^2*i \\
& - 2304*a^4*b^8*c*f*h*i^2 + 1105920*a^7*b*c^5*e*h^2*i - 384*a^2*b^10*c*f^2* \\
& g*i - 10616832*a^6*b*c^6*e^2*g*i - 3538944*a^7*b*c^5*e*g*i^2 + 1843200*a^7* \\
& b*c^5*d*h*i^2 + 1152*a^3*b^9*c*d*h*i^2 - 37062144*a^5*b*c^7*d^2*f*h + 25804 \\
& 80*a^6*b*c^6*e*f^2*i + 65664*a*b^10*c^2*d^2*g*i + 23224320*a^5*b*c^7*d^2*e* \\
& i - 9216*a^2*b^10*c*d*f*i^2 - 5985792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*c^3* \\
& d^2*f*h - 131328*a*b^9*c^3*d^2*e*i - 6300*a*b^10*c^2*d*f^2*h + 16588800*a^5 \\
& *b*c^7*d*e^2*h + 3456*a*b^10*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 13824 \\
& *a*b^8*c^4*d*e^2*f - 1474560*a^7*c^6*e*f*h*i - 10321920*a^6*c^7*d*e*f*i + 1 \\
& 350*a*b^11*c*d*f*h^2 - 552960*a^7*b^2*c^4*g*h^2*i - 552960*a^6*b^4*c^3*g*h^ \\
& 2*i - 145152*a^5*b^6*c^2*g*h^2*i - 737280*a^7*b^2*c^4*f*h*i^2 - 568320*a^6*
\end{aligned}$$

$$\begin{aligned}
& b^4c^3f^2hi^2 - 136704a^5b^6c^2f^2hi^2 - 1290240a^6b^2c^5f^2g^2i \\
& + 1105920a^6b^3c^4e^2h^2i - 860160a^5b^4c^4f^2g^2i + 290304a^5b^5 \\
& *c^3e^2h^2i - 80640a^4b^6c^3f^2g^2i + 12672a^3b^8c^2f^2g^2i + 6912 \\
& *a^4b^7c^2e^2h^2i + 5308416a^6b^2c^5e^2g^2i - 5308416a^5b^3c^5e^2 \\
& *g^2i - 3538944a^6b^3c^4e^2g^2i + 2654208a^5b^4c^4e^2g^2i + 1658880 \\
& *a^6b^3c^4d^2hi^2 - 1105920a^5b^4c^4f^2g^2h - 884736a^5b^5c^3e^2g \\
& *i^2 - 552960a^6b^2c^5f^2g^2h + 262656a^5b^5c^3d^2hi^2 - 55296a^4b^7 \\
& *c^2d^2hi^2 - 34560a^4b^6c^3f^2g^2h + 3456a^3b^8c^2f^2g^2h - 11 \\
& 612160a^5b^2c^6d^2g^2i + 1720320a^5b^3c^5e^2f^2i - 1658880a^6b^2c^5 \\
& *e^2g^2h^2 + 1596672a^3b^6c^4d^2g^2i - 829440a^5b^4c^4e^2g^2h^2 - 50 \\
& 8032a^2b^8c^3d^2g^2i + 161280a^4b^5c^4e^2f^2i - 25344a^3b^7c^3e^2 \\
& *f^2i - 20736a^4b^6c^3e^2g^2h^2 + 768a^2b^9c^2e^2f^2i - 4423680a^5b^2 \\
& *c^6e^2f^2h + 4147200a^5b^3c^5d^2g^2h - 2580480a^6b^2c^5d^2f^2i^2 \\
& - 967680a^5b^4c^4d^2f^2i^2 - 414720a^4b^5c^4d^2g^2h - 138240a^4b^4 \\
& *c^5e^2f^2h + 64512a^4b^6c^3d^2f^2i^2 + 39168a^3b^8c^2d^2f^2i^2 - 3110 \\
& 4a^3b^7c^3d^2g^2h + 13824a^3b^6c^4e^2f^2h + 10368a^2b^9c^2d^2g^2 \\
& *h + 15630336a^5b^2c^6d^2f^2h - 14459904a^4b^3c^6d^2f^2h + 9630144a^3 \\
& *b^5c^5d^2f^2h - 8764416a^5b^3c^5d^2f^2h^2 - 3870720a^5b^2c^6e^2f^2 \\
& *g - 3193344a^3b^5c^5d^2e^2i + 2867328a^4b^4c^5d^2f^2h - 2095200a^2 \\
& *b^7c^4d^2f^2h - 1414080a^3b^6c^4d^2f^2h - 34836480a^4b^2c^7d^2 \\
& *e^2g + 1016064a^2b^7c^4d^2e^2i - 645120a^4b^4c^5e^2f^2g + 306720a^3 \\
& *b^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^3 \\
& *e^2f^2g - 3870720a^5b^2c^6d^2f^2g^2 - 1935360a^4b^4c^5d^2f^2g^2 - 165 \\
& 8880a^4b^3c^6d^2e^2h + 725760a^3b^6c^4d^2f^2g^2 + 17418240a^3b^4c^6 \\
& *d^2e^2g - 124416a^3b^5c^5d^2e^2h - 96768a^2b^8c^3d^2f^2g^2 + 41472a^2 \\
& *b^7c^4d^2e^2h - 3919104a^2b^6c^5d^2e^2g - 7741440a^4b^2c^7d^2e^2 \\
& *f + 2903040a^3b^4c^6d^2e^2f - 387072a^2b^6c^5d^2e^2f + 184320a^8 \\
& *b^c^4h^2i^2 + 25344a^5b^7c^2h^2i^2 - 884736a^6b^3c^4g^3i - 5898 \\
& 24a^7b^3c^3g^2i^3 - 442368a^5b^5c^3g^3i - 294912a^6b^5c^2g^2i^3 \\
& + 430080a^7b^c^5f^2i^2 - 1984a^3b^9c^2f^2i^2 + 3538944a^5b^2c^6e^3 \\
& *i - 1648128a^5b^3c^5f^3h + 1179648a^7b^2c^4e^3i - 898560a^6b^3 \\
& *c^4f^3h^3 + 589824a^6b^4c^3e^3i^3 - 354240a^5b^5c^3f^3h^3 - 354240 \\
& *a^4b^5c^4f^3h + 98304a^5b^6c^2e^3i^3 + 43680a^3b^7c^3f^3h - 21 \\
& 600a^4b^7c^2f^3h^3 - 1050a^2b^9c^2f^3h + 225a^2b^10c^2f^2h^2 + 3 \\
& 870720a^6b^c^6d^2i^2 + 1658880a^6b^c^6e^2h^2 + 16547328a^4b^2c^7 \\
& *d^3h - 12306816a^3b^4c^6d^3h + 37310976a^3b^3c^7d^3f + 3037824a^2 \\
& *b^6c^5d^3h - 2654208a^5b^3c^5e^2g^3 + 1949184a^6b^2c^5d^2h^3 + \\
& 1296000a^5b^4c^4d^2h^3 - 155520a^4b^6c^3d^2h^3 - 40500a^6b^10c^2d^2 \\
& *h^2 - 8100a^3b^8c^2d^2h^3 + 3870720a^5b^c^7e^2f^2 + 34836480a^4b \\
& *c^8d^2e^2 - 108864a^6b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 56232 \\
& 96a^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 \\
& *i^2 + 384a^3b^10f^2hi^2 + 1152a^2b^11d^2hi^2 - 2211840a^6c^7e^2f \\
& *h - 1720320a^7c^6d^2f^2i^2 - 9450b^11c^2d^2f^2h + 6912b^11c^2d^2e^2
\end{aligned}$$

$$\begin{aligned}
& i + 1612800*a^6*c^7*d*f^2*h - 393216*a^8*b*c^4*g*i^3 - 49152*a^5*b^7*c*g*i^3 \\
& - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 883200*a^6*b*c^6*f^3*h \\
& - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f*h^3 - 15482880*a^5*c^8*d*e^2*f \\
& - 9792*a*b^11*c*d^2*i^2 - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c^4*d^3*h \\
& + 4050*a^2*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f \\
& + 7350*a*b^9*c^3*d*f^3 + 276480*a^7*b^3*c^3*h^2*i^2 + 140544*a^6*b^5*c^2*h^2*i^2 \\
& + 884736*a^7*b^2*c^4*g^2*i^2 + 884736*a^6*b^4*c^3*g^2*i^2 + 221184*a^5*b^6*c^2*g^2*i^2 \\
& + 501760*a^6*b^3*c^4*f^2*i^2 + 414720*a^6*b^3*c^4*g^2*h^2 + 207360*a^5*b^5*c^3*g^2*h^2 \\
& + 170240*a^5*b^5*c^3*f^2*i^2 + 9216*a^4*b^7*c^2*f^2*i^2 + 5184*a^4*b^7*c^2*g^2*h^2 \\
& + 3538944*a^6*b^2*c^5*e^2*i^2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 1264320*a^5*b^4*c^4*f^2*h^2 \\
& + 884736*a^5*b^4*c^4*e^2*i^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 \\
& + 1935360*a^5*b^3*c^5*d^2*i^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c^5*e^2*h^2 \\
& - 532224*a^4*b^5*c^4*d^2*i^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 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 \\
& + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 \\
& + 103680*a^7*b^2*c^4*h^4 + 32400*a^5*b^6*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 \\
& + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 \\
& + 6446304*a^2*b^4*c^7*d^4 + 7077888*a^6*c^7*e^3*i + 786432*a^8*c^5*e*i^3 + 28449792*a^5*c^8*d^3*h \\
& + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 580608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f \\
& + 32768*a^6*b^6*c*i^4 + 2025*a^4*b^8*c*h^4 - 734832*a*b^6*c^6*d^4 + 576*b^13*d^2*i^2 + 65536*a^9*c^4*i^4 \\
& + 20736*a^8*c^5*h^4 + 4096*a^5*b^8*i^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 \\
& + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, 1)*((768*a^2*b^14*c^2*d - 3145728*a^10*c^8*h \\
& - 22020096*a^9*c^9*d - 22272*a^3*b^12*c^3*d + 282624*a^4*b^10*c^4*d - 2027520*a^5*b^8*c^5*d \\
& + 8847360*a^6*b^6*c^6*d - 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 \\
& + 768*a^4*b^12*c^2*h - 12288*a^5*b^10*c^3*h + 61440*a^6*b^8*c^4*h - 983040*a^8*b^4*c^6*h \\
& + 3145728*a^9*b^2*c^7*h + 4194304*a^9*b*c^8*f)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 \\
& - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(1572864*a^9*c^9*e + 524288*a^10*c^8*i \\
& - 1536*a^4*b^10*c^4*e + 30720*a^5*b^8*c^5*e - 245760*a^6*b^6*c^6*e + 983040*a^7*b^4*c^7*e \\
& - 1966080*a^8*b^2*c^8*e
\end{aligned}$$

$$\begin{aligned}
& + 768*a^4*b^{11}*c^3*g - 15360*a^5*b^9*c^4*g + 122880*a^6*b^7*c^5*g - 491520 \\
& *a^7*b^5*c^6*g + 983040*a^8*b^3*c^7*g - 256*a^4*b^{12}*c^2*i + 4608*a^5*b^{10}* \\
& c^3*i - 30720*a^6*b^8*c^4*i + 81920*a^7*b^6*c^5*i - 393216*a^9*b^2*c^7*i - \\
& 786432*a^9*b*c^8*g)/(64*(a^4*b^{12} + 4096*a^{10}*c^6 - 24*a^5*b^{10}*c + 240*a^ \\
& 6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (roo \\
& t(56371445760*a^{11}*b^8*c^6*z^4 - 503316480*a^8*b^{14}*c^3*z^4 + 47185920*a^7* \\
& b^{16}*c^2*z^4 - 171798691840*a^{14}*b^2*c^9*z^4 + 193273528320*a^{13}*b^4*c^8*z^ \\
& 4 - 128849018880*a^{12}*b^6*c^7*z^4 - 16911433728*a^{10}*b^{10}*c^5*z^4 + 3523215 \\
& 360*a^9*b^{12}*c^4*z^4 - 2621440*a^6*b^{18}*c*z^4 + 68719476736*a^{15}*c^{10}*z^4 + \\
& 65536*a^5*b^{20}*z^4 + 196608*a^5*b^{13}*c*g*i*z^2 - 46080*a^4*b^{14}*c*f*h*z^2 \\
& - 105984*a^3*b^{15}*c*d*h*z^2 - 73728*a^2*b^{16}*c*d*f*z^2 + 2548039680*a^9*b^3 \\
& *c^7*d*h*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h* \\
& z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 7321 \\
& 68192*a^7*b^6*c^6*d*f*z^2 - 603979776*a^{10}*b^2*c^7*e*i*z^2 - 456130560*a^9* \\
& b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c^5*d*h*z^2 + 301989888*a^{10}*b^3*c^6*g* \\
& i*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 254 \\
& 017536*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^{10}*b*c^8*d*h*z^2 + 188743680*a^{10} \\
& *b^2*c^7*f*h*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 + 125829120*a^8*b^6*c^5*e* \\
& i*z^2 - 62914560*a^8*b^7*c^4*g*i*z^2 - 61931520*a^7*b^8*c^4*f*h*z^2 + 23592 \\
& 960*a^7*b^9*c^3*g*i*z^2 - 47185920*a^7*b^8*c^4*e*i*z^2 - 3538944*a^6*b^{11}*c \\
& ^2*g*i*z^2 + 96583680*a^5*b^{10}*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + \\
& 7077888*a^6*b^{10}*c^3*e*i*z^2 + 6144000*a^6*b^{10}*c^3*f*h*z^2 - 393216*a^5*b \\
& ^{12}*c^2*e*i*z^2 + 61440*a^5*b^{12}*c^2*f*h*z^2 - 23592960*a^6*b^9*c^4*e*g*z^2 \\
& + 1179648*a^5*b^{11}*c^3*e*g*z^2 + 829440*a^4*b^{13}*c^2*d*h*z^2 + 368640*a^5* \\
& b^{11}*c^3*d*h*z^2 - 15175680*a^4*b^{12}*c^3*d*f*z^2 + 1428480*a^3*b^{14}*c^2*d*f \\
& *z^2 - 1207959552*a^{10}*b*c^8*e*g*z^2 - 402653184*a^{11}*b*c^7*g*i*z^2 - 44040 \\
& 1920*a^{10}*b*c^8*f^2*z^2 - 188743680*a^{11}*b*c^7*h^2*z^2 + 1761607680*a^{10}*c^ \\
& 9*d*f*z^2 + 524288*a^6*b^{12}*c^i^2*z^2 + 46080*a^5*b^{13}*c*h^2*z^2 - 14080*a^ \\
& 3*b^{15}*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6* \\
& d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 + 805306368*a^{11}*c^8*e*i*z^2 - 15099 \\
& 49440*a^9*b^2*c^8*e^2*z^2 + 251658240*a^{11}*c^8*f*h*z^2 + 1536*a^3*b^{16}*f*h* \\
& z^2 + 4608*a^2*b^{17}*d*h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^{17} \\
& *c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 \\
& + 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888 \\
& *a^{10}*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^{10}*b^3* \\
& c^6*h^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 \\
& + 146165760*a^4*b^{11}*c^4*d^2*z^2 - 50331648*a^{10}*b^4*c^5*i^2*z^2 - 3355443 \\
& 2*a^{11}*b^2*c^6*i^2*z^2 + 20971520*a^9*b^6*c^4*i^2*z^2 - 47185920*a^7*b^8*c^ \\
& 4*g^2*z^2 - 26542080*a^8*b^7*c^4*h^2*z^2 - 2752512*a^7*b^{10}*c^2*i^2*z^2 + 2 \\
& 621440*a^8*b^8*c^3*i^2*z^2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5* \\
& c^5*h^2*z^2 - 1290240*a^6*b^{11}*c^2*h^2*z^2 + 5898240*a^6*b^{10}*c^3*g^2*z^2 - \\
& 294912*a^5*b^{12}*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b \\
& ^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^{11}*c^3*f^2*z^ \\
& 2 + 291840*a^4*b^{13}*c^2*f^2*z^2 - 19860480*a^3*b^{13}*c^3*d^2*z^2 - 1179648*a \\
& ^5*b^{10}*c^4*e^2*z^2 + 1771776*a^2*b^{15}*c^2*d^2*z^2 + 1536*a*b^{18}*d*f*z^2 +
\end{aligned}$$

$$\begin{aligned}
& 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^8d^2efz + 99090432a^8b^7d^2g^2hz - 3145728a^9b^6f^2h^2iz - 27648a^4b^{11}c^2f^2h^2iz + 56623104a^8b^7d^2f^2iz - 50688a^3b^{12}c^2d^2h^2iz - 4608a^3b^{12}c^2f^2g^2hz - 9437184a^8b^7c^2ef^2h^2z - \\
& 55296a^2b^{13}c^2d^2f^2iz - 13824a^2b^{13}c^2d^2g^2hz + 9216a^2b^{13}c^2d^2ef^2z - 4608a^2b^{14}c^2d^2f^2g^2z + 219414528a^7b^2c^7d^2ef^2hz - 221773824a^6b^3c^7d^2ef^2z - 109707264a^7b^3c^6d^2g^2hz + 110886912a^6b^4c^6d^2f^2g^2z + 40108032a^8b^2c^6d^2h^2iz + 2359296a^8b^3c^5f^2h^2iz - 491520a^6b^7c^3f^2h^2iz + 184320a^5b^9c^2f^2h^2iz - 88473600a^6b^4c^6d^2ef^2hz - 84934656a^7b^2c^7d^2f^2g^2z + 117964800a^5b^5c^6d^2ef^2z - 45613056a^7b^3c^6d^2f^2iz + 44236800a^6b^5c^5d^2g^2hz - 10321920a^6b^6c^4d^2h^2iz + 7077888a^7b^4c^5d^2h^2iz - 5898240a^7b^4c^5f^2g^2hz + 4718592a^8b^2c^6f^2g^2hz + 2949120a^6b^6c^4f^2g^2hz + 2396160a^5b^8c^3d^2h^2iz - 737280a^5b^8c^3f^2g^2hz + 92160a^4b^{10}c^2f^2g^2hz - 27648a^4b^{10}c^2d^2h^2iz - 58982400a^5b^6c^5d^2f^2g^2z + 11796480a^7b^3c^6ef^2h^2z + 8847360a^5b^7c^4d^2f^2iz - 6635520a^5b^7c^4d^2g^2hz - 5898240a^6b^5c^5ef^2h^2z - 3809280a^4b^9c^3d^2f^2iz + 2359296a^6b^5c^5d^2f^2iz + 1474560a^5b^7c^4ef^2h^2z + 681984a^3b^{11}c^2d^2f^2iz - 276480a^4b^9c^3d^2g^2hz - 184320a^4b^9c^3ef^2h^2z + 179712a^3b^{11}c^2d^2g^2hz + 9216a^3b^{11}c^2ef^2h^2z + 16220160a^4b^8c^4d^2f^2g^2z + 13271040a^5b^6c^5d^2ef^2hz - 2396160a^3b^{10}c^3d^2f^2g^2z + 552960a^4b^8c^4d^2ef^2hz - 359424a^3b^{10}c^3d^2ef^2hz + 175104a^2b^{12}c^2d^2f^2g^2z + 27648a^2b^{12}c^2d^2ef^2hz - 32440320a^4b^7c^5d^2ef^2z + 4792320a^3b^9c^4d^2ef^2z - 350208a^2b^{11}c^3d^2ef^2z + 346816512a^7b^8d^2g^2z - 41472a^5b^{10}c^2h^2iz + 7077888a^9b^6c^2g^2h^2z - 11008a^3b^{12}c^2f^2iz - 6912a^4b^{11}c^2g^2h^2z - 19660800a^8b^7c^2f^2g^2z - 768a^2b^{13}c^2f^2g^2z + 214272a^2b^{13}c^2d^2g^2z - 428544a^2b^{12}c^3d^2ez - 198180864a^8c^8d^2ef^2hz - 66060288a^9c^7d^2h^2iz + 1536a^3b^{13}f^2h^2iz + 4608a^2b^{14}d^2h^2iz - 66816a^2b^{14}c^2d^2iz + 1022754816a^6b^2c^8d^2ez - 642318336a^5b^4c^7d^2ez - 511377408a^6b^3c^7d^2g^2z + 321159168a^5b^5c^6d^2g^2z + 225312768a^7b^2c^7d^2iz + 223395840a^4b^6c^6d^2ez - 111697920a^4b^7c^5d^2g^2z + 3538944a^9b^2c^5h^2iz - 737280a^7b^6c^3h^2iz + 276480a^6b^8c^2h^2iz - 10354688a^8b^2c^6f^2iz - 43646976a^6b^4c^6d^2iz - 8847360a^8b^3c^5g^2h^2z + 4423680a^7b^5c^4g^2h^2z + 2048000a^6b^6c^4f^2iz - 1105920a^6b^7c^3g^2h^2z - 849920a^5b^8c^3f^2iz + 393216a^7b^4c^5f^2iz + 145920a^4b^{10}c^2f^2iz + 138240a^5b^9c^2g^2h^2z - 32587776a^5b^6c^5d^2iz + 25362432a^7b^3c^6f^2g^2z + 21657600a^4b^8c^4d^2iz + 17694720a^8b^2c^6ef^2h^2z - 50724864a^7b^2c^7ef^2z - 13271040a^6b^5c^5f^2g^2z - 8847360a^7b^4c^5ef^2h^2z - 5810688a^3b^{10}c^3d^2iz + 3563520a^5b^7c^4f^2g^2z + 2211840a^6b^6c^4ef^2h^2z + 845568a^2b^{12}c^2d^2iz - 506880a^4b^9c^3f^2g^2z - 276480a^5b^8c^3ef^2h^2z + 34560a^3b^{11}c^2f^2g^2z + 13824a^4b^{10}c^2ef^2h^2z + 26542080a^6b^4c^6ef^2z + 23362560a^3b^9c^4d^2g^2z - 46725120a^3b^8c^5d^2ez - 7
\end{aligned}$$

$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 + 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^2*i + 1843200*a^7*b*c^5*d*h^2*i + 1152*a^3*b^9*c*d*h^2*i - 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^2*i - 5985792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*c^3*d^2*f*h - 131328*a*b^9*c^3*d^2*e*i - 6300*a*b^{10}*c^2*d*f^2*h + 16588800*a^5*b*c^7*d*e^2*h + 3456*a*b^{10}*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 13824*a*b^8*c^4*d*e^2*f - 1474560*a^7*c^6*e*f*h*i - 10321920*a^6*c^7*d*e*f*i + 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^2*i - 568320*a^6*b^4*c^3*f*h^2*i - 136704*a^5*b^6*c^2*f*h^2*i - 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^2*i + 2654208*a^5*b^4*c^4*e*g^2*i + 1658880*a^6*b^3*c^4*d*h^2*i - 1105920*a^5*b^4*c^4*f*g^2*h - 884736*a^5*b^5*c^3*e*g^2*i - 552960*a^6*b^2*c^5*f*g^2*h + 262656*a^5*b^5*c^3*d*h^2*i - 552960*a^4*b^7*c^2*d*h^2*i - 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*$

$$\begin{aligned}
& a^5 b^2 c^6 e^2 f h + 4147200 a^5 b^3 c^5 d g^2 h - 2580480 a^6 b^2 c^5 d f \\
& * i^2 - 967680 a^5 b^4 c^4 d f i^2 - 414720 a^4 b^5 c^4 d g^2 h - 138240 a^4 \\
& * b^4 c^5 e^2 f h + 64512 a^4 b^6 c^3 d f i^2 + 39168 a^3 b^8 c^2 d f i^2 - \\
& 31104 a^3 b^7 c^3 d g^2 h + 13824 a^3 b^6 c^4 e^2 f h + 10368 a^2 b^9 c^2 d \\
& * g^2 h + 15630336 a^5 b^2 c^6 d f^2 h - 14459904 a^4 b^3 c^6 d^2 f h + 9630 \\
& 144 a^3 b^5 c^5 d^2 f h - 8764416 a^5 b^3 c^5 d f h^2 - 3870720 a^5 b^2 c^6 \\
& * e f^2 g - 3193344 a^3 b^5 c^5 d^2 e i + 2867328 a^4 b^4 c^5 d f^2 h - 2095 \\
& 200 a^2 b^7 c^4 d^2 f h - 1414080 a^3 b^6 c^4 d f^2 h - 34836480 a^4 b^2 c^7 \\
& * d^2 e g + 1016064 a^2 b^7 c^4 d^2 e i - 645120 a^4 b^4 c^5 e f^2 g + 3067 \\
& 20 a^3 b^7 c^3 d f h^2 + 197820 a^2 b^8 c^3 d f^2 h + 146880 a^4 b^5 c^4 d f \\
& * h^2 + 80640 a^3 b^6 c^4 e f^2 g - 55350 a^2 b^9 c^2 d f h^2 - 2304 a^2 b^8 \\
& * c^3 e f^2 g - 3870720 a^5 b^2 c^6 d f g^2 - 1935360 a^4 b^4 c^5 d f g^2 - \\
& 1658880 a^4 b^3 c^6 d e^2 h + 725760 a^3 b^6 c^4 d f g^2 + 17418240 a^3 b^4 \\
& * c^6 d^2 e g - 124416 a^3 b^5 c^5 d e^2 h - 96768 a^2 b^8 c^3 d f g^2 + 41 \\
& 472 a^2 b^7 c^4 d e^2 h - 3919104 a^2 b^6 c^5 d^2 e g - 7741440 a^4 b^2 c^7 \\
& * d e^2 f + 2903040 a^3 b^4 c^6 d e^2 f - 387072 a^2 b^6 c^5 d e^2 f + 18432 \\
& 0 a^8 b c^4 h^2 i^2 + 25344 a^5 b^7 c h^2 i^2 - 884736 a^6 b^3 c^4 g^3 i - \\
& 589824 a^7 b^3 c^3 g i^3 - 442368 a^5 b^5 c^3 g^3 i - 294912 a^6 b^5 c^2 g i^3 \\
& + 430080 a^7 b c^5 f^2 i^2 - 1984 a^3 b^9 c f^2 i^2 + 3538944 a^5 b^2 c^6 \\
& * e^3 i - 1648128 a^5 b^3 c^5 f^3 h + 1179648 a^7 b^2 c^4 e i^3 - 898560 a^6 \\
& * b^3 c^4 f h^3 + 589824 a^6 b^4 c^3 e i^3 - 354240 a^5 b^5 c^3 f h^3 - 35 \\
& 4240 a^4 b^5 c^4 f^3 h + 98304 a^5 b^6 c^2 e i^3 + 43680 a^3 b^7 c^3 f^3 h \\
& - 21600 a^4 b^7 c^2 f h^3 - 1050 a^2 b^9 c^2 f^3 h + 225 a^2 b^10 c f^2 h^2 \\
& + 3870720 a^6 b c^6 d^2 i^2 + 1658880 a^6 b c^6 e^2 h^2 + 16547328 a^4 b^2 \\
& * c^7 d^3 h - 12306816 a^3 b^4 c^6 d^3 h + 37310976 a^3 b^3 c^7 d^3 f + 3037 \\
& 824 a^2 b^6 c^5 d^3 h - 2654208 a^5 b^3 c^5 e g^3 + 1949184 a^6 b^2 c^5 d h^3 \\
& + 1296000 a^5 b^4 c^4 d h^3 - 155520 a^4 b^6 c^3 d h^3 - 40500 a b^10 c^2 \\
& * d^2 h^2 - 8100 a^3 b^8 c^2 d h^3 + 3870720 a^5 b c^7 e^2 f^2 + 34836480 a^4 \\
& * b c^8 d^2 e^2 - 108864 a b^9 c^3 d^2 g^2 - 8068032 a^2 b^5 c^6 d^3 f - 5 \\
& 623296 a^4 b^3 c^6 d f^3 + 1737792 a^3 b^5 c^5 d f^3 - 260190 a b^8 c^4 d^2 \\
& * f^2 - 211680 a^2 b^7 c^4 d f^3 - 435456 a b^7 c^5 d^2 e^2 - 245760 a^8 c^5 \\
& * f h i^2 + 384 a^3 b^10 f h i^2 + 1152 a^2 b^11 d h i^2 - 2211840 a^6 c^7 e \\
& ^2 f h - 1720320 a^7 c^6 d f i^2 - 9450 b^11 c^2 d^2 f h + 6912 b^11 c^2 d^2 \\
& * e i + 1612800 a^6 c^7 d f^2 h - 393216 a^8 b c^4 g i^3 - 49152 a^5 b^7 c^8 \\
& * g i^3 - 20736 b^10 c^3 d^2 e g - 75188736 a^4 b c^8 d^3 f - 883200 a^6 b c^6 \\
& * f^3 h - 317952 a^7 b c^5 f h^3 + 1350 a^3 b^9 c f h^3 - 15482880 a^5 c^8 \\
& * d e^2 f - 9792 a b^11 c d^2 i^2 - 10616832 a^5 b c^7 e^3 g - 345060 a b^8 c^4 \\
& * d^3 h + 4050 a^2 b^10 c d h^3 - 4262400 a^5 b c^7 d f^3 + 852768 a b^7 c^5 \\
& * d^3 f + 7350 a b^9 c^3 d f^3 + 276480 a^7 b^3 c^3 h^2 i^2 + 140544 a^6 b^5 \\
& * c^2 h^2 i^2 + 884736 a^7 b^2 c^4 g^2 i^2 + 884736 a^6 b^4 c^3 g^2 i^2 + \\
& 221184 a^5 b^6 c^2 g^2 i^2 + 501760 a^6 b^3 c^4 f^2 i^2 + 414720 a^6 b^3 c^4 \\
& * g^2 h^2 + 207360 a^5 b^5 c^3 g^2 h^2 + 170240 a^5 b^5 c^3 f^2 i^2 + 9216 a^4 \\
& * b^7 c^2 f^2 i^2 + 5184 a^4 b^7 c^2 g^2 h^2 + 3538944 a^6 b^2 c^5 e^2 i^2 + \\
& 1684224 a^6 b^2 c^5 f^2 h^2 + 1264320 a^5 b^4 c^4 f^2 h^2 + 884736 a^5 b^4 \\
& * c^4 e^2 i^2 + 126720 a^4 b^6 c^3 f^2 h^2 - 13950 a^3 b^8 c^2 f^2 h^2 +
\end{aligned}$$

$$\begin{aligned}
& 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 - 9676 \\
& 8a^4b^5c^4e^2h^2 - 20160a^3b^7c^3f^2g^2 + 576a^2b^9c^2f^2g^2 + 11487744a^5b^2 \\
& c^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 + 9 \\
& 79776a^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 - 3456b^12c^d^2g^i + 384a^ab^12d^f^i^2 + 576a^4b^9h^2i^2 + 3 \\
& 538944a^7c^6e^2i^2 + 115200a^7c^6f^2h^2 + 64a^2b^11f^2i^2 + 609 \\
& 6384a^6c^7d^2h^2 + 5184b^11c^2d^2g^2 + 131072a^8b^2c^3i^4 + 983 \\
& 04a^7b^4c^2i^4 + 11025b^10c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 142 \\
& 560a^6b^4c^3h^4 + 103680a^7b^2c^4h^4 + 32400a^5b^6c^2h^4 + 2073 \\
& 6b^9c^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^4 + 35145 \\
& 6a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728 \\
& a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 + 7077888a^6c^7e^3i + 786432 \\
& a^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 + 1 \\
& 60000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, l) * x * (83886 \\
& 08a^11b^c^9 - 512a^4b^15c^2 + 14336a^5b^13c^3 - 172032a^6b^11c^4 \\
& + 1146880a^7b^9c^5 - 4587520a^8b^7c^6 + 11010048a^9b^5c^7 - 14680 \\
& 064a^10b^3c^8) / (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)) + (3244 \\
& 032a^6b^c^8d^e - 327680a^8c^7f^i - 983040a^7c^8e^f + 1081344a^7b^c^7d^i + 884736a^7b^c^7e^h + 491520a^7b^c^7f^g + 294912a^8b^c^6h^i \\
& + 4608a^2b^9c^4d^e - 87552a^3b^7c^5d^e + 681984a^4b^5c^6d^e - 2433024a^5b^3c^7d^e - 2304a^2b^10c^3d^g + 43776a^3b^8c^4d^g + \\
& 1536a^3b^8c^4e^f - 340992a^4b^6c^5d^g - 39936a^4b^6c^5e^f + 12 \\
& 16512a^5b^4c^6d^g + 184320a^5b^4c^6e^f - 1622016a^6b^2c^7d^g + 49152a^6b^2c^7e^f + 768a^2b^11c^2d^i - 13056a^3b^9c^3d^i - 768a^3b^9c^3f^g \\
& + 84480a^4b^7c^4d^i + 4608a^4b^7c^4e^h + 19968a^4b^7c^4f^g - 178176a^5b^5c^5d^i + 18432a^5b^5c^5e^h - 92160a^5b^5c^5f^g - 270336a^6b^3c^6d^i \\
& - 368640a^6b^3c^6e^h - 24576a^6b^3c^6f^g + 256a^3b^10c^2f^i - 6144a^4b^8c^3f^i - 2304a^4b^8c^3g^h + 17408a^5b^6c^4f^i - 9216a^5b^6c^4g^h \\
& + 69632a^6b^4c^5f^i + 184320a^6b^4c^5g^h - 147456a^7b^2c^6f^i - 442368a^7b^2c^6g^h + 768a^4b^9c^2h^i + 4608a^5b^7c^3h^i - 55296a^6b^5c^4h^i \\
& + 24576a^7b^3c^5h^i) / (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 * (45 \\
& 1584a^6c^9d^2 + 18b^12c^3d^2 - 25600a^7c^8f^2 + 9216a^8c^7h^2 - 504a^ab^10c^4d^2 - 73728a^6b^c^8e^2 - 8192a^8b^c^6i^2 + 6228a^2b
\end{aligned}$$



$$\begin{aligned}
& ^8c^5d^2 - 42624a^3b^6c^6d^2 + 176256a^4b^4c^7d^2 - 423936a^5b^2c^8d^2 - 4608a^4b^5c^6e^2 + 36864a^5b^3c^7e^2 + 2a^2b^{10}c^3f^2 \\
& - 84a^3b^8c^4f^2 + 3520a^4b^6c^5f^2 - 26240a^5b^4c^6f^2 + 59904a^6b^2c^7f^2 - 1152a^4b^7c^4g^2 + 9216a^5b^5c^5g^2 - 18432a^6b^3c^6g^2 + 468a^4b^8c^3h^2 \\
& - 3456a^5b^6c^4h^2 + 5760a^6b^4c^5h^2 - 128a^4b^9c^2i^2 + 512a^5b^7c^3i^2 + 1536a^6b^5c^4i^2 - 4096a^7b^3c^5i^2 \\
& + 129024a^7c^8d^2h + 12ab^{11}c^3d^2f - 218112a^6b^2c^8d^2f - 49152a^7b^2c^7e^2i - 9216a^7b^2c^7f^2h - 420a^2b^9c^4d^2f \\
& + 4992a^3b^7c^5d^2f - 36480a^4b^5c^6d^2f + 144384a^5b^3c^7d^2f + 36a^2b^{10}c^3d^2h - 360a^3b^8c^4d^2h \\
& + 3456a^4b^6c^5d^2h + 4608a^4b^6c^5e^2g - 11520a^5b^4c^6d^2h - 36864a^5b^4c^6e^2g - 27648a^6b^2c^7d^2h \\
& + 73728a^6b^2c^7e^2g + 12a^3b^9c^3f^2h - 1536a^4b^7c^4e^2i - 2304a^4b^7c^4f^2h + 9216a^5b^5c^5e^2i \\
& + 17280a^5b^5c^5f^2h - 30720a^6b^3c^6f^2h + 768a^4b^8c^3g^2i - 4608a^5b^6c^4g^2i + 24576a^7b^2c^6g^2i) / (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(13824a^4c^8e^3 + 512a^7c^5i^3 - 54b^7c^5d^2e + 27b^8c^4d^2g + 13824a^5c^7e^2i + 4608a^6c^6e^2i - 9b^9c^3d^2i - 1728a^4b^3c^5g^3 + 64a^4b^6c^2i^3 + 384a^5b^4c^3i^3 + 768a^6b^2c^4i^3 - 20160a^4c^8d^2e^2f - 6720a^5c^7d^2f^2i - 2880a^5c^7e^2f^2h - 960a^6c^6f^2h^2i + 972a^2b^5c^6d^2e + 24192a^3b^2c^8d^2e - 486a^2b^6c^5d^2g + 6240a^4b^2c^7e^2f^2 - 20736a^4b^2c^7e^2g + 144a^2b^7c^4d^2i + 8064a^4b^2c^7d^2i + 1728a^5b^2c^6e^2h^2 + 2080a^5b^2c^6f^2i - 2304a^6b^2c^5g^2i^2 + 576a^6b^2c^5h^2i - 7344a^2b^3c^7d^2e + 3672a^2b^4c^6d^2g - 6a^2b^5c^5e^2f^2 - 12096a^3b^2c^7d^2g + 192a^3b^3c^6e^2f^2 + 10368a^4b^2c^6e^2g^2 - 900a^2b^5c^5d^2i + 3a^2b^6c^4f^2g + 1584a^3b^3c^6d^2i - 96a^3b^4c^5f^2g - 3120a^4b^2c^6f^2g + 1296a^4b^3c^5e^2h^2 + 6912a^4b^2c^6e^2i + 1152a^4b^4c^4e^2i^2 + 4608a^5b^2c^5e^2i^2 - a^2b^7c^3f^2i + 30a^3b^5c^4f^2i + 1104a^4b^3c^5f^2i - 648a^4b^4c^4g^2h^2 - 864a^5b^2c^5g^2h^2 + 1728a^4b^4c^4g^2i - 576a^4b^5c^3g^2i^2 + 3456a^5b^2c^5g^2i - 2304a^5b^3c^4g^2i^2 + 216a^4b^5c^3h^2i + 720a^5b^3c^4h^2i - 36a^2b^6c^5d^2e^2f + 18a^2b^7c^4d^2f^2g + 15552a^4b^2c^7d^2e^2h + 10080a^4b^2c^7d^2f^2g - 6a^2b^8c^3d^2f^2i + 5184a^5b^2c^6d^2h^2i - 13824a^5b^2c^6e^2g^2i + 1440a^5b^2c^6f^2g^2h + 900a^2b^4c^6d^2e^2f - 4896a^3b^2c^7d^2e^2f - 108a^2b^5c^5d^2e^2h - 450a^2b^5c^5d^2f^2g + 2448a^3b^3c^6d^2f^2g + 138a^2b^6c^4d^2f^2i + 54a^2b^6c^4d^2g^2h - 516a^3b^4c^5d^2f^2i - 36a^3b^4c^5e^2f^2h - 4992a^4b^2c^6d^2f^2i - 7776a^4b^2c^6d^2g^2h - 6048a^4b^2c^6e^2f^2h - 18a^2b^7c^3d^2h^2i - 36a^3b^5c^4d^2h^2i + 18a^3b^5c^4f^2g^2h + 2592a^4b^3c^5d^2h^2i - 6912a^4b^3c^5e^2g^2i + 3024a^4b^3c^5f^2g^2h - 6a^3b^6c^3f^2h^2i - 1020a^4b^4c^4f^2h^2i - 2496a^5b^2c^5f^2h^2i) / (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)) * 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}
\end{aligned}$$

$$\begin{aligned}
& 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 + \\
& 196608a^5b^{13}c^3g^i z^2 - 46080a^4b^{14}c^3f^h z^2 - 105984a^3b^{15}c^3d^* \\
& h^z^2 - 73728a^2b^{16}c^3d^*f^z^2 + 2548039680a^9b^3c^7d^*h^z^2 + 1509949 \\
& 440a^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 + 3904 \\
& 63488a^7b^7c^5d^*h^z^2 + 301989888a^{10}b^3c^6g^i z^2 - 366280704a^6* \\
& b^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 + 188 \\
& 743680a^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 + 96583680* \\
& a^5b^{10}c^4d^*f^z^2 - 51609600a^6b^9c^4d^*h^z^2 + 7077888a^6b^{10}c^3* \\
& e^i z^2 + 6144000a^6b^{10}c^3f^*h^z^2 - 393216a^5b^{12}c^2e^i z^2 + 6144 \\
& 0a^5b^{12}c^2f^*h^z^2 - 23592960a^6b^9c^4e^*g^z^2 + 1179648a^5b^{11}c^3 \\
& e^*g^z^2 + 829440a^4b^{13}c^2d^*h^z^2 + 368640a^5b^{11}c^3d^*h^z^2 - 151 \\
& 75680a^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^6 \\
& *b^{12}c^i^2z^2 + 46080a^5b^{13}c^h^2z^2 - 14080a^3b^{15}c^f^2z^2 + 693 \\
& 6330240a^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^2* \\
& z^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 + 754974720 \\
& *a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7 \\
& f^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 - 17432576 \\
& 0a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4 \\
& d^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^8 \\
& b^7c^4h^2z^2 - 2752512a^7b^{10}c^2i^2z^2 + 2621440a^8b^8c^3i^2 \\
& z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2z^2 - 1290240* \\
& a^6b^{11}c^2h^2z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294912a^5b^{12}c^2g^2 \\
& z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592 \\
& 960a^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 + \\
& 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^4 \\
& *b^{11}c^f^*h^i^z + 56623104a^8b^*c^7d^*f^i^z - 50688a^3b^{12}c^d^*h^i^z - 4 \\
& 608a^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 - 1097
\end{aligned}$$

$07264a^7b^3c^6d*ghz + 110886912a^6b^4c^6d*fgz + 40108032a^8b^2c^6d*hi*z + 2359296a^8b^3c^5f*hi*z - 491520a^6b^7c^3f*hi*z + 184320a^5b^9c^2f*hi*z - 88473600a^6b^4c^6d*eh*z - 84934656a^7b^2c^7d*fg*z + 117964800a^5b^5c^6d*ef*z - 45613056a^7b^3c^6d*fi*z + 44236800a^6b^5c^5d*gh*z - 10321920a^6b^6c^4d*hi*z + 7077888a^7b^4c^5d*hi*z - 5898240a^7b^4c^5f*gh*z + 4718592a^8b^2c^6f*gh*z + 2949120a^6b^6c^4f*gh*z + 2396160a^5b^8c^3d*hi*z - 737280a^5b^8c^3f*gh*z + 92160a^4b^10c^2f*gh*z - 27648a^4b^10c^2d*hi*z - 58982400a^5b^6c^5d*fg*z + 11796480a^7b^3c^6e*fh*z + 8847360a^5b^7c^4d*fi*z - 6635520a^5b^7c^4d*gh*z - 5898240a^6b^5c^5e*fh*z - 3809280a^4b^9c^3d*fi*z + 2359296a^6b^5c^5d*fi*z + 1474560a^5b^7c^4e*fh*z + 681984a^3b^11c^2d*fi*z - 276480a^4b^9c^3d*gh*z - 184320a^4b^9c^3e*fh*z + 179712a^3b^11c^2d*gh*z + 9216a^3b^11c^2e*fh*z + 16220160a^4b^8c^4d*fg*z + 13271040a^5b^6c^5d*eh*z - 2396160a^3b^10c^3d*fg*z + 552960a^4b^8c^4d*eh*z - 359424a^3b^10c^3d*eh*z + 175104a^2b^12c^2d*fg*z + 27648a^2b^12c^2d*eh*z - 32440320a^4b^7c^5d*ef*z + 4792320a^3b^9c^4d*ef*z - 350208a^2b^11c^3d*ef*z + 346816512a^7b*c^8d^2g*z - 41472a^5b^10c*h^2i*z + 7077888a^9b*c^6g*h^2z - 11008a^3b^12c*f^2i*z - 6912a^4b^11c*g*h^2z - 19660800a^8b*c^7f^2g*z - 768a^2b^13c*f^2g*z + 214272a*b^13c^2d^2g*z - 428544a*b^12c^3d^2e*z - 198180864a^8c^8d*e*h*z - 66060288a^9c^7d*hi*z + 1536a^3b^13f*hi*z + 4608a^2b^14d*hi*z - 66816a*b^14c*d^2i*z + 1022754816a^6b^2c^8d^2e*z - 642318336a^5b^4c^7d^2e*z - 511377408a^6b^3c^7d^2g*z + 321159168a^5b^5c^6d^2g*z + 225312768a^7b^2c^7d^2i*z + 223395840a^4b^6c^6d^2e*z - 111697920a^4b^7c^5d^2g*z + 3538944a^9b^2c^5h^2i*z - 737280a^7b^6c^3h^2i*z + 276480a^6b^8c^2h^2i*z - 10354688a^8b^2c^6f^2i*z - 43646976a^6b^4c^6d^2i*z - 8847360a^8b^3c^5g*h^2z + 4423680a^7b^5c^4g*h^2z + 2048000a^6b^6c^4f^2i*z - 1105920a^6b^7c^3g*h^2z - 849920a^5b^8c^3f^2i*z + 393216a^7b^4c^5f^2i*z + 145920a^4b^10c^2f^2i*z + 138240a^5b^9c^2g*h^2z - 32587776a^5b^6c^5d^2i*z + 25362432a^7b^3c^6f^2g*z + 21657600a^4b^8c^4d^2i*z + 17694720a^8b^2c^6e*h^2z - 50724864a^7b^2c^7e*f^2z - 13271040a^6b^5c^5f^2g*z - 8847360a^7b^4c^5e*h^2z - 5810688a^3b^10c^3d^2i*z + 3563520a^5b^7c^4f^2g*z + 2211840a^6b^6c^4e*h^2z + 845568a^2b^12c^2d^2i*z - 506880a^4b^9c^3f^2g*z - 276480a^5b^8c^3e*h^2z + 34560a^3b^11c^2f^2g*z + 13824a^4b^10c^2e*h^2z + 26542080a^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^11c^3d^2g*z + 1013760a^4b^8c^4e*f^2z - 69120a^3b^10c^3e*f^2z + 1536a^2b^12c^2e*f^2z + 5930496a^2b^10c^4d^2e*z + 1536a*b^15d*fi*z - 693633024a^7c^9d^2e*z - 231211008a^8c^8d^2i*z - 4718592a^10c^6h^2i*z + 2304a^4b^12h^2i*z + 13107200a^9c^7f^2i*z + 256a^2b^14f^2i*z - 14155776a^9c^7e*h^2z + 39321600a^8c^8e*f^2z + 13824b^14c^2d^2e*z - 6912b^15c*d^2g*z + 2304b^16d^2i*z + 737280a^7b*c^5f*gh*i - 2304a^3b^9c*f*gh*i - 6912a^2b^10c*d$

$\begin{aligned}
& *g*h*i + 11059200*a^6*b*c^6*d*e*h*i + 5160960*a^6*b*c^6*d*f*g*i + 2211840*a \\
& ^6*b*c^6*e*f*g*h + 4608*a*b^{10}*c^2*d*e*f*i + 15482880*a^5*b*c^7*d*e*f*g - 1 \\
& 3824*a*b^9*c^3*d*e*f*g - 2304*a*b^{11}*c*d*f*g*i + 1843200*a^6*b^3*c^4*f*g*h* \\
& i + 783360*a^5*b^5*c^3*f*g*h*i + 18432*a^4*b^7*c^2*f*g*h*i - 5529600*a^6*b^ \\
& 2*c^5*d*g*h*i - 3686400*a^6*b^2*c^5*e*f*h*i - 2211840*a^5*b^4*c^4*d*g*h*i - \\
& 1566720*a^5*b^4*c^4*e*f*h*i + 317952*a^4*b^6*c^3*d*g*h*i - 36864*a^4*b^6*c \\
& ^3*e*f*h*i + 6912*a^3*b^8*c^2*d*g*h*i + 4608*a^3*b^8*c^2*e*f*h*i + 5160960* \\
& a^5*b^3*c^5*d*f*g*i + 4423680*a^5*b^3*c^5*e*f*g*h + 4423680*a^5*b^3*c^5*d*e \\
& *h*i - 635904*a^4*b^5*c^4*d*e*h*i - 354816*a^3*b^7*c^3*d*f*g*i + 322560*a^4 \\
& *b^5*c^4*d*f*g*i + 138240*a^4*b^5*c^4*e*f*g*h + 59904*a^2*b^9*c^2*d*f*g*i - \\
& 13824*a^3*b^7*c^3*e*f*g*h - 13824*a^3*b^7*c^3*d*e*h*i + 13824*a^2*b^9*c^2* \\
& d*e*h*i - 16588800*a^5*b^2*c^6*d*e*g*h - 10321920*a^5*b^2*c^6*d*e*f*i + 165 \\
& 8880*a^4*b^4*c^5*d*e*g*h + 709632*a^3*b^6*c^4*d*e*f*i - 645120*a^4*b^4*c^5* \\
& d*e*f*i + 124416*a^3*b^6*c^4*d*e*g*h - 119808*a^2*b^8*c^3*d*e*f*i - 41472*a \\
& ^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 2903040*a^3*b^5*c^5*d*e* \\
& f*g + 387072*a^2*b^7*c^4*d*e*f*g - 3456*a^4*b^8*c*g*h^2*i - 2304*a^4*b^8*c* \\
& f*h*i^2 + 1105920*a^7*b*c^5*e*h^2*i - 384*a^2*b^10*c*f^2*g*i - 10616832*a^6 \\
& *b*c^6*e^2*g*i - 3538944*a^7*b*c^5*e*g*i^2 + 1843200*a^7*b*c^5*d*h*i^2 + 11 \\
& 52*a^3*b^9*c*d*h*i^2 - 37062144*a^5*b*c^7*d^2*f*h + 2580480*a^6*b*c^6*e*f^2 \\
& *i + 65664*a*b^{10}*c^2*d^2*g*i + 23224320*a^5*b*c^7*d^2*e*i - 9216*a^2*b^{10}* \\
& c*d*f*i^2 - 5985792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*c^3*d^2*f*h - 131328*a \\
& *b^9*c^3*d^2*e*i - 6300*a*b^{10}*c^2*d*f^2*h + 16588800*a^5*b*c^7*d*e^2*h + 3 \\
& 456*a*b^{10}*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 13824*a*b^8*c^4*d*e^2*f \\
& - 1474560*a^7*c^6*e*f*h*i - 10321920*a^6*c^7*d*e*f*i + 1350*a*b^{11}*c*d*f*h \\
& ^2 - 552960*a^7*b^2*c^4*g*h^2*i - 552960*a^6*b^4*c^3*g*h^2*i - 145152*a^5*b \\
& ^6*c^2*g*h^2*i - 737280*a^7*b^2*c^4*f*h*i^2 - 568320*a^6*b^4*c^3*f*h*i^2 - \\
& 136704*a^5*b^6*c^2*f*h*i^2 - 1290240*a^6*b^2*c^5*f^2*g*i + 1105920*a^6*b^3* \\
& c^4*e*h^2*i - 860160*a^5*b^4*c^4*f^2*g*i + 290304*a^5*b^5*c^3*e*h^2*i - 806 \\
& 40*a^4*b^6*c^3*f^2*g*i + 12672*a^3*b^8*c^2*f^2*g*i + 6912*a^4*b^7*c^2*e*h^2 \\
& *i + 5308416*a^6*b^2*c^5*e*g^2*i - 5308416*a^5*b^3*c^5*e^2*g*i - 3538944*a^ \\
& 6*b^3*c^4*e*g*i^2 + 2654208*a^5*b^4*c^4*e*g^2*i + 1658880*a^6*b^3*c^4*d*h*i \\
& ^2 - 1105920*a^5*b^4*c^4*f*g^2*h - 884736*a^5*b^5*c^3*e*g*i^2 - 552960*a^6* \\
& b^2*c^5*f*g^2*h + 262656*a^5*b^5*c^3*d*h*i^2 - 55296*a^4*b^7*c^2*d*h*i^2 - \\
& 34560*a^4*b^6*c^3*f*g^2*h + 3456*a^3*b^8*c^2*f*g^2*h - 11612160*a^5*b^2*c^6 \\
& *d^2*g*i + 1720320*a^5*b^3*c^5*e*f^2*i - 1658880*a^6*b^2*c^5*e*g*h^2 + 1596 \\
& 672*a^3*b^6*c^4*d^2*g*i - 829440*a^5*b^4*c^4*e*g*h^2 - 508032*a^2*b^8*c^3*d \\
& ^2*g*i + 161280*a^4*b^5*c^4*e*f^2*i - 25344*a^3*b^7*c^3*e*f^2*i - 20736*a^4 \\
& *b^6*c^3*e*g*h^2 + 768*a^2*b^9*c^2*e*f^2*i - 4423680*a^5*b^2*c^6*e^2*f*h + \\
& 4147200*a^5*b^3*c^5*d*g^2*h - 2580480*a^6*b^2*c^5*d*f*i^2 - 967680*a^5*b^4* \\
& c^4*d*f*i^2 - 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4*b^4*c^5*e^2*f*h + 645 \\
& 12*a^4*b^6*c^3*d*f*i^2 + 39168*a^3*b^8*c^2*d*f*i^2 - 31104*a^3*b^7*c^3*d*g^ \\
& 2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c^2*d*g^2*h + 15630336*a^5* \\
& b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + 9630144*a^3*b^5*c^5*d^2*f* \\
& h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2*c^6*e*f^2*g - 3193344*a^3 \\
& *b^5*c^5*d^2*e*i + 2867328*a^4*b^4*c^5*d*f^2*h - 2095200*a^2*b^7*c^4*d^2*f*
\end{aligned}$

$$\begin{aligned}
& h - 1414080a^3b^6c^4d^2f^2h - 34836480a^4b^2c^7d^2e^2g + 1016064a^2b^7c^4d^2e^2i - 645120a^4b^4c^5e^2f^2g + 306720a^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 - 387072 \\
& 0a^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 - 124416 \\
& a^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^3 \\
& b^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^5 \\
& b^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^2f^2h^2 + 3870720a^6b^3c^6d^2 \\
& ^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^3 - 155520a^4b^6c^3d^3h^3 - 40500a^4b^10c^2d^2h^2 - 8100a^3b^8 \\
& c^2d^3h^3 + 3870720a^5b^3c^7e^2f^2 + 34836480a^4b^3c^8d^2e^2 - 108864a^4b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^2f^3 \\
& + 1737792a^3b^5c^5d^2f^3 - 260190a^4b^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 - 435456a^4b^7c^5d^2e^2 - 245760a^8c^5f^2h^2i^2 + 384a^3b^1 \\
& 0f^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^7 \\
& d^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^3 \\
& c^5f^3h^3 + 1350a^3b^9c^3f^3h^3 - 15482880a^5c^8d^2e^2f - 9792a^4b^11c^2d^2i^2 - 10616832a^5b^3c^7e^3g - 345060a^4b^8c^4d^3h + 4050a^2b^10 \\
& c^2d^3h^3 - 4262400a^5b^3c^7d^2f^3 + 852768a^4b^7c^5d^3f + 7350a^4b^9c^3d^2f^3 + 276480a^7b^3c^3h^2i^2 + 140544a^6b^5c^2h^2i^2 + 88473 \\
& 6a^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^4 \\
& b^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 + 8709120 \\
& a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 979776a^2b^7c^4d^2*
\end{aligned}$$

$$\begin{aligned}
&g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7 \\
&*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - \\
&17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 - 3456*b^12*c*d \\
&^2*g*i + 384*a*b^12*d*f*i^2 + 576*a^4*b^9*h^2*i^2 + 3538944*a^7*c^6*e^2*i^2 \\
&+ 115200*a^7*c^6*f^2*h^2 + 64*a^2*b^11*f^2*i^2 + 6096384*a^6*c^7*d^2*h^2 + \\
&5184*b^11*c^2*d^2*g^2 + 131072*a^8*b^2*c^3*i^4 + 98304*a^7*b^4*c^2*i^4 + 1 \\
&1025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 + \\
&103680*a^7*b^2*c^4*h^4 + 32400*a^5*b^6*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 33 \\
&1776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43 \\
&120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 644 \\
&6304*a^2*b^4*c^7*d^4 + 7077888*a^6*c^7*e^3*i + 786432*a^8*c^5*e*i^3 + 28449 \\
&792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 580608*a^7 \\
&*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 32768*a^6*b^6*c*i^4 + 2025*a^4*b^8*c*h^4 \\
&- 734832*a*b^6*c^6*d^4 + 576*b^13*d^2*i^2 + 65536*a^9*c^4*i^4 + 20736*a^8* \\
&c^5*h^4 + 4096*a^5*b^8*i^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 53 \\
&08416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, 1), 1, 1, 4)
\end{aligned}$$

**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)\*\*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

$$\frac{-\frac{lb^4}{c^2} + \frac{jb^3}{c} - \left(3g - \frac{5al}{c}\right)b^2 + 2(3ce + aj)b + 2(jb^2 - 3cgb - 3alb + 6c^2e + 2acj)x^2 - 16a^2l}{4(b^2 - 4ac)^2(cx^4 + bx^2 + a)} + \frac{\left((ma^2 + 3c^2d)b^3 + a\right)}{4(b^2 - 4ac)^2(cx^4 + bx^2 + a)}$$

**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] 
$$\begin{aligned} & -(b*c*(c*e + a*j) - a*b^2*l - 2*a*c*(c*g - a*l) + (2*c^3*e - c^2*(b*g + 2*a*j) - b^3*l + b*c*(b*j + 3*a*l))*x^2)/(4*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) - (x*(a*b*c*(c*f + a*k) - b^2*(c^2*d + a^2*m) + 2*a*c*(c^2*d - a*c*h + a^2*m) + (a*b^2*c*k + 2*a*c^2*(c*f - a*k) - a*b^3*m - b*c*(c^2*d + a*c*h - 3*a^2*m))*x^2))/(4*a*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + ((b^3*j)/c + 2*b*(3*c*e + a*j) - 16*a^2*l - (b^4*l)/c^2 - b^2*(3*g - (5*a*l)/c) + 2*(6*c^2*e - 3*b*c*g + b^2*j + 2*a*c*j - 3*a*b*l)*x^2)/(4*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (x*(4*a^2*b*c*(2*c*f + a*k) + a*b^3*(c*f + 2*a*k) - a*b^2*(25*c^2*d + 7*a*c*h - 11*a^2*m) + 4*a^2*c*(7*c^2*d + a*c*h - 9*a^2*m) + b^4*(3*c*d - (2*a^2*m)/c) + (a*b^2*c*(c*f + 3*a*k) + 4*a^2*c^2*(5*c*f + 3*a*k) + b^3*(3*c^2*d + a^2*m) - 4*a*b*c*(6*c^2*d + 3*a*c*h + 4*a^2*m))*x^2))/(8*a^2*c*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + ((a*b^2*(c*f + 3*a*k) + 4*a^2*c*(5*c*f + 3*a*k) - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*m) + b^3*(3*c*d + (a^2*m)/c) + (a*b^3*c*(c*f - 3*a*k) - 4*a^2*b*c^2*(13*c*f + 9*a*k) - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*m) + b^4*(3*c^2*d - a^2*m) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*m)))/(c*sqrt[b^2 - 4*a*c])*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]]])/(8*sqrt[2]*a^2*sqrt[c]*(b^2 - 4*a*c)^2*sqrt[b - sqrt[b^2 - 4*a*c]]) + ((a*b^2*(c*f + 3*a*k) + 4*a^2*c*(5*c*f + 3*a*k) - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*m) + b^3*(3*c*d + (a^2*m)/c) - (a*b^3*c*(c*f - 3*a*k) - 4*a^2*b*c^2*(13*c*f + 9*a*k) - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*m) + b^4*(3*c^2*d - a^2*m) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*m)))/(c*sqrt[b^2 - 4*a*c])*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]]])/(8*sqrt[2]*a^2*sqrt[c]*(b^2 - 4*a*c)^2*sqrt[b + sqrt[b^2 - 4*a*c]]) \end{aligned}$$

) - ((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)

### 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[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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{(a + bx^2 + cx^4)^3} dx &= \int \frac{x(e + gx^2 + jx^4 + lx^6)}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2 + hx^4 + kx^6}{(a + bx^2 + cx^4)^3} dx \\
&= -\frac{x(abc(cf + ak) - b^2(c^2d + a^2m) + 2ac(c^2d - ach + 2abf))}{4ac^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(cg - al) + (2c^3e - c^2(bg + 2ah))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(cg - al) + (2c^3e - c^2(bg + 2ah))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(cg - al) + (2c^3e - c^2(bg + 2ah))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(cg - al) + (2c^3e - c^2(bg + 2ah))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

**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*1 + 10*a^3*b^2*c*1 - 32*a^4*c^2*1 + 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*1*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 - 4*a*c]*m - 16*a^3*b*c*sqrt[b^2 - 4*a*c]*m)*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]])/(8*sqrt[2]*a^2*c^(3/2)*(b^2 - 4*a*c)^(5/2)*sqrt[b - sqrt[b^2 - 4*a*c]]) + ((-3*b^4*c^2*d + 30*a*b^2*c^3*d - 168*a^2*c^4*d + 3*b^3*c^2*sqrt[b^2 - 4*a*c]*d - 24*a*b*c^3*sqrt[b^2 - 4*a*c]*d - a*b^3*c^2*f + 52*a^2*b*c^3*f + a*b^2*c^2*sqrt[b^2 - 4*a*c]*f + 20*a^2*c^3*sqrt[b^2 - 4*a*c]*f - 18*a^2*b^2*c^2*h - 24*a^3*c^3*h - 12*a^2*b*c^2*sqrt[b^2 - 4*a*c]*h + 3*a^2*b^3*c*k + 36*a^3*b*c^2*k + 3*a^2*b^2*c*sqrt[b^2 - 4*a*c]*k + 12*a^3*c^2*sqrt[b^2 - 4*a*c]*k + a^2*b^4*m - 18*a^3*b^2*c*m - 40*a^4*c^2*m + a^2*b^3*sqrt[b^2 - 4*a*c]*m - 16*a^3*b*c*sqrt[b^2 - 4*a*c]*m)*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]])/(8*sqrt[2]*a^2*c^(3/2)*(b^2 - 4*a*c)^(5/2)*sqrt[b + sqrt[b^2 - 4*a*c]]) + ((6*c^2*e - 3*b*c*g + b^2*j + 2*a*c*j - 3*a*b*1)*Log[-b + sqrt[b^2 - 4*a*c] - 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2)) + ((-6*c^2*e + 3*b*c*g - b^2*j - 2*a*c*j + 3*a*b*1)*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

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

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
```

$$\begin{aligned} &^3*b^2*c + 8*a^4*c^2)*g + 2*(a^4*b^2 + 8*a^5*c)*l - (12*a^4*b*c*k + (5*a*b^4*c - 37*a^2*b^2*c^2 + 44*a^3*c^3)*d - (a^2*b^3*c - 16*a^3*b*c^2)*f - 3*(a^3*b^2*c + 4*a^4*c^2)*h - (a^4*b^2 + 20*a^5*c)*m)*x)/(a^4*b^4*c - 8*a^5*b^2*c^2 + 16*a^6*c^3 + (a^2*b^4*c^3 - 8*a^3*b^2*c^4 + 16*a^4*c^5)*x^8 + 2*(a^2*b^5*c^2 - 8*a^3*b^3*c^3 + 16*a^4*b*c^4)*x^6 + (a^2*b^6*c - 6*a^3*b^4*c^2 + 32*a^5*c^4)*x^4 + 2*(a^3*b^5*c - 8*a^4*b^3*c^2 + 16*a^5*b*c^3)*x^2) - 1/8*integrate((12*a^3*b*c*k + (12*a^2*b*c^2*h - 3*(b^3*c^2 - 8*a*b*c^3)*d - (a*b^2*c^2 + 20*a^2*c^3)*f - 3*(a^2*b^2*c + 4*a^3*c^2)*k - (a^2*b^3 - 16*a^3*b*c)*m)*x^2 - 3*(b^4*c - 9*a*b^2*c^2 + 28*a^2*c^3)*d - (a*b^3*c - 16*a^2*b*c^2)*f - 3*(a^2*b^2*c + 4*a^3*c^2)*h - (a^3*b^2 + 20*a^4*c)*m - 8*(6*a^2*c^3*e - 3*a^2*b*c^2*g - 3*a^3*b*c*l + (a^2*b^2*c + 2*a^3*c^2)*j)*x)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3) \end{aligned}$$

**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]  $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a + b*x^2 + c*x^4)^3, x)$

[Out]  $\text{symsum}(\log(\text{root}(56371445760*a^{11}*b^8*c^9*z^4 - 503316480*a^8*b^{14}*c^6*z^4 + 47185920*a^7*b^{16}*c^5*z^4 - 2621440*a^6*b^{18}*c^4*z^4 + 65536*a^5*b^{20}*c^3*z^4 - 171798691840*a^{14}*b^2*c^{12}*z^4 + 193273528320*a^{13}*b^4*c^{11}*z^4 - 128849018880*a^{12}*b^6*c^{10}*z^4 - 16911433728*a^{10}*b^{10}*c^8*z^4 + 3523215360*a^9*b^{12}*c^7*z^4 + 68719476736*a^{15}*c^{13}*z^4 + 1536*a^5*b^{16}*c*k*m*z^2 + 1536*a*b^{18}*c^3*d*f*z^2 - 2571632640*a^9*b^5*c^8*d*m*z^2 + 2548039680*a^9*b^3*c^{10}*d*h*z^2 + 1509949440*a^{10}*b^3*c^9*e*l*z^2 + 1509949440*a^9*b^3*c^{10}*e*g*z^2 - 1401421824*a^8*b^5*c^9*d*h*z^2 - 1321205760*a^9*b^2*c^{11}*d*f*z^2 - 2793406464*a^{11}*b*c^{10}*d*m*z^2 + 890634240*a^8*b^7*c^7*d*m*z^2 - 754974720*a^{10}*b^4*c^8*g*l*z^2 - 754974720*a^9*b^5*c^8*e*l*z^2 + 719585280*a^8*b^6*c^8*d*k*z^2 - 707788800*a^9*b^4*c^9*d*k*z^2 - 754974720*a^8*b^5*c^9*e*g*z^2 + 603979776*a^{11}*b^2*c^9*g*l*z^2 - 581959680*a^{10}*b^4*c^8*f*m*z^2 + 732168192*a^7*b^6*c^9*d*f*z^2 + 534773760*a^{11}*b^3*c^8*h*m*z^2 - 456130560*a^{11}*b^4*c^7*k*m*z^2 - 603979776*a^{10}*b^2*c^{10}*e*j*z^2 + 534773760*a^{10}*b^3*c^9*f*k*z^2 + 384040960*a^9*b^6*c^7*f*m*z^2 + 377487360*a^9*b^6*c^7*g*l*z^2 - 456130560*a^9*b^4*c^9*f*h*z^2 + 301989888*a^{11}*b^3*c^8*j*l*z^2 - 415236096*a^{10}*b^2*c^{10}*d*k*z^2 + 254017536*a^{10}*b^6*c^6*k*m*z^2 - 330301440*a^{10}*b^4*c^8*h*k*z^2 + 390463488*a^7*b^7*c^8*d*h*z^2 + 188743680*a^{12}*b^2*c^8*k*m*z^2 + 301989888*a^{10}*b^3*c^9*g*j*z^2 - 297861120*a^7*b^8*c^7*d*k*z^2 - 366280704*a^6*b^8*c^8*d*f*z^2 + 188743680*a^{11}*b^2*c^9*h*k*z^2 - 330301440*a^8*b^4*c^{10}*d*f*z^2 + 254017536*a^8*b^6*c^8*f*h*z^2 - 1887436800*a^{10}*b*c^{11}*d*h*z^2 + 188743680*a^8*b^7*c^7*e*l*z^2 + 153354240*a^9*b^6*c^7*h*k*z^2 - 185303040*a^7*b^9*c^6*d*m*z^2 - 117964800*a^{10}*b^5*c^7*h*m*z^2 - 61931520*a^9*b^8*c^5*k*m*z^2 + 121634816*a^{11}*b^2*c^9*f*m*z^2 - 115671040*a^8*b^8*c^6*f*m*z^2$

$$\begin{aligned}
& - 62914560a^9b^7c^6j^1z^2 + 188743680a^{10}b^2c^{10}f^1h^1z^2 - 94371840a^8b^8c^6g^1z^2 + 6144000a^8b^{10}c^4k^1m^1z^2 - 117964800a^9b^5c^8f^1k^1z^2 + 61440a^7b^{12}c^3k^1m^1z^2 - 46080a^6b^{14}c^2k^1m^1z^2 + 23592960a^8b^9c^5j^1z^2 + 188743680a^7b^7c^8e^1g^1z^2 - 37355520a^9b^7c^6h^1m^1z^2 + 125829120a^8b^6c^8e^1j^1z^2 + 23101440a^8b^9c^5h^1m^1z^2 - 3538944a^7b^{11}c^4j^1z^2 + 196608a^6b^{13}c^3j^1z^2 - 4349952a^7b^{11}c^4h^1m^1z^2 + 337920a^6b^{13}c^3h^1m^1z^2 - 7680a^5b^{15}c^2h^1m^1z^2 - 62914560a^8b^7c^7g^1j^1z^2 - 26542080a^8b^8c^6h^1k^1z^2 + 17940480a^7b^{10}c^5f^1m^1z^2 + 11796480a^7b^{10}c^5g^1z^2 - 37355520a^8b^7c^7f^1k^1z^2 - 1347584a^6b^{12}c^4f^1m^1z^2 + 68272128a^6b^{10}c^6d^1k^1z^2 - 589824a^6b^{12}c^4g^1z^2 + 552960a^6b^{12}c^4h^1k^1z^2 - 147456a^7b^{10}c^5h^1k^1z^2 - 46080a^5b^{14}c^3h^1k^1z^2 + 35840a^5b^{14}c^3f^1m^1z^2 + 23592960a^7b^9c^6g^1j^1z^2 - 23592960a^7b^9c^6e^1z^2 + 23371776a^6b^{11}c^5d^1m^1z^2 + 23101440a^7b^9c^6f^1k^1z^2 - 47185920a^7b^8c^7e^1j^1z^2 - 61931520a^7b^8c^7f^1h^1z^2 - 4349952a^6b^{11}c^5f^1k^1z^2 - 3538944a^6b^{11}c^5g^1j^1z^2 - 1677312a^5b^{13}c^4d^1m^1z^2 + 1179648a^6b^{11}c^5e^1z^2 + 337920a^5b^{13}c^4f^1k^1z^2 + 196608a^5b^{13}c^4g^1j^1z^2 + 53760a^4b^{15}c^3d^1m^1z^2 - 7680a^4b^{15}c^3f^1k^1z^2 + 96583680a^5b^{10}c^7d^1f^1z^2 - 9179136a^5b^{12}c^5d^1k^1z^2 + 7077888a^6b^{10}c^6e^1j^1z^2 - 51609600a^6b^9c^7d^1h^1z^2 + 691200a^4b^{14}c^4d^1k^1z^2 - 393216a^5b^{12}c^5e^1j^1z^2 - 23040a^3b^{16}c^3d^1k^1z^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^1g^1z^2 + 1179648a^5b^{11}c^6e^1g^1z^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^1f^1z^2 + 1428480a^3b^{14}c^5d^1f^1z^2 - 73728a^2b^{16}c^4d^1f^1z^2 + 4108320768a^{10}b^3c^9d^1m^1z^2 - 1207959552a^{11}b^1c^{10}e^1z^2 - 1207959552a^{10}b^1c^{11}e^1g^1z^2 - 578813952a^{12}b^1c^9h^1m^1z^2 - 578813952a^{11}b^1c^{10}f^1k^1z^2 - 402653184a^{12}b^1c^9j^1z^2 - 402653184a^{11}b^1c^{10}g^1j^1z^2 - 440401920a^{10}b^1c^{11}f^1z^2 - 188743680a^{12}b^1c^9k^1z^2 - 188743680a^{11}b^1c^{10}h^1z^2 + 1761607680a^{10}c^{12}d^1f^1z^2 - 14080a^6b^{15}c^1m^1z^2 - 94464a^8b^{17}c^4d^1z^2 + 6936330240a^8b^3c^{11}d^1z^2 + 2464874496a^6b^7c^9d^1z^2 - 3963617280a^9b^1c^{12}d^1z^2 + 1056964608a^{11}c^{11}d^1k^1z^2 + 805306368a^{11}c^{11}e^1j^1z^2 + 419430400a^{12}c^{10}f^1m^1z^2 + 251658240a^{13}c^9k^1m^1z^2 - 1509949440a^9b^2c^{11}e^1z^2 + 251658240a^{11}c^{11}f^1h^1z^2 + 150994944a^{12}c^{10}h^1k^1z^2 - 5400428544a^7b^5c^{10}d^1z^2 + 754974720a^8b^4c^{10}e^1z^2 - 730054656a^5b^9c^8d^1z^2 + 477102080a^{12}b^3c^7m^1z^2 - 377487360a^{11}b^4c^7l^1z^2 + 477102080a^9b^3c^{10}f^1z^2 + 301989888a^{12}b^2c^8l^1z^2 - 377487360a^9b^4c^9g^1z^2 + 301989888a^{10}b^2c^{10}g^1z^2 - 174325760a^{11}b^5c^6m^1z^2 + 188743680a^{10}b^6c^6l^1z^2 + 141557760a^{11}b^3c^8k^1z^2 + 188743680a^8b^6c^8g^1z^2 + 141557760a^{10}b^3c^9h^1z^2 - 174325760a^8b^5c^9f^1z^2 - 188743680a^7b^6c^9e^1z^2 - 47185920a^9b^8c^5l^1z^2 + 11206656a^{10}b^7c^5m^1z^2 + 8929280a^9b^9c^4m^1z^2 - 2600960a^8b^{11}c^3m^1z^2 + 291840a^7b^{13}c^2m^1z^2 - 50331648a^{10}b^4c^8j^1z^2 + 146165760a^4b^{11}
\end{aligned}$$

$$\begin{aligned}
& c^7 d^2 z^2 - 26542080 a^9 b^7 c^6 k^2 z^2 + 5898240 a^8 b^{10} c^4 l^2 z^2 - \\
& 294912 a^7 b^{12} c^3 l^2 z^2 - 33554432 a^{11} b^2 c^9 j^2 z^2 + 9584640 a^8 b^9 c^5 k^2 z^2 + 20971520 a^9 b^6 c^7 j^2 z^2 - 2359296 a^{10} b^5 c^7 k^2 z^2 \\
& - 1290240 a^7 b^{11} c^4 k^2 z^2 + 46080 a^6 b^{13} c^3 k^2 z^2 + 2304 a^5 b^{15} c^2 k^2 z^2 - 2752512 a^7 b^{10} c^5 j^2 z^2 + 2621440 a^8 b^8 c^6 j^2 z^2 \\
& + 524288 a^6 b^{12} c^4 j^2 z^2 - 32768 a^5 b^{14} c^3 j^2 z^2 - 47185920 a^7 b^8 c^7 g^2 z^2 - 26542080 a^8 b^7 c^7 h^2 z^2 + 9584640 a^7 b^9 c^6 h^2 z^2 \\
& - 2359296 a^9 b^5 c^8 h^2 z^2 - 1290240 a^6 b^{11} c^5 h^2 z^2 + 46080 a^5 b^{13} c^4 h^2 z^2 + 2304 a^4 b^{15} c^3 h^2 z^2 + 5898240 a^6 b^{10} c^6 g^2 z^2 \\
& - 294912 a^5 b^{12} c^5 g^2 z^2 + 11206656 a^7 b^7 c^8 f^2 z^2 + 8929280 a^6 b^9 c^7 f^2 z^2 + 23592960 a^6 b^8 c^8 e^2 z^2 - 2600960 a^5 b^{11} c^6 f^2 z^2 \\
& + 291840 a^4 b^{13} c^5 f^2 z^2 - 14080 a^3 b^{15} c^4 f^2 z^2 + 256 a^2 b^{17} c^3 f^2 z^2 - 19860480 a^3 b^{13} c^6 d^2 z^2 - 1179648 a^5 b^{10} c^7 e^2 z^2 \\
& + 1771776 a^2 b^{15} c^5 d^2 z^2 - 440401920 a^{13} b^3 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^3 c^8 f^2 k^2 l^2 z^2 + 99090432 a^9 b^3 c^9 d^2 h^2 l^2 z^2 + 9437184 a^{10} b^3 c^8 e^2 k^2 m^2 z^2 + 23592960 a^{10} b^3 c^8 g^2 h^2 m^2 z^2 + 141557760 a^8 b^3 c^{10} d^2 e^2 k^2 z^2 + 47185920 a^9 b^3 c^9 d^2 j^2 k^2 z^2 - 23592960 a^9 b^3 c^9 f^2 g^2 k^2 z^2 + 169869312 a^7 b^3 c^{11} d^2 e^2 f^2 z^2 + 99090432 a^8 b^3 c^{10} d^2 g^2 h^2 z^2 - 3145728 a^9 b^3 c^9 f^2 h^2 j^2 z^2 + 56623104 a^8 b^3 c^{10} d^2 f^2 j^2 z^2 + 1536 a^3 b^{15} c^3 d^2 f^2 j^2 z^2 - 9437184 a^8 b^3 c^{10} e^2 f^2 h^2 z^2 - 4608 a^3 b^{14} c^4 d^2 f^2 g^2 z^2 + 9216 a^3 b^{13} c^5 d^2 e^2 f^2 z^2 + 412876800 a^8 b^2 c^9 d^2 e^2 m^2 z^2 - 206438400 a^9 b^3 c^7 d^2 l^2 m^2 z^2 + 5898240 a^{10} b^4 c^5 k^2 l^2 m^2 z^2 - 206438400 a^8 b^3 c^8 d^2 g^2 m^2 z^2 - 4718592 a^{11} b^2 c^6 k^2 l^2 m^2 z^2 - 2949120 a^9 b^6 c^4 k^2 l^2 m^2 z^2 + 737280 a^8 b^8 c^3 k^2 l^2 m^2 z^2 - 92160 a^7 b^{10} c^2 k^2 l^2 m^2 z^2 + 103219200 a^8 b^5 c^6 d^2 l^2 m^2 z^2 - 29491200 a^{10} b^3 c^6 h^2 l^2 m^2 z^2 - 206438400 a^7 b^4 c^8 d^2 e^2 m^2 z^2 - 2359296 a^{10} b^3 c^6 j^2 k^2 m^2 z^2 + 491520 a^8 b^7 c^4 j^2 k^2 m^2 z^2 - 184320 a^7 b^9 c^3 j^2 k^2 m^2 z^2 + 27648 a^6 b^{11} c^2 j^2 k^2 m^2 z^2 + 14745600 a^9 b^5 c^5 h^2 l^2 m^2 z^2 - 3686400 a^8 b^7 c^4 h^2 l^2 m^2 z^2 + 460800 a^7 b^9 c^3 h^2 l^2 m^2 z^2 - 23040 a^6 b^{11} c^2 h^2 l^2 m^2 z^2 + 88473600 a^8 b^4 c^7 d^2 k^2 l^2 z^2 + 82575360 a^9 b^2 c^8 d^2 j^2 m^2 z^2 + 11796480 a^{10} b^2 c^7 h^2 j^2 m^2 z^2 + 5898240 a^9 b^4 c^6 g^2 k^2 m^2 z^2 - 4718592 a^{10} b^2 c^7 g^2 k^2 m^2 z^2 - 70778880 a^9 b^2 c^8 d^2 k^2 l^2 z^2 - 2949120 a^8 b^6 c^5 g^2 k^2 m^2 z^2 - 2457600 a^8 b^6 c^5 h^2 j^2 m^2 z^2 + 921600 a^7 b^8 c^4 h^2 j^2 m^2 z^2 + 737280 a^7 b^8 c^4 g^2 k^2 m^2 z^2 - 138240 a^6 b^{10} c^3 h^2 j^2 m^2 z^2 - 92160 a^6 b^{10} c^3 g^2 k^2 m^2 z^2 + 7680 a^5 b^{12} c^2 h^2 j^2 m^2 z^2 + 4608 a^5 b^{12} c^2 g^2 k^2 m^2 z^2 + 29491200 a^9 b^3 c^7 f^2 k^2 l^2 z^2 - 176947200 a^7 b^3 c^9 d^2 e^2 k^2 z^2 - 109707264 a^8 b^3 c^8 d^2 h^2 l^2 z^2 - 25804800 a^7 b^7 c^5 d^2 l^2 m^2 z^2 + 103219200 a^7 b^5 c^7 d^2 g^2 m^2 z^2 + 219414528 a^7 b^2 c^{10} d^2 e^2 h^2 z^2 - 14745600 a^8 b^5 c^6 f^2 k^2 l^2 z^2 - 29491200 a^9 b^3 c^7 g^2 h^2 m^2 z^2 - 11796480 a^9 b^3 c^7 e^2 k^2 m^2 z^2 - 44236800 a^7 b^6 c^6 d^2 k^2 l^2 z^2 + 58982400 a^9 b^2 c^8 e^2 h^2 m^2 z^2 + 5898240 a^8 b^5 c^6 e^2 k^2 m^2 z^2 + 3686400 a^7 b^7 c^5 f^2 k^2 l^2 z^2 + 3225600 a^6 b^9 c^4 d^2 l^2 m^2 z^2 - 1474560 a^7 b^7 c^5 e^2 k^2 m^2 z^2 - 460800 a^6 b^9 c^4 f^2 k^2 l^2 z^2 + 184320 a^6 b^9 c^4 e^2 k^2 m^2 z^2 - 161280 a^5 b^{11} c^3 d^2 l^2 m^2 z^2 + 23040 a^5 b^{11} c^3 f^2 k^2 l^2 z^2 - 9216 a^5 b^{11} c^3 e^2 k^2 m^2 z^2 + 14745600 a^8 b^5 c^6 g^2 h^2 m^2 z^2 + 110886912 a^7 b^4 c^8 d^2 f^2 l^2 z^2 - 3686400 a^7 b^7 c^5 g^2 h^2 m^2 z^2 - 221773824 a^6 b^3 c^{10} d^2 e^2 f^2 z^2 + 460800 a^6 b^9 c^4 g^2 h^2 m^2 z^2 - 17203200 a^7 b^6 c^6 d^2 j^2 m^2 z^2
\end{aligned}$$

$$\begin{aligned}
& 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 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 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 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 - 14745600a^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^{11}c^4d^h l^z - 161280a^4b^{11}c^4d^g m^z - 27648a^4b^{11}c^4f^h j^z + 23040a^4b^{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 + 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^{10}c^5d^f l^z - 1382400a^4b^{10}c^5d^g k^z - 84934656a^7b^2c^{10}d^f g^z + 921600a^5b^8c^6e^f k^z + 117964800a^5b^5c^9d^e f^z + 322560a^4b^{10}c^5d^e m^z + 175104a^3b^{12}c^4d^f l^z + 69120a^3b^{12}c^4d^g k^z - 50688a^3b^{12}c^4d^h j^z - 46080a^4b^{10}c^5e^f k^z - 27648a^4b^{10}c^5d^h j^z + 4608a^2b^{14}c^3d^h j^z - 4608a^2b^{14}c^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^{10}c^5f^g h^z - 4608a^3b^{12}c^4f^g h^z + 8847360a^5b^7c^7d^f j^z - 58982400a^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^{11}c^5d^f j^z - 138240a^3b^{11}c^5d^e k^z - 55296a^2b^{13}c^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^{11}c^5d^g h^z - 13824a^2b^{13}c^4d^g h^z + 9216a^3b^{11}c^5e^f h^z + 16220160a^4b^8c^7d^f g^z + 13271040a^5b^6c^8d^e h^z - 2396160a^3b^{10}c^6d^f g^z + 552960a^4b^8c^7d^e h^z - 359424a^3b^{10}c^6d^e h^z + 175104a^2b^{12}c^5d^f g^z + 27648a^2b^{12}c^5d^e h^z - 32440320a^4b^7c^8d^e f^z + 4792320a^3b
\end{aligned}$$



$$\begin{aligned}
& b^9c^7d*ef*z - 350208a^2b^{11}c^6d*ef*z + 165150720a^{10}b^8d^1m*z \\
& z + 4608a^6b^{12}c^k^1m*z + 23592960a^{11}b^7c^h^1m*z + 3145728a^{11}b^7 \\
& c^7j^k^m*z - 1536a^5b^{13}c^j^k^m*z + 165150720a^9b^9c^d^g^m*z + 34681 \\
& 6512a^7b^c^{11}d^2g^z + 19660800a^{12}b^c^6l^m^2z - 34560a^7b^{11}c^1m^2z \\
& - 7077888a^{11}b^c^7k^2l^z + 11008a^6b^{12}c^j^m^2z + 19660800a^{11} \\
& b^c^7g^m^2z + 7077888a^{10}b^c^8h^2l^z + 768a^5b^{13}c^g^m^2z - 19 \\
& 660800a^9b^c^9f^2l^z - 7077888a^{10}b^c^8g^k^2z - 6912a^b^{15}c^3d^2 \\
& *l^z + 7077888a^9b^c^9g^h^2z - 19660800a^8b^c^{10}f^2g^z - 66816a^b^{14} \\
& c^4d^2j^z + 214272a^b^{13}c^5d^2g^z - 428544a^b^{12}c^6d^2e^z - 33 \\
& 0301440a^9c^{10}d^e^m*z - 110100480a^{10}c^9d^j^m*z - 15728640a^{11}c^8h \\
& *j^m*z - 47185920a^{10}c^9e^h^m*z - 198180864a^8c^{11}d^e^h^z + 15728640* \\
& a^{10}c^9f^j^k^z - 66060288a^9c^{10}d^h^j^z + 47185920a^9c^{10}e^f^k^z + \\
& 1022754816a^6b^2c^{11}d^2e^z - 642318336a^5b^4c^{10}d^2e^z - 51137740 \\
& 8a^7b^3c^9d^2l^z - 511377408a^6b^3c^{10}d^2g^z + 321159168a^6b^5c^8 \\
& d^2l^z + 321159168a^5b^5c^9d^2g^z + 225312768a^7b^2c^{10}d^2j^z \\
& z - 25362432a^{11}b^3c^5l^m^2z + 13271040a^{10}b^5c^4l^m^2z - 3563520 \\
& *a^9b^7c^3l^m^2z + 506880a^8b^9c^2l^m^2z + 10354688a^{11}b^2c^6j^m^2z \\
& + 8847360a^{10}b^3c^6k^2l^z - 4423680a^9b^5c^5k^2l^z - 20480 \\
& 00a^9b^6c^4j^m^2z + 1105920a^8b^7c^4k^2l^z + 849920a^8b^8c^3j^m^2z \\
& - 393216a^{10}b^4c^5j^m^2z - 145920a^7b^{10}c^2j^m^2z - 138240 \\
& *a^7b^9c^3k^2l^z + 6912a^6b^{11}c^2k^2l^z - 111697920a^5b^7c^7d^2 \\
& l^z + 223395840a^4b^6c^9d^2e^z - 25362432a^{10}b^3c^6g^m^2z - 353 \\
& 8944a^{10}b^2c^7j^k^2z + 737280a^8b^6c^5j^k^2z + 50724864a^{10}b^2c^7 \\
& e^m^2z - 276480a^7b^8c^4j^k^2z + 41472a^6b^{10}c^3j^k^2z - 230 \\
& 4a^5b^{12}c^2j^k^2z + 13271040a^9b^5c^5g^m^2z - 8847360a^9b^3c^7 \\
& *h^2l^z + 4423680a^8b^5c^6h^2l^z - 3563520a^8b^7c^4g^m^2z - 1105 \\
& 920a^7b^7c^5h^2l^z + 506880a^7b^9c^3g^m^2z + 138240a^6b^9c^4h^2 \\
& l^z - 34560a^6b^{11}c^2g^m^2z - 6912a^5b^{11}c^3h^2l^z - 26542080* \\
& a^9b^4c^6e^m^2z + 25362432a^8b^3c^8f^2l^z - 13271040a^7b^5c^7f^2 \\
& l^z + 8847360a^9b^3c^7g^k^2z + 7127040a^8b^6c^5e^m^2z - 442368 \\
& 0a^8b^5c^6g^k^2z + 3563520a^6b^7c^6f^2l^z + 3538944a^9b^2c^8h^2 \\
& j^z + 1105920a^7b^7c^5g^k^2z - 1013760a^7b^8c^4e^m^2z - 737280 \\
& *a^7b^6c^6h^2j^z - 506880a^5b^9c^5f^2l^z + 276480a^6b^8c^5h^2j^z \\
& - 138240a^6b^9c^4g^k^2z + 69120a^6b^{10}c^3e^m^2z - 41472a^5b^{10} \\
& c^4h^2j^z + 34560a^4b^{11}c^4f^2l^z + 6912a^5b^{11}c^3g^k^2z + \\
& 2304a^4b^{12}c^3h^2j^z - 1536a^5b^{12}c^2e^m^2z - 768a^3b^{13}c^3f^2 \\
& l^z - 111697920a^4b^7c^8d^2g^z + 23362560a^4b^9c^6d^2l^z - 1769 \\
& 4720a^9b^2c^8e^k^2z - 10354688a^8b^2c^9f^2j^z - 43646976a^6b^4c^9 \\
& d^2j^z + 8847360a^8b^4c^7e^k^2z - 2965248a^3b^{11}c^5d^2l^z - \\
& 2211840a^7b^6c^6e^k^2z + 2048000a^6b^6c^7f^2j^z - 849920a^5b^8c^6 \\
& f^2j^z + 393216a^7b^4c^8f^2j^z + 276480a^6b^8c^5e^k^2z + 214 \\
& 272a^2b^{13}c^4d^2l^z + 145920a^4b^{10}c^5f^2j^z - 13824a^5b^{10}c^4 \\
& *e^k^2z - 11008a^3b^{12}c^4f^2j^z + 256a^2b^{14}c^3f^2j^z - 32587776 \\
& *a^5b^6c^8d^2j^z - 8847360a^8b^3c^8g^h^2z + 21657600a^4b^8c^7d^2 \\
& j^z + 4423680a^7b^5c^7g^h^2z - 1105920a^6b^7c^6g^h^2z + 138240
\end{aligned}$$

$a^5b^9c^5g^2h^2z - 6912a^4b^{11}c^4g^2h^2z + 25362432a^7b^3c^9f^2$   
 $gz - 5810688a^3b^{10}c^6d^2jz + 17694720a^8b^2c^9e^2h^2z + 845568$   
 $a^2b^{12}c^5d^2jz - 50724864a^7b^2c^{10}e^2f^2z - 13271040a^6b^5c^8$   
 $f^2gz - 8847360a^7b^4c^8e^2h^2z + 3563520a^5b^7c^7f^2gz + 221$   
 $1840a^6b^6c^7e^2h^2z - 506880a^4b^9c^6f^2gz - 276480a^5b^8c^6e$   
 $e^2h^2z + 34560a^3b^{11}c^5f^2gz + 13824a^4b^{10}c^5e^2h^2z - 768a^2$   
 $b^{13}c^4f^2gz + 26542080a^6b^4c^9e^2f^2z + 23362560a^3b^9c^7d^2$   
 $gz - 46725120a^3b^8c^8d^2ez - 7127040a^5b^6c^8e^2f^2z - 2965248$   
 $a^2b^{11}c^6d^2gz + 1013760a^4b^8c^7e^2f^2z - 69120a^3b^{10}c^6e$   
 $f^2z + 1536a^2b^{12}c^5e^2f^2z + 5930496a^2b^{10}c^7d^2ez + 34681651$   
 $2a^8b^3c^{10}d^2l^2z - 693633024a^7c^{12}d^2ez - 231211008a^8c^{11}d^2$   
 $jz + 768a^6b^{13}l^2m^2z - 13107200a^{12}c^7j^2m^2z - 256a^5b^{14}j^2m^2$   
 $z + 4718592a^{11}c^8j^2k^2z - 39321600a^{11}c^8e^2m^2z - 4718592a^{10}c^9$   
 $h^2jz + 14155776a^{10}c^9e^2k^2z + 13107200a^9c^{10}f^2jz + 2304b^{16}$   
 $c^3d^2jz - 14155776a^9c^{10}e^2h^2z + 39321600a^8c^{11}e^2f^2z - 69$   
 $12b^{15}c^4d^2gz + 13824b^{14}c^5d^2ez + 737280a^{10}b^5c^5j^2k^2l^2m -$   
 $2304a^6b^9c^5j^2k^2l^2m + 2211840a^9b^3c^6e^2k^2l^2m + 1228800a^9b^3c^6f^2j^2$   
 $l^2m + 737280a^9b^3c^6g^2j^2k^2m + 442368a^9b^3c^6h^2j^2k^2l + 36a^3b^{12}c^6f$   
 $h^2k^2m + 3096576a^8b^3c^7d^2j^2k^2l - 12745728a^8b^3c^7d^2h^2k^2m + 3686400a^8$   
 $b^3c^7e^2f^2l^2m + 3391488a^8b^3c^7e^2h^2j^2m + 2211840a^8b^3c^7e^2g^2k^2m +$   
 $1327104a^8b^3c^7e^2h^2k^2l + 1228800a^8b^3c^7f^2g^2j^2m + 737280a^8b^3c^7f^2h$   
 $h^2j^2l + 442368a^8b^3c^7g^2h^2j^2k + 108a^2b^{13}c^6d^2h^2k^2m + 16367616a^7b^3$   
 $c^8d^2e^2j^2m + 9289728a^7b^3c^8d^2e^2k^2l + 5160960a^7b^3c^8d^2f^2j^2l + 33914$   
 $88a^7b^3c^8e^2f^2j^2k + 3096576a^7b^3c^8d^2g^2j^2k - 19307520a^7b^3c^8d^2f^2h$   
 $^2m + 3686400a^7b^3c^8e^2f^2g^2m + 2211840a^7b^3c^8e^2f^2h^2l + 1327104a^7b^3$   
 $c^8e^2g^2h^2k + 737280a^7b^3c^8f^2g^2h^2j - 180a^2b^{13}c^2d^2f^2h^2m - 540a^2b^{12}$   
 $c^3d^2f^2h^2k + 15482880a^6b^3c^9d^2e^2f^2l + 11059200a^6b^3c^9d^2e^2h^2j + 9$   
 $289728a^6b^3c^9d^2e^2g^2k + 5160960a^6b^3c^9d^2f^2g^2j - 2304a^2b^{11}c^4d^2f^2$   
 $g^2j + 2211840a^6b^3c^9e^2f^2g^2h + 4608a^2b^{10}c^5d^2e^2f^2j + 15482880a^5b^3$   
 $c^{10}d^2e^2f^2g - 13824a^2b^9c^6d^2e^2f^2g + 36a^2b^{14}c^4d^2f^2k^2m + 1843200a^9$   
 $b^3c^4j^2k^2l^2m + 783360a^8b^5c^3j^2k^2l^2m + 18432a^7b^7c^2j^2k^2l^2m -$   
 $2211840a^8b^4c^4g^2k^2l^2m - 1695744a^9b^2c^5h^2j^2l^2m - 1400832a^8b^4$   
 $c^4h^2j^2l^2m - 1105920a^9b^2c^5g^2k^2l^2m - 253440a^7b^6c^3h^2j^2l^2m - 6$   
 $9120a^7b^6c^3g^2k^2l^2m + 11520a^6b^8c^2h^2j^2l^2m + 6912a^6b^8c^2g^2k^2$   
 $l^2m + 4423680a^8b^3c^5e^2k^2l^2m + 2506752a^8b^3c^5f^2j^2l^2m + 1843200a^8$   
 $b^3c^5g^2j^2k^2m + 1327104a^8b^3c^5h^2j^2k^2l + 838656a^7b^5c^4f^2j^2$   
 $l^2m + 783360a^7b^5c^4g^2j^2k^2m + 691200a^7b^5c^4h^2j^2k^2l + 138240a^7$   
 $b^5c^4e^2k^2l^2m + 69120a^6b^7c^3h^2j^2k^2l - 53760a^6b^7c^3f^2j^2l^2m + 1$   
 $8432a^6b^7c^3g^2j^2k^2m - 13824a^6b^7c^3e^2k^2l^2m - 2304a^5b^9c^2g^2j^2$   
 $k^2m + 2543616a^8b^3c^5g^2h^2l^2m + 829440a^7b^5c^4g^2h^2l^2m - 34560a^6$   
 $b^7c^3g^2h^2l^2m - 8183808a^8b^2c^6d^2j^2l^2m - 3686400a^8b^2c^6e^2j^2k^2$   
 $m - 2285568a^7b^4c^5d^2j^2l^2m - 1695744a^8b^2c^6f^2j^2k^2l - 1566720a^7$   
 $b^4c^5e^2j^2k^2m - 1400832a^7b^4c^5f^2j^2k^2l + 741888a^6b^6c^4d^2j^2l^2m$   
 $- 253440a^6b^6c^4f^2j^2k^2l - 80640a^5b^8c^3d^2j^2l^2m - 36864a^6b^6c^4$   
 $e^2j^2k^2m + 11520a^5b^8c^3f^2j^2k^2l + 4608a^5b^8c^3e^2j^2k^2m + 6700032$

$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$

$$\begin{aligned}
& *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 \\
& 60*a^4*b^5*c^7*d*f*g*j + 207360*a^3*b^7*c^6*d*e*g*k + 59904*a^2*b^9*c^5*d*f \\
& *g*j - 13824*a^3*b^7*c^6*d*e*h*j + 13824*a^2*b^9*c^5*d*e*h*j - 13824*a^2*b^ \\
& 9*c^5*d*e*f*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 - 1658 \\
& 8800*a^5*b^2*c^9*d*e*g*h + 1658880*a^4*b^4*c^8*d*e*g*h + 124416*a^3*b^6*c^7 \\
& *d*e*g*h - 41472*a^2*b^8*c^6*d*e*g*h + 7741440*a^4*b^3*c^9*d*e*f*g - 290304 \\
& 0*a^3*b^5*c^8*d*e*f*g + 387072*a^2*b^7*c^7*d*e*f*g + 3456*a^7*b^8*c*k*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 - 154368 \\
& 0*a^9*b*c^6*f*k^2*m + 1980*a^5*b^10*c*f*k*m^2 - 384*a^5*b^10*c*g*j*m^2 - 18 \\
& 0*a^4*b^11*c*f*k^2*m + 6*a^2*b^13*c*f^2*k*m - 10298880*a^9*b*c^6*d*k*m^2 + \\
& 2580480*a^9*b*c^6*e*j*m^2 + 5310*a^4*b^11*c*d*k*m^2 - 1674*a*b^13*c^2*d^2*k \\
& *m - 540*a^3*b^12*c*d*k^2*m - 10616832*a^7*b*c^8*e^2*j*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 - 59 \\
& 512320*a^6*b*c^9*d^2*f*m + 5087232*a^7*b*c^8*e^2*h*m + 1105920*a^8*b*c^7*e* \\
& j*k^2 - 3456*a*b^12*c^3*d^2*j*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
\end{aligned}$$

$$\begin{aligned}
& 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 + 50872 32 a^6 b^c^9 e^2 f^k - 3538944 a^7 b^c^8 e^g^j^2 + 1843200 a^7 b^c^8 d^h^j^2 - 7994880 a^6 b^c^9 d^f^2 k - 4990464 a^7 b^c^8 d^f^2 k^2 + 2580480 a^6 b^c^9 e^f^2 j + 65664 a^b^10 c^5 d^2 g^j - 27972 a^b^10 c^5 d^2 f^k - 20736 a^b^10 c^5 d^2 e^l + 1260 a^b^11 c^4 d^f^2 k + 54 a^b^13 c^2 d^f^k^2 + 232243 20 a^5 b^c^10 d^2 e^j - 37062144 a^5 b^c^10 d^2 f^h + 384 a^b^12 c^3 d^f^j^2 - 131328 a^b^9 c^6 d^2 e^j - 5985792 a^6 b^c^9 d^f^h^2 + 206010 a^b^9 c^6 d^2 f^h - 6300 a^b^10 c^5 d^f^2 h + 1350 a^b^11 c^4 d^f^h^2 + 16588800 a^5 b^c^10 d^e^2 h + 3456 a^b^10 c^5 d^f^g^2 + 435456 a^b^8 c^7 d^2 e^g + 1382 4 a^b^8 c^7 d^e^2 f - 1474560 a^9 c^7 e^j^k m + 460800 a^9 c^7 f^h^k m + 32 25600 a^8 c^8 d^f^k m - 2457600 a^8 c^8 e^f^j m - 884736 a^8 c^8 e^h^j^k - 6193152 a^7 c^9 d^e^j^k + 1935360 a^7 c^9 d^f^h^k - 1474560 a^7 c^9 e^f^h^j - 10321920 a^6 c^10 d^e^f^j - 1105920 a^9 b^4 c^3 k^l^2 m - 552960 a^10 b^2 c^4 k^l^2 m - 34560 a^8 b^6 c^2 k^l^2 m - 1290240 a^10 b^2 c^4 j^l m^2 - 860160 a^9 b^4 c^3 j^l m^2 - 80640 a^8 b^6 c^2 j^l m^2 - 737280 a^9 b^2 c^5 j^2 k m - 568320 a^8 b^4 c^4 j^2 k m - 136704 a^7 b^6 c^3 j^2 k m - 2304 a^6 b^8 c^2 j^2 k m + 1271808 a^9 b^3 c^4 h^l^2 m - 552960 a^9 b^2 c^5 j^k^2 * l - 552960 a^8 b^4 c^4 j^k^2 * l + 414720 a^8 b^5 c^3 h^l^2 m - 145152 a^7 b^6 c^3 j^k^2 * l - 17280 a^7 b^7 c^2 h^l^2 m - 3456 a^6 b^8 c^2 j^k^2 * l - 364 0320 a^9 b^3 c^4 h^k m^2 - 2626560 a^8 b^3 c^5 h^2 k m + 2211840 a^9 b^2 c^5 h^k^2 m + 2056320 a^8 b^4 c^4 h^k^2 m + 1935360 a^9 b^3 c^4 g^l m^2 - 114 3360 a^8 b^5 c^3 h^k m^2 - 1097280 a^7 b^5 c^4 h^2 k m + 364608 a^7 b^6 c^3 h^k^2 m + 322560 a^8 b^5 c^3 g^l m^2 - 56160 a^6 b^7 c^3 h^2 k m - 40320 a^7 b^7 c^2 g^l m^2 + 27936 a^7 b^7 c^2 h^k m^2 - 3780 a^6 b^8 c^2 h^k^2 m + 2970 a^5 b^9 c^2 h^2 k m - 1419264 a^8 b^4 c^4 f^l^2 m - 1105920 a^7 b^4 c^5 g^2 k m - 921600 a^9 b^2 c^5 f^l^2 m - 829440 a^8 b^4 c^4 h^k^l^2 + 7495 68 a^8 b^3 c^5 h^j^2 m - 552960 a^8 b^2 c^6 g^2 k m - 331776 a^9 b^2 c^5 h^k^l^2 + 317952 a^7 b^5 c^4 h^j^2 m - 103680 a^7 b^6 c^3 h^k^l^2 + 80640 a^7 b^6 c^3 f^l^2 m + 38400 a^6 b^7 c^3 h^j^2 m - 34560 a^6 b^6 c^4 g^2 k m + 3456 a^5 b^8 c^3 g^2 k m - 1920 a^5 b^9 c^2 h^j^2 m - 5142528 a^7 b^3 c^6 f^2 k m + 5068800 a^9 b^2 c^5 f^k m^2 - 3870720 a^9 b^2 c^5 e^l m^2 - 375552 0 a^8 b^3 c^5 f^k^2 m + 3000960 a^8 b^4 c^4 f^k m^2 - 1290240 a^9 b^2 c^5 g^j m^2 - 1085760 a^7 b^5 c^4 f^k^2 m - 959040 a^6 b^5 c^5 f^2 k m - 860160 a^8 b^4 c^4 g^j m^2 + 829440 a^8 b^3 c^5 g^k^2 * l - 645120 a^8 b^4 c^4 e^l m^2 - 552960 a^8 b^2 c^6 h^2 j^l - 552960 a^7 b^4 c^5 h^2 j^l + 414720 a^7 b^5 c^4 g^k^2 * l - 145152 a^6 b^6 c^4 h^2 j^l + 103200 a^5 b^7 c^4 f^2 k m - 80640 a^7 b^6 c^3 g^j m^2 + 80640 a^7 b^6 c^3 e^l m^2 + 41280 a^7 b^6 c^3 f^k m^2 - 37188 a^6 b^8 c^2 f^k m^2 + 13536 a^6 b^7 c^3 f^k^2 m + 12672 a^6 b^8 c^2 g^j m^2 + 10368 a^6 b^7 c^3 g^k^2 * l + 5490 a^5 b^9 c^2 f^k^2 m - 34 56 a^5 b^8 c^3 h^2 j^l - 2304 a^6 b^8 c^2 e^l m^2 + 810 a^4 b^9 c^3 f^2 k m - 270 a^3 b^11 c^2 f^2 k m + 6137856 a^8 b^3 c^5 d^l^2 m - 4423680 a^7 b^2 c^7 e^2 k m - 2654208 a^8 b^3 c^5 g^j^l^2 - 2654208 a^7 b^3 c^6 g^2 j^l +
\end{aligned}$$

$1769472a^8b^2c^6g^2j^2 + 1769472a^7b^4c^5g^2j^2 - 1354752a^7b^5c^4d^2m - 1327104a^7b^5c^4g^2j^2 - 1327104a^6b^5c^5g^2j^2 + 1271808a^8b^3c^5f^2k^2 - 1040384a^8b^2c^6f^2j^2 - 697344a^7b^4c^5f^2j^2 - 516096a^8b^2c^6h^2j^2k - 451584a^7b^4c^5h^2j^2k + 442368a^6b^6c^4g^2j^2 + 414720a^7b^5c^4f^2k^2 - 138240a^6b^6c^4h^2j^2k - 138240a^6b^4c^6e^2k^2m - 121856a^6b^6c^4f^2j^2m + 120960a^6b^7c^3d^2m - 17280a^6b^7c^3f^2k^2 + 13824a^5b^6c^5e^2k^2m - 11520a^5b^8c^3h^2j^2k + 8960a^5b^8c^3f^2j^2m + 10851840a^8b^2c^6d^2k^2m - 10464768a^6b^3c^7d^2k^2m - 10275840a^8b^3c^5d^2k^2m + 7121088a^5b^5c^6d^2k^2m + 3127680a^7b^4c^5d^2k^2m + 1720320a^8b^3c^5e^2j^2m - 1658880a^8b^2c^6e^2k^2m - 1290240a^7b^2c^7f^2j^2 + 1271808a^7b^3c^6g^2h^2m - 1222560a^4b^7c^5d^2k^2m + 999360a^7b^5c^4d^2k^2m - 860160a^6b^4c^6f^2j^2 - 829440a^7b^4c^5e^2k^2 - 705024a^6b^6c^4d^2k^2m - 552960a^8b^2c^6g^2j^2k - 552960a^7b^4c^5g^2j^2k + 414720a^6b^5c^5g^2h^2m + 319392a^6b^7c^3d^2k^2m + 161280a^7b^5c^4e^2j^2m - 145152a^6b^6c^4g^2j^2k - 85734a^5b^9c^2d^2k^2m - 80640a^5b^6c^5f^2j^2 - 25344a^6b^7c^3e^2j^2m + 23490a^3b^9c^4d^2k^2m - 20736a^6b^6c^4e^2k^2 - 17280a^5b^7c^4g^2h^2m + 14148a^5b^8c^3d^2k^2m + 13716a^2b^11c^3d^2k^2m + 12690a^4b^10c^2d^2k^2m + 12672a^4b^8c^4f^2j^2 - 3456a^5b^8c^3g^2j^2k + 768a^5b^9c^2e^2j^2m - 384a^3b^10c^3f^2j^2 + 5308416a^8b^2c^6e^2j^2 - 5308416a^6b^3c^7e^2j^2 - 5142528a^8b^3c^5f^2h^2m + 5068800a^7b^2c^7f^2h^2m - 3755520a^7b^3c^6f^2h^2m - 3538944a^7b^3c^6e^2j^2 + 3000960a^6b^4c^6f^2h^2m + 2654208a^7b^4c^5e^2j^2 - 2322432a^8b^2c^6d^2k^2 + 2125824a^7b^3c^6d^2j^2m - 1990656a^7b^4c^5d^2k^2 - 1085760a^6b^5c^5f^2h^2m - 959040a^7b^5c^4f^2h^2m - 884736a^6b^5c^5e^2j^2 + 829440a^7b^3c^6g^2h^2 + 749568a^7b^3c^6f^2j^2k + 518400a^6b^6c^4d^2k^2 + 414720a^6b^5c^5g^2h^2 + 317952a^6b^5c^5f^2j^2k + 133632a^6b^5c^5d^2j^2m + 103200a^6b^7c^3f^2h^2m - 96768a^5b^7c^4d^2j^2m - 51840a^5b^8c^3d^2k^2 + 41280a^5b^6c^5f^2h^2m + 38400a^5b^7c^4f^2j^2k - 37188a^4b^8c^4f^2h^2m + 13536a^5b^7c^4f^2h^2m + 13440a^4b^9c^3d^2j^2m + 10368a^5b^7c^4g^2h^2 + 5490a^4b^9c^3f^2h^2m + 1980a^3b^10c^3f^2h^2m - 1920a^4b^9c^3f^2j^2k + 810a^5b^9c^2f^2h^2m - 180a^3b^11c^2f^2h^2m - 30a^2b^12c^2f^2h^2m + 3006720a^6b^2c^8d^2h^2m - 11612160a^6b^2c^8d^2j^2 + 1658880a^6b^3c^7e^2h^2m + 1596672a^4b^6c^6d^2j^2 - 1419264a^6b^4c^6f^2g^2m - 1105920a^7b^4c^5f^2h^2 + 1105920a^7b^3c^6e^2j^2k - 921600a^7b^2c^7f^2g^2m - 829440a^6b^4c^6g^2h^2k - 552960a^8b^2c^6f^2h^2 - 508032a^3b^8c^5d^2j^2 - 331776a^7b^2c^7g^2h^2k + 290304a^6b^5c^5e^2j^2k - 103680a^5b^6c^5g^2h^2k + 80640a^5b^6c^5f^2g^2m - 69120a^5b^5c^6e^2h^2m + 65664a^2b^10c^4d^2j^2 - 34560a^6b^6c^4f^2h^2 + 6912a^5b^7c^4e^2j^2k + 3456a^5b^8c^3f^2h^2 + 11930112a^8b^2c^6d^2h^2m + 8432640a^7b^2c^7d^2h^2m + 4450176a^7b^4c^5d^2h^2m + 4337280a^6b^4c^6d^2h^2m - 3870720a^8b^2c^6e^2g^2m - 3640320a^6b^3c^7f^2h^2k - 2885760a^5b^4c^7d^2h^2m - 2844288a^4b^6c^6d^2h^2m - 2626560a$

$$\begin{aligned}
& ^7b^3c^6f^*h^k^2 + 2211840a^7b^2c^7f^*h^2k + 2056320a^6b^4c^6f^*h^2k + 1935360a^6b^3c^7f^2g^*l - 1916928a^7b^2c^7d^*j^2k - 1687680a^6b^6c^4d^*h^m^2 - 1658880a^7b^2c^7e^*h^2*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^2*m - 912384a^6b^4c^6d^*j^2k - 829440a^6b^4c^6e^*h^2*1 - 645120a^7b^4c^5e^*g^*m^2 - 552960a^7b^2c^7g^*h^2*j - 552960a^6b^4c^6g^*h^2*j + 364608a^5b^6c^5f^*h^2k + 322560a^5b^5c^6f^2g^*l + 197460a^5b^8c^3d^*h^m^2 - 145152a^5b^6c^5g^*h^2*j - 143802a^2b^10c^4d^2h^*m + 80640a^6b^6c^4e^*g^*m^2 - 56160a^5b^7c^4f^*h^k^2 + 51948a^4b^8c^4d^*h^2*m - 40320a^4b^7c^5f^2g^*l + 34560a^4b^8c^4d^*j^2k + 27936a^4b^7c^5f^2h^*k - 20736a^5b^6c^5e^*h^2*1 - 13824a^5b^6c^5d^*j^2k + 10800a^3b^10c^3d^*h^2*m - 5760a^3b^10c^3d^*j^2k - 3780a^4b^8c^4f^*h^2k + 3690a^3b^9c^4f^2h^*k - 3456a^4b^8c^4g^*h^2*j + 2970a^4b^9c^3f^*h^k^2 - 2304a^5b^8c^3e^*g^*m^2 + 1152a^3b^9c^4f^2g^*l - 540a^3b^10c^3f^*h^2k - 540a^2b^12c^2d^*h^2*m - 90a^4b^10c^2d^*h^m^2 - 90a^2b^11c^3f^2h^*k + 54a^3b^11c^2f^*h^k^2 + 15925248a^6b^2c^8e^2g^*l - 7962624a^7b^3c^6e^*g^*l^2 - 7962624a^6b^3c^7e^*g^2*1 + 23385600a^6b^2c^8d^*f^2*m + 6137856a^6b^3c^7d^*g^2*m - 5677056a^6b^2c^8e^2f^*m + 4147200a^7b^3c^6d^*h^1^2 - 3317760a^6b^2c^8e^2h^*k - 1354752a^5b^5c^6d^*g^2*m + 1271808a^6b^3c^7f^*g^2k - 737280a^7b^2c^7f^*h^*j^2 + 17418240a^5b^3c^8d^2g^*l - 568320a^6b^4c^6f^*h^*j^2 - 414720a^6b^5c^5d^*h^1^2 + 414720a^5b^5c^6f^*g^2k - 414720a^5b^4c^7e^2h^*k + 322560a^5b^4c^7e^2f^*m - 136704a^5b^6c^5f^*h^*j^2 + 120960a^4b^7c^5d^*g^2*m - 31104a^5b^7c^4d^*h^1^2 - 17280a^4b^7c^5f^*g^2k + 10368a^4b^9c^3d^*h^1^2 - 2304a^4b^8c^4f^*h^*j^2 + 384a^3b^10c^3f^*h^*j^2 + 50042880a^5b^2c^9d^2f^*k - 13271040a^5b^3c^8d^2h^*k - 13149696a^7b^3c^6d^*f^*m^2 + 10906560a^4b^5c^7d^2f^*m - 8709120a^4b^5c^7d^2g^*l - 7418880a^5b^3c^8d^2f^*m + 7133184a^7b^2c^7d^*h^*k^2 - 6428160a^6b^3c^7d^*h^2k + 5593536a^4b^5c^7d^2h^*k - 3870720a^6b^2c^8e^*f^2*1 + 3369600a^6b^4c^6d^*h^*k^2 + 3148992a^6b^5c^5d^*f^*m^2 - 2985696a^3b^7c^6d^2f^*m + 1959552a^3b^7c^6d^2g^*l - 1658880a^7b^2c^7e^*g^*k^2 - 1505280a^4b^6c^6d^*f^2*m - 1290240a^6b^2c^8f^2g^*j - 34836480a^5b^2c^9d^2e^*1 + 1105920a^6b^3c^7e^*h^2*j - 860160a^5b^4c^7f^2g^*j - 829440a^6b^4c^6e^*g^*k^2 - 692064a^3b^7c^6d^2h^*k - 689472a^5b^5c^6d^*h^2k - 645120a^5b^4c^7e^*f^2*1 - 388800a^5b^6c^5d^*h^*k^2 + 378954a^2b^9c^5d^2f^*m + 362880a^5b^4c^7d^*f^2*m + 296964a^3b^8c^5d^*f^2*m + 290304a^5b^5c^6e^*h^2*j + 277344a^4b^7c^5d^*h^2k - 217728a^2b^9c^5d^2g^*l - 80640a^4b^6c^6f^2g^*j + 80640a^4b^6c^6e^*f^2*1 - 77070a^4b^9c^3d^*f^*m^2 - 30240a^5b^7c^4d^*f^*m^2 - 28350a^3b^9c^4d^*h^2k - 26406a^2b^9c^5d^2h^*k - 21060a^4b^8c^4d^*h^*k^2 - 20736a^5b^6c^5e^*g^*k^2 - 19278a^2b^10c^4d^*f^2*m + 12672a^3b^8c^5f^2g^*j + 10044a^3b^10c^3d^*h^*k^2 + 8820a^3b^11c^2d^*f^*m^2 + 6912a^4b^7c^5e^*h^2*j - 2304a^3b^8c^5e^*f^2*1 - 1620a^2b^11c^3d^*h^2k - 384a^2b^10c^4f^2g^*j + 162a^2b^12c^2d^*h^*k^2 - 5419008a^5b^3c^8d^*e^2*m + 5308416a^6b^2c^8e^*g^2*j - 5308416a^5b^3c^8e^2g^*j
\end{aligned}$$

$$\begin{aligned}
& - 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 - 6912 \\
& 0*a^4*b^5*c^7*e^2*f*k - 55296*a^4*b^7*c^5*d*h*j^2 - 51840*a^3*b^8*c^5*d*g^2*k + 3456*a^3*b^10*c^3*d*f*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*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 - 1658880*a^6*b^2*c^8*e*g*h^2 - 967680*a^5*b^4*c^7*d*f*j^2 - 829440*a^5*b^4*c^7*e*g*h^2 \\
& - 207360*a^3*b^6*c^7*d*e^2*k + 64512*a^4*b^6*c^6*d*f*j^2 + 39168*a^3*b^8*c^5*d*f*j^2 - 20736*a^4*b^6*c^6*e*g*h^2 - 9216*a^2*b^10*c^4*d*f*j^2 \\
& - 4423680*a^5*b^2*c^9*e^2*f*h + 4147200*a^5*b^3*c^8*d*g^2*h - 3193344*a^3*b^5*c^8*d^2*e*j + 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 - 3919104*a^2*b^6*c^8*d^2*e*g - 7741440*a^4*b^2*c^10*d*e^2*f + 2903040*a^3*b^4*c^9*d*e^2*f \\
& - 387072*a^2*b^6*c^8*d*e^2*f - 20160*a^8*b^7*c^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 - 21600*a^7*b^7*c^2*k^3*m - 13950*a^7*b^8*c*k^2*m^2 + 430080*a^10*b*c^5*j^2*m^2 - 1984*a^6*b^9*c*j^2*m^2 - 884736*a^9*b^3*c^4*j*1^3 \\
& - 589824*a^8*b^3*c^5*j^3*1 - 442368*a^8*b^5*c^3*j*1^3 - 294912*a^7*b^5*c^4*j^3*1 - 49152*a^6*b^7*c^3*j^3*1 + 1359360*a^10*b^2*c^4*h*m^3 + 1173120*a^9*b^4*c^3*h*m^3 \\
& + 743040*a^7*b^4*c^5*h^3*m + 622080*a^8*b^2*c^6*h^3*m + 184320*a^9*b*c^6*j^2*k^2 + 107136*a^6*b^6*c^4*h^3*m - 32640*a^8*b^6*c^2*h*m^3 + 540*a^5*b^8*c^3*h^3*m \\
& - 270*a^4*b^10*c^2*h^3*m - 180*a^5*b^1
\end{aligned}$$



$$\begin{aligned}
& 0*c*h^2*m^2 - 2293760*a^9*b^3*c^4*f*m^3 - 2293760*a^6*b^3*c^7*f^3*m + 13271 \\
& 04*a^8*b^4*c^4*g*1^3 + 1327104*a^6*b^4*c^6*g^3*1 - 622080*a^8*b^3*c^5*h*k^3 \\
& - 622080*a^7*b^3*c^6*h^3*k - 326592*a^7*b^5*c^4*h*k^3 - 326592*a^6*b^5*c^5 \\
& *h^3*k - 199360*a^8*b^5*c^3*f*m^3 - 199360*a^5*b^5*c^6*f^3*m + 61920*a^7*b^ \\
& 7*c^2*f*m^3 + 61920*a^4*b^7*c^5*f^3*m - 38880*a^6*b^7*c^3*h*k^3 - 38880*a^5 \\
& *b^7*c^4*h^3*k - 3682*a^3*b^9*c^4*f^3*m - 810*a^5*b^9*c^2*h*k^3 - 810*a^4*b \\
& ^9*c^3*h^3*k - 70*a^3*b^12*c*f^2*m^2 + 70*a^2*b^11*c^3*f^3*m + 3870720*a^8* \\
& b*c^7*e^2*m^2 + 184320*a^8*b*c^7*h^2*j^2 - 14152320*a^4*b^4*c^8*d^3*m + 106 \\
& 44480*a^5*b^2*c^9*d^3*m + 5483520*a^9*b^2*c^5*d*m^3 + 4269888*a^3*b^6*c^7*d \\
& ^3*m - 2654208*a^8*b^3*c^5*e*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 - 8265 \\
& 60*a^7*b^6*c^3*d*m^3 + 743040*a^7*b^4*c^5*f*k^3 + 622080*a^8*b^2*c^6*f*k^3 \\
& - 607068*a^2*b^8*c^6*d^3*m - 589824*a^7*b^3*c^6*g*j^3 - 442368*a^5*b^5*c^6* \\
& g^3*j - 294912*a^6*b^5*c^5*g*j^3 + 145188*a^6*b^8*c^2*d*m^3 + 107136*a^6*b^ \\
& 6*c^4*f*k^3 - 49152*a^5*b^7*c^4*g*j^3 - 32640*a^4*b^6*c^6*f^3*k - 5796*a^3* \\
& b^8*c^5*f^3*k + 540*a^5*b^8*c^3*f*k^3 - 270*a^4*b^10*c^2*f*k^3 + 210*a^2*b^ \\
& 10*c^4*f^3*k + 19077120*a^4*b^3*c^9*d^3*k + 1658880*a^7*b*c^8*e^2*k^2 + 430 \\
& 080*a^7*b*c^8*f^2*j^2 + 3538944*a^5*b^2*c^9*e^3*j - 2488320*a^7*b^3*c^6*d*k \\
& ^3 - 2379456*a^3*b^5*c^8*d^3*k + 1179648*a^7*b^2*c^7*e*j^3 + 589824*a^6*b^4 \\
& *c^6*e*j^3 + 98304*a^5*b^6*c^5*e*j^3 - 95904*a^2*b^7*c^7*d^3*k - 57024*a^6* \\
& b^5*c^5*d*k^3 + 49248*a^5*b^7*c^4*d*k^3 - 4050*a^4*b^9*c^3*d*k^3 - 810*a^3* \\
& b^11*c^2*d*k^3 - 486*a*b^12*c^3*d^2*k^2 + 3870720*a^6*b*c^9*d^2*j^2 - 16481 \\
& 28*a^5*b^3*c^8*f^3*h - 898560*a^6*b^3*c^7*f*h^3 - 354240*a^5*b^5*c^6*f*h^3 \\
& - 354240*a^4*b^5*c^7*f^3*h + 43680*a^3*b^7*c^6*f^3*h - 21600*a^4*b^7*c^5*f* \\
& h^3 - 9792*a*b^11*c^4*d^2*j^2 + 1350*a^3*b^9*c^4*f*h^3 - 1050*a^2*b^9*c^5*f \\
& ^3*h + 1658880*a^6*b*c^9*e^2*h^2 + 16547328*a^4*b^2*c^10*d^3*h - 12306816*a \\
& ^3*b^4*c^9*d^3*h + 37310976*a^3*b^3*c^10*d^3*f + 3037824*a^2*b^6*c^8*d^3*h \\
& - 2654208*a^5*b^3*c^8*e*g^3 + 1949184*a^6*b^2*c^8*d*h^3 + 1296000*a^5*b^4*c \\
& ^7*d*h^3 - 155520*a^4*b^6*c^6*d*h^3 - 40500*a*b^10*c^5*d^2*h^2 - 8100*a^3*b \\
& ^8*c^5*d*h^3 + 4050*a^2*b^10*c^4*d*h^3 + 3870720*a^5*b*c^10*e^2*f^2 + 34836 \\
& 480*a^4*b*c^11*d^2*e^2 - 108864*a*b^9*c^6*d^2*g^2 - 8068032*a^2*b^5*c^9*d^3 \\
& *f - 5623296*a^4*b^3*c^9*d*f^3 + 1737792*a^3*b^5*c^8*d*f^3 - 260190*a*b^8*c \\
& ^7*d^2*f^2 - 211680*a^2*b^7*c^7*d*f^3 - 435456*a*b^7*c^8*d^2*e^2 - 245760*a \\
& ^10*c^6*j^2*k*m - 384*a^6*b^10*j*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 - 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*1 - 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^
\end{aligned}$$

$$\begin{aligned}
& 3 - 1344000*a^7*b*c^8*f^3*m - 207360*a^9*b*c^6*h*k^3 - 207360*a^8*b*c^7*h^3 \\
& *k - 3682*a^6*b^9*c*f*m^3 - 9289728*a^6*c^10*d*e^2*k - 1720320*a^7*c^9*d*f* \\
& j^2 - 50803200*a^5*b*c^10*d^3*k + 6912*b^11*c^5*d^2*e*j - 10616832*a^6*b*c^ \\
& 9*e^3*l - 2211840*a^6*c^10*e^2*f*h - 393216*a^8*b*c^7*g*j^3 + 43416*a*b^10* \\
& c^5*d^3*m - 9576*a^5*b^10*c*d*m^3 - 9450*b^11*c^5*d^2*f*h - 504*a*b^14*c*d^ \\
& 2*m^2 + 1612800*a^6*c^10*d*f^2*h - 1036800*a^8*b*c^7*d*k^3 + 45198*a*b^9*c^ \\
& 6*d^3*k - 20736*b^10*c^6*d^2*e*g - 75188736*a^4*b*c^11*d^3*f - 883200*a^6*b \\
& *c^9*f^3*h - 317952*a^7*b*c^8*f*h^3 - 15482880*a^5*c^11*d*e^2*f - 10616832* \\
& a^5*b*c^10*e^3*g - 345060*a*b^8*c^7*d^3*h - 4262400*a^5*b*c^10*d*f^3 + 8527 \\
& 68*a*b^7*c^8*d^3*f + 7350*a*b^9*c^6*d*f^3 + 967680*a^10*b^3*c^3*l^2*m^2 + 1 \\
& 61280*a^9*b^5*c^2*l^2*m^2 + 1684224*a^10*b^2*c^4*k^2*m^2 + 1264320*a^9*b^4* \\
& c^3*k^2*m^2 + 126720*a^8*b^6*c^2*k^2*m^2 + 501760*a^9*b^3*c^4*j^2*m^2 + 414 \\
& 720*a^9*b^3*c^4*k^2*l^2 + 207360*a^8*b^5*c^3*k^2*l^2 + 170240*a^8*b^5*c^3*j \\
& ^2*m^2 + 9216*a^7*b^7*c^2*j^2*m^2 + 5184*a^7*b^7*c^2*k^2*l^2 + 884736*a^9*b \\
& ^2*c^5*j^2*l^2 + 884736*a^8*b^4*c^4*j^2*l^2 + 221184*a^7*b^6*c^3*j^2*l^2 + \\
& 1419840*a^8*b^4*c^4*h^2*m^2 + 1387008*a^9*b^2*c^5*h^2*m^2 + 276480*a^8*b^3* \\
& c^5*j^2*k^2 + 140544*a^7*b^5*c^4*j^2*k^2 + 84960*a^7*b^6*c^3*h^2*m^2 + 2534 \\
& 4*a^6*b^7*c^3*j^2*k^2 - 8010*a^6*b^8*c^2*h^2*m^2 + 576*a^5*b^9*c^2*j^2*k^2 \\
& + 967680*a^8*b^3*c^5*g^2*m^2 + 414720*a^8*b^3*c^5*h^2*l^2 + 207360*a^7*b^5* \\
& c^4*h^2*l^2 + 161280*a^7*b^5*c^4*g^2*m^2 - 20160*a^6*b^7*c^3*g^2*m^2 + 5184 \\
& *a^6*b^7*c^3*h^2*l^2 + 576*a^5*b^9*c^2*g^2*m^2 + 3808000*a^8*b^2*c^6*f^2*m^ \\
& 2 + 1990656*a^7*b^4*c^5*g^2*l^2 + 1643712*a^7*b^4*c^5*f^2*m^2 + 803520*a^7* \\
& b^4*c^5*h^2*k^2 + 725760*a^8*b^2*c^6*h^2*k^2 + 207360*a^6*b^6*c^4*h^2*k^2 - \\
& 125440*a^6*b^6*c^4*f^2*m^2 - 13790*a^5*b^8*c^3*f^2*m^2 + 10530*a^5*b^8*c^3 \\
& *h^2*k^2 + 1785*a^4*b^10*c^2*f^2*m^2 + 81*a^4*b^10*c^2*h^2*k^2 + 18427392*a \\
& ^7*b^2*c^7*d^2*m^2 + 967680*a^7*b^3*c^6*f^2*l^2 + 645120*a^7*b^3*c^6*e^2*m^ \\
& 2 + 414720*a^7*b^3*c^6*g^2*k^2 + 276480*a^7*b^3*c^6*h^2*j^2 + 207360*a^6*b^ \\
& 5*c^5*g^2*k^2 + 161280*a^6*b^5*c^5*f^2*l^2 + 140544*a^6*b^5*c^5*h^2*j^2 - 8 \\
& 0640*a^6*b^5*c^5*e^2*m^2 + 25344*a^5*b^7*c^4*h^2*j^2 - 20160*a^5*b^7*c^4*f^ \\
& 2*l^2 + 5184*a^5*b^7*c^4*g^2*k^2 + 2304*a^5*b^7*c^4*e^2*m^2 + 576*a^4*b^9*c \\
& ^3*h^2*j^2 + 576*a^4*b^9*c^3*f^2*l^2 + 7962624*a^7*b^2*c^7*e^2*l^2 - 414892 \\
& 8*a^6*b^4*c^6*d^2*m^2 + 1419840*a^6*b^4*c^6*f^2*k^2 + 1387008*a^7*b^2*c^7*f \\
& ^2*k^2 - 1183392*a^5*b^6*c^5*d^2*m^2 + 884736*a^7*b^2*c^7*g^2*j^2 + 884736* \\
& a^6*b^4*c^6*g^2*j^2 + 645750*a^4*b^8*c^4*d^2*m^2 + 221184*a^5*b^6*c^5*g^2*j \\
& ^2 - 115920*a^3*b^10*c^3*d^2*m^2 + 84960*a^5*b^6*c^5*f^2*k^2 + 10836*a^2*b^ \\
& 12*c^2*d^2*m^2 - 8010*a^4*b^8*c^4*f^2*k^2 - 180*a^3*b^10*c^3*f^2*k^2 + 9*a^ \\
& 2*b^12*c^2*f^2*k^2 + 8709120*a^6*b^3*c^7*d^2*l^2 - 4354560*a^5*b^5*c^6*d^2* \\
& l^2 + 979776*a^4*b^7*c^5*d^2*l^2 + 829440*a^6*b^3*c^7*e^2*k^2 + 17480448*a^ \\
& 6*b^2*c^8*d^2*k^2 + 501760*a^6*b^3*c^7*f^2*j^2 + 170240*a^5*b^5*c^6*f^2*j^2 \\
& - 108864*a^3*b^9*c^4*d^2*l^2 + 20736*a^5*b^5*c^6*e^2*k^2 + 9216*a^4*b^7*c^ \\
& 5*f^2*j^2 + 5184*a^2*b^11*c^3*d^2*l^2 - 1984*a^3*b^9*c^4*f^2*j^2 + 64*a^2*b \\
& ^11*c^3*f^2*j^2 + 3538944*a^6*b^2*c^8*e^2*j^2 - 3302208*a^5*b^4*c^7*d^2*k^2 \\
& + 884736*a^5*b^4*c^7*e^2*j^2 + 414720*a^6*b^3*c^7*g^2*h^2 + 207360*a^5*b^5 \\
& *c^6*g^2*h^2 - 103680*a^4*b^6*c^6*d^2*k^2 + 101250*a^3*b^8*c^5*d^2*k^2 - 57 \\
& 51*a^2*b^10*c^4*d^2*k^2 + 5184*a^4*b^7*c^5*g^2*h^2 + 1935360*a^5*b^3*c^8*d^
\end{aligned}$$

$$\begin{aligned}
& 2*j^2 + 1684224*a^6*b^2*c^8*f^2*h^2 + 1264320*a^5*b^4*c^7*f^2*h^2 - 532224* \\
& a^4*b^5*c^7*d^2*j^2 + 126720*a^4*b^6*c^6*f^2*h^2 - 96768*a^3*b^7*c^6*d^2*j^ \\
& 2 + 62784*a^2*b^9*c^5*d^2*j^2 - 13950*a^3*b^8*c^5*f^2*h^2 + 225*a^2*b^10*c^ \\
& 4*f^2*h^2 + 967680*a^5*b^3*c^8*f^2*g^2 + 829440*a^5*b^3*c^8*e^2*h^2 + 16128 \\
& 0*a^4*b^5*c^7*f^2*g^2 + 20736*a^4*b^5*c^7*e^2*h^2 - 20160*a^3*b^7*c^6*f^2*g \\
& ^2 + 576*a^2*b^9*c^5*f^2*g^2 + 11487744*a^5*b^2*c^9*d^2*h^2 + 7962624*a^5*b \\
& ^2*c^9*e^2*g^2 + 35525376*a^4*b^2*c^10*d^2*f^2 - 1412640*a^3*b^6*c^7*d^2*h^ \\
& 2 + 461376*a^4*b^4*c^8*d^2*h^2 + 375030*a^2*b^8*c^6*d^2*h^2 + 8709120*a^4*b \\
& ^3*c^9*d^2*g^2 - 4354560*a^3*b^5*c^8*d^2*g^2 + 979776*a^2*b^7*c^7*d^2*g^2 + \\
& 645120*a^4*b^3*c^9*e^2*f^2 - 80640*a^3*b^5*c^8*e^2*f^2 + 2304*a^2*b^7*c^7* \\
& e^2*f^2 - 15269184*a^3*b^4*c^9*d^2*f^2 + 2870784*a^2*b^6*c^8*d^2*f^2 - 1741 \\
& 8240*a^3*b^3*c^10*d^2*e^2 + 3919104*a^2*b^5*c^9*d^2*e^2 + 54*b^15*c*d^2*k*m \\
& + 6*a*b^15*d*f*m^2 + 115200*a^11*c^5*k^2*m^2 + 576*a^7*b^9*l^2*m^2 + 225*a \\
& ^6*b^10*k^2*m^2 + 64*a^5*b^11*j^2*m^2 + 345600*a^10*c^6*h^2*m^2 + 9*a^4*b^1 \\
& 2*h^2*m^2 + 320000*a^9*c^7*f^2*m^2 + 41472*a^9*c^7*h^2*k^2 + 16934400*a^8*c \\
& ^8*d^2*m^2 + 345600*a^8*c^8*f^2*k^2 + 81*b^14*c^2*d^2*k^2 + 3538944*a^7*c^9 \\
& *e^2*j^2 + 2032128*a^7*c^9*d^2*k^2 + 492800*a^11*b^2*c^3*m^4 + 351456*a^10* \\
& b^4*c^2*m^4 + 576*b^13*c^3*d^2*j^2 + 331776*a^9*b^4*c^3*l^4 + 115200*a^7*c^ \\
& 9*f^2*h^2 + 142560*a^8*b^4*c^4*k^4 + 103680*a^9*b^2*c^5*k^4 + 32400*a^7*b^6 \\
& *c^3*k^4 + 2025*b^12*c^4*d^2*h^2 + 2025*a^6*b^8*c^2*k^4 + 6096384*a^6*c^10* \\
& d^2*h^2 + 131072*a^8*b^2*c^6*j^4 + 98304*a^7*b^4*c^5*j^4 + 32768*a^6*b^6*c^ \\
& 4*j^4 + 5184*b^11*c^5*d^2*g^2 + 4096*a^5*b^8*c^3*j^4 + 11025*b^10*c^6*d^2*f \\
& ^2 + 5644800*a^5*c^11*d^2*f^2 + 142560*a^6*b^4*c^6*h^4 + 103680*a^7*b^2*c^7 \\
& *h^4 + 32400*a^5*b^6*c^5*h^4 + 20736*b^9*c^7*d^2*e^2 + 2025*a^4*b^8*c^4*h^4 \\
& + 331776*a^5*b^4*c^7*g^4 + 492800*a^5*b^2*c^9*f^4 + 351456*a^4*b^4*c^8*f^4 \\
& - 43120*a^3*b^6*c^7*f^4 + 1225*a^2*b^8*c^6*f^4 - 27433728*a^3*b^2*c^11*d^4 \\
& + 6446304*a^2*b^4*c^10*d^4 - 1050*a^7*b^9*k*m^3 + 384000*a^11*c^5*h*m^3 + \\
& 138240*a^9*c^7*h^3*m + 210*a^6*b^10*h*m^3 + 47416320*a^6*c^10*d^3*m - 1134* \\
& b^12*c^4*d^3*m + 70*a^5*b^11*f*m^3 + 2688000*a^10*c^6*d*m^3 + 384000*a^7*c^ \\
& 9*f^3*k + 138240*a^9*c^7*f*k^3 - 3402*b^11*c^5*d^3*k + 210*a^4*b^12*d*m^3 + \\
& 7077888*a^6*c^10*e^3*j + 786432*a^8*c^8*e*j^3 - 43120*a^9*b^6*c*m^4 + 2844 \\
& 9792*a^5*c^11*d^3*h + 17010*b^10*c^6*d^3*h + 580608*a^7*c^9*d*h^3 - 39690*b \\
& ^9*c^7*d^3*f - 734832*a*b^6*c^9*d^4 + 9*b^16*d^2*m^2 + 160000*a^12*c^4*m^4 \\
& + 1225*a^8*b^8*m^4 + 20736*a^10*c^6*k^4 + 65536*a^9*c^7*j^4 + 20736*a^8*c^8 \\
& *h^4 + 49787136*a^4*c^12*d^4 + 160000*a^6*c^10*f^4 + 5308416*a^5*c^11*e^4 + \\
& 35721*b^8*c^8*d^4 + a^2*b^14*f^2*m^2, z, k1)*(root(56371445760*a^11*b^8*c^ \\
& 9*z^4 - 503316480*a^8*b^14*c^6*z^4 + 47185920*a^7*b^16*c^5*z^4 - 2621440*a^ \\
& 6*b^18*c^4*z^4 + 65536*a^5*b^20*c^3*z^4 - 171798691840*a^14*b^2*c^12*z^4 + \\
& 193273528320*a^13*b^4*c^11*z^4 - 128849018880*a^12*b^6*c^10*z^4 - 169114337 \\
& 28*a^10*b^10*c^8*z^4 + 3523215360*a^9*b^12*c^7*z^4 + 68719476736*a^15*c^13* \\
& z^4 + 1536*a^5*b^16*c*k*m*z^2 + 1536*a*b^18*c^3*d*f*z^2 - 2571632640*a^9*b^ \\
& 5*c^8*d*m*z^2 + 2548039680*a^9*b^3*c^10*d*h*z^2 + 1509949440*a^10*b^3*c^9*e \\
& *l*z^2 + 1509949440*a^9*b^3*c^10*e*g*z^2 - 1401421824*a^8*b^5*c^9*d*h*z^2 - \\
& 1321205760*a^9*b^2*c^11*d*f*z^2 - 2793406464*a^11*b*c^10*d*m*z^2 + 8906342 \\
& 40*a^8*b^7*c^7*d*m*z^2 - 754974720*a^10*b^4*c^8*g*l*z^2 - 754974720*a^9*b^5
\end{aligned}$$

$$\begin{aligned}
& *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 - 581959 \\
& 680*a^10*b^4*c^8*f*m*z^2 + 732168192*a^7*b^6*c^9*d*f*z^2 + 534773760*a^11*b \\
& ^3*c^8*h*m*z^2 - 456130560*a^11*b^4*c^7*k*m*z^2 - 603979776*a^10*b^2*c^10*e \\
& *j*z^2 + 534773760*a^10*b^3*c^9*f*k*z^2 + 384040960*a^9*b^6*c^7*f*m*z^2 + 3 \\
& 77487360*a^9*b^6*c^7*g*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 - 297861 \\
& 120*a^7*b^8*c^7*d*k*z^2 - 366280704*a^6*b^8*c^8*d*f*z^2 + 188743680*a^11*b^ \\
& 2*c^9*h*k*z^2 - 330301440*a^8*b^4*c^10*d*f*z^2 + 254017536*a^8*b^6*c^8*f*h* \\
& z^2 - 1887436800*a^10*b*c^11*d*h*z^2 + 188743680*a^8*b^7*c^7*e*1*z^2 + 1533 \\
& 54240*a^9*b^6*c^7*h*k*z^2 - 185303040*a^7*b^9*c^6*d*m*z^2 - 117964800*a^10* \\
& b^5*c^7*h*m*z^2 - 61931520*a^9*b^8*c^5*k*m*z^2 + 121634816*a^11*b^2*c^9*f*m \\
& *z^2 - 115671040*a^8*b^8*c^6*f*m*z^2 - 62914560*a^9*b^7*c^6*j*1*z^2 + 18874 \\
& 3680*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^1 \\
& 0*c^4*k*m*z^2 - 117964800*a^9*b^5*c^8*f*k*z^2 + 61440*a^7*b^12*c^3*k*m*z^2 \\
& - 46080*a^6*b^14*c^2*k*m*z^2 + 23592960*a^8*b^9*c^5*j*1*z^2 + 188743680*a^7 \\
& *b^7*c^8*e*g*z^2 - 37355520*a^9*b^7*c^6*h*m*z^2 + 125829120*a^8*b^6*c^8*e*j \\
& *z^2 + 23101440*a^8*b^9*c^5*h*m*z^2 - 3538944*a^7*b^11*c^4*j*1*z^2 + 196608 \\
& *a^6*b^13*c^3*j*1*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*1*z^2 - 37355520*a^8*b^7*c^7*f*k*z^2 - 1347584*a^6*b^12*c^4*f*m*z^2 + \\
& 68272128*a^6*b^10*c^6*d*k*z^2 - 589824*a^6*b^12*c^4*g*1*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*1*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*1*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*1*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*1*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
\end{aligned}$$

$$\begin{aligned}
& ^{15}c^m z^2 - 94464 a^6 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^3 c^{12} d^2 z^2 + 10569646 \\
& 08 a^{11} c^{11} d^2 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 \\
& 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^3 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^3 c^8 f^k l^m z + 99090432 a^9 b^3 c^9 d^h l^m z + 9437184 a^{10} b^3 c^8 e^k m^m z + \\
& 23592960 a^{10} b^3 c^8 g^h m^m z + 141557760 a^8 b^3 c^{10} d^e k^k z + 47185920 a^9 b^3 c^9 d^j k^k z - 23592960 a^9 b^3 c^9 f^g k^k z + 169869312 a^7 b^3 c^{11} d^e f^f z + \\
& 99090432 a^8 b^3 c^{10} d^g h^h z - 3145728 a^9 b^3 c^9 f^h j^j z + 56623104 a^8 b^3 c^{10} d^f j^j z + 1536 a^3 b^{15} c^3 d^f j^j z - 9437184 a^8 b^3 c^{10} e^f h^h z - 4608 a^3 b^{14} c^4 d^f g^g z + 9216 a^3 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^m 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 - 47
\end{aligned}$$

$18592a^{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 + 2949120a^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 - 14745600a^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^{11}c^4d^*h^*l^*z - 161280a^4b^{11}c^4d^*g^*m^*z - 27648a^4b^{11}c^4f^*h^*j^*z + 23040a^4b^{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 + 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^{10}c^5d^*f^*l^*z - 1382400a^4b^{10}c^5d^*g^*k^*z - 84934656a^7b^2c^{10}d^*f^*g^*z + 921600a^5b^8c^6e^*f^*k^*z + 117964800a^5b^5c^9d^*e^*f^*z + 322560a^4b^{10}c^5d^*e^*m^*z + 175104a^3b^{12}c^4d^*f^*l^*z + 69120a^3b^{12}c^4d^*g^*k^*z - 50688a^3b^{12}c^4d^*h^*j^*z - 46080a^4b^{10}c^5e^*f^*k^*z$

$$\begin{aligned}
& - 27648a^4b^{10}c^5d^*h^*j^*z + 4608a^2b^{14}c^3d^*h^*j^*z - 4608a^2b^{14}c^3d^*f^*l^*z + 44236800a^6b^5c^8d^*g^*h^*z - 5898240a^7b^4c^8f^*g^*h^*z - 2 \\
& 2118400a^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^{10}c^5f^*g^*h^*z - 46 \\
& 08a^3b^{12}c^4f^*g^*h^*z + 8847360a^5b^7c^7d^*f^*j^*z - 58982400a^5b^6c^8d^*f^*g^*z - 3809280a^4b^9c^6d^*f^*j^*z + 2764800a^4b^9c^6d^*e^*k^*z + 235 \\
& 9296a^6b^5c^8d^*f^*j^*z + 681984a^3b^{11}c^5d^*f^*j^*z - 138240a^3b^{11}c^5d^*e^*k^*z - 55296a^2b^{13}c^4d^*f^*j^*z + 11796480a^7b^3c^9e^*f^*h^*z - 663 \\
& 5520a^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 + 17971 \\
& 2a^3b^{11}c^5d^*g^*h^*z - 13824a^2b^{13}c^4d^*g^*h^*z + 9216a^3b^{11}c^5e^*f^*h^*z + 16220160a^4b^8c^7d^*f^*g^*z + 13271040a^5b^6c^8d^*e^*h^*z - 239616 \\
& 0a^3b^{10}c^6d^*f^*g^*z + 552960a^4b^8c^7d^*e^*h^*z - 359424a^3b^{10}c^6d^*e^*h^*z + 175104a^2b^{12}c^5d^*f^*g^*z + 27648a^2b^{12}c^5d^*e^*h^*z - 3244032 \\
& 0a^4b^7c^8d^*e^*f^*z + 4792320a^3b^9c^7d^*e^*f^*z - 350208a^2b^{11}c^6d^*e^*f^*z + 165150720a^{10}b^*c^8d^*l^*m^*z + 4608a^6b^{12}c^*k^*l^*m^*z + 23592960* \\
& a^{11}b^*c^7h^*l^*m^*z + 3145728a^{11}b^*c^7j^*k^*m^*z - 1536a^5b^{13}c^*j^*k^*m^*z + 165150720a^9b^*c^9d^*g^*m^*z + 346816512a^7b^*c^{11}d^2g^*z + 19660800a^{12} \\
& *b^*c^6l^*m^2z - 34560a^7b^{11}c^*l^*m^2z - 7077888a^{11}b^*c^7k^2l^*z + 11008a^6b^{12}c^*j^*m^2z + 19660800a^{11}b^*c^7g^*m^2z + 7077888a^{10}b^*c^8h^ \\
& ^2l^*z + 768a^5b^{13}c^*g^*m^2z - 19660800a^9b^*c^9f^2l^*z - 7077888a^{10}b^*c^8g^*k^2z - 6912a^*b^{15}c^3d^2l^*z + 7077888a^9b^*c^9g^*h^2z - 1966 \\
& 0800a^8b^*c^{10}f^2g^*z - 66816a^*b^{14}c^4d^2j^*z + 214272a^*b^{13}c^5d^2g^*z - 428544a^*b^{12}c^6d^2e^*z - 330301440a^9c^{10}d^*e^*m^*z - 110100480a^ \\
& 10c^9d^*j^*m^*z - 15728640a^{11}c^8h^*j^*m^*z - 47185920a^{10}c^9e^*h^*m^*z - 198180864a^8c^{11}d^*e^*h^*z + 15728640a^{10}c^9f^*j^*k^*z - 66060288a^9c^{10}d^* \\
& h^*j^*z + 47185920a^9c^{10}e^*f^*k^*z + 1022754816a^6b^2c^{11}d^2e^*z - 642318336a^5b^4c^{10}d^2e^*z - 511377408a^7b^3c^9d^2l^*z - 511377408a^6b^ \\
& ^3c^{10}d^2g^*z + 321159168a^6b^5c^8d^2l^*z + 321159168a^5b^5c^9d^2g^*z + 225312768a^7b^2c^{10}d^2j^*z - 25362432a^{11}b^3c^5l^*m^2z + 132 \\
& 71040a^{10}b^5c^4l^*m^2z - 3563520a^9b^7c^3l^*m^2z + 506880a^8b^9c^2l^*m^2z + 10354688a^{11}b^2c^6j^*m^2z + 8847360a^{10}b^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^{10}b^4c^5j^*m^2z - \\
& 145920a^7b^{10}c^2j^*m^2z - 138240a^7b^9c^3k^2l^*z + 6912a^6b^{11}c^2k^2l^*z - 111697920a^5b^7c^7d^2l^*z + 223395840a^4b^6c^9d^2e^*z - \\
& 25362432a^{10}b^3c^6g^*m^2z - 3538944a^{10}b^2c^7j^*k^2z + 737280a^8b^6c^5j^*k^2z + 50724864a^{10}b^2c^7e^*m^2z - 276480a^7b^8c^4j^*k^2z \\
& z + 41472a^6b^{10}c^3j^*k^2z - 2304a^5b^{12}c^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^{11}c^2g^*m^2z - 6 \\
& 912a^5b^{11}c^3h^2l^*z - 26542080a^9b^4c^6e^*m^2z + 25362432a^8b^3c^8f^2l^*z - 13271040a^7b^5c^7f^2l^*z + 8847360a^9b^3c^7g^*k^2z + \\
& 7127040a^8b^6c^5e^*m^2z - 4423680a^8b^5c^6g^*k^2z + 3563520a^6b^7
\end{aligned}$$

$$\begin{aligned}
& *c^6*f^2*1*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*1*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*1*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*1*z - 111697920*a^4*b^7*c^8*d^2*g*z + \\
& 23362560*a^4*b^9*c^6*d^2*1*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*1*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*1*z + 145920*a^4*b^10*c^5*f^2*j*z - 13824*a^5*b^10*c^4*e*k^2*z - 11008*a^3*b^12*c^4*f^2*j*z + 256*a^2*b^14*c^3*f^2*j*z - 32587776*a^5*b^6*c^8*d^2*j*z - 8847360*a^8*b^3*c^8*g*h^2*z + 21657600*a^4*b^8*c^7*d^2*j*z + 4423680*a^7*b^5*c^7*g*h^2*z - 1105920*a^6*b^7*c^6*g*h^2*z + 138240*a^5*b^9*c^5*g*h^2*z - 6912*a^4*b^11*c^4*g*h^2*z + 25362432*a^7*b^3*c^9*f^2*g*z - 5810688*a^3*b^10*c^6*d^2*j*z + 17694720*a^8*b^2*c^9*e*h^2*z + 845568*a^2*b^12*c^5*d^2*j*z - 50724864*a^7*b^2*c^10*e*f^2*z - 13271040*a^6*b^5*c^8*f^2*g*z - 8847360*a^7*b^4*c^8*e*h^2*z + 3563520*a^5*b^7*c^7*f^2*g*z + 2211840*a^6*b^6*c^7*e*h^2*z - 506880*a^4*b^9*c^6*f^2*g*z - 276480*a^5*b^8*c^6*e*h^2*z + 34560*a^3*b^11*c^5*f^2*g*z + 13824*a^4*b^10*c^5*e*h^2*z - 768*a^2*b^13*c^4*f^2*g*z + 26542080*a^6*b^4*c^9*e*f^2*z + 23362560*a^3*b^9*c^7*d^2*g*z - 46725120*a^3*b^8*c^8*d^2*e*z - 7127040*a^5*b^6*c^8*e*f^2*z - 2965248*a^2*b^11*c^6*d^2*g*z + 1013760*a^4*b^8*c^7*e*f^2*z - 69120*a^3*b^10*c^6*e*f^2*z + 1536*a^2*b^12*c^5*e*f^2*z + 5930496*a^2*b^10*c^7*d^2*e*z + 346816512*a^8*b*c^10*d^2*1*z - 693633024*a^7*c^12*d^2*e*z - 231211008*a^8*c^11*d^2*j*z + 768*a^6*b^13*1*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 - 3932160*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*1*m - 2304*a^6*b^9*c*j*k*1*m + 2211840*a^9*b*c^6*e*k*1*m + 1228800*a^9*b*c^6*f*j*1*m + 737280*a^9*b*c^6*g*j*k*m + 442368*a^9*b*c^6*h*j*k*1 + 36*a^3*b^12*c*f*h*k*m + 3096576*a^8*b*c^7*d*j*k*1 - 12745728*a^8*b*c^7*d*h*k*m + 3686400*a^8*b*c^7*e*f*1*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*1 + 1228800*a^8*b*c^7*f*g*j*m + 737280*a^8*b*c^7*f*h*j*1 + 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*1 + 5160960*a^7*b*c^8*d*f*j*1 + 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*1 + 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*1 + 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*1*m + 783360*a^8*b^5*c^3*j*
\end{aligned}$$



$k*1*m + 18432*a^7*b^7*c^2*j*k*1*m - 2211840*a^8*b^4*c^4*g*k*1*m - 1695744*a^9*b^2*c^5*h*j*1*m - 1400832*a^8*b^4*c^4*h*j*1*m - 1105920*a^9*b^2*c^5*g*k*1*m - 253440*a^7*b^6*c^3*h*j*1*m - 69120*a^7*b^6*c^3*g*k*1*m + 11520*a^6*b^8*c^2*h*j*1*m + 6912*a^6*b^8*c^2*g*k*1*m + 4423680*a^8*b^3*c^5*e*k*1*m + 2506752*a^8*b^3*c^5*f*j*1*m + 1843200*a^8*b^3*c^5*g*j*k*m + 1327104*a^8*b^3*c^5*h*j*k*1 + 838656*a^7*b^5*c^4*f*j*1*m + 783360*a^7*b^5*c^4*g*j*k*m + 691200*a^7*b^5*c^4*h*j*k*1 + 138240*a^7*b^5*c^4*e*k*1*m + 69120*a^6*b^7*c^3*h*j*k*1 - 53760*a^6*b^7*c^3*f*j*1*m + 18432*a^6*b^7*c^3*g*j*k*m - 13824*a^6*b^7*c^3*e*k*1*m - 2304*a^5*b^9*c^2*g*j*k*m + 2543616*a^8*b^3*c^5*g*h*1*m + 829440*a^7*b^5*c^4*g*h*1*m - 34560*a^6*b^7*c^3*g*h*1*m - 8183808*a^8*b^2*c^6*d*j*1*m - 3686400*a^8*b^2*c^6*e*j*k*m - 2285568*a^7*b^4*c^5*d*j*1*m - 1695744*a^8*b^2*c^6*f*j*k*1 - 1566720*a^7*b^4*c^5*e*j*k*m - 1400832*a^7*b^4*c^5*f*j*k*1 + 741888*a^6*b^6*c^4*d*j*1*m - 253440*a^6*b^6*c^4*f*j*k*1 - 80640*a^5*b^8*c^3*d*j*1*m - 36864*a^6*b^6*c^4*e*j*k*m + 11520*a^5*b^8*c^3*f*j*k*1 + 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*1*m - 2838528*a^7*b^4*c^5*f*g*1*m - 1843200*a^8*b^2*c^6*f*g*1*m - 1695744*a^8*b^2*c^6*g*h*j*m - 1658880*a^7*b^4*c^5*g*h*k*1 - 1658880*a^7*b^4*c^5*e*h*1*m - 1400832*a^7*b^4*c^5*g*h*j*m - 663552*a^8*b^2*c^6*g*h*k*1 + 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*1 + 161280*a^6*b^6*c^4*f*g*1*m + 69120*a^6*b^6*c^4*e*h*1*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*1 + 635904*a^6*b^5*c^5*d*j*k*1 - 276480*a^5*b^7*c^4*d*j*k*1 + 34560*a^4*b^9*c^3*d*j*k*1 - 16671744*a^7*b^3*c^6*d*h*k*m + 12275712*a^7*b^3*c^6*d*g*1*m + 5677056*a^7*b^3*c^6*e*f*1*m + 4423680*a^7*b^3*c^6*e*g*k*m + 3317760*a^7*b^3*c^6*e*h*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*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*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*m + 506880*a^6*b^5*c^5*e*h*j*m + 414720*a^6*b^5*c^5*e*h*k*1 - 322560*a^6*b^5*c^5*e*f*1*m + 241920*a^5*b^7*c^4*d*g*1*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*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*m - 2304*a^4*b^9*c^3*f*h*j*1 + 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*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 + 5308416*a^6*b^4*c^6*e*g*j*1 - 5087232*a^7*b^2*c^7*e*f*k*1 - 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*1 - 3981312*a^6*b^4*c^6*d*g*k*1 - 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*1 - 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*1 - 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*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 + 26$

$8920a^4b^8c^4d^4f^4k^4m - 253440a^5b^6c^5f^4g^4j^4k - 138240a^5b^6c^5e^4h^4j^4k + 107520a^5b^6c^5e^4f^4j^4m - 103680a^4b^8c^4d^4g^4k^4l - 80640a^4b^8c^4d^4g^4j^4m + 69120a^5b^6c^5e^4f^4k^4l + 11520a^4b^8c^4f^4g^4j^4k + 6912a^4b^8c^4d^4h^4j^4l - 6912a^3b^10c^3d^4h^4j^4l + 6120a^3b^10c^3d^4f^4k^4m - 1368a^2b^12c^2d^4f^4k^4m - 5087232a^7b^2c^7e^4g^4h^4m - 2211840a^6b^4c^6f^4g^4h^4l - 1658880a^6b^4c^6e^4g^4h^4m - 1105920a^7b^2c^7f^4g^4h^4l - 69120a^5b^6c^5f^4g^4h^4l + 69120a^5b^6c^5e^4g^4h^4m + 6912a^4b^8c^4f^4g^4h^4l + 7962624a^6b^3c^7d^4e^4k^4l - 22164480a^6b^3c^7d^4f^4h^4m + 5160960a^6b^3c^7d^4f^4j^4l + 4571136a^6b^3c^7d^4e^4j^4m + 4202496a^6b^3c^7d^4g^4j^4k + 2801664a^6b^3c^7e^4f^4j^4k - 2073600a^5b^5c^6d^4e^4k^4l - 1483776a^5b^5c^6d^4e^4j^4m + 635904a^5b^5c^6d^4g^4j^4k + 506880a^5b^5c^6e^4f^4j^4k - 354816a^4b^7c^5d^4f^4j^4l + 322560a^5b^5c^6d^4f^4j^4l - 276480a^4b^7c^5d^4g^4j^4k + 207360a^4b^7c^5d^4e^4k^4l + 161280a^4b^7c^5d^4e^4j^4m + 59904a^3b^9c^4d^4f^4j^4l + 34560a^3b^9c^4d^4g^4j^4k - 23040a^4b^7c^5e^4f^4j^4k - 2304a^2b^11c^3d^4f^4j^4l + 8294400a^6b^3c^7d^4g^4h^4l + 5677056a^6b^3c^7e^4f^4g^4m + 4423680a^6b^3c^7e^4f^4h^4l + 3317760a^6b^3c^7e^4g^4h^4k + 2805120a^5b^5c^6d^4f^4h^4m + 1843200a^6b^3c^7f^4g^4h^4j - 829440a^5b^5c^6d^4g^4h^4l + 783360a^5b^5c^6f^4g^4h^4j + 437184a^4b^7c^5d^4f^4h^4m + 414720a^5b^5c^6e^4g^4h^4k - 322560a^5b^5c^6e^4f^4g^4m - 146268a^3b^9c^4d^4f^4h^4m + 138240a^5b^5c^6e^4f^4h^4l - 62208a^4b^7c^5d^4g^4h^4l + 20736a^3b^9c^4d^4g^4h^4l + 18432a^4b^7c^5f^4g^4h^4j - 13824a^4b^7c^5e^4f^4h^4l + 9360a^2b^11c^3d^4f^4h^4m - 2304a^3b^9c^4f^4g^4h^4j - 8404992a^6b^2c^8d^4e^4j^4k - 24551424a^6b^2c^8d^4e^4g^4m + 21150720a^6b^2c^8d^4f^4h^4k - 1271808a^5b^4c^7d^4e^4j^4k + 552960a^4b^6c^6d^4e^4j^4k - 69120a^3b^8c^5d^4e^4j^4k - 16588800a^6b^2c^8d^4e^4h^4l - 7741440a^6b^2c^8d^4f^4g^4l + 6946560a^5b^4c^7d^4f^4h^4k - 5529600a^6b^2c^8d^4g^4h^4j + 5419008a^5b^4c^7d^4e^4g^4m - 5087232a^6b^2c^8e^4f^4g^4k - 3870720a^5b^4c^7d^4f^4g^4l - 3686400a^6b^2c^8e^4f^4h^4j - 2211840a^5b^4c^7d^4g^4h^4j - 1755648a^4b^6c^6d^4f^4h^4k - 1658880a^5b^4c^7e^4f^4g^4k + 1658880a^5b^4c^7d^4e^4h^4l - 1566720a^5b^4c^7e^4f^4h^4j + 1451520a^4b^6c^6d^4f^4g^4l - 483840a^4b^6c^6d^4e^4g^4m + 317952a^4b^6c^6d^4g^4h^4j - 193536a^3b^8c^5d^4f^4g^4l + 124416a^4b^6c^6d^4e^4h^4l + 114696a^3b^8c^5d^4f^4h^4k + 69120a^4b^6c^6e^4f^4g^4k - 41472a^3b^8c^5d^4e^4h^4l - 36864a^4b^6c^6e^4f^4h^4j + 14580a^2b^10c^4d^4f^4h^4k + 6912a^3b^8c^5d^4g^4h^4j - 6912a^2b^10c^4d^4g^4h^4j + 6912a^2b^10c^4d^4f^4g^4l + 4608a^3b^8c^5e^4f^4h^4j + 7962624a^5b^3c^8d^4e^4g^4k + 7741440a^5b^3c^8d^4e^4f^4l + 5160960a^5b^3c^8d^4f^4g^4j + 4423680a^5b^3c^8d^4e^4h^4j - 2903040a^4b^5c^7d^4e^4f^4l - 2073600a^4b^5c^7d^4e^4g^4k - 635904a^4b^5c^7d^4e^4h^4j + 387072a^3b^7c^6d^4e^4f^4l - 354816a^3b^7c^6d^4f^4g^4j + 322560a^4b^5c^7d^4f^4g^4j + 207360a^3b^7c^6d^4e^4g^4k + 59904a^2b^9c^5d^4f^4g^4j - 13824a^3b^7c^6d^4e^4h^4j + 13824a^2b^9c^5d^4e^4h^4j - 13824a^2b^9c^5d^4e^4f^4l + 4423680a^5b^3c^8e^4f^4g^4h^4 + 138240a^4b^5c^7e^4f^4g^4h^4 - 13824a^3b^7c^6e^4f^4g^4h^4 - 10321920a^5b^2c^9d^4e^4f^4j + 709632a^3b^6c^7d^4e^4f^4j - 645120a^4b^4c^8d^4e^4f^4j - 119808a^2b^8c^6d^4e^4f^4j - 16588800a^5b^2c^9d^4e^4g^4h^4 + 1658880a^4b^4c^8d^4e^4g^4h^4 + 124416a^3b^6c^7d^4e^4g^4h^4 - 41472a^2b^8c^6d^4e^4g^4h^4 +$

$$\begin{aligned}
& 7741440a^4b^3c^9d^9e^9f^9g - 2903040a^3b^5c^8d^9e^9f^9g + 387072a^2b^7c^7d^9e^9f^9g + 3456a^7b^8c^8k^1l^2m + 12672a^7b^8c^8j^1m^2 + 384a^5b^10c^8j^2k^m - 1635840a^10b^8c^5h^kk^m^2 - 1009152a^9b^8c^6h^2k^m + 3690a^6b^9c^8h^kk^m^2 + 1152a^6b^9c^8g^1m^2 - 540a^5b^10c^8h^kk^2m + 54a^4b^11c^8h^2k^m + 565248a^9b^8c^6h^j^2m - 39771648a^7b^8c^8d^2k^m - 2496000a^8b^8c^7f^2k^m - 1543680a^9b^8c^6f^kk^2m + 1980a^5b^10c^8f^kk^m^2 - 384a^5b^10c^8g^1j^m^2 - 180a^4b^11c^8f^kk^2m + 6a^2b^13c^8f^2k^m - 10298880a^9b^8c^6d^kk^m^2 + 2580480a^9b^8c^6e^1j^m^2 + 5310a^4b^11c^8d^kk^m^2 - 1674a^8b^13c^2d^2k^m - 540a^3b^12c^8d^kk^2m - 10616832a^7b^8c^8e^2j^1 - 3538944a^8b^8c^7e^1j^2m + 2727936a^8b^8c^7d^1j^2m - 2496000a^9b^8c^6f^1h^m^2 - 1543680a^8b^8c^7f^1h^2m + 565248a^8b^8c^7f^1j^2k - 270a^4b^11c^8f^1h^m^2 - 59512320a^6b^8c^9d^2f^m + 5087232a^7b^8c^8e^2h^m + 1105920a^8b^8c^7e^1j^k^2 - 3456a^8b^12c^3d^2j^1 - 1635840a^7b^8c^8f^2h^k - 1009152a^8b^8c^7f^1h^k^2 + 10260a^8b^12c^3d^2h^m - 684a^3b^12c^8d^h^m^2 - 24675840a^6b^8c^9d^2h^k - 15552000a^8b^8c^7d^1f^m^2 + 24551424a^6b^8c^9d^9e^2m - 3939840a^7b^8c^8d^8h^2k + 1105920a^7b^8c^8e^1h^2j - 25074a^8b^11c^4d^2f^m + 10530a^8b^11c^4d^2h^k + 10368a^8b^11c^4d^2g^1 + 420a^8b^12c^3d^1f^2m - 378a^2b^13c^8d^1f^m^2 - 10616832a^6b^8c^9e^2g^1j + 5087232a^6b^8c^9e^2f^1k - 3538944a^7b^8c^8e^1g^1j^2 + 1843200a^7b^8c^8d^1h^j^2 - 7994880a^6b^8c^9d^1f^2k - 4990464a^7b^8c^8d^1f^1k^2 + 2580480a^6b^8c^9e^1f^2j + 65664a^8b^10c^5d^2g^1j - 27972a^8b^10c^5d^2f^1k - 20736a^8b^10c^5d^2e^1 + 1260a^8b^11c^4d^1f^2k + 54a^8b^13c^2d^1f^1k^2 + 23224320a^5b^8c^10d^2e^1j - 37062144a^5b^8c^10d^2f^1h + 384a^8b^12c^3d^1f^1j^2 - 131328a^8b^9c^6d^2e^1j - 5985792a^6b^8c^9d^1f^1h^2 + 206010a^8b^9c^6d^2f^1h - 6300a^8b^10c^5d^1f^2h + 1350a^8b^11c^4d^1f^1h^2 + 16588800a^5b^8c^10d^9e^2h + 3456a^8b^10c^5d^1f^1g^2 + 435456a^8b^8c^7d^2e^1g + 13824a^8b^8c^7d^9e^2f - 1474560a^9c^7e^1j^kk^m + 460800a^9c^7f^1h^kk^m + 3225600a^8c^8d^1f^1k^m - 2457600a^8c^8e^1f^1j^m - 884736a^8c^8e^1h^1j^k - 6193152a^7c^9d^9e^1j^k + 1935360a^7c^9d^1f^1h^k - 1474560a^7c^9e^1f^1h^j - 10321920a^6c^10d^9e^1f^1j - 1105920a^9b^4c^3k^1l^2m - 552960a^10b^2c^4k^1l^2m - 34560a^8b^6c^2k^1l^2m - 1290240a^10b^2c^4j^1l^2m - 860160a^9b^4c^3j^1l^2m - 80640a^8b^6c^2j^1l^2m - 737280a^9b^2c^5j^2k^m - 568320a^8b^4c^4j^2k^m - 136704a^7b^6c^3j^2k^m - 2304a^6b^8c^2j^2k^m + 1271808a^9b^3c^4h^1l^2m - 552960a^9b^2c^5j^1k^2l - 552960a^8b^4c^4j^1k^2l + 414720a^8b^5c^3h^1l^2m - 145152a^7b^6c^3j^1k^2l - 17280a^7b^7c^2h^1l^2m - 3456a^6b^8c^2j^1k^2l - 3640320a^9b^3c^4h^kk^m^2 - 2626560a^8b^3c^5h^2k^m + 2211840a^9b^2c^5h^kk^2m + 2056320a^8b^4c^4h^kk^2m + 1935360a^9b^3c^4g^1l^2m - 1143360a^8b^5c^3h^kk^m^2 - 1097280a^7b^5c^4h^2k^m + 364608a^7b^6c^3h^kk^2m + 322560a^8b^5c^3g^1l^2m - 56160a^6b^7c^3h^2k^m - 40320a^7b^7c^2g^1l^2m + 27936a^7b^7c^2h^kk^m^2 - 3780a^6b^8c^2h^kk^2m + 2970a^5b^9c^2h^2k^m - 1419264a^8b^4c^4f^1l^2m - 1105920a^7b^4c^5g^2k^m - 921600a^9b^2c^5f^1l^2m - 829440a^8b^4c^4h^kk^1l^2 + 749568a^8b^3c^5h^1j^2m - 552960a^8b^2c^6g^2k^m - 331776a^9b^2c^5h^kk^1l^2 + 317952a^7b^5c^4h^1j^2m - 10
\end{aligned}$$

$$\begin{aligned}
& 3680*a^7*b^6*c^3*h*k*l^2 + 80640*a^7*b^6*c^3*f*l^2*m + 38400*a^6*b^7*c^3*h* \\
& j^2*m - 34560*a^6*b^6*c^4*g^2*k*m + 3456*a^5*b^8*c^3*g^2*k*m - 1920*a^5*b^9 \\
& *c^2*h*j^2*m - 5142528*a^7*b^3*c^6*f^2*k*m + 5068800*a^9*b^2*c^5*f*k*m^2 - \\
& 3870720*a^9*b^2*c^5*e*l*m^2 - 3755520*a^8*b^3*c^5*f*k^2*m + 3000960*a^8*b^4 \\
& *c^4*f*k*m^2 - 1290240*a^9*b^2*c^5*g*j*m^2 - 1085760*a^7*b^5*c^4*f*k^2*m - \\
& 959040*a^6*b^5*c^5*f^2*k*m - 860160*a^8*b^4*c^4*g*j*m^2 + 829440*a^8*b^3*c^ \\
& 5*g*k^2*l - 645120*a^8*b^4*c^4*e*l*m^2 - 552960*a^8*b^2*c^6*h^2*j*l - 55296 \\
& 0*a^7*b^4*c^5*h^2*j*l + 414720*a^7*b^5*c^4*g*k^2*l - 145152*a^6*b^6*c^4*h^2 \\
& *j*l + 103200*a^5*b^7*c^4*f^2*k*m - 80640*a^7*b^6*c^3*g*j*m^2 + 80640*a^7*b \\
& ^6*c^3*e*l*m^2 + 41280*a^7*b^6*c^3*f*k*m^2 - 37188*a^6*b^8*c^2*f*k*m^2 + 13 \\
& 536*a^6*b^7*c^3*f*k^2*m + 12672*a^6*b^8*c^2*g*j*m^2 + 10368*a^6*b^7*c^3*g*k \\
& ^2*l + 5490*a^5*b^9*c^2*f*k^2*m - 3456*a^5*b^8*c^3*h^2*j*l - 2304*a^6*b^8*c \\
& ^2*e*l*m^2 + 810*a^4*b^9*c^3*f^2*k*m - 270*a^3*b^11*c^2*f^2*k*m + 6137856*a \\
& ^8*b^3*c^5*d*l^2*m - 4423680*a^7*b^2*c^7*e^2*k*m - 2654208*a^8*b^3*c^5*g*j* \\
& l^2 - 2654208*a^7*b^3*c^6*g^2*j*l + 1769472*a^8*b^2*c^6*g*j^2*l + 1769472*a \\
& ^7*b^4*c^5*g*j^2*l - 1354752*a^7*b^5*c^4*d*l^2*m - 1327104*a^7*b^5*c^4*g*j* \\
& l^2 - 1327104*a^6*b^5*c^5*g^2*j*l + 1271808*a^8*b^3*c^5*f*k*l^2 - 1040384*a \\
& ^8*b^2*c^6*f*j^2*m - 697344*a^7*b^4*c^5*f*j^2*m - 516096*a^8*b^2*c^6*h*j^2* \\
& k - 451584*a^7*b^4*c^5*h*j^2*k + 442368*a^6*b^6*c^4*g*j^2*l + 414720*a^7*b^ \\
& 5*c^4*f*k*l^2 - 138240*a^6*b^6*c^4*h*j^2*k - 138240*a^6*b^4*c^6*e^2*k*m - 1 \\
& 21856*a^6*b^6*c^4*f*j^2*m + 120960*a^6*b^7*c^3*d*l^2*m - 17280*a^6*b^7*c^3* \\
& f*k*l^2 + 13824*a^5*b^6*c^5*e^2*k*m - 11520*a^5*b^8*c^3*h*j^2*k + 8960*a^5* \\
& b^8*c^3*f*j^2*m + 10851840*a^8*b^2*c^6*d*k^2*m - 10464768*a^6*b^3*c^7*d^2*k \\
& *m - 10275840*a^8*b^3*c^5*d*k*m^2 + 7121088*a^5*b^5*c^6*d^2*k*m + 3127680*a \\
& ^7*b^4*c^5*d*k^2*m + 1720320*a^8*b^3*c^5*e*j*m^2 - 1658880*a^8*b^2*c^6*e*k^ \\
& 2*l - 1290240*a^7*b^2*c^7*f^2*j*l + 1271808*a^7*b^3*c^6*g^2*h*m - 1222560*a \\
& ^4*b^7*c^5*d^2*k*m + 999360*a^7*b^5*c^4*d*k*m^2 - 860160*a^6*b^4*c^6*f^2*j* \\
& l - 829440*a^7*b^4*c^5*e*k^2*l - 705024*a^6*b^6*c^4*d*k^2*m - 552960*a^8*b^ \\
& 2*c^6*g*j*k^2 - 552960*a^7*b^4*c^5*g*j*k^2 + 414720*a^6*b^5*c^5*g^2*h*m + 3 \\
& 19392*a^6*b^7*c^3*d*k*m^2 + 161280*a^7*b^5*c^4*e*j*m^2 - 145152*a^6*b^6*c^4 \\
& *g*j*k^2 - 85734*a^5*b^9*c^2*d*k*m^2 - 80640*a^5*b^6*c^5*f^2*j*l - 25344*a^ \\
& 6*b^7*c^3*e*j*m^2 + 23490*a^3*b^9*c^4*d^2*k*m - 20736*a^6*b^6*c^4*e*k^2*l - \\
& 17280*a^5*b^7*c^4*g^2*h*m + 14148*a^5*b^8*c^3*d*k^2*m + 13716*a^2*b^11*c^3 \\
& *d^2*k*m + 12690*a^4*b^10*c^2*d*k^2*m + 12672*a^4*b^8*c^4*f^2*j*l - 3456*a^ \\
& 5*b^8*c^3*g*j*k^2 + 768*a^5*b^9*c^2*e*j*m^2 - 384*a^3*b^10*c^3*f^2*j*l + 53 \\
& 08416*a^8*b^2*c^6*e*j*l^2 - 5308416*a^6*b^3*c^7*e^2*j*l - 5142528*a^8*b^3*c \\
& ^5*f*h*m^2 + 5068800*a^7*b^2*c^7*f^2*h*m - 3755520*a^7*b^3*c^6*f*h^2*m - 35 \\
& 38944*a^7*b^3*c^6*e*j^2*l + 3000960*a^6*b^4*c^6*f^2*h*m + 2654208*a^7*b^4*c \\
& ^5*e*j*l^2 - 2322432*a^8*b^2*c^6*d*k*l^2 + 2125824*a^7*b^3*c^6*d*j^2*m - 19 \\
& 90656*a^7*b^4*c^5*d*k*l^2 - 1085760*a^6*b^5*c^5*f*h^2*m - 959040*a^7*b^5*c^ \\
& 4*f*h*m^2 - 884736*a^6*b^5*c^5*e*j^2*l + 829440*a^7*b^3*c^6*g*h^2*l + 74956 \\
& 8*a^7*b^3*c^6*f*j^2*k + 518400*a^6*b^6*c^4*d*k*l^2 + 414720*a^6*b^5*c^5*g*h \\
& ^2*l + 317952*a^6*b^5*c^5*f*j^2*k + 133632*a^6*b^5*c^5*d*j^2*m + 103200*a^6 \\
& *b^7*c^3*f*h*m^2 - 96768*a^5*b^7*c^4*d*j^2*m - 51840*a^5*b^8*c^3*d*k*l^2 + \\
& 41280*a^5*b^6*c^5*f^2*h*m + 38400*a^5*b^7*c^4*f*j^2*k - 37188*a^4*b^8*c^4*f
\end{aligned}$$

$$\begin{aligned}
&^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 - \\
&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 + 23385600*a^6*b^2*c^8*d*f^2*m + 61378 \\
&56*a^6*b^3*c^7*d*g^2*m - 5677056*a^6*b^2*c^8*e^2*f*m + 4147200*a^7*b^3*c^6* \\
&d*h*1^2 - 3317760*a^6*b^2*c^8*e^2*h*k - 1354752*a^5*b^5*c^6*d*g^2*m + 12718 \\
&08*a^6*b^3*c^7*f*g^2*k - 737280*a^7*b^2*c^7*f*h*j^2 + 17418240*a^5*b^3*c^8* \\
&d^2*g*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 - 230 \\
&4*a^4*b^8*c^4*f*h*j^2 + 384*a^3*b^10*c^3*f*h*j^2 + 50042880*a^5*b^2*c^9*d^2 \\
&*f*k - 13271040*a^5*b^3*c^8*d^2*h*k - 13149696*a^7*b^3*c^6*d*f*m^2 + 109065 \\
&60*a^4*b^5*c^7*d^2*f*m - 8709120*a^4*b^5*c^7*d^2*g*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 + 55935 \\
&36*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 + 19595
\end{aligned}$$

$52*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*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 - 1658880*a^6*b^2*c^8*e*g*h^2 - 967680*a^5*b^4*c^7*d*f*j^2 - 829440*a^5*b^4*c^7*e*g*h^2 - 207360*a^3*b^6*c^7*d*e^2*k + 64512*a^4*b^6*c^6*d*f*j^2 + 39168*a^3*b^8*c^5*d*f*j^2 - 20736*a^4*b^6*c^6*e*g*h^2 - 9216*a^2*b^10*c^4*d*f*j^2 - 4423680*a^5*b^2*c^9*e^2*f*h + 4147200*a^5*b^3*c^8*d*g^2*h - 3193344*a^3*b^5*c^8*d^2*e*j + 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*$

$$\begin{aligned}
& 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^{12} 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^2 k^2 m^2 + 430080 a^{10} b^3 c^5 j^2 m^2 - \\
& 1984 a^6 b^9 c^2 j^2 m^2 - 884736 a^9 b^3 c^4 j^3 m^3 - 589824 a^8 b^3 c^5 j^3 \\
& m^3 - 442368 a^8 b^5 c^3 j^3 m^3 - 294912 a^7 b^5 c^4 j^3 m^3 - 49152 a^6 b^7 c^3 \\
& j^3 m^3 + 1359360 a^{10} b^2 c^4 h^3 m^3 + 1173120 a^9 b^4 c^3 h^3 m^3 + 743040 a^7 \\
& b^4 c^5 h^3 m^3 + 622080 a^8 b^2 c^6 h^3 m^3 + 184320 a^9 b^3 c^6 j^2 k^2 + 10 \\
& 7136 a^6 b^6 c^4 h^3 m^3 - 32640 a^8 b^6 c^2 h^3 m^3 + 540 a^5 b^8 c^3 h^3 m^3 - \\
& 270 a^4 b^{10} c^2 h^3 m^3 - 180 a^5 b^{10} c^2 h^2 m^2 - 2293760 a^9 b^3 c^4 f^3 m^3 \\
& - 2293760 a^6 b^3 c^7 f^3 m^3 + 1327104 a^8 b^4 c^4 g^3 m^3 + 1327104 a^6 b^4 c^6 \\
& g^3 m^3 - 622080 a^8 b^3 c^5 h^3 k^3 - 622080 a^7 b^3 c^6 h^3 k^3 - 326592 a^7 \\
& b^5 c^4 h^3 k^3 - 326592 a^6 b^5 c^5 h^3 k^3 - 199360 a^8 b^5 c^3 f^3 m^3 - 199 \\
& 360 a^5 b^5 c^6 f^3 m^3 + 61920 a^7 b^7 c^2 f^3 m^3 + 61920 a^4 b^7 c^5 f^3 m^3 - \\
& 38880 a^6 b^7 c^3 h^3 k^3 - 38880 a^5 b^7 c^4 h^3 k^3 - 3682 a^3 b^9 c^4 f^3 m^3 \\
& - 810 a^5 b^9 c^2 h^3 k^3 - 810 a^4 b^9 c^3 h^3 k^3 - 70 a^3 b^{12} c^2 f^2 m^2 + \\
& 70 a^2 b^{11} c^3 f^3 m^3 + 3870720 a^8 b^3 c^7 e^2 m^2 + 184320 a^8 b^3 c^7 h^2 j^2 \\
& - 14152320 a^4 b^4 c^8 d^3 m^3 + 10644480 a^5 b^2 c^9 d^3 m^3 + 5483520 a^9 b^2 \\
& c^5 d^3 m^3 + 4269888 a^3 b^6 c^7 d^3 m^3 - 2654208 a^8 b^3 c^5 e^3 m^3 + 1359 \\
& 360 a^6 b^2 c^8 f^3 k^3 + 1330560 a^8 b^4 c^4 d^3 m^3 + 1173120 a^5 b^4 c^7 f^3 \\
& k^3 - 884736 a^6 b^3 c^7 g^3 j^3 - 826560 a^7 b^6 c^3 d^3 m^3 + 743040 a^7 b^4 c^5 \\
& f^3 k^3 + 622080 a^8 b^2 c^6 f^3 k^3 - 607068 a^2 b^8 c^6 d^3 m^3 - 589824 a^7 \\
& b^3 c^6 g^3 j^3 - 442368 a^5 b^5 c^6 g^3 j^3 - 294912 a^6 b^5 c^5 g^3 j^3 + 1451 \\
& 88 a^6 b^8 c^2 d^3 m^3 + 107136 a^6 b^6 c^4 f^3 k^3 - 49152 a^5 b^7 c^4 g^3 j^3 - \\
& 32640 a^4 b^6 c^6 f^3 k^3 - 5796 a^3 b^8 c^5 f^3 k^3 + 540 a^5 b^8 c^3 f^3 k^3 - \\
& 270 a^4 b^{10} c^2 f^3 k^3 + 210 a^2 b^{10} c^4 f^3 k^3 + 19077120 a^4 b^3 c^9 d^3 \\
& k^3 + 1658880 a^7 b^3 c^8 e^2 k^2 + 430080 a^7 b^3 c^8 f^2 j^2 + 3538944 a^5 b^2 \\
& c^9 e^3 j^3 - 2488320 a^7 b^3 c^6 d^3 k^3 - 2379456 a^3 b^5 c^8 d^3 k^3 + 117964 \\
& 8 a^7 b^2 c^7 e^3 j^3 + 589824 a^6 b^4 c^6 e^3 j^3 + 98304 a^5 b^6 c^5 e^3 j^3 - \\
& 95904 a^2 b^7 c^7 d^3 k^3 - 57024 a^6 b^5 c^5 d^3 k^3 + 49248 a^5 b^7 c^4 d^3 k^3 \\
& - 4050 a^4 b^9 c^3 d^3 k^3 - 810 a^3 b^{11} c^2 d^3 k^3 - 486 a^3 b^{12} c^3 d^2 k^2 \\
& + 3870720 a^6 b^3 c^9 d^2 j^2 - 1648128 a^5 b^3 c^8 f^3 h^3 - 898560 a^6 b^3 c^7 \\
& f^3 h^3 - 354240 a^5 b^5 c^6 f^3 h^3 - 354240 a^4 b^5 c^7 f^3 h^3 + 43680 a^3 b^7 \\
& c^6 f^3 h^3 - 21600 a^4 b^7 c^5 f^3 h^3 - 9792 a^3 b^{11} c^4 d^2 j^2 + 1350 a^3 \\
& b^9 c^4 f^3 h^3 - 1050 a^2 b^9 c^5 f^3 h^3 + 1658880 a^6 b^3 c^9 e^2 h^2 + 1654 \\
& 7328 a^4 b^2 c^{10} d^3 h^3 - 12306816 a^3 b^4 c^9 d^3 h^3 + 37310976 a^3 b^3 c^1 \\
& 0 d^3 f^3 + 3037824 a^2 b^6 c^8 d^3 h^3 - 2654208 a^5 b^3 c^8 e^3 g^3 + 1949184 a^6 \\
& b^2 c^8 d^3 h^3 + 1296000 a^5 b^4 c^7 d^3 h^3 - 155520 a^4 b^6 c^6 d^3 h^3 - 4 \\
& 0500 a^3 b^{10} c^5 d^2 h^2 - 8100 a^3 b^8 c^5 d^3 h^3 + 4050 a^2 b^{10} c^4 d^3 h^3 \\
& + 3870720 a^5 b^3 c^{10} e^2 f^2 + 34836480 a^4 b^3 c^{11} d^2 e^2 - 108864 a^3 b^9 c
\end{aligned}$$

$$\begin{aligned}
& ^6d^2g^2 - 8068032a^2b^5c^9d^3f - 5623296a^4b^3c^9d^3f^3 + 173779 \\
& 2a^3b^5c^8d^3f^3 - 260190a^2b^8c^7d^2f^2 - 211680a^2b^7c^7d^3f^3 - \\
& 435456a^2b^7c^8d^2e^2 - 245760a^10c^6j^2k^m - 384a^6b^10j^1m^2 \\
& + 138240a^10c^6h^k^2m - 90a^5b^11h^k^2m^2 + 384000a^10c^6f^k^2m^2 - \\
& 2211840a^8c^8e^2k^m - 409600a^9c^7f^j^2m - 147456a^9c^7h^j^2k \\
& - 30a^4b^12f^k^2m^2 + 967680a^9c^7d^k^2m + 384000a^8c^8f^2h^m - 9 \\
& 0a^3b^13d^k^2m^2 + 20321280a^7c^9d^2h^m - 883200a^11b^c^4k^m^3 - 3 \\
& 17952a^10b^c^5k^3m + 43680a^8b^7c^k^3m + 1350a^6b^9c^k^3m - 270 \\
& b^14c^2d^2h^m + 6a^3b^13f^h^2m + 4838400a^9c^7d^h^2m + 2903040a^ \\
& 8c^8d^h^2m - 1032192a^8c^8d^j^2k + 138240a^8c^8f^h^2k - 368640 \\
& 0a^7c^9e^2f^m - 1327104a^7c^9e^2h^k - 393216a^9b^c^6j^3l - 2457 \\
& 60a^8c^8f^h^j^2 - 810b^13c^3d^2h^k + 630b^13c^3d^2f^m + 18a^2b^ \\
& ^14d^h^2m + 2688000a^7c^9d^3f^2m + 580608a^8c^8d^h^k^2 - 5796a^7b^ \\
& ^8c^h^3 - 3456b^12c^4d^2g^j + 1890b^12c^4d^2f^k + 6773760a^6c^ \\
& 10d^2f^k - 1344000a^10b^c^5f^m^3 - 1344000a^7b^c^8f^3m - 207360a^ \\
& 9b^c^6h^k^3 - 207360a^8b^c^7h^3k - 3682a^6b^9c^f^m^3 - 9289728a^6 \\
& c^10d^e^2k - 1720320a^7c^9d^3f^j^2 - 50803200a^5b^c^10d^3k + 6912* \\
& b^11c^5d^2e^j - 10616832a^6b^c^9e^3l - 2211840a^6c^10e^2f^h - 39 \\
& 3216a^8b^c^7g^j^3 + 43416a^2b^10c^5d^3m - 9576a^5b^10c^d^m^3 - 945 \\
& 0b^11c^5d^2f^h - 504a^2b^14c^d^2m^2 + 1612800a^6c^10d^3f^2h - 1036 \\
& 800a^8b^c^7d^k^3 + 45198a^2b^9c^6d^3k - 20736b^10c^6d^2e^g - 7518 \\
& 8736a^4b^c^11d^3f - 883200a^6b^c^9f^3h - 317952a^7b^c^8f^h^3 - 1 \\
& 5482880a^5c^11d^e^2f - 10616832a^5b^c^10e^3g - 345060a^2b^8c^7d^3 \\
& h - 4262400a^5b^c^10d^3f^3 + 852768a^2b^7c^8d^3f + 7350a^2b^9c^6d^3f \\
& ^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 +
\end{aligned}$$



$$\begin{aligned}
& 7962624*a^7*b^2*c^7*e^2*l^2 - 4148928*a^6*b^4*c^6*d^2*m^2 + 1419840*a^6*b^4 \\
& *c^6*f^2*k^2 + 1387008*a^7*b^2*c^7*f^2*k^2 - 1183392*a^5*b^6*c^5*d^2*m^2 + \\
& 884736*a^7*b^2*c^7*g^2*j^2 + 884736*a^6*b^4*c^6*g^2*j^2 + 645750*a^4*b^8*c^4 \\
& *d^2*m^2 + 221184*a^5*b^6*c^5*g^2*j^2 - 115920*a^3*b^10*c^3*d^2*m^2 + 8496 \\
& 0*a^5*b^6*c^5*f^2*k^2 + 10836*a^2*b^12*c^2*d^2*m^2 - 8010*a^4*b^8*c^4*f^2*k \\
& ^2 - 180*a^3*b^10*c^3*f^2*k^2 + 9*a^2*b^12*c^2*f^2*k^2 + 8709120*a^6*b^3*c^7 \\
& *d^2*l^2 - 4354560*a^5*b^5*c^6*d^2*l^2 + 979776*a^4*b^7*c^5*d^2*l^2 + 8294 \\
& 40*a^6*b^3*c^7*e^2*k^2 + 17480448*a^6*b^2*c^8*d^2*k^2 + 501760*a^6*b^3*c^7 \\
& *f^2*j^2 + 170240*a^5*b^5*c^6*f^2*j^2 - 108864*a^3*b^9*c^4*d^2*l^2 + 20736*a \\
& ^5*b^5*c^6*e^2*k^2 + 9216*a^4*b^7*c^5*f^2*j^2 + 5184*a^2*b^11*c^3*d^2*l^2 - \\
& 1984*a^3*b^9*c^4*f^2*j^2 + 64*a^2*b^11*c^3*f^2*j^2 + 3538944*a^6*b^2*c^8*e \\
& ^2*j^2 - 3302208*a^5*b^4*c^7*d^2*k^2 + 884736*a^5*b^4*c^7*e^2*j^2 + 414720* \\
& a^6*b^3*c^7*g^2*h^2 + 207360*a^5*b^5*c^6*g^2*h^2 - 103680*a^4*b^6*c^6*d^2*k \\
& ^2 + 101250*a^3*b^8*c^5*d^2*k^2 - 5751*a^2*b^10*c^4*d^2*k^2 + 5184*a^4*b^7* \\
& c^5*g^2*h^2 + 1935360*a^5*b^3*c^8*d^2*j^2 + 1684224*a^6*b^2*c^8*f^2*h^2 + 1 \\
& 264320*a^5*b^4*c^7*f^2*h^2 - 532224*a^4*b^5*c^7*d^2*j^2 + 126720*a^4*b^6*c^6 \\
& *f^2*h^2 - 96768*a^3*b^7*c^6*d^2*j^2 + 62784*a^2*b^9*c^5*d^2*j^2 - 13950*a \\
& ^3*b^8*c^5*f^2*h^2 + 225*a^2*b^10*c^4*f^2*h^2 + 967680*a^5*b^3*c^8*f^2*g^2 \\
& + 829440*a^5*b^3*c^8*e^2*h^2 + 161280*a^4*b^5*c^7*f^2*g^2 + 20736*a^4*b^5*c \\
& ^7*e^2*h^2 - 20160*a^3*b^7*c^6*f^2*g^2 + 576*a^2*b^9*c^5*f^2*g^2 + 11487744 \\
& *a^5*b^2*c^9*d^2*h^2 + 7962624*a^5*b^2*c^9*e^2*g^2 + 35525376*a^4*b^2*c^10* \\
& d^2*f^2 - 1412640*a^3*b^6*c^7*d^2*h^2 + 461376*a^4*b^4*c^8*d^2*h^2 + 375030 \\
& *a^2*b^8*c^6*d^2*h^2 + 8709120*a^4*b^3*c^9*d^2*g^2 - 4354560*a^3*b^5*c^8*d^2 \\
& *g^2 + 979776*a^2*b^7*c^7*d^2*g^2 + 645120*a^4*b^3*c^9*e^2*f^2 - 80640*a^3 \\
& *b^5*c^8*e^2*f^2 + 2304*a^2*b^7*c^7*e^2*f^2 - 15269184*a^3*b^4*c^9*d^2*f^2 \\
& + 2870784*a^2*b^6*c^8*d^2*f^2 - 17418240*a^3*b^3*c^10*d^2*e^2 + 3919104*a^2 \\
& *b^5*c^9*d^2*e^2 + 54*b^15*c*d^2*k*m + 6*a*b^15*d*f*m^2 + 115200*a^11*c^5*k \\
& ^2*m^2 + 576*a^7*b^9*l^2*m^2 + 225*a^6*b^10*k^2*m^2 + 64*a^5*b^11*j^2*m^2 + \\
& 345600*a^10*c^6*h^2*m^2 + 9*a^4*b^12*h^2*m^2 + 320000*a^9*c^7*f^2*m^2 + 41 \\
& 472*a^9*c^7*h^2*k^2 + 16934400*a^8*c^8*d^2*m^2 + 345600*a^8*c^8*f^2*k^2 + 8 \\
& 1*b^14*c^2*d^2*k^2 + 3538944*a^7*c^9*e^2*j^2 + 2032128*a^7*c^9*d^2*k^2 + 49 \\
& 2800*a^11*b^2*c^3*m^4 + 351456*a^10*b^4*c^2*m^4 + 576*b^13*c^3*d^2*j^2 + 33 \\
& 1776*a^9*b^4*c^3*l^4 + 115200*a^7*c^9*f^2*h^2 + 142560*a^8*b^4*c^4*k^4 + 10 \\
& 3680*a^9*b^2*c^5*k^4 + 32400*a^7*b^6*c^3*k^4 + 2025*b^12*c^4*d^2*h^2 + 2025 \\
& *a^6*b^8*c^2*k^4 + 6096384*a^6*c^10*d^2*h^2 + 131072*a^8*b^2*c^6*j^4 + 9830 \\
& 4*a^7*b^4*c^5*j^4 + 32768*a^6*b^6*c^4*j^4 + 5184*b^11*c^5*d^2*g^2 + 4096*a^ \\
& 5*b^8*c^3*j^4 + 11025*b^10*c^6*d^2*f^2 + 5644800*a^5*c^11*d^2*f^2 + 142560* \\
& a^6*b^4*c^6*h^4 + 103680*a^7*b^2*c^7*h^4 + 32400*a^5*b^6*c^5*h^4 + 20736*b^ \\
& 9*c^7*d^2*e^2 + 2025*a^4*b^8*c^4*h^4 + 331776*a^5*b^4*c^7*g^4 + 492800*a^5* \\
& b^2*c^9*f^4 + 351456*a^4*b^4*c^8*f^4 - 43120*a^3*b^6*c^7*f^4 + 1225*a^2*b^8 \\
& *c^6*f^4 - 27433728*a^3*b^2*c^11*d^4 + 6446304*a^2*b^4*c^10*d^4 - 1050*a^7* \\
& b^9*k*m^3 + 384000*a^11*c^5*h*m^3 + 138240*a^9*c^7*h^3*m + 210*a^6*b^10*h*m \\
& ^3 + 47416320*a^6*c^10*d^3*m - 1134*b^12*c^4*d^3*m + 70*a^5*b^11*f*m^3 + 26 \\
& 88000*a^10*c^6*d*m^3 + 384000*a^7*c^9*f^3*k + 138240*a^9*c^7*f*k^3 - 3402*b \\
& ^11*c^5*d^3*k + 210*a^4*b^12*d*m^3 + 7077888*a^6*c^10*e^3*j + 786432*a^8*c^
\end{aligned}$$

$$\begin{aligned}
& 8*e*j^3 - 43120*a^9*b^6*c*m^4 + 28449792*a^5*c^{11}*d^3*h + 17010*b^{10}*c^6*d^3*h + 580608*a^7*c^9*d*h^3 - 39690*b^9*c^7*d^3*f - 734832*a*b^6*c^9*d^4 + 9 \\
& *b^{16}*d^2*m^2 + 160000*a^{12}*c^4*m^4 + 1225*a^8*b^8*m^4 + 20736*a^{10}*c^6*k^4 \\
& + 65536*a^9*c^7*j^4 + 20736*a^8*c^8*h^4 + 49787136*a^4*c^{12}*d^4 + 160000*a \\
& ^6*c^{10}*f^4 + 5308416*a^5*c^{11}*e^4 + 35721*b^8*c^8*d^4 + a^2*b^{14}*f^2*m^2, \\
& z, k1)*((768*a^2*b^{14}*c^3*d - 3145728*a^{10}*c^9*h - 5242880*a^{11}*c^8*m - 220 \\
& 20096*a^9*c^{10}*d - 22272*a^3*b^{12}*c^4*d + 282624*a^4*b^{10}*c^5*d - 2027520*a \\
& ^5*b^8*c^6*d + 8847360*a^6*b^6*c^7*d - 23396352*a^7*b^4*c^8*d + 34603008*a^ \\
& 8*b^2*c^9*d + 256*a^3*b^{13}*c^3*f - 9216*a^4*b^{11}*c^4*f + 122880*a^5*b^9*c^5 \\
& *f - 819200*a^6*b^7*c^6*f + 2949120*a^7*b^5*c^7*f - 5505024*a^8*b^3*c^8*f + \\
& 768*a^4*b^{12}*c^3*h - 12288*a^5*b^{10}*c^4*h + 61440*a^6*b^8*c^5*h - 983040*a \\
& ^8*b^4*c^7*h + 3145728*a^9*b^2*c^8*h - 3072*a^5*b^{11}*c^3*k + 61440*a^6*b^9* \\
& c^4*k - 491520*a^7*b^7*c^5*k + 1966080*a^8*b^5*c^6*k - 3932160*a^9*b^3*c^7* \\
& k + 256*a^5*b^{12}*c^2*m - 61440*a^7*b^8*c^4*m + 655360*a^8*b^6*c^5*m - 29491 \\
& 20*a^9*b^4*c^6*m + 6291456*a^{10}*b^2*c^7*m + 4194304*a^9*b*c^9*f + 3145728*a \\
& ^{10}*b*c^8*k)/(512*(4096*a^{10}*c^7 + a^4*b^{12}*c - 24*a^5*b^{10}*c^2 + 240*a^6*b \\
& ^8*c^3 - 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6)) + (x*(157 \\
& 2864*a^9*c^{10}*e + 524288*a^{10}*c^9*j - 1536*a^4*b^{10}*c^5*e + 30720*a^5*b^8*c \\
& ^6*e - 245760*a^6*b^6*c^7*e + 983040*a^7*b^4*c^8*e - 1966080*a^8*b^2*c^9*e \\
& + 768*a^4*b^{11}*c^4*g - 15360*a^5*b^9*c^5*g + 122880*a^6*b^7*c^6*g - 491520*a \\
& ^7*b^5*c^7*g + 983040*a^8*b^3*c^8*g - 256*a^4*b^{12}*c^3*j + 4608*a^5*b^{10}*c \\
& ^4*j - 30720*a^6*b^8*c^5*j + 81920*a^7*b^6*c^6*j - 393216*a^9*b^2*c^8*j + 7 \\
& 68*a^5*b^{11}*c^3*l - 15360*a^6*b^9*c^4*l + 122880*a^7*b^7*c^5*l - 491520*a^8 \\
& *b^5*c^6*l + 983040*a^9*b^3*c^7*l - 786432*a^9*b*c^9*g - 786432*a^{10}*b*c^8* \\
& l))/(64*(4096*a^{10}*c^7 + a^4*b^{12}*c - 24*a^5*b^{10}*c^2 + 240*a^6*b^8*c^3 - 1 \\
& 280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6)) + (root(56371445760 \\
& *a^{11}*b^8*c^9*z^4 - 503316480*a^8*b^{14}*c^6*z^4 + 47185920*a^7*b^{16}*c^5*z^4 \\
& - 2621440*a^6*b^{18}*c^4*z^4 + 65536*a^5*b^{20}*c^3*z^4 - 171798691840*a^{14}*b^2 \\
& *c^{12}*z^4 + 193273528320*a^{13}*b^4*c^{11}*z^4 - 128849018880*a^{12}*b^6*c^{10}*z^4 \\
& - 16911433728*a^{10}*b^{10}*c^8*z^4 + 3523215360*a^9*b^{12}*c^7*z^4 + 6871947673 \\
& 6*a^{15}*c^{13}*z^4 + 1536*a^5*b^{16}*c*k*m*z^2 + 1536*a*b^{18}*c^3*d*f*z^2 - 25716 \\
& 32640*a^9*b^5*c^8*d*m*z^2 + 2548039680*a^9*b^3*c^{10}*d*h*z^2 + 1509949440*a^ \\
& ^{10}*b^3*c^9*e*l*z^2 + 1509949440*a^9*b^3*c^{10}*e*g*z^2 - 1401421824*a^8*b^5*c \\
& ^9*d*h*z^2 - 1321205760*a^9*b^2*c^{11}*d*f*z^2 - 2793406464*a^{11}*b*c^{10}*d*m*z \\
& ^2 + 890634240*a^8*b^7*c^7*d*m*z^2 - 754974720*a^{10}*b^4*c^8*g*l*z^2 - 75497 \\
& 4720*a^9*b^5*c^8*e*l*z^2 + 719585280*a^8*b^6*c^8*d*k*z^2 - 707788800*a^9*b^ \\
& 4*c^9*d*k*z^2 - 754974720*a^8*b^5*c^9*e*g*z^2 + 603979776*a^{11}*b^2*c^9*g*l* \\
& z^2 - 581959680*a^{10}*b^4*c^8*f*m*z^2 + 732168192*a^7*b^6*c^9*d*f*z^2 + 5347 \\
& 73760*a^{11}*b^3*c^8*h*m*z^2 - 456130560*a^{11}*b^4*c^7*k*m*z^2 - 603979776*a^1 \\
& 0*b^2*c^{10}*e*j*z^2 + 534773760*a^{10}*b^3*c^9*f*k*z^2 + 384040960*a^9*b^6*c^7 \\
& *f*m*z^2 + 377487360*a^9*b^6*c^7*g*l*z^2 - 456130560*a^9*b^4*c^9*f*h*z^2 + \\
& 301989888*a^{11}*b^3*c^8*j*l*z^2 - 415236096*a^{10}*b^2*c^{10}*d*k*z^2 + 25401753 \\
& 6*a^{10}*b^6*c^6*k*m*z^2 - 330301440*a^{10}*b^4*c^8*h*k*z^2 + 390463488*a^7*b^7 \\
& *c^8*d*h*z^2 + 188743680*a^{12}*b^2*c^8*k*m*z^2 + 301989888*a^{10}*b^3*c^9*g*j* \\
& z^2 - 297861120*a^7*b^8*c^7*d*k*z^2 - 366280704*a^6*b^8*c^8*d*f*z^2 + 18874
\end{aligned}$$

$$\begin{aligned}
& 3680a^{11}b^2c^9hkz^2 - 330301440a^8b^4c^{10}dfz^2 + 254017536a^8b^6c^8f^hz^2 - 1887436800a^{10}b^2c^{11}d^hz^2 + 188743680a^8b^7c^7e^l z^2 + 153354240a^9b^6c^7h^kz^2 - 185303040a^7b^9c^6d^mz^2 - 117964800a^{10}b^5c^7h^mz^2 - 61931520a^9b^8c^5k^mz^2 + 121634816a^{11}b^2c^9f^mz^2 - 115671040a^8b^8c^6f^mz^2 - 62914560a^9b^7c^6j^l z^2 + 188743680a^{10}b^2c^{10}f^hz^2 - 94371840a^8b^8c^6g^l z^2 + 6144000a^8b^{10}c^4k^mz^2 - 117964800a^9b^5c^8f^kz^2 + 61440a^7b^{12}c^3k^mz^2 - 46080a^6b^{14}c^2k^mz^2 + 23592960a^8b^9c^5j^l z^2 + 188743680a^7b^7c^8e^gz^2 - 37355520a^9b^7c^6h^mz^2 + 125829120a^8b^6c^8e^jz^2 + 23101440a^8b^9c^5h^mz^2 - 3538944a^7b^{11}c^4j^l z^2 + 196608a^6b^{13}c^3j^l z^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^7b^{10}c^5f^mz^2 + 11796480a^7b^{10}c^5g^l z^2 - 37355520a^8b^7c^7f^kz^2 - 1347584a^6b^{12}c^4f^mz^2 + 68272128a^6b^{10}c^6d^kz^2 - 589824a^6b^{12}c^4g^l z^2 + 552960a^6b^{12}c^4h^kz^2 - 147456a^7b^{10}c^5h^kz^2 - 46080a^5b^{14}c^3h^kz^2 + 35840a^5b^{14}c^3f^mz^2 + 23592960a^7b^9c^6g^jz^2 - 23592960a^7b^9c^6e^l z^2 + 23371776a^6b^{11}c^5d^mz^2 + 23101440a^7b^9c^6f^kz^2 - 47185920a^7b^8c^7e^jz^2 - 61931520a^7b^8c^7f^hz^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^l z^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 - 51609600a^6b^9c^7d^hz^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^hz^2 + 61440a^5b^{12}c^5f^hz^2 - 46080a^4b^{14}c^4f^hz^2 + 1536a^3b^{16}c^3f^hz^2 - 23592960a^6b^9c^7e^gz^2 + 1179648a^5b^{11}c^6e^gz^2 + 829440a^4b^{13}c^5d^hz^2 + 368640a^5b^{11}c^6d^hz^2 - 105984a^3b^{15}c^4d^hz^2 + 4608a^2b^{17}c^3d^hz^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^2c^{10}e^l z^2 - 1207959552a^{10}b^2c^{11}e^gz^2 - 578813952a^{12}b^2c^9h^mz^2 - 578813952a^{11}b^2c^{10}f^kz^2 - 402653184a^{12}b^2c^9j^l z^2 - 402653184a^{11}b^2c^{10}g^jz^2 - 440401920a^{10}b^2c^{11}f^2z^2 - 188743680a^{12}b^2c^9k^2z^2 - 188743680a^{11}b^2c^{10}h^2z^2 + 1761607680a^{10}c^{12}d^fz^2 - 14080a^6b^{15}c^m^2z^2 - 94464a^6b^{17}c^4d^2z^2 + 6936330240a^8b^3c^{11}d^2z^2 + 2464874496a^6b^7c^9d^2z^2 - 3963617280a^9b^2c^{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^hz^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 + 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^{11}b^3
\end{aligned}$$

$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 - 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^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 - 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$

$$\begin{aligned}
& ^7b^7c^5ekmz - 460800a^6b^9c^4fklz + 184320a^6b^9c^4ekmz \\
& z - 161280a^5b^{11}c^3d^1mz + 23040a^5b^{11}c^3fklz - 9216a^5b^{11} \\
& c^3ekmz + 14745600a^8b^5c^6g^h^mz + 110886912a^7b^4c^8d^f^1z \\
& z - 3686400a^7b^7c^5g^h^mz - 221773824a^6b^3c^{10}d^e^fz + 460800a \\
& ^6b^9c^4g^h^mz - 17203200a^7b^6c^6d^j^mz - 23040a^5b^{11}c^3g^h^ \\
& mz - 29491200a^8b^4c^7e^h^mz - 11796480a^9b^2c^8f^j^kz + 1105920 \\
& 0a^6b^8c^5d^k^1z + 6451200a^6b^8c^5d^j^mz + 88473600a^7b^4c^8d^ \\
& g^k^z + 2457600a^7b^6c^6f^j^kz - 35389440a^8b^3c^8d^j^kz - 1382 \\
& 400a^5b^{10}c^4d^k^1z - 84934656a^8b^2c^9d^f^1z - 967680a^5b^{10}c \\
& ^4d^j^mz - 921600a^6b^8c^5f^j^kz + 138240a^5b^{10}c^4f^j^kz + 691 \\
& 20a^4b^{12}c^3d^k^1z + 53760a^4b^{12}c^3d^j^mz - 7680a^4b^{12}c^3f^ \\
& j^kz + 44236800a^7b^5c^7d^h^1z + 7372800a^7b^6c^6e^h^mz - 589824 \\
& 0a^8b^4c^7f^h^1z + 4718592a^9b^2c^8f^h^1z - 70778880a^8b^2c^9d^ \\
& g^k^z + 2949120a^7b^6c^6f^h^1z - 921600a^6b^8c^5e^h^mz - 737280 \\
& a^6b^8c^5f^h^1z + 92160a^5b^{10}c^4f^h^1z + 46080a^5b^{10}c^4e^h^ \\
& mz - 4608a^4b^{12}c^3f^h^1z + 29491200a^8b^3c^8f^g^kz - 109707264a \\
& ^7b^3c^9d^g^h^z - 25804800a^6b^7c^6d^g^mz - 58982400a^8b^2c^9e \\
& ^f^kz - 58982400a^6b^6c^7d^f^1z + 7372800a^6b^7c^6d^j^kz + 88473 \\
& 600a^6b^5c^8d^e^kz - 2764800a^5b^9c^5d^j^kz + 51609600a^6b^6c^ \\
& 7d^e^mz + 414720a^4b^{11}c^4d^j^kz - 23040a^3b^{13}c^3d^j^kz - 1474 \\
& 5600a^7b^5c^7f^g^kz - 44236800a^6b^6c^7d^g^kz - 6635520a^6b^7c \\
& ^6d^h^1z + 40108032a^8b^2c^9d^h^jz + 3686400a^6b^7c^6f^g^kz + 3 \\
& 225600a^5b^9c^5d^g^mz + 2359296a^8b^3c^8f^h^jz - 491520a^6b^7c \\
& ^6f^h^jz - 460800a^5b^9c^5f^g^kz - 276480a^5b^9c^5d^h^1z + 1843 \\
& 20a^5b^9c^5f^h^jz + 179712a^4b^{11}c^4d^h^1z - 161280a^4b^{11}c^4d^ \\
& g^mz - 27648a^4b^{11}c^4f^h^jz + 23040a^4b^{11}c^4f^g^kz - 13824a^ \\
& ^3b^{13}c^3d^h^1z + 1536a^3b^{13}c^3f^h^jz + 29491200a^7b^4c^8e^f^ \\
& kz + 110886912a^6b^4c^9d^f^g^z + 16220160a^5b^8c^6d^f^1z - 456130 \\
& 56a^7b^3c^9d^f^jz + 11059200a^5b^8c^6d^g^kz - 10321920a^6b^6c^ \\
& 7d^h^jz - 7372800a^6b^6c^7e^f^kz + 7077888a^7b^4c^8d^h^jz - 645 \\
& 1200a^5b^8c^6d^e^mz - 88473600a^6b^4c^9d^e^h^z + 2396160a^5b^8c \\
& ^6d^h^jz - 2396160a^4b^{10}c^5d^f^1z - 1382400a^4b^{10}c^5d^g^kz - \\
& 84934656a^7b^2c^{10}d^f^g^z + 921600a^5b^8c^6e^f^kz + 117964800a^5b \\
& ^5c^9d^e^fz + 322560a^4b^{10}c^5d^e^mz + 175104a^3b^{12}c^4d^f^1z \\
& + 69120a^3b^{12}c^4d^g^kz - 50688a^3b^{12}c^4d^h^jz - 46080a^4b^{10} \\
& c^5e^f^kz - 27648a^4b^{10}c^5d^h^jz + 4608a^2b^{14}c^3d^h^jz - 460 \\
& 8a^2b^{14}c^3d^f^1z + 44236800a^6b^5c^8d^g^h^z - 5898240a^7b^4c^8 \\
& f^g^h^z - 22118400a^5b^7c^7d^e^kz + 4718592a^8b^2c^9f^g^h^z + 294 \\
& 9120a^6b^6c^7f^g^h^z - 737280a^5b^8c^6f^g^h^z + 92160a^4b^{10}c^5f^ \\
& g^h^z - 4608a^3b^{12}c^4f^g^h^z + 8847360a^5b^7c^7d^f^jz - 5898240 \\
& 0a^5b^6c^8d^f^g^z - 3809280a^4b^9c^6d^f^jz + 2764800a^4b^9c^6d^ \\
& e^kz + 2359296a^6b^5c^8d^f^jz + 681984a^3b^{11}c^5d^f^jz - 138240 \\
& a^3b^{11}c^5d^e^kz - 55296a^2b^{13}c^4d^f^jz + 11796480a^7b^3c^9e \\
& ^f^h^z - 6635520a^5b^7c^7d^g^h^z - 5898240a^6b^5c^8e^f^h^z + 147456 \\
& 0a^5b^7c^7e^f^h^z - 276480a^4b^9c^6d^g^h^z - 184320a^4b^9c^6e^f
\end{aligned}$$

$$\begin{aligned}
& *h*z + 179712*a^3*b^{11}*c^5*d*g*h*z - 13824*a^2*b^{13}*c^4*d*g*h*z + 9216*a^3* \\
& b^{11}*c^5*e*f*h*z + 16220160*a^4*b^8*c^7*d*f*g*z + 13271040*a^5*b^6*c^8*d*e* \\
& h*z - 2396160*a^3*b^{10}*c^6*d*f*g*z + 552960*a^4*b^8*c^7*d*e*h*z - 359424*a^ \\
& 3*b^{10}*c^6*d*e*h*z + 175104*a^2*b^{12}*c^5*d*f*g*z + 27648*a^2*b^{12}*c^5*d*e*h \\
& *z - 32440320*a^4*b^7*c^8*d*e*f*z + 4792320*a^3*b^9*c^7*d*e*f*z - 350208*a^ \\
& 2*b^{11}*c^6*d*e*f*z + 165150720*a^{10}*b*c^8*d*l*m*z + 4608*a^6*b^{12}*c*k*l*m*z \\
& + 23592960*a^{11}*b*c^7*h*l*m*z + 3145728*a^{11}*b*c^7*j*k*m*z - 1536*a^5*b^{13} \\
& *c*j*k*m*z + 165150720*a^9*b*c^9*d*g*m*z + 346816512*a^7*b*c^{11}*d^2*g*z + 1 \\
& 9660800*a^{12}*b*c^6*l*m^2*z - 34560*a^7*b^{11}*c*l*m^2*z - 7077888*a^{11}*b*c^7* \\
& k^2*l*z + 11008*a^6*b^{12}*c*j*m^2*z + 19660800*a^{11}*b*c^7*g*m^2*z + 7077888* \\
& a^{10}*b*c^8*h^2*l*z + 768*a^5*b^{13}*c*g*m^2*z - 19660800*a^9*b*c^9*f^2*l*z - \\
& 7077888*a^{10}*b*c^8*g*k^2*z - 6912*a*b^{15}*c^3*d^2*l*z + 7077888*a^9*b*c^9*g* \\
& h^2*z - 19660800*a^8*b*c^{10}*f^2*g*z - 66816*a*b^{14}*c^4*d^2*j*z + 214272*a*b \\
& ^{13}*c^5*d^2*g*z - 428544*a*b^{12}*c^6*d^2*e*z - 330301440*a^9*c^{10}*d*e*m*z - \\
& 110100480*a^{10}*c^9*d*j*m*z - 15728640*a^{11}*c^8*h*j*m*z - 47185920*a^{10}*c^9* \\
& e*h*m*z - 198180864*a^8*c^{11}*d*e*h*z + 15728640*a^{10}*c^9*f*j*k*z - 66060288 \\
& *a^9*c^{10}*d*h*j*z + 47185920*a^9*c^{10}*e*f*k*z + 1022754816*a^6*b^2*c^{11}*d^2 \\
& *e*z - 642318336*a^5*b^4*c^{10}*d^2*e*z - 511377408*a^7*b^3*c^9*d^2*l*z - 511 \\
& 377408*a^6*b^3*c^{10}*d^2*g*z + 321159168*a^6*b^5*c^8*d^2*l*z + 321159168*a^5 \\
& *b^5*c^9*d^2*g*z + 225312768*a^7*b^2*c^{10}*d^2*j*z - 25362432*a^{11}*b^3*c^5*l \\
& *m^2*z + 13271040*a^{10}*b^5*c^4*l*m^2*z - 3563520*a^9*b^7*c^3*l*m^2*z + 5068 \\
& 80*a^8*b^9*c^2*l*m^2*z + 10354688*a^{11}*b^2*c^6*j*m^2*z + 8847360*a^{10}*b^3*c \\
& ^6*k^2*l*z - 4423680*a^9*b^5*c^5*k^2*l*z - 2048000*a^9*b^6*c^4*j*m^2*z + 11 \\
& 05920*a^8*b^7*c^4*k^2*l*z + 849920*a^8*b^8*c^3*j*m^2*z - 393216*a^{10}*b^4*c^ \\
& 5*j*m^2*z - 145920*a^7*b^{10}*c^2*j*m^2*z - 138240*a^7*b^9*c^3*k^2*l*z + 6912 \\
& *a^6*b^{11}*c^2*k^2*l*z - 111697920*a^5*b^7*c^7*d^2*l*z + 223395840*a^4*b^6*c \\
& ^9*d^2*e*z - 25362432*a^{10}*b^3*c^6*g*m^2*z - 3538944*a^{10}*b^2*c^7*j*k^2*z + \\
& 737280*a^8*b^6*c^5*j*k^2*z + 50724864*a^{10}*b^2*c^7*e*m^2*z - 276480*a^7*b^ \\
& 8*c^4*j*k^2*z + 41472*a^6*b^{10}*c^3*j*k^2*z - 2304*a^5*b^{12}*c^2*j*k^2*z + 13 \\
& 271040*a^9*b^5*c^5*g*m^2*z - 8847360*a^9*b^3*c^7*h^2*l*z + 4423680*a^8*b^5* \\
& c^6*h^2*l*z - 3563520*a^8*b^7*c^4*g*m^2*z - 1105920*a^7*b^7*c^5*h^2*l*z + 5 \\
& 06880*a^7*b^9*c^3*g*m^2*z + 138240*a^6*b^9*c^4*h^2*l*z - 34560*a^6*b^{11}*c^2 \\
& *g*m^2*z - 6912*a^5*b^{11}*c^3*h^2*l*z - 26542080*a^9*b^4*c^6*e*m^2*z + 25362 \\
& 432*a^8*b^3*c^8*f^2*l*z - 13271040*a^7*b^5*c^7*f^2*l*z + 8847360*a^9*b^3*c^ \\
& 7*g*k^2*z + 7127040*a^8*b^6*c^5*e*m^2*z - 4423680*a^8*b^5*c^6*g*k^2*z + 356 \\
& 3520*a^6*b^7*c^6*f^2*l*z + 3538944*a^9*b^2*c^8*h^2*j*z + 1105920*a^7*b^7*c^ \\
& 5*g*k^2*z - 1013760*a^7*b^8*c^4*e*m^2*z - 737280*a^7*b^6*c^6*h^2*j*z - 5068 \\
& 80*a^5*b^9*c^5*f^2*l*z + 276480*a^6*b^8*c^5*h^2*j*z - 138240*a^6*b^9*c^4*g* \\
& k^2*z + 69120*a^6*b^{10}*c^3*e*m^2*z - 41472*a^5*b^{10}*c^4*h^2*j*z + 34560*a^4 \\
& *b^{11}*c^4*f^2*l*z + 6912*a^5*b^{11}*c^3*g*k^2*z + 2304*a^4*b^{12}*c^3*h^2*j*z - \\
& 1536*a^5*b^{12}*c^2*e*m^2*z - 768*a^3*b^{13}*c^3*f^2*l*z - 111697920*a^4*b^7*c \\
& ^8*d^2*g*z + 23362560*a^4*b^9*c^6*d^2*l*z - 17694720*a^9*b^2*c^8*e*k^2*z - \\
& 10354688*a^8*b^2*c^9*f^2*j*z - 43646976*a^6*b^4*c^9*d^2*j*z + 8847360*a^8*b \\
& ^4*c^7*e*k^2*z - 2965248*a^3*b^{11}*c^5*d^2*l*z - 2211840*a^7*b^6*c^6*e*k^2*z \\
& + 2048000*a^6*b^6*c^7*f^2*j*z - 849920*a^5*b^8*c^6*f^2*j*z + 393216*a^7*b^
\end{aligned}$$

$$\begin{aligned}
& 4c^8f^2jz + 276480a^6b^8c^5eek^2z + 214272a^2b^13c^4d^2l^2z + \\
& 145920a^4b^10c^5f^2jz - 13824a^5b^10c^4eek^2z - 11008a^3b^12c^4f^2jz + 256a^2b^14c^3f^2jz - 32587776a^5b^6c^8d^2jz - 8847 \\
& 360a^8b^3c^8ggh^2z + 21657600a^4b^8c^7d^2jz + 4423680a^7b^5c^7ggh^2z - 1105920a^6b^7c^6ggh^2z + 138240a^5b^9c^5ggh^2z - 6912 \\
& a^4b^11c^4ggh^2z + 25362432a^7b^3c^9f^2gz - 5810688a^3b^10c^6d^2jz + 17694720a^8b^2c^9eeh^2z + 845568a^2b^12c^5d^2jz - 507 \\
& 24864a^7b^2c^10eef^2z - 13271040a^6b^5c^8f^2gz - 8847360a^7b^4c^8eeh^2z + 3563520a^5b^7c^7f^2gz + 2211840a^6b^6c^7eeh^2z - \\
& 506880a^4b^9c^6f^2gz - 276480a^5b^8c^6eeh^2z + 34560a^3b^11c^5f^2gz + 13824a^4b^10c^5eeh^2z - 768a^2b^13c^4f^2gz + 2654208 \\
& 0a^6b^4c^9eef^2z + 23362560a^3b^9c^7d^2gz - 46725120a^3b^8c^8d^2ez - 7127040a^5b^6c^8eef^2z - 2965248a^2b^11c^6d^2gz + 101 \\
& 3760a^4b^8c^7eef^2z - 69120a^3b^10c^6eef^2z + 1536a^2b^12c^5eef^2z + 5930496a^2b^10c^7d^2ez + 346816512a^8b^10c^10d^2l^2z - 6936 \\
& 33024a^7c^12d^2ez - 231211008a^8c^11d^2jz + 768a^6b^13l^2m^2z - 13107200a^12c^7jm^2z - 256a^5b^14jkm^2z + 4718592a^11c^8jkm^2z \\
& z - 39321600a^11c^8eem^2z - 4718592a^10c^9h^2jz + 14155776a^10c^9eek^2z + 13107200a^9c^10f^2jz + 2304b^16c^3d^2jz - 14155776a^9c^10eeh^2z \\
& + 39321600a^8c^11eef^2z - 6912b^15c^4d^2gz + 13824b^14c^5d^2ez + 737280a^10b^5jkk^1m - 2304a^6b^9c^5jkk^1m + 22 \\
& 11840a^9b^6eek^1m + 1228800a^9b^6c^6f^2j^1m + 737280a^9b^6c^6g^2j^1m + 442368a^9b^6c^6h^2j^1m + 36a^3b^12c^4f^2h^2k^1m + 3096576a^8b^6c^7d^2j^1m \\
& - 12745728a^8b^6c^7d^2h^2k^1m + 3686400a^8b^6c^7eef^1m + 3391488a^8b^6c^7eeh^2j^1m + 2211840a^8b^6c^7eeg^2k^1m + 1327104a^8b^6c^7eeh^2k^1m \\
& + 1228800a^8b^6c^7f^2g^2j^1m + 737280a^8b^6c^7f^2h^2j^1m + 442368a^8b^6c^7g^2h^2j^1m + 108a^2b^13c^4d^2h^2k^1m + 16367616a^7b^6c^8d^2e^2j^1m \\
& + 9289728a^7b^6c^8d^2e^2k^1m + 5160960a^7b^6c^8d^2f^2j^1m + 3391488a^7b^6c^8eef^2j^1m + 3096576a^7b^6c^8d^2g^2j^1m - 19307520a^7b^6c^8d^2f^2h^2m \\
& + 3686400a^7b^6c^8eef^2g^1m + 2211840a^7b^6c^8eef^2h^1m + 1327104a^7b^6c^8eeg^2h^1m + 737280a^7b^6c^8f^2g^2h^1m - 180a^2b^13c^2d^2f^2h^1m \\
& - 540a^2b^12c^3d^2f^2h^1m + 15482880a^6b^6c^9d^2e^2f^1m + 11059200a^6b^6c^9d^2e^2h^1m + 9289728a^6b^6c^9d^2e^2g^1m + 5160960a^6b^6c^9d^2f^2g^1m \\
& - 2304a^2b^11c^4d^2f^2g^1m + 2211840a^6b^6c^9eef^2gh^1m + 4608a^2b^10c^5d^2eef^2j^1m + 15482880a^5b^6c^10d^2eef^2g^1m - 13824a^2b^9c^6d^2eef^2g^1m \\
& + 36a^2b^14c^4d^2f^2k^1m + 1843200a^9b^3c^4j^2k^1m + 783360a^8b^5c^3j^2k^1m + 18432a^7b^7c^2j^2k^1m - 2211840a^8b^4c^4g^2k^1m \\
& - 1695744a^9b^2c^5h^2j^1m - 1400832a^8b^4c^4h^2j^1m - 1105920a^9b^2c^5g^2k^1m - 253440a^7b^6c^3h^2j^1m - 69120a^7b^6c^3g^2k^1m + 11520a^6b^8c^2h^2j^1m \\
& + 6912a^6b^8c^2g^2k^1m + 4423680a^8b^3c^5eek^1m + 2506752a^8b^3c^5f^2j^1m + 1843200a^8b^3c^5g^2j^1m + 1327104a^8b^3c^5h^2j^1m + 838656a^7b^5c^4f^2j^1m \\
& + 783360a^7b^5c^4g^2j^1m + 691200a^7b^5c^4h^2j^1m + 138240a^7b^5c^4eek^1m + 69120a^6b^7c^3h^2j^1m - 53760a^6b^7c^3f^2j^1m + 18432a^6b^7c^3g^2j^1m - 13824a^6b^7c^3eek^1m \\
& - 2304a^5b^9c^2g^2j^1m + 2543616a^8b^3c^5g^2h^1m + 829440a^7b^5c^4g^2h^1m - 34560a^6b^7c^3g^2h^1m - 8183808a^6b^7c^3g^2h^1m
\end{aligned}$$

$a^8b^2c^6d^j1^m - 3686400a^8b^2c^6e^j*k^m - 2285568a^7b^4c^5d^j$   
 $1^m - 1695744a^8b^2c^6f^j*k^1 - 1566720a^7b^4c^5e^j*k^m - 1400832*$   
 $a^7b^4c^5f^j*k^1 + 741888a^6b^6c^4d^j1^m - 253440a^6b^6c^4f^j*k$   
 $1 - 80640a^5b^8c^3d^j1^m - 36864a^6b^6c^4e^j*k^m + 11520a^5b^8*$   
 $c^3f^j*k^1 + 4608a^5b^8c^3e^j*k^m + 6700032a^8b^2c^6f^h*k^m + 5103$   
 $360a^7b^4c^5f^h*k^m - 5087232a^8b^2c^6e^h*1^m - 2838528a^7b^4c^5$   
 $f^g*1^m - 1843200a^8b^2c^6f^g*1^m - 1695744a^8b^2c^6g^h*j^m - 1658$   
 $880a^7b^4c^5g^h*k^1 - 1658880a^7b^4c^5e^h*1^m - 1400832a^7b^4c^5$   
 $*g^h*j^m - 663552a^8b^2c^6g^h*k^1 + 483840a^6b^6c^4f^h*k^m - 253440$   
 $*a^6b^6c^4g^h*j^m - 207360a^6b^6c^4g^h*k^1 + 161280a^6b^6c^4f^g*$   
 $1^m + 69120a^6b^6c^4e^h*1^m - 50040a^5b^8c^3f^h*k^m + 11520a^5b^8$   
 $*c^3g^h*j^m + 180a^4b^10c^2f^h*k^m + 4202496a^7b^3c^6d^j*k^1 + 635$   
 $904a^6b^5c^5d^j*k^1 - 276480a^5b^7c^4d^j*k^1 + 34560a^4b^9c^3d*$   
 $j*k^1 - 16671744a^7b^3c^6d^h*k^m + 12275712a^7b^3c^6d^g*1^m + 56770$   
 $56a^7b^3c^6e^f*1^m + 4423680a^7b^3c^6e^g*k^m + 3317760a^7b^3c^6*$   
 $e^h*k^1 + 2801664a^7b^3c^6e^h*j^m - 2709504a^6b^5c^5d^g*1^m + 25436$   
 $16a^7b^3c^6f^g*k^1 + 2506752a^7b^3c^6f^g*j^m + 1843200a^7b^3c^6*$   
 $f^h*j^1 + 1327104a^7b^3c^6g^h*j^k + 838656a^6b^5c^5f^g*j^m + 829440$   
 $*a^6b^5c^5f^g*k^1 + 783360a^6b^5c^5f^h*j^1 + 691200a^6b^5c^5g^h*$   
 $j^k + 665280a^5b^7c^4d^h*k^m + 506880a^6b^5c^5e^h*j^m + 414720a^6*$   
 $b^5c^5e^h*k^1 - 322560a^6b^5c^5e^f*1^m + 241920a^5b^7c^4d^g*1^m +$   
 $138240a^6b^5c^5e^g*k^m - 108540a^4b^9c^3d^h*k^m + 69120a^5b^7c^4$   
 $g^h*j^k - 53760a^5b^7c^4f^g*j^m - 51840a^6b^5c^5d^h*k^m - 34560a$   
 $^5b^7c^4f^g*k^1 - 23040a^5b^7c^4e^h*j^m + 18432a^5b^7c^4f^h*j^1$   
 $- 13824a^5b^7c^4e^g*k^m - 2304a^4b^9c^3f^h*j^1 + 1296a^3b^11c^2*$   
 $d^h*k^m + 31924224a^7b^2c^7d^f*k^m - 24551424a^7b^2c^7d^e*1^m + 106$   
 $16832a^7b^2c^7e^g*j^1 - 8183808a^7b^2c^7d^g*j^m - 5529600a^7b^2c$   
 $^7d^h*j^1 + 5419008a^6b^4c^6d^e*1^m + 5308416a^6b^4c^6e^g*j^1 - 50$   
 $87232a^7b^2c^7e^f*k^1 - 5013504a^7b^2c^7e^f*j^m + 4868352a^6b^4c$   
 $^6d^f*k^m - 4644864a^7b^2c^7d^g*k^1 - 3981312a^6b^4c^6d^g*k^1 - 26$   
 $54208a^7b^2c^7e^h*j^k - 2367360a^5b^6c^5d^f*k^m - 2285568a^6b^4c$   
 $^6d^g*j^m - 2211840a^6b^4c^6d^h*j^1 - 1695744a^7b^2c^7f^g*j^k - 16$   
 $77312a^6b^4c^6e^f*j^m - 1658880a^6b^4c^6e^f*k^1 - 1400832a^6b^4c$   
 $^6f^g*j^k - 1382400a^6b^4c^6e^h*j^k + 1036800a^5b^6c^5d^g*k^1 + 74$   
 $1888a^5b^6c^5d^g*j^m - 483840a^5b^6c^5d^e*1^m + 317952a^5b^6c^5*$   
 $d^h*j^1 + 268920a^4b^8c^4d^f*k^m - 253440a^5b^6c^5f^g*j^k - 138240*$   
 $a^5b^6c^5e^h*j^k + 107520a^5b^6c^5e^f*j^m - 103680a^4b^8c^4d^g*k$   
 $*1 - 80640a^4b^8c^4d^g*j^m + 69120a^5b^6c^5e^f*k^1 + 11520a^4b^8*$   
 $c^4f^g*j^k + 6912a^4b^8c^4d^h*j^1 - 6912a^3b^10c^3d^h*j^1 + 6120a$   
 $^3b^10c^3d^f*k^m - 1368a^2b^12c^2d^f*k^m - 5087232a^7b^2c^7e^g^h$   
 $*m - 2211840a^6b^4c^6f^g^h*1 - 1658880a^6b^4c^6e^g^h*m - 1105920a^7$   
 $b^2c^7f^g^h*1 - 69120a^5b^6c^5f^g^h*1 + 69120a^5b^6c^5e^g^h*m +$   
 $6912a^4b^8c^4f^g^h*1 + 7962624a^6b^3c^7d^e*k^1 - 22164480a^6b^3*$   
 $c^7d^f^h*m + 5160960a^6b^3c^7d^f*j^1 + 4571136a^6b^3c^7d^e*j^m + 4$   
 $202496a^6b^3c^7d^g*j^k + 2801664a^6b^3c^7e^f*j^k - 2073600a^5b^5*$



$$\begin{aligned}
& c^6*d*e*k*1 - 1483776*a^5*b^5*c^6*d*e*j*m + 635904*a^5*b^5*c^6*d*g*j*k + 50 \\
& 6880*a^5*b^5*c^6*e*f*j*k - 354816*a^4*b^7*c^5*d*f*j*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*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 + 4423680*a^6*b^3*c^7*e*f*h*1 + 3 \\
& 317760*a^6*b^3*c^7*e*g*h*k + 2805120*a^5*b^5*c^6*d*f*h*m + 1843200*a^6*b^3* \\
& c^7*f*g*h*j - 829440*a^5*b^5*c^6*d*g*h*1 + 783360*a^5*b^5*c^6*f*g*h*j + 437 \\
& 184*a^4*b^7*c^5*d*f*h*m + 414720*a^5*b^5*c^6*e*g*h*k - 322560*a^5*b^5*c^6*e \\
& *f*g*m - 146268*a^3*b^9*c^4*d*f*h*m + 138240*a^5*b^5*c^6*e*f*h*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 + 21150 \\
& 720*a^6*b^2*c^8*d*f*h*k - 1271808*a^5*b^4*c^7*d*e*j*k + 552960*a^4*b^6*c^6* \\
& d*e*j*k - 69120*a^3*b^8*c^5*d*e*j*k - 16588800*a^6*b^2*c^8*d*e*h*1 - 774144 \\
& 0*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 - 387072 \\
& 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
\end{aligned}$$

$$\begin{aligned}
& ^7d*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* \\
& 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 - 55 \\
& 2960*a^8*b^2*c^6*g^2*k*m - 331776*a^9*b^2*c^5*h*k*1^2 + 317952*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 + 300 \\
& 0960*a^8*b^4*c^4*f*k*m^2 - 1290240*a^9*b^2*c^5*g*j*m^2 - 1085760*a^7*b^5*c^ \\
& 4*f*k^2*m - 959040*a^6*b^5*c^5*f^2*k*m - 860160*a^8*b^4*c^4*g*j*m^2 + 82944 \\
& 0*a^8*b^3*c^5*g*k^2*1 - 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*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*
\end{aligned}$$

$$\begin{aligned}
& 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*m + 5490*a^5*b^9*c^2*f*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*1^2*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 + 4 \\
& 14720*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 - 5 \\
& 52960*a^8*b^2*c^6*g*j*k^2 - 552960*a^7*b^4*c^5*g*j*k^2 + 414720*a^6*b^5*c^5 \\
& *g^2*h*m + 319392*a^6*b^7*c^3*d*k*m^2 + 161280*a^7*b^5*c^4*e*j*m^2 - 145152 \\
& *a^6*b^6*c^4*g*j*k^2 - 85734*a^5*b^9*c^2*d*k*m^2 - 80640*a^5*b^6*c^5*f^2*j* \\
& 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 - 51425 \\
& 28*a^8*b^3*c^5*f*h*m^2 + 5068800*a^7*b^2*c^7*f^2*h*m - 3755520*a^7*b^3*c^6* \\
& f*h^2*m - 3538944*a^7*b^3*c^6*e*j^2*1 + 3000960*a^6*b^4*c^6*f^2*h*m + 26542 \\
& 08*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 - 1990656*a^7*b^4*c^5*d*k*1^2 - 1085760*a^6*b^5*c^5*f*h^2*m - 95904 \\
& 0*a^7*b^5*c^4*f*h*m^2 - 884736*a^6*b^5*c^5*e*j^2*1 + 829440*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 - 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*g^2*m - 1105920*a^7*b^4*c^5*f*h*1^2 + 11 \\
& 05920*a^7*b^3*c^6*e*j*k^2 - 921600*a^7*b^2*c^7*f*g^2*m - 829440*a^6*b^4*c^6 \\
& *g^2*h*k - 552960*a^8*b^2*c^6*f*h*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^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*
\end{aligned}$$

$$\begin{aligned}
& e*g*k^2 - 19278*a^2*b^10*c^4*d*f^2*m + 12672*a^3*b^8*c^5*f^2*g*j + 10044*a^3*b^10*c^3*d*h*k^2 + 8820*a^3*b^11*c^2*d*f*m^2 + 6912*a^4*b^7*c^5*e*h^2*j - \\
& 2304*a^3*b^8*c^5*e*f^2*l - 1620*a^2*b^11*c^3*d*h^2*k - 384*a^2*b^10*c^4*f^2*g*j + 162*a^2*b^12*c^2*d*h*k^2 - 5419008*a^5*b^3*c^8*d*e^2*m + 5308416*a^6*b^2*c^8*e*g^2*j - 5308416*a^5*b^3*c^8*e^2*g*j - 3870720*a^7*b^2*c^7*d*f*l^2 - 3538944*a^6*b^3*c^7*e*g*j^2 + 2654208*a^5*b^4*c^7*e*g^2*j - 2322432*a^6*b^2*c^8*d*g^2*k - 1990656*a^5*b^4*c^7*d*g^2*k - 1935360*a^6*b^4*c^6*d*f*l^2 + 1658880*a^6*b^3*c^7*d*h*j^2 + 1658880*a^5*b^3*c^8*e^2*f*k - 884736*a^5*b^5*c^6*e*g*j^2 + 725760*a^5*b^6*c^5*d*f*l^2 + 17418240*a^4*b^4*c^8*d^2*e*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*l^2 - 69120*a^4*b^5*c^7*e^2*f*k - 55296*a^4*b^7*c^5*d*h*j^2 - 51840*a^3*b^8*c^5*d*g^2*k + 3456*a^3*b^10*c^3*d*f*l^2 + 1152*a^3*b^9*c^4*d*h*j^2 + 1152*a^2*b^11*c^3*d*h*j^2 - 15431040*a^4*b^4*c^8*d^2*f*k - 13248000*a^5*b^3*c^8*d*f^2*k - 11612160*a^5*b^2*c^9*d^2*g*j - 10063872*a^6*b^3*c^7*d*f*k^2 - 3919104*a^3*b^6*c^7*d^2*e*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 - 1658880*a^6*b^2*c^8*e*g*h^2 - 967680*a^5*b^4*c^7*d*f*j^2 - 829440*a^5*b^4*c^7*e*g*h^2 - 207360*a^3*b^6*c^7*d*e^2*k + 64512*a^4*b^6*c^6*d*f*j^2 + 39168*a^3*b^8*c^5*d*f*j^2 - 20736*a^4*b^6*c^6*e*g*h^2 - 9216*a^2*b^10*c^4*d*f*j^2 - 4423680*a^5*b^2*c^9*e^2*f*h + 4147200*a^5*b^3*c^8*d*g^2*h - 3193344*a^3*b^5*c^8*d^2*e*j + 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 - 3919104*a^2*b^6*c^8*d^2*e*g - 7741440*a^4*b^2*c^10*d*e^2*f + 2903040*a^3*b^4*c^9*d*e^2*f - 387072*a^2*b^6*c^8*d*e^2*f - 20160*a^8*b^7*c^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 - 21600*a^7*b^7*c^2*k^3*m - 13950*a^7*b^8*c*k^2*m^2 + 430080*a^10*b*c^5*j^2*m^2 - 1984*a^6*b^9*c*j^2*m^2 - 884736*a^9*b^3*c^4*j^1^3 - 589824*a^8
\end{aligned}$$

$$\begin{aligned}
& *b^3*c^5*j^3*1 - 442368*a^8*b^5*c^3*j^1*1^3 - 294912*a^7*b^5*c^4*j^3*1 - 4915 \\
& 2*a^6*b^7*c^3*j^3*1 + 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 + 1327 \\
& 104*a^6*b^4*c^6*g^3*1 - 622080*a^8*b^3*c^5*h*k^3 - 622080*a^7*b^3*c^6*h^3*k \\
& - 326592*a^7*b^5*c^4*h*k^3 - 326592*a^6*b^5*c^5*h^3*k - 199360*a^8*b^5*c^3 \\
& *f*m^3 - 199360*a^5*b^5*c^6*f^3*m + 61920*a^7*b^7*c^2*f*m^3 + 61920*a^4*b^7 \\
& *c^5*f^3*m - 38880*a^6*b^7*c^3*h*k^3 - 38880*a^5*b^7*c^4*h^3*k - 3682*a^3*b \\
& ^9*c^4*f^3*m - 810*a^5*b^9*c^2*h*k^3 - 810*a^4*b^9*c^3*h^3*k - 70*a^3*b^12* \\
& c*f^2*m^2 + 70*a^2*b^11*c^3*f^3*m + 3870720*a^8*b*c^7*e^2*m^2 + 184320*a^8* \\
& b*c^7*h^2*j^2 - 14152320*a^4*b^4*c^8*d^3*m + 10644480*a^5*b^2*c^9*d^3*m + 5 \\
& 483520*a^9*b^2*c^5*d*m^3 + 4269888*a^3*b^6*c^7*d^3*m - 2654208*a^8*b^3*c^5* \\
& e*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 + 7430 \\
& 40*a^7*b^4*c^5*f*k^3 + 622080*a^8*b^2*c^6*f*k^3 - 607068*a^2*b^8*c^6*d^3*m \\
& - 589824*a^7*b^3*c^6*g*j^3 - 442368*a^5*b^5*c^6*g^3*j - 294912*a^6*b^5*c^5* \\
& g*j^3 + 145188*a^6*b^8*c^2*d*m^3 + 107136*a^6*b^6*c^4*f*k^3 - 49152*a^5*b^7 \\
& *c^4*g*j^3 - 32640*a^4*b^6*c^6*f^3*k - 5796*a^3*b^8*c^5*f^3*k + 540*a^5*b^8 \\
& *c^3*f*k^3 - 270*a^4*b^10*c^2*f*k^3 + 210*a^2*b^10*c^4*f^3*k + 19077120*a^4 \\
& *b^3*c^9*d^3*k + 1658880*a^7*b*c^8*e^2*k^2 + 430080*a^7*b*c^8*f^2*j^2 + 353 \\
& 8944*a^5*b^2*c^9*e^3*j - 2488320*a^7*b^3*c^6*d*k^3 - 2379456*a^3*b^5*c^8*d^ \\
& 3*k + 1179648*a^7*b^2*c^7*e*j^3 + 589824*a^6*b^4*c^6*e*j^3 + 98304*a^5*b^6* \\
& c^5*e*j^3 - 95904*a^2*b^7*c^7*d^3*k - 57024*a^6*b^5*c^5*d*k^3 + 49248*a^5*b \\
& ^7*c^4*d*k^3 - 4050*a^4*b^9*c^3*d*k^3 - 810*a^3*b^11*c^2*d*k^3 - 486*a*b^12 \\
& *c^3*d^2*k^2 + 3870720*a^6*b*c^9*d^2*j^2 - 1648128*a^5*b^3*c^8*f^3*h - 8985 \\
& 60*a^6*b^3*c^7*f*h^3 - 354240*a^5*b^5*c^6*f*h^3 - 354240*a^4*b^5*c^7*f^3*h \\
& + 43680*a^3*b^7*c^6*f^3*h - 21600*a^4*b^7*c^5*f*h^3 - 9792*a*b^11*c^4*d^2*j \\
& ^2 + 1350*a^3*b^9*c^4*f*h^3 - 1050*a^2*b^9*c^5*f^3*h + 1658880*a^6*b*c^9*e^ \\
& 2*h^2 + 16547328*a^4*b^2*c^10*d^3*h - 12306816*a^3*b^4*c^9*d^3*h + 37310976 \\
& *a^3*b^3*c^10*d^3*f + 3037824*a^2*b^6*c^8*d^3*h - 2654208*a^5*b^3*c^8*e*g^3 \\
& + 1949184*a^6*b^2*c^8*d*h^3 + 1296000*a^5*b^4*c^7*d*h^3 - 155520*a^4*b^6*c \\
& ^6*d*h^3 - 40500*a*b^10*c^5*d^2*h^2 - 8100*a^3*b^8*c^5*d*h^3 + 4050*a^2*b^1 \\
& 0*c^4*d*h^3 + 3870720*a^5*b*c^10*e^2*f^2 + 34836480*a^4*b*c^11*d^2*e^2 - 10 \\
& 8864*a*b^9*c^6*d^2*g^2 - 8068032*a^2*b^5*c^9*d^3*f - 5623296*a^4*b^3*c^9*d* \\
& f^3 + 1737792*a^3*b^5*c^8*d*f^3 - 260190*a*b^8*c^7*d^2*f^2 - 211680*a^2*b^7 \\
& *c^7*d*f^3 - 435456*a*b^7*c^8*d^2*e^2 - 245760*a^10*c^6*j^2*k*m - 384*a^6*b \\
& ^10*j*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 - 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^
\end{aligned}$$

$$\begin{aligned}
& 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*1 - 245760*a^8*c^8*f*h*j^2 - 810*b^13*c^3*d^2*h*k + 630*b^13*c^3*d^2*f* \\
& m + 18*a^2*b^14*d*h*m^2 + 2688000*a^7*c^9*d*f^2*m + 580608*a^8*c^8*d*h*k^2 \\
& - 5796*a^7*b^8*c*h*m^3 - 3456*b^12*c^4*d^2*g*j + 1890*b^12*c^4*d^2*f*k + 67 \\
& 73760*a^6*c^10*d^2*f*k - 1344000*a^10*b*c^5*f*m^3 - 1344000*a^7*b*c^8*f^3*m \\
& - 207360*a^9*b*c^6*h*k^3 - 207360*a^8*b*c^7*h^3*k - 3682*a^6*b^9*c*f*m^3 - \\
& 9289728*a^6*c^10*d*e^2*k - 1720320*a^7*c^9*d*f*j^2 - 50803200*a^5*b*c^10*d \\
& ^3*k + 6912*b^11*c^5*d^2*e*j - 10616832*a^6*b*c^9*e^3*1 - 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*1^2*m^2 + 161280*a^9*b^5*c^2*1^2*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*1^2 + 2 \\
& 07360*a^8*b^5*c^3*k^2*1^2 + 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*1^2 + 884736*a^9*b^2*c^5*j^2*1^2 + 884736*a^8 \\
& *b^4*c^4*j^2*1^2 + 221184*a^7*b^6*c^3*j^2*1^2 + 1419840*a^8*b^4*c^4*h^2*m^2 \\
& + 1387008*a^9*b^2*c^5*h^2*m^2 + 276480*a^8*b^3*c^5*j^2*k^2 + 140544*a^7*b^ \\
& 5*c^4*j^2*k^2 + 84960*a^7*b^6*c^3*h^2*m^2 + 25344*a^6*b^7*c^3*j^2*k^2 - 801 \\
& 0*a^6*b^8*c^2*h^2*m^2 + 576*a^5*b^9*c^2*j^2*k^2 + 967680*a^8*b^3*c^5*g^2*m^ \\
& 2 + 414720*a^8*b^3*c^5*h^2*1^2 + 207360*a^7*b^5*c^4*h^2*1^2 + 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*1^2 + 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 \\
& *1^2 + 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*1^2 + 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*1^2 + 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*1^2 + 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*1^2 + 7962624*a^7*b^2*c^7*e^2*1^2 - 4148928*a^6*b^4*c^6*d^2*m^2 + 141 \\
& 9840*a^6*b^4*c^6*f^2*k^2 + 1387008*a^7*b^2*c^7*f^2*k^2 - 1183392*a^5*b^6*c^ \\
& 5*d^2*m^2 + 884736*a^7*b^2*c^7*g^2*j^2 + 884736*a^6*b^4*c^6*g^2*j^2 + 64575 \\
& 0*a^4*b^8*c^4*d^2*m^2 + 221184*a^5*b^6*c^5*g^2*j^2 - 115920*a^3*b^10*c^3*d^ \\
& 2*m^2 + 84960*a^5*b^6*c^5*f^2*k^2 + 10836*a^2*b^12*c^2*d^2*m^2 - 8010*a^4*b \\
& ^8*c^4*f^2*k^2 - 180*a^3*b^10*c^3*f^2*k^2 + 9*a^2*b^12*c^2*f^2*k^2 + 870912 \\
& 0*a^6*b^3*c^7*d^2*1^2 - 4354560*a^5*b^5*c^6*d^2*1^2 + 979776*a^4*b^7*c^5*d^ \\
& 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
\end{aligned}$$

$$\begin{aligned}
& ^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 + 884736a^5b^4c^7e^2j^2 + 414720a^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^{10}c^4d^2k^2 + 5184a^4b^7c^5g^2h^2 + 1935360a^5b^3c^8d^2j^2 + 1684224a^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 + 62784a^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^5c^7f^2g^2 + 20736a^4b^5c^7e^2h^2 - 20160a^3b^7c^6f^2g^2 + 576a^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 + 461376a^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^3b^3c^{10}d^2e^2 + 3919104a^2b^5c^9d^2e^2 + 54b^{15}c^d^2k^m + 6a^b^{15}d^f^m + 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 + 5184b^{11}c^5d^2g^2 + 4096a^5b^8c^3j^4 + 11025b^{10}c^6d^2f^2 + 5644800a^5c^{11}d^2f^2 + 142560a^6b^4c^6h^4 + 103680a^7b^2c^7h^4 + 32400a^5b^6c^5h^4 + 20736b^9c^7d^2e^2 + 2025a^4b^8c^4h^4 + 331776a^5b^4c^7g^4 + 492800a^5b^2c^9f^4 + 351456a^4b^4c^8f^4 - 43120a^3b^6c^7f^4 + 1225a^2b^8c^6f^4 - 27433728a^3b^2c^{11}d^4 + 6446304a^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^4d^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 + 7077888a^6c^{10}e^3j + 786432a^8c^8e^j^3 - 43120a^9b^6c^m^4 + 28449792a^5c^{11}d^3h + 17010b^{10}c^6d^3h + 580608a^7c^9d^3h^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 + 49787136a^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) * x * (8388608a^{11}b^c^{10} - 512a^4b^{15}c^3 + 14336a^5b^{13}c^4 - 172032a^6b^{11}c^5 + 1146880a^7b^9c^6 - 4587520a^8b^7c^7 + 11010048a^9b^5c^8 - 14680064a^{10}b^3c^9) / (64 * (4096a^{10}c^7 + a^4b^{12}c - 24a^5b^{10}c^2 + 240a^6b^8c^3 - 1280a^7b^6c^4 + 3840a^8b^4c^5 - 6144a^9b^2c^6))) - (983040a^7c^9e^f + 589824a^8c^8e^k + 32768
\end{aligned}$$



$$\begin{aligned}
& 0*a^8*c^8*f*j + 196608*a^9*c^7*j*k - 3244032*a^6*b*c^9*d*e - 884736*a^7*b*c^8*e*h - 491520*a^7*b*c^8*f*g - 1081344*a^7*b*c^8*d*j - 1277952*a^8*b*c^7*e*m - 491520*a^8*b*c^7*f*l - 294912*a^8*b*c^7*g*k - 294912*a^8*b*c^7*h*j - 425984*a^9*b*c^6*j*m - 294912*a^9*b*c^6*k*l - 4608*a^2*b^9*c^5*d*e + 87552*a^3*b^7*c^6*d*e - 681984*a^4*b^5*c^7*d*e + 2433024*a^5*b^3*c^8*d*e + 2304*a^2*b^10*c^4*d*g - 43776*a^3*b^8*c^5*d*g - 1536*a^3*b^8*c^5*e*f + 340992*a^4*b^6*c^6*d*g + 39936*a^4*b^6*c^6*e*f - 1216512*a^5*b^4*c^7*d*g - 184320*a^5*b^4*c^7*e*f + 1622016*a^6*b^2*c^8*d*g - 49152*a^6*b^2*c^8*e*f + 768*a^3*b^9*c^4*f*g - 4608*a^4*b^7*c^5*e*h - 19968*a^4*b^7*c^5*f*g - 18432*a^5*b^5*c^6*e*h + 92160*a^5*b^5*c^6*f*g + 368640*a^6*b^3*c^7*e*h + 24576*a^6*b^3*c^7*f*g - 768*a^2*b^11*c^3*d*j + 13056*a^3*b^9*c^4*d*j - 84480*a^4*b^7*c^5*d*j + 178176*a^5*b^5*c^6*d*j + 270336*a^6*b^3*c^7*d*j + 2304*a^4*b^8*c^4*g*h + 9216*a^5*b^6*c^5*g*h - 184320*a^6*b^4*c^6*g*h + 442368*a^7*b^2*c^7*g*h + 2304*a^3*b^10*c^3*d*l - 256*a^3*b^10*c^3*f*j - 43776*a^4*b^8*c^4*d*l + 6144*a^4*b^8*c^4*f*j + 340992*a^5*b^6*c^5*d*l + 27648*a^5*b^6*c^5*e*k - 17408*a^5*b^6*c^5*f*j - 1216512*a^6*b^4*c^6*d*l - 184320*a^6*b^4*c^6*e*k - 69632*a^6*b^4*c^6*f*j + 1622016*a^7*b^2*c^7*d*l + 147456*a^7*b^2*c^7*e*k + 147456*a^7*b^2*c^7*f*j + 768*a^4*b^9*c^3*f*l - 768*a^4*b^9*c^3*h*j + 1536*a^5*b^7*c^4*e*m - 19968*a^5*b^7*c^4*f*l - 13824*a^5*b^7*c^4*g*k - 4608*a^5*b^7*c^4*h*j - 92160*a^6*b^5*c^5*e*m + 92160*a^6*b^5*c^5*f*l + 92160*a^6*b^5*c^5*g*k + 55296*a^6*b^5*c^5*h*j + 663552*a^7*b^3*c^6*e*m + 24576*a^7*b^3*c^6*f*l - 73728*a^7*b^3*c^6*g*k - 24576*a^7*b^3*c^6*h*j - 768*a^5*b^8*c^3*g*m + 2304*a^5*b^8*c^3*h*l + 46080*a^6*b^6*c^4*g*m + 9216*a^6*b^6*c^4*h*l - 331776*a^7*b^4*c^5*g*m - 184320*a^7*b^4*c^5*h*l + 638976*a^8*b^2*c^6*g*m + 442368*a^8*b^2*c^6*h*l + 4608*a^5*b^8*c^3*j*k - 21504*a^6*b^6*c^4*j*k - 36864*a^7*b^4*c^5*j*k + 147456*a^8*b^2*c^6*j*k + 256*a^5*b^9*c^2*j*m - 14848*a^6*b^7*c^3*j*m - 13824*a^6*b^7*c^3*k*l + 79872*a^7*b^5*c^4*j*m + 92160*a^7*b^5*c^4*k*l + 8192*a^8*b^3*c^5*j*m - 73728*a^8*b^3*c^5*k*l - 768*a^6*b^8*c^2*l*m + 46080*a^7*b^6*c^3*l*m - 331776*a^8*b^4*c^4*l*m + 638976*a^9*b^2*c^5*l*m)/(512*(4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^2 + 240*a^6*b^8*c^3 - 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6)) + (x*(25600*a^7*c^9*f^2 - 18*b^12*c^4*d^2 - 451584*a^6*c^10*d^2 - 9216*a^8*c^8*h^2 + 9216*a^9*c^7*k^2 - 2*a^4*b^12*m^2 - 25600*a^10*c^6*m^2 + 504*a*b^10*c^5*d^2 + 73728*a^6*b*c^9*e^2 + 8192*a^8*b*c^7*j^2 + 88*a^5*b^10*c*m^2 - 6228*a^2*b^8*c^6*d^2 + 42624*a^3*b^6*c^7*d^2 - 176256*a^4*b^4*c^8*d^2 + 423936*a^5*b^2*c^9*d^2 + 4608*a^4*b^5*c^7*e^2 - 36864*a^5*b^3*c^8*e^2 - 2*a^2*b^10*c^4*f^2 + 84*a^3*b^8*c^5*f^2 - 3520*a^4*b^6*c^6*f^2 + 26240*a^5*b^4*c^7*f^2 - 59904*a^6*b^2*c^8*f^2 + 1152*a^4*b^7*c^5*g^2 - 9216*a^5*b^5*c^6*g^2 + 18432*a^6*b^3*c^7*g^2 - 468*a^4*b^8*c^4*h^2 + 3456*a^5*b^6*c^5*h^2 - 5760*a^6*b^4*c^6*h^2 + 128*a^4*b^9*c^3*j^2 - 512*a^5*b^7*c^4*j^2 - 1536*a^6*b^5*c^5*j^2 + 4096*a^7*b^3*c^6*j^2 - 18*a^4*b^10*c^2*k^2 - 108*a^5*b^8*c^3*k^2 + 576*a^6*b^6*c^4*k^2 + 5760*a^7*b^4*c^5*k^2 - 23040*a^8*b^2*c^6*k^2 + 1152*a^6*b^7*c^3*l^2 - 9216*a^7*b^5*c^4*l^2 + 18432*a^8*b^3*c^5*l^2 - 1236*a^6*b^8*c^2*m^2 + 5760*a^7*b^6*c^3*m^2 - 8320*a^8*b^4*c^4*m^2 + 6144*a^9*b^2*c^5*m^2 - 129024*a^7*c^9*d*h - 215040*a^8*c^8*d*m + 30720*a^8*c^8*f*k - 30720*a^9*c^7*h*m - 12*a*b^11*
\end{aligned}$$

$$\begin{aligned}
& c^4*d*f + 218112*a^6*b*c^9*d*f + 9216*a^7*b*c^8*f*h + 156672*a^7*b*c^8*d*k \\
& + 49152*a^7*b*c^8*e*j + 25600*a^8*b*c^7*f*m + 9216*a^8*b*c^7*h*k - 12*a^4*b \\
& ^{11}*c*k*m + 21504*a^9*b*c^6*k*m + 420*a^2*b^9*c^5*d*f - 4992*a^3*b^7*c^6*d* \\
& f + 36480*a^4*b^5*c^7*d*f - 144384*a^5*b^3*c^8*d*f - 36*a^2*b^{10}*c^4*d*h + \\
& 360*a^3*b^8*c^5*d*h - 3456*a^4*b^6*c^6*d*h - 4608*a^4*b^6*c^6*e*g + 11520*a \\
& ^5*b^4*c^7*d*h + 36864*a^5*b^4*c^7*e*g + 27648*a^6*b^2*c^8*d*h - 73728*a^6* \\
& b^2*c^8*e*g - 12*a^3*b^9*c^4*f*h + 2304*a^4*b^7*c^5*f*h - 17280*a^5*b^5*c^6 \\
& *f*h + 30720*a^6*b^3*c^7*f*h + 180*a^3*b^9*c^4*d*k - 2304*a^4*b^7*c^5*d*k + \\
& 1536*a^4*b^7*c^5*e*j + 19584*a^5*b^5*c^6*d*k - 9216*a^5*b^5*c^6*e*j - 9216 \\
& 0*a^6*b^3*c^7*d*k - 168*a^4*b^8*c^4*d*m - 360*a^4*b^8*c^4*f*k - 768*a^4*b^8 \\
& *c^4*g*j + 768*a^5*b^6*c^5*d*m - 4608*a^5*b^6*c^5*e*l - 768*a^5*b^6*c^5*f*k \\
& + 4608*a^5*b^6*c^5*g*j - 11520*a^6*b^4*c^6*d*m + 36864*a^6*b^4*c^6*e*l + 2 \\
& 5344*a^6*b^4*c^6*f*k + 98304*a^7*b^2*c^7*d*m - 73728*a^7*b^2*c^7*e*l - 7372 \\
& 8*a^7*b^2*c^7*f*k - 24576*a^7*b^2*c^7*g*j - 140*a^4*b^9*c^3*f*m + 180*a^4*b \\
& ^9*c^3*h*k + 3584*a^5*b^7*c^4*f*m + 2304*a^5*b^7*c^4*g*l - 20352*a^6*b^5*c^ \\
& 5*f*m - 18432*a^6*b^5*c^5*g*l - 8064*a^6*b^5*c^5*h*k + 26624*a^7*b^3*c^6*f* \\
& m + 36864*a^7*b^3*c^6*g*l + 18432*a^7*b^3*c^6*h*k + 60*a^4*b^{10}*c^2*h*m - 1 \\
& 560*a^5*b^8*c^3*h*m + 8832*a^6*b^6*c^4*h*m - 13056*a^7*b^4*c^5*h*m + 3072*a \\
& ^8*b^2*c^6*h*m - 768*a^5*b^8*c^3*j*l + 4608*a^6*b^6*c^4*j*l - 24576*a^8*b^2 \\
& *c^6*j*l + 228*a^5*b^9*c^2*k*m + 384*a^6*b^7*c^3*k*m - 9600*a^7*b^5*c^4*k*m \\
& + 15360*a^8*b^3*c^5*k*m)/(64*(4096*a^{10}*c^7 + a^4*b^{12}*c - 24*a^5*b^{10}*c^ \\
& 2 + 240*a^6*b^8*c^3 - 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^ \\
& 6))) + (35*a^6*b^7*m^3 - 8000*a^5*c^8*f^3 - 1728*a^8*c^5*k^3 - 567*b^7*c^6* \\
& d^3 + 10368*a*b^5*c^7*d^3 + 169344*a^3*b*c^9*d^3 + 193536*a^4*c^9*d*e^2 - 1 \\
& 41120*a^4*c^9*d^2*f + 1728*a^6*b*c^6*h^3 + 315*b^8*c^5*d^2*f + 27648*a^5*c^ \\
& 8*e^2*h - 135*b^9*c^4*d^2*h + 21504*a^6*c^7*d*j^2 - 2880*a^6*c^7*f*h^2 - 84 \\
& 672*a^5*c^8*d^2*k - 1176*a^7*b^5*c*m^3 + 6400*a^9*b*c^3*m^3 + 3*a^2*b^{11}*d* \\
& m^2 + 27*b^{10}*c^3*d^2*k - 14400*a^6*c^7*f^2*k - 8640*a^7*c^6*f*k^2 + a^3*b^ \\
& ^{10}*f*m^2 + 46080*a^6*c^7*e^2*m + 3072*a^7*c^6*h*j^2 + 9*b^{11}*c^2*d^2*m - 17 \\
& 28*a^7*c^6*h^2*k - 8000*a^8*c^5*f*m^2 + 3*a^4*b^9*h*m^2 - 15*a^5*b^8*k*m^2 \\
& + 5120*a^8*c^5*j^2*m - 4800*a^9*c^4*k*m^2 - 67824*a^2*b^3*c^8*d^3 + 35*a^2* \\
& b^6*c^5*f^3 + 84*a^3*b^4*c^6*f^3 - 12720*a^4*b^2*c^7*f^3 + 540*a^4*b^5*c^4* \\
& h^3 + 4320*a^5*b^3*c^5*h^3 - 135*a^5*b^6*c^2*k^3 - 1620*a^6*b^4*c^3*k^3 - 4 \\
& 752*a^7*b^2*c^4*k^3 + 9456*a^8*b^3*c^2*m^3 - 40320*a^5*c^8*d*f*h + 129024*a \\
& ^5*c^8*d*e*j - 67200*a^6*c^7*d*f*m - 24192*a^6*c^7*d*h*k + 18432*a^6*c^7*e* \\
& h*j - 9600*a^7*c^6*f*h*m - 40320*a^7*c^6*d*k*m + 30720*a^7*c^6*e*j*m - 5760 \\
& *a^8*c^5*h*k*m - 6237*a*b^6*c^6*d^2*f + 210*a*b^7*c^5*d*f^2 + 116160*a^4*b* \\
& c^8*d*f^2 - 36864*a^4*b*c^8*e^2*f + 2430*a*b^7*c^5*d^2*h + 133056*a^4*b*c^8 \\
& *d^2*h + 27648*a^5*b*c^7*d*h^2 + 26880*a^5*b*c^7*f^2*h - 297*a*b^8*c^4*d^2* \\
& k + 46656*a^6*b*c^6*d*k^2 - 27648*a^5*b*c^7*e^2*k - 4096*a^6*b*c^6*f*j^2 - \\
& 324*a*b^9*c^3*d^2*m - 132*a^3*b^9*c*d*m^2 + 193536*a^5*b*c^7*d^2*m + 63360* \\
& a^7*b*c^5*d*m^2 - 51*a^4*b^8*c*f*m^2 + 40000*a^6*b*c^6*f^2*m + 10368*a^7*b* \\
& c^5*h*k^2 - 78*a^5*b^7*c*h*m^2 + 8064*a^7*b*c^5*h^2*m - 3072*a^7*b*c^5*j^2* \\
& k + 12480*a^8*b*c^4*h*m^2 - 90*a^5*b^7*c*k^2*m + 705*a^6*b^6*c*k*m^2 + 1555 \\
& 2*a^8*b*c^4*k^2*m + 6912*a^2*b^4*c^7*d*e^2 - 62208*a^3*b^2*c^8*d*e^2 + 4237
\end{aligned}$$

$$\begin{aligned}
& 2*a^2*b^4*c^7*d^2*f - 1764*a^2*b^5*c^6*d*f^2 - 96048*a^3*b^2*c^8*d^2*f - 46 \\
& 08*a^3*b^3*c^7*d*f^2 + 1728*a^2*b^6*c^5*d*g^2 + 2304*a^3*b^3*c^7*e^2*f - 15 \\
& 552*a^3*b^4*c^6*d*g^2 + 48384*a^4*b^2*c^7*d*g^2 - 13716*a^2*b^5*c^6*d^2*h + \\
& 405*a^2*b^7*c^4*d*h^2 + 12096*a^3*b^3*c^7*d^2*h - 5400*a^3*b^5*c^5*d*h^2 + \\
& 28944*a^4*b^3*c^6*d*h^2 + 576*a^3*b^5*c^5*f*g^2 + 6912*a^4*b^2*c^7*e^2*h - \\
& 9216*a^4*b^3*c^6*f*g^2 - 15*a^2*b^7*c^4*f^2*h + 192*a^2*b^8*c^3*d*j^2 - 36 \\
& 0*a^3*b^5*c^5*f^2*h - 960*a^3*b^6*c^4*d*j^2 + 135*a^3*b^6*c^4*f*h^2 + 15696 \\
& *a^4*b^3*c^6*f^2*h - 768*a^4*b^4*c^5*d*j^2 - 5580*a^4*b^4*c^5*f*h^2 + 14592 \\
& *a^5*b^2*c^6*d*j^2 - 20592*a^5*b^2*c^6*f*h^2 - 999*a^2*b^6*c^5*d^2*k + 27*a \\
& ^2*b^9*c^2*d*k^2 + 23004*a^3*b^4*c^6*d^2*k - 108*a^3*b^7*c^3*d*k^2 - 84240* \\
& a^4*b^2*c^7*d^2*k + 1728*a^4*b^4*c^5*g^2*h - 1404*a^4*b^5*c^4*d*k^2 + 6912* \\
& a^5*b^2*c^6*g^2*h + 14688*a^5*b^3*c^5*d*k^2 + 64*a^3*b^7*c^3*f*j^2 - 768*a^ \\
& 4*b^5*c^4*f*j^2 + 1728*a^4*b^6*c^3*d*l^2 - 3840*a^5*b^3*c^5*f*j^2 - 15552*a \\
& ^5*b^4*c^4*d*l^2 + 48384*a^6*b^2*c^5*d*l^2 + 3717*a^2*b^7*c^4*d^2*m + 3*a^2 \\
& *b^8*c^3*f^2*k - 15192*a^3*b^5*c^5*d^2*m + 135*a^3*b^6*c^4*f^2*k + 9*a^3*b^ \\
& 8*c^2*f*k^2 - 7920*a^4*b^3*c^6*d^2*m - 2988*a^4*b^4*c^5*f^2*k - 99*a^4*b^6* \\
& c^3*f*k^2 + 2079*a^4*b^7*c^2*d*m^2 - 28272*a^5*b^2*c^6*f^2*k - 4500*a^5*b^4 \\
& *c^4*f*k^2 - 14448*a^5*b^5*c^3*d*m^2 - 20304*a^6*b^2*c^5*f*k^2 + 37104*a^6* \\
& b^3*c^4*d*m^2 + 192*a^4*b^6*c^3*h*j^2 + 2304*a^5*b^2*c^6*e^2*m - 6912*a^5*b \\
& ^3*c^5*g^2*k + 1536*a^5*b^4*c^4*h*j^2 + 576*a^5*b^5*c^3*f*l^2 + 3840*a^6*b^ \\
& 2*c^5*h*j^2 - 9216*a^6*b^3*c^4*f*l^2 + a^2*b^9*c^2*f^2*m + 20*a^3*b^7*c^3*f \\
& ^2*m - 1596*a^4*b^5*c^4*f^2*m - 243*a^4*b^6*c^3*h^2*k + 27*a^4*b^7*c^2*h*k^ \\
& 2 + 16736*a^5*b^3*c^5*f^2*m - 5940*a^5*b^4*c^4*h^2*k + 1728*a^5*b^5*c^3*h*k \\
& ^2 + 875*a^5*b^6*c^2*f*m^2 - 13392*a^6*b^2*c^5*h^2*k + 10800*a^6*b^3*c^4*h* \\
& k^2 - 2716*a^6*b^4*c^3*f*m^2 - 39600*a^7*b^2*c^4*f*m^2 + 576*a^5*b^4*c^4*g^ \\
& 2*m + 11520*a^6*b^2*c^5*g^2*m + 1728*a^6*b^4*c^3*h*l^2 + 6912*a^7*b^2*c^4*h \\
& *l^2 - 81*a^4*b^7*c^2*h^2*m + 720*a^5*b^5*c^3*h^2*m - 768*a^5*b^5*c^3*j^2*k \\
& + 17136*a^6*b^3*c^4*h^2*m - 3072*a^6*b^3*c^4*j^2*k - 900*a^6*b^5*c^2*h*m^2 \\
& + 22272*a^7*b^3*c^3*h*m^2 + 64*a^5*b^6*c^2*j^2*m + 1536*a^6*b^4*c^3*j^2*m \\
& + 5376*a^7*b^2*c^4*j^2*m - 6912*a^7*b^3*c^3*k*l^2 + 1260*a^6*b^5*c^2*k^2*m \\
& + 13248*a^7*b^3*c^3*k^2*m - 6084*a^7*b^4*c^2*k*m^2 - 26256*a^8*b^2*c^3*k*m^ \\
& 2 + 576*a^7*b^4*c^2*l^2*m + 11520*a^8*b^2*c^3*l^2*m - 193536*a^4*b*c^8*d*e* \\
& g - 90*a*b^8*c^4*d*f*h - 27648*a^5*b*c^7*e*g*h + 18*a*b^9*c^3*d*f*k - 19353 \\
& 6*a^5*b*c^7*d*e*l + 147456*a^5*b*c^7*d*f*k - 64512*a^5*b*c^7*d*g*j - 24576* \\
& a^5*b*c^7*e*f*j + 6*a*b^10*c^2*d*f*m + 84096*a^6*b*c^6*d*h*m - 46080*a^6*b* \\
& c^6*e*g*m - 27648*a^6*b*c^6*e*h*l + 33408*a^6*b*c^6*f*h*k - 9216*a^6*b*c^6* \\
& g*h*j - 64512*a^6*b*c^6*d*j*l - 18432*a^6*b*c^6*e*j*k + 18*a^2*b^10*c*d*k*m \\
& + 6*a^3*b^9*c*f*k*m - 46080*a^7*b*c^5*e*l*m + 49920*a^7*b*c^5*f*k*m - 1536 \\
& 0*a^7*b*c^5*g*j*m - 9216*a^7*b*c^5*h*j*l + 18*a^4*b^8*c*h*k*m - 15360*a^8*b \\
& *c^4*j*l*m - 6912*a^2*b^5*c^6*d*e*g + 62208*a^3*b^3*c^7*d*e*g - 270*a^2*b^6 \\
& *c^5*d*f*h + 16056*a^3*b^4*c^6*d*f*h - 2304*a^3*b^4*c^6*e*f*g - 127008*a^4* \\
& b^2*c^7*d*f*h + 36864*a^4*b^2*c^7*e*f*g + 2304*a^2*b^6*c^5*d*e*j - 16128*a^ \\
& 3*b^4*c^6*d*e*j + 23040*a^4*b^2*c^7*d*e*j - 6912*a^4*b^3*c^6*e*g*h + 306*a^ \\
& 2*b^7*c^4*d*f*k - 1152*a^2*b^7*c^4*d*g*j - 6912*a^3*b^5*c^5*d*e*l - 5328*a^ \\
& 3*b^5*c^5*d*f*k + 8064*a^3*b^5*c^5*d*g*j + 768*a^3*b^5*c^5*e*f*j + 62208*a^
\end{aligned}$$

$$\begin{aligned}
& 4*b^3*c^6*d*e*1 + 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*1 + 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*1 - 1944*a \\
& ^4*b^4*c^5*d*h*k - 2304*a^4*b^4*c^5*e*f*1 + 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*1 - 872 \\
& 64*a^5*b^2*c^6*d*h*k + 36864*a^5*b^2*c^6*e*f*1 + 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*1 + 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*1 - \\
& 18432*a^5*b^3*c^5*f*g*1 + 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*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*1 - 57504*a^6*b^2*c^5*f*h*m \\
& + 13824*a^6*b^2*c^5*g*h*1 - 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*m + \\
& 5376*a^5*b^4*c^4*f*j*1 + 4608*a^5*b^4*c^4*g*j*k - 114336*a^6*b^2*c^5*d*k*m \\
& + 16896*a^6*b^2*c^5*e*j*m + 27648*a^6*b^2*c^5*e*k*1 + 12288*a^6*b^2*c^5*f*j \\
& *1 + 9216*a^6*b^2*c^5*g*j*k - 186*a^4*b^7*c^2*f*k*m - 384*a^5*b^5*c^3*g*j*m \\
& - 1152*a^5*b^5*c^3*h*j*1 - 2304*a^6*b^3*c^4*e*1*m + 31584*a^6*b^3*c^4*f*k* \\
& m - 8448*a^6*b^3*c^4*g*j*m - 13824*a^6*b^3*c^4*g*k*1 - 6912*a^6*b^3*c^4*h*j \\
& *1 + 342*a^5*b^6*c^2*h*k*m + 1152*a^6*b^4*c^3*g*1*m - 12600*a^6*b^4*c^3*h*k \\
& *m + 23040*a^7*b^2*c^4*g*1*m - 37728*a^7*b^2*c^4*h*k*m + 4608*a^6*b^4*c^3*j \\
& *k*1 + 9216*a^7*b^2*c^4*j*k*1 - 384*a^6*b^5*c^2*j*1*m - 8448*a^7*b^3*c^3*j* \\
& 1*m)/(512*(4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^2 + 240*a^6*b^8*c^3 - \\
& 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6)) + (x*(13824*a^4*c \\
& ^9*e^3 + 512*a^7*c^6*j^3 - 54*b^7*c^6*d^2*e + 27*b^8*c^5*d^2*g + 13824*a^5* \\
& c^8*e^2*j + 4608*a^6*c^7*e*j^2 - 9*b^9*c^4*d^2*j + a^4*b^9*j*m^2 - 3*a^5*b^ \\
& 8*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*1^3 - 20160*a^4*c^9*d*e*f - 2880*a^ \\
& 5*c^8*e*f*h - 12096*a^5*c^8*d*e*k - 6720*a^5*c^8*d*f*j - 4800*a^6*c^7*e*f*m \\
& - 1728*a^6*c^7*e*h*k - 960*a^6*c^7*f*h*j - 4032*a^6*c^7*d*j*k - 2880*a^7*c \\
& ^6*e*k*m - 1600*a^7*c^6*f*j*m - 576*a^7*c^6*h*j*k - 960*a^8*c^5*j*k*m + 972 \\
& *a*b^5*c^7*d^2*e + 24192*a^3*b*c^9*d^2*e - 486*a*b^6*c^6*d^2*g + 6240*a^4*b \\
& *c^8*e*f^2 - 20736*a^4*b*c^8*e^2*g + 1728*a^5*b*c^7*e*h^2 + 144*a*b^7*c^5*d \\
& ^2*j + 8064*a^4*b*c^8*d^2*j + 27*a*b^8*c^4*d^2*1 + 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*1 - 2304*a^6*b*c^6*g*j^2 + 576*a^ \\
& 6*b*c^6*h^2*j + 3840*a^7*b*c^5*e*m^2 - 3*a^4*b^8*c*g*m^2 + 864*a^7*b*c^5*j* \\
& k^2 - 2304*a^7*b*c^5*j^2*1 - 32*a^5*b^7*c*j*m^2 + 1280*a^8*b*c^4*j*m^2 + 10 \\
& 2*a^6*b^6*c*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
\end{aligned}$$

$$\begin{aligned}
& ^5g^h^2 + 4608a^5b^2c^6e^j^2 - 864a^5b^2c^6g^h^2 - 486a^2b^6c^5 \\
& *d^2*1 - a^2b^7c^4f^2*j + 3672a^3b^4c^6d^2*1 + 30a^3b^5c^5f^2*j \\
& - 12096a^4b^2c^7d^2*1 + 1104a^4b^3c^6f^2*j + 54a^4b^5c^4e^k^2 + \\
& 864a^5b^3c^5e^k^2 + 1728a^4b^4c^5g^2*j - 576a^4b^5c^4g*j^2 + 3 \\
& 456a^5b^2c^6g^2*j - 2304a^5b^3c^5g*j^2 + 10368a^6b^2c^5e^1^2 + \\
& 3a^3b^6c^4f^2*1 - 96a^4b^4c^5f^2*1 + 216a^4b^5c^4h^2*j - 27a^4 \\
& *b^6c^3g*k^2 + 6a^4b^7c^2e^m^2 - 3120a^5b^2c^6f^2*1 + 720a^5b^3 \\
& *c^5h^2*j - 432a^5b^4c^4g*k^2 - 204a^5b^5c^3e^m^2 - 1296a^6b^2c \\
& ^5g*k^2 + 1488a^6b^3c^4e^m^2 - 5184a^5b^3c^5g^2*1 - 5184a^6b^3c \\
& ^4g*1^2 - 648a^5b^4c^4h^2*1 + 102a^5b^6c^2g*m^2 - 864a^6b^2c^5 \\
& h^2*1 - 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^2*1 - \\
& 2304a^6b^3c^4j^2*1 + 1728a^6b^4c^3j*1^2 + 3456a^7b^2c^4j*1^2 - \\
& 27a^5b^6c^2k^2*1 - 432a^6b^4c^3k^2*1 + 180a^6b^5c^2j*m^2 - 129 \\
& 6a^7b^2c^4k^2*1 + 1136a^7b^3c^3j*m^2 - 744a^7b^4c^2*1*m^2 - 1920 \\
& *a^8b^2c^3*1*m^2 - 36a*b^6c^6d*e*f + 18a*b^7c^5d*f*g + 15552a^4b* \\
& c^8d*e*h + 10080a^4b*c^8d*f*g - 6a*b^8c^4d*f*j + 1440a^5b*c^7f*g* \\
& h + 21888a^5b*c^7d*e*m + 10080a^5b*c^7d*f*1 + 6048a^5b*c^7d*g*k + \\
& 5184a^5b*c^7d*h*j + 8064a^5b*c^7e*f*k - 13824a^5b*c^7e*g*j + 5184* \\
& a^6b*c^6e*h*m + 2400a^6b*c^6f*g*m + 1440a^6b*c^6f*h*1 + 864a^6b*c \\
& ^6g*h*k + 7296a^6b*c^6d*j*m + 6048a^6b*c^6d*k*1 - 13824a^6b*c^6e* \\
& j*1 + 2688a^6b*c^6f*j*k + 2400a^7b*c^5f*1*m + 1440a^7b*c^5g*k*m + \\
& 1728a^7b*c^5h*j*m + 864a^7b*c^5h*k*1 + 6a^4b^8c*j*k*m - 18a^5b^7 \\
& *c*k*1*m + 1440a^8b*c^4k*1*m + 900a^2b^4c^7d*e*f - 4896a^3b^2c^8 \\
& d*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 + 1 \\
& 8a^3b^5c^5f*g*h + 3024a^4b^3c^6f*g*h + 18a^2b^7c^4d*f*1 - 18a^ \\
& 2b^7c^4d*h*j - 450a^3b^5c^5d*f*1 - 270a^3b^5c^5d*g*k - 36a^3b^ \\
& 5c^5d*h*j - 2016a^4b^3c^6d*e*m + 2448a^4b^3c^6d*f*1 + 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*1 - 6a^3b^6c^4f*h*j + 1008a^4b^4c^5 \\
& *d*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*1 - 7392a^5b^2c^6e*f*m + 20736a^5b^2c^6e*g*1 - 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*1 + 270a^4b^5c^4g*h*k + \\
& 2880a^5b^3c^5e*h*m + 3696a^5b^3c^5f*g*m + 3024a^5b^3c^5f*h*1 + \\
& 2160a^5b^3c^5g*h*k - 336a^4b^5c^4d*j*m - 270a^4b^5c^4d*k*1 + 24 \\
& 0a^4b^5c^4f*j*k + 2976a^5b^3c^5d*j*m + 3024a^5b^3c^5d*k*1 - 691 \\
& 2a^5b^3c^5e*j*1 + 1824a^5b^3c^5f*j*k + 90a^4b^6c^3g*h*m - 1440* \\
& a^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*1*m - 324a^5b^4
\end{aligned}$$

$$\begin{aligned}
& *c^4*ekm - 1092*a^5*b^4*c^4*f*j*m - 720*a^5*b^4*c^4*f*k*l + 3456*a^5*b^4*c^4*g*j*l - 900*a^5*b^4*c^4*h*j*k - 10944*a^6*b^2*c^5*d*1*m - 5472*a^6*b^2*c^5*ekm - 3264*a^6*b^2*c^5*f*j*m - 4032*a^6*b^2*c^5*f*k*l + 6912*a^6*b^2*c^5*g*j*l - 1728*a^6*b^2*c^5*h*j*k - 18*a^4*b^7*c^2*g*k*m - 30*a^4*b^7*c^2*h*j*m - 210*a^5*b^5*c^3*f*1*m + 162*a^5*b^5*c^3*g*k*m + 420*a^5*b^5*c^3*h*j*m + 270*a^5*b^5*c^3*h*k*l + 3696*a^6*b^3*c^4*f*1*m + 2736*a^6*b^3*c^4*g*k*m + 1824*a^6*b^3*c^4*h*j*m + 2160*a^6*b^3*c^4*h*k*l + 90*a^5*b^6*c^2*h*1*m - 1440*a^6*b^4*c^3*h*1*m - 2592*a^7*b^2*c^4*h*1*m - 42*a^5*b^6*c^2*j*k*m - 1020*a^6*b^4*c^3*j*k*m - 2304*a^7*b^2*c^4*j*k*m + 162*a^6*b^5*c^2*k*1*m + 2736*a^7*b^3*c^3*k*1*m)) / (64*(4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^2 + 240*a^6*b^8*c^3 - 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6)) *root(56371445760*a^11*b^8*c^9*z^4 - 503316480*a^8*b^14*c^6*z^4 + 47185920*a^7*b^16*c^5*z^4 - 2621440*a^6*b^18*c^4*z^4 + 65536*a^5*b^20*c^3*z^4 - 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*b^7*c^8*e*g*z^2 - 37355520*a^9*b^7*c^6*h*m*z^2 + 125829120*a^8*b^6*c^8*e*j*z^2 + 23101440*a^8*b^9*c^5*h*m*z^2 - 3538944*a^7*b^11*c^4*j*1*z^2 + 196608*a^6*b^13*c^3*j*1*z^2 - 4349952*a^7*b^11*c^4*h*m*z^2 + 337920*a^6*b^13*c^3*h*m*z^2 - 7680*a^5*b^15*c^2*h*m*z^2 - 62914560*a^8*b^7*c^7*g*j*z^2 - 26542080*a^8*b^8*c^6*h*k*z^2 + 17940480*a^7*b^10*c^5*f*m*z^2 + 11796480*a^7*b^10*c^5*g*1*z^2 - 37355520*a^8*b^7*c^7*f*k*z^2 - 1347584*a^6*b^12*c^4*f*m*z^2 + 68272128*a^6*b^10*c^6*d*k*z^2 - 589824*a^6*b
\end{aligned}$$

$$\begin{aligned}
& ^{12}c^4g^1z^2 + 552960a^6b^{12}c^4h^kz^2 - 147456a^7b^{10}c^5h^kz^2 \\
& - 46080a^5b^{14}c^3h^kz^2 + 35840a^5b^{14}c^3f^mz^2 + 23592960a^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 - 51609600a^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^gz^2 + 1179648a^5b^{11}c^6e^gz^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^gz^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 + 1761607680a^{10}c^{12}d^fz^2 - 14080a^6b^{15}c^m^2z^2 - 94464a^b^{17}c^4d^2z^2 + 6936330240a^8b^3c^{11}d^2z^2 \\
& + 2464874496a^6b^7c^9d^2z^2 - 3963617280a^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 + 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^{11}b^3c^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 - 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^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 - 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^7
\end{aligned}$$

$$\begin{aligned}
& *f^2*z^2 + 23592960*a^6*b^8*c^8*e^2*z^2 - 2600960*a^5*b^{11}*c^6*f^2*z^2 + 29 \\
& 1840*a^4*b^{13}*c^5*f^2*z^2 - 14080*a^3*b^{15}*c^4*f^2*z^2 + 256*a^2*b^{17}*c^3*f \\
& ^2*z^2 - 19860480*a^3*b^{13}*c^6*d^2*z^2 - 1179648*a^5*b^{10}*c^7*e^2*z^2 + 177 \\
& 1776*a^2*b^{15}*c^5*d^2*z^2 - 440401920*a^{13}*b*c^8*m^2*z^2 + 1207959552*a^{10}* \\
& c^{12}*e^2*z^2 + 134217728*a^{12}*c^{10}*j^2*z^2 + 256*a^5*b^{17}*m^2*z^2 + 2304*b^ \\
& 19*c^3*d^2*z^2 - 23592960*a^{10}*b*c^8*f*k*l*z + 99090432*a^9*b*c^9*d*h*l*z + \\
& 9437184*a^{10}*b*c^8*e*k*m*z + 23592960*a^{10}*b*c^8*g*h*m*z + 141557760*a^8*b \\
& *c^{10}*d*e*k*z + 47185920*a^9*b*c^9*d*j*k*z - 23592960*a^9*b*c^9*f*g*k*z + 1 \\
& 69869312*a^7*b*c^{11}*d*e*f*z + 99090432*a^8*b*c^{10}*d*g*h*z - 3145728*a^9*b*c \\
& ^9*f*h*j*z + 56623104*a^8*b*c^{10}*d*f*j*z + 1536*a*b^{15}*c^3*d*f*j*z - 943718 \\
& 4*a^8*b*c^{10}*e*f*h*z - 4608*a*b^{14}*c^4*d*f*g*z + 9216*a*b^{13}*c^5*d*e*f*z + \\
& 412876800*a^8*b^2*c^9*d*e*m*z - 206438400*a^9*b^3*c^7*d*l*m*z + 5898240*a^1 \\
& 0*b^4*c^5*k*l*m*z - 206438400*a^8*b^3*c^8*d*g*m*z - 4718592*a^{11}*b^2*c^6*k* \\
& l*m*z - 2949120*a^9*b^6*c^4*k*l*m*z + 737280*a^8*b^8*c^3*k*l*m*z - 92160*a^ \\
& 7*b^{10}*c^2*k*l*m*z + 103219200*a^8*b^5*c^6*d*l*m*z - 29491200*a^{10}*b^3*c^6* \\
& h*l*m*z - 206438400*a^7*b^4*c^8*d*e*m*z - 2359296*a^{10}*b^3*c^6*j*k*m*z + 49 \\
& 1520*a^8*b^7*c^4*j*k*m*z - 184320*a^7*b^9*c^3*j*k*m*z + 27648*a^6*b^{11}*c^2* \\
& j*k*m*z + 14745600*a^9*b^5*c^5*h*l*m*z - 3686400*a^8*b^7*c^4*h*l*m*z + 4608 \\
& 00*a^7*b^9*c^3*h*l*m*z - 23040*a^6*b^{11}*c^2*h*l*m*z + 88473600*a^8*b^4*c^7* \\
& d*k*l*z + 82575360*a^9*b^2*c^8*d*j*m*z + 11796480*a^{10}*b^2*c^7*h*j*m*z + 58 \\
& 98240*a^9*b^4*c^6*g*k*m*z - 4718592*a^{10}*b^2*c^7*g*k*m*z - 70778880*a^9*b^2 \\
& *c^8*d*k*l*z - 2949120*a^8*b^6*c^5*g*k*m*z - 2457600*a^8*b^6*c^5*h*j*m*z + \\
& 921600*a^7*b^8*c^4*h*j*m*z + 737280*a^7*b^8*c^4*g*k*m*z - 138240*a^6*b^{10}*c \\
& ^3*h*j*m*z - 92160*a^6*b^{10}*c^3*g*k*m*z + 7680*a^5*b^{12}*c^2*h*j*m*z + 4608* \\
& a^5*b^{12}*c^2*g*k*m*z + 29491200*a^9*b^3*c^7*f*k*l*z - 176947200*a^7*b^3*c^9 \\
& *d*e*k*z - 109707264*a^8*b^3*c^8*d*h*l*z - 25804800*a^7*b^7*c^5*d*l*m*z + 1 \\
& 03219200*a^7*b^5*c^7*d*g*m*z + 219414528*a^7*b^2*c^{10}*d*e*h*z - 14745600*a^ \\
& 8*b^5*c^6*f*k*l*z - 29491200*a^9*b^3*c^7*g*h*m*z - 11796480*a^9*b^3*c^7*e*k \\
& *m*z - 44236800*a^7*b^6*c^6*d*k*l*z + 58982400*a^9*b^2*c^8*e*h*m*z + 589824 \\
& 0*a^8*b^5*c^6*e*k*m*z + 3686400*a^7*b^7*c^5*f*k*l*z + 3225600*a^6*b^9*c^4*d \\
& *l*m*z - 1474560*a^7*b^7*c^5*e*k*m*z - 460800*a^6*b^9*c^4*f*k*l*z + 184320* \\
& a^6*b^9*c^4*e*k*m*z - 161280*a^5*b^{11}*c^3*d*l*m*z + 23040*a^5*b^{11}*c^3*f*k* \\
& l*z - 9216*a^5*b^{11}*c^3*e*k*m*z + 14745600*a^8*b^5*c^6*g*h*m*z + 110886912* \\
& a^7*b^4*c^8*d*f*l*z - 3686400*a^7*b^7*c^5*g*h*m*z - 221773824*a^6*b^3*c^{10}* \\
& d*e*f*z + 460800*a^6*b^9*c^4*g*h*m*z - 17203200*a^7*b^6*c^6*d*j*m*z - 23040 \\
& *a^5*b^{11}*c^3*g*h*m*z - 29491200*a^8*b^4*c^7*e*h*m*z - 11796480*a^9*b^2*c^8 \\
& *f*j*k*z + 11059200*a^6*b^8*c^5*d*k*l*z + 6451200*a^6*b^8*c^5*d*j*m*z + 884 \\
& 73600*a^7*b^4*c^8*d*g*k*z + 2457600*a^7*b^6*c^6*f*j*k*z - 35389440*a^8*b^3* \\
& c^8*d*j*k*z - 1382400*a^5*b^{10}*c^4*d*k*l*z - 84934656*a^8*b^2*c^9*d*f*l*z - \\
& 967680*a^5*b^{10}*c^4*d*j*m*z - 921600*a^6*b^8*c^5*f*j*k*z + 138240*a^5*b^{10} \\
& *c^4*f*j*k*z + 69120*a^4*b^{12}*c^3*d*k*l*z + 53760*a^4*b^{12}*c^3*d*j*m*z - 76 \\
& 80*a^4*b^{12}*c^3*f*j*k*z + 44236800*a^7*b^5*c^7*d*h*l*z + 7372800*a^7*b^6*c^ \\
& 6*e*h*m*z - 5898240*a^8*b^4*c^7*f*h*l*z + 4718592*a^9*b^2*c^8*f*h*l*z - 707 \\
& 78880*a^8*b^2*c^9*d*g*k*z + 2949120*a^7*b^6*c^6*f*h*l*z - 921600*a^6*b^8*c^ \\
& 5*e*h*m*z - 737280*a^6*b^8*c^5*f*h*l*z + 92160*a^5*b^{10}*c^4*f*h*l*z + 46080
\end{aligned}$$



$a^5b^{10}c^4e^hmz - 4608a^4b^{12}c^3f^h*1z + 29491200a^8b^3c^8f^g*kz - 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*1z + 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 - 14745600a^7b^5c^7f^g*k*z - 44236800a^6b^6c^7d^g*k*z - 6635520a^6b^7c^6d^h*1z + 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*1z + 184320a^5b^9c^5f^h*j*z + 179712a^4b^{11}c^4d^h*1z - 161280a^4b^{11}c^4d^g*m*z - 27648a^4b^{11}c^4f^h*j*z + 23040a^4b^{11}c^4f^g*k*z - 13824a^3b^{13}c^3d^h*1z + 1536a^3b^{13}c^3f^h*j*z + 2949120a^7b^4c^8e^f*k*z + 110886912a^6b^4c^9d^f*g*z + 16220160a^5b^8c^6d^f*1z - 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^{10}c^5d^f*1z - 1382400a^4b^{10}c^5d^g*k*z - 84934656a^7b^2c^{10}d^f*g*z + 921600a^5b^8c^6e^f*k*z + 117964800a^5b^5c^9d^e*f*z + 322560a^4b^{10}c^5d^e*m*z + 175104a^3b^{12}c^4d^f*1z + 69120a^3b^{12}c^4d^g*k*z - 50688a^3b^{12}c^4d^h*j*z - 46080a^4b^{10}c^5e^f*k*z - 27648a^4b^{10}c^5d^h*j*z + 4608a^2b^{14}c^3d^h*j*z - 4608a^2b^{14}c^3d^f*1z + 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^{10}c^5f^g*h*z - 4608a^3b^{12}c^4f^g*h*z + 8847360a^5b^7c^7d^f*j*z - 58982400a^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^{11}c^5d^f*j*z - 138240a^3b^{11}c^5d^e*k*z - 55296a^2b^{13}c^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^{11}c^5d^g*h*z - 13824a^2b^{13}c^4d^g*h*z + 9216a^3b^{11}c^5e^f*h*z + 16220160a^4b^8c^7d^f*g*z + 13271040a^5b^6c^8d^e*h*z - 2396160a^3b^{10}c^6d^f*g*z + 552960a^4b^8c^7d^e*h*z - 359424a^3b^{10}c^6d^e*h*z + 175104a^2b^{12}c^5d^f*g*z + 27648a^2b^{12}c^5d^e*h*z - 32440320a^4b^7c^8d^e*f*z + 4792320a^3b^9c^7d^e*f*z - 350208a^2b^{11}c^6d^e*f*z + 165150720a^{10}b^c^8d^l*m*z + 4608a^6b^{12}c^k*1*m*z + 23592960a^{11}b^c^7h*1*m*z + 3145728a^{11}b^c^7j*k*m*z - 1536a^5b^{13}c^j*k*m*z + 165150720a^9b^c^9d^g*m*z + 346816512a^7b^c^{11}d^2g*z + 19660800a^{12}b^c^6l*m^2*z - 34560a^7b^{11}c^l*m^2*z - 7077888a^{11}b^c^7k^2l*z + 11008a^6b^{12}c^j*m^2*z + 19660800a^{11}b^c^7g*m^2*z + 7077888a^{10}b^c^8h^2l*z + 768a^5b^{13}c^g*m^2*z - 19660800a^9b^c^9f^2l*z - 7077888a^{10}b^c^8g*k^2*z - 6912a^b^{15}c^3d^2l*z + 7077888a^9b^c^9g^h^2*z - 19660800a^8b^c^{10}f^2g*z - 66816a^b^{14}c^4d^2j*z + 214272a^b^{13}c^5d^2g*z - 428544a^b^{12}c^6d^2e*z - 330301440a^9c^{10}d^e*m*z - 110100480a^{10}c^9d^j*m*z - 15728640a^{11}c^8h*j*m*z -$

$47185920a^{10}c^9e^h*m*z - 198180864a^8c^{11}d^e*h*z + 15728640a^{10}c^9f*j*k*z - 66060288a^9c^{10}d^h*j*z + 47185920a^9c^{10}e^f*k*z + 1022754816a^6b^2c^{11}d^2e*z - 642318336a^5b^4c^{10}d^2e*z - 511377408a^7b^3c^9d^2l*z - 511377408a^6b^3c^{10}d^2g*z + 321159168a^6b^5c^8d^2l*z + 321159168a^5b^5c^9d^2g*z + 225312768a^7b^2c^{10}d^2j*z - 25362432a^{11}b^3c^5l^m^2*z + 13271040a^{10}b^5c^4l^m^2*z - 3563520a^9b^7c^3l^m^2*z + 506880a^8b^9c^2l^m^2*z + 10354688a^{11}b^2c^6j^m^2*z + 8847360a^{10}b^3c^6k^2l^m^2*z - 4423680a^9b^5c^5k^2l^m^2*z - 2048000a^9b^6c^4j^m^2*z + 1105920a^8b^7c^4k^2l^m^2*z + 849920a^8b^8c^3j^m^2*z - 393216a^{10}b^4c^5j^m^2*z - 145920a^7b^10c^2j^m^2*z - 138240a^7b^9c^3k^2l^m^2*z + 6912a^6b^11c^2k^2l^m^2*z - 111697920a^5b^7c^7d^2l^m^2*z + 223395840a^4b^6c^9d^2e*z - 25362432a^{10}b^3c^6g^m^2*z - 3538944a^{10}b^2c^7j^k^2*z + 737280a^8b^6c^5j^k^2*z + 50724864a^{10}b^2c^7e^m^2*z - 276480a^7b^8c^4j^k^2*z + 41472a^6b^10c^3j^k^2*z - 2304a^5b^12c^2j^k^2*z + 13271040a^9b^5c^5g^m^2*z - 8847360a^9b^3c^7h^2l^m^2*z + 4423680a^8b^5c^6h^2l^m^2*z - 3563520a^8b^7c^4g^m^2*z - 1105920a^7b^7c^5h^2l^m^2*z + 506880a^7b^9c^3g^m^2*z + 138240a^6b^9c^4h^2l^m^2*z - 34560a^6b^11c^2g^m^2*z - 6912a^5b^11c^3h^2l^m^2*z - 26542080a^9b^4c^6e^m^2*z + 25362432a^8b^3c^8f^2l^m^2*z - 13271040a^7b^5c^7f^2l^m^2*z + 8847360a^9b^3c^7g^k^2*z + 7127040a^8b^6c^5e^m^2*z - 4423680a^8b^5c^6g^k^2*z + 3563520a^6b^7c^6f^2l^m^2*z + 3538944a^9b^2c^8h^2j^m^2*z + 1105920a^7b^7c^5g^k^2*z - 1013760a^7b^8c^4e^m^2*z - 737280a^7b^6c^6h^2j^m^2*z - 506880a^5b^9c^5f^2l^m^2*z + 276480a^6b^8c^5h^2j^m^2*z - 138240a^6b^9c^4g^k^2*z + 69120a^6b^10c^3e^m^2*z - 41472a^5b^10c^4h^2j^m^2*z + 34560a^4b^11c^4f^2l^m^2*z + 6912a^5b^11c^3g^k^2*z + 2304a^4b^12c^3h^2j^m^2*z - 1536a^5b^12c^2e^m^2*z - 768a^3b^13c^3f^2l^m^2*z - 111697920a^4b^7c^8d^2g^m^2*z + 23362560a^4b^9c^6d^2l^m^2*z - 17694720a^9b^2c^8e^k^2*z - 10354688a^8b^2c^9f^2j^m^2*z - 43646976a^6b^4c^9d^2j^m^2*z + 8847360a^8b^4c^7e^k^2*z - 2965248a^3b^11c^5d^2l^m^2*z - 2211840a^7b^6c^6e^k^2*z + 2048000a^6b^6c^7f^2j^m^2*z - 849920a^5b^8c^6f^2j^m^2*z + 393216a^7b^4c^8f^2j^m^2*z + 276480a^6b^8c^5e^k^2*z + 214272a^2b^13c^4d^2l^m^2*z + 145920a^4b^10c^5f^2j^m^2*z - 13824a^5b^10c^4e^k^2*z - 11008a^3b^12c^4f^2j^m^2*z + 256a^2b^14c^3f^2j^m^2*z - 32587776a^5b^6c^8d^2j^m^2*z - 8847360a^8b^3c^8g^h^2*z + 21657600a^4b^8c^7d^2j^m^2*z + 4423680a^7b^5c^7g^h^2*z - 1105920a^6b^7c^6g^h^2*z + 138240a^5b^9c^5g^h^2*z - 6912a^4b^11c^4g^h^2*z + 25362432a^7b^3c^9f^2g^m^2*z - 5810688a^3b^10c^6d^2j^m^2*z + 17694720a^8b^2c^9e^h^2*z + 845568a^2b^12c^5d^2j^m^2*z - 50724864a^7b^2c^10e^f^2*z - 13271040a^6b^5c^8f^2g^m^2*z - 8847360a^7b^4c^8e^h^2*z + 3563520a^5b^7c^7f^2g^m^2*z + 2211840a^6b^6c^7e^h^2*z - 506880a^4b^9c^6f^2g^m^2*z - 276480a^5b^8c^6e^h^2*z + 34560a^3b^11c^5f^2g^m^2*z + 13824a^4b^10c^5e^h^2*z - 768a^2b^13c^4f^2g^m^2*z + 26542080a^6b^4c^9e^f^2*z + 23362560a^3b^9c^7d^2g^m^2*z - 46725120a^3b^8c^8d^2e^z - 7127040a^5b^6c^8e^f^2*z - 2965248a^2b^11c^6d^2g^m^2*z + 1013760a^4b^8c^7e^f^2*z - 69120a^3b^10c^6e^f^2*z + 1536a^2b^12c^5e^f^2*z + 5930496a^2b^10c^7d^2e^z + 346816512a^8b^c$

$$\begin{aligned}
& ^{10}d^2 * l * z - 693633024 * a^7 * c^{12} * d^2 * e * z - 231211008 * a^8 * c^{11} * d^2 * j * z + 768 \\
& * a^6 * b^{13} * l * m^2 * z - 13107200 * a^{12} * c^7 * j * m^2 * z - 256 * a^5 * b^{14} * j * m^2 * z + 4718 \\
& 592 * a^{11} * c^8 * j * k^2 * z - 39321600 * a^{11} * c^8 * e * m^2 * z - 4718592 * a^{10} * c^9 * h^2 * j * z \\
& + 14155776 * a^{10} * c^9 * e * k^2 * z + 13107200 * a^9 * c^{10} * f^2 * j * z + 2304 * b^{16} * c^3 * d^2 \\
& * j * z - 14155776 * a^9 * c^{10} * e * h^2 * z + 39321600 * a^8 * c^{11} * e * f^2 * z - 6912 * b^{15} * c^4 \\
& * d^2 * g * z + 13824 * b^{14} * c^5 * d^2 * e * z + 737280 * a^{10} * b * c^5 * j * k * l * m - 2304 * a^6 * \\
& b^9 * c * j * k * l * m + 2211840 * a^9 * b * c^6 * e * k * l * m + 1228800 * a^9 * b * c^6 * f * j * l * m + 737 \\
& 280 * a^9 * b * c^6 * g * j * k * m + 442368 * a^9 * b * c^6 * h * j * k * l + 36 * a^3 * b^{12} * c * f * h * k * m + \\
& 3096576 * a^8 * b * c^7 * d * j * k * l - 12745728 * a^8 * b * c^7 * d * h * k * m + 3686400 * a^8 * b * c^7 * \\
& e * f * l * m + 3391488 * a^8 * b * c^7 * e * h * j * m + 2211840 * a^8 * b * c^7 * e * g * k * m + 1327104 * a^8 \\
& * b * c^7 * e * h * k * l + 1228800 * a^8 * b * c^7 * f * g * j * m + 737280 * a^8 * b * c^7 * f * h * j * l + 4 \\
& 42368 * a^8 * b * c^7 * g * h * j * k + 108 * a^2 * b^{13} * c * d * h * k * m + 16367616 * a^7 * b * c^8 * d * e * j \\
& * m + 9289728 * a^7 * b * c^8 * d * e * k * l + 5160960 * a^7 * b * c^8 * d * f * j * l + 3391488 * a^7 * b * \\
& c^8 * e * f * j * k + 3096576 * a^7 * b * c^8 * d * g * j * k - 19307520 * a^7 * b * c^8 * d * f * h * m + 3686 \\
& 400 * a^7 * b * c^8 * e * f * g * m + 2211840 * a^7 * b * c^8 * e * f * h * l + 1327104 * a^7 * b * c^8 * e * g * h \\
& * k + 737280 * a^7 * b * c^8 * f * g * h * j - 180 * a * b^{13} * c^2 * d * f * h * m - 540 * a * b^{12} * c^3 * d * f \\
& * h * k + 15482880 * a^6 * b * c^9 * d * e * f * l + 11059200 * a^6 * b * c^9 * d * e * h * j + 9289728 * a^6 \\
& * b * c^9 * d * e * g * k + 5160960 * a^6 * b * c^9 * d * f * g * j - 2304 * a * b^{11} * c^4 * d * f * g * j + 221 \\
& 1840 * a^6 * b * c^9 * e * f * g * h + 4608 * a * b^{10} * c^5 * d * e * f * j + 15482880 * a^5 * b * c^{10} * d * e * \\
& f * g - 13824 * a * b^9 * c^6 * d * e * f * g + 36 * a * b^{14} * c * d * f * k * m + 1843200 * a^9 * b^3 * c^4 * j \\
& * k * l * m + 783360 * a^8 * b^5 * c^3 * j * k * l * m + 18432 * a^7 * b^7 * c^2 * j * k * l * m - 2211840 * a^8 \\
& * b^4 * c^4 * g * k * l * m - 1695744 * a^9 * b^2 * c^5 * h * j * l * m - 1400832 * a^8 * b^4 * c^4 * h * j * \\
& l * m - 1105920 * a^9 * b^2 * c^5 * g * k * l * m - 253440 * a^7 * b^6 * c^3 * h * j * l * m - 69120 * a^7 * \\
& b^6 * c^3 * g * k * l * m + 11520 * a^6 * b^8 * c^2 * h * j * l * m + 6912 * a^6 * b^8 * c^2 * g * k * l * m + 44 \\
& 23680 * a^8 * b^3 * c^5 * e * k * l * m + 2506752 * a^8 * b^3 * c^5 * f * j * l * m + 1843200 * a^8 * b^3 * c^5 \\
& * g * j * k * m + 1327104 * a^8 * b^3 * c^5 * h * j * k * l + 838656 * a^7 * b^5 * c^4 * f * j * l * m + 783 \\
& 360 * a^7 * b^5 * c^4 * g * j * k * m + 691200 * a^7 * b^5 * c^4 * h * j * k * l + 138240 * a^7 * b^5 * c^4 * e \\
& * k * l * m + 69120 * a^6 * b^7 * c^3 * h * j * k * l - 53760 * a^6 * b^7 * c^3 * f * j * l * m + 18432 * a^6 * \\
& b^7 * c^3 * g * j * k * m - 13824 * a^6 * b^7 * c^3 * e * k * l * m - 2304 * a^5 * b^9 * c^2 * g * j * k * m + 25 \\
& 43616 * a^8 * b^3 * c^5 * g * h * l * m + 829440 * a^7 * b^5 * c^4 * g * h * l * m - 34560 * a^6 * b^7 * c^3 * \\
& g * h * l * m - 8183808 * a^8 * b^2 * c^6 * d * j * l * m - 3686400 * a^8 * b^2 * c^6 * e * j * k * m - 22855 \\
& 68 * a^7 * b^4 * c^5 * d * j * l * m - 1695744 * a^8 * b^2 * c^6 * f * j * k * l - 1566720 * a^7 * b^4 * c^5 * \\
& e * j * k * m - 1400832 * a^7 * b^4 * c^5 * f * j * k * l + 741888 * a^6 * b^6 * c^4 * d * j * l * m - 253440 \\
& * a^6 * b^6 * c^4 * f * j * k * l - 80640 * a^5 * b^8 * c^3 * d * j * l * m - 36864 * a^6 * b^6 * c^4 * e * j * k * \\
& m + 11520 * a^5 * b^8 * c^3 * f * j * k * l + 4608 * a^5 * b^8 * c^3 * e * j * k * m + 6700032 * a^8 * b^2 * \\
& c^6 * f * h * k * m + 5103360 * a^7 * b^4 * c^5 * f * h * k * m - 5087232 * a^8 * b^2 * c^6 * e * h * l * m - 2 \\
& 838528 * a^7 * b^4 * c^5 * f * g * l * m - 1843200 * a^8 * b^2 * c^6 * f * g * l * m - 1695744 * a^8 * b^2 * \\
& c^6 * g * h * j * m - 1658880 * a^7 * b^4 * c^5 * g * h * k * l - 1658880 * a^7 * b^4 * c^5 * e * h * l * m - 1 \\
& 400832 * a^7 * b^4 * c^5 * g * h * j * m - 663552 * a^8 * b^2 * c^6 * g * h * k * l + 483840 * a^6 * b^6 * c^4 \\
& * f * h * k * m - 253440 * a^6 * b^6 * c^4 * g * h * j * m - 207360 * a^6 * b^6 * c^4 * g * h * k * l + 16128 \\
& 0 * a^6 * b^6 * c^4 * f * g * l * m + 69120 * a^6 * b^6 * c^4 * e * h * l * m - 50040 * a^5 * b^8 * c^3 * f * h * k \\
& * m + 11520 * a^5 * b^8 * c^3 * g * h * j * m + 180 * a^4 * b^{10} * c^2 * f * h * k * m + 4202496 * a^7 * b^3 \\
& * c^6 * d * j * k * l + 635904 * a^6 * b^5 * c^5 * d * j * k * l - 276480 * a^5 * b^7 * c^4 * d * j * k * l + 34 \\
& 560 * a^4 * b^9 * c^3 * d * j * k * l - 16671744 * a^7 * b^3 * c^6 * d * h * k * m + 12275712 * a^7 * b^3 * c^6 \\
& * d * g * l * m + 5677056 * a^7 * b^3 * c^6 * e * f * l * m + 4423680 * a^7 * b^3 * c^6 * e * g * k * m + 33
\end{aligned}$$

$17760a^7b^3c^6e*h*k*1 + 2801664a^7b^3c^6e*h*j*m - 2709504a^6b^5c^5*d*g*1*m + 2543616a^7b^3c^6*f*g*k*1 + 2506752a^7b^3c^6*f*g*j*m + 1843200a^7b^3c^6*f*h*j*1 + 1327104a^7b^3c^6*g*h*j*k + 838656a^6b^5c^5*f*g*j*m + 829440a^6b^5c^5*f*g*k*1 + 783360a^6b^5c^5*f*h*j*1 + 691200a^6b^5c^5*g*h*j*k + 665280a^5b^7c^4*d*h*k*m + 506880a^6b^5c^5*e*h*j*m + 414720a^6b^5c^5*e*h*k*1 - 322560a^6b^5c^5*e*f*1*m + 241920a^5b^7c^4*d*g*1*m + 138240a^6b^5c^5*e*g*k*m - 108540a^4b^9c^3*d*h*k*m + 69120a^5b^7c^4*g*h*j*k - 53760a^5b^7c^4*f*g*j*m - 51840a^6b^5c^5*d*h*k*m - 34560a^5b^7c^4*f*g*k*1 - 23040a^5b^7c^4*e*h*j*m + 18432a^5b^7c^4*f*h*j*1 - 13824a^5b^7c^4*e*g*k*m - 2304a^4b^9c^3*f*h*j*1 + 1296a^3b^11c^2*d*h*k*m + 31924224a^7b^2c^7*d*f*k*m - 24551424a^7b^2c^7*d*e*1*m + 10616832a^7b^2c^7*e*g*j*1 - 8183808a^7b^2c^7*d*g*j*m - 5529600a^7b^2c^7*d*h*j*1 + 5419008a^6b^4c^6*d*e*1*m + 5308416a^6b^4c^6*e*g*j*1 - 5087232a^7b^2c^7*e*f*k*1 - 5013504a^7b^2c^7*e*f*j*m + 4868352a^6b^4c^6*d*f*k*m - 4644864a^7b^2c^7*d*g*k*1 - 3981312a^6b^4c^6*d*g*k*1 - 2654208a^7b^2c^7*e*h*j*k - 2367360a^5b^6c^5*d*f*k*m - 2285568a^6b^4c^6*d*g*j*m - 2211840a^6b^4c^6*d*h*j*1 - 1695744a^7b^2c^7*f*g*j*k - 1677312a^6b^4c^6*e*f*j*m - 1658880a^6b^4c^6*e*f*k*1 - 1400832a^6b^4c^6*f*g*j*k - 1382400a^6b^4c^6*e*h*j*k + 1036800a^5b^6c^5*d*g*k*1 + 741888a^5b^6c^5*d*g*j*m - 483840a^5b^6c^5*d*e*1*m + 317952a^5b^6c^5*d*h*j*1 + 268920a^4b^8c^4*d*f*k*m - 253440a^5b^6c^5*f*g*j*k - 138240a^5b^6c^5*e*h*j*k + 107520a^5b^6c^5*e*f*j*m - 103680a^4b^8c^4*d*g*k*1 - 80640a^4b^8c^4*d*g*j*m + 69120a^5b^6c^5*e*f*k*1 + 11520a^4b^8c^4*f*g*j*k + 6912a^4b^8c^4*d*h*j*1 - 6912a^3b^10c^3*d*h*j*1 + 6120a^3b^10c^3*d*f*k*m - 1368a^2b^12c^2*d*f*k*m - 5087232a^7b^2c^7*e*g*h*m - 2211840a^6b^4c^6*f*g*h*1 - 1658880a^6b^4c^6*e*g*h*m - 1105920a^7b^2c^7*f*g*h*1 - 69120a^5b^6c^5*f*g*h*1 + 69120a^5b^6c^5*e*g*h*m + 6912a^4b^8c^4*f*g*h*1 + 7962624a^6b^3c^7*d*e*k*1 - 22164480a^6b^3c^7*d*f*h*m + 5160960a^6b^3c^7*d*f*j*1 + 4571136a^6b^3c^7*d*e*j*m + 4202496a^6b^3c^7*d*g*j*k + 2801664a^6b^3c^7*e*f*j*k - 2073600a^5b^5c^6*d*e*k*1 - 1483776a^5b^5c^6*d*e*j*m + 635904a^5b^5c^6*d*g*j*k + 506880a^5b^5c^6*e*f*j*k - 354816a^4b^7c^5*d*f*j*1 + 322560a^5b^5c^6*d*f*j*1 - 276480a^4b^7c^5*d*g*j*k + 207360a^4b^7c^5*d*e*k*1 + 161280a^4b^7c^5*d*e*j*m + 59904a^3b^9c^4*d*f*j*1 + 34560a^3b^9c^4*d*g*j*k - 23040a^4b^7c^5*e*f*j*k - 2304a^2b^11c^3*d*f*j*1 + 8294400a^6b^3c^7*d*g*h*1 + 5677056a^6b^3c^7*e*f*g*m + 4423680a^6b^3c^7*e*f*h*1 + 3317760a^6b^3c^7*e*g*h*k + 2805120a^5b^5c^6*d*f*h*m + 1843200a^6b^3c^7*f*g*h*j - 829440a^5b^5c^6*d*g*h*1 + 783360a^5b^5c^6*f*g*h*j + 437184a^4b^7c^5*d*f*h*m + 414720a^5b^5c^6*e*g*h*k - 322560a^5b^5c^6*e*f*g*m - 146268a^3b^9c^4*d*f*h*m + 138240a^5b^5c^6*e*f*h*1 - 62208a^4b^7c^5*d*g*h*1 + 20736a^3b^9c^4*d*g*h*1 + 18432a^4b^7c^5*f*g*h*j - 13824a^4b^7c^5*e*f*h*1 + 9360a^2b^11c^3*d*f*h*m - 2304a^3b^9c^4*f*g*h*j - 8404992a^6b^2c^8*d*e*j*k - 24551424a^6b^2c^8*d*e*g*m + 21150720a^6b^2c^8*d*f*h*k - 1271808a^5b^4c^7*d*e*j*k + 552960a^4b^6c^6*d*e*j*k - 69120a^3b^8c^5*d*e*j*k - 16588800a^6b^2c^$

$$\begin{aligned}
& 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 - 552 \\
& 9600*a^6*b^2*c^8*d*g*h*j + 5419008*a^5*b^4*c^7*d*e*g*m - 5087232*a^6*b^2*c^ \\
& 8*e*f*g*k - 3870720*a^5*b^4*c^7*d*f*g*1 - 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*1 - 1566720*a^5*b^4*c^7*e*f*h*j + 145 \\
& 1520*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 + 207360*a^3*b^7*c^6*d*e*g*k + 59904*a^2*b^9*c^5*d*f*g*j - 13 \\
& 824*a^3*b^7*c^6*d*e*h*j + 13824*a^2*b^9*c^5*d*e*h*j - 13824*a^2*b^9*c^5*d*e \\
& *f*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 + 387072*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 - 1 \\
& 009152*a^9*b*c^6*h^2*k*m + 3690*a^6*b^9*c*h*k*m^2 + 1152*a^6*b^9*c*g*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^1 \\
& 1*c*f*k^2*m + 6*a^2*b^13*c*f^2*k*m - 10298880*a^9*b*c^6*d*k*m^2 + 2580480*a \\
& ^9*b*c^6*e*j*m^2 + 5310*a^4*b^11*c*d*k*m^2 - 1674*a*b^13*c^2*d^2*k*m - 540* \\
& a^3*b^12*c*d*k^2*m - 10616832*a^7*b*c^8*e^2*j*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 - 3 \\
& 456*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 - 15552000*a^8*b*c^7*d*f*m^2 + 24551424*a^6*b*c^9*d*e^2*m - 39398 \\
& 40*a^7*b*c^8*d*h^2*k + 1105920*a^7*b*c^8*e*h^2*j - 25074*a*b^11*c^4*d^2*f*m \\
& + 10530*a*b^11*c^4*d^2*h*k + 10368*a*b^11*c^4*d^2*g*1 + 420*a*b^12*c^3*d*f \\
& ^2*m - 378*a^2*b^13*c*d*f*m^2 - 10616832*a^6*b*c^9*e^2*g*j + 5087232*a^6*b* \\
& c^9*e^2*f*k - 3538944*a^7*b*c^8*e*g*j^2 + 1843200*a^7*b*c^8*d*h*j^2 - 79948 \\
& 80*a^6*b*c^9*d*f^2*k - 4990464*a^7*b*c^8*d*f*k^2 + 2580480*a^6*b*c^9*e*f^2* \\
& j + 65664*a*b^10*c^5*d^2*g*j - 27972*a*b^10*c^5*d^2*f*k - 20736*a*b^10*c^5* \\
& d^2*e*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 - 37062144*a^5*b*c^10*d^2*f*h + 384*a*b^12*c^3*d*f*j^2 - 13132 \\
& 8*a*b^9*c^6*d^2*e*j - 5985792*a^6*b*c^9*d*f*h^2 + 206010*a*b^9*c^6*d^2*f*h
\end{aligned}$$

$$\begin{aligned}
& - 6300*a*b^{10}*c^5*d*f^2*h + 1350*a*b^{11}*c^4*d*f*h^2 + 16588800*a^5*b*c^{10}*d \\
& *e^2*h + 3456*a*b^{10}*c^5*d*f*g^2 + 435456*a*b^8*c^7*d^2*e*g + 13824*a*b^8*c \\
& ^7*d*e^2*f - 1474560*a^9*c^7*e*j*k*m + 460800*a^9*c^7*f*h*k*m + 3225600*a^8 \\
& *c^8*d*f*k*m - 2457600*a^8*c^8*e*f*j*m - 884736*a^8*c^8*e*h*j*k - 6193152*a \\
& ^7*c^9*d*e*j*k + 1935360*a^7*c^9*d*f*h*k - 1474560*a^7*c^9*e*f*h*j - 103219 \\
& 20*a^6*c^{10}*d*e*f*j - 1105920*a^9*b^4*c^3*k*l^2*m - 552960*a^{10}*b^2*c^4*k*l \\
& ^2*m - 34560*a^8*b^6*c^2*k*l^2*m - 1290240*a^{10}*b^2*c^4*j*l*m^2 - 860160*a^ \\
& 9*b^4*c^3*j*l*m^2 - 80640*a^8*b^6*c^2*j*l*m^2 - 737280*a^9*b^2*c^5*j^2*k*m \\
& - 568320*a^8*b^4*c^4*j^2*k*m - 136704*a^7*b^6*c^3*j^2*k*m - 2304*a^6*b^8*c^ \\
& 2*j^2*k*m + 1271808*a^9*b^3*c^4*h*l^2*m - 552960*a^9*b^2*c^5*j*k^2*l - 5529 \\
& 60*a^8*b^4*c^4*j*k^2*l + 414720*a^8*b^5*c^3*h*l^2*m - 145152*a^7*b^6*c^3*j* \\
& k^2*l - 17280*a^7*b^7*c^2*h*l^2*m - 3456*a^6*b^8*c^2*j*k^2*l - 3640320*a^9* \\
& b^3*c^4*h*k*m^2 - 2626560*a^8*b^3*c^5*h^2*k*m + 2211840*a^9*b^2*c^5*h*k^2*m \\
& + 2056320*a^8*b^4*c^4*h*k^2*m + 1935360*a^9*b^3*c^4*g*l*m^2 - 1143360*a^8* \\
& b^5*c^3*h*k*m^2 - 1097280*a^7*b^5*c^4*h^2*k*m + 364608*a^7*b^6*c^3*h*k^2*m \\
& + 322560*a^8*b^5*c^3*g*l*m^2 - 56160*a^6*b^7*c^3*h^2*k*m - 40320*a^7*b^7*c^ \\
& 2*g*l*m^2 + 27936*a^7*b^7*c^2*h*k*m^2 - 3780*a^6*b^8*c^2*h*k^2*m + 2970*a^5 \\
& *b^9*c^2*h^2*k*m - 1419264*a^8*b^4*c^4*f*l^2*m - 1105920*a^7*b^4*c^5*g^2*k* \\
& m - 921600*a^9*b^2*c^5*f*l^2*m - 829440*a^8*b^4*c^4*h*k*l^2 + 749568*a^8*b^ \\
& 3*c^5*h*j^2*m - 552960*a^8*b^2*c^6*g^2*k*m - 331776*a^9*b^2*c^5*h*k*l^2 + 3 \\
& 17952*a^7*b^5*c^4*h*j^2*m - 103680*a^7*b^6*c^3*h*k*l^2 + 80640*a^7*b^6*c^3* \\
& f*l^2*m + 38400*a^6*b^7*c^3*h*j^2*m - 34560*a^6*b^6*c^4*g^2*k*m + 3456*a^5* \\
& b^8*c^3*g^2*k*m - 1920*a^5*b^9*c^2*h*j^2*m - 5142528*a^7*b^3*c^6*f^2*k*m + \\
& 5068800*a^9*b^2*c^5*f*k*m^2 - 3870720*a^9*b^2*c^5*e*l*m^2 - 3755520*a^8*b^3 \\
& *c^5*f*k^2*m + 3000960*a^8*b^4*c^4*f*k*m^2 - 1290240*a^9*b^2*c^5*g*j*m^2 - \\
& 1085760*a^7*b^5*c^4*f*k^2*m - 959040*a^6*b^5*c^5*f^2*k*m - 860160*a^8*b^4*c \\
& ^4*g*j*m^2 + 829440*a^8*b^3*c^5*g*k^2*l - 645120*a^8*b^4*c^4*e*l*m^2 - 5529 \\
& 60*a^8*b^2*c^6*h^2*j*l - 552960*a^7*b^4*c^5*h^2*j*l + 414720*a^7*b^5*c^4*g* \\
& k^2*l - 145152*a^6*b^6*c^4*h^2*j*l + 103200*a^5*b^7*c^4*f^2*k*m - 80640*a^7 \\
& *b^6*c^3*g*j*m^2 + 80640*a^7*b^6*c^3*e*l*m^2 + 41280*a^7*b^6*c^3*f*k*m^2 - \\
& 37188*a^6*b^8*c^2*f*k*m^2 + 13536*a^6*b^7*c^3*f*k^2*m + 12672*a^6*b^8*c^2*g \\
& *j*m^2 + 10368*a^6*b^7*c^3*g*k^2*l + 5490*a^5*b^9*c^2*f*k^2*m - 3456*a^5*b^ \\
& 8*c^3*h^2*j*l - 2304*a^6*b^8*c^2*e*l*m^2 + 810*a^4*b^9*c^3*f^2*k*m - 270*a^ \\
& 3*b^11*c^2*f^2*k*m + 6137856*a^8*b^3*c^5*d*l^2*m - 4423680*a^7*b^2*c^7*e^2* \\
& k*m - 2654208*a^8*b^3*c^5*g*j*l^2 - 2654208*a^7*b^3*c^6*g^2*j*l + 1769472*a \\
& ^8*b^2*c^6*g*j^2*l + 1769472*a^7*b^4*c^5*g*j^2*l - 1354752*a^7*b^5*c^4*d*l^ \\
& 2*m - 1327104*a^7*b^5*c^4*g*j*l^2 - 1327104*a^6*b^5*c^5*g^2*j*l + 1271808*a \\
& ^8*b^3*c^5*f*k*l^2 - 1040384*a^8*b^2*c^6*f*j^2*m - 697344*a^7*b^4*c^5*f*j^2 \\
& *m - 516096*a^8*b^2*c^6*h*j^2*k - 451584*a^7*b^4*c^5*h*j^2*k + 442368*a^6*b \\
& ^6*c^4*g*j^2*l + 414720*a^7*b^5*c^4*f*k*l^2 - 138240*a^6*b^6*c^4*h*j^2*k - \\
& 138240*a^6*b^4*c^6*e^2*k*m - 121856*a^6*b^6*c^4*f*j^2*m + 120960*a^6*b^7*c^ \\
& 3*d*l^2*m - 17280*a^6*b^7*c^3*f*k*l^2 + 13824*a^5*b^6*c^5*e^2*k*m - 11520*a \\
& ^5*b^8*c^3*h*j^2*k + 8960*a^5*b^8*c^3*f*j^2*m + 10851840*a^8*b^2*c^6*d*k^2* \\
& m - 10464768*a^6*b^3*c^7*d^2*k*m - 10275840*a^8*b^3*c^5*d*k*m^2 + 7121088*a \\
& ^5*b^5*c^6*d^2*k*m + 3127680*a^7*b^4*c^5*d*k^2*m + 1720320*a^8*b^3*c^5*e*j*
\end{aligned}$$

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

$$\begin{aligned}
& ^4b^7c^5f^2hk - 20736a^5b^6c^5e^h^2l - 13824a^5b^6c^5d^j^2k \\
& + 10800a^3b^10c^3d^h^2m - 5760a^3b^10c^3d^j^2k - 3780a^4b^8c^4 \\
& *f^h^2k + 3690a^3b^9c^4f^2hk - 3456a^4b^8c^4g^h^2j + 2970a^4b \\
& ^9c^3f^hk^2 - 2304a^5b^8c^3e^g^m^2 + 1152a^3b^9c^4f^2g^l - 540* \\
& a^3b^10c^3f^h^2k - 540a^2b^12c^2d^h^2m - 90a^4b^10c^2d^h^m^2 - \\
& 90a^2b^11c^3f^2hk + 54a^3b^11c^2f^hk^2 + 15925248a^6b^2c^8e \\
& ^2g^l - 7962624a^7b^3c^6e^g^l^2 - 7962624a^6b^3c^7e^g^2l + 233856 \\
& 00a^6b^2c^8d^f^2m + 6137856a^6b^3c^7d^g^2m - 5677056a^6b^2c^8* \\
& e^2f^m + 4147200a^7b^3c^6d^h^l^2 - 3317760a^6b^2c^8e^2hk - 13547 \\
& 52a^5b^5c^6d^g^2m + 1271808a^6b^3c^7f^g^2k - 737280a^7b^2c^7f \\
& *h^j^2 + 17418240a^5b^3c^8d^2g^l - 568320a^6b^4c^6f^h^j^2 - 414720 \\
& *a^6b^5c^5d^h^l^2 + 414720a^5b^5c^6f^g^2k - 414720a^5b^4c^7e^2* \\
& hk + 322560a^5b^4c^7e^2f^m - 136704a^5b^6c^5f^h^j^2 + 120960a^4* \\
& b^7c^5d^g^2m - 31104a^5b^7c^4d^h^l^2 - 17280a^4b^7c^5f^g^2k + 1 \\
& 0368a^4b^9c^3d^h^l^2 - 2304a^4b^8c^4f^h^j^2 + 384a^3b^10c^3f^h* \\
& j^2 + 50042880a^5b^2c^9d^2f^k - 13271040a^5b^3c^8d^2hk - 1314969 \\
& 6a^7b^3c^6d^f^m^2 + 10906560a^4b^5c^7d^2f^m - 8709120a^4b^5c^7* \\
& d^2g^l - 7418880a^5b^3c^8d^2f^m + 7133184a^7b^2c^7d^hk^2 - 64281 \\
& 60a^6b^3c^7d^h^2k + 5593536a^4b^5c^7d^2hk - 3870720a^6b^2c^8* \\
& e^f^2l + 3369600a^6b^4c^6d^hk^2 + 3148992a^6b^5c^5d^f^m^2 - 29856 \\
& 96a^3b^7c^6d^2f^m + 1959552a^3b^7c^6d^2g^l - 1658880a^7b^2c^7* \\
& e^g^k^2 - 1505280a^4b^6c^6d^f^2m - 1290240a^6b^2c^8f^2g^j - 34836 \\
& 480a^5b^2c^9d^2e^l + 1105920a^6b^3c^7e^h^2j - 860160a^5b^4c^7* \\
& f^2g^j - 829440a^6b^4c^6e^g^k^2 - 692064a^3b^7c^6d^2hk - 689472* \\
& a^5b^5c^6d^h^2k - 645120a^5b^4c^7e^f^2l - 388800a^5b^6c^5d^hk \\
& ^2 + 378954a^2b^9c^5d^2f^m + 362880a^5b^4c^7d^f^2m + 296964a^3b \\
& ^8c^5d^f^2m + 290304a^5b^5c^6e^h^2j + 277344a^4b^7c^5d^h^2k - \\
& 217728a^2b^9c^5d^2g^l - 80640a^4b^6c^6f^2g^j + 80640a^4b^6c^6* \\
& e^f^2l - 77070a^4b^9c^3d^f^m^2 - 30240a^5b^7c^4d^f^m^2 - 28350a^3 \\
& *b^9c^4d^h^2k - 26406a^2b^9c^5d^2hk - 21060a^4b^8c^4d^hk^2 - \\
& 20736a^5b^6c^5e^g^k^2 - 19278a^2b^10c^4d^f^2m + 12672a^3b^8c^5* \\
& f^2g^j + 10044a^3b^10c^3d^hk^2 + 8820a^3b^11c^2d^f^m^2 + 6912a^4 \\
& *b^7c^5e^h^2j - 2304a^3b^8c^5e^f^2l - 1620a^2b^11c^3d^h^2k - 3 \\
& 84a^2b^10c^4f^2g^j + 162a^2b^12c^2d^hk^2 - 5419008a^5b^3c^8d* \\
& e^2m + 5308416a^6b^2c^8e^g^2j - 5308416a^5b^3c^8e^2g^j - 3870720 \\
& *a^7b^2c^7d^f^l^2 - 3538944a^6b^3c^7e^g^j^2 + 2654208a^5b^4c^7e* \\
& g^2j - 2322432a^6b^2c^8d^g^2k - 1990656a^5b^4c^7d^g^2k - 1935360 \\
& *a^6b^4c^6d^f^l^2 + 1658880a^6b^3c^7d^h^j^2 + 1658880a^5b^3c^8e^ \\
& ^2f^k - 884736a^5b^5c^6e^g^j^2 + 725760a^5b^6c^5d^f^l^2 + 17418240* \\
& a^4b^4c^8d^2e^l + 518400a^4b^6c^6d^g^2k + 483840a^4b^5c^7d^e^2 \\
& *m + 262656a^5b^5c^6d^h^j^2 - 96768a^4b^8c^4d^f^l^2 - 69120a^4b^5 \\
& *c^7e^2f^k - 55296a^4b^7c^5d^h^j^2 - 51840a^3b^8c^5d^g^2k + 3456 \\
& *a^3b^10c^3d^f^l^2 + 1152a^3b^9c^4d^h^j^2 + 1152a^2b^11c^3d^h^j^ \\
& ^2 - 15431040a^4b^4c^8d^2f^k - 13248000a^5b^3c^8d^f^2k - 11612160* \\
& a^5b^2c^9d^2g^j - 10063872a^6b^3c^7d^f^k^2 - 3919104a^3b^6c^7d^
\end{aligned}$$



$$\begin{aligned}
& 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 - 1 \\
& 38240*a^4*b^4*c^8*e^2*f*h - 31104*a^3*b^7*c^6*d*g^2*h + 13824*a^3*b^6*c^7*e \\
& ^2*f*h + 10368*a^2*b^9*c^5*d*g^2*h + 15630336*a^5*b^2*c^9*d*f^2*h - 1445990 \\
& 4*a^4*b^3*c^9*d^2*f*h + 9630144*a^3*b^5*c^8*d^2*f*h - 8764416*a^5*b^3*c^8*d \\
& *f*h^2 - 3870720*a^5*b^2*c^9*e*f^2*g + 2867328*a^4*b^4*c^8*d*f^2*h - 209520 \\
& 0*a^2*b^7*c^7*d^2*f*h - 1414080*a^3*b^6*c^7*d*f^2*h - 34836480*a^4*b^2*c^10 \\
& *d^2*e*g - 645120*a^4*b^4*c^8*e*f^2*g + 306720*a^3*b^7*c^6*d*f*h^2 + 197820 \\
& *a^2*b^8*c^6*d*f^2*h + 146880*a^4*b^5*c^7*d*f*h^2 + 80640*a^3*b^6*c^7*e*f^2 \\
& *g - 55350*a^2*b^9*c^5*d*f*h^2 - 2304*a^2*b^8*c^6*e*f^2*g - 3870720*a^5*b^2 \\
& *c^9*d*f*g^2 - 1935360*a^4*b^4*c^8*d*f*g^2 - 1658880*a^4*b^3*c^9*d*e^2*h + \\
& 725760*a^3*b^6*c^7*d*f*g^2 + 17418240*a^3*b^4*c^9*d^2*e*g - 124416*a^3*b^5* \\
& c^8*d*e^2*h - 96768*a^2*b^8*c^6*d*f*g^2 + 41472*a^2*b^7*c^7*d*e^2*h - 39191 \\
& 04*a^2*b^6*c^8*d^2*e*g - 7741440*a^4*b^2*c^10*d*e^2*f + 2903040*a^3*b^4*c^9 \\
& *d*e^2*f - 387072*a^2*b^6*c^8*d*e^2*f - 20160*a^8*b^7*c^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 - 3 \\
& 54240*a^8*b^5*c^3*k^3*m - 21600*a^7*b^7*c^2*k^3*m - 13950*a^7*b^8*c*k^2*m^2 \\
& + 430080*a^10*b*c^5*j^2*m^2 - 1984*a^6*b^9*c*j^2*m^2 - 884736*a^9*b^3*c^4* \\
& j*1^3 - 589824*a^8*b^3*c^5*j^3*1 - 442368*a^8*b^5*c^3*j*1^3 - 294912*a^7*b^ \\
& 5*c^4*j^3*1 - 49152*a^6*b^7*c^3*j^3*1 + 1359360*a^10*b^2*c^4*h*m^3 + 117312 \\
& 0*a^9*b^4*c^3*h*m^3 + 743040*a^7*b^4*c^5*h^3*m + 622080*a^8*b^2*c^6*h^3*m + \\
& 184320*a^9*b*c^6*j^2*k^2 + 107136*a^6*b^6*c^4*h^3*m - 32640*a^8*b^6*c^2*h* \\
& m^3 + 540*a^5*b^8*c^3*h^3*m - 270*a^4*b^10*c^2*h^3*m - 180*a^5*b^10*c*h^2*m \\
& ^2 - 2293760*a^9*b^3*c^4*f*m^3 - 2293760*a^6*b^3*c^7*f^3*m + 1327104*a^8*b^ \\
& 4*c^4*g*1^3 + 1327104*a^6*b^4*c^6*g^3*1 - 622080*a^8*b^3*c^5*h*k^3 - 622080 \\
& *a^7*b^3*c^6*h^3*k - 326592*a^7*b^5*c^4*h*k^3 - 326592*a^6*b^5*c^5*h^3*k - \\
& 199360*a^8*b^5*c^3*f*m^3 - 199360*a^5*b^5*c^6*f^3*m + 61920*a^7*b^7*c^2*f*m \\
& ^3 + 61920*a^4*b^7*c^5*f^3*m - 38880*a^6*b^7*c^3*h*k^3 - 38880*a^5*b^7*c^4* \\
& h^3*k - 3682*a^3*b^9*c^4*f^3*m - 810*a^5*b^9*c^2*h*k^3 - 810*a^4*b^9*c^3*h^ \\
& 3*k - 70*a^3*b^12*c*f^2*m^2 + 70*a^2*b^11*c^3*f^3*m + 3870720*a^8*b*c^7*e^2 \\
& *m^2 + 184320*a^8*b*c^7*h^2*j^2 - 14152320*a^4*b^4*c^8*d^3*m + 10644480*a^5 \\
& *b^2*c^9*d^3*m + 5483520*a^9*b^2*c^5*d*m^3 + 4269888*a^3*b^6*c^7*d^3*m - 26 \\
& 54208*a^8*b^3*c^5*e*1^3 + 1359360*a^6*b^2*c^8*f^3*k + 1330560*a^8*b^4*c^4*d
\end{aligned}$$

$$\begin{aligned}
& *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 - 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 + 1179648*a^7*b^2*c^7*e*j^3 + 589824*a^6*b^4*c^6*e*j^3 + 98304*a^5*b^6*c^5*e*j^3 - 95904*a^2*b^7*c^7*d^3*k - 57024*a^6*b^5*c^5*d*k^3 + 49248*a^5*b^7*c^4*d*k^3 - 4050*a^4*b^9*c^3*d*k^3 - 810*a^3*b^11*c^2*d*k^3 - 486*a*b^12*c^3*d^2*k^2 + 3870720*a^6*b*c^9*d^2*j^2 - 1648128*a^5*b^3*c^8*f^3*h - 898560*a^6*b^3*c^7*f*h^3 - 354240*a^5*b^5*c^6*f*h^3 - 354240*a^4*b^5*c^7*f^3*h + 43680*a^3*b^7*c^6*f^3*h - 21600*a^4*b^7*c^5*f*h^3 - 9792*a*b^11*c^4*d^2*j^2 + 1350*a^3*b^9*c^4*f*h^3 - 1050*a^2*b^9*c^5*f^3*h + 1658880*a^6*b*c^9*e^2*h^2 + 16547328*a^4*b^2*c^10*d^3*h - 12306816*a^3*b^4*c^9*d^3*h + 37310976*a^3*b^3*c^10*d^3*f + 3037824*a^2*b^6*c^8*d^3*h - 2654208*a^5*b^3*c^8*e*g^3 + 1949184*a^6*b^2*c^8*d*h^3 + 1296000*a^5*b^4*c^7*d*h^3 - 155520*a^4*b^6*c^6*d*h^3 - 40500*a*b^10*c^5*d^2*h^2 - 8100*a^3*b^8*c^5*d*h^3 + 4050*a^2*b^10*c^4*d*h^3 + 3870720*a^5*b*c^10*e^2*f^2 + 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 + 1737792*a^3*b^5*c^8*d*f^3 - 260190*a*b^8*c^7*d^2*f^2 - 211680*a^2*b^7*c^7*d*f^3 - 435456*a*b^7*c^8*d^2*e^2 - 245760*a^10*c^6*j^2*k*m - 384*a^6*b^10*j^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 - 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
\end{aligned}$$

$$\begin{aligned}
& *b^5*c^2*1^2*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*1^2 + 207360*a^8*b^5*c^3*k^2*1^2 + 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*1^2 + 884736*a^9*b^2*c^5*j^ \\
& 2*1^2 + 884736*a^8*b^4*c^4*j^2*1^2 + 221184*a^7*b^6*c^3*j^2*1^2 + 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*1^2 + 207360*a^7*b^5*c^4*h^2*1 \\
& ^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*1^2 + 576*a^5*b^9*c^2*g^2*m^2 + 3808000*a^8*b^2*c^6*f^2*m^2 + 19906 \\
& 56*a^7*b^4*c^5*g^2*1^2 + 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*1^2 + 645120*a^7*b^3*c^6*e^2*m^2 + 41472 \\
& 0*a^7*b^3*c^6*g^2*k^2 + 276480*a^7*b^3*c^6*h^2*j^2 + 207360*a^6*b^5*c^5*g^2 \\
& *k^2 + 161280*a^6*b^5*c^5*f^2*1^2 + 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*1^2 + 5 \\
& 184*a^5*b^7*c^4*g^2*k^2 + 2304*a^5*b^7*c^4*e^2*m^2 + 576*a^4*b^9*c^3*h^2*j^ \\
& 2 + 576*a^4*b^9*c^3*f^2*1^2 + 7962624*a^7*b^2*c^7*e^2*1^2 - 4148928*a^6*b^4 \\
& *c^6*d^2*m^2 + 1419840*a^6*b^4*c^6*f^2*k^2 + 1387008*a^7*b^2*c^7*f^2*k^2 - \\
& 1183392*a^5*b^6*c^5*d^2*m^2 + 884736*a^7*b^2*c^7*g^2*j^2 + 884736*a^6*b^4*c \\
& ^6*g^2*j^2 + 645750*a^4*b^8*c^4*d^2*m^2 + 221184*a^5*b^6*c^5*g^2*j^2 - 1159 \\
& 20*a^3*b^10*c^3*d^2*m^2 + 84960*a^5*b^6*c^5*f^2*k^2 + 10836*a^2*b^12*c^2*d^ \\
& 2*m^2 - 8010*a^4*b^8*c^4*f^2*k^2 - 180*a^3*b^10*c^3*f^2*k^2 + 9*a^2*b^12*c^ \\
& 2*f^2*k^2 + 8709120*a^6*b^3*c^7*d^2*1^2 - 4354560*a^5*b^5*c^6*d^2*1^2 + 979 \\
& 776*a^4*b^7*c^5*d^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 + 5184*a^4*b^7*c^5*g^2*h^2 + 1935360*a^5*b^3*c^8*d^2*j^2 + 1 \\
& 684224*a^6*b^2*c^8*f^2*h^2 + 1264320*a^5*b^4*c^7*f^2*h^2 - 532224*a^4*b^5*c \\
& ^7*d^2*j^2 + 126720*a^4*b^6*c^6*f^2*h^2 - 96768*a^3*b^7*c^6*d^2*j^2 + 62784 \\
& *a^2*b^9*c^5*d^2*j^2 - 13950*a^3*b^8*c^5*f^2*h^2 + 225*a^2*b^10*c^4*f^2*h^2 \\
& + 967680*a^5*b^3*c^8*f^2*g^2 + 829440*a^5*b^3*c^8*e^2*h^2 + 161280*a^4*b^5 \\
& *c^7*f^2*g^2 + 20736*a^4*b^5*c^7*e^2*h^2 - 20160*a^3*b^7*c^6*f^2*g^2 + 576* \\
& a^2*b^9*c^5*f^2*g^2 + 11487744*a^5*b^2*c^9*d^2*h^2 + 7962624*a^5*b^2*c^9*e^ \\
& 2*g^2 + 35525376*a^4*b^2*c^10*d^2*f^2 - 1412640*a^3*b^6*c^7*d^2*h^2 + 46137 \\
& 6*a^4*b^4*c^8*d^2*h^2 + 375030*a^2*b^8*c^6*d^2*h^2 + 8709120*a^4*b^3*c^9*d^ \\
& 2*g^2 - 4354560*a^3*b^5*c^8*d^2*g^2 + 979776*a^2*b^7*c^7*d^2*g^2 + 645120*a \\
& ^4*b^3*c^9*e^2*f^2 - 80640*a^3*b^5*c^8*e^2*f^2 + 2304*a^2*b^7*c^7*e^2*f^2 -
\end{aligned}$$

$$\begin{aligned}
& 15269184*a^3*b^4*c^9*d^2*f^2 + 2870784*a^2*b^6*c^8*d^2*f^2 - 17418240*a^3* \\
& b^3*c^{10}*d^2*e^2 + 3919104*a^2*b^5*c^9*d^2*e^2 + 54*b^{15}*c*d^2*k*m + 6*a*b^ \\
& 15*d*f*m^2 + 115200*a^{11}*c^5*k^2*m^2 + 576*a^7*b^9*l^2*m^2 + 225*a^6*b^{10}*k \\
& ^2*m^2 + 64*a^5*b^{11}*j^2*m^2 + 345600*a^{10}*c^6*h^2*m^2 + 9*a^4*b^{12}*h^2*m^2 \\
& + 320000*a^9*c^7*f^2*m^2 + 41472*a^9*c^7*h^2*k^2 + 16934400*a^8*c^8*d^2*m^ \\
& 2 + 345600*a^8*c^8*f^2*k^2 + 81*b^{14}*c^2*d^2*k^2 + 3538944*a^7*c^9*e^2*j^2 \\
& + 2032128*a^7*c^9*d^2*k^2 + 492800*a^{11}*b^2*c^3*m^4 + 351456*a^{10}*b^4*c^2*m \\
& ^4 + 576*b^{13}*c^3*d^2*j^2 + 331776*a^9*b^4*c^3*l^4 + 115200*a^7*c^9*f^2*h^2 \\
& + 142560*a^8*b^4*c^4*k^4 + 103680*a^9*b^2*c^5*k^4 + 32400*a^7*b^6*c^3*k^4 \\
& + 2025*b^{12}*c^4*d^2*h^2 + 2025*a^6*b^8*c^2*k^4 + 6096384*a^6*c^{10}*d^2*h^2 + \\
& 131072*a^8*b^2*c^6*j^4 + 98304*a^7*b^4*c^5*j^4 + 32768*a^6*b^6*c^4*j^4 + 5 \\
& 184*b^{11}*c^5*d^2*g^2 + 4096*a^5*b^8*c^3*j^4 + 11025*b^{10}*c^6*d^2*f^2 + 5644 \\
& 800*a^5*c^{11}*d^2*f^2 + 142560*a^6*b^4*c^6*h^4 + 103680*a^7*b^2*c^7*h^4 + 32 \\
& 400*a^5*b^6*c^5*h^4 + 20736*b^9*c^7*d^2*e^2 + 2025*a^4*b^8*c^4*h^4 + 331776 \\
& *a^5*b^4*c^7*g^4 + 492800*a^5*b^2*c^9*f^4 + 351456*a^4*b^4*c^8*f^4 - 43120* \\
& a^3*b^6*c^7*f^4 + 1225*a^2*b^8*c^6*f^4 - 27433728*a^3*b^2*c^{11}*d^4 + 644630 \\
& 4*a^2*b^4*c^{10}*d^4 - 1050*a^7*b^9*k*m^3 + 384000*a^{11}*c^5*h*m^3 + 138240*a^ \\
& 9*c^7*h^3*m + 210*a^6*b^{10}*h*m^3 + 47416320*a^6*c^{10}*d^3*m - 1134*b^{12}*c^4* \\
& d^3*m + 70*a^5*b^{11}*f*m^3 + 2688000*a^{10}*c^6*d*m^3 + 384000*a^7*c^9*f^3*k + \\
& 138240*a^9*c^7*f*k^3 - 3402*b^{11}*c^5*d^3*k + 210*a^4*b^{12}*d*m^3 + 7077888* \\
& a^6*c^{10}*e^3*j + 786432*a^8*c^8*e*j^3 - 43120*a^9*b^6*c*m^4 + 28449792*a^5* \\
& c^{11}*d^3*h + 17010*b^{10}*c^6*d^3*h + 580608*a^7*c^9*d*h^3 - 39690*b^9*c^7*d^ \\
& 3*f - 734832*a*b^6*c^9*d^4 + 9*b^{16}*d^2*m^2 + 160000*a^{12}*c^4*m^4 + 1225*a^ \\
& 8*b^8*m^4 + 20736*a^{10}*c^6*k^4 + 65536*a^9*c^7*j^4 + 20736*a^8*c^8*h^4 + 49 \\
& 787136*a^4*c^{12}*d^4 + 160000*a^6*c^{10}*f^4 + 5308416*a^5*c^{11}*e^4 + 35721*b^ \\
& 8*c^8*d^4 + a^2*b^{14}*f^2*m^2, z, k1), k1, 1, 4) - ((8*a^2*c^2*g + a^2*b^2*1 \\
& + b^3*c*e + 8*a^3*c*1 - 10*a*b*c^2*e + a*b^2*c*g - 6*a^2*b*c*j)/(4*c*(b^4 \\
& + 16*a^2*c^2 - 8*a*b^2*c)) + (x^4*(b^4*1 + 9*b^2*c^2*g + 16*a^2*c^2*1 - 18* \\
& b*c^3*e - 3*b^3*c*j - 6*a*b*c^2*j + a*b^2*c*1))/(4*c*(b^4 + 16*a^2*c^2 - 8* \\
& a*b^2*c)) - (x^7*(3*b^3*c^2*d + 20*a^2*c^3*f + 12*a^3*c^2*k + a^2*b^3*m - 2 \\
& 4*a*b*c^3*d - 16*a^3*b*c*m + a*b^2*c^2*f - 12*a^2*b*c^2*h + 3*a^2*b^2*c*k)) \\
& /(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^2*(2*a^2*c^2*j - 2*b^2*c^2*e - \\
& 10*a*c^3*e + b^3*c*g + a*b^3*1 + 5*a*b*c^2*g - 5*a*b^2*c*j + 5*a^2*b*c*1)) \\
& /(2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (c*x^6*(6*c^2*e + b^2*j - 3*b*c*g + \\
& 2*a*c*j - 3*a*b*1))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^3*(4*a^4*c^2*k \\
& - 36*a^3*c^3*f + 2*a^3*b^3*m - 3*b^5*c*d - 5*a^2*b^2*c^2*f - a*b^4*c*f + 2 \\
& 8*a^4*b*c*m + 20*a*b^3*c^2*d + 4*a^2*b*c^3*d + 5*a^2*b^3*c*h + 16*a^3*b*c^2 \\
& *h - 19*a^3*b^2*c*k))/(8*a^2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x*(12*a^3 \\
& *c^2*h - 44*a^2*c^3*d + a^3*b^2*m - 5*b^4*c*d + 20*a^4*c*m + a*b^3*c*f - 12 \\
& *a^3*b*c*k + 37*a*b^2*c^2*d - 16*a^2*b*c^2*f + 3*a^2*b^2*c*h))/(8*a*c*(b^4 \\
& + 16*a^2*c^2 - 8*a*b^2*c)) - (x^5*(28*a^2*c^4*d + 6*b^4*c^2*d + 4*a^3*c^3*h \\
& - a^2*b^4*m - 36*a^4*c^2*m - 19*a^2*b^2*c^2*h - 49*a*b^2*c^3*d + 2*a*b^3*c \\
& ^2*f + 28*a^2*b*c^3*f + 5*a^2*b^3*c*k + 16*a^3*b*c^2*k - 5*a^3*b^2*c*m))/(8 \\
& *a^2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 \\
& + 2*a*b*x^2 + 2*b*c*x^6)
\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+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

$$\frac{x \left( x^2 (-ab^2j + bc(ah + cd) - 2ac(cf - aj)) + c \left( -\frac{ab(aj+cf)}{c} - 2a(cd - ah) + b^2d \right) \right) \tan^{-1} \left( \frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left( \frac{ab^2j}{c} + \frac{-ab^3j}{2\sqrt{2}} \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{2\sqrt{2}}{2\sqrt{2}}$$

**Rubi [A]** time = 3.37, antiderivative size = 645, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, integrand size = 50,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$ , Rules used = {1673, 1678, 1166, 205, 1663, 1660, 634, 618, 206, 628}

$$\frac{\tan^{-1} \left( \frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left( \frac{ab^2j}{c} + \frac{-ab^3j}{2\sqrt{2}} \right) + \frac{x \left( x^2 (-ab^2j + bc(ah + cd) - 2ac(cf - aj)) + c \left( -\frac{ab(aj+cf)}{c} - 2a(cd - ah) + b^2d \right) \right) \tan^{-1} \left( \frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left( \frac{ab^2j}{c} + \frac{-ab^3j}{2\sqrt{2}} \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)}}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)}$$

Antiderivative was successfully verified.

[In] Int[(d + e\*x + f\*x^2 + g\*x^3 + h\*x^4 + i\*x^5 + 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] && Gt

$Q[a, 0] \parallel LtQ[b, 0]$

### Rule 618

$\text{Int}[(a_.) + (b_.)(x_) + (c_.)(x_)^2]^{-1}, x\_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4ac - x^2, x], x], x, b + 2cx], x] /; \text{FreeQ}\{a, b, c, x\} \ \&\& \ \text{NeQ}[b^2 - 4ac, 0]$

### Rule 628

$\text{Int}[(d_) + (e_)(x_)] / [(a_) + (b_)(x_) + (c_)(x_)^2], x\_Symbol] \rightarrow \text{Simp}[(d \cdot \text{Log}[\text{RemoveContent}[a + bx + cx^2, x]])/b, x] /; \text{FreeQ}\{a, b, c, d, e, x\} \ \&\& \ \text{EqQ}[2cd - be, 0]$

### Rule 634

$\text{Int}[(d_) + (e_)(x_)] / [(a_) + (b_)(x_) + (c_)(x_)^2], x\_Symbol] \rightarrow \text{Dist}[(2cd - be)/(2c), \text{Int}[1/(a + bx + cx^2), x], x] + \text{Dist}[e/(2c), \text{Int}[(b + 2cx)/(a + bx + cx^2), x], x] /; \text{FreeQ}\{a, b, c, d, e, x\} \ \&\& \ \text{NeQ}[2cd - be, 0] \ \&\& \ \text{NeQ}[b^2 - 4ac, 0] \ \&\& \ !\text{NiceSqrtQ}[b^2 - 4ac]$

### Rule 1166

$\text{Int}[(d_) + (e_)(x_)^2] / [(a_) + (b_)(x_)^2 + (c_)(x_)^4], x\_Symbol] \rightarrow \text{With}\{q = \text{Rt}[b^2 - 4ac, 2]\}, \text{Dist}[e/2 + (2cd - be)/(2q), \text{Int}[1/(b/2 - q/2 + cx^2), x], x] + \text{Dist}[e/2 - (2cd - be)/(2q), \text{Int}[1/(b/2 + q/2 + cx^2), x], x] /; \text{FreeQ}\{a, b, c, d, e, x\} \ \&\& \ \text{NeQ}[b^2 - 4ac, 0] \ \&\& \ \text{NeQ}[cd^2 - ae^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4ac]$

### Rule 1660

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

### Rule 1663

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

$(m - 1)/2]$

### Rule 1673

```
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



$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 58x^5 + jx^6 + kx^7}{(a + bx^2 + cx^4)^2} dx &= \int \frac{d + fx^2 + hx^4 + jx^6}{(a + bx^2 + cx^4)^2} dx + \int \frac{x(e + gx^2 + 58x^4 + kx^6)}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x \left( c \left( b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2 j) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x \left( c \left( b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2 j) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x \left( c \left( b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2 j) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x \left( c \left( b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2 j) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x \left( c \left( b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2 j) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

**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 +

$$\begin{aligned}
& 2*a*c*h + 3*a*\sqrt{b^2 - 4*a*c}*j)) * \text{ArcTan}[(\sqrt{2}*\sqrt{c}*x)/\sqrt{b - \sqrt{b^2 - 4*a*c}}] / (a*(b^2 - 4*a*c)^{(3/2)}*\sqrt{b - \sqrt{b^2 - 4*a*c}}) + (\sqrt{2}*\sqrt{c}*(a*b^3*j + b*c*(c*\sqrt{b^2 - 4*a*c}*d - 4*a*c*f + a*\sqrt{b^2 - 4*a*c}*h - 8*a^2*j) + 2*a*c*(6*c^2*d - c*\sqrt{b^2 - 4*a*c}*f + 2*a*c*h - 3*a*\sqrt{b^2 - 4*a*c}*j) + b^2*(-(c^2*d) + a*c*h + a*\sqrt{b^2 - 4*a*c}*j)) * \text{ArcTan}[(\sqrt{2}*\sqrt{c}*x)/\sqrt{b + \sqrt{b^2 - 4*a*c}}] / (a*(b^2 - 4*a*c)^{(3/2)}*\sqrt{b + \sqrt{b^2 - 4*a*c}}) + ((-4*c^3*e + 2*c^2*(b*g - 2*a*i) + b^2*(-(b + \sqrt{b^2 - 4*a*c})*k + a*c*(6*b*k - 4*\sqrt{b^2 - 4*a*c}*k)) * \text{Log}[-b + \sqrt{b^2 - 4*a*c} - 2*c*x^2]) / (b^2 - 4*a*c)^{(3/2)} + ((4*c^3*e + c^2*(-2*b*g + 4*a*i) + b^2*(b + \sqrt{b^2 - 4*a*c})*k - 2*a*c*(3*b + 2*\sqrt{b^2 - 4*a*c})*k) * \text{Log}[b + \sqrt{b^2 - 4*a*c} + 2*c*x^2]) / (b^2 - 4*a*c)^{(3/2)}) / (4*c^2)
\end{aligned}$$

**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]  $\text{int}((k*x^7+j*x^6+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x)$

[Out]  $\frac{1}{4}(4ac-b^2)^{2\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} (-4ac+b^2)^{\sqrt{2}} / (2b^2h \arctan(2^{\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) + \frac{1}{4}(4ac-b^2)^{2\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} \operatorname{arctanh}(2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) (-4ac+b^2)^{\sqrt{2}} b^2h + (-1/2/a(2a^2cj-ab^2j+abc^2h-2ac^2f+bc^2d)/(4ac-b^2)/c^2x^3+1/2(3abck-2ac^2i-b^3k+b^2ci-bc^2g+2c^3e)/(4ac-b^2)/c^2x^2+1/2(a^2bj-2a^2ch+abc^2f+2ac^2d-b^2cd)/a/c/(4ac-b^2)cx+1/2(2a^2ck-ab^2k+abc^2i-2ac^2g+bc^2e)/(4ac-b^2)/c^2)/(c^2x^4+b^2x^2+a)-1/4(4ac-b^2)^{2\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} (-4ac+b^2)^{\sqrt{2}} / ab^2cd \arctan(2^{\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) - 1/4c/(4ac-b^2)^2/a^{2\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} \operatorname{arctanh}(2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) (-4ac+b^2)^{\sqrt{2}} b^2d+4a^2/(4ac-b^2)^2 \ln(-2cx^2-b+(-4ac+b^2)^{\sqrt{2}})k+4a^2/(4ac-b^2)^2 \ln(2cx^2+b+(-4ac+b^2)^{\sqrt{2}})k-c/(4ac-b^2)^2 2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} \operatorname{arctanh}(2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) (-4ac+b^2)^{\sqrt{2}} b^2f-1/(4ac-b^2)^2 2^{\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} (-4ac+b^2)^{\sqrt{2}} b^2cf \arctan(2^{\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) - 2c^2/(4ac-b^2)^2 a^{2\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} \operatorname{arctanh}(2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) f+1/2c/(4ac-b^2)^2 2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} \operatorname{arctanh}(2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) b^2f+2/(4ac-b^2)^2 2^{\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} ac^2f \arctan(2^{\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) - 1/2/(4ac-b^2)^2 2^{\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} b^2cf \arctan(2^{\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) - 1/4c/(4ac-b^2)^2/a^{2\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} \operatorname{arctanh}(2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) b^3d+a/(4ac-b^2)^2 c^2 2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} \operatorname{arctanh}(2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) b^2h+1/2/(4ac-b^2)^2 (-4ac+b^2)^{\sqrt{2}} b^2g \ln(-2cx^2-b+(-4ac+b^2)^{\sqrt{2}}) + 1/(4ac-b^2)^2 (-4ac+b^2)^{\sqrt{2}} ce \ln(2cx^2+b+(-4ac+b^2)^{\sqrt{2}}) - 1/(4ac-b^2)^2 (-4ac+b^2)^{\sqrt{2}} ce \ln(-2cx^2-b+(-4ac+b^2)^{\sqrt{2}}) - 1/4/(4ac-b^2)^2 c^2 2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} \operatorname{arctanh}(2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) b^4j-3/2a/(4ac-b^2)^2/c \ln(2cx^2+b+(-4ac+b^2)^{\sqrt{2}}) (-4ac+b^2)^{\sqrt{2}} bk+6a^2/(4ac-b^2)^2 c^2 2^{\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} \arctan(2^{\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) j+1/4/(4ac-b^2)^2/c^2 2^{\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} \arctan(2^{\sqrt{2}} / ((b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) b^4j+5/2a/(4ac-b^2)^2 2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}} \operatorname{arctanh}(2^{\sqrt{2}} / ((-b+(-4ac+b^2)^{\sqrt{2}})c)^{\sqrt{2}})cx) b^2j-6a^2/(4ac-b^2)^2 c^2$

$$\begin{aligned} & (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)^j-5/2*a/(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*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)}*\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)}*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)}*\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)}*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)}*\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^3*j-2*a/(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*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*\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)+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)+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)}*\operatorname{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*\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)}*a*b*c*h*\operatorname{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)}*\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)}*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*\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*(-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 \end{aligned}$$

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

$$\frac{abc^2c - 2a^2c^2g + a^2bcI - (bc^2d - 2ac^2f + abc^2h - (ab^2c - 2a^2c^2))j^2 + (2ac^2c - abc^2g + (ab^2c - 2a^2c^2)k - (ab^2 - 3a^2bc)k)^2 - (a^2b^2 - 2a^2c)k + (abc^2f - 2a^2c^2h + a^2bcj - (b^2c^2 - 2ac^2)d)jx - \int \frac{2(ab^2 - 4a^2)k^3 + abc^2j - 2abcd + a^2j(b^2d - 2ac^2f + abc^2h + (ab^2 - 6a^2c))j^2 + (b^2c - 6a^2)j + 2(2ac^2c - abc^2g + 2a^2bc)jx}{c^4b^4a} dx}{2(a^2b^2c^2 - 4a^2c^3 + (ab^2c^3 - 4a^2c^4)j^2 + (ab^2c^2 - 4a^2bc^2)k^2)}$$

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)*i - (a*b^3 - 3*a^2*b*c)*k)*x^2 - (a^2*b^2 - 2*a^3*c)*k + (a*b*c^2*f
- 2*a^2*c^2*h + a^2*b*c*j - (b^2*c^2 - 2*a*c^3)*d)*x)/(a^2*b^2*c^2 - 4*a^3*
c^3 + (a*b^2*c^3 - 4*a^2*c^4)*x^4 + (a*b^3*c^2 - 4*a^2*b*c^3)*x^2) - 1/2*in
tegrate(-(2*(a*b^2 - 4*a^2*c)*k*x^3 + a*b*c*f - 2*a^2*c*h + a^2*b*j + (b*c^
2*d - 2*a*c^2*f + a*b*c*h + (a*b^2 - 6*a^2*c)*j)*x^2 + (b^2*c - 6*a*c^2)*d
- 2*(2*a*c^2*e - a*b*c*g + 2*a^2*c*i - a^2*b*k)*x)/(c*x^4 + b*x^2 + a), x)/
(a*b^2*c - 4*a^2*c^2)
```

**mupad [B]** time = 8.85, size = 53538, normalized size = 83.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^6 + k*x^7)/(a + b*x^2 +
c*x^4)^2, x)
```

```
[Out] ((b*c^2*e - 2*a*c^2*g - a*b^2*k + 2*a^2*c*k + a*b*c*i)/(2*c^2*(4*a*c - b^2)
) + (x^2*(2*c^3*e - b^3*k - b*c^2*g - 2*a*c^2*i + b^2*c*i + 3*a*b*c*k))/(2*
c^2*(4*a*c - b^2)) + (x*(2*a*c^2*d - b^2*c*d - 2*a^2*c*h + a^2*b*j + a*b*c*
f))/(2*a*c*(4*a*c - b^2)) - (x^3*(b*c^2*d - 2*a*c^2*f - a*b^2*j + 2*a^2*c*j
+ a*b*c*h))/(2*a*c*(4*a*c - b^2)))/(a + b*x^2 + c*x^4) + symsum(log(root(1
572864*a^8*b^2*c^9*z^4 - 983040*a^7*b^4*c^8*z^4 + 327680*a^6*b^6*c^7*z^4 -
61440*a^5*b^8*c^6*z^4 + 6144*a^4*b^10*c^5*z^4 - 256*a^3*b^12*c^4*z^4 - 1048
576*a^9*c^10*z^4 - 1572864*a^8*b^2*c^7*k*z^3 + 983040*a^7*b^4*c^6*k*z^3 - 3
27680*a^6*b^6*c^5*k*z^3 + 61440*a^5*b^8*c^4*k*z^3 - 6144*a^4*b^10*c^3*k*z^3
+ 256*a^3*b^12*c^2*k*z^3 + 1048576*a^9*c^8*k*z^3 + 98304*a^8*b*c^6*i*k*z^2
+ 98304*a^7*b*c^7*e*k*z^2 + 57344*a^7*b*c^7*f*j*z^2 + 32768*a^7*b*c^7*g*i*
z^2 + 57344*a^6*b*c^8*d*h*z^2 + 32768*a^6*b*c^8*e*g*z^2 - 32*a*b^10*c^4*d*f
*z^2 - 90112*a^7*b^3*c^5*i*k*z^2 + 30720*a^6*b^5*c^4*i*k*z^2 - 4608*a^5*b^7
*c^3*i*k*z^2 + 256*a^4*b^9*c^2*i*k*z^2 - 49152*a^7*b^2*c^6*g*k*z^2 + 45056*
a^6*b^4*c^5*g*k*z^2 + 24576*a^7*b^2*c^6*h*j*z^2 - 15360*a^5*b^6*c^4*g*k*z^2
- 3072*a^5*b^6*c^4*h*j*z^2 + 2304*a^4*b^8*c^3*g*k*z^2 + 2048*a^6*b^4*c^5*h
*j*z^2 + 576*a^4*b^8*c^3*h*j*z^2 - 128*a^3*b^10*c^2*g*k*z^2 - 32*a^3*b^10*c
^2*h*j*z^2 - 90112*a^6*b^3*c^6*e*k*z^2 - 49152*a^6*b^3*c^6*f*j*z^2 + 30720*
a^5*b^5*c^5*e*k*z^2 - 24576*a^6*b^3*c^6*g*i*z^2 + 15360*a^5*b^5*c^5*f*j*z^2
+ 6144*a^5*b^5*c^5*g*i*z^2 - 4608*a^4*b^7*c^4*e*k*z^2 - 2048*a^4*b^7*c^4*f
*j*z^2 - 512*a^4*b^7*c^4*g*i*z^2 + 256*a^3*b^9*c^3*e*k*z^2 + 96*a^3*b^9*c^3
*f*j*z^2 + 131072*a^6*b^2*c^7*d*j*z^2 + 49152*a^6*b^2*c^7*e*i*z^2 - 43008*a
^5*b^4*c^6*d*j*z^2 - 12288*a^5*b^4*c^6*e*i*z^2 + 6144*a^5*b^4*c^6*f*h*z^2 +
6144*a^4*b^6*c^5*d*j*z^2 - 2048*a^4*b^6*c^5*f*h*z^2 + 1024*a^4*b^6*c^5*e*i
*z^2 - 320*a^3*b^8*c^4*d*j*z^2 + 192*a^3*b^8*c^4*f*h*z^2 - 49152*a^5*b^3*c^
7*d*h*z^2 - 24576*a^5*b^3*c^7*e*g*z^2 + 15360*a^4*b^5*c^6*d*h*z^2 + 6144*a^
4*b^5*c^6*e*g*z^2 - 2048*a^3*b^7*c^5*d*h*z^2 - 512*a^3*b^7*c^5*e*g*z^2 + 96
```

$$\begin{aligned}
& *a^2*b^9*c^4*d*h*z^2 + 24576*a^5*b^2*c^8*d*f*z^2 - 3072*a^3*b^6*c^6*d*f*z^2 \\
& + 2048*a^4*b^4*c^7*d*f*z^2 + 576*a^2*b^8*c^5*d*f*z^2 + 1536*a^4*b^10*c*k^2 \\
& *z^2 + 61440*a^8*b*c^6*j^2*z^2 - 16*a^3*b^11*c*j^2*z^2 + 12288*a^7*b*c^7*h^ \\
& 2*z^2 + 12288*a^6*b*c^8*f^2*z^2 + 61440*a^5*b*c^9*d^2*z^2 + 432*a*b^9*c^5*d \\
& ^2*z^2 - 49152*a^8*c^7*h*j*z^2 - 147456*a^7*c^8*d*j*z^2 - 65536*a^7*c^8*e*i \\
& *z^2 - 16384*a^7*c^8*f*h*z^2 - 49152*a^6*c^9*d*f*z^2 + 516096*a^8*b^2*c^5*k \\
& ^2*z^2 - 288768*a^7*b^4*c^4*k^2*z^2 + 88576*a^6*b^6*c^3*k^2*z^2 - 15744*a^5 \\
& *b^8*c^2*k^2*z^2 - 61440*a^7*b^3*c^5*j^2*z^2 + 24064*a^6*b^5*c^4*j^2*z^2 - \\
& 4608*a^5*b^7*c^3*j^2*z^2 + 432*a^4*b^9*c^2*j^2*z^2 + 24576*a^7*b^2*c^6*i^2* \\
& z^2 - 6144*a^6*b^4*c^5*i^2*z^2 + 512*a^5*b^6*c^4*i^2*z^2 - 8192*a^6*b^3*c^6 \\
& *h^2*z^2 + 1536*a^5*b^5*c^5*h^2*z^2 - 16*a^3*b^9*c^3*h^2*z^2 - 8192*a^6*b^2 \\
& *c^7*g^2*z^2 + 6144*a^5*b^4*c^6*g^2*z^2 - 1536*a^4*b^6*c^5*g^2*z^2 + 128*a^ \\
& 3*b^8*c^4*g^2*z^2 - 8192*a^5*b^3*c^7*f^2*z^2 + 1536*a^4*b^5*c^6*f^2*z^2 - 1 \\
& 6*a^2*b^9*c^4*f^2*z^2 + 24576*a^5*b^2*c^8*e^2*z^2 - 6144*a^4*b^4*c^7*e^2*z^ \\
& 2 + 512*a^3*b^6*c^6*e^2*z^2 - 61440*a^4*b^3*c^8*d^2*z^2 + 24064*a^3*b^5*c^7 \\
& *d^2*z^2 - 4608*a^2*b^7*c^6*d^2*z^2 - 393216*a^9*c^6*k^2*z^2 - 64*a^3*b^12*k \\
& ^2*z^2 - 32768*a^8*c^7*i^2*z^2 - 32768*a^6*c^9*e^2*z^2 - 16*b^11*c^4*d^2*z \\
& ^2 - 16384*a^7*b*c^5*g*i*k*z - 10240*a^7*b*c^5*f*j*k*z + 4096*a^7*b*c^5*h*i \\
& *j*z - 47104*a^6*b*c^6*d*h*k*z - 16384*a^6*b*c^6*e*g*k*z + 6144*a^6*b*c^6*f \\
& *g*j*z + 4096*a^6*b*c^6*e*h*j*z + 32*a*b^10*c^2*d*f*k*z - 6144*a^5*b*c^7*d* \\
& g*h*z - 4096*a^5*b*c^7*d*f*i*z - 32*a*b^8*c^4*d*f*g*z - 4096*a^4*b*c^8*d*e* \\
& f*z + 64*a*b^7*c^5*d*e*f*z - 18432*a^7*b^2*c^4*h*j*k*z + 4608*a^6*b^4*c^3*h \\
& *j*k*z - 384*a^5*b^6*c^2*h*j*k*z + 12288*a^6*b^3*c^4*g*i*k*z + 7680*a^6*b^3 \\
& *c^4*f*j*k*z - 3072*a^6*b^3*c^4*h*i*j*z - 3072*a^5*b^5*c^3*g*i*k*z - 1920*a \\
& ^5*b^5*c^3*f*j*k*z + 768*a^5*b^5*c^3*h*i*j*z + 256*a^4*b^7*c^2*g*i*k*z + 16 \\
& 0*a^4*b^7*c^2*f*j*k*z - 64*a^4*b^7*c^2*h*i*j*z - 65536*a^6*b^2*c^5*d*j*k*z \\
& - 24576*a^6*b^2*c^5*e*i*k*z + 21504*a^5*b^4*c^4*d*j*k*z + 9216*a^6*b^2*c^5* \\
& f*i*j*z + 6144*a^5*b^4*c^4*e*i*k*z - 3072*a^5*b^4*c^4*f*h*k*z - 3072*a^4*b^ \\
& 6*c^3*d*j*k*z - 2304*a^5*b^4*c^4*f*i*j*z - 2048*a^6*b^2*c^5*g*h*j*z + 1536* \\
& a^5*b^4*c^4*g*h*j*z + 1024*a^4*b^6*c^3*f*h*k*z - 512*a^4*b^6*c^3*e*i*k*z - \\
& 384*a^4*b^6*c^3*g*h*j*z + 192*a^4*b^6*c^3*f*i*j*z + 160*a^3*b^8*c^2*d*j*k*z \\
& - 96*a^3*b^8*c^2*f*h*k*z + 32*a^3*b^8*c^2*g*h*j*z + 41472*a^5*b^3*c^5*d*h* \\
& k*z - 13440*a^4*b^5*c^4*d*h*k*z + 12288*a^5*b^3*c^5*e*g*k*z - 4608*a^5*b^3* \\
& c^5*f*g*j*z - 3072*a^5*b^3*c^5*e*h*j*z - 3072*a^4*b^5*c^4*e*g*k*z + 1888*a^ \\
& 3*b^7*c^3*d*h*k*z + 1152*a^4*b^5*c^4*f*g*j*z + 768*a^4*b^5*c^4*e*h*j*z + 25 \\
& 6*a^3*b^7*c^3*e*g*k*z - 96*a^3*b^7*c^3*f*g*j*z - 96*a^2*b^9*c^2*d*h*k*z - 6 \\
& 4*a^3*b^7*c^3*e*h*j*z + 9216*a^5*b^2*c^6*e*f*j*z - 9216*a^5*b^2*c^6*d*h*i*z \\
& - 6656*a^4*b^4*c^5*d*f*k*z - 6144*a^5*b^2*c^6*d*f*k*z + 3456*a^3*b^6*c^4*d \\
& *f*k*z - 2304*a^4*b^4*c^5*e*f*j*z + 2304*a^4*b^4*c^5*d*h*i*z - 576*a^2*b^8* \\
& c^3*d*f*k*z + 192*a^3*b^6*c^4*e*f*j*z - 192*a^3*b^6*c^4*d*h*i*z + 4608*a^4* \\
& b^3*c^6*d*g*h*z + 3072*a^4*b^3*c^6*d*f*i*z - 1152*a^3*b^5*c^5*d*g*h*z - 768 \\
& *a^3*b^5*c^5*d*f*i*z + 96*a^2*b^7*c^4*d*g*h*z + 64*a^2*b^7*c^4*d*f*i*z - 92 \\
& 16*a^4*b^2*c^7*d*e*h*z + 2304*a^3*b^4*c^6*d*e*h*z + 2048*a^4*b^2*c^7*d*f*g* \\
& z - 1536*a^3*b^4*c^6*d*f*g*z + 384*a^2*b^6*c^5*d*f*g*z - 192*a^2*b^6*c^5*d* \\
& e*h*z + 3072*a^3*b^3*c^7*d*e*f*z - 768*a^2*b^5*c^6*d*e*f*z - 3072*a^8*b*c^4
\end{aligned}$$

$$\begin{aligned}
& j^2 k^2 z + 48 a^5 b^7 c^j k^2 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^2 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^2 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^2 z - 1024 a^6 b^c^6 g^h^2 z - 432 a^b^9 c^3 d^2 k^2 z + 1024 a^5 b^c^7 f^2 g^2 z + 32 a^b^8 c^4 d^2 i^2 z - 9216 a^4 b^c^8 d^2 g^2 z + 336 a^b^7 c^5 d^2 g^2 z - 672 a^b^6 c^6 d^2 e^2 z + 24576 a^8 c^5 h^j k^2 z + 73728 a^7 c^6 d^j k^2 z + 32768 a^7 c^6 e^i k^2 z - 12288 a^7 c^6 f^i j^2 z + 8192 a^7 c^6 f^h k^2 z + 24576 a^6 c^7 d^f k^2 z - 12288 a^6 c^7 e^f j^2 z + 12288 a^6 c^7 d^h i^2 z + 12288 a^5 c^8 d^e h^2 z + 2304 a^7 b^3 c^3 j^2 k^2 z - 576 a^6 b^5 c^2 j^2 k^2 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^2 z + 3072 a^6 b^4 c^3 i^2 k^2 z - 256 a^5 b^6 c^2 i^2 k^2 z + 15872 a^7 b^2 c^4 i^j^2 z + 6912 a^6 b^3 c^4 h^2 k^2 z - 4992 a^6 b^4 c^3 i^j^2 z - 1728 a^5 b^5 c^3 h^2 k^2 z + 672 a^5 b^6 c^2 i^j^2 z + 144 a^4 b^7 c^2 h^2 k^2 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^2 z - 3072 a^5 b^4 c^4 g^2 k^2 z + 768 a^4 b^6 c^3 g^2 k^2 z - 64 a^3 b^8 c^2 g^2 k^2 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^2 z + 1280 a^5 b^3 c^5 f^2 k^2 z + 384 a^5 b^4 c^4 h^2 i^2 z - 336 a^4 b^7 c^2 g^j^2 z + 192 a^4 b^5 c^4 f^2 k^2 z - 144 a^3 b^7 c^3 f^2 k^2 z - 32 a^4 b^6 c^3 h^2 i^2 z + 16 a^2 b^9 c^2 f^2 k^2 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^2 z + 3072 a^4 b^4 c^5 e^2 k^2 z + 2304 a^4 b^7 c^2 e^k^2 z - 256 a^3 b^6 c^4 e^2 k^2 z + 59136 a^4 b^3 c^6 d^2 k^2 z - 23488 a^3 b^5 c^5 d^2 k^2 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^2 z + 1536 a^5 b^2 c^6 f^2 i^2 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^2 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^2 z + 16 a^3 b^7 c^3 g^h^2 z - 15872 a^4 b^2 c^7 d^2 i^2 z + 4992 a^3 b^4 c^6 d^2 i^2 z - 1536 a^5 b^2 c^6 e^h^2 z - 768 a^4 b^3 c^6 f^2 g^2 z - 672 a^2 b^6 c^5 d^2 i^2 z + 384 a^4 b^4 c^5 e^h^2 z + 192 a^3 b^5 c^5 f^2 g^2 z - 32 a^3 b^6 c^4 e^h^2 z - 16 a^2 b^7 c^4 f^2 g^2 z + 7936 a^3 b^3 c^7 d^2 g^2 z - 2496 a^2 b^5 c^6 d^2 g^2 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^2 z + 4992 a^2 b^4 c^7 d^2 e^2 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^2 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^2 z + 64 a^3 b^10 g^k^2 z + 16384 a^6 c^7 e^2 k^2 z + 16 b^11 c^2 d^2 k^2 z - 18432 a^7 c^6 e^j^2 z - 2048 a^6 c^7 f^2 i^2 z + 18432 a^5 c^8 d^2 i^2 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^2 z - 2048 a^5 c^8 e^f^2 z + 32 b^8 c^5 d^2 e^2 z + 18432 a^4 c^9 d^2 e^2 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
\end{aligned}$$

$$\begin{aligned}
& 56a^4b^6c^6efgh - 32a^7b^3c^3d^2efk - 768a^3b^7c^7d^2efg + 32a^8b^5c^5d^2efg + 576a^6b^3c^2h^2ij^2k + 1664a^6b^2c^3g^2h^2j^2k + 384a^6b^2c^3f^2ij^2k - 288a^5b^4c^2g^2h^2j^2k - 160a^5b^4c^2f^2ij^2k + 2112a^5b^3c^3d^2ij^2k + 576a^5b^3c^3e^2h^2j^2k - 448a^5b^3c^3f^2h^2ik - 192a^5b^3c^3g^2h^2ij - 192a^5b^3c^3f^2g^2j^2k - 160a^4b^5c^2d^2ij^2k + 96a^4b^5c^2f^2h^2ik + 80a^4b^5c^2f^2g^2j^2k + 32a^4b^5c^2g^2h^2ij + 4992a^5b^2c^4d^2h^2ik - 4608a^5b^2c^4e^2g^2ik + 3456a^5b^2c^4d^2g^2j^2k - 1312a^4b^4c^3d^2h^2ik - 1056a^4b^4c^3d^2g^2j^2k + 896a^5b^2c^4d^2f^2g^2ij + 768a^4b^4c^3e^2g^2ik + 384a^5b^2c^4f^2g^2h^2k + 384a^5b^2c^4e^2h^2ij + 384a^5b^2c^4e^2f^2j^2k + 224a^4b^4c^3f^2g^2h^2k - 160a^4b^4c^3e^2f^2j^2k - 96a^4b^4c^3f^2g^2ij + 96a^3b^6c^2d^2h^2ik + 80a^3b^6c^2d^2g^2j^2k - 64a^4b^4c^3e^2h^2ij - 48a^3b^6c^2f^2g^2h^2k - 2496a^4b^3c^4d^2g^2h^2k + 2112a^4b^3c^4d^2e^2j^2k - 960a^4b^3c^4d^2f^2ik + 656a^3b^5c^3d^2g^2h^2k - 448a^4b^3c^4e^2f^2h^2k + 384a^3b^5c^3d^2f^2ik + 320a^4b^3c^4d^2g^2ij - 192a^4b^3c^4f^2g^2hi - 192a^4b^3c^4e^2g^2h^2j + 192a^4b^3c^4e^2f^2ij - 160a^3b^5c^3d^2e^2j^2k + 96a^3b^5c^3e^2f^2h^2k - 48a^2b^7c^2d^2g^2h^2k + 32a^3b^5c^3e^2g^2h^2j - 32a^2b^7c^2d^2f^2ik + 4992a^4b^2c^5d^2e^2h^2k - 3584a^4b^2c^5d^2f^2h^2j - 1312a^3b^4c^4d^2e^2h^2k + 896a^4b^2c^5e^2f^2g^2j + 896a^4b^2c^5d^2g^2h^2i + 640a^4b^2c^5d^2f^2g^2k - 640a^4b^2c^5d^2e^2ij + 600a^3b^4c^4d^2f^2h^2j + 480a^3b^4c^4d^2f^2g^2k + 384a^4b^2c^5e^2f^2hi - 192a^2b^6c^3d^2f^2g^2k - 96a^3b^4c^4e^2f^2g^2j - 96a^3b^4c^4d^2g^2h^2i + 96a^2b^6c^3d^2e^2h^2k + 12a^2b^6c^3d^2f^2h^2j - 960a^3b^3c^5d^2e^2f^2k + 384a^2b^5c^4d^2e^2f^2k + 320a^3b^3c^5d^2e^2g^2j - 192a^3b^3c^5e^2f^2gh - 192a^3b^3c^5d^2f^2gi + 192a^3b^3c^5d^2e^2hi + 32a^2b^5c^4d^2f^2gi + 896a^3b^2c^6d^2e^2gh + 384a^3b^2c^6d^2e^2fi - 96a^2b^4c^5d^2e^2gh - 64a^2b^4c^5d^2e^2fi - 192a^2b^3c^6d^2e^2fg + 48a^6b^4c^2ij^2k - 1424a^6b^4c^2h^2j^2k^2 - 2304a^7b^3c^3g^2j^2k - 24a^5b^5c^2g^2j^2k + 2048a^7b^3c^3g^2ik^2 - 1024a^7b^3c^3f^2j^2k^2 - 768a^5b^5c^2g^2ik^2 + 408a^5b^5c^2f^2j^2k^2 + 256a^6b^3c^4g^2h^2k + 16a^4b^6c^2g^2ij^2 + 4608a^6b^3c^4e^2i^2k + 4608a^5b^3c^5e^2i^2k - 896a^6b^3c^4f^2i^2j + 768a^4b^6c^2d^2j^2k^2 - 256a^4b^6c^2f^2h^2k^2 - 128a^4b^6c^2e^2i^2k^2 + 2208a^6b^3c^4f^2h^2j^2 - 1920a^6b^3c^4e^2ij^2 + 800a^5b^3c^5f^2h^2j - 256a^5b^3c^5f^2g^2k - 16a^8b^8c^2d^2i^2k + 6a^3b^7c^2f^2h^2j^2 + 8192a^6b^3c^4d^2h^2k^2 + 2048a^6b^3c^4e^2g^2k^2 - 472a^3b^7c^2d^2h^2k^2 + 64a^3b^7c^2e^2g^2k^2 + 4896a^4b^3c^6d^2h^2j + 2304a^4b^3c^6d^2g^2k + 1824a^5b^3c^5d^2h^2j - 384a^5b^3c^5e^2h^2i - 168a^6b^7c^3d^2g^2k + 42a^6b^7c^3d^2h^2j + 6a^2b^8c^2d^2h^2j^2 + 1536a^5b^3c^5e^2gi^2 + 1536a^4b^3c^6e^2gi^2 - 896a^5b^3c^5d^2h^2i^2 - 896a^4b^3c^6e^2f^2j + 144a^2b^8c^2d^2f^2k^2 + 4896a^5b^3c^5d^2f^2j^2 + 1824a^4b^3c^6d^2f^2j - 384a^4b^3c^6e^2f^2i + 336a^6b^3c^4d^2e^2k - 156a^6b^3c^4d^2f^2j + 16a^6b^3c^4d^2g^2i + 12a^6b^7c^3d^2f^2j + 2208a^3b^3c^7d^2f^2h - 1920a^3b^3c^7d^2e^2i + 800a^4b^3c^6d^2f^2h^2 - 102a^6b^5c^5d^2f^2h - 32a^6b^5c^5d^2e^2i + 12a^6b^6c^4d^2f^2h - 2a^6b^7c^3d^2f^2h^2 - 896a^3b^3c^7d^2e^2h - 8a^6b^6c^4d^2f^2g^2 - 240a^6b^4c^6d^2e^2g - 32a^6b^4c^6d^2e^2f + 3072a^7c^4f^2ij^2k + 3072a^6c^5e^2f^2j^2k - 3
\end{aligned}$$



$$\begin{aligned}
& 072*a^6*c^5*d*h*i*k + 1536*a^6*c^5*e*h*i*j + 4608*a^5*c^6*d*e*i*j - 3072*a^5*c^6*d*e*h*k - 1152*a^5*c^6*d*f*h*j + 512*a^5*c^6*e*f*h*i + 1536*a^4*c^7*d \\
& *e*f*i - 2*a*b^9*c*d*f*j^2 - 1088*a^7*b^2*c^2*i*j^2*k + 4800*a^7*b^2*c^2*h*j*k^2 + 960*a^6*b^2*c^3*h^2*i*k + 544*a^6*b^3*c^2*g*j^2*k - 144*a^5*b^4*c^2 \\
& *h^2*i*k - 2304*a^6*b^2*c^3*g*i^2*k + 1920*a^6*b^3*c^2*g*i*k^2 + 1152*a^5*b^3*c^3*g^2*i*k - 864*a^6*b^3*c^2*f*j*k^2 + 384*a^5*b^4*c^2*g*i^2*k + 192*a^6 \\
& *b^2*c^3*h*i^2*j - 192*a^4*b^5*c^2*g^2*i*k - 32*a^5*b^4*c^2*h*i^2*j - 1088*a^6*b^2*c^3*e*j^2*k + 960*a^6*b^2*c^3*g*i*j^2 - 480*a^5*b^3*c^3*g*h^2*k - \\
& 240*a^5*b^4*c^2*g*i*j^2 + 192*a^5*b^2*c^4*f^2*i*k + 72*a^4*b^5*c^2*g*h^2*k + 48*a^5*b^4*c^2*e*j^2*k + 48*a^4*b^4*c^3*f^2*i*k - 16*a^3*b^6*c^2*f^2*i*k \\
& + 13376*a^6*b^2*c^3*d*j*k^2 - 5136*a^5*b^4*c^2*d*j*k^2 - 3840*a^6*b^2*c^3*e*i*k^2 + 1536*a^5*b^4*c^2*e*i*k^2 - 768*a^5*b^3*c^3*e*i^2*k - 768*a^4*b^3*c^4 \\
& *e^2*i*k + 624*a^5*b^4*c^2*f*h*k^2 + 576*a^6*b^2*c^3*f*h*k^2 + 192*a^5*b^2*c^4*g^2*h*j + 96*a^5*b^3*c^3*f*i^2*j + 48*a^4*b^4*c^3*g^2*h*j - 8*a^3*b^6 \\
& *c^2*g^2*h*j + 6848*a^4*b^2*c^5*d^2*i*k - 2448*a^3*b^4*c^4*d^2*i*k + 960*a^5*b^2*c^4*e*h^2*k - 864*a^5*b^2*c^4*f*h^2*j + 480*a^5*b^3*c^3*e*i*j^2 + 336 \\
& *a^4*b^3*c^4*f^2*h*j + 336*a^2*b^6*c^3*d^2*i*k + 192*a^5*b^2*c^4*g*h^2*i + 144*a^5*b^3*c^3*f*h*j^2 - 144*a^4*b^4*c^3*e*h^2*k - 102*a^4*b^5*c^2*f*h*j^2 \\
& - 96*a^4*b^3*c^4*f^2*g*k - 32*a^4*b^5*c^2*e*i*j^2 - 30*a^3*b^5*c^3*f^2*h*j - 24*a^3*b^5*c^3*f^2*g*k + 16*a^4*b^4*c^3*g*h^2*i - 12*a^4*b^4*c^3*f*h^2*j \\
& + 12*a^3*b^6*c^2*f*h^2*j + 8*a^2*b^7*c^2*f^2*g*k - 2*a^2*b^7*c^2*f^2*h*j - 9312*a^5*b^3*c^3*d*h*k^2 + 3288*a^4*b^5*c^2*d*h*k^2 - 2304*a^4*b^2*c^5*e^2 \\
& *g*k + 1920*a^5*b^3*c^3*e*g*k^2 + 1152*a^4*b^3*c^4*e*g^2*k - 768*a^4*b^5*c^2*e*g*k^2 + 384*a^3*b^4*c^4*e^2*g*k - 320*a^5*b^2*c^4*d*i^2*j - 224*a^4*b^3 \\
& *c^4*f*g^2*j + 192*a^5*b^2*c^4*f*h*i^2 + 192*a^4*b^2*c^5*e^2*h*j - 192*a^3*b^5*c^3*e*g^2*k - 32*a^3*b^4*c^4*e^2*h*j + 24*a^3*b^5*c^3*f*g^2*j - 3552*a^5 \\
& *b^2*c^4*d*h*j^2 - 3424*a^3*b^3*c^5*d^2*g*k + 1332*a^4*b^4*c^3*d*h*j^2 + 1224*a^2*b^5*c^4*d^2*g*k + 960*a^5*b^2*c^4*e*g*j^2 - 496*a^3*b^3*c^5*d^2*h*j \\
& + 432*a^4*b^3*c^4*d*h^2*j - 240*a^4*b^4*c^3*e*g*j^2 - 222*a^2*b^5*c^4*d^2*h*j + 192*a^4*b^2*c^5*f^2*g*i + 192*a^4*b^2*c^5*e*f^2*k - 174*a^3*b^5*c^3*d \\
& *h^2*j - 156*a^3*b^6*c^2*d*h*j^2 + 48*a^3*b^4*c^4*e*f^2*k - 32*a^4*b^3*c^4*e*h^2*i + 16*a^3*b^6*c^2*e*g*j^2 + 16*a^3*b^4*c^4*f^2*g*i - 16*a^2*b^6*c^3*e \\
& *f^2*k + 12*a^2*b^7*c^2*d*h^2*j + 1728*a^5*b^2*c^4*d*f*k^2 + 1392*a^4*b^4*c^3*d*f*k^2 - 840*a^3*b^6*c^2*d*f*k^2 - 768*a^4*b^2*c^5*e*g^2*i + 576*a^4*b^2 \\
& *c^5*d*g^2*j + 96*a^4*b^3*c^4*d*h*i^2 + 96*a^3*b^3*c^5*e^2*f*j - 80*a^3*b^4*c^4*d*g^2*j + 64*a^4*b^2*c^5*f*g^2*h + 48*a^3*b^4*c^4*f*g^2*h + 6848*a^3 \\
& *b^2*c^6*d^2*e*k - 3552*a^3*b^2*c^6*d^2*f*j - 2448*a^2*b^4*c^5*d^2*e*k + 1332*a^2*b^4*c^5*d^2*f*j + 960*a^3*b^2*c^6*d^2*g*i - 496*a^4*b^3*c^4*d*f*j^2 \\
& + 432*a^3*b^3*c^5*d*f^2*j - 240*a^2*b^4*c^5*d^2*g*i - 222*a^3*b^5*c^3*d*f*j^2 + 192*a^4*b^2*c^5*e*g*h^2 - 174*a^2*b^5*c^4*d*f^2*j + 42*a^2*b^7*c^2*d*f \\
& *j^2 - 32*a^3*b^3*c^5*e*f^2*i + 16*a^3*b^4*c^4*e*g*h^2 - 320*a^3*b^2*c^6*d*e^2*j - 224*a^3*b^3*c^5*d*g^2*h + 192*a^4*b^2*c^5*d*f*i^2 + 192*a^3*b^2*c^6 \\
& *e^2*f*h - 32*a^3*b^4*c^4*d*f*i^2 + 24*a^2*b^5*c^4*d*g^2*h - 864*a^3*b^2*c^6*d*f^2*h + 480*a^2*b^3*c^6*d^2*e*i + 336*a^3*b^3*c^5*d*f*h^2 + 192*a^3*b^2 \\
& *c^6*e*f^2*g + 144*a^2*b^3*c^6*d^2*f*h - 30*a^2*b^5*c^4*d*f*h^2 + 16*a^2*b^
\end{aligned}$$

$$\begin{aligned}
& 4*c^5*e*f^2*g - 12*a^2*b^4*c^5*d*f^2*h + 192*a^3*b^2*c^6*d*f*g^2 + 96*a^2*b^3*c^6*d*e^2*h + 48*a^2*b^4*c^5*d*f*g^2 + 960*a^2*b^2*c^7*d^2*e*g + 192*a^2*b^2*c^7*d*e^2*f - 3072*a^8*b*c^2*j^2*k^2 + 1104*a^7*b^3*c*j^2*k^2 + 768*a^6*b^4*c*i^2*k^2 - 256*a^6*b^3*c^2*i^3*k + 1536*a^7*b*c^3*h^2*k^2 - 960*a^7*b*c^3*i^2*j^2 + 444*a^5*b^5*c*h^2*k^2 - 16*a^5*b^5*c*i^2*j^2 - 3072*a^7*b^2*c^2*g*k^3 - 496*a^6*b^3*c^2*h*j^3 + 192*a^4*b^6*c*g^2*k^2 - 192*a^4*b^4*c^3*g^3*k + 144*a^5*b^3*c^3*h^3*j + 32*a^3*b^6*c^2*g^3*k - 18*a^4*b^5*c^2*h^3*j - 9*a^4*b^6*c*h^2*j^2 - 192*a^6*b*c^4*h^2*i^2 + 36*a^3*b^7*c*f^2*k^2 - 4*a^3*b^7*c*g^2*j^2 - 2176*a^6*b^3*c^2*e*k^3 - 256*a^3*b^3*c^5*e^3*k - 192*a^6*b^2*c^3*f*j^3 - 192*a^4*b^2*c^5*f^3*j + 132*a^5*b^4*c^2*f*j^3 + 128*a^4*b^3*c^4*g^3*i - 28*a^3*b^4*c^4*f^3*j + 6*a^2*b^6*c^3*f^3*j + 10752*a^5*b*c^5*d^2*k^2 - 960*a^5*b*c^5*e^2*j^2 - 192*a^5*b*c^5*f^2*i^2 - 1680*a^5*b^3*c^3*d*j^3 - 1680*a^2*b^3*c^6*d^3*j + 222*a^4*b^5*c^2*d*j^3 + 80*a^4*b^3*c^4*f*h^3 + 80*a^3*b^3*c^5*f^3*h + 30*a*b^8*c^2*d^2*j^2 + 6*a^3*b^5*c^3*f*h^3 + 6*a^2*b^5*c^4*f^3*h - 960*a^4*b*c^6*d^2*i^2 - 192*a^4*b*c^6*e^2*h^2 - 192*a^4*b^2*c^5*d*h^3 - 192*a^2*b^2*c^7*d^3*h + 128*a^3*b^3*c^5*e*g^3 - 28*a^3*b^4*c^4*d*h^3 + 12*a*b^6*c^4*d^2*h^2 + 6*a^2*b^6*c^3*d*h^3 - 192*a^3*b*c^7*e^2*f^2 + 60*a*b^5*c^5*d^2*g^2 + 198*a*b^4*c^6*d^2*f^2 + 144*a^2*b^3*c^6*d*f^3 - 960*a^2*b*c^8*d^2*e^2 + 240*a*b^3*c^7*d^2*e^2 + 4608*a^8*c^3*i*j^2*k - 3072*a^8*c^3*h*j*k^2 - 512*a^7*c^4*h^2*i*k + 120*a^5*b^6*h*j*k^2 + 768*a^7*c^4*h*i^2*j + 4608*a^7*c^4*e*j^2*k + 512*a^6*c^5*f^2*i*k + 64*a^4*b^7*g*i*k^2 - 40*a^4*b^7*f*j*k^2 - 9216*a^7*c^4*d*j*k^2 - 4096*a^7*c^4*e*i*k^2 - 1024*a^7*c^4*f*h*k^2 - 4608*a^5*c^6*d^2*i*k - 512*a^6*c^5*e*h^2*k - 192*a^6*c^5*f*h^2*j - 40*a^3*b^8*d*j*k^2 + 24*a^3*b^8*f*h*k^2 + 2304*a^6*c^5*d*i^2*j + 768*a^5*c^6*e^2*h*j + 256*a^6*c^5*f*h*i^2 + 8*b^9*c^2*d^2*g*k - 2*b^9*c^2*d^2*h*j + 6144*a^8*b*c^2*i*k^3 - 2176*a^7*b^3*c*i*k^3 - 1728*a^6*c^5*d*h*j^2 + 1536*a^7*b*c^3*i^3*k + 512*a^5*c^6*e*f^2*k + 24*a^2*b^9*d*h*k^2 - 3072*a^6*c^5*d*f*k^2 - 16*b^8*c^3*d^2*e*k + 6*b^8*c^3*d^2*f*j - 4608*a^4*c^7*d^2*e*k + 2016*a^7*b*c^3*h*j^3 - 1728*a^4*c^7*d^2*f*j + 1088*a^6*b^4*c*g*k^3 + 224*a^6*b*c^4*h^3*j + 30*a^5*b^5*c*h*j^3 + 2304*a^4*c^7*d*e^2*j + 768*a^5*c^6*d*f*i^2 + 256*a^4*c^7*e^2*f*h + 6*b^7*c^4*d^2*f*h + 6144*a^7*b*c^3*e*k^3 + 1536*a^4*b*c^6*e^3*k + 512*a^6*b*c^4*g*i^3 + 192*a^5*b^5*c*e*k^3 - 192*a^4*c^7*d*f^2*h - 10*a^4*b^6*c*f*j^3 + 108*a*b^9*c*d^2*k^2 + 16*b^6*c^5*d^2*e*g + 4320*a^6*b*c^4*d*j^3 + 4320*a^3*b*c^7*d^3*j + 222*a*b^5*c^5*d^3*j + 96*a^5*b*c^5*f*h^3 + 96*a^4*b*c^6*f^3*h - 10*a^3*b^7*c*d*j^3 + 768*a^3*c^8*d*e^2*f + 512*a^3*b*c^7*e^3*g + 132*a*b^4*c^6*d^3*h + 2016*a^2*b*c^8*d^3*f - 496*a*b^3*c^7*d^3*f + 224*a^3*b*c^7*d*f^3 - 18*a*b^5*c^5*d*f^3 - 1920*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*
\end{aligned}$$

$$\begin{aligned}
& b^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^2b^10d^2fk^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^2b^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^2b^5c^5d^2e + 1024a^3b^2c^7d^2e - 16a^2b^6c^4d^2g + 1024a^4b^2c^6d^2i + 512a^4b^2c^6e^2h + 256a^4b^2c^6f^2g + 16a^2b^8c^2d^2k + 256a^5b^2c^5f^2k + 768a^5b^2c^5g^2j + 512a^5b^2c^5h^2i + 1792a^6b^2c^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^4d^2k - 32a^3b^4c^4e^2j + 32a^3b^4c^4f^2i + 64a^3b^4c^4g^2h - 4352a^4b^2c^5d^2k + 512a^4b^2c^5e^2j - 256a^4b^2c^5g^2h + 16a^2b^7c^2f^2k - 144a^3b^5c^3f^2k + 16a^3b^5c^3g^2j + 256a^4b^3c^4f^2k - 256a^4b^3c^4g^2j - 128a^4b^3c^4h^2i - 48a^3b^6c^2h^2k + 512a^4b^4c^3h^2k - 32a^4b^4c^3i^2j - 1536a^5b^2c^4h^2k + 512a^5b^2c^4i^2j + 80a^4b^5c^2j^2k - 768a^5b^3c^3j^2k) / (8(64a^5c^5 - a^2b^6c^2 + 12a^3b^4c^3 - 48a^4b^2c^4)) - \text{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^7kz^3 + 983040a^7b^4c^6kz^3 - 327680a^6b^6c^5kz^3 + 61440a^5b^8c^4kz^3 - 6144a^4b^10c^3kz^3 + 256a^3b^12c^2kz^3 + 1048576a^9c^8kz^3 + 98304a^8b^2c^6ikz^2 + 98304a^7b^2c^7ekz^2 + 57344a^7b^2c^7fjz^2 + 32768a^7b^2c^7giz^2 + 57344a^6b^2c^8d^2hz^2 + 32768a^6b^2c^8egz^2 - 32a^2b^10c^4d^2fz^2 - 90112a^7b^3c^5ikz^2 + 30720a^6b^5c^4ikz^2 - 4608a^5b^7c^3ikz^2 + 256a^4b^9c^2ikz^2 - 49152a^7b^2c^6gkz^2 + 45056a^6b^4c^5gkz^2 + 24576a^7b^2c^6hjz^2 - 15360a^5b^6c^4gkz^2 - 3072a^5b^6c^4hjz^2 + 2304a^
\end{aligned}$$

$$\begin{aligned}
& a^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^7d^jz^2 + 49152a^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^2k^2z^2 + 61440a^8b^6c^6j^2z^2 - 16a^3b^{11}c^2j^2z^2 + 12288a^7b^6c^7h^2z^2 + 12288a^6b^6c^8f^2z^2 + 61440a^5b^6c^9d^2z^2 + 432a^6b^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^6c^5g^i k z - 10240a^7b^6c^5f^j k z + 4096a^7b^6c^5h^i j z - 47104a^6b^6c^6d^h k z - 16384a^6b^6c^6e^g k z + 6144a^6b^6c^6f^g j z + 4096a^6b^6c^6e^h j z + 32a^6b^{10}c^2d^f k z - 6144a^5b^6c^7d^g h z - 4096a^5b^6c^7d^f i z - 32a^6b^8c^4d^f g z - 4096a^4b^6c^8d^e f z + 64a^6b^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
\end{aligned}$$

$$\begin{aligned}
& j^*z - 3072*a^4*b^5*c^4*e*g*k^*z + 1888*a^3*b^7*c^3*d*h*k^*z + 1152*a^4*b^5*c^4*f*g*j^*z + 768*a^4*b^5*c^4*e*h*j^*z + 256*a^3*b^7*c^3*e*g*k^*z - 96*a^3*b^7*c^3*f*g*j^*z - 96*a^2*b^9*c^2*d*h*k^*z - 64*a^3*b^7*c^3*e*h*j^*z + 9216*a^5*b^2*c^6*e*f*j^*z - 9216*a^5*b^2*c^6*d*h*i^*z - 6656*a^4*b^4*c^5*d*f*k^*z - 6144*a^5*b^2*c^6*d*f*k^*z + 3456*a^3*b^6*c^4*d*f*k^*z - 2304*a^4*b^4*c^5*e*f*j^*z + 2304*a^4*b^4*c^5*d*h*i^*z - 576*a^2*b^8*c^3*d*f*k^*z + 192*a^3*b^6*c^4*e*f*j^*z - 192*a^3*b^6*c^4*d*h*i^*z + 4608*a^4*b^3*c^6*d*g*h^*z + 3072*a^4*b^3*c^6*d*f*i^*z - 1152*a^3*b^5*c^5*d*g*h^*z - 768*a^3*b^5*c^5*d*f*i^*z + 96*a^2*b^7*c^4*d*g*h^*z + 64*a^2*b^7*c^4*d*f*i^*z - 9216*a^4*b^2*c^7*d*e*h^*z + 2304*a^3*b^4*c^6*d*e*h^*z + 2048*a^4*b^2*c^7*d*f*g^*z - 1536*a^3*b^4*c^6*d*f*g^*z + 384*a^2*b^6*c^5*d*f*g^*z - 192*a^2*b^6*c^5*d*e*h^*z + 3072*a^3*b^3*c^7*d*e*f^*z - 768*a^2*b^5*c^6*d*e*f^*z - 3072*a^8*b*c^4*j^2*k^*z + 48*a^5*b^7*c*j^2*k^*z - 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*
\end{aligned}$$

$$\begin{aligned}
& c^5 i^j z^2 - 128 a^4 b^9 i^k z^2 + 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^8 c^2 d f g k - 4 a^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^7 c^3 d e f k - 768 a^3 b c^7 d e f g + 32 a^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 - 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 + 48 a^6 b^4 c i^j z^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^8 c^2 d^2 i k + 6 a^3 b^7 c f h j^2
\end{aligned}$$

$$\begin{aligned}
& 2 + 8192a^6b^3c^4d^2h^2k^2 + 2048a^6b^3c^4e^2g^2k^2 - 472a^3b^7c^4d^2h^2k^2 \\
& + 64a^3b^7c^4e^2g^2k^2 + 4896a^4b^3c^6d^2h^2j + 2304a^4b^3c^6d^2g^2k + \\
& 1824a^5b^3c^5d^2h^2j - 384a^5b^3c^5e^2h^2i - 168a^3b^7c^3d^2g^2k + 4 \\
& 2a^3b^7c^3d^2h^2j + 6a^2b^8c^4d^2h^2j^2 + 1536a^5b^3c^5e^2g^2i^2 + 1536a^4 \\
& b^3c^6e^2g^2i - 896a^5b^3c^5d^2h^2i^2 - 896a^4b^3c^6e^2f^2j + 144a^2b^8 \\
& c^4d^2f^2k^2 + 4896a^5b^3c^5d^2f^2j^2 + 1824a^4b^3c^6d^2f^2j - 384a^4b^3 \\
& c^6e^2f^2i + 336a^3b^6c^4d^2e^2k - 156a^3b^6c^4d^2f^2j + 16a^3b^6c^4 \\
& d^2g^2i + 12a^3b^7c^3d^2f^2j + 2208a^3b^3c^7d^2f^2h - 1920a^3b^3c^7d^2 \\
& e^2i + 800a^4b^3c^6d^2f^2h^2 - 102a^3b^5c^5d^2f^2h - 32a^3b^5c^5d^2e^2 \\
& i + 12a^3b^6c^4d^2f^2h - 2a^3b^7c^3d^2f^2h^2 - 896a^3b^3c^7d^2e^2h - 8 \\
& a^3b^6c^4d^2f^2g^2 - 240a^3b^4c^6d^2e^2g - 32a^3b^4c^6d^2e^2f + 3072a^7 \\
& c^4f^2i^2j^2k + 3072a^6c^5e^2f^2j^2k - 3072a^6c^5d^2h^2i^2k + 1536a^6c^5e^2 \\
& h^2i^2j + 4608a^5c^6d^2e^2i^2j - 3072a^5c^6d^2e^2h^2k - 1152a^5c^6d^2f^2h^2 \\
& j + 512a^5c^6e^2f^2h^2i + 1536a^4c^7d^2e^2f^2i - 2a^3b^9c^4d^2f^2j^2 - 1088a^7 \\
& b^2c^2i^2j^2k + 4800a^7b^2c^2h^2j^2k^2 + 960a^6b^2c^3h^2i^2k + 5 \\
& 44a^6b^3c^2g^2j^2k - 144a^5b^4c^2h^2i^2k - 2304a^6b^2c^3g^2i^2k \\
& + 1920a^6b^3c^2g^2i^2k^2 + 1152a^5b^3c^3g^2i^2k - 864a^6b^3c^2f^2j^2 \\
& k^2 + 384a^5b^4c^2g^2i^2k + 192a^6b^2c^3h^2i^2j - 192a^4b^5c^2 \\
& g^2i^2k - 32a^5b^4c^2h^2i^2j - 1088a^6b^2c^3e^2j^2k + 960a^6b^2c^3 \\
& g^2i^2j^2 - 480a^5b^3c^3g^2h^2k - 240a^5b^4c^2g^2i^2j^2 + 192a^5b^2 \\
& c^4f^2i^2k + 72a^4b^5c^2g^2h^2k + 48a^5b^4c^2e^2j^2k + 48a^4b^4 \\
& c^3f^2i^2k - 16a^3b^6c^2f^2i^2k + 13376a^6b^2c^3d^2j^2k^2 - 5136a^5 \\
& b^4c^2d^2j^2k^2 - 3840a^6b^2c^3e^2i^2k^2 + 1536a^5b^4c^2e^2i^2k^2 - \\
& 768a^5b^3c^3e^2i^2k - 768a^4b^3c^4e^2i^2k + 624a^5b^4c^2f^2h^2k^2 \\
& + 576a^6b^2c^3f^2h^2k^2 + 192a^5b^2c^4g^2h^2j + 96a^5b^3c^3f^2i^2 \\
& 2j + 48a^4b^4c^3g^2h^2j - 8a^3b^6c^2g^2h^2j + 6848a^4b^2c^5d^2 \\
& i^2k - 2448a^3b^4c^4d^2i^2k + 960a^5b^2c^4e^2h^2k - 864a^5b^2c^4 \\
& f^2h^2j + 480a^5b^3c^3e^2i^2j^2 + 336a^4b^3c^4f^2h^2j + 336a^2b^6c^3 \\
& d^2i^2k + 192a^5b^2c^4g^2h^2i + 144a^5b^3c^3f^2h^2j^2 - 144a^4b^4 \\
& c^3e^2h^2k - 102a^4b^5c^2f^2h^2j^2 - 96a^4b^3c^4f^2g^2k - 32a^4b^5 \\
& c^2e^2i^2j^2 - 30a^3b^5c^3f^2h^2j - 24a^3b^5c^3f^2g^2k + 16a^4b^4 \\
& c^3g^2h^2i - 12a^4b^4c^3f^2h^2j + 12a^3b^6c^2f^2h^2j + 8a^2b^7 \\
& c^2f^2g^2k - 2a^2b^7c^2f^2h^2j - 9312a^5b^3c^3d^2h^2k^2 + 3288a^4 \\
& b^5c^2d^2h^2k^2 - 2304a^4b^2c^5e^2g^2k + 1920a^5b^3c^3e^2g^2k^2 + 1 \\
& 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^2 \\
& i^2 + 192a^4b^2c^5e^2h^2j - 192a^3b^5c^3e^2g^2k - 32a^3b^4c^4e^2 \\
& h^2j + 24a^3b^5c^3f^2g^2j - 3552a^5b^2c^4d^2h^2j^2 - 3424a^3b^3c^5 \\
& d^2g^2k + 1332a^4b^4c^3d^2h^2j^2 + 1224a^2b^5c^4d^2g^2k + 960a^5b^2 \\
& c^4e^2g^2j^2 - 496a^3b^3c^5d^2h^2j + 432a^4b^3c^4d^2h^2j - 240a^4 \\
& b^4c^3e^2g^2j^2 - 222a^2b^5c^4d^2h^2j + 192a^4b^2c^5f^2g^2i + 192 \\
& a^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
\end{aligned}$$

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



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

$$\begin{aligned}
& 8576a^9c^{10}z^4 - 1572864a^8b^2c^7kz^3 + 983040a^7b^4c^6kz^3 - \\
& 327680a^6b^6c^5kz^3 + 61440a^5b^8c^4kz^3 - 6144a^4b^{10}c^3kz^3 \\
& + 256a^3b^{12}c^2kz^3 + 1048576a^9c^8kz^3 + 98304a^8b^6c^6ikz^2 \\
& + 98304a^7b^6c^7ekz^2 + 57344a^7b^6c^7fjz^2 + 32768a^7b^6c^7giz^2 \\
& + 57344a^6b^6c^8dhz^2 + 32768a^6b^6c^8egz^2 - 32a^6b^{10}c^4dfz^2 \\
& - 90112a^7b^3c^5ikz^2 + 30720a^6b^5c^4ikz^2 - 4608a^5b^7c^3ikz^2 \\
& + 256a^4b^9c^2ikz^2 - 49152a^7b^2c^6gkz^2 + 45056a^6b^4c^5gkz^2 \\
& + 24576a^7b^2c^6hjkz^2 - 15360a^5b^6c^4gkz^2 - 3072a^5b^6c^4hjkz^2 \\
& + 2304a^4b^8c^3gkz^2 + 2048a^6b^4c^5hjkz^2 + 576a^4b^8c^3hjkz^2 \\
& - 128a^3b^{10}c^2gkz^2 - 32a^3b^{10}c^2hjkz^2 - 90112a^6b^3c^6ekz^2 \\
& - 49152a^6b^3c^6fjz^2 + 30720a^5b^5c^5ekz^2 - 24576a^6b^3c^6giz^2 \\
& + 15360a^5b^5c^5fjz^2 + 6144a^5b^5c^5giz^2 - 4608a^4b^7c^4ekz^2 \\
& - 2048a^4b^7c^4fjz^2 - 512a^4b^7c^4giz^2 + 256a^3b^9c^3ekz^2 \\
& + 96a^3b^9c^3fjz^2 + 131072a^6b^2c^7djkz^2 + 49152a^6b^2c^7eiz^2 \\
& - 43008a^5b^4c^6djkz^2 - 12288a^5b^4c^6eiz^2 + 6144a^5b^4c^6fhz^2 \\
& + 6144a^4b^6c^5djkz^2 - 2048a^4b^6c^5fhz^2 + 1024a^4b^6c^5eiz^2 \\
& - 320a^3b^8c^4djkz^2 + 192a^3b^8c^4fhz^2 - 49152a^5b^3c^7djkz^2 \\
& - 24576a^5b^3c^7egz^2 + 15360a^4b^5c^6dhjkz^2 + 6144a^4b^5c^6egz^2 \\
& - 2048a^3b^7c^5dhjkz^2 - 512a^3b^7c^5egz^2 + 96a^2b^9c^4dhjkz^2 \\
& + 24576a^5b^2c^8djkz^2 - 3072a^3b^6c^6djkz^2 + 2048a^4b^4c^7djkz^2 \\
& + 576a^2b^8c^5djkz^2 + 1536a^4b^{10}c^2kz^2 + 61440a^8b^6c^6j^2z^2 \\
& - 16a^3b^{11}c^2j^2z^2 + 12288a^7b^6c^7h^2z^2 + 12288a^6b^6c^8f^2z^2 \\
& + 61440a^5b^6c^9d^2z^2 + 432a^6b^9c^5d^2z^2 - 49152a^8c^7hjkz^2 \\
& - 147456a^7c^8djkz^2 - 65536a^7c^8eiz^2 - 16384a^7c^8fhz^2 \\
& - 49152a^6c^9djkz^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^6c^5gikz - 10240a^7b^6c^5fjkz + 4096a^7b^6c^5hikz \\
& - 47104a^6b^6c^6djhkz - 16384a^6b^6c^6egkz + 6144a^6b^6c^6fgjkz \\
& + 4096a^6b^6c^6ehjkz + 32a^6b^{10}c^2dfkz - 6144a^5b^6c^7dghkz \\
& - 4096a^5b^6c^7dfikz - 32a^6b^8c^4dfgkz - 4096a^4b^6c^8dfe^2z^2 \\
& + 64a^6b^7c^5dfe^2z^2 - 18432a^7b^2c^4hjkz + 4608a^6b^4c^3hjkz \\
& - 384a^5b^6c^2hjkz + 12288a^6b^3c^4gikz + 7680a^6b^3c^4fjkz \\
& - 3072a^6b^3c^4hikz - 3072a^5b^5c^3gikz - 1920a^5b^5c^3fjkz \\
& + 768a^5b^5c^3hikz + 256a^4b^7c^2gikz + 1
\end{aligned}$$

$$\begin{aligned}
& 60a^4b^7c^2fjkz - 64a^4b^7c^2h*ijz - 65536a^6b^2c^5d*jkz \\
& - 24576a^6b^2c^5e*ikz + 21504a^5b^4c^4d*jkz + 9216a^6b^2c^5 \\
& *f*ijz + 6144a^5b^4c^4e*ikz - 3072a^5b^4c^4f*h*jkz - 3072a^4b \\
& ^6c^3d*jkz - 2304a^5b^4c^4f*ijz - 2048a^6b^2c^5g*h*jkz + 1536 \\
& *a^5b^4c^4g*h*jkz + 1024a^4b^6c^3f*h*jkz - 512a^4b^6c^3e*ikz - \\
& 384a^4b^6c^3g*h*jkz + 192a^4b^6c^3f*ijz + 160a^3b^8c^2d*jkz \\
& z - 96a^3b^8c^2f*h*jkz + 32a^3b^8c^2g*h*jkz + 41472a^5b^3c^5d*h \\
& *kz - 13440a^4b^5c^4d*h*jkz + 12288a^5b^3c^5e*g*jkz - 4608a^5b^3 \\
& *c^5f*g*jkz - 3072a^5b^3c^5e*h*jkz - 3072a^4b^5c^4e*g*jkz + 1888a \\
& ^3b^7c^3d*h*jkz + 1152a^4b^5c^4f*g*jkz + 768a^4b^5c^4e*h*jkz + 2 \\
& 56a^3b^7c^3e*g*jkz - 96a^3b^7c^3f*g*jkz - 96a^2b^9c^2d*h*jkz - \\
& 64a^3b^7c^3e*h*jkz + 9216a^5b^2c^6e*f*jkz - 9216a^5b^2c^6d*h*ij \\
& z - 6656a^4b^4c^5d*f*jkz - 6144a^5b^2c^6d*f*jkz + 3456a^3b^6c^4 \\
& d*f*jkz - 2304a^4b^4c^5e*f*jkz + 2304a^4b^4c^5d*h*ijz - 576a^2b^8 \\
& *c^3d*f*jkz + 192a^3b^6c^4e*f*jkz - 192a^3b^6c^4d*h*ijz + 4608a^4 \\
& *b^3c^6d*g*h*jkz + 3072a^4b^3c^6d*f*ijz - 1152a^3b^5c^5d*g*h*jkz - 76 \\
& 8a^3b^5c^5d*f*ijz + 96a^2b^7c^4d*g*h*jkz + 64a^2b^7c^4d*f*ijz - 9 \\
& 216a^4b^2c^7d*e*h*jkz + 2304a^3b^4c^6d*e*h*jkz + 2048a^4b^2c^7d*f*g \\
& *jkz - 1536a^3b^4c^6d*f*g*jkz + 384a^2b^6c^5d*f*g*jkz - 192a^2b^6c^5d \\
& *e*h*jkz + 3072a^3b^3c^7d*e*f*jkz - 768a^2b^5c^6d*e*f*jkz - 3072a^8b^c^ \\
& 4j^2*kz + 48a^5b^7c*j^2*kz - 49152a^8b^c^4i*k^2z + 2304a^5b^7c \\
& *i*k^2z - 9216a^7b^c^5h^2*kz - 32a^4b^8c*i*j^2z - 1152a^4b^8c*g \\
& *k^2z + 9216a^7b^c^5g*j^2z - 3072a^6b^c^6f^2*kz + 16a^3b^9c*g*j \\
& ^2z - 49152a^7b^c^5e*k^2z - 128a^3b^9c*e*k^2z - 58368a^5b^c^7d^ \\
& 2*kz - 1024a^6b^c^6g*h^2z - 432a*b^9c^3d^2*kz + 1024a^5b^c^7f^2 \\
& *gz + 32a*b^8c^4d^2*iz - 9216a^4b^c^8d^2*g*gz + 336a*b^7c^5d^2*g* \\
& z - 672a*b^6c^6d^2*e*gz + 24576a^8c^5h*jkz + 73728a^7c^6d*jkz + \\
& 32768a^7c^6e*ikz - 12288a^7c^6f*ijz + 8192a^7c^6f*h*jkz + 245 \\
& 76a^6c^7d*f*jkz - 12288a^6c^7e*f*jkz + 12288a^6c^7d*h*ijz + 12288a \\
& ^5c^8d*e*h*jkz + 2304a^7b^3c^3j^2*kz - 576a^6b^5c^2j^2*kz + 4505 \\
& 6a^7b^3c^3i*k^2z - 15360a^6b^5c^2i*k^2z - 12288a^7b^2c^4i^2*k \\
& *z + 3072a^6b^4c^3i^2*kz - 256a^5b^6c^2i^2*kz + 15872a^7b^2c^4 \\
& *i*j^2z + 6912a^6b^3c^4h^2*kz - 4992a^6b^4c^3i*j^2z - 1728a^5b \\
& ^5c^3h^2*kz + 672a^5b^6c^2i*j^2z + 144a^4b^7c^2h^2*kz + 24576a \\
& ^7b^2c^4g*k^2z - 22528a^6b^4c^3g*k^2z + 7680a^5b^6c^2g*k^2z \\
& + 4096a^6b^2c^5g^2*kz - 3072a^5b^4c^4g^2*kz + 768a^4b^6c^3g^2 \\
& *kz - 64a^3b^8c^2g^2*kz - 7936a^6b^3c^4g*j^2z + 2496a^5b^5c^3 \\
& *g*j^2z - 1536a^6b^2c^5h^2*iz + 1280a^5b^3c^5f^2*kz + 384a^5b^ \\
& 4c^4h^2*iz - 336a^4b^7c^2g*j^2z + 192a^4b^5c^4f^2*kz - 144a^3 \\
& *b^7c^3f^2*kz - 32a^4b^6c^3h^2*iz + 16a^2b^9c^2f^2*kz + 45056a \\
& ^6b^3c^4e*k^2z - 15360a^5b^5c^3e*k^2z - 12288a^5b^2c^6e^2*kz \\
& + 3072a^4b^4c^5e^2*kz + 2304a^4b^7c^2e*k^2z - 256a^3b^6c^4e^ \\
& 2*kz + 59136a^4b^3c^6d^2*kz - 23488a^3b^5c^5d^2*kz + 15872a^6b \\
& ^2c^5e*j^2z - 4992a^5b^4c^4e*j^2z + 4560a^2b^7c^4d^2*kz + 1536 \\
& *a^5b^2c^6f^2*iz + 768a^5b^3c^5g*h^2z + 672a^4b^6c^3e*j^2z -
\end{aligned}$$

$384a^4b^4c^5f^2i^*z - 192a^4b^5c^4g^*h^2z - 32a^3b^8c^2e^*j^2z$   
 $+ 32a^3b^6c^4f^2i^*z + 16a^3b^7c^3g^*h^2z - 15872a^4b^2c^7d^2i^*$   
 $*z + 4992a^3b^4c^6d^2i^*z - 1536a^5b^2c^6e^*h^2z - 768a^4b^3c^6f^2g^*z$   
 $- 672a^2b^6c^5d^2i^*z + 384a^4b^4c^5e^*h^2z + 192a^3b^5c^5f^2g^*z$   
 $- 32a^3b^6c^4e^*h^2z - 16a^2b^7c^4f^2g^*z + 7936a^3b^3c^7d^2g^*z$   
 $- 2496a^2b^5c^6d^2g^*z + 1536a^4b^2c^7e^*f^2z - 384a^3b^4c^6e^*f^2z$   
 $+ 32a^2b^6c^5e^*f^2z - 15872a^3b^2c^8d^2e^*z + 4992a^2b^4c^7d^2e^*z$   
 $- 61440a^8b^2c^3k^3z + 21504a^7b^4c^2k^3z + 16384a^8c^5i^2k^*z$   
 $- 18432a^8c^5i^*j^2z - 128a^4b^9i^*k^2z + 2048a^7c^6h^2i^*z$   
 $+ 64a^3b^10g^*k^2z + 16384a^6c^7e^2k^*z + 16b^11c^2d^2k^*z$   
 $- 18432a^7c^6e^*j^2z - 2048a^6c^7f^2i^*z + 18432a^5c^8d^2i^*z$   
 $- 3328a^6b^6c^*k^3z + 2048a^6c^7e^*h^2z - 16b^9c^4d^2g^*z - 2048a^5c^8e^*f^2z$   
 $+ 32b^8c^5d^2e^*z + 18432a^4c^9d^2e^*z + 65536a^9c^4k^3z$   
 $+ 192a^5b^8k^3z - 3328a^7b^*c^3h^*i^*j^*k - 6912a^6b^*c^4d^*i^*j^*k$   
 $- 3328a^6b^*c^4e^*h^*j^*k - 1536a^6b^*c^4f^*g^*j^*k - 768a^6b^*c^4g^*h^*i^*j$   
 $- 768a^6b^*c^4f^*h^*i^*k - 6912a^5b^*c^5d^*e^*j^*k - 2304a^5b^*c^5d^*g^*i^*j$   
 $- 1792a^5b^*c^5e^*f^*i^*j + 1536a^5b^*c^5d^*g^*h^*k - 1280a^5b^*c^5d^*f^*i^*k$   
 $- 768a^5b^*c^5e^*g^*h^*j - 768a^5b^*c^5e^*f^*h^*k - 256a^5b^*c^5f^*g^*h^*i$   
 $+ 16a^*b^8c^2d^*f^*g^*k - 4a^*b^8c^2d^*f^*h^*j - 2304a^4b^*c^6d^*e^*g^*j - 1792a^4b^*c^6d^*e^*h^*i$   
 $- 1280a^4b^*c^6d^*e^*f^*k - 768a^4b^*c^6d^*f^*g^*i - 256a^4b^*c^6e^*f^*g^*h$   
 $- 32a^*b^7c^3d^*e^*f^*k - 768a^3b^*c^7d^*e^*f^*g + 32a^*b^5c^5d^*e^*f^*g$   
 $+ 576a^6b^3c^2h^*i^*j^*k + 1664a^6b^2c^3g^*h^*j^*k + 384a^6b^2c^3f^*i^*j^*k$   
 $- 288a^5b^4c^2g^*h^*j^*k - 160a^5b^4c^2f^*i^*j^*k + 2112a^5b^3c^3d^*i^*j^*k$   
 $+ 576a^5b^3c^3e^*h^*j^*k - 448a^5b^3c^3f^*h^*i^*k - 192a^5b^3c^3g^*h^*i^*j$   
 $- 192a^5b^3c^3f^*g^*j^*k - 160a^4b^5c^2d^*i^*j^*k + 96a^4b^5c^2f^*h^*i^*k$   
 $+ 80a^4b^5c^2f^*g^*j^*k + 32a^4b^5c^2g^*h^*i^*j + 4992a^5b^2c^4d^*h^*i^*k$   
 $- 4608a^5b^2c^4e^*g^*i^*k + 3456a^5b^2c^4d^*g^*j^*k - 1312a^4b^4c^3d^*h^*i^*k$   
 $- 1056a^4b^4c^3d^*g^*j^*k + 896a^5b^2c^4f^*g^*i^*j + 768a^4b^4c^3e^*g^*i^*k$   
 $+ 384a^5b^2c^4f^*g^*h^*k + 384a^5b^2c^4e^*h^*i^*j + 384a^5b^2c^4e^*f^*j^*k$   
 $+ 224a^4b^4c^3f^*g^*h^*k - 160a^4b^4c^3e^*f^*j^*k - 96a^4b^4c^3f^*g^*i^*j$   
 $+ 96a^3b^6c^2d^*h^*i^*k + 80a^3b^6c^2d^*g^*j^*k - 64a^4b^4c^3e^*h^*i^*j$   
 $- 48a^3b^6c^2f^*g^*h^*k - 2496a^4b^3c^4d^*g^*h^*k + 2112a^4b^3c^4d^*e^*j^*k$   
 $- 960a^4b^3c^4d^*f^*i^*k + 656a^3b^5c^3d^*g^*h^*k - 448a^4b^3c^4e^*f^*h^*k$   
 $+ 384a^3b^5c^3d^*f^*i^*k + 320a^4b^3c^4d^*g^*i^*j - 192a^4b^3c^4f^*g^*h^*i$   
 $- 192a^4b^3c^4e^*g^*h^*j + 192a^4b^3c^4e^*f^*i^*j - 160a^3b^5c^3d^*e^*j^*k$   
 $+ 96a^3b^5c^3e^*f^*h^*k - 48a^2b^7c^2d^*g^*h^*k + 32a^3b^5c^3e^*g^*h^*j$   
 $- 32a^2b^7c^2d^*f^*i^*k + 4992a^4b^2c^5d^*e^*h^*k - 3584a^4b^2c^5d^*f^*h^*j$   
 $- 1312a^3b^4c^4d^*e^*h^*k + 896a^4b^2c^5e^*f^*g^*j + 896a^4b^2c^5d^*g^*h^*i$   
 $+ 640a^4b^2c^5d^*f^*g^*k - 640a^4b^2c^5d^*e^*i^*j + 600a^3b^4c^4d^*f^*h^*j$   
 $+ 480a^3b^4c^4d^*f^*g^*k + 384a^4b^2c^5e^*f^*h^*i - 192a^2b^6c^3d^*f^*g^*k$   
 $- 96a^3b^4c^4e^*f^*g^*j - 96a^3b^4c^4d^*g^*h^*i + 96a^2b^6c^3d^*e^*h^*k$   
 $+ 12a^2b^6c^3d^*f^*h^*j - 960a^3b^3c^5d^*e^*f^*k + 384a^2b^5c^4d^*e^*f^*k$   
 $+ 320a^3b^3c^5d^*e^*g^*j - 192a^3b^3c^5e^*f^*g^*h - 192a^3b^3c^5d^*f^*g^*i$   
 $+ 192a^3b^3c^5d^*e^*h^*i + 32a^2b^5c^4d^*f^*g^*i + 896a^3b^2c^6d^*$

$$\begin{aligned}
& e*g*h + 384*a^3*b^2*c^6*d*e*f*i - 96*a^2*b^4*c^5*d*e*g*h - 64*a^2*b^4*c^5*d \\
& *e*f*i - 192*a^2*b^3*c^6*d*e*f*g + 48*a^6*b^4*c*i*j^2*k - 1424*a^6*b^4*c*h* \\
& j*k^2 - 2304*a^7*b*c^3*g*j^2*k - 24*a^5*b^5*c*g*j^2*k + 2048*a^7*b*c^3*g*i* \\
& k^2 - 1024*a^7*b*c^3*f*j*k^2 - 768*a^5*b^5*c*g*i*k^2 + 408*a^5*b^5*c*f*j*k^ \\
& 2 + 256*a^6*b*c^4*g*h^2*k + 16*a^4*b^6*c*g*i*j^2 + 4608*a^6*b*c^4*e*i^2*k + \\
& 4608*a^5*b*c^5*e^2*i*k - 896*a^6*b*c^4*f*i^2*j + 768*a^4*b^6*c*d*j*k^2 - 2 \\
& 56*a^4*b^6*c*f*h*k^2 - 128*a^4*b^6*c*e*i*k^2 + 2208*a^6*b*c^4*f*h*j^2 - 192 \\
& 0*a^6*b*c^4*e*i*j^2 + 800*a^5*b*c^5*f^2*h*j - 256*a^5*b*c^5*f^2*g*k - 16*a* \\
& b^8*c^2*d^2*i*k + 6*a^3*b^7*c*f*h*j^2 + 8192*a^6*b*c^4*d*h*k^2 + 2048*a^6*b \\
& *c^4*e*g*k^2 - 472*a^3*b^7*c*d*h*k^2 + 64*a^3*b^7*c*e*g*k^2 + 4896*a^4*b*c^ \\
& 6*d^2*h*j + 2304*a^4*b*c^6*d^2*g*k + 1824*a^5*b*c^5*d*h^2*j - 384*a^5*b*c^5 \\
& *e*h^2*i - 168*a*b^7*c^3*d^2*g*k + 42*a*b^7*c^3*d^2*h*j + 6*a^2*b^8*c*d*h*j \\
& ^2 + 1536*a^5*b*c^5*e*g*i^2 + 1536*a^4*b*c^6*e^2*g*i - 896*a^5*b*c^5*d*h*i^ \\
& 2 - 896*a^4*b*c^6*e^2*f*j + 144*a^2*b^8*c*d*f*k^2 + 4896*a^5*b*c^5*d*f*j^2 \\
& + 1824*a^4*b*c^6*d*f^2*j - 384*a^4*b*c^6*e*f^2*i + 336*a*b^6*c^4*d^2*e*k - \\
& 156*a*b^6*c^4*d^2*f*j + 16*a*b^6*c^4*d^2*g*i + 12*a*b^7*c^3*d*f^2*j + 2208* \\
& a^3*b*c^7*d^2*f*h - 1920*a^3*b*c^7*d^2*e*i + 800*a^4*b*c^6*d*f*h^2 - 102*a* \\
& b^5*c^5*d^2*f*h - 32*a*b^5*c^5*d^2*e*i + 12*a*b^6*c^4*d*f^2*h - 2*a*b^7*c^3 \\
& *d*f*h^2 - 896*a^3*b*c^7*d*e^2*h - 8*a*b^6*c^4*d*f*g^2 - 240*a*b^4*c^6*d^2* \\
& e*g - 32*a*b^4*c^6*d*e^2*f + 3072*a^7*c^4*f*i*j*k + 3072*a^6*c^5*e*f*j*k - \\
& 3072*a^6*c^5*d*h*i*k + 1536*a^6*c^5*e*h*i*j + 4608*a^5*c^6*d*e*i*j - 3072*a \\
& ^5*c^6*d*e*h*k - 1152*a^5*c^6*d*f*h*j + 512*a^5*c^6*e*f*h*i + 1536*a^4*c^7* \\
& d*e*f*i - 2*a*b^9*c*d*f*j^2 - 1088*a^7*b^2*c^2*i*j^2*k + 4800*a^7*b^2*c^2*h \\
& *j*k^2 + 960*a^6*b^2*c^3*h^2*i*k + 544*a^6*b^3*c^2*g*j^2*k - 144*a^5*b^4*c^ \\
& 2*h^2*i*k - 2304*a^6*b^2*c^3*g*i^2*k + 1920*a^6*b^3*c^2*g*i*k^2 + 1152*a^5* \\
& b^3*c^3*g^2*i*k - 864*a^6*b^3*c^2*f*j*k^2 + 384*a^5*b^4*c^2*g*i^2*k + 192*a \\
& ^6*b^2*c^3*h*i^2*j - 192*a^4*b^5*c^2*g^2*i*k - 32*a^5*b^4*c^2*h*i^2*j - 108 \\
& 8*a^6*b^2*c^3*e*j^2*k + 960*a^6*b^2*c^3*g*i*j^2 - 480*a^5*b^3*c^3*g*h^2*k - \\
& 240*a^5*b^4*c^2*g*i*j^2 + 192*a^5*b^2*c^4*f^2*i*k + 72*a^4*b^5*c^2*g*h^2*k \\
& + 48*a^5*b^4*c^2*e*j^2*k + 48*a^4*b^4*c^3*f^2*i*k - 16*a^3*b^6*c^2*f^2*i*k \\
& + 13376*a^6*b^2*c^3*d*j*k^2 - 5136*a^5*b^4*c^2*d*j*k^2 - 3840*a^6*b^2*c^3* \\
& e*i*k^2 + 1536*a^5*b^4*c^2*e*i*k^2 - 768*a^5*b^3*c^3*e*i^2*k - 768*a^4*b^3* \\
& c^4*e^2*i*k + 624*a^5*b^4*c^2*f*h*k^2 + 576*a^6*b^2*c^3*f*h*k^2 + 192*a^5*b \\
& ^2*c^4*g^2*h*j + 96*a^5*b^3*c^3*f*i^2*j + 48*a^4*b^4*c^3*g^2*h*j - 8*a^3*b^ \\
& 6*c^2*g^2*h*j + 6848*a^4*b^2*c^5*d^2*i*k - 2448*a^3*b^4*c^4*d^2*i*k + 960*a \\
& ^5*b^2*c^4*e*h^2*k - 864*a^5*b^2*c^4*f*h^2*j + 480*a^5*b^3*c^3*e*i*j^2 + 33 \\
& 6*a^4*b^3*c^4*f^2*h*j + 336*a^2*b^6*c^3*d^2*i*k + 192*a^5*b^2*c^4*g*h^2*i + \\
& 144*a^5*b^3*c^3*f*h*j^2 - 144*a^4*b^4*c^3*e*h^2*k - 102*a^4*b^5*c^2*f*h*j^ \\
& 2 - 96*a^4*b^3*c^4*f^2*g*k - 32*a^4*b^5*c^2*e*i*j^2 - 30*a^3*b^5*c^3*f^2*h* \\
& j - 24*a^3*b^5*c^3*f^2*g*k + 16*a^4*b^4*c^3*g*h^2*i - 12*a^4*b^4*c^3*f*h^2* \\
& j + 12*a^3*b^6*c^2*f*h^2*j + 8*a^2*b^7*c^2*f^2*g*k - 2*a^2*b^7*c^2*f^2*h*j \\
& - 9312*a^5*b^3*c^3*d*h*k^2 + 3288*a^4*b^5*c^2*d*h*k^2 - 2304*a^4*b^2*c^5*e^ \\
& 2*g*k + 1920*a^5*b^3*c^3*e*g*k^2 + 1152*a^4*b^3*c^4*e*g^2*k - 768*a^4*b^5*c \\
& ^2*e*g*k^2 + 384*a^3*b^4*c^4*e^2*g*k - 320*a^5*b^2*c^4*d*i^2*j - 224*a^4*b^ \\
& 3*c^4*f*g^2*j + 192*a^5*b^2*c^4*f*h*i^2 + 192*a^4*b^2*c^5*e^2*h*j - 192*a^3
\end{aligned}$$

$$\begin{aligned}
& *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 + 1 \\
& 332*a^2*b^4*c^5*d^2*f*j + 960*a^3*b^2*c^6*d^2*g*i - 496*a^4*b^3*c^4*d*f*j^2 \\
& + 432*a^3*b^3*c^5*d*f^2*j - 240*a^2*b^4*c^5*d^2*g*i - 222*a^3*b^5*c^3*d*f* \\
& j^2 + 192*a^4*b^2*c^5*e*g*h^2 - 174*a^2*b^5*c^4*d*f^2*j + 42*a^2*b^7*c^2*d* \\
& f*j^2 - 32*a^3*b^3*c^5*e*f^2*i + 16*a^3*b^4*c^4*e*g*h^2 - 320*a^3*b^2*c^6*d \\
& *e^2*j - 224*a^3*b^3*c^5*d*g^2*h + 192*a^4*b^2*c^5*d*f*i^2 + 192*a^3*b^2*c^ \\
& 6*e^2*f*h - 32*a^3*b^4*c^4*d*f*i^2 + 24*a^2*b^5*c^4*d*g^2*h - 864*a^3*b^2*c \\
& ^6*d*f^2*h + 480*a^2*b^3*c^6*d^2*e*i + 336*a^3*b^3*c^5*d*f*h^2 + 192*a^3*b^ \\
& 2*c^6*e*f^2*g + 144*a^2*b^3*c^6*d^2*f*h - 30*a^2*b^5*c^4*d*f*h^2 + 16*a^2*b \\
& ^4*c^5*e*f^2*g - 12*a^2*b^4*c^5*d*f^2*h + 192*a^3*b^2*c^6*d*f*g^2 + 96*a^2* \\
& b^3*c^6*d*e^2*h + 48*a^2*b^4*c^5*d*f*g^2 + 960*a^2*b^2*c^7*d^2*e*g + 192*a^ \\
& 2*b^2*c^7*d*e^2*f - 3072*a^8*b*c^2*j^2*k^2 + 1104*a^7*b^3*c*j^2*k^2 + 768*a \\
& ^6*b^4*c*i^2*k^2 - 256*a^6*b^3*c^2*i^3*k + 1536*a^7*b*c^3*h^2*k^2 - 960*a^7 \\
& *b*c^3*i^2*j^2 + 444*a^5*b^5*c*h^2*k^2 - 16*a^5*b^5*c*i^2*j^2 - 3072*a^7*b^ \\
& 2*c^2*g*k^3 - 496*a^6*b^3*c^2*h*j^3 + 192*a^4*b^6*c*g^2*k^2 - 192*a^4*b^4*c \\
& ^3*g^3*k + 144*a^5*b^3*c^3*h^3*j + 32*a^3*b^6*c^2*g^3*k - 18*a^4*b^5*c^2*h^ \\
& 3*j - 9*a^4*b^6*c*h^2*j^2 - 192*a^6*b*c^4*h^2*i^2 + 36*a^3*b^7*c*f^2*k^2 - \\
& 4*a^3*b^7*c*g^2*j^2 - 2176*a^6*b^3*c^2*e*k^3 - 256*a^3*b^3*c^5*e^3*k - 192* \\
& a^6*b^2*c^3*f*j^3 - 192*a^4*b^2*c^5*f^3*j + 132*a^5*b^4*c^2*f*j^3 + 128*a^4 \\
& *b^3*c^4*g^3*i - 28*a^3*b^4*c^4*f^3*j + 6*a^2*b^6*c^3*f^3*j + 10752*a^5*b*c \\
& ^5*d^2*k^2 - 960*a^5*b*c^5*e^2*j^2 - 192*a^5*b*c^5*f^2*i^2 - 1680*a^5*b^3*c \\
& ^3*d*j^3 - 1680*a^2*b^3*c^6*d^3*j + 222*a^4*b^5*c^2*d*j^3 + 80*a^4*b^3*c^4* \\
& f*h^3 + 80*a^3*b^3*c^5*f^3*h + 30*a*b^8*c^2*d^2*j^2 + 6*a^3*b^5*c^3*f*h^3 + \\
& 6*a^2*b^5*c^4*f^3*h - 960*a^4*b*c^6*d^2*i^2 - 192*a^4*b*c^6*e^2*h^2 - 192* \\
& a^4*b^2*c^5*d*h^3 - 192*a^2*b^2*c^7*d^3*h + 128*a^3*b^3*c^5*e*g^3 - 28*a^3* \\
& b^4*c^4*d*h^3 + 12*a*b^6*c^4*d^2*h^2 + 6*a^2*b^6*c^3*d*h^3 - 192*a^3*b*c^7* \\
& e^2*f^2 + 60*a*b^5*c^5*d^2*g^2 + 198*a*b^4*c^6*d^2*f^2 + 144*a^2*b^3*c^6*d* \\
& f^3 - 960*a^2*b*c^8*d^2*e^2 + 240*a*b^3*c^7*d^2*e^2 + 4608*a^8*c^3*i*j^2*k \\
& - 3072*a^8*c^3*h*j*k^2 - 512*a^7*c^4*h^2*i*k + 120*a^5*b^6*h*j*k^2 + 768*a^ \\
& 7*c^4*h*i^2*j + 4608*a^7*c^4*e*j^2*k + 512*a^6*c^5*f^2*i*k + 64*a^4*b^7*g*i \\
& *k^2 - 40*a^4*b^7*f*j*k^2 - 9216*a^7*c^4*d*j*k^2 - 4096*a^7*c^4*e*i*k^2 - 1 \\
& 024*a^7*c^4*f*h*k^2 - 4608*a^5*c^6*d^2*i*k - 512*a^6*c^5*e*h^2*k - 192*a^6* \\
& c^5*f*h^2*j - 40*a^3*b^8*d*j*k^2 + 24*a^3*b^8*f*h*k^2 + 2304*a^6*c^5*d*i^2* \\
& j + 768*a^5*c^6*e^2*h*j + 256*a^6*c^5*f*h*i^2 + 8*b^9*c^2*d^2*g*k - 2*b^9*c
\end{aligned}$$

$$\begin{aligned}
&^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 - 30 \\
&72*a^6*c^5*d*f*k^2 - 16*b^8*c^3*d^2*e*k + 6*b^8*c^3*d^2*f*j - 4608*a^4*c^7* \\
&d^2*e*k + 2016*a^7*b*c^3*h*j^3 - 1728*a^4*c^7*d^2*f*j + 1088*a^6*b^4*c*g*k^ \\
&3 + 224*a^6*b*c^4*h^3*j + 30*a^5*b^5*c*h*j^3 + 2304*a^4*c^7*d*e^2*j + 768*a \\
&^5*c^6*d*f*i^2 + 256*a^4*c^7*e^2*f*h + 6*b^7*c^4*d^2*f*h + 6144*a^7*b*c^3*e \\
&*k^3 + 1536*a^4*b*c^6*e^3*k + 512*a^6*b*c^4*g*i^3 + 192*a^5*b^5*c*e*k^3 - 1 \\
&92*a^4*c^7*d*f^2*h - 10*a^4*b^6*c*f*j^3 + 108*a*b^9*c*d^2*k^2 + 16*b^6*c^5* \\
&d^2*e*g + 4320*a^6*b*c^4*d*j^3 + 4320*a^3*b*c^7*d^3*j + 222*a*b^5*c^5*d^3*j \\
&+ 96*a^5*b*c^5*f*h^3 + 96*a^4*b*c^6*f^3*h - 10*a^3*b^7*c*d*j^3 + 768*a^3*c \\
&^8*d*e^2*f + 512*a^3*b*c^7*e^3*g + 132*a*b^4*c^6*d^3*h + 2016*a^2*b*c^8*d^3 \\
&*f - 496*a*b^3*c^7*d^3*f + 224*a^3*b*c^7*d*f^3 - 18*a*b^5*c^5*d*f^3 - 1920* \\
&a^7*b^2*c^2*i^2*k^2 - 1648*a^6*b^3*c^2*h^2*k^2 + 240*a^6*b^3*c^2*i^2*j^2 - \\
&960*a^6*b^2*c^3*h^2*j^2 - 512*a^6*b^2*c^3*g^2*k^2 - 480*a^5*b^4*c^2*g^2*k^2 \\
&+ 198*a^5*b^4*c^2*h^2*j^2 - 240*a^5*b^3*c^3*g^2*j^2 - 240*a^5*b^3*c^3*f^2* \\
&k^2 + 60*a^4*b^5*c^2*g^2*j^2 - 36*a^4*b^5*c^2*f^2*k^2 - 16*a^5*b^3*c^3*h^2* \\
&i^2 - 1920*a^5*b^2*c^4*e^2*k^2 + 768*a^4*b^4*c^3*e^2*k^2 - 464*a^5*b^2*c^4* \\
&>f^2*j^2 - 384*a^5*b^2*c^4*g^2*i^2 - 64*a^3*b^6*c^2*e^2*k^2 + 42*a^4*b^4*c^3 \\
&>*f^2*j^2 + 12*a^3*b^6*c^2*f^2*j^2 - 13104*a^4*b^3*c^4*d^2*k^2 + 5628*a^3*b^ \\
&5*c^3*d^2*k^2 - 1128*a^2*b^7*c^2*d^2*k^2 + 240*a^4*b^3*c^4*e^2*j^2 - 48*a^4 \\
&*b^3*c^4*g^2*h^2 - 16*a^4*b^3*c^4*f^2*i^2 - 16*a^3*b^5*c^3*e^2*j^2 - 4*a^3* \\
&b^5*c^3*g^2*h^2 - 2880*a^4*b^2*c^5*d^2*j^2 + 1750*a^3*b^4*c^4*d^2*j^2 - 345 \\
&>*a^2*b^6*c^3*d^2*j^2 - 192*a^4*b^2*c^5*f^2*h^2 - 42*a^3*b^4*c^4*f^2*h^2 + 2 \\
&40*a^3*b^3*c^5*d^2*i^2 - 48*a^3*b^3*c^5*f^2*g^2 - 16*a^3*b^3*c^5*e^2*h^2 - \\
&16*a^2*b^5*c^4*d^2*i^2 - 4*a^2*b^5*c^4*f^2*g^2 - 464*a^3*b^2*c^6*d^2*h^2 - \\
&384*a^3*b^2*c^6*e^2*g^2 + 42*a^2*b^4*c^5*d^2*h^2 - 240*a^2*b^3*c^6*d^2*g^2 \\
&- 16*a^2*b^3*c^6*e^2*f^2 - 960*a^2*b^2*c^7*d^2*f^2 - 8*a*b^10*d*f*k^2 - a^2 \\
&*b^8*c*f^2*j^2 - 2048*a^8*c^3*i^2*k^2 - 100*a^6*b^5*j^2*k^2 - 64*a^5*b^6*i^ \\
&2*k^2 - 288*a^7*c^4*h^2*j^2 - 36*a^4*b^7*h^2*k^2 - 16*a^3*b^8*g^2*k^2 - 204 \\
&8*a^6*c^5*e^2*k^2 - 864*a^6*c^5*f^2*j^2 - 4*a^2*b^9*f^2*k^2 - 2592*a^5*c^6* \\
&d^2*j^2 - 1536*a^5*c^6*e^2*i^2 - 32*a^5*c^6*f^2*h^2 - 864*a^4*c^7*d^2*h^2 + \\
&360*a^7*b^2*c^2*j^4 - 4*b^7*c^4*d^2*g^2 - 9*b^6*c^5*d^2*f^2 - 288*a^3*c^8* \\
&d^2*f^2 - 24*a^5*b^2*c^4*h^4 - 16*b^5*c^6*d^2*e^2 - 9*a^4*b^4*c^3*h^4 - 16* \\
&a^3*b^4*c^4*g^4 - 24*a^3*b^2*c^6*f^4 - 9*a^2*b^4*c^5*f^4 - a^2*b^6*c^3*f^2* \\
&>h^2 + 192*a^6*b^5*i*k^3 - 96*a^5*b^6*g*k^3 - 1728*a^7*c^4*f*j^3 - 192*a^5*c \\
&^6*f^3*j - 10*b^7*c^4*d^3*j - 1024*a^6*c^5*e*i^3 - 1024*a^4*c^7*e^3*i + 153 \\
&6*a^8*b^2*c*k^4 - 10*b^6*c^5*d^3*h - 1728*a^3*c^8*d^3*h - 192*a^5*c^6*d*h^3 \\
&- 25*a^6*b^4*c*j^4 + 30*b^5*c^6*d^3*f + 360*a*b^2*c^8*d^4 - 4*b^11*d^2*k^2 \\
&- 4096*a^9*c^2*k^4 - 1296*a^8*c^3*j^4 - 144*a^7*b^4*k^4 - 256*a^7*c^4*i^4 \\
&- 16*a^6*c^5*h^4 - 16*a^4*c^7*f^4 - 256*a^3*c^8*e^4 - 25*b^4*c^7*d^4 - 1296 \\
&>*a^2*c^9*d^4 - b^8*c^3*d^2*h^2 - b^10*c*d^2*j^2, z, n)*x*(8192*a^6*b*c^8 + \\
&32*a^2*b^9*c^4 - 512*a^3*b^7*c^5 + 3072*a^4*b^5*c^6 - 8192*a^5*b^3*c^7))/(4 \\
&*(64*a^5*c^5 - a^2*b^6*c^2 + 12*a^3*b^4*c^3 - 48*a^4*b^2*c^4))) + (x*(2*b^6 \\
&*c^5*d^2 - 576*a^3*c^8*d^2 + 64*a^4*c^7*f^2 - 64*a^5*c^6*h^2 + 8*a^2*b^9*k^ \\
&2 + 576*a^6*c^5*j^2 - 36*a*b^4*c^6*d^2 + 128*a^3*b*c^7*e^2 + 128*a^5*b*c^5*
\end{aligned}$$

$$\begin{aligned}
& i^2 + 2a^2b^8c^j - 136a^3b^7c^k + 3072a^6b^4c^k + 256a^2b^8 \\
& 2c^7d^2 - 32a^2b^3c^6e^2 + 20a^2b^4c^5f^2 - 96a^3b^2c^6f^2 - \\
& 8a^2b^5c^4g^2 + 32a^3b^3c^5g^2 + 2a^2b^6c^3h^2 - 4a^3b^4c^4 \\
& h^2 - 32a^4b^3c^4i^2 - 40a^3b^6c^2j^2 + 276a^4b^4c^3j^2 - 736a \\
& ^5b^2c^4j^2 + 888a^4b^5c^2k^2 - 2656a^5b^3c^3k^2 - 384a^4c^7d \\
& *h - 1024a^5c^6e*k + 384a^5c^6f*j - 1024a^6c^5i*k + 4a*b^5c^5d* \\
& f + 320a^3b^c^7d*f + 576a^4b^c^6d*j + 256a^4b^c^6e*i + 64a^4b^c^ \\
& 6f*h + 512a^5b^c^5g*k + 64a^5b^c^5h*j - 96a^2b^3c^6d*f + 8a^2b^ \\
& ^4c^5d*h + 32a^2b^4c^5e*g + 64a^3b^2c^6d*h - 128a^3b^2c^6e*g \\
& + 20a^2b^5c^4d*j - 12a^2b^5c^4f*h - 224a^3b^3c^5d*j - 64a^3b^ \\
& 3c^5e*i + 32a^3b^3c^5f*h - 12a^2b^6c^3f*j - 32a^3b^4c^4e*k + \\
& 152a^3b^4c^4f*j + 32a^3b^4c^4g*i + 384a^4b^2c^5e*k - 512a^4b^ \\
& 2c^5f*j - 128a^4b^2c^5g*i + 4a^2b^7c^2h*j + 16a^3b^5c^3g*k - \\
& 44a^3b^5c^3h*j - 192a^4b^3c^4g*k + 96a^4b^3c^4h*j - 32a^4b^4* \\
& c^3i*k + 384a^5b^2c^4i*k) / (4*(64a^5c^5 - a^2b^6c^2 + 12a^3b^4c \\
& ^3 - 48a^4b^2c^4)) - (5b^3c^6d^3 + 8a^3c^6f^3 + 216a^6c^3j^3 - \\
& 96a^2c^7d^2e^2 + 72a^2c^7d^2f - 4a^4b^c^4h^3 - 3b^4c^5d^2f + \\
& 5a^4b^4c^j^3 - 32a^3c^6e^2h - 96a^4c^5d^i^2 + b^5c^4d^2h + 216 \\
& a^3c^6d^2j + 8a^4c^5f^h^2 + 384a^5c^4d^k^2 + b^6c^3d^2j + 4a^ \\
& 2b^7f^k^2 + 72a^4c^5f^2j + 216a^5c^4f^j^2 - 32a^5c^4h^i^2 - 12* \\
& a^3b^6h^k^2 + 24a^5c^4h^2j + 128a^6c^3h^k^2 + 20a^4b^5j^k^2 + 6 \\
& *a^2b^2c^5f^3 - 3a^3b^3c^3h^3 - 66a^5b^2c^2j^3 - 36a*b^c^7d^3 \\
& + 4a*b^8d^k^2 + a*b^7c*d^j^2 - 192a^3c^6d^e*i + 48a^3c^6d^f*h + 14 \\
& 4a^4c^5d^h*j - 128a^4c^5e^f*k - 64a^4c^5e^h*i - 384a^5c^4e^j*k \\
& - 128a^5c^4f^i*k - 384a^6c^3i^j*k + 16a*b^2c^6d^e^2 + 18a*b^2c^6 \\
& *d^2f + 3a*b^3c^5d^f^2 - 60a^2b^c^6d^f^2 + 4a*b^4c^4d^g^2 + 16a^ \\
& 2b^c^6e^2f - a*b^3c^5d^2h + a*b^5c^3d^h^2 - 60a^2b^c^6d^2h - 28 \\
& *a^3b^c^5d^h^2 - 10a*b^4c^4d^2j - 28a^3b^c^5f^2h - 396a^4b^c^4* \\
& d^j^2 - 72a^2b^6c^d^k^2 + 16a^3b^c^5e^2j + 16a^4b^c^4f^i^2 + a^2* \\
& b^6c^f^j^2 - 36a^3b^5c^f^k^2 + 128a^5b^c^3f^k^2 - 3a^3b^5c^h^j^2 \\
& - 204a^5b^c^3h^j^2 + 128a^4b^4c^h^k^2 + 16a^5b^c^3i^2j - 204a^5* \\
& b^3c^j^k^2 + 512a^6b^c^2j^k^2 - 24a^2b^2c^5d^g^2 - 9a^2b^3c^4d* \\
& h^2 + 4a^2b^3c^4f^g^2 + 16a^3b^2c^4d^i^2 - 6a^2b^2c^5d^2j - 5* \\
& a^2b^3c^4f^2h + a^2b^4c^3f^h^2 - 21a^2b^5c^2d^j^2 + 18a^3b^2c^ \\
& ^4f^h^2 + 155a^3b^3c^3d^j^2 - 8a^3b^2c^4g^2h + 436a^3b^4c^2d* \\
& k^2 - 952a^4b^2c^3d^k^2 - 5a^2b^4c^3f^2j + 26a^3b^2c^4f^2j - \\
& 12a^3b^4c^2f^j^2 + 2a^4b^2c^3f^j^2 + 4a^3b^3c^3g^2j + 52a^4b^ \\
& ^3c^2f^k^2 - 6a^3b^4c^2h^2j + 42a^4b^2c^3h^2j + 51a^4b^3c^2* \\
& h^j^2 - 360a^5b^2c^2h^k^2 - 16a*b^3c^5d^e^g + 96a^2b^c^6d^e^g - 4 \\
& *a*b^4c^4d^f^h + 16a*b^5c^3d^e^k - 4a*b^5c^3d^f^j + 544a^3b^c^5d \\
& *e^k - 312a^3b^c^5d^f^j + 96a^3b^c^5d^g^i + 32a^3b^c^5e^f^i + 32a \\
& ^3b^c^5e^g^h - 8a*b^6c^2d^g^k + 2a*b^6c^2d^h^j + 544a^4b^c^4d^i* \\
& k + 224a^4b^c^4e^h^k + 32a^4b^c^4e^i^j + 64a^4b^c^4f^g^k - 152a^4 \\
& *b^c^4f^h^j + 32a^4b^c^4g^h^i + 192a^5b^c^3g^j^k + 224a^5b^c^3h^i \\
& *k + 32a^2b^2c^5d^e^i + 52a^2b^2c^5d^f^h - 16a^2b^2c^5e^f^g - 1
\end{aligned}$$



$$\begin{aligned}
& 92a^2b^3c^4d^*e^*k + 70a^2b^3c^4d^*f^*j - 16a^2b^3c^4d^*g^*i + 96a^2 \\
& *b^4c^3d^*g^*k - 30a^2b^4c^3d^*h^*j + 16a^2b^4c^3e^*f^*k - 272a^3b^2c^4d^*g^*k + 100a^3b^2c^4d^*h^*j - 48a^3b^2c^4e^*f^*k - 16a^3b^2c^4e \\
& *g^*j - 16a^3b^2c^4f^*g^*i + 16a^2b^5c^2d^*i^*k - 8a^2b^5c^2f^*g^*k + \\
& 2a^2b^5c^2f^*h^*j - 192a^3b^3c^3d^*i^*k - 48a^3b^3c^3e^*h^*k + 24a^3 \\
& *b^3c^3f^*g^*k + 6a^3b^3c^3f^*h^*j + 16a^3b^4c^2f^*i^*k + 24a^3b^4c^2 \\
& *g^*h^*k + 80a^4b^2c^3e^*j^*k - 48a^4b^2c^3f^*i^*k - 112a^4b^2c^3g^*h \\
& *k - 16a^4b^2c^3g^*i^*j - 40a^4b^3c^2g^*j^*k - 48a^4b^3c^2h^*i^*k + 8 \\
& 0a^5b^2c^2i^*j^*k)/(8*(64a^5c^5 - a^2b^6c^2 + 12a^3b^4c^3 - 48a^4 \\
& *b^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^*k^3 - 320a^6b^*c^2k^3 + 96a^3c \\
& ^6e^2i + 96a^4c^5e^i^2 + 144a^3c^6d^2k + 128a^5c^4e^*k^2 - b^6c \\
& ^3d^2k - 4a^2b^7g^*k^2 - 16a^4c^5f^2k + 8a^3b^6i^*k^2 + 16a^5c^ \\
& 4h^2k + 128a^6c^3i^*k^2 - 144a^6c^3j^2k - 4a^2b^3c^4g^3 + 24a^* \\
& b^*c^7d^2e - 48a^2c^7d^*e^*f - 144a^3c^6d^*e^*j - 48a^3c^6d^*f^*i - 16 \\
& a^3c^6e^*f^*h + 96a^4c^5d^*h^*k - 144a^4c^5d^*i^*j - 48a^4c^5e^*h^*j - 1 \\
& 6a^4c^5f^*h^*i - 96a^5c^4f^*j^*k - 48a^5c^4h^*i^*j - 12a^*b^2c^6d^2g \\
& + 16a^2b^*c^6e^*f^2 - 48a^2b^*c^6e^2g - 2a^*b^3c^5d^2i + 24a^2b^*c^ \\
& 6d^2i + 8a^3b^*c^5e^*h^2 + 18a^*b^4c^4d^2k + 16a^3b^*c^5f^2i + 96 \\
& a^4b^*c^4e^*j^2 + 8a^2b^6c^*e^*k^2 - 176a^3b^*c^5e^2k - 48a^4b^*c^4g^* \\
& i^2 - a^2b^6c^*g^*j^2 + 8a^4b^*c^4h^2i + 44a^3b^5c^*g^*k^2 - 64a^5b^*c \\
& ^3g^*k^2 + 2a^3b^5c^*i^*j^2 + 96a^5b^*c^3i^*j^2 - 88a^4b^4c^*i^*k^2 - 17 \\
& 6a^5b^*c^3i^2k - 3a^4b^4c^*j^2k + 24a^2b^2c^5e^*g^2 - 8a^2b^2c^ \\
& 5f^2g + 2a^2b^3c^4e^*h^2 - 100a^2b^2c^5d^2k - a^2b^4c^3g^*h^2 + \\
& 2a^2b^5c^2e^*j^2 - 4a^3b^2c^4g^*h^2 - 28a^3b^3c^3e^*j^2 + 32a^2b^3 \\
& c^4e^2k + 24a^3b^2c^4g^2i - 88a^3b^4c^2e^*k^2 + 216a^4b^2c^ \\
& ^3e^*k^2 - a^2b^4c^3f^2k + 2a^3b^3c^3h^2i + 14a^3b^4c^2g^*j^2 - \\
& 48a^4b^2c^3g^*j^2 + 8a^2b^5c^2g^2k - 44a^3b^3c^3g^2k - 108a^ \\
& 4b^3c^2g^*k^2 - 12a^4b^2c^3h^2k - 28a^4b^3c^2i^*j^2 + 32a^4b^3c^ \\
& ^2i^2k + 216a^5b^2c^2i^*k^2 + 40a^5b^2c^2j^2k - 4a^*b^2c^6d^*e^* \\
& f + 2a^*b^3c^5d^*f^*g + 32a^2b^*c^6d^*e^*h + 24a^2b^*c^6d^*f^*g - 2a^*b^5c \\
& ^3d^*f^*k - 8a^3b^*c^5d^*f^*k + 72a^3b^*c^5d^*g^*j + 32a^3b^*c^5d^*h^*i + 80 \\
& *a^3b^*c^5e^*f^*j - 96a^3b^*c^5e^*g^*i + 8a^3b^*c^5f^*g^*h + 72a^4b^*c^4d^* \\
& j^*k - 352a^4b^*c^4e^*i^*k + 8a^4b^*c^4f^*h^*k + 80a^4b^*c^4f^*i^*j + 24a^4 \\
& *b^*c^4g^*h^*j + 56a^5b^*c^3h^*j^*k + 20a^2b^2c^5d^*e^*j - 4a^2b^2c^5d^* \\
& f^*i - 16a^2b^2c^5d^*g^*h - 12a^2b^2c^5e^*f^*h + 18a^2b^3c^4d^*f^*k - \\
& 10a^2b^3c^4d^*g^*j - 12a^2b^3c^4e^*f^*j + 6a^2b^3c^4f^*g^*h + 6a^2b^ \\
& ^4c^3d^*h^*k - 32a^2b^4c^3e^*g^*k + 4a^2b^4c^3e^*h^*j + 6a^2b^4c^3f^ \\
& *g^*j - 64a^3b^2c^4d^*h^*k + 20a^3b^2c^4d^*i^*j + 176a^3b^2c^4e^*g^*k \\
& - 20a^3b^2c^4e^*h^*j - 40a^3b^2c^4f^*g^*j - 12a^3b^2c^4f^*h^*i - 2a^ \\
& 2b^5c^2g^*h^*j - 10a^3b^3c^3d^*j^*k + 64a^3b^3c^3e^*i^*k + 6a^3b^3c^ \\
& ^3f^*h^*k - 12a^3b^3c^3f^*i^*j + 10a^3b^3c^3g^*h^*j - 32a^3b^4c^2g^*i \\
& *k + 4a^3b^4c^2h^*i^*j + 8a^4b^2c^3f^*j^*k + 176a^4b^2c^3g^*i^*k - 20 \\
& *a^4b^2c^3h^*i^*j - 6a^4b^3c^2h^*j^*k))/(4*(64a^5c^5 - a^2b^6c^2 + 1 \\
& 2a^3b^4c^3 - 48a^4b^2c^4)))*root(1572864a^8b^2c^9z^4 - 983040a^7
\end{aligned}$$

$$\begin{aligned}
& *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^2 - 16384*a^7*b*c^5*g*i*k*z - 10240*a^7*b*c^5*f*j*k*z + 4096*a^7*b*c^5*h*i*j*z - 47104*a^6*b*c^6*d*h*k*z - 16384*a^6*b*c^6*e*g*k*z + 6144*a^6*b*c^6*f*g*j*z + 4096*a^6*b*c^6*e*h*j*z + 32*a*b^10*c^2*d*f*k*z - 6144*a^5*b*c^7*d*g*h*z - 4096*a^5*b*c^7*d*f*i*z - 32*a*b^8*c^4*d*f*g*z - 4096*a^4*b*c^8*d*e*f*z + 64*a*b^7*c^5*d*e*f*z - 18432*a^7*b^2*c^4*h*j*k*z + 4608*a^6*b^4*c^3*h*j*k*z - 384*a^5*b^6*c^2*h*j*k*z + 12288*a^6*b^3*c^4*g*i*k*z + 7680*a^6*b^3*c^4*f*j*k*z - 3072*a^6*b^3*c^4*h*i
\end{aligned}$$

$$\begin{aligned}
 & *j*z - 3072*a^5*b^5*c^3*g*i*k*z - 1920*a^5*b^5*c^3*f*j*k*z + 768*a^5*b^5*c^3*h*i*j*z + 256*a^4*b^7*c^2*g*i*k*z + 160*a^4*b^7*c^2*f*j*k*z - 64*a^4*b^7*c^2*h*i*j*z - 65536*a^6*b^2*c^5*d*j*k*z - 24576*a^6*b^2*c^5*e*i*k*z + 21504 \\
 & *a^5*b^4*c^4*d*j*k*z + 9216*a^6*b^2*c^5*f*i*j*z + 6144*a^5*b^4*c^4*e*i*k*z - 3072*a^5*b^4*c^4*f*h*k*z - 3072*a^4*b^6*c^3*d*j*k*z - 2304*a^5*b^4*c^4*f*i*j*z - 2048*a^6*b^2*c^5*g*h*j*z + 1536*a^5*b^4*c^4*g*h*j*z + 1024*a^4*b^6*c^3*f*h*k*z - 512*a^4*b^6*c^3*e*i*k*z - 384*a^4*b^6*c^3*g*h*j*z + 192*a^4*b^6*c^3*f*i*j*z + 160*a^3*b^8*c^2*d*j*k*z - 96*a^3*b^8*c^2*f*h*k*z + 32*a^3*b^8*c^2*g*h*j*z + 41472*a^5*b^3*c^5*d*h*k*z - 13440*a^4*b^5*c^4*d*h*k*z + 1 \\
 & 2288*a^5*b^3*c^5*e*g*k*z - 4608*a^5*b^3*c^5*f*g*j*z - 3072*a^5*b^3*c^5*e*h*j*z - 3072*a^4*b^5*c^4*e*g*k*z + 1888*a^3*b^7*c^3*d*h*k*z + 1152*a^4*b^5*c^4*f*g*j*z + 768*a^4*b^5*c^4*e*h*j*z + 256*a^3*b^7*c^3*e*g*k*z - 96*a^3*b^7*c^3*f*g*j*z - 96*a^2*b^9*c^2*d*h*k*z - 64*a^3*b^7*c^3*e*h*j*z + 9216*a^5*b^2*c^6*e*f*j*z - 9216*a^5*b^2*c^6*d*h*i*z - 6656*a^4*b^4*c^5*d*f*k*z - 6144*a^5*b^2*c^6*d*f*k*z + 3456*a^3*b^6*c^4*d*f*k*z - 2304*a^4*b^4*c^5*e*f*j*z + 2304*a^4*b^4*c^5*d*h*i*z - 576*a^2*b^8*c^3*d*f*k*z + 192*a^3*b^6*c^4*e*f*j*z - 192*a^3*b^6*c^4*d*h*i*z + 4608*a^4*b^3*c^6*d*g*h*z + 3072*a^4*b^3*c^6*d*f*i*z - 1152*a^3*b^5*c^5*d*g*h*z - 768*a^3*b^5*c^5*d*f*i*z + 96*a^2*b^7*c^4*d*g*h*z + 64*a^2*b^7*c^4*d*f*i*z - 9216*a^4*b^2*c^7*d*e*h*z + 2304*a^3*b^4*c^6*d*e*h*z + 2048*a^4*b^2*c^7*d*f*g*z - 1536*a^3*b^4*c^6*d*f*g*z + 384*a^2*b^6*c^5*d*f*g*z - 192*a^2*b^6*c^5*d*e*h*z + 3072*a^3*b^3*c^7*d*e*f*z - 768*a^2*b^5*c^6*d*e*f*z - 3072*a^8*b*c^4*j^2*k*z + 48*a^5*b^7*c*j^2*k*z - 4 \\
 & 9152*a^8*b*c^4*i*k^2*z + 2304*a^5*b^7*c*i*k^2*z - 9216*a^7*b*c^5*h^2*k*z - 32*a^4*b^8*c*i*j^2*z - 1152*a^4*b^8*c*g*k^2*z + 9216*a^7*b*c^5*g*j^2*z - 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*
 \end{aligned}$$

$j^2z + 4560a^2b^7c^4d^2kz + 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^3b^4c^6e^2f^2z + 32a^2b^6c^5e^2f^2z - 15872a^3b^2c^8d^2e^2z + 4992a^2b^4c^7d^2e^2z - 61440a^8b^2c^3k^3z + 21504a^7b^4c^2k^3z + 16384a^8c^5i^2k^2z - 18432a^8c^5i^2j^2z - 128a^4b^9i^2k^2z + 2048a^7c^6h^2i^2z + 64a^3b^10g^2k^2z + 16384a^6c^7e^2k^2z + 16b^11c^2d^2k^2z - 18432a^7c^6e^2j^2z - 2048a^6c^7f^2i^2z + 18432a^5c^8d^2i^2z - 3328a^6b^6c^2k^3z + 2048a^6c^7e^2h^2z - 16b^9c^4d^2g^2z - 2048a^5c^8e^2f^2z + 32b^8c^5d^2e^2z + 18432a^4c^9d^2e^2z + 65536a^9c^4k^3z + 192a^5b^8k^3z - 3328a^7b^3c^3h^2i^2j^2k - 6912a^6b^3c^4d^2i^2j^2k - 3328a^6b^3c^4e^2h^2j^2k - 1536a^6b^3c^4f^2g^2j^2k - 768a^6b^3c^4g^2h^2i^2j - 768a^6b^3c^4f^2h^2i^2k - 6912a^5b^3c^5d^2e^2j^2k - 2304a^5b^3c^5d^2g^2i^2j - 1792a^5b^3c^5e^2f^2i^2j + 1536a^5b^3c^5d^2g^2h^2k - 1280a^5b^3c^5d^2f^2i^2k - 768a^5b^3c^5e^2g^2h^2j - 768a^5b^3c^5e^2f^2h^2k - 256a^5b^3c^5f^2g^2h^2i + 16a^4b^8c^2d^2f^2g^2k - 4a^4b^8c^2d^2f^2h^2j - 2304a^4b^3c^6d^2e^2g^2j - 1792a^4b^3c^6d^2e^2h^2i - 1280a^4b^3c^6d^2e^2f^2k - 768a^4b^3c^6d^2f^2g^2i - 256a^4b^3c^6e^2f^2g^2h - 32a^4b^3c^6d^2e^2f^2k - 768a^3b^3c^7d^2e^2f^2g + 32a^4b^5c^5d^2e^2f^2g + 576a^6b^3c^2d^2h^2i^2j^2k + 1664a^6b^2c^3g^2h^2j^2k + 384a^6b^2c^3f^2i^2j^2k - 288a^5b^4c^2g^2h^2j^2k - 160a^5b^4c^2f^2i^2j^2k + 2112a^5b^3c^3d^2i^2j^2k + 576a^5b^3c^3e^2h^2j^2k - 448a^5b^3c^3f^2h^2i^2k - 192a^5b^3c^3g^2h^2i^2j - 192a^5b^3c^3f^2g^2j^2k - 160a^4b^5c^2d^2i^2j^2k + 96a^4b^5c^2f^2h^2i^2k + 80a^4b^5c^2f^2g^2j^2k + 32a^4b^5c^2g^2h^2i^2j + 4992a^5b^2c^4d^2h^2i^2k - 4608a^5b^2c^4e^2g^2i^2k + 3456a^5b^2c^4d^2g^2j^2k - 1312a^4b^4c^3d^2h^2i^2k - 1056a^4b^4c^3d^2g^2j^2k + 896a^5b^2c^4f^2g^2i^2j + 768a^4b^4c^3e^2g^2i^2k + 384a^5b^2c^4f^2g^2h^2k + 384a^5b^2c^4e^2h^2i^2j + 384a^5b^2c^4e^2f^2j^2k + 224a^4b^4c^3f^2g^2h^2k - 160a^4b^4c^3e^2f^2j^2k - 96a^4b^4c^3f^2g^2i^2j + 96a^3b^6c^2d^2h^2i^2k + 80a^3b^6c^2d^2g^2j^2k - 64a^4b^4c^3e^2h^2i^2j - 48a^3b^6c^2f^2g^2h^2k - 2496a^4b^3c^4d^2g^2h^2k + 2112a^4b^3c^4d^2e^2j^2k - 960a^4b^3c^4d^2f^2i^2k + 656a^3b^5c^3d^2g^2h^2k - 448a^4b^3c^4e^2f^2h^2k + 384a^3b^5c^3d^2f^2i^2k + 320a^4b^3c^4d^2g^2i^2j - 192a^4b^3c^4f^2g^2h^2i - 192a^4b^3c^4e^2g^2h^2j + 192a^4b^3c^4e^2f^2i^2j - 160a^3b^5c^3d^2e^2j^2k + 96a^3b^5c^3e^2f^2h^2k - 48a^2b^7c^2d^2g^2h^2k + 32a^3b^5c^3e^2g^2h^2j - 32a^2b^7c^2d^2f^2i^2k + 4992a^4b^2c^5d^2e^2h^2k - 3584a^4b^2c^5d^2f^2h^2j - 1312a^3b^4c^4d^2e^2h^2k + 896a^4b^2c^5e^2f^2g^2j + 896a^4b^2c^5d^2g^2h^2i + 640a^4b^2c^5d^2f^2g^2k - 640a^4b^2c^5d^2e^2i^2j + 600a^3b^4c^4d^2f^2h^2j + 480a^3b^4c^4d^2f^2g^2k + 384a^4b^2c^5e^2f^2h^2i - 192a^2b^6c^3d^2f^2g^2k - 96a^3b^4c^4e^2f^2g^2j - 96a^3b^4c^4d^2g^2h^2i + 96a^2b^6c^3d^2e^2h^2k + 12a^2b^6c^3d^2f^2h^2j - 960a^3b^3c^5d^2e^2f^2k + 384a^2b^5c^4d^2e^2f^2k + 320a^3b^3c^5d^2e^2g^2j - 192a^3$

$$\begin{aligned}
& b^3c^5efgh - 192a^3b^3c^5d*fgi + 192a^3b^3c^5d*ehi + 32a^2b^5c^4d*fgi + 896a^3b^2c^6d*egh + 384a^3b^2c^6d*efi - 96 \\
& a^2b^4c^5d*egh - 64a^2b^4c^5d*efi - 192a^2b^3c^6d*efg + 48a^6b^4c^3i*j^2k - 1424a^6b^4c^3h*j^2k - 2304a^7b^3c^3g*j^2k - 24a^5b^5c^3g*j^2k + 2048a^7b^3c^3g*i*k^2 - 1024a^7b^3c^3f*j^2k - 768a^5b^5c^3g*i*k^2 + 408a^5b^5c^3f*j^2k + 256a^6b^3c^4g*h^2k + 16a^4b^6c^3g*i*j^2 + 4608a^6b^3c^4e*i^2k + 4608a^5b^3c^5e^2*i*k - 896a^6b^3c^4f*i^2*j + 768a^4b^6c^3d*j^2k - 256a^4b^6c^3f*h^2k - 128a^4b^6c^3e*i*k^2 + 2208a^6b^3c^4f*h*j^2 - 1920a^6b^3c^4e*i*j^2 + 800a^5b^3c^5f^2*h*j - 256a^5b^3c^5f^2*g*k - 16a^3b^8c^2d^2*i*k + 6a^3b^7c^3f*h*j^2 + 8192a^6b^3c^4d*h^2k + 2048a^6b^3c^4e*g^2k - 472a^3b^7c^3d*h^2k + 64a^3b^7c^3e*g^2k + 4896a^4b^3c^6d^2*h*j + 2304a^4b^3c^6d^2g^2k + 1824a^5b^3c^5d*h^2j - 384a^5b^3c^5e*h^2i - 168a^3b^7c^3d^2g^2k + 42a^3b^7c^3d^2h*j + 6a^2b^8c^3d*h*j^2 + 1536a^5b^3c^5e*g^2i + 1536a^4b^3c^6e^2g^2i - 896a^5b^3c^5d*h^2i - 896a^4b^3c^6e^2f*j + 144a^2b^8c^3d*f^2k + 4896a^5b^3c^5d*f^2j + 1824a^4b^3c^6d*f^2j - 384a^4b^3c^6e^2f^2i + 336a^3b^6c^4d^2e*k - 156a^3b^6c^4d^2f*j + 16a^3b^6c^4d^2g^2i + 12a^3b^7c^3d*f^2j + 2208a^3b^3c^7d^2*f*h - 1920a^3b^3c^7d^2e*i + 800a^4b^3c^6d*f^2h - 102a^3b^5c^5d^2*f*h - 32a^3b^5c^5d^2e*i + 12a^3b^6c^4d*f^2h - 2a^3b^7c^3d*f^2h - 896a^3b^3c^7d*e^2h - 8a^3b^6c^4d*f^2g - 240a^3b^4c^6d^2e*g - 32a^3b^4c^6d*e^2f + 3072a^7c^4f*i*j^2k + 3072a^6c^5e*f*j^2k - 3072a^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^3b^9c^3d*f^2j - 1088a^7b^2c^2i*j^2k + 4800a^7b^2c^2h*j^2k + 960a^6b^2c^3h^2i*k + 544a^6b^3c^2g*j^2k - 144a^5b^4c^2h^2i*k - 2304a^6b^2c^3g^2i*k + 1920a^6b^3c^2g^2i*k + 1152a^5b^3c^3g^2i*k - 864a^6b^3c^2f*j^2k + 384a^5b^4c^2g^2i*k + 192a^6b^2c^3h^2i^2j - 192a^4b^5c^2g^2i*k - 32a^5b^4c^2h^2i^2j - 1088a^6b^2c^3e*j^2k + 960a^6b^2c^3g^2i*j^2 - 480a^5b^3c^3g^2h^2k - 240a^5b^4c^2g^2i*j^2 + 192a^5b^2c^4f^2i*k + 72a^4b^5c^2g^2h^2k + 48a^5b^4c^2e*j^2k + 48a^4b^4c^3f^2i*k - 16a^3b^6c^2f^2i*k + 13376a^6b^2c^3d*j^2k - 5136a^5b^4c^2d*j^2k - 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^2k + 576a^6b^2c^3f*h^2k + 192a^5b^2c^4g^2h*j + 96a^5b^3c^3f^2i^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^2h^2k - 864a^5b^2c^4f^2h^2j + 480a^5b^3c^3e*i^2j + 336a^4b^3c^4f^2h*j + 336a^2b^6c^3d^2i*k + 192a^5b^2c^4g^2h^2i + 144a^5b^3c^3f^2h*j - 144a^4b^4c^3e^2h^2k - 102a^4b^5c^2f^2h*j - 96a^4b^3c^4f^2g^2k - 32a^4b^5c^2e*i^2j - 30a^3b^5c^3f^2h*j - 24a^3b^5c^3f^2g^2k + 16a^4b^4c^3g^2h^2i - 12a^4b^4c^3f^2h^2j + 12a^3b^6c^2f^2h^2j + 8a^2b^7c^2f^2g^2k - 2a^2b^7c^2f^2h^2j - 9312a^5b^3c^3d^2h^2k + 3288a^4b^5c^2d^2h^2k - 2304a^4b^2c^5e^2g^2k + 1920a^5b^3c^3e*g^2k + 152a^4b^3c^4e*g^2k - 768a^4b^5c^2e*g^2k + 384a^3b^4c^4e^2g^2k
\end{aligned}$$

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

$$\begin{aligned}
& 4a^3b^8f^2hk^2 + 2304a^6c^5d^2i^2j + 768a^5c^6e^2h^2j + 256a^6c^5f^2hi^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 + 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^2c^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^2b^9c^2d^2k^2 + 16b^6c^5d^2e^2g + 4320a^6b^2c^4d^2j^3 + 4320a^3b^2c^7d^3j + 222a^2b^5c^5d^3j + 96a^5b^2c^5f^2h^3 + 96a^4b^2c^6f^2h - 10a^3b^7c^2d^2j^3 + 768a^3c^8d^2e^2f + 512a^3b^2c^7e^3g + 132a^2b^4c^6d^3h + 2016a^2b^2c^8d^3f - 496a^2b^3c^7d^3f + 224a^3b^2c^7d^2f^3 - 18a^2b^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^2b^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^2h^3 - 25a^6b^4c^2j^4 + 30b^5c^6d^3f + 360a^2b^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), n, 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((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

$$\frac{x \left( \left( - \left( \left( \frac{ja^2}{c^2} + d \right) b^2 \right) + afb + 2a \left( \frac{ja^2}{c} - ha + cd \right) \right) c^2 + (-ajb^3 - c(-3ja^2 + cha + c^2d)b + 2ac^3f)x^2 \right) \left( ja^2 + 3 \right)}{4ac^2 (b^2 - 4ac) (cx^4 + bx^2 + a)^2} + \dots$$

**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] 
$$-\left(x \left( c^2(a b f - b^2(d + (a^2 j)/c^2) + 2a(c d - a h + (a^2 j)/c)) + (2 a^3 c f - a b^3 j - b c(c^2 d + a c h - 3 a^2 j)) x^2 \right) / (4 a^2 c(b^2 - 4 a c)(a + b x^2 + c x^4)^2) - (b^3 c^3(c e + a i) - a b^4 k + 4 a^2 b^2 c k - 2 a^2 c^2(c^2 g + a^2 k) + (2 c^5 e + b^2 c^3 i - c^4(b g + 2 a i) - b^5 k + 5 a b^3 c k - 5 a^2 b c^2 k) x^2) / (4 c^4(b^2 - 4 a c)(a + b x^2 + c x^4)^2) + (x(c(a b^3 f + 8 a^2 b c f + 4 a^2(7 c^2 d + a c h - 9 a^2 j) + b^4(3 d - (2 a^2 j)/c^2) - a b^2(25 c d + 7 a h - (11 a^2 j)/c)) + (a b^2 c^2 f + 20 a^2 c^3 f + b^3(3 c^2 d + a^2 j) - 4 a b c(6 c^2 d + 3 a c h + 4 a^2 j)) x^2) / (8 a^2 c(b^2 - 4 a c)^2(a + b x^2 + c x^4) + (b^3 c^2 i + 2 b c^3(3 c e + a i) + 11 a b^4 k - (b^6 k)/c + 32 a^3 c^2 k - 3 b^2(c^3 g + 13 a^2 c k) + 2(6 c^5 e + b^2 c^3 i - c^4(3 b g - 2 a i) + 2 b^5 k - 15 a b^3 c k + 25 a^2 b c^2 k) x^2) / (4 c^3(b^2 - 4 a c)^2(a + b x^2 + c x^4)) + ((a b^2 c f + 20 a^2 c^2 f - 4 a b(6 c^2 d + 3 a c h + 4 a^2 j) + b^3(3 c d + (a^2 j)/c) + (a b^3 c^2 f - 52 a^2 b c^3 f - 6 a b^2 c(5 c^2 d - 3 a c h - 3 a^2 j) + b^4(3 c^2 d - a^2 j) + 8 a^2 c^2(21 c^2 d + 3 a c h + 5 a^2 j)) / (c \sqrt{b^2 - 4 a c})) \operatorname{ArcTan}[\sqrt{2} \sqrt{c} x] / \sqrt{b - \sqrt{b^2 - 4 a c}}] / (8 \sqrt{2} a^2 \sqrt{c} (b^2 - 4 a c)^2 \sqrt{b - \sqrt{b^2 - 4 a c}}) + ((a b^2 c f + 20 a^2 c^2 f - 4 a b(6 c^2 d + 3 a c h + 4 a^2 j) + b^3(3 c d + (a^2 j)/c) - (a b^3 c^2 f - 52 a^2 b c^3 f - 6 a b^2 c(5 c^2 d - 3 a c h - 3 a^2 j) + b^4(3 c^2 d - a^2 j) + 8 a^2 c^2(21 c^2 d + 3 a c h + 5 a^2 j)) / (c \sqrt{b^2 - 4 a c})) \operatorname{ArcTan}[\sqrt{2} \sqrt{c} x] / \sqrt{b + \sqrt{b^2 - 4 a c}}] / (8 \sqrt{2} a^2 \sqrt{c} (b^2 - 4 a c)^2 \sqrt{b + \sqrt{b^2 - 4 a c}}) - ((12 c^5 e + 2 b^2 c^3 i - c^4(6 b g - 4 a i) + \dots$$

$$-b^5k + 10ab^3c^k - 30a^2b^2c^k) \operatorname{ArcTanh}[(b + 2cx^2)/\sqrt{b^2 - 4ac}]] / (2c^3(b^2 - 4ac)^{5/2}) + (k \operatorname{Log}[a + bx^2 + cx^4]) / (4c^3)$$
Rule 205

$$\operatorname{Int}[(a_ + (b_)(x_)^2)^{-1}, x\_Symbol] \rightarrow \operatorname{Simp}[(\operatorname{Rt}[a/b, 2] \operatorname{ArcTan}[x/\operatorname{Rt}[a/b, 2]])/a, x] \text{ /; FreeQ}\{a, b\}, x] \ \&\& \operatorname{PosQ}[a/b]$$
Rule 206

$$\operatorname{Int}[(a_ + (b_)(x_)^2)^{-1}, x\_Symbol] \rightarrow \operatorname{Simp}[(1 \operatorname{ArcTanh}[\operatorname{Rt}[-b, 2]x] / \operatorname{Rt}[a, 2]) / (\operatorname{Rt}[a, 2] \operatorname{Rt}[-b, 2]), x] \text{ /; FreeQ}\{a, b\}, x] \ \&\& \operatorname{NegQ}[a/b] \ \&\& (\operatorname{GtQ}[a, 0] \ || \ \operatorname{LtQ}[b, 0])$$
Rule 618

$$\operatorname{Int}[(a_ + (b_)(x_ + (c_)(x_)^2)^{-1}, x\_Symbol] \rightarrow \operatorname{Dist}[-2, \operatorname{Subst}[\operatorname{Int}[1/\operatorname{Simp}[b^2 - 4ac - x^2, x], x], x, b + 2cx], x] \text{ /; FreeQ}\{a, b, c\}, x] \ \&\& \operatorname{NeQ}[b^2 - 4ac, 0]$$
Rule 628

$$\operatorname{Int}[(d_ + (e_)(x_)) / ((a_ + (b_)(x_ + (c_)(x_)^2)), x\_Symbol] \rightarrow \operatorname{Simp}[(d \operatorname{Log}[\operatorname{RemoveContent}[a + bx + cx^2, x]]) / b, x] \text{ /; FreeQ}\{a, b, c, d, e\}, x] \ \&\& \operatorname{EqQ}[2cd - be, 0]$$
Rule 634

$$\operatorname{Int}[(d_ + (e_)(x_)) / ((a_ + (b_)(x_ + (c_)(x_)^2)), x\_Symbol] \rightarrow \operatorname{Dist}[(2cd - be) / (2c), \operatorname{Int}[1/(a + bx + cx^2), x], x] + \operatorname{Dist}[e / (2c), \operatorname{Int}[(b + 2cx) / (a + bx + cx^2), x], x] \text{ /; FreeQ}\{a, b, c, d, e\}, x] \ \&\& \operatorname{NeQ}[2cd - be, 0] \ \&\& \operatorname{NeQ}[b^2 - 4ac, 0] \ \&\& \operatorname{!NiceSqrtQ}[b^2 - 4ac]$$
Rule 1166

$$\operatorname{Int}[(d_ + (e_)(x_)^2) / ((a_ + (b_)(x_)^2 + (c_)(x_)^4), x\_Symbol] \rightarrow \operatorname{With}\{q = \operatorname{Rt}[b^2 - 4ac, 2]\}, \operatorname{Dist}[e/2 + (2cd - be) / (2q), \operatorname{Int}[1/(b/2 - q/2 + cx^2), x], x] + \operatorname{Dist}[e/2 - (2cd - be) / (2q), \operatorname{Int}[1/(b/2 + q/2 + cx^2), x], x]] \text{ /; FreeQ}\{a, b, c, d, e\}, x] \ \&\& \operatorname{NeQ}[b^2 - 4ac, 0] \ \&\& \operatorname{NeQ}[c^2d^2 - a^2e^2, 0] \ \&\& \operatorname{PosQ}[b^2 - 4ac]$$
Rule 1660

$$\operatorname{Int}[(Pq_)((a_ + (b_)(x_ + (c_)(x_)^2)^{p_}), x\_Symbol] \rightarrow \operatorname{With}\{Q = \operatorname{PolynomialQuotient}[Pq, a + bx + cx^2, x], f = \operatorname{Coeff}[\operatorname{PolynomialRemainder}[Pq, a + bx + cx^2, x], x, 0], g = \operatorname{Coeff}[\operatorname{PolynomialRemainder}[Pq, a + bx +$$

```
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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 59x^5 + jx^8 + kx^{11}}{(a + bx^2 + cx^4)^3} dx &= \int \frac{d + fx^2 + hx^4 + jx^8}{(a + bx^2 + cx^4)^3} dx + \int \frac{x(e + gx^2 + 59x^4 + kx^{10})}{(a + bx^2 + cx^4)^3} dx \\
&= -\frac{x \left( c^2 \left( abf - b^2 \left( d + \frac{a^2j}{c^2} \right) + 2a \left( cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3 f)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^2} \\
&= -\frac{x \left( c^2 \left( abf - b^2 \left( d + \frac{a^2j}{c^2} \right) + 2a \left( cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3 f)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^2} \\
&= -\frac{x \left( c^2 \left( abf - b^2 \left( d + \frac{a^2j}{c^2} \right) + 2a \left( cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3 f)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^2} \\
&= -\frac{x \left( c^2 \left( abf - b^2 \left( d + \frac{a^2j}{c^2} \right) + 2a \left( cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3 f)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^2} \\
&= -\frac{x \left( c^2 \left( abf - b^2 \left( d + \frac{a^2j}{c^2} \right) + 2a \left( cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3 f)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^2} \\
&= -\frac{x \left( c^2 \left( abf - b^2 \left( d + \frac{a^2j}{c^2} \right) + 2a \left( cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3 f)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^2}
\end{aligned}$$

**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*i - 2*a^2*b^6*k + 22*a^3*b^4*c*k - 78*a^4*b^2*c^2*k + 64*a^5*c^3*k + 3*b^4*c^4*d*x - 25*a*b^2*c^5*d*x + 28*a^2*c^6*d*x + a*b^3*c^4*f*x + 8*a^2*b*c^5*f*x - 7*a^2*b^2*c^4*h*x + 4*a^3*c^5*h*x - 2*a^2*b^4*c^2*j*x + 11*a^3*b^2*c^3*j*x - 36*a^4*c^4*j*x + 24*a^2*c^6*e*x^2 - 12*a^2*b*c^5*g*x^2 + 4*a^2*b^2*c^4*i*x^2 + 8*a^3*c^5*i*x^2 + 8*a^2*b^5*c*k*x^2 - 60*a^3*b^3*c^2*k*x^2 + 100*a^4*b*c^3*k*x^2 + 3*b^3*c^5*d*x^3 - 24*a*b*c^6*d*x^3 + a*b^2*c^5*f*x^3 + 20*a^2*c^6*f*x^3 - 12*a^2*b*c^5*h*x^3 + a^2*b^3*c^3*j*x^3 - 16*a^3*b*c^4*j*x^3)/(8*a^2*c^4*(-b^2 + 4*a*c)^2*(a + b*x^2 + c*x^4)) + ((3*b^4*c^2*d - 30*a*b^2*c^3*d + 168*a^2*c^4*d + 3*b^3*c^2*sqrt[b^2 - 4*a*c]*d - 24*a*b*c^3*sqrt[b^2 - 4*a*c]*d + a*b^3*c^2*f - 52*a^2*b*c^3*f + a*b^2*c^2*sqrt[b^2 - 4*a*c]*f + 20*a^2*c^3*sqrt[b^2 - 4*a*c]*f + 18*a^2*b^2*c^2*h + 24*a^3*c^3*h - 12*a^2*b*c^2*sqrt[b^2 - 4*a*c]*h - a^2*b^4*j + 18*a^3*b^2*c*j + 40*a^4*c^2*j + a^2*b^3*sqrt[b^2 - 4*a*c]*j - 16*a^3*b*c*sqrt[b^2 - 4*a*c]*j)*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]])/(8*sqrt[2]*a^2*c^(3/2)*(b^2 - 4*a*c)^(5/2)*sqrt[b - sqrt[b^2 - 4*a*c]]) + ((-3*b^4*c^2*d + 30*a*b^2*c^3*d - 168*a^2*c^4*d + 3*b^3*c^2*sqrt[b^2 - 4*a*c]*d - 24*a*b*c^3*sqrt[b^2 - 4*a*c]*d - a*b^3*c^2*f + 52*a^2*b*c^3*f + a*b^2*c^2*sqrt[b^2 - 4*a*c]*f + 20*a^2*c^3*sqrt[b^2 - 4*a*c]*f - 18*a^2*b^2*c^2*h - 24*a^3*c^3*h - 12*a^2*b*c^2*sqrt[b^2 - 4*a*c]*h + a^2*b^4*j - 18*a^3*b^2*c*j - 40*a^4*c^2*j + a^2*b^3*sqrt[b^2 - 4*a*c]*j - 16*a^3*b*c*sqrt[b^2 - 4*a*c]*j)*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]])/(8*sqrt[2]*a^2*c^(3/2)*(b^2 - 4*a*c)^(5/2)*sqrt[b + sqrt[b^2 - 4*a*c]]) + ((12*c^5*e - 6*b*c^4*g + 2*b^2*c^3*i + 4*a*c^4*i - b^5*k + 10*a*b^3*c*k - 30*a^2*b*c^2*k + b^4*sqrt[b^2 - 4*a*c]*k - 8*a*b^2*c*sqrt[b^2 - 4*a*c]*k + 16*a^2*c^2*sqrt[b^2 - 4*a*c]*k)*Log[-b + sqrt[b^2 - 4*a*c] - 2*c*x^2])/(4*c^3*(b^2 - 4*a*c)^(5/2)) + ((-12*c^5*e + 6*b*c^4*g - 2*b^2*c^3*i - 4*a*c^4*i + b^5*k - 10*a*b^3*c*k + 30*a^2*b*c^2*k + b^4*sqrt[b^2 - 4*a*c]*k - 8*a*b^2*c*sqrt[b^2 - 4*a*c]*k + 16*a^2*c^2*sqrt[b^2 - 4*a*c]*k)*Log[b + sqrt[b^2 - 4*a*c] + 2*c*x^2])/(4*c^3*(b^2 - 4*a*c)^(5/2))
```

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + ix^5 + jx^8 + kx^{11}}{(a + bx^2 + cx^4)^3} dx$$

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] int((k\*x^11+j\*x^8+i\*x^5+h\*x^4+g\*x^3+f\*x^2+e\*x+d)/(c\*x^4+b\*x^2+a)^3,x)

[Out] result too large to display

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

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((k\*x^11+j\*x^8+i\*x^5+h\*x^4+g\*x^3+f\*x^2+e\*x+d)/(c\*x^4+b\*x^2+a)^3,x,  
algorithm="maxima")

[Out]  $\frac{1}{8}*(12*a^4*b*c^3*i - (12*a^2*b*c^5*h - 3*(b^3*c^5 - 8*a*b*c^6)*d - (a*b^2*c^5 + 20*a^2*c^6)*f - (a^2*b^3*c^3 - 16*a^3*b*c^4)*j)*x^7 + 4*(6*a^2*c^6*e - 3*a^2*b*c^5*g + (a^2*b^2*c^4 + 2*a^3*c^5)*i + (2*a^2*b^5*c - 15*a^3*b^3*c^2 + 25*a^4*b*c^3)*k)*x^6 + ((6*b^4*c^4 - 49*a*b^2*c^5 + 28*a^2*c^6)*d + 2*(a*b^3*c^4 + 14*a^2*b*c^5)*f - (19*a^2*b^2*c^4 - 4*a^3*c^5)*h - (a^2*b^4*c^$

$$\begin{aligned}
& 2 + 5a^3b^2c^3 + 36a^4c^4)j)x^5 + 2(18a^2b^3c^5e - 9a^2b^2c^4g \\
& + 3(a^2b^3c^3 + 2a^3b^4c^4)i + (3a^2b^6 - 19a^3b^4c + 11a^4b^2 \\
& 2c^2 + 32a^5c^3)k)x^4 + ((3b^5c^3 - 20ab^3c^4 - 4a^2b^3c^5)d + \\
& (ab^4c^3 + 5a^2b^2c^4 + 36a^3c^5)f - (5a^2b^3c^3 + 16a^3b^4c^4) \\
& *h - 2(a^3b^3c^2 + 14a^4b^3c^3)j)x^3 + 4(2(a^2b^2c^4 + 5a^3c^5) \\
& *e - (a^2b^3c^3 + 5a^3b^4c^4)g + (5a^3b^2c^3 - 2a^4c^4)i + (3a^3 \\
& *b^5 - 22a^4b^3c + 31a^5b^3c^2)k)x^2 - 2(a^2b^3c^3 - 10a^3b^4c^4) \\
& *e - 2(a^3b^2c^3 + 8a^4c^4)g + 6(a^4b^4 - 7a^5b^2c + 8a^6c^2)k \\
& + ((5ab^4c^3 - 37a^2b^2c^4 + 44a^3c^5)d - (a^2b^3c^3 - 16a^3b^4c^4) \\
& *f - 3(a^3b^2c^3 + 4a^4c^4)h - (a^4b^2c^2 + 20a^5c^3)j)x) \\
& / (a^4b^4c^3 - 8a^5b^2c^4 + 16a^6c^5 + (a^2b^4c^5 - 8a^3b^2c^6 + \\
& 16a^4c^7)x^8 + 2(a^2b^5c^4 - 8a^3b^3c^5 + 16a^4b^3c^6)x^6 + (a^2 \\
& b^6c^3 - 6a^3b^4c^4 + 32a^5c^6)x^4 + 2(a^3b^5c^3 - 8a^4b^3c^4 \\
& + 16a^5b^3c^5)x^2) + 1/8 \int ((8(a^2b^4 - 8a^3b^2c + 16a^4c^2) \\
& *k)x^3 - (12a^2b^3c^3h - 3(b^3c^3 - 8ab^3c^4)d - (ab^2c^3 + 20a^2 \\
& c^4)f - (a^2b^3c - 16a^3b^3c^2)j)x^2 + 3(b^4c^2 - 9ab^2c^3 + \\
& 28a^2c^4)d + (ab^3c^2 - 16a^2b^3c^3)f + 3(a^2b^2c^2 + 4a^3c^3)h \\
& + (a^3b^2c + 20a^4c^2)j + 8(6a^2c^4e - 3a^2b^3c^3g + (a^2b^2c^2 \\
& + 2a^3c^3)i + (a^3b^3 - 7a^4b^3c)k)x) / (cx^4 + bx^2 + a), x) / (a^2 \\
& b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)
\end{aligned}$$

**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]  $\text{int}((d + ex + fx^2 + gx^3 + hx^4 + ix^5 + jx^8 + kx^{11})/(a + bx^2 + cx^4)^3, x)$

[Out] 
$$\begin{aligned}
& ((x^7(3b^3c^2d + 20a^2c^3f + a^2b^3j - 24ab^3c^3d - 16a^3b^3c^3j \\
& + ab^2c^2f - 12a^2b^3c^2h))/(8a^2(b^4 + 16a^2c^2 - 8ab^2c)) - \\
& (b^3c^3e + 8a^2c^4g - 3a^2b^4k - 24a^4c^2k - 10ab^3c^4e + ab^2 \\
& c^3g - 6a^2b^3c^3i + 21a^3b^2c^3k)/(4c^3(b^4 + 16a^2c^2 - 8ab^2c)) \\
& + (x^4(3b^6k - 9b^2c^4g + 3b^3c^3i + 32a^3c^3k + 18b^3c^5 \\
& *e + 11a^2b^2c^2k + 6ab^3c^4i - 19ab^4c^3k))/(4c^3(b^4 + 16a^2c^2 \\
& - 8ab^2c)) + (x^2(2b^2c^4e - b^3c^3g - 2a^2c^4i + 10a^3c^5e \\
& + 3ab^5k - 5ab^3c^4g + 5ab^2c^3i - 22a^2b^3c^3k + 31a^3b^3c^2k) \\
& )/(2c^3(b^4 + 16a^2c^2 - 8ab^2c)) + (x^6(6c^5e + 2b^5k + b^2c^3i \\
& - 3b^3c^4g + 2a^3c^4i - 15ab^3c^3k + 25a^2b^3c^2k))/(2c^2(b^4 \\
& + 16a^2c^2 - 8ab^2c)) - (x^3(2a^3b^3j - 36a^3c^3f - 3b^5c^3d \\
& - 5a^2b^2c^2f - ab^4c^3f + 28a^4b^3c^3j + 20ab^3c^2d + 4a^2b^3c^3 \\
& *d + 5a^2b^3c^3h + 16a^3b^3c^2h))/(8a^2c(b^4 + 16a^2c^2 - 8ab^2c)) \\
& + (x^5(28a^2c^4d + 6b^4c^2d + 4a^3c^3h - a^2b^4j - 36a^4c^2j \\
& - 19a^2b^2c^2h - 49ab^2c^3d + 2ab^3c^2f + 28a^2b^3c^3f - \\
& 5a^3b^2c^3j))/(8a^2c(b^4 + 16a^2c^2 - 8ab^2c)) - (x(12a^3c^2*
\end{aligned}$$

$$\begin{aligned}
& h - 44*a^2*c^3*d + a^3*b^2*j - 5*b^4*c*d + 20*a^4*c*j + a*b^3*c*f + 37*a*b^2*c^2*d - 16*a^2*b*c^2*f + 3*a^2*b^2*c*h) / (8*a*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) / (x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6) + \text{symsum} \\
& (\log((10368*a*b^5*c^10*d^3 - 8000*a^5*c^11*f^3 - 567*b^7*c^9*d^3 + 169344*a^3*b*c^12*d^3 + 193536*a^4*c^12*d*e^2 - 141120*a^4*c^12*d^2*f + 1728*a^6*b*c^9*h^3 + 315*b^8*c^8*d^2*f + 6400*a^9*b*c^6*j^3 + 27648*a^5*c^11*e^2*h + 21504*a^6*c^10*d*i^2 - 135*b^9*c^7*d^2*h + 192*a^2*b^14*d*k^2 - 2880*a^6*c^10*f*h^2 + 46080*a^6*c^10*e^2*j - 1376256*a^9*c^7*d*k^2 + 9*b^11*c^5*d^2*j + 64*a^3*b^13*f*k^2 - 8000*a^8*c^8*f*j^2 + 3072*a^7*c^9*h*i^2 + 192*a^4*b^12*h*k^2 + 5120*a^8*c^8*i^2*j - 196608*a^10*c^6*h*k^2 + 2240*a^6*b^10*j*k^2 - 327680*a^11*c^5*j*k^2 - 67824*a^2*b^3*c^11*d^3 + 35*a^2*b^6*c^8*f^3 + 84*a^3*b^4*c^9*f^3 - 12720*a^4*b^2*c^10*f^3 + 540*a^4*b^5*c^7*h^3 + 4320*a^5*b^3*c^8*h^3 + 35*a^6*b^7*c^3*j^3 - 1176*a^7*b^5*c^4*j^3 + 9456*a^8*b^3*c^5*j^3 + 129024*a^5*c^11*d*e*i - 40320*a^5*c^11*d*f*h - 67200*a^6*c^10*d*f*j + 18432*a^6*c^10*e*h*i + 245760*a^7*c^9*e*f*k + 30720*a^7*c^9*e*i*j - 9600*a^7*c^9*f*h*j + 81920*a^8*c^8*f*i*k - 6237*a*b^6*c^9*d^2*f + 210*a*b^7*c^8*d*f^2 + 116160*a^4*b*c^11*d*f^2 - 36864*a^4*b*c^11*e^2*f + 2430*a*b^7*c^8*d^2*h + 133056*a^4*b*c^11*d^2*h + 27648*a^5*b*c^10*d*h^2 - 324*a*b^9*c^6*d^2*j + 193536*a^5*b*c^10*d^2*j + 26880*a^5*b*c^10*f^2*h + 63360*a^7*b*c^8*d*j^2 - 5568*a^3*b^12*c*d*k^2 - 4096*a^6*b*c^9*f*i^2 + 40000*a^6*b*c^9*f^2*j - 2304*a^4*b^11*c*f*k^2 - 352256*a^9*b*c^6*f*k^2 + 8064*a^7*b*c^8*h^2*j + 12480*a^8*b*c^7*h*j^2 - 2112*a^5*b^10*c*h*k^2 - 41664*a^7*b^8*c*j*k^2 + 6912*a^2*b^4*c^10*d*e^2 - 62208*a^3*b^2*c^11*d*e^2 + 42372*a^2*b^4*c^10*d^2*f - 1764*a^2*b^5*c^9*d*f^2 - 96048*a^3*b^2*c^11*d^2*f - 4608*a^3*b^3*c^10*d*f^2 + 1728*a^2*b^6*c^8*d*g^2 + 2304*a^3*b^3*c^10*e^2*f - 15552*a^3*b^4*c^9*d*g^2 + 48384*a^4*b^2*c^10*d*g^2 - 13716*a^2*b^5*c^9*d^2*h + 405*a^2*b^7*c^7*d*h^2 + 12096*a^3*b^3*c^10*d^2*h - 5400*a^3*b^5*c^8*d*h^2 + 28944*a^4*b^3*c^9*d*h^2 + 192*a^2*b^8*c^6*d*i^2 + 576*a^3*b^5*c^8*f*g^2 - 960*a^3*b^6*c^7*d*i^2 + 6912*a^4*b^2*c^10*e^2*h - 9216*a^4*b^3*c^9*f*g^2 - 768*a^4*b^4*c^8*d*i^2 + 14592*a^5*b^2*c^9*d*i^2 + 3717*a^2*b^7*c^7*d^2*j - 15*a^2*b^7*c^7*f^2*h + 3*a^2*b^11*c^3*d*j^2 - 15192*a^3*b^5*c^8*d^2*j - 360*a^3*b^5*c^8*f^2*h + 135*a^3*b^6*c^7*f*h^2 - 132*a^3*b^9*c^4*d*j^2 - 7920*a^4*b^3*c^9*d^2*j + 15696*a^4*b^3*c^9*f^2*h - 5580*a^4*b^4*c^8*f*h^2 + 2079*a^4*b^7*c^5*d*j^2 - 20592*a^5*b^2*c^9*f*h^2 - 14448*a^5*b^5*c^6*d*j^2 + 37104*a^6*b^3*c^7*d*j^2 + 64*a^3*b^7*c^6*f*i^2 + 1728*a^4*b^4*c^8*g^2*h - 768*a^4*b^5*c^7*f*i^2 + 70656*a^4*b^10*c^2*d*k^2 + 2304*a^5*b^2*c^9*e^2*j + 6912*a^5*b^2*c^9*g^2*h - 3840*a^5*b^3*c^8*f*i^2 - 499008*a^5*b^8*c^3*d*k^2 + 2071104*a^6*b^6*c^4*d*k^2 - 4853952*a^7*b^4*c^5*d*k^2 + 5399808*a^8*b^2*c^6*d*k^2 + a^2*b^9*c^5*f^2*j + 20*a^3*b^7*c^6*f^2*j + a^3*b^10*c^3*f*j^2 - 1596*a^4*b^5*c^7*f^2*j - 51*a^4*b^8*c^4*f*j^2 + 16736*a^5*b^3*c^8*f^2*j + 875*a^5*b^6*c^5*f*j^2 - 2716*a^6*b^4*c^6*f*j^2 - 39600*a^7*b^2*c^7*f*j^2 + 192*a^4*b^6*c^6*h*i^2 + 1536*a^5*b^4*c^7*h*i^2 + 576*a^5*b^4*c^7*g^2*j + 28480*a^5*b^9*c^2*f*k^2 + 3840*a^6*b^2*c^8*h*i^2 + 11520*a^6*b^2*c^8*g^2*j - 164096*a^6*b^7*c^3*f*k^2 + 436800*a^7*b^5*c^4*f*k^2 - 338944*a^8*b^3*c^5*f*k^2 - 81*a^4*b^7*c^5*h^2*j + 3*a^4*b^9*c^3*h*j^2 + 720*a^5*b^5*c^6*h^2*j - 78*a^5*b^7*c^4*h*j^2 +
\end{aligned}$$



$$\begin{aligned}
& 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 \\
& *j^2k^2 + 1479936a^{10}b^2c^4j^2k^2 - 193536a^4b^8c^{11}d^2e^2g - 90a^8b^8c^7 \\
& *d^2f^2h + 6a^8b^{10}c^5d^2f^2j - 64512a^5b^8c^{10}d^2g^2i - 24576a^5b^8c^{10}e^2 \\
& *f^2i - 27648a^5b^8c^{10}e^2g^2h - 1778688a^6b^8c^9d^2e^2k + 84096a^6b^8c^9d^2 \\
& *h^2j - 46080a^6b^8c^9e^2g^2j - 9216a^6b^8c^9g^2h^2i - 592896a^7b^8c^8d^2i^2k \\
& - 359424a^7b^8c^8e^2h^2k - 122880a^7b^8c^8f^2g^2k - 15360a^7b^8c^8g^2i^2j \\
& - 549888a^8b^8c^7e^2j^2k - 119808a^8b^8c^7h^2i^2k - 183296a^9b^8c^6i^2j^2k \\
& - 6912a^2b^5c^9d^2e^2g + 62208a^3b^3c^{10}d^2e^2g + 2304a^2b^6c^8d^2e^2 \\
& *i - 270a^2b^6c^8d^2f^2h - 16128a^3b^4c^9d^2e^2i + 16056a^3b^4c^9d^2f^2 \\
& *h - 2304a^3b^4c^9e^2f^2g + 23040a^4b^2c^{10}d^2e^2i - 127008a^4b^2c^1 \\
& 0d^2f^2h + 36864a^4b^2c^{10}e^2f^2g - 1152a^2b^7c^7d^2g^2i - 48a^2b^8c^6 \\
& *d^2f^2j - 2304a^2b^9c^5d^2e^2k + 8064a^3b^5c^8d^2g^2i + 768a^3b^5c^8 \\
& *e^2f^2i - 2226a^3b^6c^7d^2f^2j + 43776a^3b^7c^6d^2e^2k - 11520a^4b^3c^9 \\
& *d^2g^2i - 10752a^4b^3c^9e^2f^2i - 6912a^4b^3c^9e^2g^2h + 33384a^4b^4 \\
& *c^8d^2f^2j - 340992a^4b^5c^7d^2e^2k - 162528a^5b^2c^9d^2f^2j + 1241856 \\
& a^5b^3c^8d^2e^2k - 72a^2b^9c^5d^2h^2j + 1152a^2b^{10}c^4d^2g^2k - 384a^3 \\
& *b^6c^7f^2g^2i + 2016a^3b^7c^6d^2h^2j - 21888a^3b^8c^5d^2g^2k - 768a^3 \\
& *b^8c^5e^2f^2k + 2304a^4b^4c^8e^2h^2i + 5376a^4b^4c^8f^2g^2i - 18648a^4 \\
& *b^5c^7d^2h^2j + 170496a^4b^6c^6d^2g^2k + 19968a^4b^6c^6e^2f^2k + 138 \\
& 24a^5b^2c^9e^2h^2i + 12288a^5b^2c^9f^2g^2i + 67392a^5b^3c^8d^2h^2j - \\
& 2304a^5b^3c^8e^2g^2j - 620928a^5b^4c^7d^2g^2k - 119040a^5b^4c^7e^2f^2 \\
& *k + 889344a^6b^2c^8d^2g^2k + 172032a^6b^2c^8e^2f^2k - 384a^2b^{11}c^3 \\
& *d^2i^2k - 24a^3b^8c^5f^2h^2j + 6528a^3b^9c^4d^2i^2k + 384a^3b^9c^4f^2g^2 \\
& *k - 1152a^4b^5c^7g^2h^2i + 1050a^4b^6c^6f^2h^2j - 42240a^4b^7c^5d^2 \\
& *i^2k - 2304a^4b^7c^5e^2h^2k - 9984a^4b^7c^5f^2g^2k - 6912a^5b^3c^8g^2 \\
& *h^2i + 768a^5b^4c^7e^2i^2j - 9576a^5b^4c^7f^2h^2j + 93312a^5b^5c^6d^2 \\
& *i^2k + 2304a^5b^5c^6e^2h^2k + 59520a^5b^5c^6f^2g^2k + 16896a^6b^2c^8 \\
& *e^2i^2j - 57504a^6b^2c^8f^2h^2j + 117504a^6b^3c^7d^2i^2k + 103680a^6b^3 \\
& *c^7e^2h^2k - 86016a^6b^3c^7f^2g^2k - 128a^3b^{10}c^3f^2i^2k + 3072a^4b^8 \\
& *c^4f^2i^2k + 1152a^4b^8c^4g^2h^2k - 384a^5b^5c^6g^2i^2j - 13184a^5b^6 \\
& *c^5f^2i^2k - 1152a^5b^6c^5g^2h^2k - 8448a^6b^3c^7g^2i^2j - 11008a^6b^4 \\
& *c^6f^2i^2k - 51840a^6b^4c^6g^2h^2k - 26880a^6b^5c^5e^2j^2k + 98304a^7 \\
& *b^2c^7f^2i^2k + 179712a^7b^2c^7g^2h^2k + 231168a^7b^3c^6e^2j^2k - 384 \\
& *a^4b^9c^3h^2i^2k - 384a^5b^7c^4h^2i^2k + 18048a^6b^5c^5h^2i^2k + 1344 \\
& 0a^6b^6c^4g^2j^2k - 25344a^7b^3c^6h^2i^2k - 115584a^7b^4c^5g^2j^2k + \\
& 274944a^8b^2c^6g^2j^2k - 4480a^6b^7c^3i^2j^2k + 29568a^7b^5c^4i^2j^2k \\
& - 14592a^8b^3c^5i^2j^2k)/(512*(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^2 \\
& c^9)) + \text{root}(56371445760a^{11}b^8c^{12}z^4 - 503316480a^8b^{14}c^9z^4 \\
& + 47185920a^7b^{16}c^8z^4 - 2621440a^6b^{18}c^7z^4 + 65536a^5b^{20}c^6 \\
& *z^4 - 171798691840a^{14}b^2c^{15}z^4 + 193273528320a^{13}b^4c^{14}z^4 - 12 \\
& 8849018880a^{12}b^6c^{13}z^4 - 16911433728a^{10}b^{10}c^{11}z^4 + 3523215360*
\end{aligned}$$

$$\begin{aligned}
& a^9 b^{12} c^{10} z^4 + 68719476736 a^{15} c^{16} z^4 - 47185920 a^7 b^{16} c^5 k z^3 \\
& + 2621440 a^6 b^{18} c^4 k z^3 - 65536 a^5 b^{20} c^3 k z^3 + 171798691840 a^1 \\
& 4 b^2 c^{12} k z^3 - 193273528320 a^{13} b^4 c^{11} k z^3 + 128849018880 a^{12} b^6 \\
& c^{10} k z^3 + 16911433728 a^{10} b^{10} c^8 k z^3 - 3523215360 a^9 b^{12} c^7 k z \\
& ^3 - 56371445760 a^{11} b^8 c^9 k z^3 + 503316480 a^8 b^{14} c^6 k z^3 - 687194 \\
& 76736 a^{15} c^{13} k z^3 + 1536 a^* b^{18} c^6 d f z^2 - 2571632640 a^9 b^5 c^{11} d \\
& * j z^2 + 2548039680 a^9 b^3 c^{13} d h z^2 + 2453667840 a^9 b^7 c^9 e k z^2 + \\
& 2181038080 a^{12} b^3 c^{10} i k z^2 - 6492782592 a^{10} b^5 c^{10} e k z^2 + 1509 \\
& 949440 a^9 b^3 c^{13} e g z^2 - 1401421824 a^8 b^5 c^{12} d h z^2 - 1226833920 * \\
& a^9 b^8 c^8 g k z^2 - 1321205760 a^9 b^2 c^{14} d f z^2 - 2793406464 a^{11} b c \\
& ^{13} d j z^2 + 9563013120 a^{11} b^3 c^{11} e k z^2 + 890634240 a^8 b^7 c^{10} d j \\
& * z^2 - 754974720 a^8 b^5 c^{12} e g z^2 - 570425344 a^{11} b^5 c^9 i k z^2 + 73 \\
& 2168192 a^7 b^6 c^{12} d f z^2 - 581959680 a^{10} b^4 c^{11} f j z^2 - 603979776 * \\
& a^{10} b^2 c^{13} e i z^2 + 534773760 a^{11} b^3 c^{11} h j z^2 - 558366720 a^8 b^9 \\
& c^8 e k z^2 - 4781506560 a^{11} b^4 c^{10} g k z^2 - 2013265920 a^{13} b c^{11} i * \\
& k z^2 - 456130560 a^9 b^4 c^{12} f h z^2 + 384040960 a^9 b^6 c^{10} f j z^2 - 2 \\
& 64241152 a^{10} b^7 c^8 i k z^2 + 390463488 a^7 b^7 c^{11} d h z^2 + 279183360 * \\
& a^8 b^{10} c^7 g k z^2 + 301989888 a^{10} b^3 c^{12} g i z^2 + 222822400 a^9 b^9 * \\
& c^7 i k z^2 - 366280704 a^6 b^8 c^{11} d f z^2 - 330301440 a^8 b^4 c^{13} d f z \\
& ^2 + 254017536 a^8 b^6 c^{11} f h z^2 - 1887436800 a^{10} b c^{14} d h z^2 + 1887 \\
& 43680 a^{10} b^2 c^{13} f h z^2 - 185303040 a^7 b^9 c^9 d j z^2 - 117964800 a^1 \\
& 0 b^5 c^{10} h j z^2 - 6039797760 a^{12} b c^{12} e k z^2 - 67502080 a^8 b^{11} c^6 \\
& i k z^2 + 121634816 a^{11} b^2 c^{12} f j z^2 + 188743680 a^7 b^7 c^{11} e g z^2 \\
& - 115671040 a^8 b^8 c^9 f j z^2 + 125829120 a^8 b^6 c^{11} e i z^2 + 1081344 \\
& 0 a^7 b^{13} c^5 i k z^2 + 76677120 a^7 b^{11} c^7 e k z^2 - 38338560 a^7 b^{12} * \\
& c^6 g k z^2 - 37355520 a^9 b^7 c^9 h j z^2 - 917504 a^6 b^{15} c^4 i k z^2 + \\
& 32768 a^5 b^{17} c^3 i k z^2 - 62914560 a^8 b^7 c^{10} g i z^2 + 23101440 a^8 b \\
& ^9 c^8 h j z^2 - 4349952 a^7 b^{11} c^7 h j z^2 + 2949120 a^6 b^{14} c^5 g k z^ \\
& 2 + 337920 a^6 b^{13} c^6 h j z^2 - 98304 a^5 b^{16} c^4 g k z^2 - 7680 a^5 b^1 \\
& 5 c^5 h j z^2 - 61931520 a^7 b^8 c^{10} f h z^2 + 23592960 a^7 b^9 c^9 g i z^ \\
& 2 + 17940480 a^7 b^{10} c^8 f j z^2 - 47185920 a^7 b^8 c^{10} e i z^2 - 5898240 \\
& a^6 b^{13} c^6 e k z^2 - 3538944 a^6 b^{11} c^8 g i z^2 - 1347584 a^6 b^{12} c^7 \\
& * f j z^2 + 196608 a^5 b^{15} c^5 e k z^2 + 196608 a^5 b^{13} c^7 g i z^2 + 3584 \\
& 0 a^5 b^{14} c^6 f j z^2 + 96583680 a^5 b^{10} c^{10} d f z^2 + 23371776 a^6 b^{11} \\
& c^8 d j z^2 - 51609600 a^6 b^9 c^{10} d h z^2 + 7077888 a^6 b^{10} c^9 e i z^2 \\
& + 6144000 a^6 b^{10} c^9 f h z^2 - 1677312 a^5 b^{13} c^7 d j z^2 - 393216 a^5 \\
& b^{12} c^8 e i z^2 + 61440 a^5 b^{12} c^8 f h z^2 + 53760 a^4 b^{15} c^6 d j z^2 \\
& - 46080 a^4 b^{14} c^7 f h z^2 + 1536 a^3 b^{16} c^6 f h z^2 - 23592960 a^6 b^ \\
& 9 c^{10} e g z^2 + 1179648 a^5 b^{11} c^9 e g z^2 + 829440 a^4 b^{13} c^8 d h z^2 \\
& + 368640 a^5 b^{11} c^9 d h z^2 - 105984 a^3 b^{15} c^7 d h z^2 + 4608 a^2 b^1 \\
& 7 c^6 d h z^2 - 15175680 a^4 b^{12} c^9 d f z^2 + 1428480 a^3 b^{14} c^8 d f z^ \\
& 2 - 73728 a^2 b^{16} c^7 d f z^2 + 4108320768 a^{10} b^3 c^{12} d j z^2 - 1207959 \\
& 552 a^{10} b c^{14} e g z^2 - 578813952 a^{12} b c^{12} h j z^2 + 3246391296 a^{10} b \\
& ^6 c^9 g k z^2 - 402653184 a^{11} b c^{13} g i z^2 + 3019898880 a^{12} b^2 c^{11} g \\
& * k z^2 - 440401920 a^{10} b c^{14} f^2 z^2 - 188743680 a^{11} b c^{13} h^2 z^2 + 17
\end{aligned}$$

$61607680a^{10}c^{15}d^2f^2z^2 - 655360a^6b^{18}c^2k^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^3c^{15}d^2z^2 + 58007224320a^{13}b^4c^8k^2z^2 + 14968422400a^{11}b^8c^6k^2z^2 + 805306368a^{11}c^{14}e^2i^2z^2 - 35966156800a^{12}b^6c^7k^2z^2 + 419430400a^{12}c^{13}f^2j^2z^2 - 1509949440a^9b^2c^{14}e^2z^2 + 251658240a^{11}c^{14}f^2h^2z^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^10e^2z^2 + 1771776a^2b^{15}c^8d^2z^2 - 440401920a^{13}b^3c^{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^3c^{12}d^2g^2j^2z + 23592960a^{10}b^3c^{11}g^2h^2j^2z + 169869312a^7b^3c^{14}d^2e^2f^2z + 99090432a^8b^3c^{13}d^2g^2h^2z - 3145728a^9b^3c^{12}f^2h^2i^2z + 56623104a^8b^3c^{13}d^2f^2i^2z - 1536a^6b^{18}c^3d^2f^2k^2z - 9437184a^8b^3c^{13}e^2f^2h^2z + 1536a^6b^{15}c^6d^2f^2i^2z - 4608a^6b^{14}c^7d^2f^2g^2z + 9216a^6b^{13}c^8d^2e^2f^2z + 2173501440a^9b^5c^8d^2j^2k^2z - 1987706880a^9b^3c^{10}d^2h^2k^2z + 121255424a^8b^5c^9d^2h^2k^2z + 861143040a^8b^4c^{10}d^2f^2k^2z - 859963392a^7b^6c^9d^2f^2k^2z - 780779520a^8b^7c^7d^2j^2k^2z - 754974720a^9b^3c^10e^2g^2k^2z + 222456832a^{11}b^3c^{10}d^2j^2k^2z - 454164480a^{11}b^3c^8h^2j^2k^2z + 377487360a^8b^5c^9e^2g^2k^2z + 290979840a^{10}b^4c^8f^2j^2k^2z + 381026304a^6b^8c^8d^2f^2k^2z + 412876800a^8b^2c^{12}d^2e^2j^2z + 301989888a^{10}b^2c^{10}e^2i^2k^2z - 320421888a^7b^7c^8d^2h^2k^2z + 185794560a^{10}b^5c^7h^2j^2k^2z - 192020480a^9b^6c^7f^2j^2k^2z + 190709760a^9b^4c^9f^2h^2k^2z - 150994944a^{10}b^3c^9g^2i^2k^2z + 168990720a^7b^9c^6d^2j^2k^2z + 235929600a^9b^2c^{11}d^2f^2k^2z - 206438400a^8b^3c^{11}d^2g^2j^2z - 206438400a^7b^4c^{11}d^2e^2j^2z - 101646336a^8b^6c^8f^2h^2k^2z - 29245440a^9b^7c^6h^2j^2k^2z - 60817408a^{11}b^2c^9f^2j^2k^2z + 57835520a^8b^8c^6f^2j^2k^2z + 219414528a^7b^$

$b^2c^{13}d^*e^*h^*z - 70778880a^{10}b^2c^{10}f^*h^*k^*z + 677376a^7b^{11}c^4h^*j^*k^*z - 645120a^8b^9c^5h^*j^*k^*z - 53760a^6b^{13}c^3h^*j^*k^*z + 31457280a^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 - 8970240a^7b^{10}c^5f^*j^*k^*z + 103219200a^7b^5c^{10}d^*g^*j^*z - 2457600a^8b^6c^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 - 97136640a^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 + 42854400a^6b^9c^7d^*h^*k^*z - 109707264a^7b^3c^{12}d^*g^*h^*z - 3686400a^7b^7c^8g^*h^*j^*z - 3538944a^6b^{10}c^6e^*i^*k^*z + 1645056a^5b^{13}c^4d^*j^*k^*z - 890880a^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 + 46080a^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 + 11796480a^6b^9c^7e^*g^*k^*z + 110886912a^6b^4c^{12}d^*f^*g^*z + 7372800a^7b^6c^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 + 46080a^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 - 88473600a^6b^4c^{12}d^*e^*h^*z + 51609600a^6b^6c^{10}d^*e^*j^*z - 84934656a^7b^2c^{13}d^*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 - 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^*j^*z + 2949120a^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 + 92160a^4b^{10}c^8f^*g^*h^*z + 73728a^2b^{16}c^4d^*f^*k^*z - 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^*j^*z - 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^*j^*z - 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^4$

$$\begin{aligned}
& *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*k*z - 3361603584*a^{10}*b^3*c^9*d*j*k*k*z + 60 \\
& 3979776*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*z + 129761280*a^{11}*b*c^{10}*h^2* \\
& 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 + 7077888*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*z - 66816*a*b^{14}*c^ \\
& 7*d^2*i*z + 214272*a*b^{13}*c^8*d^2*g*z - 428544*a*b^{12}*c^9*d^2*e*z + 2390753 \\
& 280*a^{11}*b^4*c^7*g*k^2*z - 2411421696*a^6*b^7*c^9*d^2*k*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 - 15099 \\
& 49440*a^{12}*b^2*c^8*g*k^2*z - 209715200*a^{12}*c^{10}*f*j*k*k*z - 330301440*a^9*c^ \\
& 13*d*e*j*z + 3019898880*a^{12}*b*c^9*e*k^2*z - 125829120*a^{11}*c^{11}*f*h*k*k*z - \\
& 110100480*a^{10}*c^{12}*d*i*j*z - 198180864*a^8*c^{14}*d*e*h*z - 15728640*a^{11}*c^ \\
& 11*h*i*j*z - 1226833920*a^9*b^7*c^6*e*k^2*z - 47185920*a^{10}*c^{12}*e*h*j*z - \\
& 66060288*a^9*c^{13}*d*h*i*z - 1090519040*a^{12}*b^3*c^7*i*k^2*z + 1022754816*a^ \\
& 6*b^2*c^{14}*d^2*e*z + 5216108544*a^7*b^5*c^{10}*d^2*k*k*z + 754974720*a^9*b^2*c^ \\
& 11*e^2*k*k*z + 721529856*a^5*b^9*c^8*d^2*k*k*z + 613416960*a^9*b^8*c^5*g*k^2*z \\
& - 642318336*a^5*b^4*c^{13}*d^2*e*z - 4781506560*a^{11}*b^3*c^8*e*k^2*z - 398131 \\
& 200*a^{12}*b^3*c^7*j^2*k*k*z - 511377408*a^6*b^3*c^{13}*d^2*g*z - 377487360*a^8*b \\
& ^4*c^{10}*e^2*k*k*z + 285212672*a^{11}*b^5*c^6*i*k^2*z + 199065600*a^{11}*b^5*c^6*j \\
& ^2*k*k*z + 279183360*a^8*b^9*c^5*e*k^2*z + 321159168*a^5*b^5*c^{12}*d^2*g*z + 1 \\
& 88743680*a^9*b^4*c^9*g^2*k*k*z + 132120576*a^{10}*b^7*c^5*i*k^2*z - 150994944*a \\
& ^{10}*b^2*c^{10}*g^2*k*k*z - 111411200*a^9*b^9*c^4*i*k^2*z - 126812160*a^{10}*b^3*c \\
& ^9*h^2*k*k*z + 225312768*a^7*b^2*c^{13}*d^2*i*z - 139591680*a^8*b^{10}*c^4*g*k^2* \\
& z - 49766400*a^{10}*b^7*c^5*j^2*k*k*z - 145463040*a^4*b^{11}*c^7*d^2*k*k*z - 943718 \\
& 40*a^8*b^6*c^8*g^2*k*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*k*z + 94371840*a^7*b^6*c^9*e^2*k*k*z \\
& + 25165824*a^{10}*b^4*c^8*i^2*k*k*z + 6220800*a^9*b^9*c^4*j^2*k*k*z + 39223296*a \\
& ^9*b^5*c^8*h^2*k*k*z - 311040*a^8*b^{11}*c^3*j^2*k*k*z + 16777216*a^{11}*b^2*c^9*i^ \\
& 2*k*k*z - 10485760*a^9*b^6*c^7*i^2*k*k*z - 5406720*a^7*b^{13}*c^2*i*k^2*z + 13762 \\
& 56*a^7*b^{10}*c^5*i^2*k*k*z - 1310720*a^8*b^8*c^6*i^2*k*k*z - 262144*a^6*b^{12}*c^4 \\
& *i^2*k*k*z + 16384*a^5*b^{14}*c^3*i^2*k*k*z + 10354688*a^{11}*b^2*c^9*i*j^2*z + 235 \\
& 92960*a^7*b^8*c^7*g^2*k*k*z + 38559744*a^7*b^7*c^8*f^2*k*k*z + 19169280*a^7*b^1 \\
& 2*c^3*g*k^2*z - 2048000*a^9*b^6*c^7*i*j^2*z - 1520640*a^7*b^9*c^6*h^2*k*k*z - \\
& 1105920*a^8*b^7*c^7*h^2*k*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*k*z - 145920*a^7*b^{10}*c^5*i*j^2*z + \\
& 11520*a^5*b^{13}*c^4*h^2*k*k*z + 11008*a^6*b^{12}*c^4*i*j^2*z - 2304*a^4*b^{15}*c^3 \\
& *h^2*k*k*z - 256*a^5*b^{14}*c^3*i*j^2*z - 25362432*a^{10}*b^3*c^9*g*j^2*z - 24739 \\
& 840*a^8*b^5*c^9*f^2*k*k*z - 38338560*a^7*b^{11}*c^4*e*k^2*z - 2949120*a^6*b^{10} \\
& c^6*g^2*k*k*z - 1474560*a^6*b^{14}*c^2*g*k^2*z + 50724864*a^{10}*b^2*c^{10}*e*j^2*z \\
& + 147456*a^5*b^{12}*c^5*g^2*k*k*z - 15150080*a^6*b^9*c^7*f^2*k*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*k*z - 73728 \\
& 0*a^7*b^6*c^9*h^2*i*z + 506880*a^7*b^9*c^6*g*j^2*z - 291840*a^4*b^{13}*c^5*f^
\end{aligned}$$

$2*k*z + 276480*a^6*b^8*c^8*h^2*i*z - 41472*a^5*b^10*c^7*h^2*i*z - 34560*a^6$   
 $*b^11*c^5*g*j^2*z + 14080*a^3*b^15*c^4*f^2*k*z + 2304*a^4*b^12*c^6*h^2*i*z$   
 $+ 768*a^5*b^13*c^4*g*j^2*z - 256*a^2*b^17*c^3*f^2*k*z - 11796480*a^6*b^8*c^$   
 $8*e^2*k*z - 26542080*a^9*b^4*c^9*e*j^2*z + 19837440*a^3*b^13*c^6*d^2*k*z +$   
 $2949120*a^6*b^13*c^3*e*k^2*z + 589824*a^5*b^10*c^7*e^2*k*z - 98304*a^5*b^15$   
 $*c^2*e*k^2*z - 10354688*a^8*b^2*c^12*f^2*i*z - 43646976*a^6*b^4*c^12*d^2*i*$   
 $z - 8847360*a^8*b^3*c^11*g*h^2*z + 7127040*a^8*b^6*c^8*e*j^2*z + 4423680*a^$   
 $7*b^5*c^10*g*h^2*z + 2048000*a^6*b^6*c^10*f^2*i*z - 1771776*a^2*b^15*c^5*d^$   
 $2*k*z - 1105920*a^6*b^7*c^9*g*h^2*z - 1013760*a^7*b^8*c^7*e*j^2*z - 849920*$   
 $a^5*b^8*c^9*f^2*i*z + 393216*a^7*b^4*c^11*f^2*i*z + 145920*a^4*b^10*c^8*f^2$   
 $*i*z + 138240*a^5*b^9*c^8*g*h^2*z + 69120*a^6*b^10*c^6*e*j^2*z - 11008*a^3*$   
 $b^12*c^7*f^2*i*z - 6912*a^4*b^11*c^7*g*h^2*z - 1536*a^5*b^12*c^5*e*j^2*z +$   
 $256*a^2*b^14*c^6*f^2*i*z - 32587776*a^5*b^6*c^11*d^2*i*z + 25362432*a^7*b^3$   
 $*c^12*f^2*g*z + 21657600*a^4*b^8*c^10*d^2*i*z + 17694720*a^8*b^2*c^12*e*h^2$   
 $*z - 50724864*a^7*b^2*c^13*e*f^2*z - 13271040*a^6*b^5*c^11*f^2*g*z - 884736$   
 $0*a^7*b^4*c^11*e*h^2*z - 5810688*a^3*b^10*c^9*d^2*i*z + 3563520*a^5*b^7*c^1$   
 $0*f^2*g*z + 2211840*a^6*b^6*c^10*e*h^2*z + 845568*a^2*b^12*c^8*d^2*i*z - 50$   
 $6880*a^4*b^9*c^9*f^2*g*z - 276480*a^5*b^8*c^9*e*h^2*z + 34560*a^3*b^11*c^8*$   
 $f^2*g*z + 13824*a^4*b^10*c^8*e*h^2*z - 768*a^2*b^13*c^7*f^2*g*z + 26542080*$   
 $a^6*b^4*c^12*e*f^2*z + 23362560*a^3*b^9*c^10*d^2*g*z - 46725120*a^3*b^8*c^1$   
 $1*d^2*e*z - 7127040*a^5*b^6*c^11*e*f^2*z - 2965248*a^2*b^11*c^9*d^2*g*z + 1$   
 $013760*a^4*b^8*c^10*e*f^2*z - 69120*a^3*b^10*c^9*e*f^2*z + 1536*a^2*b^12*c^$   
 $8*e*f^2*z + 5930496*a^2*b^10*c^10*d^2*e*z + 1006632960*a^13*b*c^8*i*k^2*z +$   
 $3246391296*a^10*b^5*c^7*e*k^2*z + 318504960*a^13*b*c^8*j^2*k*z + 61538304*$   
 $a^10*b^10*c^2*k^3*z - 603979776*a^10*c^12*e^2*k*z - 693633024*a^7*c^15*d^2*$   
 $e*z - 231211008*a^8*c^14*d^2*i*z - 67108864*a^12*c^10*i^2*k*z - 13107200*a^$   
 $12*c^10*i*j^2*z - 16384*a^5*b^17*i*k^2*z - 39321600*a^11*c^11*e*j^2*z - 471$   
 $8592*a^10*c^12*h^2*i*z - 2304*b^19*c^3*d^2*k*z + 13107200*a^9*c^13*f^2*i*z$   
 $+ 2304*b^16*c^6*d^2*i*z - 14155776*a^9*c^13*e*h^2*z + 39321600*a^8*c^14*e*f$   
 $^2*z - 4833280*a^9*b^12*c*k^3*z - 6912*b^15*c^7*d^2*g*z + 6962544640*a^14*b$   
 $^2*c^6*k^3*z + 13824*b^14*c^8*d^2*e*z + 1876951040*a^12*b^6*c^4*k^3*z - 484$   
 $4421120*a^13*b^4*c^5*k^3*z - 437780480*a^11*b^8*c^3*k^3*z - 4294967296*a^15$   
 $*c^7*k^3*z + 163840*a^8*b^14*k^3*z + 6144000*a^10*b*c^8*f*i*j*k - 5898240*a$   
 $^10*b*c^8*g*h*j*k - 41287680*a^9*b*c^9*d*g*j*k + 4472832*a^9*b*c^9*f*h*i*k$   
 $+ 18432000*a^9*b*c^9*e*f*j*k + 3391488*a^8*b*c^10*e*h*i*j + 1228800*a^8*b*c$   
 $^10*f*g*i*j - 24772608*a^8*b*c^10*d*g*h*k + 13418496*a^8*b*c^10*e*f*h*k + 1$   
 $1649024*a^8*b*c^10*d*f*i*k + 737280*a^7*b*c^11*f*g*h*i - 768*a*b^15*c^3*d*f$   
 $*i*k - 19307520*a^7*b*c^11*d*f*h*j + 16367616*a^7*b*c^11*d*e*i*j + 3686400*$   
 $a^7*b*c^11*e*f*g*j + 34947072*a^7*b*c^11*d*e*f*k + 2304*a*b^14*c^4*d*f*g*k$   
 $- 180*a*b^13*c^5*d*f*h*j + 11059200*a^6*b*c^12*d*e*h*i + 5160960*a^6*b*c^12$   
 $*d*f*g*i + 2211840*a^6*b*c^12*e*f*g*h - 4608*a*b^13*c^5*d*e*f*k - 2304*a*b^$   
 $11*c^7*d*f*g*i + 4608*a*b^10*c^8*d*e*f*i + 15482880*a^5*b*c^13*d*e*f*g - 13$   
 $824*a*b^9*c^9*d*e*f*g - 225976320*a^8*b^2*c^9*d*e*j*k + 112988160*a^8*b^3*c$   
 $^8*d*g*j*k - 11427840*a^10*b^2*c^7*h*i*j*k - 4177920*a^9*b^4*c^6*h*i*j*k +$   
 $1399296*a^8*b^6*c^5*h*i*j*k - 26880*a^6*b^10*c^3*h*i*j*k + 16128*a^7*b^8*c^$

$4h^*i^*j^*k - 61562880a^9b^2c^8d^*i^*j^*k + 20090880a^9b^3c^7g^*h^*j^*k + 1$   
 $19623680a^7b^4c^8d^*e^*j^*k + 10485760a^9b^3c^7f^*i^*j^*k - 40181760a^9b^2c^8e^*h^*j^*k - 3778560a^8b^5c^6g^*h^*j^*k - 137797632a^7b^2c^10d^*e^*$   
 $h^*k - 1248768a^7b^7c^5f^*i^*j^*k + 229376a^6b^9c^4f^*i^*j^*k + 220160a^8b^5c^6f^*i^*j^*k - 209664a^7b^7c^5g^*h^*j^*k + 80640a^6b^9c^4g^*h^*j^*k -$   
 $8960a^5b^11c^3f^*i^*j^*k - 59811840a^7b^5c^7d^*g^*j^*k + 53084160a^8b^2c^9e^*g^*i^*k - 11120640a^8b^4c^7f^*g^*j^*k + 10455552a^7b^6c^6d^*i^*j^*k$   
 $- 9216000a^9b^2c^8f^*g^*j^*k + 7557120a^8b^4c^7e^*h^*j^*k + 7397376a^8b^3c^8f^*h^*i^*k + 5230080a^7b^6c^6f^*g^*j^*k - 37675008a^8b^2c^9d^*h^*i^*$   
 $k - 3633408a^6b^8c^5d^*i^*j^*k + 2211840a^8b^4c^7d^*i^*j^*k + 68898816a^7b^3c^9d^*g^*h^*k - 1695744a^8b^2c^9g^*h^*i^*j - 1400832a^7b^4c^8g^*h^*i^*$   
 $*j + 967680a^7b^5c^7f^*h^*i^*k - 783360a^6b^7c^6f^*h^*i^*k - 741888a^6b^8c^5f^*g^*j^*k + 499968a^5b^10c^4d^*i^*j^*k + 419328a^7b^6c^6e^*h^*j^*k -$   
 $253440a^6b^6c^7g^*h^*i^*j - 161280a^6b^8c^5e^*h^*j^*k + 42240a^5b^9c^5f^*h^*i^*k + 26880a^5b^10c^4f^*g^*j^*k - 26880a^4b^12c^3d^*i^*j^*k + 13824$   
 $a^4b^11c^4f^*h^*i^*k + 11520a^5b^8c^6g^*h^*i^*j - 768a^3b^13c^3f^*h^*i^*k + 22241280a^8b^3c^8e^*f^*j^*k + 14222592a^6b^7c^6d^*g^*j^*k - 10460160$   
 $a^7b^5c^7e^*f^*j^*k + 8847360a^7b^4c^8e^*g^*i^*k - 7741440a^7b^4c^8f^*g^*h^*k - 7077888a^6b^6c^7e^*g^*i^*k + 6935040a^6b^6c^7d^*h^*i^*k - 6709248$   
 $a^8b^2c^9f^*g^*h^*k - 3612672a^7b^4c^8d^*h^*i^*k + 2801664a^7b^3c^9e^*h^*i^*j + 2506752a^7b^3c^9f^*g^*i^*j + 2419200a^6b^6c^7f^*g^*h^*k - 1661184$   
 $a^5b^9c^5d^*g^*j^*k + 1483776a^6b^7c^6e^*f^*j^*k - 1463040a^5b^8c^6d^*h^*i^*k + 884736a^5b^8c^6e^*g^*i^*k + 838656a^6b^5c^8f^*g^*i^*j + 506880a^6$   
 $b^5c^8e^*h^*i^*j + 80640a^4b^11c^4d^*g^*j^*k - 53760a^5b^9c^5e^*f^*j^*k - 53760a^5b^7c^7f^*g^*i^*j - 46080a^4b^10c^5f^*g^*h^*k - 34560a^5b^8c^6$   
 $f^*g^*h^*k + 25344a^3b^12c^4d^*h^*i^*k - 23040a^5b^7c^7e^*h^*i^*j + 13824a^4b^10c^5d^*h^*i^*k + 2304a^3b^12c^4f^*g^*h^*k - 2304a^2b^14c^3d^*h^*i^*k$   
 $- 29030400a^6b^5c^8d^*g^*h^*k + 28606464a^7b^3c^9d^*f^*i^*k - 28445184a^6b^6c^7d^*e^*j^*k + 58060800a^6b^4c^9d^*e^*h^*k + 15482880a^7b^3c^9e^*$   
 $f^*h^*k - 8183808a^7b^2c^10d^*g^*i^*j - 6718464a^6b^5c^8d^*f^*i^*k - 5087232a^7b^2c^10e^*g^*h^*j - 5013504a^7b^2c^10e^*f^*i^*j - 4838400a^6b^5c^8$   
 $e^*f^*h^*k + 4112640a^5b^7c^7d^*g^*h^*k - 3663360a^5b^7c^7d^*f^*i^*k + 3322368a^5b^8c^6d^*e^*j^*k - 2285568a^6b^4c^9d^*g^*i^*j + 1896960a^4b^9c^6$   
 $d^*f^*i^*k + 1843200a^6b^3c^10f^*g^*h^*i - 1677312a^6b^4c^9e^*f^*i^*j - 1658880a^6b^4c^9e^*g^*h^*j + 68345856a^6b^3c^10d^*e^*f^*k + 783360a^5b^5c^9$   
 $f^*g^*h^*i + 741888a^5b^6c^8d^*g^*i^*j - 34172928a^6b^4c^9d^*f^*g^*k - 340992a^3b^11c^5d^*f^*i^*k - 161280a^4b^10c^5d^*e^*j^*k + 138240a^4b^9c^6$   
 $d^*g^*h^*k + 107520a^5b^6c^8e^*f^*i^*j + 92160a^4b^9c^6e^*f^*h^*k - 89856a^3b^11c^5d^*g^*h^*k - 80640a^4b^8c^7d^*g^*i^*j + 69120a^5b^7c^7e^*f^*h^*k$   
 $+ 69120a^5b^6c^8e^*g^*h^*j + 27648a^2b^13c^4d^*f^*i^*k + 18432a^4b^7c^8f^*g^*h^*i + 6912a^2b^13c^4d^*g^*h^*k - 4608a^3b^11c^5e^*f^*h^*k - 2304$   
 $a^3b^9c^7f^*g^*h^*i + 27164160a^5b^6c^8d^*f^*g^*k - 22164480a^6b^3c^10d^*f^*h^*j - 54328320a^5b^5c^9d^*e^*f^*k - 17473536a^7b^2c^10d^*f^*g^*k - 82$   
 $25280a^5b^6c^8d^*e^*h^*k - 8087040a^4b^8c^7d^*f^*g^*k + 5677056a^6b^3c^10e^*f^*g^*j - 5529600a^6b^2c^11d^*g^*h^*i + 4571136a^6b^3c^10d^*e^*i^*j -$

$3686400a^6b^2c^{11}efh^i + 2805120a^5b^5c^9dfeh^j - 2211840a^5b^4c^{10}dgh^i - 1566720a^5b^4c^{10}efh^i - 1483776a^5b^5c^9d*ei*j + 1198080a^3b^{10}c^6d*fg*k + 437184a^4b^7c^8d*fh^j - 322560a^5b^5c^9e*fg*j + 317952a^4b^6c^9d*gh^i - 276480a^4b^8c^7d*eh^k + 179712a^3b^{10}c^6d*eh^k + 161280a^4b^7c^8d*ei*j - 146268a^3b^9c^7d*fh^j - 87552a^2b^{12}c^5d*fg*k - 36864a^4b^6c^9e*fh^i - 13824a^2b^{12}c^5d*eh^k + 9360a^2b^{11}c^6d*fh^j + 6912a^3b^8c^8d*gh^i - 6912a^2b^{10}c^7d*gh^i + 4608a^3b^8c^8e*fh^i - 24551424a^6b^2c^{11}d*eg*j + 16174080a^4b^7c^8d*ef*k + 5419008a^5b^4c^{10}d*eg*j + 5160960a^5b^3c^{11}d*fg*i + 4423680a^5b^3c^{11}e*fg*h + 4423680a^5b^3c^{11}d*eh^i - 2396160a^3b^9c^7d*ef*k - 635904a^4b^5c^{10}d*eh^i - 483840a^4b^6c^9d*eg*j - 354816a^3b^7c^9d*fg*i + 322560a^4b^5c^{10}d*fg*i + 175104a^2b^{11}c^6d*ef*k + 138240a^4b^5c^{10}e*fg*h + 59904a^2b^9c^8d*fg*i - 13824a^3b^7c^9e*fg*h - 13824a^3b^7c^9d*eh^i + 13824a^2b^9c^8d*eh^i - 16588800a^5b^2c^{12}d*eg*h - 10321920a^5b^2c^{12}d*ef*i + 1658880a^4b^4c^{11}d*eg*h + 709632a^3b^6c^{10}d*ef*i - 645120a^4b^4c^{11}d*ef*i + 124416a^3b^6c^{10}d*eg*h - 119808a^2b^8c^9d*ef*i - 41472a^2b^8c^9d*eg*h + 7741440a^4b^3c^{12}d*ef*g - 2903040a^3b^5c^{11}d*ef*g + 387072a^2b^7c^{10}d*ef*g - 381026304a^{11}b^c^7d*j*k^2 - 241827840a^{10}b^c^8d*h^k^2 - 65667072a^{12}b^c^6h^j*k^2 - 169344a^7b^{11}c^h^j*k^2 - 25165824a^{11}b^c^7g^i*k^2 - 4915200a^{11}b^c^7g^j^2*k - 53084160a^8b^c^{10}e^2*i*k - 75497472a^{10}b^c^8e*g*k^2 - 86704128a^7b^c^{11}d^2*g*k + 565248a^9b^c^9h^i^2*j - 168448a^6b^{12}c^f*j*k^2 - 24576a^5b^{13}c^g^i*k^2 - 1769472a^9b^c^9g^h^2*k - 17694720a^9b^c^9e^i^2*k - 411264a^5b^{13}c^d*j*k^2 - 11520a^4b^14c^f*h^k^2 + 4915200a^8b^c^{10}f^2*g*k + 2580480a^9b^c^9e^i*j^2 - 2496000a^9b^c^9f^h^j^2 - 1543680a^8b^c^{10}f^h^2*j + 33408a^b^{14}c^4d^2*i*k - 59512320a^6b^c^{12}d^2*f*j + 5087232a^7b^c^{11}e^2*h^j + 2727936a^8b^c^{10}d^i^2*j - 26496a^3b^{15}c^d*h^k^2 + 1105920a^7b^c^{11}e^h^2*i - 107136a^b^{13}c^5d^2*g*k + 10260a^b^{12}c^6d^2*h^j - 10616832a^6b^c^{12}e^2g^i - 3538944a^7b^c^{11}e*g^i^2 + 1843200a^7b^c^{11}d*h^i^2 - 18432a^2b^{16}c^d*f*k^2 - 15552000a^8b^c^{10}d*f^j^2 + 24551424a^6b^c^{12}d*e^2*j - 37062144a^5b^c^{13}d^2*f^h + 2580480a^6b^c^{12}e*f^2*i + 214272a^b^{12}c^6d^2e*k + 65664a^b^{10}c^8d^2g^i - 25074a^b^{11}c^7d^2f^j + 420a^b^{12}c^6d^2f^2*j + 6a^b^{15}c^3d*f^j^2 + 23224320a^5b^c^{13}d^2e^i + 384a^b^{12}c^6d*f^i^2 - 5985792a^6b^c^{12}d*f^h^2 + 206010a^b^9c^9d^2f^h - 131328a^b^9c^9d^2e^i - 6300a^b^{10}c^8d*f^2*h + 1350a^b^{11}c^7d*f^h^2 + 16588800a^5b^c^{13}d*e^2*h + 3456a^b^{10}c^8d*f^g^2 + 435456a^b^8c^{10}d^2e*g + 13824a^b^8c^{10}d*e^2*f + 3932160a^{11}c^8h^i*j*k + 27525120a^{10}c^9d^i*j*k + 82575360a^9c^{10}d*e^j*k + 11796480a^{10}c^9e^h^j*k + 16515072a^9c^{10}d^h^i*k + 49545216a^8c^{11}d*eh^k - 2457600a^8c^{11}e*f^i*j - 1474560a^7c^{12}e*fh^i - 10321920a^6c^{13}d*ef^i + 737077248a^{10}b^3c^6d*j*k^2 - 518814720a^9b^5c^5d*j*k^2 + 441354240a^9b^3c^7d^h^k^2 - 429871104a^6b^2c^{11}d^2e*k - 272212992a^8b^5c^6d^h^k^2 + 305731584a^5b^4c^{10}d^2e*k + 192412800a^8b^7c^4d*j*k^2 + 11191$



$$\begin{aligned}
& 2960a^{11}b^3c^5h^*jk^2 + 214935552a^6b^3c^{10}d^2g^*k + 202427136a^7b^6c^6d^*fk^2 - 49904640a^{10}b^5c^4h^*jk^2 - 178513920a^8b^4c^7d^*fk^2 - 152865792a^5b^5c^9d^2g^*k - 114388992a^7b^2c^{10}d^2i^*k + 94961664a^{10}b^2c^7e^*ik^2 - 9039872a^{11}b^2c^6i^*j^2k - 56494080a^{10}b^4c^5f^*jk^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^*ik^2 + 45576960a^9b^6c^4f^*jk^2 + 7954560a^9b^7c^3h^*jk^2 - 104693760a^9b^3c^7e^*gk^2 + 142080a^8b^9c^2h^*jk^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^*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^*jk^2 - 32034816a^{10}b^2c^7e^*j^2k - 14369280a^8b^8c^3f^*jk^2 - 13271040a^8b^3c^8g^2i^*k + 80267904a^7b^7c^5d^*hk^2 + 79626240a^7b^2c^{10}e^2g^*k + 11059200a^9b^5c^5g^*ik^2 + 8847360a^9b^2c^8g^*i^2k - 42113280a^7b^9c^3d^*jk^2 + 6389760a^8b^7c^4g^*ik^2 + 5898240a^8b^4c^7g^*i^2k - 37601280a^9b^4c^6f^*hk^2 - 2949120a^7b^9c^3g^*ik^2 + 2242560a^7b^10c^2f^*jk^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^*ik^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^*fk^2 + 24645888a^8b^6c^5f^*hk^2 + 6359040a^8b^3c^8g^*h^2k - 22118400a^9b^4c^6e^*ik^2 - 3862528a^8b^2c^9f^2i^*k - 2248704a^7b^4c^8f^2i^*k - 1290240a^9b^2c^8g^*i^2k - 948480a^8b^6c^5e^*j^2k - 860160a^8b^4c^7g^*i^2k - 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^2k - 72960a^4b^10c^5f^2i^*k + 17280a^5b^9c^5g^*h^2k + 12672a^6b^8c^5g^*i^2k + 5504a^3b^12c^4f^2i^*k + 3456a^4b^11c^4g^*h^2k - 384a^5b^10c^4g^*i^2k - 128a^2b^14c^3f^2i^*k + 30265344a^6b^4c^9d^2i^*k - 12779520a^8b^6c^5e^*ik^2 - 11796480a^8b^3c^8e^*i^2k - 8847360a^7b^3c^9e^2i^*k - 7925760a^{10}b^2c^7f^*hk^2 + 7077888a^6b^5c^8e^2i^*k - 39813120a^7b^3c^9e^*g^2k - 73175040a^9b^2c^8d^*fk^2 + 5898240a^7b^8c^4e^*ik^2 + 5542272a^6b^11c^2d^*jk^2 - 5420160a^7b^8c^4f^*hk^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^*ik^2 + 884736a^6b^7c^6e^*i^2k - 884736a^5b^7c^7e^2i^*k - 697344a^7b^4c^8f^*i^2k + 414720a^6b^5c^8g^2h^*j + 226560a^6b^10c^3f^*hk^2 - 147456a^5b^9c^5e^*i^2k - 121856a^6b^6c^7f^*i^2j + 82560a^5b^12c^2f^*hk^2 + 49152a^5b^12c^2e^*ik^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^*gk^2 - 5142528a^8b^3c^8f^*h^2j + 5068800a^7b^2c^{10}f^2h^*j - 3755520a^7b^3c^9f^*h^2j + 3336192a^7b^3c^9f^2g^*k + 3000960a^6b^4
\end{aligned}$$

$$\begin{aligned}
& *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 + 2654208*a^5*b^6*c^8*e^2*g*k + 2125824*a^7*b^3*c^9*d*i^2*j + 1658880*a^6*b^3*c^10*e^2*h*j - 1419264*a^6*b^4*c^9*f*g^2*j - 1327104*a^5*b^7*c^7*e*g^2*k - 921600*a^7*b^2*c^10*f*g^2*j - 737280*a^7*b^2*c^10*f*h*i^2 - 568320*a^6*b^4*c^9*f*h*i^2 + 207360*a^4*b^13*c^2*d*h*k^2 - 147456*a^5*b^11*c^3*e*g*k^2 - 136704*a^5*b^6*c^8*f*h*i^2 + 133632*a^6*b^5*c^8*d*i^2*j - 96768*a^5*b^7*c^7*d*i^2*j + 80640*a^5*b^6*c^8*f*g^2*j - 69120*a^5*b^5*c^9*e^2*h*j + 13440*a^4*b^9*c^6*d*i^2*j - 5760*a^5*b^11*c^3*d*h*k^2 - 2304*a^4*b^8*c^7*f*h*i^2 + 384*a^3*b^10*c^6*f*h*i^2 + 11930112*a^8*b^2*c^9*d*h*j^2 - 11646720*a^3*b^9*c^7*d^2*g*k + 8432640*a^7*b^2*c^10*d*h^2*j + 24140160*a^5*b^10*c^4*d*f*k^2 - 6672384*a^7*b^2*c^10*e*f^2*k + 4450176*a^7*b^4*c^8*d*h*j^2 + 4337280*a^6*b^4*c^9*d*h^2*j - 3870720*a^8*b^2*c^9*e*g*j^2 - 3409920*a^6*b^4*c^9*e*f^2*k - 2885760*a^5*b^4*c^10*d^2*h*j - 2844288*a^4*b^6*c^9*d^2*h*j + 2615040*a^5*b^6*c^8*e*f^2*k - 1687680*a^6*b^6*c^7*d*h*j^2 + 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*
\end{aligned}$$

$$\begin{aligned}
& b^{11}c^6d^*h^*i^2 - 13149696a^7b^3c^9d^*f^*j^2 - 11612160a^5b^2c^{12}d^2 \\
& *g^*i + 10906560a^4b^5c^{10}d^2f^*j - 7418880a^5b^3c^{11}d^2f^*j + 31489 \\
& 92a^6b^5c^8d^*f^*j^2 - 2985696a^3b^7c^9d^2f^*j - 2965248a^2b^{10}c^7 \\
& *d^2e^*k + 1720320a^5b^3c^{11}e^*f^2i - 1658880a^6b^2c^{11}e^*g^*h^2 + 15 \\
& 96672a^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 + 362 \\
& 880a^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 + 41472 \\
& 00a^5b^3c^{11}d^*g^2h - 2580480a^6b^2c^{11}d^*f^*i^2 - 967680a^5b^4c^1 \\
& 0d^*f^*i^2 + 483840a^4b^5c^{10}d^*e^2j - 414720a^4b^5c^{10}d^*g^2h - 138 \\
& 240a^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^2* \\
& b^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 - 1414 \\
& 080a^3b^6c^{10}d^*f^2h - 34836480a^4b^2c^{13}d^2e^*g + 1016064a^2b^7* \\
& c^{10}d^2e^*i - 645120a^4b^4c^{11}e^*f^2g + 306720a^3b^7c^9d^*f^*h^2 + 1 \\
& 97820a^2b^8c^9d^*f^2h + 146880a^4b^5c^{10}d^*f^*h^2 + 80640a^3b^6c^1 \\
& 0e^*f^2g - 55350a^2b^9c^8d^*f^*h^2 - 2304a^2b^8c^9e^*f^2g - 3870720* \\
& a^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 - 124 \\
& 416a^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 + 2903 \\
& 040a^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 - 1 \\
& 32956160a^{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 - 91 \\
& 42272a^{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 - 55705 \\
& 6a^8b^5c^6i^3k + 147456a^7b^7c^5i^3k - 65536a^6b^12c^*i^2k^2 + \\
& 32768a^6b^9c^4i^3k - 8192a^5b^{11}c^3i^3k + 430080a^{10}b^*c^8i^2* \\
& j^2 - 2880a^5b^{13}c^*h^2k^2 + 6635520a^7b^4c^8g^3k - 4792320a^9b^8 \\
& *c^2g^*k^3 - 2211840a^6b^6c^7g^3k + 1359360a^{10}b^2c^7h^*j^3 + 11731 \\
& 20a^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^{10}c^5h^ \\
& 3j + 210a^6b^{10}c^3h^*j^3 - 2949120a^{10}b^*c^8f^2k^2 + 17694720a^6b^ \\
& 3c^{10}e^3k + 184320a^8b^*c^{10}h^2i^2 - 3520a^3b^{15}c^*f^2k^2 + 958464 \\
& 0a^9b^7c^3e^*k^3 - 2293760a^9b^3c^7f^*j^3 - 2293760a^6b^3c^{10}f^3* \\
& j - 1769472a^5b^5c^9e^3k - 884736a^6b^3c^{10}g^3i - 589824a^7b^3* \\
& c^9g^*i^3 - 491520a^8b^9c^2e^*k^3 - 442368a^5b^5c^9g^3i - 294912a^
\end{aligned}$$

$6*b^5*c^8*g*i^3 - 199360*a^8*b^5*c^6*f*j^3 - 199360*a^5*b^5*c^9*f^3*j + 619$   
 $20*a^7*b^7*c^5*f*j^3 + 61920*a^4*b^7*c^8*f^3*j - 49152*a^5*b^7*c^7*g*i^3 -$   
 $3682*a^6*b^9*c^4*f*j^3 - 3682*a^3*b^9*c^7*f^3*j + 70*a^5*b^11*c^3*f*j^3 + 7$   
 $0*a^2*b^11*c^6*f^3*j + 3870720*a^8*b*c^10*e^2*j^2 + 430080*a^7*b*c^11*f^2*i$   
 $^2 - 14152320*a^4*b^4*c^11*d^3*j + 10644480*a^5*b^2*c^12*d^3*j + 5483520*a^$   
 $9*b^2*c^8*d*j^3 + 4269888*a^3*b^6*c^10*d^3*j + 3538944*a^5*b^2*c^12*e^3*i -$   
 $1648128*a^5*b^3*c^11*f^3*h + 1330560*a^8*b^4*c^7*d*j^3 + 1179648*a^7*b^2*c$   
 $^10*e*i^3 - 898560*a^6*b^3*c^10*f*h^3 - 826560*a^7*b^6*c^6*d*j^3 - 607068*a$   
 $^2*b^8*c^9*d^3*j + 589824*a^6*b^4*c^9*e*i^3 - 354240*a^5*b^5*c^9*f*h^3 - 35$   
 $4240*a^4*b^5*c^10*f^3*h + 145188*a^6*b^8*c^5*d*j^3 + 98304*a^5*b^6*c^8*e*i^$   
 $3 + 43680*a^3*b^7*c^9*f^3*h - 21600*a^4*b^7*c^8*f*h^3 - 9576*a^5*b^10*c^4*d$   
 $*j^3 + 1350*a^3*b^9*c^7*f*h^3 - 1050*a^2*b^9*c^8*f^3*h - 504*a*b^14*c^4*d^2$   
 $*j^2 + 210*a^4*b^12*c^3*d*j^3 + 3870720*a^6*b*c^12*d^2*i^2 + 1658880*a^6*b*$   
 $c^12*e^2*h^2 - 9792*a*b^11*c^7*d^2*i^2 + 16547328*a^4*b^2*c^13*d^3*h - 1230$   
 $6816*a^3*b^4*c^12*d^3*h + 37310976*a^3*b^3*c^13*d^3*f + 3037824*a^2*b^6*c^1$   
 $1*d^3*h - 2654208*a^5*b^3*c^11*e*g^3 + 1949184*a^6*b^2*c^11*d*h^3 + 1296000$   
 $*a^5*b^4*c^10*d*h^3 - 155520*a^4*b^6*c^9*d*h^3 - 40500*a*b^10*c^8*d^2*h^2 -$   
 $8100*a^3*b^8*c^8*d*h^3 + 4050*a^2*b^10*c^7*d*h^3 + 3870720*a^5*b*c^13*e^2*$   
 $f^2 + 34836480*a^4*b*c^14*d^2*e^2 - 108864*a*b^9*c^9*d^2*g^2 - 8068032*a^2*$   
 $b^5*c^12*d^3*f - 5623296*a^4*b^3*c^12*d*f^3 + 1737792*a^3*b^5*c^11*d*f^3 -$   
 $260190*a*b^8*c^10*d^2*f^2 - 211680*a^2*b^7*c^10*d*f^3 - 435456*a*b^7*c^11*d$   
 $^2*e^2 - 377487360*a^12*b*c^6*e*k^3 + 1434977280*a^8*b^3*c^8*d^2*k^2 + 1734$   
 $08256*a^7*c^12*d^2*e*k + 3276800*a^12*c^7*i*j^2*k - 125829120*a^13*b*c^5*i*$   
 $k^3 + 26214400*a^12*c^7*f*j*k^2 + 1179648*a^10*c^9*h^2*i*k + 13440*a^6*b^13$   
 $*h*j*k^2 + 50331648*a^11*c^8*e*i*k^2 + 110100480*a^10*c^9*d*f*k^2 + 5780275$   
 $2*a^8*c^11*d^2*i*k + 9830400*a^11*c^8*e*j^2*k - 3276800*a^9*c^10*f^2*i*k +$   
 $4480*a^5*b^14*f*j*k^2 + 15728640*a^11*c^8*f*h*k^2 - 409600*a^9*c^10*f*i^2*j$   
 $- 1152*b^16*c^3*d^2*i*k - 1220516352*a^7*b^5*c^7*d^2*k^2 + 3538944*a^9*c^1$   
 $0*e*h^2*k + 384000*a^8*c^11*f^2*h*j + 13440*a^4*b^15*d*j*k^2 + 384*a^3*b^16$   
 $*f*h*k^2 + 20321280*a^7*c^12*d^2*h*j - 245760*a^8*c^11*f*h*i^2 + 3456*b^15*$   
 $c^4*d^2*g*k - 270*b^14*c^5*d^2*h*j - 9830400*a^8*c^11*e*f^2*k + 4838400*a^9$   
 $*c^10*d*h*j^2 + 2903040*a^8*c^11*d*h^2*j - 1966080*a^10*b*c^8*i^3*k + 14336$   
 $00*a^9*b^9*c*i*k^3 + 1152*a^2*b^17*d*h*k^2 - 3686400*a^7*c^12*e^2*f*j - 530$   
 $84160*a^7*b*c^11*e^3*k - 6912*b^14*c^5*d^2*e*k - 3456*b^12*c^7*d^2*g*i + 63$   
 $0*b^13*c^6*d^2*f*j + 2688000*a^7*c^12*d*f^2*j + 245760*a^8*b^10*c*g*k^3 - 2$   
 $211840*a^6*c^13*e^2*f*h - 1720320*a^7*c^12*d*f*i^2 - 9450*b^11*c^8*d^2*f*h$   
 $+ 6912*b^11*c^8*d^2*e*i + 1612800*a^6*c^13*d*f^2*h - 1344000*a^10*b*c^8*f*j$   
 $^3 - 1344000*a^7*b*c^11*f^3*j - 393216*a^8*b*c^10*g*i^3 - 23616*a*b^17*c*d^$   
 $2*k^2 - 20736*b^10*c^9*d^2*e*g - 75188736*a^4*b*c^14*d^3*f - 883200*a^6*b*c$   
 $^12*f^3*h - 317952*a^7*b*c^11*f*h^3 + 43416*a*b^10*c^8*d^3*j - 15482880*a^5$   
 $*c^14*d*e^2*f - 10616832*a^5*b*c^13*e^3*g - 345060*a*b^8*c^10*d^3*h - 42624$   
 $00*a^5*b*c^13*d*f^3 + 852768*a*b^7*c^11*d^3*f + 7350*a*b^9*c^9*d*f^3 + 5845$   
 $78368*a^6*b^7*c^6*d^2*k^2 + 93905920*a^12*b^3*c^4*j^2*k^2 - 177997248*a^5*b$   
 $^9*c^5*d^2*k^2 - 50967040*a^11*b^5*c^3*j^2*k^2 + 104693760*a^9*b^2*c^8*e^2*$   
 $k^2 + 12849984*a^10*b^7*c^2*j^2*k^2 + 20021248*a^11*b^2*c^6*i^2*k^2 - 85524$

$$\begin{aligned}
& 480*a^8*b^4*c^7*e^2*k^2 + 33223680*a^10*b^3*c^6*h^2*k^2 + 4227072*a^10*b^4*c^5*i^2*k^2 - 3973120*a^9*b^6*c^4*i^2*k^2 + 344064*a^7*b^10*c^2*i^2*k^2 - 8 \\
& 1920*a^8*b^8*c^3*i^2*k^2 - 11386368*a^9*b^5*c^5*h^2*k^2 + 26173440*a^9*b^4*c^6*g^2*k^2 - 21381120*a^8*b^6*c^5*g^2*k^2 + 18874368*a^10*b^2*c^7*g^2*k^2 \\
& + 501760*a^9*b^3*c^7*i^2*j^2 + 452160*a^8*b^7*c^4*h^2*k^2 + 385920*a^7*b^9*c^3*h^2*k^2 + 170240*a^8*b^5*c^6*i^2*j^2 - 48960*a^6*b^11*c^2*h^2*k^2 + 921 \\
& 6*a^7*b^7*c^5*i^2*j^2 - 1984*a^6*b^9*c^4*i^2*j^2 + 64*a^5*b^11*c^3*i^2*j^2 + 5898240*a^7*b^8*c^4*g^2*k^2 + 1419840*a^8*b^4*c^7*h^2*j^2 + 1387008*a^9*b \\
& ^2*c^8*h^2*j^2 - 737280*a^6*b^10*c^3*g^2*k^2 + 84960*a^7*b^6*c^6*h^2*j^2 + 36864*a^5*b^12*c^2*g^2*k^2 - 8010*a^6*b^8*c^5*h^2*j^2 - 180*a^5*b^10*c^4*h^ \\
& 2*j^2 + 9*a^4*b^12*c^3*h^2*j^2 + 14115840*a^9*b^3*c^7*f^2*k^2 - 9231552*a^7 *b^7*c^5*f^2*k^2 + 23592960*a^7*b^6*c^6*e^2*k^2 + 4984320*a^8*b^5*c^6*f^2*k \\
& ^2 + 3759040*a^6*b^9*c^4*f^2*k^2 + 36190080*a^4*b^11*c^4*d^2*k^2 + 967680*a ^8*b^3*c^8*g^2*j^2 - 727360*a^5*b^11*c^3*f^2*k^2 + 276480*a^7*b^3*c^9*h^2*i \\
& ^2 + 161280*a^7*b^5*c^7*g^2*j^2 + 140544*a^6*b^5*c^8*h^2*i^2 + 72960*a^4*b^13*c^2*f^2*k^2 + 25344*a^5*b^7*c^7*h^2*i^2 - 20160*a^6*b^7*c^6*g^2*j^2 + 57 \\
& 6*a^5*b^9*c^5*g^2*j^2 + 576*a^4*b^9*c^6*h^2*i^2 + 3808000*a^8*b^2*c^9*f^2*j ^2 - 2949120*a^6*b^8*c^5*e^2*k^2 + 1643712*a^7*b^4*c^8*f^2*j^2 + 884736*a^7 *b^2*c^10*g^2*i^2 + 884736*a^6*b^4*c^9*g^2*i^2 + 221184*a^5*b^6*c^8*g^2*i^2 \\
& + 147456*a^5*b^10*c^4*e^2*k^2 - 125440*a^6*b^6*c^7*f^2*j^2 - 13790*a^5*b^8 *c^6*f^2*j^2 + 1785*a^4*b^10*c^5*f^2*j^2 - 70*a^3*b^12*c^4*f^2*j^2 - 495360 \\
& 0*a^3*b^13*c^3*d^2*k^2 + 18427392*a^7*b^2*c^10*d^2*j^2 + 645120*a^7*b^3*c^9 *e^2*j^2 + 501760*a^6*b^3*c^10*f^2*i^2 + 442944*a^2*b^15*c^2*d^2*k^2 + 4147 \\
& 20*a^6*b^3*c^10*g^2*h^2 + 207360*a^5*b^5*c^9*g^2*h^2 + 170240*a^5*b^5*c^9*f ^2*i^2 - 80640*a^6*b^5*c^8*e^2*j^2 + 9216*a^4*b^7*c^8*f^2*i^2 + 5184*a^4*b^7 *c^8*g^2*h^2 + 2304*a^5*b^7*c^7*e^2*j^2 - 1984*a^3*b^9*c^7*f^2*i^2 + 64*a^2 *b^11*c^6*f^2*i^2 - 4148928*a^6*b^4*c^9*d^2*j^2 + 3538944*a^6*b^2*c^11*e^2 *i^2 + 1684224*a^6*b^2*c^11*f^2*h^2 + 1264320*a^5*b^4*c^10*f^2*h^2 - 118339 \\
& 2*a^5*b^6*c^8*d^2*j^2 + 884736*a^5*b^4*c^10*e^2*i^2 + 645750*a^4*b^8*c^7*d^2*j^2 + 126720*a^4*b^6*c^9*f^2*h^2 - 115920*a^3*b^10*c^6*d^2*j^2 - 13950*a^3 *b^8*c^8*f^2*h^2 + 10836*a^2*b^12*c^5*d^2*j^2 + 225*a^2*b^10*c^7*f^2*h^2 + 1935360*a^5*b^3*c^11*d^2*i^2 + 967680*a^5*b^3*c^11*f^2*g^2 + 829440*a^5*b^3 *c^11*e^2*h^2 - 532224*a^4*b^5*c^10*d^2*i^2 + 161280*a^4*b^5*c^10*f^2*g^2 - 96768*a^3*b^7*c^9*d^2*i^2 + 62784*a^2*b^9*c^8*d^2*i^2 + 20736*a^4*b^5*c^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 + 375 \\
& 030*a^2*b^8*c^9*d^2*h^2 + 8709120*a^4*b^3*c^12*d^2*g^2 - 4354560*a^3*b^5*c^11*d^2*g^2 + 979776*a^2*b^7*c^10*d^2*g^2 + 645120*a^4*b^3*c^12*e^2*f^2 - 80 \\
& 640*a^3*b^5*c^11*e^2*f^2 + 2304*a^2*b^7*c^10*e^2*f^2 - 15269184*a^3*b^4*c^12 *d^2*f^2 + 2870784*a^2*b^6*c^11*d^2*f^2 - 17418240*a^3*b^3*c^13*d^2*e^2 + 3919104*a^2*b^5*c^12*d^2*e^2 + 384*a*b^18*d*f*k^2 - 199229440*a^14*b^2*c^3 *k^4 + 8388608*a^12*c^7*i^2*k^2 + 75497472*a^10*c^9*e^2*k^2 + 78400*a^8*b^11 *j^2*k^2 + 4096*a^5*b^14*i^2*k^2 + 345600*a^10*c^9*h^2*j^2 + 576*a^4*b^15*h^2 *k^2 + 57937920*a^13*b^4*c^2*k^4 + 320000*a^9*c^10*f^2*j^2 + 64*a^2*b^17*
\end{aligned}$$

$f^2k^2 + 16934400a^8c^{11}d^2j^2 + 9b^{16}c^3d^2j^2 + 3538944a^7c^{12}$   
 $e^2i^2 + 115200a^7c^{12}f^2h^2 + 576b^{13}c^6d^2i^2 + 2025b^{12}c^7d$   
 $^2h^2 + 6096384a^6c^{13}d^2h^2 + 492800a^{11}b^2c^6j^4 + 351456a^{10}b$   
 $^4c^5j^4 - 43120a^9b^6c^4j^4 + 5184b^{11}c^8d^2g^2 + 1225a^8b^8c$   
 $^3j^4 + 131072a^8b^2c^9i^4 + 98304a^7b^4c^8i^4 + 32768a^6b^6c^7$   
 $i^4 + 11025b^{10}c^9d^2f^2 + 4096a^5b^8c^6i^4 + 5644800a^5c^{14}d^2$   
 $f^2 + 142560a^6b^4c^9h^4 + 103680a^7b^2c^{10}h^4 + 32400a^5b^6c^8$   
 $h^4 + 20736b^9c^{10}d^2e^2 + 2025a^4b^8c^7h^4 + 331776a^5b^4c^{10}$   
 $g^4 + 492800a^5b^2c^{12}f^4 + 351456a^4b^4c^{11}f^4 - 43120a^3b^6c^1$   
 $0f^4 + 1225a^2b^8c^9f^4 - 27433728a^3b^2c^{14}d^4 + 6446304a^2b^4c$   
 $^{13}d^4 + a^2b^{14}c^3f^2j^2 - 81920a^8b^{11}i^3k^3 + 384000a^{11}c^8h*$   
 $j^3 + 138240a^9c^{10}h^3j + 47416320a^6c^{13}d^3j - 1134b^{12}c^7d^3j$   
 $+ 7077888a^6c^{13}e^3i + 2688000a^{10}c^9d^3j^3 + 786432a^8c^{11}e^3i^3$   
 $+ 28449792a^5c^{14}d^3h - 7782400a^{12}b^6c^3k^4 + 17010b^{10}c^9d^3h +$   
 $580608a^7c^{12}d^3h^3 - 39690b^9c^{10}d^3f - 734832a^6b^6c^{12}d^4 + 268$   
 $435456a^{15}c^4k^4 + 576b^{19}d^2k^2 + 409600a^{11}b^8k^4 + 160000a^{12}c$   
 $^7j^4 + 65536a^9c^{10}i^4 + 20736a^8c^{11}h^4 + 49787136a^4c^{15}d^4 +$   
 $160000a^6c^{13}f^4 + 5308416a^5c^{14}e^4 + 35721b^8c^{11}d^4, z, n)*((1$   
 $1010048a^9c^{10}d^3k - 327680a^8c^{11}f^3i - 983040a^7c^{12}e^3f + 1572864*$   
 $a^{10}c^9h^3k + 2621440a^{11}c^8j^3k + 3244032a^6b^3c^{12}d^3e + 1081344a^7*$   
 $b^3c^{11}d^3i + 884736a^7b^3c^{11}e^3h + 491520a^7b^3c^{11}f^3g + 1277952a^8b^3*$   
 $c^{10}e^3j + 294912a^8b^3c^{10}h^3i + 360448a^9b^3c^9f^3k + 425984a^9b^3c^9*$   
 $i^3j + 4608a^2b^9c^8d^3e - 87552a^3b^7c^9d^3e + 681984a^4b^5c^{10}d^3*$   
 $e - 2433024a^5b^3c^{11}d^3e - 2304a^2b^{10}c^7d^3g + 43776a^3b^8c^8d^3*$   
 $g + 1536a^3b^8c^8e^3f - 340992a^4b^6c^9d^3g - 39936a^4b^6c^9e^3f +$   
 $1216512a^5b^4c^{10}d^3g + 184320a^5b^4c^{10}e^3f - 1622016a^6b^2c^{11}*$   
 $d^3g + 49152a^6b^2c^{11}e^3f + 768a^2b^{11}c^6d^3i - 13056a^3b^9c^7d^3i$   
 $- 768a^3b^9c^7f^3g + 84480a^4b^7c^8d^3i + 4608a^4b^7c^8e^3h + 199$   
 $68a^4b^7c^8f^3g - 178176a^5b^5c^9d^3i + 18432a^5b^5c^9e^3h - 92160$   
 $a^5b^5c^9f^3g - 270336a^6b^3c^{10}d^3i - 368640a^6b^3c^{10}e^3h - 2457$   
 $6a^6b^3c^{10}f^3g - 768a^2b^{14}c^3d^3k + 256a^3b^{10}c^6f^3i + 22272a^3*$   
 $b^{12}c^4d^3k - 6144a^4b^8c^7f^3i - 2304a^4b^8c^7g^3h - 282624a^4b^8*$   
 $c^5d^3k + 17408a^5b^6c^8f^3i - 9216a^5b^6c^8g^3h - 1536a^5b^7c^8*$   
 $e^3j + 2003712a^5b^8c^6d^3k + 69632a^6b^4c^9f^3i + 184320a^6b^4c^9*$   
 $g^3h + 92160a^6b^5c^8e^3j - 8426496a^6b^6c^7d^3k - 147456a^7b^2c^8*$   
 $c^5d^3k - 442368a^7b^2c^{10}g^3h - 663552a^7b^3c^9e^3j + 20484096a^7b^3*$   
 $c^8d^3k - 25411584a^8b^2c^9d^3k - 256a^3b^{13}c^3f^3k + 768a^4b^9c^6*$   
 $h^3i + 9216a^4b^{11}c^4f^3k + 4608a^5b^7c^7h^3i + 768a^5b^8c^6g^3*$   
 $j - 113920a^5b^9c^5f^3k - 55296a^6b^5c^8h^3i - 46080a^6b^6c^7g^3j$   
 $+ 658944a^6b^7c^6f^3k + 24576a^7b^3c^9h^3i + 331776a^7b^4c^8g^3j -$   
 $1812480a^7b^5c^7f^3k - 638976a^8b^2c^9g^3j + 1810432a^8b^3c^8f^3k$   
 $- 768a^4b^{12}c^3h^3k - 256a^5b^9c^5i^3j + 8448a^5b^{10}c^4h^3k + 148$   
 $48a^6b^7c^6i^3j + 3840a^6b^8c^5h^3k - 79872a^7b^5c^7i^3j - 427008*$   
 $a^7b^6c^6h^3k - 8192a^8b^3c^8i^3j + 2150400a^8b^4c^7h^3k - 3784704*$   
 $a^9b^2c^8h^3k - 8960a^6b^{10}c^3j^3k + 166656a^7b^8c^4j^3k - 1217536*$

$$\begin{aligned}
& 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^6 b^{18} c^6 d f z^2 - 2571632640 a^9 b^5 c^{11} d j z^2 + 2548039680 a^9 b^3 c^{13} d h z^2 + 2453667840 a^9 b^7 c^9 e k z^2 + 2181038080 a^{12} b^3 c^{10} i k z^2 \\
& - 6492782592 a^{10} b^5 c^{10} e k z^2 + 1509949440 a^9 b^3 c^{13} e g z^2 - 140 \\
& 1421824 a^8 b^5 c^{12} d h z^2 - 1226833920 a^9 b^8 c^8 g k z^2 - 1321205760 a^9 b^2 c^{14} d f z^2 - 2793406464 a^{11} b c^{13} d j z^2 + 9563013120 a^{11} b^3 c^{11} e k z^2 + 890634240 a^8 b^7 c^{10} d j z^2 - 754974720 a^8 b^5 c^{12} e g z^2 - 570425344 a^{11} b^5 c^9 i k z^2 + 732168192 a^7 b^6 c^{12} d f z^2 - 58 \\
& 1959680 a^{10} b^4 c^{11} f j z^2 - 603979776 a^{10} b^2 c^{13} e i z^2 + 534773760 a^{11} b^3 c^{11} h j z^2 - 558366720 a^8 b^9 c^8 e k z^2 - 4781506560 a^{11} b^4 c^{10} g k z^2 - 2013265920 a^{13} b c^{11} i k z^2 - 456130560 a^9 b^4 c^{12} f h z^2 + 384040960 a^9 b^6 c^{10} f j z^2 - 264241152 a^{10} b^7 c^8 i k z^2 + 3 \\
& 90463488 a^7 b^7 c^{11} d h z^2 + 279183360 a^8 b^{10} c^7 g k z^2 + 301989888 a^{10} b^3 c^{12} g i z^2 + 222822400 a^9 b^9 c^7 i k z^2 - 366280704 a^6 b^8 c^{11} d f z^2 - 330301440 a^8 b^4 c^{13} d f z^2 + 254017536 a^8 b^6 c^{11} f h z^2 \\
& - 1887436800 a^{10} b c^{14} d h z^2 + 188743680 a^{10} b^2 c^{13} f h z^2 - 185 \\
& 303040 a^7 b^9 c^9 d j z^2 - 117964800 a^{10} b^5 c^{10} h j z^2 - 6039797760 a^{12} b c^{12} e k z^2 - 67502080 a^8 b^{11} c^6 i k z^2 + 121634816 a^{11} b^2 c^{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 + 10813440 a^7 b^{13} c^5 i k z^2 + 76677120 a^7 b^{11} c^7 e k z^2 - 38338560 a^7 b^{12} c^6 g k z^2 - 37355520 a^9 b^7 c^9 h j z^2 - 917504 a^6 b^{15} c^4 i k z^2 + 32768 a^5 b^{17} c^3 i k z^2 - 6291 4560 a^8 b^7 c^{10} g i z^2 + 23101440 a^8 b^9 c^8 h j z^2 - 4349952 a^7 b^{11} c^7 h j z^2 + 2949120 a^6 b^{14} c^5 g k z^2 + 337920 a^6 b^{13} c^6 h j z^2 - 98304 a^5 b^{16} c^4 g k z^2 - 7680 a^5 b^{15} c^5 h j z^2 - 61931520 a^7 b^8 c^{10} f h z^2 + 23592960 a^7 b^9 c^9 g i z^2 + 17940480 a^7 b^{10} c^8 f j z^2 - 47185920 a^7 b^8 c^{10} e i z^2 - 5898240 a^6 b^{13} c^6 e k z^2 - 3538944 a^6 b^{11} c^8 g i z^2 - 1347584 a^6 b^{12} c^7 f j z^2 + 196608 a^5 b^{15} c^5 e k z^2 + 196608 a^5 b^{13} c^7 g i z^2 + 35840 a^5 b^{14} c^6 f j z^2 + 96583680 a^5 b^{10} c^{10} d f z^2 + 23371776 a^6 b^{11} c^8 d j z^2 - 51609600 a^6 b^9 c^{10} d h z^2 + 7077888 a^6 b^{10} c^9 e i z^2 + 6144000 a^6 b^{10} c^9 f h z^2 - 1677312 a^5 b^{13} c^7 d j z^2 - 393216 a^5 b^{12} c^8 e i z^2 + 61440 a^5 b^{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 + 1 536 a^3 b^{16} c^6 f h z^2 - 23592960 a^6 b^9 c^{10} e g z^2 + 1179648 a^5 b^{11}
\end{aligned}$$

$$\begin{aligned}
& *c^9 * e * g * z^2 + 829440 * a^4 * b^{13} * c^8 * d * h * z^2 + 368640 * a^5 * b^{11} * c^9 * d * h * z^2 - \\
& 105984 * a^3 * b^{15} * c^7 * d * h * z^2 + 4608 * a^2 * b^{17} * c^6 * d * h * z^2 - 15175680 * a^4 * b^{12} \\
& * c^9 * d * f * z^2 + 1428480 * a^3 * b^{14} * c^8 * d * f * z^2 - 73728 * a^2 * b^{16} * c^7 * d * f * z^2 + \\
& 4108320768 * a^{10} * b^3 * c^{12} * d * j * z^2 - 1207959552 * a^{10} * b * c^{14} * e * g * z^2 - 5788139 \\
& 52 * a^{12} * b * c^{12} * h * j * z^2 + 3246391296 * a^{10} * b^6 * c^9 * g * k * z^2 - 402653184 * a^{11} * b \\
& * c^{13} * g * i * z^2 + 3019898880 * a^{12} * b^2 * c^{11} * g * k * z^2 - 440401920 * a^{10} * b * c^{14} * f^ \\
& 2 * z^2 - 188743680 * a^{11} * b * c^{13} * h^2 * z^2 + 1761607680 * a^{10} * c^{15} * d * f * z^2 - 6553 \\
& 60 * a^6 * b^{18} * c * k^2 * z^2 - 94464 * a * b^{17} * c^7 * d^2 * z^2 + 6936330240 * a^8 * b^3 * c^{14} * \\
& d^2 * z^2 + 2464874496 * a^6 * b^7 * c^{12} * d^2 * z^2 - 3963617280 * a^9 * b * c^{15} * d^2 * z^2 + \\
& 58007224320 * a^{13} * b^4 * c^8 * k^2 * z^2 + 14968422400 * a^{11} * b^8 * c^6 * k^2 * z^2 + 8053 \\
& 06368 * a^{11} * c^{14} * e * i * z^2 - 35966156800 * a^{12} * b^6 * c^7 * k^2 * z^2 + 419430400 * a^{12} \\
& * c^{13} * f * j * z^2 - 1509949440 * a^9 * b^2 * c^{14} * e^2 * z^2 + 251658240 * a^{11} * c^{14} * f * h * z \\
& ^2 - 56874762240 * a^{14} * b^2 * c^9 * k^2 * z^2 - 5400428544 * a^7 * b^5 * c^{13} * d^2 * z^2 + 8 \\
& 90470400 * a^9 * b^{12} * c^4 * k^2 * z^2 + 754974720 * a^8 * b^4 * c^{13} * e^2 * z^2 - 730054656 * \\
& a^5 * b^9 * c^{11} * d^2 * z^2 + 477102080 * a^{12} * b^3 * c^{10} * j^2 * z^2 + 477102080 * a^9 * b^3 * \\
& c^{13} * f^2 * z^2 - 377487360 * a^9 * b^4 * c^{12} * g^2 * z^2 + 301989888 * a^{10} * b^2 * c^{13} * g^2 \\
& * z^2 - 174325760 * a^{11} * b^5 * c^9 * j^2 * z^2 - 126156800 * a^8 * b^{14} * c^3 * k^2 * z^2 + 18 \\
& 8743680 * a^8 * b^6 * c^{11} * g^2 * z^2 + 141557760 * a^{10} * b^3 * c^{12} * h^2 * z^2 - 174325760 * \\
& a^8 * b^5 * c^{12} * f^2 * z^2 - 188743680 * a^7 * b^6 * c^{12} * e^2 * z^2 - 4350935040 * a^{10} * b^1 \\
& 0 * c^5 * k^2 * z^2 + 146165760 * a^4 * b^{11} * c^{10} * d^2 * z^2 - 50331648 * a^{10} * b^4 * c^{11} * i^ \\
& 2 * z^2 + 11796480 * a^7 * b^{16} * c^2 * k^2 * z^2 - 33554432 * a^{11} * b^2 * c^{12} * i^2 * z^2 + 11 \\
& 206656 * a^{10} * b^7 * c^8 * j^2 * z^2 + 8929280 * a^9 * b^9 * c^7 * j^2 * z^2 + 20971520 * a^9 * b^ \\
& 6 * c^{10} * i^2 * z^2 - 2600960 * a^8 * b^{11} * c^6 * j^2 * z^2 + 291840 * a^7 * b^{13} * c^5 * j^2 * z^2 \\
& - 14080 * a^6 * b^{15} * c^4 * j^2 * z^2 + 256 * a^5 * b^{17} * c^3 * j^2 * z^2 - 47185920 * a^7 * b^8 \\
& * c^{10} * g^2 * z^2 - 26542080 * a^8 * b^7 * c^{10} * h^2 * z^2 - 2752512 * a^7 * b^{10} * c^8 * i^2 * z^ \\
& 2 + 2621440 * a^8 * b^8 * c^9 * i^2 * z^2 + 524288 * a^6 * b^{12} * c^7 * i^2 * z^2 - 32768 * a^5 * b \\
& ^{14} * c^6 * i^2 * z^2 + 9584640 * a^7 * b^9 * c^9 * h^2 * z^2 - 2359296 * a^9 * b^5 * c^{11} * h^2 * z^ \\
& 2 - 1290240 * a^6 * b^{11} * c^8 * h^2 * z^2 + 46080 * a^5 * b^{13} * c^7 * h^2 * z^2 + 2304 * a^4 * b^ \\
& 15 * c^6 * h^2 * z^2 + 5898240 * a^6 * b^{10} * c^9 * g^2 * z^2 - 294912 * a^5 * b^{12} * c^8 * g^2 * z^2 \\
& + 11206656 * a^7 * b^7 * c^{11} * f^2 * z^2 + 8929280 * a^6 * b^9 * c^{10} * f^2 * z^2 + 23592960 * \\
& a^6 * b^8 * c^{11} * e^2 * z^2 - 2600960 * a^5 * b^{11} * c^9 * f^2 * z^2 + 291840 * a^4 * b^{13} * c^8 * f \\
& ^2 * z^2 - 14080 * a^3 * b^{15} * c^7 * f^2 * z^2 + 256 * a^2 * b^{17} * c^6 * f^2 * z^2 - 19860480 * a \\
& ^3 * b^{13} * c^9 * d^2 * z^2 - 1179648 * a^5 * b^{10} * c^{10} * e^2 * z^2 + 1771776 * a^2 * b^{15} * c^8 * \\
& d^2 * z^2 - 440401920 * a^{13} * b * c^{11} * j^2 * z^2 + 1207959552 * a^{10} * c^{15} * e^2 * z^2 + 13 \\
& 4217728 * a^{12} * c^{13} * i^2 * z^2 + 25769803776 * a^{15} * c^{10} * k^2 * z^2 + 16384 * a^5 * b^{20} * \\
& k^2 * z^2 + 2304 * b^{19} * c^6 * d^2 * z^2 + 165150720 * a^9 * b * c^{12} * d * g * j * z + 23592960 * a \\
& ^{10} * b * c^{11} * g * h * j * z + 169869312 * a^7 * b * c^{14} * d * e * f * z + 99090432 * a^8 * b * c^{13} * d * g \\
& * h * z - 3145728 * a^9 * b * c^{12} * f * h * i * z + 56623104 * a^8 * b * c^{13} * d * f * i * z - 1536 * a * b^ \\
& 18 * c^3 * d * f * k * z - 9437184 * a^8 * b * c^{13} * e * f * h * z + 1536 * a * b^{15} * c^6 * d * f * i * z - 460 \\
& 8 * a * b^{14} * c^7 * d * f * g * z + 9216 * a * b^{13} * c^8 * d * e * f * z + 2173501440 * a^9 * b^5 * c^8 * d * j \\
& * k * z - 1987706880 * a^9 * b^3 * c^{10} * d * h * k * z + 1121255424 * a^8 * b^5 * c^9 * d * h * k * z + 8 \\
& 61143040 * a^8 * b^4 * c^{10} * d * f * k * z - 859963392 * a^7 * b^6 * c^9 * d * f * k * z - 780779520 * a \\
& ^8 * b^7 * c^7 * d * j * k * z - 754974720 * a^9 * b^3 * c^{10} * e * g * k * z + 2222456832 * a^{11} * b * c^1 \\
& 0 * d * j * k * z - 454164480 * a^{11} * b^3 * c^8 * h * j * k * z + 377487360 * a^8 * b^5 * c^9 * e * g * k * z \\
& + 290979840 * a^{10} * b^4 * c^8 * f * j * k * z + 381026304 * a^6 * b^8 * c^8 * d * f * k * z + 41287680
\end{aligned}$$



$0*a^8*b^2*c^{12}*d*e*j*z + 301989888*a^{10}*b^2*c^{10}*e*i*k*z - 320421888*a^7*b^7*c^8*d*h*k*z + 185794560*a^{10}*b^5*c^7*h*j*k*z - 192020480*a^9*b^6*c^7*f*j*k*z + 190709760*a^9*b^4*c^9*f*h*k*z - 150994944*a^{10}*b^3*c^9*g*i*k*z + 168990720*a^7*b^9*c^6*d*j*k*z + 235929600*a^9*b^2*c^{11}*d*f*k*z - 206438400*a^8*b^3*c^{11}*d*g*j*z - 206438400*a^7*b^4*c^{11}*d*e*j*z - 101646336*a^8*b^6*c^8*f*h*k*z - 29245440*a^9*b^7*c^6*h*j*k*z - 60817408*a^{11}*b^2*c^9*f*j*k*z + 57835520*a^8*b^8*c^6*f*j*k*z + 219414528*a^7*b^2*c^{13}*d*e*h*z - 70778880*a^{10}*b^2*c^{10}*f*h*k*z + 677376*a^7*b^{11}*c^4*h*j*k*z - 645120*a^8*b^9*c^5*h*j*k*z - 53760*a^6*b^{13}*c^3*h*j*k*z + 31457280*a^8*b^7*c^7*g*i*k*z - 62914560*a^8*b^6*c^8*e*i*k*z - 94371840*a^7*b^7*c^8*e*g*k*z - 221773824*a^6*b^3*c^{13}*d*e*f*z + 82575360*a^9*b^2*c^{11}*d*i*j*z + 11796480*a^{10}*b^2*c^{10}*h*i*j*z - 11796480*a^7*b^9*c^6*g*i*k*z - 8970240*a^7*b^{10}*c^5*f*j*k*z + 103219200*a^7*b^5*c^{10}*d*g*j*z - 2457600*a^8*b^6*c^8*h*i*j*z + 1769472*a^6*b^{11}*c^5*g*i*k*z + 921600*a^7*b^8*c^7*h*i*j*z + 673792*a^6*b^{12}*c^4*f*j*k*z - 138240*a^6*b^{10}*c^6*h*i*j*z - 98304*a^5*b^{13}*c^4*g*i*k*z - 17920*a^5*b^{14}*c^3*f*j*k*z + 7680*a^5*b^{12}*c^5*h*i*j*z - 97136640*a^5*b^{10}*c^7*d*f*k*z - 29491200*a^9*b^3*c^{10}*g*h*j*z + 58982400*a^9*b^2*c^{11}*e*h*j*z + 23592960*a^7*b^8*c^7*e*i*k*z - 22169088*a^6*b^{11}*c^5*d*j*k*z + 21381120*a^7*b^8*c^7*f*h*k*z + 14745600*a^8*b^5*c^9*g*h*j*z + 42854400*a^6*b^9*c^7*d*h*k*z - 109707264*a^7*b^3*c^{12}*d*g*h*z - 3686400*a^7*b^7*c^8*g*h*j*z - 3538944*a^6*b^{10}*c^6*e*i*k*z + 1645056*a^5*b^{13}*c^4*d*j*k*z - 890880*a^6*b^{10}*c^6*f*h*k*z + 460800*a^6*b^9*c^7*g*h*j*z - 330240*a^5*b^{12}*c^5*f*h*k*z + 196608*a^5*b^{12}*c^5*e*i*k*z - 53760*a^4*b^{15}*c^3*d*j*k*z + 46080*a^4*b^{14}*c^4*f*h*k*z - 23040*a^5*b^{11}*c^6*g*h*j*z - 1536*a^3*b^{16}*c^3*f*h*k*z - 29491200*a^8*b^4*c^{10}*e*h*j*z - 17203200*a^7*b^6*c^9*d*i*j*z + 11796480*a^6*b^9*c^7*e*g*k*z + 110886912*a^6*b^4*c^{12}*d*f*g*z + 7372800*a^7*b^6*c^9*e*h*j*z + 40108032*a^8*b^2*c^{12}*d*h*i*z + 6451200*a^6*b^8*c^8*d*i*j*z + 2359296*a^8*b^3*c^{11}*f*h*i*z - 967680*a^5*b^{10}*c^7*d*i*j*z - 921600*a^6*b^8*c^8*e*h*j*z - 829440*a^4*b^{13}*c^5*d*h*k*z - 589824*a^5*b^{11}*c^6*e*g*k*z - 491520*a^6*b^7*c^9*f*h*i*z + 184320*a^5*b^9*c^8*f*h*i*z + 105984*a^3*b^{15}*c^4*d*h*k*z + 69120*a^5*b^{11}*c^6*d*h*k*z + 53760*a^4*b^{12}*c^6*d*i*j*z + 46080*a^5*b^{10}*c^7*e*h*j*z - 27648*a^4*b^{11}*c^7*f*h*i*z - 4608*a^2*b^{17}*c^3*d*h*k*z + 1536*a^3*b^{13}*c^6*f*h*i*z - 25804800*a^6*b^7*c^9*d*g*j*z - 88473600*a^6*b^4*c^{12}*d*e*h*z + 51609600*a^6*b^6*c^{10}*d*e*j*z - 84934656*a^7*b^2*c^{13}*d*f*g*z + 117964800*a^5*b^5*c^{12}*d*e*f*z + 15160320*a^4*b^{12}*c^6*d*f*k*z - 45613056*a^7*b^3*c^{12}*d*f*i*z + 44236800*a^6*b^5*c^{11}*d*g*h*z - 10321920*a^6*b^6*c^{10}*d*h*i*z + 7077888*a^7*b^4*c^{11}*d*h*i*z - 5898240*a^7*b^4*c^{11}*f*g*h*z + 4718592*a^8*b^2*c^{12}*f*g*h*z + 3225600*a^5*b^9*c^8*d*g*j*z + 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 + 117964800*a^7*b^3*c^{12}*e*f*h*z + 88473600*a^5*b^7*c^{10}*d*f*i*z - 66355200*a^5*b^7*c^{10}*d*g*h*z - 64512000*a^5*b^8*c^9*d*e*j*z - 58982400*a^6*b^5*c^{11}*e*f*h*z - 38092800*a^4*b^9*c^9*d*f*i*z + 235929600*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^8*c^{10}*d*e*j*z - 276480*a^4*b^9*c^9*d*g*h*z - 184320*a^4*b^9*c^9*e*f*h*z + 179712*a^3*b^{11}*c^8*d*g*h*z - 55296*a^2*b^{13}*c^7*d*f*i*z - 13824*a^2*b^{13}*c^7*d*g*h*z + 9216*a^3*b^{11}*c^8*e*f*h*z + 16220160*a^4*b^8*c^{10}*d*f*g*z + 13271040*a^5*b^6*c^{11}*d*e*h*z - 2396160*a^3*b^{10}*c^9*d*f*g*z + 552960*a^4*b^8*c^{10}*d*e*h*z - 359424*a^3*b^{10}*c^9*d*e*h*z + 175104*a^2*b^{12}*c^8*d*f*g*z + 27648*a^2*b^{12}*c^8*d*e*h*z - 32440320*a^4*b^7*c^{11}*d*e*f*z + 4792320*a^3*b^9*c^{10}*d*e*f*z - 350208*a^2*b^{11}*c^9*d*e*f*z + 1439170560*a^{10}*b*c^{11}*d*h*k*z - 3361603584*a^{10}*b^3*c^9*d*j*k*z + 603979776*a^{10}*b*c^{11}*e*g*k*z + 407371776*a^{12}*b*c^9*h*j*k*z + 201326592*a^{11}*b*c^{10}*g*i*k*z + 346816512*a^7*b*c^{14}*d^2*g*z + 129761280*a^{11}*b*c^{10}*h^2*k*z + 121896960*a^{10}*b*c^{11}*f^2*k*z + 458752*a^6*b^{15}*c*i*k^2*z + 19660800*a^{11}*b*c^{10}*g*j^2*z + 49152*a^5*b^{16}*c*g*k^2*z + 7077888*a^9*b*c^{12}*g*h^2*z + 94464*a*b^{17}*c^4*d^2*k*z - 19660800*a^8*b*c^{13}*f^2*g*z - 66816*a*b^{14}*c^7*d^2*i*z + 214272*a*b^{13}*c^8*d^2*g*z - 428544*a*b^{12}*c^9*d^2*e*z + 2390753280*a^{11}*b^4*c^7*g*k^2*z - 2411421696*a^6*b^7*c^9*d^2*k*z - 6603079680*a^8*b^3*c^{11}*d^2*k*z + 3715891200*a^9*b*c^{12}*d^2*k*z - 880803840*a^{10}*c^{12}*d*f*k*z - 1623195648*a^{10}*b^6*c^6*g*k^2*z - 402653184*a^{11}*c^{11}*e*i*k*z - 1509949440*a^{12}*b^2*c^8*g*k^2*z - 209715200*a^{12}*c^{10}*f*j*k*z - 330301440*a^9*c^{13}*d*e*j*z + 3019898880*a^{12}*b*c^9*e*k^2*z - 125829120*a^{11}*c^{11}*f*h*k*z - 110100480*a^{10}*c^{12}*d*i*j*z - 198180864*a^8*c^{14}*d*e*h*z - 15728640*a^{11}*c^{11}*h*i*j*z - 1226833920*a^9*b^7*c^6*e*k^2*z - 47185920*a^{10}*c^{12}*e*h*j*z - 66060288*a^9*c^{13}*d*h*i*z - 1090519040*a^{12}*b^3*c^7*i*k^2*z + 1022754816*a^6*b^2*c^{14}*d^2*e*z + 5216108544*a^7*b^5*c^{10}*d^2*k*z + 754974720*a^9*b^2*c^{11}*e^2*k*z + 721529856*a^5*b^9*c^8*d^2*k*z + 613416960*a^9*b^8*c^5*g*k^2*z - 642318336*a^5*b^4*c^{13}*d^2*e*z - 4781506560*a^{11}*b^3*c^8*e*k^2*z - 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 - 139591680*a^8*b^{10}*c^4*g*k^2*z - 49766400*a^{10}*b^7*c^5*j^2*k*z - 145463040*a^4*b^{11}*c^7*d^2*k*z - 94371840*a^8*b^6*c^8*g^2*k*z + 223395840*a^4*b^6*c^{12}*d^2*e*z + 33751040*a^8*b^{11}*c^3*i*k^2*z - 78970880*a^9*b^3*c^{10}*f^2*k*z + 94371840*a^7*b^6*c^9*e^2*k*z + 25165824*a^{10}*b^4*c^8*i^2*k*z + 6220800*a^9*b^9*c^4*j^2*k*z + 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 - 1520640*a^7*b^9*c^6*h^2*k*z - 1105920*a^8*b^7*c^7*h^2*k*z + 849920*a^8*b^8*c^6*i*j^2*z - 393216*a^{10}*b^4*c^8*i*j^2*z + 195840*a^6*b^{11}*c^5*h^2*k*z - 145920*a^7*b^{10}*c^5*i*j^2*z + 11520*a^5*b^{13}*c^4*h^2*k*z + 11008*a^6*b^{12}*c^4*i*j^2*z - 2304*a^4*b^{15}*c^3*h^2*k*z - 256*a^5*b^{14}*c^3*i*j^2$

$\begin{aligned}
& *z - 25362432*a^{10}*b^3*c^9*g*j^2*z - 24739840*a^8*b^5*c^9*f^2*k*z - 3833856 \\
& 0*a^7*b^{11}*c^4*e*k^2*z - 2949120*a^6*b^{10}*c^6*g^2*k*z - 1474560*a^6*b^{14}*c^ \\
& 2*g*k^2*z + 50724864*a^{10}*b^2*c^{10}*e*j^2*z + 147456*a^5*b^{12}*c^5*g^2*k*z - \\
& 15150080*a^6*b^9*c^7*f^2*k*z + 13271040*a^9*b^5*c^8*g*j^2*z - 111697920*a^4 \\
& *b^7*c^{11}*d^2*g*z - 3563520*a^8*b^7*c^7*g*j^2*z + 3538944*a^9*b^2*c^{11}*h^2* \\
& i*z + 2912000*a^5*b^{11}*c^6*f^2*k*z - 737280*a^7*b^6*c^9*h^2*i*z + 506880*a^ \\
& 7*b^9*c^6*g*j^2*z - 291840*a^4*b^{13}*c^5*f^2*k*z + 276480*a^6*b^8*c^8*h^2*i* \\
& z - 41472*a^5*b^{10}*c^7*h^2*i*z - 34560*a^6*b^{11}*c^5*g*j^2*z + 14080*a^3*b^1 \\
& 5*c^4*f^2*k*z + 2304*a^4*b^{12}*c^6*h^2*i*z + 768*a^5*b^{13}*c^4*g*j^2*z - 256* \\
& a^2*b^{17}*c^3*f^2*k*z - 11796480*a^6*b^8*c^8*e^2*k*z - 26542080*a^9*b^4*c^9* \\
& e*j^2*z + 19837440*a^3*b^{13}*c^6*d^2*k*z + 2949120*a^6*b^{13}*c^3*e*k^2*z + 58 \\
& 9824*a^5*b^{10}*c^7*e^2*k*z - 98304*a^5*b^{15}*c^2*e*k^2*z - 10354688*a^8*b^2*c \\
& ^{12}*f^2*i*z - 43646976*a^6*b^4*c^{12}*d^2*i*z - 8847360*a^8*b^3*c^{11}*g*h^2*z \\
& + 7127040*a^8*b^6*c^8*e*j^2*z + 4423680*a^7*b^5*c^{10}*g*h^2*z + 2048000*a^6* \\
& b^6*c^{10}*f^2*i*z - 1771776*a^2*b^{15}*c^5*d^2*k*z - 1105920*a^6*b^7*c^9*g*h^2 \\
& *z - 1013760*a^7*b^8*c^7*e*j^2*z - 849920*a^5*b^8*c^9*f^2*i*z + 393216*a^7* \\
& b^4*c^{11}*f^2*i*z + 145920*a^4*b^{10}*c^8*f^2*i*z + 138240*a^5*b^9*c^8*g*h^2*z \\
& + 69120*a^6*b^{10}*c^6*e*j^2*z - 11008*a^3*b^{12}*c^7*f^2*i*z - 6912*a^4*b^{11}* \\
& c^7*g*h^2*z - 1536*a^5*b^{12}*c^5*e*j^2*z + 256*a^2*b^{14}*c^6*f^2*i*z - 325877 \\
& 76*a^5*b^6*c^{11}*d^2*i*z + 25362432*a^7*b^3*c^{12}*f^2*g*z + 21657600*a^4*b^8* \\
& c^{10}*d^2*i*z + 17694720*a^8*b^2*c^{12}*e*h^2*z - 50724864*a^7*b^2*c^{13}*e*f^2* \\
& z - 13271040*a^6*b^5*c^{11}*f^2*g*z - 8847360*a^7*b^4*c^{11}*e*h^2*z - 5810688* \\
& a^3*b^{10}*c^9*d^2*i*z + 3563520*a^5*b^7*c^{10}*f^2*g*z + 2211840*a^6*b^6*c^{10}* \\
& e*h^2*z + 845568*a^2*b^{12}*c^8*d^2*i*z - 506880*a^4*b^9*c^9*f^2*g*z - 276480 \\
& *a^5*b^8*c^9*e*h^2*z + 34560*a^3*b^{11}*c^8*f^2*g*z + 13824*a^4*b^{10}*c^8*e*h^ \\
& 2*z - 768*a^2*b^{13}*c^7*f^2*g*z + 26542080*a^6*b^4*c^{12}*e*f^2*z + 23362560*a \\
& ^3*b^9*c^{10}*d^2*g*z - 46725120*a^3*b^8*c^{11}*d^2*e*z - 7127040*a^5*b^6*c^{11}* \\
& e*f^2*z - 2965248*a^2*b^{11}*c^9*d^2*g*z + 1013760*a^4*b^8*c^{10}*e*f^2*z - 691 \\
& 20*a^3*b^{10}*c^9*e*f^2*z + 1536*a^2*b^{12}*c^8*e*f^2*z + 5930496*a^2*b^{10}*c^{10} \\
& *d^2*e*z + 1006632960*a^{13}*b*c^8*i*k^2*z + 3246391296*a^{10}*b^5*c^7*e*k^2*z \\
& + 318504960*a^{13}*b*c^8*j^2*k*z + 61538304*a^{10}*b^{10}*c^2*k^3*z - 603979776*a \\
& ^{10}*c^{12}*e^2*k*z - 693633024*a^7*c^{15}*d^2*e*z - 231211008*a^8*c^{14}*d^2*i*z \\
& - 67108864*a^{12}*c^{10}*i^2*k*z - 13107200*a^{12}*c^{10}*i*j^2*z - 16384*a^5*b^{17}* \\
& i*k^2*z - 39321600*a^{11}*c^{11}*e*j^2*z - 4718592*a^{10}*c^{12}*h^2*i*z - 2304*b^1 \\
& 9*c^3*d^2*k*z + 13107200*a^9*c^{13}*f^2*i*z + 2304*b^{16}*c^6*d^2*i*z - 1415577 \\
& 6*a^9*c^{13}*e*h^2*z + 39321600*a^8*c^{14}*e*f^2*z - 4833280*a^9*b^{12}*c*k^3*z - \\
& 6912*b^{15}*c^7*d^2*g*z + 6962544640*a^{14}*b^2*c^6*k^3*z + 13824*b^{14}*c^8*d^2 \\
& *e*z + 1876951040*a^{12}*b^6*c^4*k^3*z - 4844421120*a^{13}*b^4*c^5*k^3*z - 4377 \\
& 80480*a^{11}*b^8*c^3*k^3*z - 4294967296*a^{15}*c^7*k^3*z + 163840*a^8*b^{14}*k^3* \\
& z + 6144000*a^{10}*b*c^8*f*i*j*k - 5898240*a^{10}*b*c^8*g*h*j*k - 41287680*a^9* \\
& b*c^9*d*g*j*k + 4472832*a^9*b*c^9*f*h*i*k + 18432000*a^9*b*c^9*e*f*j*k + 33 \\
& 91488*a^8*b*c^{10}*e*h*i*j + 1228800*a^8*b*c^{10}*f*g*i*j - 24772608*a^8*b*c^{10} \\
& *d*g*h*k + 13418496*a^8*b*c^{10}*e*f*h*k + 11649024*a^8*b*c^{10}*d*f*i*k + 7372 \\
& 80*a^7*b*c^{11}*f*g*h*i - 768*a*b^{15}*c^3*d*f*i*k - 19307520*a^7*b*c^{11}*d*f*h* \\
& j + 16367616*a^7*b*c^{11}*d*e*i*j + 3686400*a^7*b*c^{11}*e*f*g*j + 34947072*a^7
\end{aligned}$

$$\begin{aligned}
& *b*c^{11}*d*e*f*k + 2304*a*b^{14}*c^4*d*f*g*k - 180*a*b^{13}*c^5*d*f*h*j + 110592 \\
& 00*a^6*b*c^{12}*d*e*h*i + 5160960*a^6*b*c^{12}*d*f*g*i + 2211840*a^6*b*c^{12}*e*f \\
& *g*h - 4608*a*b^{13}*c^5*d*e*f*k - 2304*a*b^{11}*c^7*d*f*g*i + 4608*a*b^{10}*c^8* \\
& d*e*f*i + 15482880*a^5*b*c^{13}*d*e*f*g - 13824*a*b^9*c^9*d*e*f*g - 225976320 \\
& *a^8*b^2*c^9*d*e*j*k + 112988160*a^8*b^3*c^8*d*g*j*k - 11427840*a^{10}*b^2*c^ \\
& 7*h*i*j*k - 4177920*a^9*b^4*c^6*h*i*j*k + 1399296*a^8*b^6*c^5*h*i*j*k - 268 \\
& 80*a^6*b^{10}*c^3*h*i*j*k + 16128*a^7*b^8*c^4*h*i*j*k - 61562880*a^9*b^2*c^8* \\
& d*i*j*k + 20090880*a^9*b^3*c^7*g*h*j*k + 119623680*a^7*b^4*c^8*d*e*j*k + 10 \\
& 485760*a^9*b^3*c^7*f*i*j*k - 40181760*a^9*b^2*c^8*e*h*j*k - 3778560*a^8*b^5 \\
& *c^6*g*h*j*k - 137797632*a^7*b^2*c^{10}*d*e*h*k - 1248768*a^7*b^7*c^5*f*i*j*k \\
& + 229376*a^6*b^9*c^4*f*i*j*k + 220160*a^8*b^5*c^6*f*i*j*k - 209664*a^7*b^7 \\
& *c^5*g*h*j*k + 80640*a^6*b^9*c^4*g*h*j*k - 8960*a^5*b^{11}*c^3*f*i*j*k - 5981 \\
& 1840*a^7*b^5*c^7*d*g*j*k + 53084160*a^8*b^2*c^9*e*g*i*k - 11120640*a^8*b^4* \\
& c^7*f*g*j*k + 10455552*a^7*b^6*c^6*d*i*j*k - 9216000*a^9*b^2*c^8*f*g*j*k + \\
& 7557120*a^8*b^4*c^7*e*h*j*k + 7397376*a^8*b^3*c^8*f*h*i*k + 5230080*a^7*b^6 \\
& *c^6*f*g*j*k - 37675008*a^8*b^2*c^9*d*h*i*k - 3633408*a^6*b^8*c^5*d*i*j*k + \\
& 2211840*a^8*b^4*c^7*d*i*j*k + 68898816*a^7*b^3*c^9*d*g*h*k - 1695744*a^8*b \\
& ^2*c^9*g*h*i*j - 1400832*a^7*b^4*c^8*g*h*i*j + 967680*a^7*b^5*c^7*f*h*i*k - \\
& 783360*a^6*b^7*c^6*f*h*i*k - 741888*a^6*b^8*c^5*f*g*j*k + 499968*a^5*b^{10}* \\
& c^4*d*i*j*k + 419328*a^7*b^6*c^6*e*h*j*k - 253440*a^6*b^6*c^7*g*h*i*j - 161 \\
& 280*a^6*b^8*c^5*e*h*j*k + 42240*a^5*b^9*c^5*f*h*i*k + 26880*a^5*b^{10}*c^4*f* \\
& g*j*k - 26880*a^4*b^{12}*c^3*d*i*j*k + 13824*a^4*b^{11}*c^4*f*h*i*k + 11520*a^5 \\
& *b^8*c^6*g*h*i*j - 768*a^3*b^{13}*c^3*f*h*i*k + 22241280*a^8*b^3*c^8*e*f*j*k \\
& + 14222592*a^6*b^7*c^6*d*g*j*k - 10460160*a^7*b^5*c^7*e*f*j*k + 8847360*a^7 \\
& *b^4*c^8*e*g*i*k - 7741440*a^7*b^4*c^8*f*g*h*k - 7077888*a^6*b^6*c^7*e*g*i* \\
& k + 6935040*a^6*b^6*c^7*d*h*i*k - 6709248*a^8*b^2*c^9*f*g*h*k - 3612672*a^7 \\
& *b^4*c^8*d*h*i*k + 2801664*a^7*b^3*c^9*e*h*i*j + 2506752*a^7*b^3*c^9*f*g*i* \\
& j + 2419200*a^6*b^6*c^7*f*g*h*k - 1661184*a^5*b^9*c^5*d*g*j*k + 1483776*a^6 \\
& *b^7*c^6*e*f*j*k - 1463040*a^5*b^8*c^6*d*h*i*k + 884736*a^5*b^8*c^6*e*g*i*k \\
& + 838656*a^6*b^5*c^8*f*g*i*j + 506880*a^6*b^5*c^8*e*h*i*j + 80640*a^4*b^{11} \\
& *c^4*d*g*j*k - 53760*a^5*b^9*c^5*e*f*j*k - 53760*a^5*b^7*c^7*f*g*i*j - 4608 \\
& 0*a^4*b^{10}*c^5*f*g*h*k - 34560*a^5*b^8*c^6*f*g*h*k + 25344*a^3*b^{12}*c^4*d*h \\
& *i*k - 23040*a^5*b^7*c^7*e*h*i*j + 13824*a^4*b^{10}*c^5*d*h*i*k + 2304*a^3*b^ \\
& 12*c^4*f*g*h*k - 2304*a^2*b^{14}*c^3*d*h*i*k - 29030400*a^6*b^5*c^8*d*g*h*k + \\
& 28606464*a^7*b^3*c^9*d*f*i*k - 28445184*a^6*b^6*c^7*d*e*j*k + 58060800*a^6 \\
& *b^4*c^9*d*e*h*k + 15482880*a^7*b^3*c^9*e*f*h*k - 8183808*a^7*b^2*c^{10}*d*g* \\
& i*j - 6718464*a^6*b^5*c^8*d*f*i*k - 5087232*a^7*b^2*c^{10}*e*g*h*j - 5013504* \\
& a^7*b^2*c^{10}*e*f*i*j - 4838400*a^6*b^5*c^8*e*f*h*k + 4112640*a^5*b^7*c^7*d* \\
& g*h*k - 3663360*a^5*b^7*c^7*d*f*i*k + 3322368*a^5*b^8*c^6*d*e*j*k - 2285568 \\
& *a^6*b^4*c^9*d*g*i*j + 1896960*a^4*b^9*c^6*d*f*i*k + 1843200*a^6*b^3*c^{10}*f \\
& *g*h*i - 1677312*a^6*b^4*c^9*e*f*i*j - 1658880*a^6*b^4*c^9*e*g*h*j + 683458 \\
& 56*a^6*b^3*c^{10}*d*e*f*k + 783360*a^5*b^5*c^9*f*g*h*i + 741888*a^5*b^6*c^8*d \\
& *g*i*j - 34172928*a^6*b^4*c^9*d*f*g*k - 340992*a^3*b^{11}*c^5*d*f*i*k - 16128 \\
& 0*a^4*b^{10}*c^5*d*e*j*k + 138240*a^4*b^9*c^6*d*g*h*k + 107520*a^5*b^6*c^8*e* \\
& f*i*j + 92160*a^4*b^9*c^6*e*f*h*k - 89856*a^3*b^{11}*c^5*d*g*h*k - 80640*a^4*
\end{aligned}$$

$$\begin{aligned}
& b^8c^7d^*g^*i^*j + 69120a^5b^7c^7e^*f^*h^*k + 69120a^5b^6c^8e^*g^*h^*j + 2 \\
& 7648a^2b^{13}c^4d^*f^*i^*k + 18432a^4b^7c^8f^*g^*h^*i + 6912a^2b^{13}c^4d^* \\
& *g^*h^*k - 4608a^3b^{11}c^5e^*f^*h^*k - 2304a^3b^9c^7f^*g^*h^*i + 27164160a^5 \\
& b^6c^8d^*f^*g^*k - 22164480a^6b^3c^{10}d^*f^*h^*j - 54328320a^5b^5c^9d^* \\
& e^*f^*k - 17473536a^7b^2c^{10}d^*f^*g^*k - 8225280a^5b^6c^8d^*e^*h^*k - 80870 \\
& 40a^4b^8c^7d^*f^*g^*k + 5677056a^6b^3c^{10}e^*f^*g^*j - 5529600a^6b^2c^1 \\
& 1d^*g^*h^*i + 4571136a^6b^3c^{10}d^*e^*i^*j - 3686400a^6b^2c^{11}e^*f^*h^*i + 2 \\
& 805120a^5b^5c^9d^*f^*h^*j - 2211840a^5b^4c^{10}d^*g^*h^*i - 1566720a^5b^4 \\
& c^{10}e^*f^*h^*i - 1483776a^5b^5c^9d^*e^*i^*j + 1198080a^3b^{10}c^6d^*f^*g^*k \\
& + 437184a^4b^7c^8d^*f^*h^*j - 322560a^5b^5c^9e^*f^*g^*j + 317952a^4b^6c^9 \\
& d^*g^*h^*i - 276480a^4b^8c^7d^*e^*h^*k + 179712a^3b^{10}c^6d^*e^*h^*k + 16 \\
& 1280a^4b^7c^8d^*e^*i^*j - 146268a^3b^9c^7d^*f^*h^*j - 87552a^2b^{12}c^5d^* \\
& f^*g^*k - 36864a^4b^6c^9e^*f^*h^*i - 13824a^2b^{12}c^5d^*e^*h^*k + 9360a^2 \\
& b^{11}c^6d^*f^*h^*j + 6912a^3b^8c^8d^*g^*h^*i - 6912a^2b^{10}c^7d^*g^*h^*i + \\
& 4608a^3b^8c^8e^*f^*h^*i - 24551424a^6b^2c^{11}d^*e^*g^*j + 16174080a^4b^7 \\
& c^8d^*e^*f^*k + 5419008a^5b^4c^{10}d^*e^*g^*j + 5160960a^5b^3c^{11}d^*f^*g^*i \\
& + 4423680a^5b^3c^{11}e^*f^*g^*h + 4423680a^5b^3c^{11}d^*e^*h^*i - 2396160a^3 \\
& b^9c^7d^*e^*f^*k - 635904a^4b^5c^{10}d^*e^*h^*i - 483840a^4b^6c^9d^*e^*g^*j \\
& - 354816a^3b^7c^9d^*f^*g^*i + 322560a^4b^5c^{10}d^*f^*g^*i + 175104a^2b^ \\
& 11c^6d^*e^*f^*k + 138240a^4b^5c^{10}e^*f^*g^*h + 59904a^2b^9c^8d^*f^*g^*i - \\
& 13824a^3b^7c^9e^*f^*g^*h - 13824a^3b^7c^9d^*e^*h^*i + 13824a^2b^9c^8d^* \\
& e^*h^*i - 16588800a^5b^2c^{12}d^*e^*g^*h - 10321920a^5b^2c^{12}d^*e^*f^*i + 16 \\
& 58880a^4b^4c^{11}d^*e^*g^*h + 709632a^3b^6c^{10}d^*e^*f^*i - 645120a^4b^4c^ \\
& ^{11}d^*e^*f^*i + 124416a^3b^6c^{10}d^*e^*g^*h - 119808a^2b^8c^9d^*e^*f^*i - 41 \\
& 472a^2b^8c^9d^*e^*g^*h + 7741440a^4b^3c^{12}d^*e^*f^*g - 2903040a^3b^5c^ \\
& ^{11}d^*e^*f^*g + 387072a^2b^7c^{10}d^*e^*f^*g - 381026304a^{11}b^*c^7d^*j^*k^2 - 2 \\
& 41827840a^{10}b^*c^8d^*h^*k^2 - 65667072a^{12}b^*c^6h^*j^*k^2 - 169344a^7b^11 \\
& *c^*h^*j^*k^2 - 25165824a^{11}b^*c^7g^*i^*k^2 - 4915200a^{11}b^*c^7g^*j^2*k - 530 \\
& 84160a^8b^*c^{10}e^2*i^*k - 75497472a^{10}b^*c^8e^*g^*k^2 - 86704128a^7b^*c^1 \\
& 1d^2*g^*k + 565248a^9b^*c^9h^*i^2*j - 168448a^6b^12c^*f^*j^*k^2 - 24576a^ \\
& 5b^13c^*g^*i^*k^2 - 1769472a^9b^*c^9g^*h^2*k - 17694720a^9b^*c^9e^*i^2*k - \\
& 411264a^5b^13c^*d^*j^*k^2 - 11520a^4b^14c^*f^*h^*k^2 + 4915200a^8b^*c^10 \\
& f^2*g^*k + 2580480a^9b^*c^9e^*i^*j^2 - 2496000a^9b^*c^9f^*h^*j^2 - 1543680a^ \\
& ^8b^*c^10f^*h^2*j + 33408a^*b^14c^4d^2*i^*k - 59512320a^6b^*c^12d^2*f^*j \\
& + 5087232a^7b^*c^11e^2*h^*j + 2727936a^8b^*c^10d^*i^2*j - 26496a^3b^15 \\
& c^*d^*h^*k^2 + 1105920a^7b^*c^11e^*h^2*i - 107136a^*b^13c^5d^2*g^*k + 10260 \\
& a^*b^12c^6d^2*h^*j - 10616832a^6b^*c^12e^2*g^*i - 3538944a^7b^*c^11e^*g^*i \\
& ^2 + 1843200a^7b^*c^11d^*h^*i^2 - 18432a^2b^16c^*d^*f^*k^2 - 15552000a^8b^* \\
& c^10d^*f^*j^2 + 24551424a^6b^*c^12d^*e^2*j - 37062144a^5b^*c^13d^2*f^*h + \\
& 2580480a^6b^*c^12e^*f^2*i + 214272a^*b^12c^6d^2*e^*k + 65664a^*b^10c^8 \\
& d^2*g^*i - 25074a^*b^11c^7d^2*f^*j + 420a^*b^12c^6d^*f^2*j + 6a^*b^15c^3 \\
& d^*f^*j^2 + 23224320a^5b^*c^13d^2*e^*i + 384a^*b^12c^6d^*f^*i^2 - 5985792a^ \\
& 6b^*c^12d^*f^*h^2 + 206010a^*b^9c^9d^2*f^*h - 131328a^*b^9c^9d^2*e^*i - 63 \\
& 00a^*b^10c^8d^*f^2*h + 1350a^*b^11c^7d^*f^*h^2 + 16588800a^5b^*c^13d^*e^2 \\
& *h + 3456a^*b^10c^8d^*f^*g^2 + 435456a^*b^8c^10d^2*e^*g + 13824a^*b^8c^10
\end{aligned}$$

$$\begin{aligned}
& *d^2e^2f + 3932160a^{11}c^8h^i*j^k + 27525120a^{10}c^9d^i*j^k + 82575360a^9c^{10}d^e*j^k + 11796480a^{10}c^9e^h*j^k + 16515072a^9c^{10}d^h*i^k + \\
& 49545216a^8c^{11}d^e*h^k - 2457600a^8c^{11}e^f*i^j - 1474560a^7c^{12}e^f*h^i - 10321920a^6c^{13}d^e*f^i + 737077248a^{10}b^3c^6d^j*k^2 - 5188147 \\
& 20a^9b^5c^5d^j*k^2 + 441354240a^9b^3c^7d^h*k^2 - 429871104a^6b^2c^{11}d^2e^k - 272212992a^8b^5c^6d^h*k^2 + 305731584a^5b^4c^{10}d^2e^k + \\
& 192412800a^8b^7c^4d^j*k^2 + 111912960a^{11}b^3c^5h^j*k^2 + 21493552a^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 +
\end{aligned}$$

$$\begin{aligned}
& 226560a^6b^{10}c^3f^2hk^2 - 147456a^5b^9c^5e^2i^2k - 121856a^6b^6c^7f^2i^2j + 82560a^5b^{12}c^2f^2hk^2 + 49152a^5b^{12}c^2e^2ik^2 - 17280a^5b^7c^7g^2h^2j + 8960a^5b^8c^6f^2i^2j + 14194944a^5b^6c^8d^2ik - 12718080a^8b^2c^9e^2h^2k - 10615680a^4b^8c^7d^2ik - 26542080a^6b^4c^9e^2g^2k - 23592960a^7b^7c^5e^2g^2k - 5142528a^8b^3c^8f^2h^2j + 5068800a^7b^2c^10f^2h^2j - 3755520a^7b^3c^9f^2h^2j + 3336192a^7b^3c^9f^2g^2k + 3000960a^6b^4c^9f^2h^2j + 2893824a^3b^{10}c^6d^2ik + 1720320a^8b^3c^8e^2ij^2 + 1704960a^6b^5c^8f^2g^2k - 1307520a^5b^7c^7f^2g^2k - 1085760a^6b^5c^8f^2h^2j - 959040a^7b^5c^7f^2h^2j + 829440a^7b^4c^8e^2h^2k - 552960a^7b^2c^10g^2h^2i - 552960a^6b^4c^9g^2h^2i + 449280a^6b^6c^7e^2h^2k - 422784a^2b^{12}c^5d^2ik + 253440a^4b^9c^6f^2g^2k + 161280a^7b^5c^7e^2ij^2 - 145152a^5b^6c^8g^2h^2i + 103200a^6b^7c^6f^2h^2j + 41280a^5b^6c^8f^2h^2j - 37188a^4b^8c^7f^2h^2j - 34560a^5b^8c^6e^2h^2k - 25344a^6b^7c^6e^2ij^2 - 17280a^3b^{11}c^5f^2g^2k + 13536a^5b^7c^7f^2h^2j - 6912a^4b^{10}c^5e^2h^2k + 5490a^4b^9c^6f^2h^2j - 3456a^4b^8c^7g^2h^2i + 1980a^3b^{10}c^6f^2h^2j + 810a^5b^9c^5f^2h^2j + 768a^5b^9c^5e^2ij^2 + 384a^2b^{13}c^4f^2g^2k - 270a^4b^{11}c^4f^2h^2j - 180a^3b^{11}c^5f^2h^2j - 30a^2b^{12}c^5f^2h^2j + 6a^3b^{13}c^3f^2h^2j + 30067200a^6b^2c^{11}d^2h^2j + 13271040a^6b^5c^8e^2g^2k - 10857600a^6b^9c^4d^2hk^2 + 2949120a^6b^9c^4e^2g^2k + 2654208a^5b^6c^8e^2g^2k + 2125824a^7b^3c^9d^2i^2j + 1658880a^6b^3c^{10}e^2h^2j - 1419264a^6b^4c^9f^2g^2j - 1327104a^5b^7c^7e^2g^2k - 921600a^7b^2c^{10}f^2g^2j - 737280a^7b^2c^{10}f^2h^2i - 568320a^6b^4c^9f^2h^2i + 207360a^4b^{13}c^2d^2hk^2 - 147456a^5b^{11}c^3e^2g^2k - 136704a^5b^6c^8f^2h^2i + 133632a^6b^5c^8d^2i^2j - 96768a^5b^7c^7d^2i^2j + 80640a^5b^6c^8f^2g^2j - 69120a^5b^5c^9e^2h^2j + 13440a^4b^9c^6d^2i^2j - 5760a^5b^{11}c^3d^2hk^2 - 2304a^4b^8c^7f^2h^2i + 384a^3b^{10}c^6f^2h^2i + 11930112a^8b^2c^9d^2h^2j - 11646720a^3b^9c^7d^2g^2k + 8432640a^7b^2c^{10}d^2h^2j + 24140160a^5b^{10}c^4d^2f^2k - 6672384a^7b^2c^{10}e^2f^2k + 4450176a^7b^4c^8d^2h^2j + 4337280a^6b^4c^9d^2h^2j - 3870720a^8b^2c^9e^2g^2j - 3409920a^6b^4c^9e^2f^2k - 2885760a^5b^4c^{10}d^2h^2j - 2844288a^4b^6c^9d^2h^2j + 2615040a^5b^6c^8e^2f^2k - 1687680a^6b^6c^7d^2h^2j + 1482624a^2b^{11}c^6d^2g^2k - 1290240a^6b^2c^{11}f^2g^2i + 1105920a^6b^3c^{10}e^2h^2i + 1019412a^3b^8c^8d^2h^2j - 1007424a^5b^6c^8d^2h^2j - 860160a^5b^4c^{10}f^2g^2i - 645120a^7b^4c^8e^2g^2j - 506880a^4b^8c^7e^2f^2k + 290304a^5b^5c^9e^2h^2i + 197460a^5b^8c^6d^2h^2j - 143802a^2b^{10}c^7d^2h^2j + 80640a^6b^6c^7e^2g^2j - 80640a^4b^6c^9f^2g^2i + 51948a^4b^8c^7d^2h^2j + 34560a^3b^{10}c^6e^2f^2k + 12672a^3b^8c^8f^2g^2i + 10800a^3b^{10}c^6d^2h^2j + 6912a^4b^7c^8e^2h^2i - 2304a^5b^8c^6e^2g^2j - 768a^2b^{12}c^5e^2f^2k - 684a^3b^{12}c^4d^2h^2j - 540a^2b^{12}c^5d^2h^2j - 384a^2b^{10}c^7f^2g^2i - 90a^4b^{10}c^5d^2h^2j + 18a^2b^{14}c^3d^2h^2j + 23385600a^6b^2c^{11}d^2f^2j + 23293440a^3b^8c^8d^2e^2k + 6137856a^6b^3c^{10}d^2g^2j - 5677056a^6b^2c^{11}e^2f^2j + 5308416a^6b^2c^{11}e^2g^2i - 5308416a^5b^3c^{11}
\end{aligned}$$

$$\begin{aligned}
& *e^2 * g^i - 3786240 * a^4 * b^{12} * c^3 * d * f * k^2 - 3538944 * a^6 * b^3 * c^{10} * e * g^i^2 + 26 \\
& 54208 * a^5 * b^4 * c^{10} * e * g^2 * i + 1658880 * a^6 * b^3 * c^{10} * d * h * i^2 - 1354752 * a^5 * b^5 \\
& * c^9 * d * g^2 * j - 1105920 * a^5 * b^4 * c^{10} * f * g^2 * h - 884736 * a^5 * b^5 * c^9 * e * g^i^2 - \\
& 552960 * a^6 * b^2 * c^{11} * f * g^2 * h + 357120 * a^3 * b^{14} * c^2 * d * f * k^2 + 322560 * a^5 * b^4 * \\
& c^{10} * e^2 * f * j + 262656 * a^5 * b^5 * c^9 * d * h * i^2 + 120960 * a^4 * b^7 * c^8 * d * g^2 * j - 55 \\
& 296 * a^4 * b^7 * c^8 * d * h * i^2 - 34560 * a^4 * b^6 * c^9 * f * g^2 * h + 3456 * a^3 * b^8 * c^8 * f * g^ \\
& 2 * h + 1152 * a^3 * b^9 * c^7 * d * h * i^2 + 1152 * a^2 * b^{11} * c^6 * d * h * i^2 - 13149696 * a^7 * b \\
& ^3 * c^9 * d * f * j^2 - 11612160 * a^5 * b^2 * c^{12} * d^2 * g^i + 10906560 * a^4 * b^5 * c^{10} * d^2 * \\
& f * j - 7418880 * a^5 * b^3 * c^{11} * d^2 * f * j + 3148992 * a^6 * b^5 * c^8 * d * f * j^2 - 2985696 * \\
& a^3 * b^7 * c^9 * d^2 * f * j - 2965248 * a^2 * b^{10} * c^7 * d^2 * e * k + 1720320 * a^5 * b^3 * c^{11} * e \\
& * f^2 * i - 1658880 * a^6 * b^2 * c^{11} * e * g * h^2 + 1596672 * a^3 * b^6 * c^{10} * d^2 * g^i - 1505 \\
& 280 * a^4 * b^6 * c^9 * d * f^2 * j - 829440 * a^5 * b^4 * c^{10} * e * g * h^2 - 508032 * a^2 * b^8 * c^9 * \\
& d^2 * g^i + 378954 * a^2 * b^9 * c^8 * d^2 * f * j + 362880 * a^5 * b^4 * c^{10} * d * f^2 * j + 296964 \\
& * a^3 * b^8 * c^8 * d * f^2 * j + 161280 * a^4 * b^5 * c^{10} * e * f^2 * i - 77070 * a^4 * b^9 * c^6 * d * f * \\
& j^2 - 30240 * a^5 * b^7 * c^7 * d * f * j^2 - 25344 * a^3 * b^7 * c^9 * e * f^2 * i - 20736 * a^4 * b^6 \\
& * c^9 * e * g * h^2 - 19278 * a^2 * b^{10} * c^7 * d * f^2 * j + 8820 * a^3 * b^{11} * c^5 * d * f * j^2 + 768 \\
& * a^2 * b^9 * c^8 * e * f^2 * i - 378 * a^2 * b^{13} * c^4 * d * f * j^2 - 5419008 * a^5 * b^3 * c^{11} * d * e^ \\
& 2 * j - 4423680 * a^5 * b^2 * c^{12} * e^2 * f * h + 4147200 * a^5 * b^3 * c^{11} * d * g^2 * h - 2580480 \\
& * a^6 * b^2 * c^{11} * d * f * i^2 - 967680 * a^5 * b^4 * c^{10} * d * f * i^2 + 483840 * a^4 * b^5 * c^{10} * d \\
& * e^2 * j - 414720 * a^4 * b^5 * c^{10} * d * g^2 * h - 138240 * a^4 * b^4 * c^{11} * e^2 * f * h + 64512 * \\
& a^4 * b^6 * c^9 * d * f * i^2 + 39168 * a^3 * b^8 * c^8 * d * f * i^2 - 31104 * a^3 * b^7 * c^9 * d * g^2 * h \\
& + 13824 * a^3 * b^6 * c^{10} * e^2 * f * h + 10368 * a^2 * b^9 * c^8 * d * g^2 * h - 9216 * a^2 * b^{10} * c \\
& ^7 * d * f * i^2 + 15630336 * a^5 * b^2 * c^{12} * d * f^2 * h - 14459904 * a^4 * b^3 * c^{12} * d^2 * f * h \\
& + 9630144 * a^3 * b^5 * c^{11} * d^2 * f * h - 8764416 * a^5 * b^3 * c^{11} * d * f * h^2 - 3870720 * a^5 \\
& * b^2 * c^{12} * e * f^2 * g - 3193344 * a^3 * b^5 * c^{11} * d^2 * e * i + 2867328 * a^4 * b^4 * c^{11} * d * f \\
& ^2 * h - 2095200 * a^2 * b^7 * c^{10} * d^2 * f * h - 1414080 * a^3 * b^6 * c^{10} * d * f^2 * h - 348364 \\
& 80 * a^4 * b^2 * c^{13} * d^2 * e * g + 1016064 * a^2 * b^7 * c^{10} * d^2 * e * i - 645120 * a^4 * b^4 * c^1 \\
& 1 * e * f^2 * g + 306720 * a^3 * b^7 * c^9 * d * f * h^2 + 197820 * a^2 * b^8 * c^9 * d * f^2 * h + 14688 \\
& 0 * a^4 * b^5 * c^{10} * d * f * h^2 + 80640 * a^3 * b^6 * c^{10} * e * f^2 * g - 55350 * a^2 * b^9 * c^8 * d * f \\
& * h^2 - 2304 * a^2 * b^8 * c^9 * e * f^2 * g - 3870720 * a^5 * b^2 * c^{12} * d * f * g^2 - 1935360 * a^ \\
& 4 * b^4 * c^{11} * d * f * g^2 - 1658880 * a^4 * b^3 * c^{12} * d * e^2 * h + 725760 * a^3 * b^6 * c^{10} * d * f \\
& * g^2 + 17418240 * a^3 * b^4 * c^{12} * d^2 * e * g - 124416 * a^3 * b^5 * c^{11} * d * e^2 * h - 96768 * \\
& a^2 * b^8 * c^9 * d * f * g^2 + 41472 * a^2 * b^7 * c^{10} * d * e^2 * h - 3919104 * a^2 * b^6 * c^{11} * d^2 \\
& * e * g - 7741440 * a^4 * b^2 * c^{13} * d * e^2 * f + 2903040 * a^3 * b^4 * c^{12} * d * e^2 * f - 387072 \\
& * a^2 * b^6 * c^{11} * d * e^2 * f - 681246720 * a^9 * b * c^9 * d^2 * k^2 + 265912320 * a^{11} * b^3 * c^ \\
& 5 * e * k^3 + 188743680 * a^{12} * b^2 * c^5 * g * k^3 - 132956160 * a^{11} * b^4 * c^4 * g * k^3 - 521 \\
& 01120 * a^{13} * b * c^5 * j^2 * k^2 + 25722880 * a^{12} * b^3 * c^4 * i * k^3 + 19644416 * a^{11} * b^5 * \\
& c^3 * i * k^3 - 1583680 * a^9 * b^9 * c * j^2 * k^2 - 9142272 * a^{10} * b^7 * c^2 * i * k^3 - 740229 \\
& 12 * a^{10} * b^5 * c^4 * e * k^3 - 20643840 * a^{11} * b * c^7 * h^2 * k^2 + 37011456 * a^{10} * b^6 * c^3 \\
& * g * k^3 - 2293760 * a^9 * b^3 * c^7 * i^3 * k - 557056 * a^8 * b^5 * c^6 * i^3 * k + 147456 * a^7 * \\
& b^7 * c^5 * i^3 * k - 65536 * a^6 * b^{12} * c * i^2 * k^2 + 32768 * a^6 * b^9 * c^4 * i^3 * k - 8192 * a \\
& ^5 * b^{11} * c^3 * i^3 * k + 430080 * a^{10} * b * c^8 * i^2 * j^2 - 2880 * a^5 * b^{13} * c * h^2 * k^2 + 6 \\
& 635520 * a^7 * b^4 * c^8 * g^3 * k - 4792320 * a^9 * b^8 * c^2 * g * k^3 - 2211840 * a^6 * b^6 * c^7 * \\
& g^3 * k + 1359360 * a^{10} * b^2 * c^7 * h * j^3 + 1173120 * a^9 * b^4 * c^6 * h * j^3 + 743040 * a^7 \\
& * b^4 * c^8 * h^3 * j + 622080 * a^8 * b^2 * c^9 * h^3 * j + 221184 * a^5 * b^8 * c^6 * g^3 * k + 1071
\end{aligned}$$



$$\begin{aligned}
& 36a^6b^6c^7h^3j - 32640a^8b^6c^5h^3j^3 - 5796a^7b^8c^4h^3j^3 + 5 \\
& 40a^5b^8c^6h^3j - 270a^4b^{10}c^5h^3j + 210a^6b^{10}c^3h^3j^3 - 29 \\
& 49120a^{10}b^6c^8f^2k^2 + 17694720a^6b^3c^{10}e^3k + 184320a^8b^6c^{10} \\
& h^2i^2 - 3520a^3b^{15}c^6f^2k^2 + 9584640a^9b^7c^3e^3k^3 - 2293760a^9 \\
& b^3c^7f^3j^3 - 2293760a^6b^3c^{10}f^3j - 1769472a^5b^5c^9e^3k - 8 \\
& 84736a^6b^3c^{10}g^3i - 589824a^7b^3c^9g^3i^3 - 491520a^8b^9c^2e^3 \\
& k^3 - 442368a^5b^5c^9g^3i - 294912a^6b^5c^8g^3i^3 - 199360a^8b^5c^6 \\
& f^3j^3 - 199360a^5b^5c^9f^3j + 61920a^7b^7c^5f^3j^3 + 61920a^4b^7 \\
& c^8f^3j - 49152a^5b^7c^7g^3i^3 - 3682a^6b^9c^4f^3j^3 - 3682a^3b^9 \\
& c^7f^3j + 70a^5b^{11}c^3f^3j^3 + 70a^2b^{11}c^6f^3j + 3870720a^8 \\
& b^6c^{10}e^2j^2 + 430080a^7b^6c^{11}f^2i^2 - 14152320a^4b^4c^{11}d^3j \\
& + 10644480a^5b^2c^{12}d^3j + 5483520a^9b^2c^8d^3j^3 + 4269888a^3b^6 \\
& c^{10}d^3j + 3538944a^5b^2c^{12}e^3i - 1648128a^5b^3c^{11}f^3h + 133 \\
& 0560a^8b^4c^7d^3j^3 + 1179648a^7b^2c^{10}e^3i^3 - 898560a^6b^3c^{10}f \\
& h^3 - 826560a^7b^6c^6d^3j^3 - 607068a^2b^8c^9d^3j + 589824a^6b^4 \\
& c^9e^3i^3 - 354240a^5b^5c^9f^3h^3 - 354240a^4b^5c^{10}f^3h + 145188a \\
& a^6b^8c^5d^3j^3 + 98304a^5b^6c^8e^3i^3 + 43680a^3b^7c^9f^3h - 216 \\
& 00a^4b^7c^8f^3h^3 - 9576a^5b^{10}c^4d^3j^3 + 1350a^3b^9c^7f^3h^3 - 1 \\
& 050a^2b^9c^8f^3h - 504a^6b^{14}c^4d^2j^2 + 210a^4b^{12}c^3d^3j^3 + 3 \\
& 870720a^6b^6c^{12}d^2i^2 + 1658880a^6b^6c^{12}e^2h^2 - 9792a^6b^{11}c^7d^2 \\
& i^2 + 16547328a^4b^2c^{13}d^3h - 12306816a^3b^4c^{12}d^3h + 3731097 \\
& 6a^3b^3c^{13}d^3f + 3037824a^2b^6c^{11}d^3h - 2654208a^5b^3c^{11}e^3 \\
& g^3 + 1949184a^6b^2c^{11}d^3h^3 + 1296000a^5b^4c^{10}d^3h^3 - 155520a^4 \\
& b^6c^9d^3h^3 - 40500a^6b^{10}c^8d^2h^2 - 8100a^3b^8c^8d^3h^3 + 4050a^2 \\
& b^{10}c^7d^3h^3 + 3870720a^5b^6c^{13}e^2f^2 + 34836480a^4b^6c^{14}d^2e^2 \\
& - 108864a^6b^9c^9d^2g^2 - 8068032a^2b^5c^{12}d^3f - 5623296a^4b^3c^{12} \\
& d^3f^3 + 1737792a^3b^5c^{11}d^3f^3 - 260190a^6b^8c^{10}d^2f^2 - 21168 \\
& 0a^2b^7c^{10}d^3f^3 - 435456a^6b^7c^{11}d^2e^2 - 377487360a^{12}b^6c^6e^3k \\
& ^3 + 1434977280a^8b^3c^8d^2k^2 + 173408256a^7c^{12}d^2e^3k + 3276800a \\
& a^{12}c^7i^2j^2k - 125829120a^{13}b^6c^5i^3k^3 + 26214400a^{12}c^7f^3j^3k^2 + \\
& 1179648a^{10}c^9h^2i^3k + 13440a^6b^{13}h^3j^3k^2 + 50331648a^{11}c^8e^3i^3 \\
& k^2 + 110100480a^{10}c^9d^3f^3k^2 + 57802752a^8c^{11}d^2i^3k + 9830400a^{11} \\
& c^8e^3j^2k - 3276800a^9c^{10}f^2i^3k + 4480a^5b^{14}f^3j^3k^2 + 15728640a \\
& a^{11}c^8f^3h^3k^2 - 409600a^9c^{10}f^3i^2j - 1152b^{16}c^3d^2i^3k - 122051 \\
& 6352a^7b^5c^7d^2k^2 + 3538944a^9c^{10}e^3h^2k + 384000a^8c^{11}f^2h^3 \\
& j + 13440a^4b^{15}d^3j^3k^2 + 384a^3b^{16}f^3h^3k^2 + 20321280a^7c^{12}d^2h \\
& h^3j - 245760a^8c^{11}f^3h^3i^2 + 3456b^{15}c^4d^2g^3k - 270b^{14}c^5d^2h^3 \\
& j - 9830400a^8c^{11}e^3f^2k + 4838400a^9c^{10}d^3h^3j^2 + 2903040a^8c^{11} \\
& d^3h^2j - 1966080a^{10}b^6c^8i^3k + 1433600a^9b^9c^3i^3k^3 + 1152a^2b^{17} \\
& d^3h^3k^2 - 3686400a^7c^{12}e^2f^3j - 53084160a^7b^6c^{11}e^3k - 6912b^{17} \\
& 4c^5d^2e^3k - 3456b^{12}c^7d^2g^3i + 630b^{13}c^6d^2f^3j + 2688000a^7c^{12} \\
& d^3f^2j + 245760a^8b^{10}c^6g^3k^3 - 2211840a^6c^{13}e^2f^3h - 1720320 \\
& a^7c^{12}d^3f^3i^2 - 9450b^{11}c^8d^2f^3h + 6912b^{11}c^8d^2e^3i + 1612800 \\
& a^6c^{13}d^3f^2h - 1344000a^{10}b^6c^8f^3j^3 - 1344000a^7b^6c^{11}f^3j - 3 \\
& 93216a^8b^6c^{10}g^3i^3 - 23616a^6b^{17}c^3d^2k^2 - 20736b^{10}c^9d^2e^3g -
\end{aligned}$$

$75188736a^4b^3c^{14}d^3f - 883200a^6b^3c^{12}f^3h - 317952a^7b^3c^{11}f^3h^3 + 43416a^8b^{10}c^8d^3j - 15482880a^5c^{14}d^2e^2f - 10616832a^5b^3c^{13}e^3g - 345060a^8b^8c^{10}d^3h - 4262400a^5b^3c^{13}d^2f^3 + 852768a^8b^7c^{11}d^3f + 7350a^8b^9c^9d^2f^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^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}$

$$\begin{aligned}
& 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^2k^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) * ((768a^2b^{14}c^6d - 3145728a^{10}c^{12}h - 5242880a^{11}c^{11}j - 22020096a^9c^{13}d - 22272a^3b^{12}c^7d + 282624a^4b^{10}c^8d - 2027520a^5b^8c^9d + 8847360a^6b^6c^{10}d - 23396352a^7b^4c^{11}d + 34603008a^8b^2c^{12}d + 256a^3b^{13}c^6f - 9216a^4b^{11}c^7f + 122880a^5b^9c^8f - 819200a^6b^7c^9f + 2949120a^7b^5c^{10}f - 5505024a^8b^3c^{11}f + 768a^4b^{12}c^6h - 12288a^5b^{10}c^7h + 61440a^6b^8c^8h - 983040a^8b^4c^{10}h + 3145728a^9b^2c^{11}h + 256a^5b^{12}c^5j - 61440a^7b^8c^7j + 655360a^8b^6c^8j - 2949120a^9b^4c^9j + 6291456a^{10}b^2c^{10}j + 4194304a^9b^2c^{12}f) / (512 * (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 * (1572864a^9c^{13}e + 524288a^{10}c^{12}i - 1536a^4b^{10}c^8e + 30720a^5b^8c^9e - 245760a^6b^6c^{10}e + 983040a^7b^4c^{11}e - 1966080a^8b^2c^{12}e + 768a^4b^{11}c^7g - 15360a^5b^9c^8g + 122880a^6b^7c^9g - 491520a^7b^5c^{10}g + 983040a^8b^3c^{11}g - 256a^4b^{12}c^6i + 4608a^5b^{10}c^7i - 30720a^6b^8c^8i + 81920a^7b^6c^9i - 393216a^9b^2c^{11}i + 512a^4b^{11}c^3k - 14592a^5b^{13}c^4k + 178944a^6b^{11}c^5k - 1223680a^7b^9c^6k + 5038080a^8b^7c^7k - 12484608a^9b^5c^8k + 17235968a^{10}b^3c^9k - 786432a^9b^2c^{12}g - 10223616a^{11}b^2c^{10}k)) / (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)) + (root(56371445760a^{11}b^8c^{12}z^4 - 50
\end{aligned}$$

$$\begin{aligned}
& 3316480a^8b^{14}c^9z^4 + 47185920a^7b^{16}c^8z^4 - 2621440a^6b^{18}c^7z^4 + 65536a^5b^{20}c^6z^4 - 171798691840a^{14}b^2c^{15}z^4 + 193273528320a^{13}b^4c^{14}z^4 - 128849018880a^{12}b^6c^{13}z^4 - 16911433728a^{10}b^{10}c^{11}z^4 + 3523215360a^9b^{12}c^{10}z^4 + 68719476736a^{15}c^{16}z^4 - 47185920a^7b^{16}c^5kz^3 + 2621440a^6b^{18}c^4kz^3 - 65536a^5b^{20}c^3kz^3 + 171798691840a^{14}b^2c^{12}kz^3 - 193273528320a^{13}b^4c^{11}kz^3 + 128849018880a^{12}b^6c^{10}kz^3 + 16911433728a^{10}b^{10}c^8kz^3 - 3523215360a^9b^{12}c^7kz^3 - 56371445760a^{11}b^8c^9kz^3 + 503316480a^8b^{14}c^6kz^3 - 68719476736a^{15}c^{13}kz^3 + 1536a^5b^{18}c^6d^2fz^2 - 2571632640a^9b^5c^{11}d^2jz^2 + 2548039680a^9b^3c^{13}d^2hz^2 + 2453667840a^9b^7c^9e^2kz^2 + 2181038080a^{12}b^3c^{10}i^2kz^2 - 6492782592a^{10}b^5c^{10}e^2kz^2 + 1509949440a^9b^3c^{13}e^2gz^2 - 1401421824a^8b^5c^{12}d^2hz^2 - 1226833920a^9b^8c^8g^2kz^2 - 1321205760a^9b^2c^{14}d^2fz^2 - 2793406464a^{11}b^3c^{13}d^2jz^2 + 9563013120a^{11}b^3c^{11}e^2kz^2 + 890634240a^8b^7c^{10}d^2jz^2 - 754974720a^8b^5c^{12}e^2gz^2 - 570425344a^{11}b^5c^9i^2kz^2 + 732168192a^7b^6c^{12}d^2fz^2 - 581959680a^{10}b^4c^{11}f^2jz^2 - 603979776a^{10}b^2c^{13}e^2iz^2 + 534773760a^{11}b^3c^{11}h^2jz^2 - 558366720a^8b^9c^8e^2kz^2 - 4781506560a^{11}b^4c^{10}g^2kz^2 - 2013265920a^{13}b^3c^{11}i^2kz^2 - 456130560a^9b^4c^{12}f^2hz^2 + 384040960a^9b^6c^{10}f^2jz^2 - 264241152a^{10}b^7c^8i^2kz^2 + 390463488a^7b^7c^{11}d^2hz^2 + 279183360a^8b^{10}c^7g^2kz^2 + 301989888a^{10}b^3c^{12}g^2iz^2 + 222822400a^9b^9c^7i^2kz^2 - 366280704a^6b^8c^{11}d^2fz^2 - 330301440a^8b^4c^{13}d^2fz^2 + 254017536a^8b^6c^{11}f^2hz^2 - 1887436800a^{10}b^3c^{14}d^2hz^2 + 188743680a^{10}b^2c^{13}f^2hz^2 - 185303040a^7b^9c^9d^2jz^2 - 117964800a^{10}b^5c^{10}h^2jz^2 - 6039797760a^{12}b^3c^{12}e^2kz^2 - 67502080a^8b^{11}c^6i^2kz^2 + 121634816a^{11}b^2c^{12}f^2jz^2 + 188743680a^7b^7c^{11}e^2gz^2 - 115671040a^8b^8c^9f^2jz^2 + 125829120a^8b^6c^{11}e^2iz^2 + 10813440a^7b^{13}c^5i^2kz^2 + 76677120a^7b^{11}c^7e^2kz^2 - 38338560a^7b^{12}c^6g^2kz^2 - 37355520a^9b^7c^9h^2jz^2 - 917504a^6b^{15}c^4i^2kz^2 + 32768a^5b^{17}c^3i^2kz^2 - 62914560a^8b^7c^{10}g^2iz^2 + 23101440a^8b^9c^8h^2jz^2 - 4349952a^7b^{11}c^7h^2jz^2 + 2949120a^6b^{14}c^5g^2kz^2 + 337920a^6b^{13}c^6h^2jz^2 - 98304a^5b^{16}c^4g^2kz^2 - 7680a^5b^{15}c^5h^2jz^2 - 61931520a^7b^8c^{10}f^2hz^2 + 23592960a^7b^9c^9g^2iz^2 + 17940480a^7b^{10}c^8f^2jz^2 - 47185920a^7b^8c^{10}e^2iz^2 - 5898240a^6b^{13}c^6e^2kz^2 - 3538944a^6b^{11}c^8g^2iz^2 - 1347584a^6b^{12}c^7f^2jz^2 + 196608a^5b^{15}c^5e^2kz^2 + 196608a^5b^{13}c^7g^2iz^2 + 35840a^5b^{14}c^6f^2jz^2 + 96583680a^5b^{10}c^{10}d^2fz^2 + 23371776a^6b^{11}c^8d^2jz^2 - 51609600a^6b^9c^{10}d^2hz^2 + 7077888a^6b^{10}c^9e^2iz^2 + 6144000a^6b^{10}c^9f^2hz^2 - 1677312a^5b^{13}c^7d^2jz^2 - 393216a^5b^{12}c^8e^2iz^2 + 61440a^5b^{12}c^8f^2hz^2 + 53760a^4b^{15}c^6d^2jz^2 - 46080a^4b^{14}c^7f^2hz^2 + 1536a^3b^{16}c^6f^2hz^2 - 23592960a^6b^9c^{10}e^2gz^2 + 1179648a^5b^{11}c^9e^2gz^2 + 829440a^4b^{13}c^8d^2hz^2 + 368640a^5b^{11}c^9d^2hz^2 - 105984a^3b^{15}c^7d^2hz^2 + 4608a^2b^{17}c^6d^2hz^2 - 15175680a^4b^{12}c^9d^2fz^2 + 1428480a^3b^{14}c^8d^2fz^2 - 73728a^2b^{16}c^7d^2fz^2 + 4108320768a^{10}b
\end{aligned}$$

$$\begin{aligned}
&^3c^{12}d^jz^2 - 1207959552a^{10}b^6c^{14}e^gk^z^2 - 578813952a^{12}b^6c^{12}h^jz^2 + 3246391296a^{10}b^6c^9g^kz^2 - 402653184a^{11}b^6c^{13}g^iiz^2 + 3 \\
&019898880a^{12}b^2c^{11}g^kz^2 - 440401920a^{10}b^6c^{14}f^2z^2 - 188743680 \\
&a^{11}b^6c^{13}h^2z^2 + 1761607680a^{10}c^{15}d^fz^2 - 655360a^6b^{18}c^kz^2 \\
&z^2 - 94464a^6b^7c^{12}d^2z^2 + 6936330240a^8b^3c^{14}d^2z^2 + 2464874 \\
&496a^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 \\
&iiz^2 - 35966156800a^{12}b^6c^7k^2z^2 + 419430400a^{12}c^{13}f^jz^2 - 1 \\
&509949440a^9b^2c^{14}e^2z^2 + 251658240a^{11}c^{14}f^hiz^2 - 56874762240a \\
&a^{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 \\
&z^2 + 477102080a^{12}b^3c^{10}j^2z^2 + 477102080a^9b^3c^{13}f^2z^2 - 37 \\
&7487360a^9b^4c^{12}g^2z^2 + 301989888a^{10}b^2c^{13}g^2z^2 - 174325760a \\
&a^{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 \\
&z^2 - 188743680a^7b^6c^{12}e^2z^2 - 4350935040a^{10}b^{10}c^5k^2z^2 + 1 \\
&46165760a^4b^{11}c^{10}d^2z^2 - 50331648a^{10}b^4c^{11}i^2z^2 + 11796480a \\
&a^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 - 2 \\
&6542080a^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 \\
&z^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 - 4404019 \\
&20a^{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^ \\
&19c^6d^2z^2 + 165150720a^9b^6c^{12}d^g^jz + 23592960a^{10}b^6c^{11}g^h^jz \\
&z + 169869312a^7b^6c^{14}d^e^fz + 99090432a^8b^6c^{13}d^g^h^z - 3145728a^ \\
&9b^6c^{12}f^h^iiz + 56623104a^8b^6c^{13}d^f^iiz - 1536a^6b^{18}c^3d^f^k^z - \\
&9437184a^8b^6c^{13}e^f^h^z + 1536a^6b^{15}c^6d^f^iiz - 4608a^6b^{14}c^7d^f^g \\
&^z + 9216a^6b^{13}c^8d^e^fz + 2173501440a^9b^5c^8d^j^k^z - 1987706880 \\
&a^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 \\
&z - 754974720a^9b^3c^{10}e^g^k^z + 2222456832a^{11}b^6c^{10}d^j^k^z - 45416 \\
&4480a^{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 \\
&^jz + 301989888a^{10}b^2c^{10}e^i^k^z - 320421888a^7b^7c^8d^h^k^z + 1 \\
&85794560a^{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^6
\end{aligned}$$

$$\begin{aligned}
& *d*j*k*z + 235929600*a^9*b^2*c^{11}*d*f*k*z - 206438400*a^8*b^3*c^{11}*d*g*j*z \\
& - 206438400*a^7*b^4*c^{11}*d*e*j*z - 101646336*a^8*b^6*c^8*f*h*k*z - 29245440 \\
& *a^9*b^7*c^6*h*j*k*z - 60817408*a^{11}*b^2*c^9*f*j*k*z + 57835520*a^8*b^8*c^6 \\
& *f*j*k*z + 219414528*a^7*b^2*c^{13}*d*e*h*z - 70778880*a^{10}*b^2*c^{10}*f*h*k*z \\
& + 677376*a^7*b^{11}*c^4*h*j*k*z - 645120*a^8*b^9*c^5*h*j*k*z - 53760*a^6*b^{13} \\
& *c^3*h*j*k*z + 31457280*a^8*b^7*c^7*g*i*k*z - 62914560*a^8*b^6*c^8*e*i*k*z \\
& - 94371840*a^7*b^7*c^8*e*g*k*z - 221773824*a^6*b^3*c^{13}*d*e*f*z + 82575360* \\
& a^9*b^2*c^{11}*d*i*j*z + 11796480*a^{10}*b^2*c^{10}*h*i*j*z - 11796480*a^7*b^9*c^6 \\
& *g*i*k*z - 8970240*a^7*b^{10}*c^5*f*j*k*z + 103219200*a^7*b^5*c^{10}*d*g*j*z - \\
& 2457600*a^8*b^6*c^8*h*i*j*z + 1769472*a^6*b^{11}*c^5*g*i*k*z + 921600*a^7*b^8 \\
& *c^7*h*i*j*z + 673792*a^6*b^{12}*c^4*f*j*k*z - 138240*a^6*b^{10}*c^6*h*i*j*z - \\
& 98304*a^5*b^{13}*c^4*g*i*k*z - 17920*a^5*b^{14}*c^3*f*j*k*z + 7680*a^5*b^{12}*c^5 \\
& *h*i*j*z - 97136640*a^5*b^{10}*c^7*d*f*k*z - 29491200*a^9*b^3*c^{10}*g*h*j*z + \\
& 58982400*a^9*b^2*c^{11}*e*h*j*z + 23592960*a^7*b^8*c^7*e*i*k*z - 22169088*a^6 \\
& *b^{11}*c^5*d*j*k*z + 21381120*a^7*b^8*c^7*f*h*k*z + 14745600*a^8*b^5*c^9*g* \\
& h*j*z + 42854400*a^6*b^9*c^7*d*h*k*z - 109707264*a^7*b^3*c^{12}*d*g*h*z - 368 \\
& 6400*a^7*b^7*c^8*g*h*j*z - 3538944*a^6*b^{10}*c^6*e*i*k*z + 1645056*a^5*b^{13}* \\
& c^4*d*j*k*z - 890880*a^6*b^{10}*c^6*f*h*k*z + 460800*a^6*b^9*c^7*g*h*j*z - 33 \\
& 0240*a^5*b^{12}*c^5*f*h*k*z + 196608*a^5*b^{12}*c^5*e*i*k*z - 53760*a^4*b^{15}*c^3 \\
& *d*j*k*z + 46080*a^4*b^{14}*c^4*f*h*k*z - 23040*a^5*b^{11}*c^6*g*h*j*z - 1536* \\
& a^3*b^{16}*c^3*f*h*k*z - 29491200*a^8*b^4*c^{10}*e*h*j*z - 17203200*a^7*b^6*c^9 \\
& *d*i*j*z + 11796480*a^6*b^9*c^7*e*g*k*z + 110886912*a^6*b^4*c^{12}*d*f*g*z + \\
& 7372800*a^7*b^6*c^9*e*h*j*z + 40108032*a^8*b^2*c^{12}*d*h*i*z + 6451200*a^6*b^8 \\
& *c^8*d*i*j*z + 2359296*a^8*b^3*c^{11}*f*h*i*z - 967680*a^5*b^{10}*c^7*d*i*j*z \\
& - 921600*a^6*b^8*c^8*e*h*j*z - 829440*a^4*b^{13}*c^5*d*h*k*z - 589824*a^5*b^8 \\
& *c^6*e*g*k*z - 491520*a^6*b^7*c^9*f*h*i*z + 184320*a^5*b^9*c^8*f*h*i*z + \\
& 105984*a^3*b^{15}*c^4*d*h*k*z + 69120*a^5*b^{11}*c^6*d*h*k*z + 53760*a^4*b^{12}*c^6 \\
& *d*i*j*z + 46080*a^5*b^{10}*c^7*e*h*j*z - 27648*a^4*b^{11}*c^7*f*h*i*z - 4608 \\
& *a^2*b^{17}*c^3*d*h*k*z + 1536*a^3*b^{13}*c^6*f*h*i*z - 25804800*a^6*b^7*c^9*d* \\
& g*j*z - 88473600*a^6*b^4*c^{12}*d*e*h*z + 51609600*a^6*b^6*c^{10}*d*e*j*z - 849 \\
& 34656*a^7*b^2*c^{13}*d*f*g*z + 117964800*a^5*b^5*c^{12}*d*e*f*z + 15160320*a^4* \\
& b^{12}*c^6*d*f*k*z - 45613056*a^7*b^3*c^{12}*d*f*i*z + 44236800*a^6*b^5*c^{11}*d* \\
& g*h*z - 10321920*a^6*b^6*c^{10}*d*h*i*z + 7077888*a^7*b^4*c^{11}*d*h*i*z - 5898 \\
& 240*a^7*b^4*c^{11}*f*g*h*z + 4718592*a^8*b^2*c^{12}*f*g*h*z + 3225600*a^5*b^9*c^8 \\
& *d*g*j*z + 2949120*a^6*b^6*c^{10}*f*g*h*z + 2396160*a^5*b^8*c^9*d*h*i*z - 1 \\
& 428480*a^3*b^{14}*c^5*d*f*k*z - 737280*a^5*b^8*c^9*f*g*h*z - 161280*a^4*b^{11}* \\
& c^7*d*g*j*z + 92160*a^4*b^{10}*c^8*f*g*h*z + 73728*a^2*b^{16}*c^4*d*f*k*z - 506 \\
& 88*a^3*b^{12}*c^7*d*h*i*z - 27648*a^4*b^{10}*c^8*d*h*i*z - 4608*a^3*b^{12}*c^7*f* \\
& g*h*z + 4608*a^2*b^{14}*c^6*d*h*i*z - 58982400*a^5*b^6*c^{11}*d*f*g*z + 1179648 \\
& 0*a^7*b^3*c^{12}*e*f*h*z + 8847360*a^5*b^7*c^{10}*d*f*i*z - 6635520*a^5*b^7*c^1 \\
& 0*d*g*h*z - 6451200*a^5*b^8*c^9*d*e*j*z - 5898240*a^6*b^5*c^{11}*e*f*h*z - 38 \\
& 09280*a^4*b^9*c^9*d*f*i*z + 2359296*a^6*b^5*c^{11}*d*f*i*z + 1474560*a^5*b^7* \\
& c^{10}*e*f*h*z + 681984*a^3*b^{11}*c^8*d*f*i*z + 322560*a^4*b^{10}*c^8*d*e*j*z - \\
& 276480*a^4*b^9*c^9*d*g*h*z - 184320*a^4*b^9*c^9*e*f*h*z + 179712*a^3*b^{11}*c^8 \\
& *d*g*h*z - 55296*a^2*b^{13}*c^7*d*f*i*z - 13824*a^2*b^{13}*c^7*d*g*h*z + 9216
\end{aligned}$$

$$\begin{aligned}
& a^3 b^{11} c^8 e f h z + 16220160 a^4 b^8 c^{10} d f g z + 13271040 a^5 b^6 c^{11} d e h z - 2396160 a^3 b^{10} c^9 d f g z + 552960 a^4 b^8 c^{10} d e h z - 3 \\
& 59424 a^3 b^{10} c^9 d e h z + 175104 a^2 b^{12} c^8 d f g z + 27648 a^2 b^{12} c^8 d e h z - 32440320 a^4 b^7 c^{11} d e f z + 4792320 a^3 b^9 c^{10} d e f z - \\
& 350208 a^2 b^{11} c^9 d e f z + 1439170560 a^{10} b c^{11} d h k z - 3361603584 a^{10} b^3 c^9 d j k z + 603979776 a^{10} b c^{11} e g k z + 407371776 a^{12} b c^9 \\
& h j k z + 201326592 a^{11} b c^{10} g i k z + 346816512 a^7 b c^{14} d^2 g z + 1 \\
& 29761280 a^{11} b c^{10} h^2 k z + 121896960 a^{10} b c^{11} f^2 k z + 458752 a^6 b^{15} c i k^2 z + 19660800 a^{11} b c^{10} g j^2 z + 49152 a^5 b^{16} c g k^2 z + 7 \\
& 077888 a^9 b c^{12} g h^2 z + 94464 a b^{17} c^4 d^2 k z - 19660800 a^8 b c^{13} f^2 g z - 66816 a b^{14} c^7 d^2 i z + 214272 a b^{13} c^8 d^2 g z - 428544 a b^{12} c^9 d^2 e z + 2390753280 a^{11} b^4 c^7 g k^2 z - 2411421696 a^6 b^7 c^9 d^2 k z - 6603079680 a^8 b^3 c^{11} d^2 k z + 3715891200 a^9 b c^{12} d^2 k z - 880803840 a^{10} c^{12} d f k z - 1623195648 a^{10} b^6 c^6 g k^2 z - 402653184 a^{11} c^{11} e i k z - 1509949440 a^{12} b^2 c^8 g k^2 z - 209715200 a^{12} c^{10} f j k z - 330301440 a^9 c^{13} d e j z + 3019898880 a^{12} b c^9 e k^2 z - 125829120 a^{11} c^{11} f h k z - 110100480 a^{10} c^{12} d i j z - 198180864 a^8 c^{14} d e h z - 15728640 a^{11} c^{11} h i j z - 1226833920 a^9 b^7 c^6 e k^2 z - 47185920 a^{10} c^{12} e h j z - 66060288 a^9 c^{13} d h i z - 1090519040 a^{12} b^3 c^7 i k^2 z + 1022754816 a^6 b^2 c^{14} d^2 e z + 5216108544 a^7 b^5 c^{10} d^2 k z + 754974720 a^9 b^2 c^{11} e^2 k z + 721529856 a^5 b^9 c^8 d^2 k z + 613416960 a^9 b^8 c^5 g k^2 z - 642318336 a^5 b^4 c^{13} d^2 e z - 4781506560 a^{11} b^3 c^8 e k^2 z - 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 - 139591680 a^8 b^{10} c^4 g k^2 z - 49766400 a^{10} b^7 c^5 j^2 k z - 145463040 a^4 b^{11} c^7 d^2 k z - 94371840 a^8 b^6 c^8 g^2 k z + 223395840 a^4 b^6 c^{12} d^2 e z + 33751040 a^8 b^{11} c^3 i k^2 z - 78970880 a^9 b^3 c^{10} f^2 k z + 94371840 a^7 b^6 c^9 e^2 k z + 25165824 a^{10} b^4 c^8 i^2 k z + 6220800 a^9 b^9 c^4 j^2 k z + 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 - 1520640 a^7 b^9 c^6 h^2 k z - 1105920 a^8 b^7 c^7 h^2 k z + 849920 a^8 b^8 c^6 i j^2 z - 393216 a^{10} b^4 c^8 i j^2 z + 195840 a^6 b^{11} c^5 h^2 k z - 145920 a^7 b^{10} c^5 i j^2 z + 11520 a^5 b^{13} c^4 h^2 k z + 11008 a^6 b^{12} c^4 i j^2 z - 2304 a^4 b^{15} c^3 h^2 k z - 256 a^5 b^{14} c^3 i j^2 z - 25362432 a^{10} b^3 c^9 g j^2 z - 24739840 a^8 b^5 c^9 f^2 k z - 38338560 a^7 b^{11} c^4 e k^2 z - 2949120 a^6 b^{10} c^6 g^2 k z - 1474560 a^6 b^{14} c^2 g k^2 z + 50724864 a^{10} b^2 c^{10} e j^2 z + 147456 a^5 b^{12} c^5 g^2 k z - 15150080 a^6 b^9
\end{aligned}$$

$c^7 f^2 k^2 z + 13271040 a^9 b^5 c^8 g^2 j^2 z - 111697920 a^4 b^7 c^{11} d^2 g^2 z$   
 $- 3563520 a^8 b^7 c^7 g^2 j^2 z + 3538944 a^9 b^2 c^{11} h^2 i^2 z + 2912000 a^5$   
 $b^{11} c^6 f^2 k^2 z - 737280 a^7 b^6 c^9 h^2 i^2 z + 506880 a^7 b^9 c^6 g^2 j^2 z$   
 $- 291840 a^4 b^{13} c^5 f^2 k^2 z + 276480 a^6 b^8 c^8 h^2 i^2 z - 41472 a^5 b^1$   
 $0 c^7 h^2 i^2 z - 34560 a^6 b^{11} c^5 g^2 j^2 z + 14080 a^3 b^{15} c^4 f^2 k^2 z + 2$   
 $304 a^4 b^{12} c^6 h^2 i^2 z + 768 a^5 b^{13} c^4 g^2 j^2 z - 256 a^2 b^{17} c^3 f^2 k^2 z$   
 $- 11796480 a^6 b^8 c^8 e^2 k^2 z - 26542080 a^9 b^4 c^9 e^2 j^2 z + 1983744$   
 $0 a^3 b^{13} c^6 d^2 k^2 z + 2949120 a^6 b^{13} c^3 e^2 k^2 z + 589824 a^5 b^{10} c^7$   
 $e^2 k^2 z - 98304 a^5 b^{15} c^2 e^2 k^2 z - 10354688 a^8 b^2 c^{12} f^2 i^2 z - 436$   
 $46976 a^6 b^4 c^{12} d^2 i^2 z - 8847360 a^8 b^3 c^{11} g^2 h^2 z + 7127040 a^8 b^6$   
 $c^8 e^2 j^2 z + 4423680 a^7 b^5 c^{10} g^2 h^2 z + 2048000 a^6 b^6 c^{10} f^2 i^2 z$   
 $- 1771776 a^2 b^{15} c^5 d^2 k^2 z - 1105920 a^6 b^7 c^9 g^2 h^2 z - 1013760 a^7 b^8$   
 $c^7 e^2 j^2 z - 849920 a^5 b^8 c^9 f^2 i^2 z + 393216 a^7 b^4 c^{11} f^2 i^2 z$   
 $+ 145920 a^4 b^{10} c^8 f^2 i^2 z + 138240 a^5 b^9 c^8 g^2 h^2 z + 69120 a^6 b^{10}$   
 $c^6 e^2 j^2 z - 11008 a^3 b^{12} c^7 f^2 i^2 z - 6912 a^4 b^{11} c^7 g^2 h^2 z - 153$   
 $6 a^5 b^{12} c^5 e^2 j^2 z + 256 a^2 b^{14} c^6 f^2 i^2 z - 32587776 a^5 b^6 c^{11} d^2$   
 $i^2 z + 25362432 a^7 b^3 c^{12} f^2 g^2 z + 21657600 a^4 b^8 c^{10} d^2 i^2 z + 17$   
 $694720 a^8 b^2 c^{12} e^2 h^2 z - 50724864 a^7 b^2 c^{13} e^2 f^2 z - 13271040 a^6 b^5$   
 $c^{11} f^2 g^2 z - 8847360 a^7 b^4 c^{11} e^2 h^2 z - 5810688 a^3 b^{10} c^9 d^2 i^2 z$   
 $+ 3563520 a^5 b^7 c^{10} f^2 g^2 z + 2211840 a^6 b^6 c^{10} e^2 h^2 z + 845568 a^2$   
 $b^{12} c^8 d^2 i^2 z - 506880 a^4 b^9 c^9 f^2 g^2 z - 276480 a^5 b^8 c^9 e^2 h^2 z$   
 $+ 34560 a^3 b^{11} c^8 f^2 g^2 z + 13824 a^4 b^{10} c^8 e^2 h^2 z - 768 a^2 b^{13} c^7$   
 $f^2 g^2 z + 26542080 a^6 b^4 c^{12} e^2 f^2 z + 23362560 a^3 b^9 c^{10} d^2 g^2 z$   
 $- 46725120 a^3 b^8 c^{11} d^2 e^2 z - 7127040 a^5 b^6 c^{11} e^2 f^2 z - 2965248$   
 $a^2 b^{11} c^9 d^2 g^2 z + 1013760 a^4 b^8 c^{10} e^2 f^2 z - 69120 a^3 b^{10} c^9 e^2$   
 $f^2 z + 1536 a^2 b^{12} c^8 e^2 f^2 z + 5930496 a^2 b^{10} c^{10} d^2 e^2 z + 100663$   
 $2960 a^{13} b^3 c^8 i^2 k^2 z + 3246391296 a^{10} b^5 c^7 e^2 k^2 z + 318504960 a^{13} b^3$   
 $c^8 j^2 k^2 z + 61538304 a^{10} b^{10} c^2 k^3 z - 603979776 a^{10} c^{12} e^2 k^2 z$   
 $- 693633024 a^7 c^{15} d^2 e^2 z - 231211008 a^8 c^{14} d^2 i^2 z - 67108864 a^{12} c^{10}$   
 $i^2 k^2 z - 13107200 a^{12} c^{10} i^2 j^2 z - 16384 a^5 b^{17} i^2 k^2 z - 3932160$   
 $0 a^{11} c^{11} e^2 j^2 z - 4718592 a^{10} c^{12} h^2 i^2 z - 2304 b^{19} c^3 d^2 k^2 z + 1$   
 $3107200 a^9 c^{13} f^2 i^2 z + 2304 b^{16} c^6 d^2 i^2 z - 14155776 a^9 c^{13} e^2 h^2 z$   
 $+ 39321600 a^8 c^{14} e^2 f^2 z - 4833280 a^9 b^{12} c^2 k^3 z - 6912 b^{15} c^7 d^2$   
 $g^2 z + 6962544640 a^{14} b^2 c^6 k^3 z + 13824 b^{14} c^8 d^2 e^2 z + 1876951040$   
 $a^{12} b^6 c^4 k^3 z - 4844421120 a^{13} b^4 c^5 k^3 z - 437780480 a^{11} b^8 c^3$   
 $k^3 z - 4294967296 a^{15} c^7 k^3 z + 163840 a^8 b^{14} k^3 z + 6144000 a^{10} b^3$   
 $c^8 f^2 i^2 j^2 k - 5898240 a^{10} b^3 c^8 g^2 h^2 j^2 k - 41287680 a^9 b^3 c^9 d^2 g^2 j^2 k$   
 $+ 472832 a^9 b^3 c^9 f^2 h^2 i^2 k + 18432000 a^9 b^3 c^9 e^2 f^2 j^2 k + 3391488 a^8 b^3 c^{10}$   
 $e^2 h^2 i^2 j + 1228800 a^8 b^3 c^{10} f^2 g^2 i^2 j - 24772608 a^8 b^3 c^{10} d^2 g^2 h^2 k$   
 $+ 13418496 a^8 b^3 c^{10} e^2 f^2 h^2 k + 11649024 a^8 b^3 c^{10} d^2 f^2 i^2 k + 737280 a^7 b^3 c^{11}$   
 $f^2 g^2 h^2 i - 768 a^2 b^{15} c^3 d^2 f^2 i^2 k - 19307520 a^7 b^3 c^{11} d^2 f^2 h^2 j$   
 $+ 16367616 a^7 b^3 c^{11} d^2 e^2 i^2 j + 3686400 a^7 b^3 c^{11} e^2 f^2 g^2 j + 34947072 a^7 b^3 c^{11}$   
 $d^2 e^2 f^2 k + 2304 a^2 b^{14} c^4 d^2 f^2 g^2 k - 180 a^2 b^{13} c^5 d^2 f^2 h^2 j$   
 $+ 11059200 a^6 b^3 c^{12} d^2 e^2 h^2 i + 5160960 a^6 b^3 c^{12} d^2 f^2 g^2 i$   
 $+ 2211840 a^6 b^3 c^{12} e^2 f^2 g^2 h - 4608 a^2 b^{13} c^5 d^2 e^2 f^2 k - 2304 a^2 b^{11} c^7$   
 $d^2 f^2 g^2 i + 4608 a^2 b^{10} c^8 d^2 e^2 f^2 i + 1548288$



$0*a^5*b*c^{13}*d*e*f*g - 13824*a*b^9*c^9*d*e*f*g - 225976320*a^8*b^2*c^9*d*e*f*g + 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 - 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*d*f*i*k + 1843200*a^6*b^3*c^{10}*f*g*h*i - 1677312*a^6*b^4*c^9*e*f*i*j - 1658880*a^6*b^4*c^9*e*g*h*j + 68345856*a^6*b^3*c^{10}*d*e*f*k + 783360*a^5*b^5*c^9*f*g*h*i + 741888*a^5*b^6*c^8*d*g*i*j - 34172928*a^6*b^4*c^9*d*f*g*k - 340992*a^3*b^{11}*c^5*d*f*i*k - 161280*a^4*b^{10}*c^5*d*e*j*k + 138240*a^4*b^9*c^6*d*g*h*k + 107520*a^5*b^6*c^8*e*f*i*j + 92160*a^4*b^9*c^6*e*f*h*k - 89856*a^3*b^{11}*c^5*d*g*h*k - 80640*a^4*b^8*c^7*d*g*i*j + 69120*a^5*b^7*c^7*e*f*h*k + 69120*a^5*b^6*c^8*e*g*h*j + 27648*a^2*b^{13}*c^4*d*f*i*k + 18432*a^4*b^7*c^8*f*g*h*i + 6912*a^2*b^{13}*c^4*d*g*h*k - 4608*a^3*b^{11}*c^5*e*f*h*k - 2304*a^3*b^9*c^7*f*g*h*i + 27164160*a^5*b^6*c^8*d*f*g*k$

$$\begin{aligned}
& - 22164480a^6b^3c^{10}d^f h^j - 54328320a^5b^5c^9d^e f^k - 17473536a^7b^2c^{10}d^f g^k - 8225280a^5b^6c^8d^e h^k - 8087040a^4b^8c^7d^f g^k + 5677056a^6b^3c^{10}e^f g^j - 5529600a^6b^2c^{11}d^g h^i + 4571136a^6b^3c^{10}d^e i^j - 3686400a^6b^2c^{11}e^f h^i + 2805120a^5b^5c^9d^f h^j - 2211840a^5b^4c^{10}d^g h^i - 1566720a^5b^4c^{10}e^f h^i - 1483776a^5b^5c^9d^e i^j + 1198080a^3b^{10}c^6d^f g^k + 437184a^4b^7c^8d^f h^j - 322560a^5b^5c^9e^f g^j + 317952a^4b^6c^9d^g h^i - 276480a^4b^8c^7d^e h^k + 179712a^3b^{10}c^6d^e h^k + 161280a^4b^7c^8d^e i^j - 146268a^3b^9c^7d^f h^j - 87552a^2b^{12}c^5d^f g^k - 36864a^4b^6c^9e^f h^i - 13824a^2b^{12}c^5d^e h^k + 9360a^2b^{11}c^6d^f h^j + 6912a^3b^8c^8d^g h^i - 6912a^2b^{10}c^7d^g h^i + 4608a^3b^8c^8e^f h^i - 24551424a^6b^2c^{11}d^e g^j + 16174080a^4b^7c^8d^e f^k + 5419008a^5b^4c^{10}d^e g^j + 5160960a^5b^3c^{11}d^f g^i + 4423680a^5b^3c^{11}e^f g^h + 4423680a^5b^3c^{11}d^e h^i - 2396160a^3b^9c^7d^e f^k - 635904a^4b^5c^{10}d^e h^i - 483840a^4b^6c^9d^e g^j - 354816a^3b^7c^9d^f g^i + 322560a^4b^5c^{10}d^f g^i + 175104a^2b^{11}c^6d^e f^k + 138240a^4b^5c^{10}e^f g^h + 59904a^2b^9c^8d^f g^i - 13824a^3b^7c^9e^f g^h - 13824a^3b^7c^9d^e h^i + 13824a^2b^9c^8d^e h^i - 16588800a^5b^2c^{12}d^e g^h - 10321920a^5b^2c^{12}d^e f^i + 1658880a^4b^4c^{11}d^e g^h + 709632a^3b^6c^{10}d^e f^i - 645120a^4b^4c^{11}d^e f^i + 124416a^3b^6c^{10}d^e g^h - 119808a^2b^8c^9d^e f^i - 41472a^2b^8c^9d^e g^h + 7741440a^4b^3c^{12}d^e f^g - 2903040a^3b^5c^{11}d^e f^g + 387072a^2b^7c^{10}d^e f^g - 381026304a^{11}b^c^7d^j k^2 - 241827840a^{10}b^c^8d^h k^2 - 65667072a^{12}b^c^6h^j k^2 - 169344a^7b^{11}c^h j^k^2 - 25165824a^{11}b^c^7g^i k^2 - 4915200a^{11}b^c^7g^j^2 k - 53084160a^8b^c^{10}e^2 i^k - 75497472a^{10}b^c^8e^g k^2 - 86704128a^7b^c^{11}d^2 g^k + 565248a^9b^c^9h^i^2 j - 168448a^6b^{12}c^f j^k^2 - 24576a^5b^{13}c^g i^k^2 - 1769472a^9b^c^9g^h^2 k - 17694720a^9b^c^9e^i^2 k - 411264a^5b^{13}c^d j^k^2 - 11520a^4b^{14}c^f h^k^2 + 4915200a^8b^c^{10}f^2 g^k + 2580480a^9b^c^9e^i j^2 - 2496000a^9b^c^9f^h j^2 - 1543680a^8b^c^{10}f^h^2 j + 33408a^a b^{14}c^4d^2 i^k - 59512320a^6b^c^{12}d^2 f^j + 5087232a^7b^c^{11}e^2 h^j + 2727936a^8b^c^{10}d^i^2 j - 26496a^3b^{15}c^d h^k^2 + 1105920a^7b^c^{11}e^h^2 i - 107136a^a b^{13}c^5d^2 g^k + 10260a^a b^{12}c^6d^2 h^j - 10616832a^6b^c^{12}e^2 g^i - 3538944a^7b^c^{11}e^g i^2 + 1843200a^7b^c^{11}d^h i^2 - 18432a^2b^{16}c^d f^k^2 - 15552000a^8b^c^{10}d^f j^2 + 24551424a^6b^c^{12}d^e^2 j - 37062144a^5b^c^{13}d^2 f^h + 2580480a^6b^c^{12}e^f^2 i + 214272a^a b^{12}c^6d^2 e^k + 65664a^a b^{10}c^8d^2 g^i - 25074a^a b^{11}c^7d^2 f^j + 420a^a b^{12}c^6d^f^2 j + 6a^a b^{15}c^3d^f j^2 + 23224320a^5b^c^{13}d^2 e^i + 384a^a b^{12}c^6d^d f^i^2 - 5985792a^6b^c^{12}d^d f^h^2 + 206010a^a b^9c^9d^2 f^h - 131328a^a b^9c^9d^2 e^i - 6300a^a b^{10}c^8d^f^2 h + 1350a^a b^{11}c^7d^d f^h^2 + 16588800a^5b^c^{13}d^e^2 h + 3456a^a b^{10}c^8d^d f^g^2 + 435456a^a b^8c^{10}d^2 e^g + 13824a^a b^8c^{10}d^e^2 f + 3932160a^11c^8h^i j^k + 27525120a^{10}c^9d^i j^k + 82575360a^9c^{10}d^e j^k + 11796480a^{10}c^9e^h j^k + 16515072a^9c^{10}d^h i^k + 49545216a^8c^{11}d^e h^k - 2457600a^8c^{11}e^f i^j - 1474560a^7c^{12}e^f h^i - 10321920a
\end{aligned}$$

$$\begin{aligned}
& ^6c^{13}d^*e^*f^*i + 737077248a^{10}b^3c^6d^*j^*k^2 - 518814720a^9b^5c^5d^* \\
& j^*k^2 + 441354240a^9b^3c^7d^*h^*k^2 - 429871104a^6b^2c^{11}d^2e^*k - 27 \\
& 2212992a^8b^5c^6d^*h^*k^2 + 305731584a^5b^4c^{10}d^2e^*k + 192412800a^ \\
& 8b^7c^4d^*j^*k^2 + 111912960a^{11}b^3c^5h^*j^*k^2 + 214935552a^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^6 \\
& i^*j^2k - 56494080a^{10}b^4c^5f^*j^*k^2 - 2052096a^{10}b^4c^5i^*j^2k + 13 \\
& 27360a^9b^6c^4i^*j^2k - 158080a^8b^8c^3i^*j^2k - 47480832a^{10}b^3c^6 \\
& g^*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^8 \\
& b^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^6 \\
& ^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^7 \\
& *b^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 + 5898240 \\
& a^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 + 176947 \\
& 2a^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^9 \\
& b^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 + 2 \\
& 66880a^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^9 \\
& *d^2i^*k - 12779520a^8b^6c^5e^*i^*k^2 - 11796480a^8b^3c^8e^*i^2k - 88 \\
& 47360a^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^ \\
& 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^{10}c^ \\
& ^3f^*h^*k^2 - 147456a^5b^9c^5e^*i^2k - 121856a^6b^6c^7f^*i^2j + 8256 \\
& 0a^5b^{12}c^2f^*h^*k^2 + 49152a^5b^{12}c^2e^*i^*k^2 - 17280a^5b^7c^7g^2 \\
& *h^*j + 8960a^5b^8c^6f^*i^2j + 14194944a^5b^6c^8d^2i^*k - 12718080a
\end{aligned}$$

$$\begin{aligned}
& ^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 + 506880 \\
& 0a^7b^2c^10f^2h^j - 3755520a^7b^3c^9f^h^2j + 3336192a^7b^3c^9f^ \\
& f^2g^k + 3000960a^6b^4c^9f^2h^j + 2893824a^3b^10c^6d^2i^k + 1720 \\
& 320a^8b^3c^8e^i^j^2 + 1704960a^6b^5c^8f^2g^k - 1307520a^5b^7c^7 \\
& f^2g^k - 1085760a^6b^5c^8f^h^2j - 959040a^7b^5c^7f^h^j^2 + 82944 \\
& 0a^7b^4c^8e^h^2k - 552960a^7b^2c^10g^h^2i - 552960a^6b^4c^9g^h^ \\
& 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 \\
& i + 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 - 17280 \\
& a^3b^11c^5f^2g^k + 13536a^5b^7c^7f^h^2j - 6912a^4b^10c^5e^h^2 \\
& k + 5490a^4b^9c^6f^h^2j - 3456a^4b^8c^7g^h^2i + 1980a^3b^10c^ \\
& 6f^2h^j + 810a^5b^9c^5f^h^j^2 + 768a^5b^9c^5e^i^j^2 + 384a^2b^1 \\
& 3c^4f^2g^k - 270a^4b^11c^4f^h^j^2 - 180a^3b^11c^5f^h^2j - 30a^ \\
& 2b^12c^5f^2h^j + 6a^3b^13c^3f^h^j^2 + 30067200a^6b^2c^11d^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^7b^3c^9d^i^2 \\
& *j + 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^k^2 - 147456a^5 \\
& b^11c^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^11c^3d^h^k^2 - 2304a^ \\
& 4b^8c^7f^h^i^2 + 384a^3b^10c^6f^h^i^2 + 11930112a^8b^2c^9d^h^j^2 \\
& - 11646720a^3b^9c^7d^2g^k + 8432640a^7b^2c^10d^h^2j + 24140160a^ \\
& ^5b^10c^4d^f^k^2 - 6672384a^7b^2c^10e^f^2k + 4450176a^7b^4c^8d^ \\
& h^j^2 + 4337280a^6b^4c^9d^h^2j - 3870720a^8b^2c^9e^g^j^2 - 3409920 \\
& a^6b^4c^9e^f^2k - 2885760a^5b^4c^10d^2h^j - 2844288a^4b^6c^9d^ \\
& ^2h^j + 2615040a^5b^6c^8e^f^2k - 1687680a^6b^6c^7d^h^j^2 + 148262 \\
& 4a^2b^11c^6d^2g^k - 1290240a^6b^2c^11f^2g^i + 1105920a^6b^3c^1 \\
& 0e^h^2i + 1019412a^3b^8c^8d^2h^j - 1007424a^5b^6c^8d^h^2j - 860 \\
& 160a^5b^4c^10f^2g^i - 645120a^7b^4c^8e^g^j^2 - 506880a^4b^8c^7e^ \\
& e^f^2k + 290304a^5b^5c^9e^h^2i + 197460a^5b^8c^6d^h^j^2 - 143802a^ \\
& a^2b^10c^7d^2h^j + 80640a^6b^6c^7e^g^j^2 - 80640a^4b^6c^9f^2g^ \\
& i + 51948a^4b^8c^7d^h^2j + 34560a^3b^10c^6e^f^2k + 12672a^3b^8c^ \\
& c^8f^2g^i + 10800a^3b^10c^6d^h^2j + 6912a^4b^7c^8e^h^2i - 2304a^ \\
& a^5b^8c^6e^g^j^2 - 768a^2b^12c^5e^f^2k - 684a^3b^12c^4d^h^j^2 - \\
& 540a^2b^12c^5d^h^2j - 384a^2b^10c^7f^2g^i - 90a^4b^10c^5d^h^ \\
& j^2 + 18a^2b^14c^3d^h^j^2 + 23385600a^6b^2c^11d^f^2j + 23293440a^ \\
& 3b^8c^8d^2e^k + 6137856a^6b^3c^10d^g^2j - 5677056a^6b^2c^11e^2 \\
& f^j + 5308416a^6b^2c^11e^g^2i - 5308416a^5b^3c^11e^2g^i - 378624 \\
& 0a^4b^12c^3d^f^k^2 - 3538944a^6b^3c^10e^g^i^2 + 2654208a^5b^4c^1 \\
& 0e^g^2i + 1658880a^6b^3c^10d^h^i^2 - 1354752a^5b^5c^9d^g^2j - 11 \\
& 05920a^5b^4c^10f^g^2h - 884736a^5b^5c^9e^g^i^2 - 552960a^6b^2c^
\end{aligned}$$

$$\begin{aligned}
& 11*f*g^2*h + 357120*a^3*b^14*c^2*d*f*k^2 + 322560*a^5*b^4*c^10*e^2*f*j + 26 \\
& 2656*a^5*b^5*c^9*d*h*i^2 + 120960*a^4*b^7*c^8*d*g^2*j - 55296*a^4*b^7*c^8*d \\
& *h*i^2 - 34560*a^4*b^6*c^9*f*g^2*h + 3456*a^3*b^8*c^8*f*g^2*h + 1152*a^3*b^ \\
& 9*c^7*d*h*i^2 + 1152*a^2*b^11*c^6*d*h*i^2 - 13149696*a^7*b^3*c^9*d*f*j^2 - \\
& 11612160*a^5*b^2*c^12*d^2*g*i + 10906560*a^4*b^5*c^10*d^2*f*j - 7418880*a^5 \\
& *b^3*c^11*d^2*f*j + 3148992*a^6*b^5*c^8*d*f*j^2 - 2985696*a^3*b^7*c^9*d^2*f \\
& *j - 2965248*a^2*b^10*c^7*d^2*e*k + 1720320*a^5*b^3*c^11*e*f^2*i - 1658880* \\
& a^6*b^2*c^11*e*g*h^2 + 1596672*a^3*b^6*c^10*d^2*g*i - 1505280*a^4*b^6*c^9*d \\
& *f^2*j - 829440*a^5*b^4*c^10*e*g*h^2 - 508032*a^2*b^8*c^9*d^2*g*i + 378954* \\
& a^2*b^9*c^8*d^2*f*j + 362880*a^5*b^4*c^10*d*f^2*j + 296964*a^3*b^8*c^8*d*f^ \\
& 2*j + 161280*a^4*b^5*c^10*e*f^2*i - 77070*a^4*b^9*c^6*d*f*j^2 - 30240*a^5*b \\
& ^7*c^7*d*f*j^2 - 25344*a^3*b^7*c^9*e*f^2*i - 20736*a^4*b^6*c^9*e*g*h^2 - 19 \\
& 278*a^2*b^10*c^7*d*f^2*j + 8820*a^3*b^11*c^5*d*f*j^2 + 768*a^2*b^9*c^8*e*f^ \\
& 2*i - 378*a^2*b^13*c^4*d*f*j^2 - 5419008*a^5*b^3*c^11*d*e^2*j - 4423680*a^5 \\
& *b^2*c^12*e^2*f*h + 4147200*a^5*b^3*c^11*d*g^2*h - 2580480*a^6*b^2*c^11*d*f \\
& *i^2 - 967680*a^5*b^4*c^10*d*f*i^2 + 483840*a^4*b^5*c^10*d*e^2*j - 414720*a \\
& ^4*b^5*c^10*d*g^2*h - 138240*a^4*b^4*c^11*e^2*f*h + 64512*a^4*b^6*c^9*d*f*i \\
& ^2 + 39168*a^3*b^8*c^8*d*f*i^2 - 31104*a^3*b^7*c^9*d*g^2*h + 13824*a^3*b^6* \\
& c^10*e^2*f*h + 10368*a^2*b^9*c^8*d*g^2*h - 9216*a^2*b^10*c^7*d*f*i^2 + 1563 \\
& 0336*a^5*b^2*c^12*d*f^2*h - 14459904*a^4*b^3*c^12*d^2*f*h + 9630144*a^3*b^5 \\
& *c^11*d^2*f*h - 8764416*a^5*b^3*c^11*d*f*h^2 - 3870720*a^5*b^2*c^12*e*f^2*g \\
& - 3193344*a^3*b^5*c^11*d^2*e*i + 2867328*a^4*b^4*c^11*d*f^2*h - 2095200*a^ \\
& 2*b^7*c^10*d^2*f*h - 1414080*a^3*b^6*c^10*d*f^2*h - 34836480*a^4*b^2*c^13*d \\
& ^2*e*g + 1016064*a^2*b^7*c^10*d^2*e*i - 645120*a^4*b^4*c^11*e*f^2*g + 30672 \\
& 0*a^3*b^7*c^9*d*f*h^2 + 197820*a^2*b^8*c^9*d*f^2*h + 146880*a^4*b^5*c^10*d* \\
& f*h^2 + 80640*a^3*b^6*c^10*e*f^2*g - 55350*a^2*b^9*c^8*d*f*h^2 - 2304*a^2*b \\
& ^8*c^9*e*f^2*g - 3870720*a^5*b^2*c^12*d*f*g^2 - 1935360*a^4*b^4*c^11*d*f*g^ \\
& 2 - 1658880*a^4*b^3*c^12*d*e^2*h + 725760*a^3*b^6*c^10*d*f*g^2 + 17418240*a \\
& ^3*b^4*c^12*d^2*e*g - 124416*a^3*b^5*c^11*d*e^2*h - 96768*a^2*b^8*c^9*d*f*g \\
& ^2 + 41472*a^2*b^7*c^10*d*e^2*h - 3919104*a^2*b^6*c^11*d^2*e*g - 7741440*a^ \\
& 4*b^2*c^13*d*e^2*f + 2903040*a^3*b^4*c^12*d*e^2*f - 387072*a^2*b^6*c^11*d*e \\
& ^2*f - 681246720*a^9*b*c^9*d^2*k^2 + 265912320*a^11*b^3*c^5*e*k^3 + 1887436 \\
& 80*a^12*b^2*c^5*g*k^3 - 132956160*a^11*b^4*c^4*g*k^3 - 52101120*a^13*b*c^5* \\
& j^2*k^2 + 25722880*a^12*b^3*c^4*i*k^3 + 19644416*a^11*b^5*c^3*i*k^3 - 15836 \\
& 80*a^9*b^9*c*j^2*k^2 - 9142272*a^10*b^7*c^2*i*k^3 - 74022912*a^10*b^5*c^4*e \\
& *k^3 - 20643840*a^11*b*c^7*h^2*k^2 + 37011456*a^10*b^6*c^3*g*k^3 - 2293760* \\
& a^9*b^3*c^7*i^3*k - 557056*a^8*b^5*c^6*i^3*k + 147456*a^7*b^7*c^5*i^3*k - 6 \\
& 5536*a^6*b^12*c*i^2*k^2 + 32768*a^6*b^9*c^4*i^3*k - 8192*a^5*b^11*c^3*i^3*k \\
& + 430080*a^10*b*c^8*i^2*j^2 - 2880*a^5*b^13*c*h^2*k^2 + 6635520*a^7*b^4*c^ \\
& 8*g^3*k - 4792320*a^9*b^8*c^2*g*k^3 - 2211840*a^6*b^6*c^7*g^3*k + 1359360*a \\
& ^10*b^2*c^7*h*j^3 + 1173120*a^9*b^4*c^6*h*j^3 + 743040*a^7*b^4*c^8*h^3*j + \\
& 622080*a^8*b^2*c^9*h^3*j + 221184*a^5*b^8*c^6*g^3*k + 107136*a^6*b^6*c^7*h^ \\
& 3*j - 32640*a^8*b^6*c^5*h*j^3 - 5796*a^7*b^8*c^4*h*j^3 + 540*a^5*b^8*c^6*h^ \\
& 3*j - 270*a^4*b^10*c^5*h^3*j + 210*a^6*b^10*c^3*h*j^3 - 2949120*a^10*b*c^8* \\
& f^2*k^2 + 17694720*a^6*b^3*c^10*e^3*k + 184320*a^8*b*c^10*h^2*i^2 - 3520*a^
\end{aligned}$$

$$\begin{aligned}
& 3*b^{15}*c^f^2*k^2 + 9584640*a^9*b^7*c^3*e*k^3 - 2293760*a^9*b^3*c^7*f*j^3 - \\
& 2293760*a^6*b^3*c^{10}*f^3*j - 1769472*a^5*b^5*c^9*e^3*k - 884736*a^6*b^3*c^{10} \\
& 0*g^3*i - 589824*a^7*b^3*c^9*g*i^3 - 491520*a^8*b^9*c^2*e*k^3 - 442368*a^5* \\
& b^5*c^9*g^3*i - 294912*a^6*b^5*c^8*g*i^3 - 199360*a^8*b^5*c^6*f*j^3 - 19936 \\
& 0*a^5*b^5*c^9*f^3*j + 61920*a^7*b^7*c^5*f*j^3 + 61920*a^4*b^7*c^8*f^3*j - 4 \\
& 9152*a^5*b^7*c^7*g*i^3 - 3682*a^6*b^9*c^4*f*j^3 - 3682*a^3*b^9*c^7*f^3*j + \\
& 70*a^5*b^{11}*c^3*f*j^3 + 70*a^2*b^{11}*c^6*f^3*j + 3870720*a^8*b*c^{10}*e^2*j^2 \\
& + 430080*a^7*b*c^{11}*f^2*i^2 - 14152320*a^4*b^4*c^{11}*d^3*j + 10644480*a^5*b^ \\
& 2*c^{12}*d^3*j + 5483520*a^9*b^2*c^8*d*j^3 + 4269888*a^3*b^6*c^{10}*d^3*j + 353 \\
& 8944*a^5*b^2*c^{12}*e^3*i - 1648128*a^5*b^3*c^{11}*f^3*h + 1330560*a^8*b^4*c^7* \\
& d*j^3 + 1179648*a^7*b^2*c^{10}*e*i^3 - 898560*a^6*b^3*c^{10}*f*h^3 - 826560*a^7 \\
& *b^6*c^6*d*j^3 - 607068*a^2*b^8*c^9*d^3*j + 589824*a^6*b^4*c^9*e*i^3 - 3542 \\
& 40*a^5*b^5*c^9*f*h^3 - 354240*a^4*b^5*c^{10}*f^3*h + 145188*a^6*b^8*c^5*d*j^3 \\
& + 98304*a^5*b^6*c^8*e*i^3 + 43680*a^3*b^7*c^9*f^3*h - 21600*a^4*b^7*c^8*f* \\
& h^3 - 9576*a^5*b^{10}*c^4*d*j^3 + 1350*a^3*b^9*c^7*f*h^3 - 1050*a^2*b^9*c^8*f \\
& ^3*h - 504*a*b^{14}*c^4*d^2*j^2 + 210*a^4*b^{12}*c^3*d*j^3 + 3870720*a^6*b*c^{12} \\
& *d^2*i^2 + 1658880*a^6*b*c^{12}*e^2*h^2 - 9792*a*b^{11}*c^7*d^2*i^2 + 16547328* \\
& a^4*b^2*c^{13}*d^3*h - 12306816*a^3*b^4*c^{12}*d^3*h + 37310976*a^3*b^3*c^{13}*d^ \\
& 3*f + 3037824*a^2*b^6*c^{11}*d^3*h - 2654208*a^5*b^3*c^{11}*e*g^3 + 1949184*a^6 \\
& *b^2*c^{11}*d*h^3 + 1296000*a^5*b^4*c^{10}*d*h^3 - 155520*a^4*b^6*c^9*d*h^3 - 4 \\
& 0500*a*b^{10}*c^8*d^2*h^2 - 8100*a^3*b^8*c^8*d*h^3 + 4050*a^2*b^{10}*c^7*d*h^3 \\
& + 3870720*a^5*b*c^{13}*e^2*f^2 + 34836480*a^4*b*c^{14}*d^2*e^2 - 108864*a*b^9*c \\
& ^9*d^2*g^2 - 8068032*a^2*b^5*c^{12}*d^3*f - 5623296*a^4*b^3*c^{12}*d*f^3 + 1737 \\
& 792*a^3*b^5*c^{11}*d*f^3 - 260190*a*b^8*c^{10}*d^2*f^2 - 211680*a^2*b^7*c^{10}*d* \\
& f^3 - 435456*a*b^7*c^{11}*d^2*e^2 - 377487360*a^{12}*b*c^6*e*k^3 + 1434977280*a \\
& ^8*b^3*c^8*d^2*k^2 + 173408256*a^7*c^{12}*d^2*e*k + 3276800*a^{12}*c^7*i*j^2*k \\
& - 125829120*a^{13}*b*c^5*i*k^3 + 26214400*a^{12}*c^7*f*j*k^2 + 1179648*a^{10}*c^9 \\
& *h^2*i*k + 13440*a^6*b^{13}*h*j*k^2 + 50331648*a^{11}*c^8*e*i*k^2 + 110100480*a \\
& ^{10}*c^9*d*f*k^2 + 57802752*a^8*c^{11}*d^2*i*k + 9830400*a^{11}*c^8*e*j^2*k - 32 \\
& 76800*a^9*c^{10}*f^2*i*k + 4480*a^5*b^{14}*f*j*k^2 + 15728640*a^{11}*c^8*f*h*k^2 \\
& - 409600*a^9*c^{10}*f*i^2*j - 1152*b^{16}*c^3*d^2*i*k - 1220516352*a^7*b^5*c^7* \\
& d^2*k^2 + 3538944*a^9*c^{10}*e*h^2*k + 384000*a^8*c^{11}*f^2*h*j + 13440*a^4*b^ \\
& 15*d*j*k^2 + 384*a^3*b^{16}*f*h*k^2 + 20321280*a^7*c^{12}*d^2*h*j - 245760*a^8* \\
& c^{11}*f*h*i^2 + 3456*b^{15}*c^4*d^2*g*k - 270*b^{14}*c^5*d^2*h*j - 9830400*a^8*c \\
& ^{11}*e*f^2*k + 4838400*a^9*c^{10}*d*h*j^2 + 2903040*a^8*c^{11}*d*h^2*j - 1966080 \\
& *a^{10}*b*c^8*i^3*k + 1433600*a^9*b^9*c*i*k^3 + 1152*a^2*b^{17}*d*h*k^2 - 36864 \\
& 00*a^7*c^{12}*e^2*f*j - 53084160*a^7*b*c^{11}*e^3*k - 6912*b^{14}*c^5*d^2*e*k - 3 \\
& 456*b^{12}*c^7*d^2*g*i + 630*b^{13}*c^6*d^2*f*j + 2688000*a^7*c^{12}*d*f^2*j + 24 \\
& 5760*a^8*b^{10}*c*g*k^3 - 2211840*a^6*c^{13}*e^2*f*h - 1720320*a^7*c^{12}*d*f*i^2 \\
& - 9450*b^{11}*c^8*d^2*f*h + 6912*b^{11}*c^8*d^2*e*i + 1612800*a^6*c^{13}*d*f^2*h \\
& - 1344000*a^{10}*b*c^8*f*j^3 - 1344000*a^7*b*c^{11}*f^3*j - 393216*a^8*b*c^{10}* \\
& g*i^3 - 23616*a*b^{17}*c*d^2*k^2 - 20736*b^{10}*c^9*d^2*e*g - 75188736*a^4*b*c^ \\
& 14*d^3*f - 883200*a^6*b*c^{12}*f^3*h - 317952*a^7*b*c^{11}*f*h^3 + 43416*a*b^{10} \\
& *c^8*d^3*j - 15482880*a^5*c^{14}*d*e^2*f - 10616832*a^5*b*c^{13}*e^3*g - 345060 \\
& *a*b^8*c^{10}*d^3*h - 4262400*a^5*b*c^{13}*d*f^3 + 852768*a*b^7*c^{11}*d^3*f + 73
\end{aligned}$$

$$\begin{aligned}
& 50*a*b^9*c^9*d*f^3 + 584578368*a^6*b^7*c^6*d^2*k^2 + 93905920*a^12*b^3*c^4* \\
& j^2*k^2 - 177997248*a^5*b^9*c^5*d^2*k^2 - 50967040*a^11*b^5*c^3*j^2*k^2 + 1 \\
& 04693760*a^9*b^2*c^8*e^2*k^2 + 12849984*a^10*b^7*c^2*j^2*k^2 + 20021248*a^1 \\
& 1*b^2*c^6*i^2*k^2 - 85524480*a^8*b^4*c^7*e^2*k^2 + 33223680*a^10*b^3*c^6*h^ \\
& 2*k^2 + 4227072*a^10*b^4*c^5*i^2*k^2 - 3973120*a^9*b^6*c^4*i^2*k^2 + 344064 \\
& *a^7*b^10*c^2*i^2*k^2 - 81920*a^8*b^8*c^3*i^2*k^2 - 11386368*a^9*b^5*c^5*h^ \\
& 2*k^2 + 26173440*a^9*b^4*c^6*g^2*k^2 - 21381120*a^8*b^6*c^5*g^2*k^2 + 18874 \\
& 368*a^10*b^2*c^7*g^2*k^2 + 501760*a^9*b^3*c^7*i^2*j^2 + 452160*a^8*b^7*c^4* \\
& h^2*k^2 + 385920*a^7*b^9*c^3*h^2*k^2 + 170240*a^8*b^5*c^6*i^2*j^2 - 48960*a \\
& ^6*b^11*c^2*h^2*k^2 + 9216*a^7*b^7*c^5*i^2*j^2 - 1984*a^6*b^9*c^4*i^2*j^2 + \\
& 64*a^5*b^11*c^3*i^2*j^2 + 5898240*a^7*b^8*c^4*g^2*k^2 + 1419840*a^8*b^4*c^ \\
& 7*h^2*j^2 + 1387008*a^9*b^2*c^8*h^2*j^2 - 737280*a^6*b^10*c^3*g^2*k^2 + 849 \\
& 60*a^7*b^6*c^6*h^2*j^2 + 36864*a^5*b^12*c^2*g^2*k^2 - 8010*a^6*b^8*c^5*h^2* \\
& j^2 - 180*a^5*b^10*c^4*h^2*j^2 + 9*a^4*b^12*c^3*h^2*j^2 + 14115840*a^9*b^3* \\
& c^7*f^2*k^2 - 9231552*a^7*b^7*c^5*f^2*k^2 + 23592960*a^7*b^6*c^6*e^2*k^2 + \\
& 4984320*a^8*b^5*c^6*f^2*k^2 + 3759040*a^6*b^9*c^4*f^2*k^2 + 36190080*a^4*b^ \\
& 11*c^4*d^2*k^2 + 967680*a^8*b^3*c^8*g^2*j^2 - 727360*a^5*b^11*c^3*f^2*k^2 + \\
& 276480*a^7*b^3*c^9*h^2*i^2 + 161280*a^7*b^5*c^7*g^2*j^2 + 140544*a^6*b^5*c \\
& ^8*h^2*i^2 + 72960*a^4*b^13*c^2*f^2*k^2 + 25344*a^5*b^7*c^7*h^2*i^2 - 20160 \\
& *a^6*b^7*c^6*g^2*j^2 + 576*a^5*b^9*c^5*g^2*j^2 + 576*a^4*b^9*c^6*h^2*i^2 + \\
& 3808000*a^8*b^2*c^9*f^2*j^2 - 2949120*a^6*b^8*c^5*e^2*k^2 + 1643712*a^7*b^4 \\
& *c^8*f^2*j^2 + 884736*a^7*b^2*c^10*g^2*i^2 + 884736*a^6*b^4*c^9*g^2*i^2 + 2 \\
& 21184*a^5*b^6*c^8*g^2*i^2 + 147456*a^5*b^10*c^4*e^2*k^2 - 125440*a^6*b^6*c^ \\
& 7*f^2*j^2 - 13790*a^5*b^8*c^6*f^2*j^2 + 1785*a^4*b^10*c^5*f^2*j^2 - 70*a^3* \\
& b^12*c^4*f^2*j^2 - 4953600*a^3*b^13*c^3*d^2*k^2 + 18427392*a^7*b^2*c^10*d^2 \\
& *j^2 + 645120*a^7*b^3*c^9*e^2*j^2 + 501760*a^6*b^3*c^10*f^2*i^2 + 442944*a^ \\
& 2*b^15*c^2*d^2*k^2 + 414720*a^6*b^3*c^10*g^2*h^2 + 207360*a^5*b^5*c^9*g^2*h \\
& ^2 + 170240*a^5*b^5*c^9*f^2*i^2 - 80640*a^6*b^5*c^8*e^2*j^2 + 9216*a^4*b^7* \\
& c^8*f^2*i^2 + 5184*a^4*b^7*c^8*g^2*h^2 + 2304*a^5*b^7*c^7*e^2*j^2 - 1984*a^ \\
& 3*b^9*c^7*f^2*i^2 + 64*a^2*b^11*c^6*f^2*i^2 - 4148928*a^6*b^4*c^9*d^2*j^2 + \\
& 3538944*a^6*b^2*c^11*e^2*i^2 + 1684224*a^6*b^2*c^11*f^2*h^2 + 1264320*a^5* \\
& b^4*c^10*f^2*h^2 - 1183392*a^5*b^6*c^8*d^2*j^2 + 884736*a^5*b^4*c^10*e^2*i^ \\
& 2 + 645750*a^4*b^8*c^7*d^2*j^2 + 126720*a^4*b^6*c^9*f^2*h^2 - 115920*a^3*b^ \\
& 10*c^6*d^2*j^2 - 13950*a^3*b^8*c^8*f^2*h^2 + 10836*a^2*b^12*c^5*d^2*j^2 + 2 \\
& 25*a^2*b^10*c^7*f^2*h^2 + 1935360*a^5*b^3*c^11*d^2*i^2 + 967680*a^5*b^3*c^1 \\
& 1*f^2*g^2 + 829440*a^5*b^3*c^11*e^2*h^2 - 532224*a^4*b^5*c^10*d^2*i^2 + 161 \\
& 280*a^4*b^5*c^10*f^2*g^2 - 96768*a^3*b^7*c^9*d^2*i^2 + 62784*a^2*b^9*c^8*d^ \\
& 2*i^2 + 20736*a^4*b^5*c^10*e^2*h^2 - 20160*a^3*b^7*c^9*f^2*g^2 + 576*a^2*b^ \\
& 9*c^8*f^2*g^2 + 11487744*a^5*b^2*c^12*d^2*h^2 + 7962624*a^5*b^2*c^12*e^2*g^ \\
& 2 + 35525376*a^4*b^2*c^13*d^2*f^2 - 1412640*a^3*b^6*c^10*d^2*h^2 + 461376*a \\
& ^4*b^4*c^11*d^2*h^2 + 375030*a^2*b^8*c^9*d^2*h^2 + 8709120*a^4*b^3*c^12*d^2 \\
& *g^2 - 4354560*a^3*b^5*c^11*d^2*g^2 + 979776*a^2*b^7*c^10*d^2*g^2 + 645120* \\
& a^4*b^3*c^12*e^2*f^2 - 80640*a^3*b^5*c^11*e^2*f^2 + 2304*a^2*b^7*c^10*e^2*f \\
& ^2 - 15269184*a^3*b^4*c^12*d^2*f^2 + 2870784*a^2*b^6*c^11*d^2*f^2 - 1741824 \\
& 0*a^3*b^3*c^13*d^2*e^2 + 3919104*a^2*b^5*c^12*d^2*e^2 + 384*a*b^18*d*f*k^2
\end{aligned}$$

$$\begin{aligned}
& - 199229440*a^{14}*b^2*c^3*k^4 + 8388608*a^{12}*c^7*i^2*k^2 + 75497472*a^{10}*c^9 \\
& *e^2*k^2 + 78400*a^8*b^{11}*j^2*k^2 + 4096*a^5*b^{14}*i^2*k^2 + 345600*a^{10}*c^9 \\
& *h^2*j^2 + 576*a^4*b^{15}*h^2*k^2 + 57937920*a^{13}*b^4*c^2*k^4 + 320000*a^9*c^ \\
& 10*f^2*j^2 + 64*a^2*b^{17}*f^2*k^2 + 16934400*a^8*c^{11}*d^2*j^2 + 9*b^{16}*c^3*d \\
& ^2*j^2 + 3538944*a^7*c^{12}*e^2*i^2 + 115200*a^7*c^{12}*f^2*h^2 + 576*b^{13}*c^6* \\
& d^2*i^2 + 2025*b^{12}*c^7*d^2*h^2 + 6096384*a^6*c^{13}*d^2*h^2 + 492800*a^{11}*b^ \\
& 2*c^6*j^4 + 351456*a^{10}*b^4*c^5*j^4 - 43120*a^9*b^6*c^4*j^4 + 5184*b^{11}*c^8 \\
& *d^2*g^2 + 1225*a^8*b^8*c^3*j^4 + 131072*a^8*b^2*c^9*i^4 + 98304*a^7*b^4*c^ \\
& 8*i^4 + 32768*a^6*b^6*c^7*i^4 + 11025*b^{10}*c^9*d^2*f^2 + 4096*a^5*b^8*c^6*i \\
& ^4 + 5644800*a^5*c^{14}*d^2*f^2 + 142560*a^6*b^4*c^9*h^4 + 103680*a^7*b^2*c^1 \\
& 0*h^4 + 32400*a^5*b^6*c^8*h^4 + 20736*b^9*c^{10}*d^2*e^2 + 2025*a^4*b^8*c^7*h \\
& ^4 + 331776*a^5*b^4*c^{10}*g^4 + 492800*a^5*b^2*c^{12}*f^4 + 351456*a^4*b^4*c^1 \\
& 1*f^4 - 43120*a^3*b^6*c^{10}*f^4 + 1225*a^2*b^8*c^9*f^4 - 27433728*a^3*b^2*c^ \\
& 14*d^4 + 6446304*a^2*b^4*c^{13}*d^4 + a^2*b^{14}*c^3*f^2*j^2 - 81920*a^8*b^{11}*i \\
& *k^3 + 384000*a^{11}*c^8*h*j^3 + 138240*a^9*c^{10}*h^3*j + 47416320*a^6*c^{13}*d^ \\
& 3*j - 1134*b^{12}*c^7*d^3*j + 7077888*a^6*c^{13}*e^3*i + 2688000*a^{10}*c^9*d*j^3 \\
& + 786432*a^8*c^{11}*e*i^3 + 28449792*a^5*c^{14}*d^3*h - 7782400*a^{12}*b^6*c*k^4 \\
& + 17010*b^{10}*c^9*d^3*h + 580608*a^7*c^{12}*d*h^3 - 39690*b^9*c^{10}*d^3*f - 73 \\
& 4832*a*b^6*c^{12}*d^4 + 268435456*a^{15}*c^4*k^4 + 576*b^{19}*d^2*k^2 + 409600*a^ \\
& 11*b^8*k^4 + 160000*a^{12}*c^7*j^4 + 65536*a^9*c^{10}*i^4 + 20736*a^8*c^{11}*h^4 \\
& + 49787136*a^4*c^{15}*d^4 + 160000*a^6*c^{13}*f^4 + 5308416*a^5*c^{14}*e^4 + 3572 \\
& 1*b^8*c^{11}*d^4, z, n)*x*(8388608*a^{11}*b*c^{13} - 512*a^4*b^{15}*c^6 + 14336*a^5 \\
& *b^{13}*c^7 - 172032*a^6*b^{11}*c^8 + 1146880*a^7*b^9*c^9 - 4587520*a^8*b^7*c^1 \\
& 0 + 11010048*a^9*b^5*c^{11} - 14680064*a^{10}*b^3*c^{12}))/((64*(4096*a^{10}*c^{10} + \\
& a^4*b^{12}*c^4 - 24*a^5*b^{10}*c^5 + 240*a^6*b^8*c^6 - 1280*a^7*b^6*c^7 + 3840* \\
& a^8*b^4*c^8 - 6144*a^9*b^2*c^9))) - (x*(451584*a^6*c^{13}*d^2 + 18*b^{12}*c^7*d \\
& ^2 - 25600*a^7*c^{12}*f^2 + 9216*a^8*c^{11}*h^2 + 128*a^4*b^{15}*k^2 + 25600*a^{10} \\
& *c^9*j^2 - 504*a*b^{10}*c^8*d^2 - 73728*a^6*b*c^{12}*e^2 - 8192*a^8*b*c^{10}*i^2 \\
& - 3712*a^5*b^{13}*c*k^2 - 3538944*a^{11}*b*c^7*k^2 + 6228*a^2*b^8*c^9*d^2 - 426 \\
& 24*a^3*b^6*c^{10}*d^2 + 176256*a^4*b^4*c^{11}*d^2 - 423936*a^5*b^2*c^{12}*d^2 - 4 \\
& 608*a^4*b^5*c^{10}*e^2 + 36864*a^5*b^3*c^{11}*e^2 + 2*a^2*b^{10}*c^7*f^2 - 84*a^3 \\
& *b^8*c^8*f^2 + 3520*a^4*b^6*c^9*f^2 - 26240*a^5*b^4*c^{10}*f^2 + 59904*a^6*b^ \\
& 2*c^{11}*f^2 - 1152*a^4*b^7*c^8*g^2 + 9216*a^5*b^5*c^9*g^2 - 18432*a^6*b^3*c^ \\
& 10*g^2 + 468*a^4*b^8*c^7*h^2 - 3456*a^5*b^6*c^8*h^2 + 5760*a^6*b^4*c^9*h^2 \\
& - 128*a^4*b^9*c^6*i^2 + 512*a^5*b^7*c^7*i^2 + 1536*a^6*b^5*c^8*i^2 - 4096*a \\
& ^7*b^3*c^9*i^2 + 2*a^4*b^{12}*c^3*j^2 - 88*a^5*b^{10}*c^4*j^2 + 1236*a^6*b^8*c^ \\
& 5*j^2 - 5760*a^7*b^6*c^6*j^2 + 8320*a^8*b^4*c^7*j^2 - 6144*a^9*b^2*c^8*j^2 \\
& + 46464*a^6*b^{11}*c^2*k^2 - 326400*a^7*b^9*c^3*k^2 + 1394560*a^8*b^7*c^4*k^2 \\
& - 3640320*a^9*b^5*c^5*k^2 + 5404672*a^{10}*b^3*c^6*k^2 + 129024*a^7*c^{12}*d*h \\
& + 215040*a^8*c^{11}*d*j + 786432*a^9*c^{10}*e*k + 30720*a^9*c^{10}*h*j + 262144* \\
& a^{10}*c^9*i*k + 12*a*b^{11}*c^7*d*f - 218112*a^6*b*c^{12}*d*f - 49152*a^7*b*c^{11} \\
& *e*i - 9216*a^7*b*c^{11}*f*h - 25600*a^8*b*c^{10}*f*j - 393216*a^9*b*c^9*g*k - \\
& 420*a^2*b^9*c^8*d*f + 4992*a^3*b^7*c^9*d*f - 36480*a^4*b^5*c^{10}*d*f + 14438 \\
& 4*a^5*b^3*c^{11}*d*f + 36*a^2*b^{10}*c^7*d*h - 360*a^3*b^8*c^8*d*h + 3456*a^4*b \\
& ^6*c^9*d*h + 4608*a^4*b^6*c^9*e*g - 11520*a^5*b^4*c^{10}*d*h - 36864*a^5*b^4*
\end{aligned}$$



$$\begin{aligned}
& c^{10}e^g - 27648a^6b^2c^{11}d^h + 73728a^6b^2c^{11}e^g + 12a^3b^9c^7 \\
& *f^h - 1536a^4b^7c^8e^i - 2304a^4b^7c^8f^h + 168a^4b^8c^7d^j + \\
& 9216a^5b^5c^9e^i + 17280a^5b^5c^9f^h - 768a^5b^6c^8d^j - 30720a^6 \\
& b^3c^{10}f^h + 11520a^6b^4c^9d^j - 98304a^7b^2c^{10}d^j + 768a^4 \\
& b^8c^7g^i + 140a^4b^9c^6f^j - 4608a^5b^6c^8g^i - 3584a^5b^7c^7 \\
& f^j + 1536a^5b^8c^6e^k + 20352a^6b^5c^8f^j - 26112a^6b^6c^7e^k \\
& k + 24576a^7b^2c^{10}g^i - 26624a^7b^3c^9f^j + 184320a^7b^4c^8e^k \\
& - 614400a^8b^2c^9e^k - 60a^4b^{10}c^5h^j + 1560a^5b^8c^6h^j - 76 \\
& 8a^5b^9c^5g^k - 8832a^6b^6c^7h^j + 13056a^6b^7c^6g^k + 13056a^7 \\
& b^4c^8h^j - 92160a^7b^5c^7g^k - 3072a^8b^2c^9h^j + 307200a^8b^3 \\
& c^8g^k + 256a^5b^{10}c^4i^k - 3840a^6b^8c^5i^k + 22016a^7b^6c^6 \\
& i^k - 40960a^8b^4c^7i^k - 73728a^9b^2c^8i^k)) / (64*(4096a^{10}c^{10} \\
& + a^4b^{12}c^4 - 24a^5b^{10}c^5 + 240a^6b^8c^6 - 1280a^7b^6c^7 + 38 \\
& 40a^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^7 \\
& c^k^3 - 376832a^{11}b^c^4k^3 + 13824a^5c^{11}e^2i + 4608a^6c^{10}e^i^2 \\
& - 9b^9c^7d^2i + 112896a^6c^{10}d^2k + 98304a^9c^7e^k^2 + 9b^{12}c^4 \\
& d^2k - 6400a^7c^9f^2k + 64a^4b^{12}i^k^2 + 2304a^8c^8h^2k + 3 \\
& 2768a^{10}c^6i^k^2 + 6400a^{10}c^6j^2k - 1728a^4b^3c^9g^3 + 64a^4b^6 \\
& c^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^e^f - 6720a^5c^{11}d^f^i \\
& - 2880a^5c^{11}e^f^h - 4800a^6c^{10}e^f^j - 960a^6c^{10}f^h^i + 32256a^7 \\
& c^9d^h^k - 1600a^7c^9f^i^j + 53760a^8c^8d^j^k + 7680a^9c^7h^j^k \\
& + 972a^b^5c^{10}d^2e + 24192a^3b^c^{12}d^2e - 486a^b^6c^9d^2g + 62 \\
& 40a^4b^c^{11}e^f^2 - 20736a^4b^c^{11}e^2g + 144a^b^7c^8d^2i + 8064a^4 \\
& b^c^{11}d^2i + 1728a^5b^c^{10}e^h^2 - 252a^b^{10}c^5d^2k + 2080a^5b^c^{10} \\
& f^2i + 3840a^7b^c^8e^j^2 - 2304a^6b^c^9g^i^2 - 122112a^6b^c^9 \\
& e^2k + 576a^6b^c^9h^2i - 192a^4b^{11}c^g^k^2 - 49152a^9b^c^6g^k^2 \\
& + 1280a^8b^c^7i^j^2 - 1088a^5b^{10}c^i^k^2 - 13568a^8b^c^7i^2k - \\
& 7344a^2b^3c^{11}d^2e + 3672a^2b^4c^{10}d^2g - 6a^2b^5c^9e^f^2 - 1 \\
& 2096a^3b^2c^{11}d^2g + 192a^3b^3c^{10}e^f^2 + 10368a^4b^2c^{10}e^g^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^h^2 + 6 \\
& 912a^4b^2c^{10}e^2i + 1152a^4b^4c^8e^i^2 + 4608a^5b^2c^9e^i^2 - \\
& a^2b^7c^7f^2i + 3114a^2b^8c^6d^2k + 30a^3b^5c^8f^2i - 21222a^3 \\
& b^6c^7d^2k + 1104a^4b^3c^9f^2i - 648a^4b^4c^8g^h^2 + 82584a^4 \\
& b^4c^8d^2k + 6a^4b^7c^5e^j^2 - 864a^5b^2c^9g^h^2 - 166464a^5 \\
& b^2c^9d^2k - 204a^5b^5c^6e^j^2 + 1488a^6b^3c^7e^j^2 + 1728a^4 \\
& b^4c^8g^2i - 576a^4b^5c^7g^i^2 - 4608a^4b^5c^7e^2k + 384a^4b^10 \\
& c^2e^k^2 + 3456a^5b^2c^9g^2i - 2304a^5b^3c^8g^i^2 + 43776a^5 \\
& b^3c^8e^2k - 7296a^5b^8c^3e^k^2 + 54912a^6b^6c^4e^k^2 - 188160a^7 \\
& b^4c^5e^k^2 + 228480a^8b^2c^6e^k^2 + a^2b^{10}c^4f^2k - 42a^3b^8 \\
& c^5f^2k + 216a^4b^5c^7h^2i + 535a^4b^6c^6f^2k - 3a^4b^8c^4 \\
& g^j^2 + 720a^5b^3c^8h^2i - 1840a^5b^4c^7f^2k + 102a^5b^6c^5 \\
& g^j^2 - 624a^6b^2c^8f^2k - 744a^6b^4c^6g^j^2 - 1920a^7b^2c^7g^k
\end{aligned}$$

$$\begin{aligned}
& j^2 - 1152a^4b^7c^5g^2k + 10944a^5b^5c^6g^2k + 3648a^5b^9c^2g \\
& *k^2 - 30528a^6b^3c^7g^2k - 27456a^6b^7c^3g^2k + 94080a^7b^5c^4 \\
& *g^2k - 114240a^8b^3c^5g^2k + 9a^4b^8c^4h^2k + a^4b^9c^3i^2j^2 \\
& + 72a^5b^6c^5h^2k - 32a^5b^7c^4i^2j^2 - 360a^6b^4c^6h^2k + 1 \\
& 80a^6b^5c^5i^2j^2 - 4320a^7b^2c^7h^2k + 1136a^7b^3c^6i^2j^2 - 12 \\
& 8a^4b^9c^3i^2k + 704a^5b^7c^4i^2k + 960a^6b^5c^5i^2k + 6720a \\
& a^6b^8c^2i^2k - 8704a^7b^3c^6i^2k - 13056a^7b^6c^3i^2k - 2464 \\
& 0a^8b^4c^4i^2k + 92544a^9b^2c^5i^2k - 10a^7b^6c^3j^2k + 1560 \\
& a^8b^4c^4j^2k - 11136a^9b^2c^5j^2k - 36a^6b^6c^9d^2ef + 18a^6b^7 \\
& c^8d^2fg + 15552a^4b^6c^11d^2ef + 10080a^4b^6c^11d^2fg - 6a^6b^8c^7 \\
& d^2fi + 21888a^5b^6c^10d^2ef + 6a^6b^11c^4d^2fk + 5184a^5b^6c^10d^2h \\
& i - 13824a^5b^6c^10d^2ef + 1440a^5b^6c^10d^2efgh - 4128a^6b^6c^9d^2fk + \\
& 7296a^6b^6c^9d^2ij + 5184a^6b^6c^9d^2efgh + 2400a^6b^6c^9d^2fgj - 81408 \\
& a^7b^6c^8d^2efk + 4896a^7b^6c^8d^2efgh + 1728a^7b^6c^8d^2efhi + 5600a^8b \\
& c^7d^2efjk + 900a^2b^4c^10d^2ef - 4896a^3b^2c^11d^2ef - 108a^2b^5 \\
& c^9d^2efh - 450a^2b^5c^9d^2efg + 2448a^3b^3c^10d^2efg + 138a^2b^6c^8 \\
& d^2efi + 54a^2b^6c^8d^2efgh - 516a^3b^4c^9d^2efi - 36a^3b^4c^9d^2ef \\
& fh - 4992a^4b^2c^10d^2efi - 7776a^4b^2c^10d^2efgh - 6048a^4b^2c^1 \\
& 0d^2efh - 2016a^4b^3c^9d^2efj - 18a^2b^7c^7d^2efhi - 210a^2b^9c^5d \\
& f^2k - 36a^3b^5c^8d^2efhi + 18a^3b^5c^8d^2efgh + 2496a^3b^7c^6d^2efk \\
& + 2592a^4b^3c^9d^2efhi - 6912a^4b^3c^9d^2efghi + 3024a^4b^3c^9d^2efgh \\
& + 1008a^4b^4c^8d^2efgj + 420a^4b^4c^8d^2efhj - 13770a^4b^5c^7d^2efk \\
& - 10944a^5b^2c^9d^2efgj - 7392a^5b^2c^9d^2efhj + 31536a^5b^3c^8d^2ef \\
& k + 18a^2b^10c^4d^2efhk - 6a^3b^6c^7d^2efhi - 180a^3b^8c^5d^2efhk - \\
& 1020a^4b^4c^8d^2efhi - 336a^4b^5c^7d^2efij - 180a^4b^5c^7d^2efhj - 21 \\
& 0a^4b^5c^7d^2efgj - 162a^4b^6c^6d^2efhk + 4608a^4b^6c^6d^2efgk - 2496 \\
& a^5b^2c^9d^2efhi + 2976a^5b^3c^8d^2efij + 2880a^5b^3c^8d^2efhj + 3696 \\
& a^5b^3c^8d^2efgj + 10080a^5b^4c^7d^2efhk - 43776a^5b^4c^7d^2efgk - 45 \\
& 792a^6b^2c^8d^2efhk + 122112a^6b^2c^8d^2efgk + 6a^3b^9c^4d^2efhk + 70 \\
& a^4b^6c^6d^2efij + 90a^4b^6c^6d^2efghj - 1536a^4b^7c^5d^2efik - 102a^4 \\
& b^7c^5d^2efhk + 210a^4b^8c^4d^2efjk - 1092a^5b^4c^7d^2efij - 1440a^5 \\
& b^4c^7d^2efghj + 11520a^5b^5c^6d^2efik - 390a^5b^5c^6d^2efhk - 3696a^5 \\
& b^6c^5d^2efjk - 3264a^6b^2c^8d^2efij - 2592a^6b^2c^8d^2efghj - 11520a^6 \\
& b^3c^7d^2efik + 5040a^6b^3c^7d^2efhk + 26160a^6b^4c^6d^2efjk - 79296a \\
& a^7b^2c^7d^2efjk - 30a^4b^7c^5d^2efhi + 768a^4b^8c^4d^2efik + 420a^5b \\
& b^5c^6d^2efhi - 5760a^5b^6c^5d^2efik + 70a^5b^7c^4d^2efjk + 1824a^6b^ \\
& 3c^7d^2efhi + 5760a^6b^4c^6d^2efik - 1722a^6b^5c^5d^2efjk + 40704a^7b \\
& ^2c^7d^2efik + 7824a^7b^3c^6d^2efjk + 210a^6b^6c^4d^2efhk + 384a^7b^4 \\
& c^5d^2efhk - 13728a^8b^2c^6d^2efhk)) / (64 * (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^14 \\
& c^9z^4 + 47185920a^7b^16c^8z^4 - 2621440a^6b^18c^7z^4 + 65536a^5 \\
& b^20c^6z^4 - 171798691840a^14b^2c^15z^4 + 193273528320a^13b^4c^14 \\
& z^4 - 128849018880a^12b^6c^13z^4 - 16911433728a^10b^10c^11z^4 + 35 \\
& 23215360a^9b^12c^10z^4 + 68719476736a^15c^16z^4 - 47185920a^7b^16c^
\end{aligned}$$

$$\begin{aligned}
& 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^{11} \\
& 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 a b^{18} c^6 d f z^2 - 2571632640 a^9 b \\
& ^5 c^{11} d j z^2 + 2548039680 a^9 b^3 c^{13} d h z^2 + 2453667840 a^9 b^7 c^9 \\
& e k z^2 + 2181038080 a^{12} b^3 c^{10} i k z^2 - 6492782592 a^{10} b^5 c^{10} e k z \\
& ^2 + 1509949440 a^9 b^3 c^{13} e g z^2 - 1401421824 a^8 b^5 c^{12} d h z^2 - 12 \\
& 26833920 a^9 b^8 c^8 g k z^2 - 1321205760 a^9 b^2 c^{14} d f z^2 - 2793406464 \\
& a^{11} b c^{13} d j z^2 + 9563013120 a^{11} b^3 c^{11} e k z^2 + 890634240 a^8 b^7 \\
& c^{10} d j z^2 - 754974720 a^8 b^5 c^{12} e g z^2 - 570425344 a^{11} b^5 c^9 i k \\
& z^2 + 732168192 a^7 b^6 c^{12} d f z^2 - 581959680 a^{10} b^4 c^{11} f j z^2 - 6 \\
& 03979776 a^{10} b^2 c^{13} e i z^2 + 534773760 a^{11} b^3 c^{11} h j z^2 - 55836672 \\
& 0 a^8 b^9 c^8 e k z^2 - 4781506560 a^{11} b^4 c^{10} g k z^2 - 2013265920 a^{13} \\
& b c^{11} i k z^2 - 456130560 a^9 b^4 c^{12} f h z^2 + 384040960 a^9 b^6 c^{10} f j \\
& z^2 - 264241152 a^{10} b^7 c^8 i k z^2 + 390463488 a^7 b^7 c^{11} d h z^2 + 2 \\
& 79183360 a^8 b^{10} c^7 g k z^2 + 301989888 a^{10} b^3 c^{12} g i z^2 + 222822400 \\
& a^9 b^9 c^7 i k z^2 - 366280704 a^6 b^8 c^{11} d f z^2 - 330301440 a^8 b^4 c \\
& ^{13} d f z^2 + 254017536 a^8 b^6 c^{11} f h z^2 - 1887436800 a^{10} b c^{14} d h z \\
& ^2 + 188743680 a^{10} b^2 c^{13} f h z^2 - 185303040 a^7 b^9 c^9 d j z^2 - 1179 \\
& 64800 a^{10} b^5 c^{10} h j z^2 - 6039797760 a^{12} b c^{12} e k z^2 - 67502080 a^8 \\
& b^{11} c^6 i k z^2 + 121634816 a^{11} b^2 c^{12} f j z^2 + 188743680 a^7 b^7 c^1 \\
& 1 e g z^2 - 115671040 a^8 b^8 c^9 f j z^2 + 125829120 a^8 b^6 c^{11} e i z^2 \\
& + 10813440 a^7 b^{13} c^5 i k z^2 + 76677120 a^7 b^{11} c^7 e k z^2 - 38338560 \\
& a^7 b^{12} c^6 g k z^2 - 37355520 a^9 b^7 c^9 h j z^2 - 917504 a^6 b^{15} c^4 i \\
& k z^2 + 32768 a^5 b^{17} c^3 i k z^2 - 62914560 a^8 b^7 c^{10} g i z^2 + 23101 \\
& 440 a^8 b^9 c^8 h j z^2 - 4349952 a^7 b^{11} c^7 h j z^2 + 2949120 a^6 b^{14} c \\
& ^5 g k z^2 + 337920 a^6 b^{13} c^6 h j z^2 - 98304 a^5 b^{16} c^4 g k z^2 - 768 \\
& 0 a^5 b^{15} c^5 h j z^2 - 61931520 a^7 b^8 c^{10} f h z^2 + 23592960 a^7 b^9 c \\
& ^9 g i z^2 + 17940480 a^7 b^{10} c^8 f j z^2 - 47185920 a^7 b^8 c^{10} e i z^2 \\
& - 5898240 a^6 b^{13} c^6 e k z^2 - 3538944 a^6 b^{11} c^8 g i z^2 - 1347584 a^6 \\
& b^{12} c^7 f j z^2 + 196608 a^5 b^{15} c^5 e k z^2 + 196608 a^5 b^{13} c^7 g i z \\
& ^2 + 35840 a^5 b^{14} c^6 f j z^2 + 96583680 a^5 b^{10} c^{10} d f z^2 + 23371776 \\
& a^6 b^{11} c^8 d j z^2 - 51609600 a^6 b^9 c^{10} d h z^2 + 7077888 a^6 b^{10} c^ \\
& 9 e i z^2 + 6144000 a^6 b^{10} c^9 f h z^2 - 1677312 a^5 b^{13} c^7 d j z^2 - 3 \\
& 93216 a^5 b^{12} c^8 e i z^2 + 61440 a^5 b^{12} c^8 f h z^2 + 53760 a^4 b^{15} c^ \\
& 6 d j z^2 - 46080 a^4 b^{14} c^7 f h z^2 + 1536 a^3 b^{16} c^6 f h z^2 - 235929 \\
& 60 a^6 b^9 c^{10} e g z^2 + 1179648 a^5 b^{11} c^9 e g z^2 + 829440 a^4 b^{13} c^ \\
& 8 d h z^2 + 368640 a^5 b^{11} c^9 d h z^2 - 105984 a^3 b^{15} c^7 d h z^2 + 460 \\
& 8 a^2 b^{17} c^6 d h z^2 - 15175680 a^4 b^{12} c^9 d f z^2 + 1428480 a^3 b^{14} c \\
& ^8 d f z^2 - 73728 a^2 b^{16} c^7 d f z^2 + 4108320768 a^{10} b^3 c^{12} d j z^2 \\
& - 1207959552 a^{10} b c^{14} e g z^2 - 578813952 a^{12} b c^{12} h j z^2 + 32463912 \\
& 96 a^{10} b^6 c^9 g k z^2 - 402653184 a^{11} b c^{13} g i z^2 + 3019898880 a^{12} b \\
& ^2 c^{11} g k z^2 - 440401920 a^{10} b c^{14} f^2 z^2 - 188743680 a^{11} b c^{13} h^2 \\
& z^2 + 1761607680 a^{10} c^{15} d f z^2 - 655360 a^6 b^{18} c k^2 z^2 - 94464 a b
\end{aligned}$$

$$\begin{aligned}
& ^{17}c^7d^2z^2 + 6936330240a^8b^3c^{14}d^2z^2 + 2464874496a^6b^7c^{12} \\
& d^2z^2 - 3963617280a^9b^3c^{15}d^2z^2 + 58007224320a^{13}b^4c^8k^2z^2 \\
& + 14968422400a^{11}b^8c^6k^2z^2 + 805306368a^{11}c^{14}e^i z^2 - 3596615 \\
& 6800a^{12}b^6c^7k^2z^2 + 419430400a^{12}c^{13}f^j z^2 - 1509949440a^9b^ \\
& 2c^{14}e^2z^2 + 251658240a^{11}c^{14}f^h z^2 - 56874762240a^{14}b^2c^9k^2 \\
& z^2 - 5400428544a^7b^5c^{13}d^2z^2 + 890470400a^9b^{12}c^4k^2z^2 + 7 \\
& 54974720a^8b^4c^{13}e^2z^2 - 730054656a^5b^9c^{11}d^2z^2 + 477102080* \\
& a^{12}b^3c^{10}j^2z^2 + 477102080a^9b^3c^{13}f^2z^2 - 377487360a^9b^4* \\
& c^{12}g^2z^2 + 301989888a^{10}b^2c^{13}g^2z^2 - 174325760a^{11}b^5c^9j^2 \\
& z^2 - 126156800a^8b^{14}c^3k^2z^2 + 188743680a^8b^6c^{11}g^2z^2 + 14 \\
& 1557760a^{10}b^3c^{12}h^2z^2 - 174325760a^8b^5c^{12}f^2z^2 - 188743680* \\
& a^7b^6c^{12}e^2z^2 - 4350935040a^{10}b^{10}c^5k^2z^2 + 146165760a^4b^1 \\
& 1c^{10}d^2z^2 - 50331648a^{10}b^4c^{11}i^2z^2 + 11796480a^7b^{16}c^2k^2 \\
& z^2 - 33554432a^{11}b^2c^{12}i^2z^2 + 11206656a^{10}b^7c^8j^2z^2 + 892 \\
& 9280a^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 + 2 \\
& 56a^5b^{17}c^3j^2z^2 - 47185920a^7b^8c^{10}g^2z^2 - 26542080a^8b^7* \\
& c^{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^9 \\
& c^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^5 \\
& b^{10}c^{10}e^2z^2 + 1771776a^2b^{15}c^8d^2z^2 - 440401920a^{13}b^3c^{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^3c^{12}d^2g^2j^2z^2 + 23592960a^{10}b^3c^{11}g^2h^2j^2z^2 + 169869312a^ \\
& 7b^3c^{14}d^2e^2f^2z^2 + 99090432a^8b^3c^{13}d^2g^2h^2z^2 - 3145728a^9b^3c^{12}f^2h^2i^2z^2 \\
& + 56623104a^8b^3c^{13}d^2f^2i^2z^2 - 1536a^8b^{18}c^3d^2f^2k^2z^2 - 9437184a^8b^3c^ \\
& 13e^2f^2h^2z^2 + 1536a^8b^{15}c^6d^2f^2i^2z^2 - 4608a^8b^{14}c^7d^2f^2g^2z^2 + 9216a^8b^1 \\
& 3c^8d^2e^2f^2z^2 + 2173501440a^9b^5c^8d^2j^2k^2z^2 - 1987706880a^9b^3c^{10}d^2 \\
& h^2k^2z^2 + 1121255424a^8b^5c^9d^2h^2k^2z^2 + 861143040a^8b^4c^{10}d^2f^2k^2z^2 - 8 \\
& 59963392a^7b^6c^9d^2f^2k^2z^2 - 780779520a^8b^7c^7d^2j^2k^2z^2 - 754974720a^ \\
& 9b^3c^{10}e^2g^2k^2z^2 + 2222456832a^{11}b^3c^{10}d^2j^2k^2z^2 - 454164480a^{11}b^3c^ \\
& 8h^2j^2k^2z^2 + 377487360a^8b^5c^9e^2g^2k^2z^2 + 290979840a^{10}b^4c^8f^2j^2k^2z^2 \\
& + 381026304a^6b^8c^8d^2f^2k^2z^2 + 412876800a^8b^2c^{12}d^2e^2j^2z^2 + 30198988 \\
& 8a^{10}b^2c^{10}e^2i^2k^2z^2 - 320421888a^7b^7c^8d^2h^2k^2z^2 + 185794560a^{10}b^ \\
& 5c^7h^2j^2k^2z^2 - 192020480a^9b^6c^7f^2j^2k^2z^2 + 190709760a^9b^4c^9f^2h^2k^ \\
& z^2 - 150994944a^{10}b^3c^9g^2i^2k^2z^2 + 168990720a^7b^9c^6d^2j^2k^2z^2 + 23592 \\
& 9600a^9b^2c^{11}d^2f^2k^2z^2 - 206438400a^8b^3c^{11}d^2g^2j^2z^2 - 206438400a^7* \\
& b^4c^{11}d^2e^2j^2z^2 - 101646336a^8b^6c^8f^2h^2k^2z^2 - 29245440a^9b^7c^6h^2j^ \\
& 2k^2z^2 - 60817408a^{11}b^2c^9f^2j^2k^2z^2 + 57835520a^8b^8c^6f^2j^2k^2z^2 + 21941 \\
& 4528a^7b^2c^{13}d^2e^2h^2z^2 - 70778880a^{10}b^2c^{10}f^2h^2k^2z^2 + 677376a^7b^1
\end{aligned}$$

$1*c^4*h*j*k*z - 645120*a^8*b^9*c^5*h*j*k*z - 53760*a^6*b^13*c^3*h*j*k*z + 3$   
 $1457280*a^8*b^7*c^7*g*i*k*z - 62914560*a^8*b^6*c^8*e*i*k*z - 94371840*a^7*b$   
 $^7*c^8*e*g*k*z - 221773824*a^6*b^3*c^13*d*e*f*z + 82575360*a^9*b^2*c^11*d*i$   
 $*j*z + 11796480*a^10*b^2*c^10*h*i*j*z - 11796480*a^7*b^9*c^6*g*i*k*z - 8970$   
 $240*a^7*b^10*c^5*f*j*k*z + 103219200*a^7*b^5*c^10*d*g*j*z - 2457600*a^8*b^6$   
 $*c^8*h*i*j*z + 1769472*a^6*b^11*c^5*g*i*k*z + 921600*a^7*b^8*c^7*h*i*j*z +$   
 $673792*a^6*b^12*c^4*f*j*k*z - 138240*a^6*b^10*c^6*h*i*j*z - 98304*a^5*b^13*$   
 $c^4*g*i*k*z - 17920*a^5*b^14*c^3*f*j*k*z + 7680*a^5*b^12*c^5*h*i*j*z - 9713$   
 $6640*a^5*b^10*c^7*d*f*k*z - 29491200*a^9*b^3*c^10*g*h*j*z + 58982400*a^9*b^$   
 $2*c^11*e*h*j*z + 23592960*a^7*b^8*c^7*e*i*k*z - 22169088*a^6*b^11*c^5*d*j*k$   
 $*z + 21381120*a^7*b^8*c^7*f*h*k*z + 14745600*a^8*b^5*c^9*g*h*j*z + 42854400$   
 $*a^6*b^9*c^7*d*h*k*z - 109707264*a^7*b^3*c^12*d*g*h*z - 3686400*a^7*b^7*c^8$   
 $*g*h*j*z - 3538944*a^6*b^10*c^6*e*i*k*z + 1645056*a^5*b^13*c^4*d*j*k*z - 89$   
 $0880*a^6*b^10*c^6*f*h*k*z + 460800*a^6*b^9*c^7*g*h*j*z - 330240*a^5*b^12*c^$   
 $5*f*h*k*z + 196608*a^5*b^12*c^5*e*i*k*z - 53760*a^4*b^15*c^3*d*j*k*z + 4608$   
 $0*a^4*b^14*c^4*f*h*k*z - 23040*a^5*b^11*c^6*g*h*j*z - 1536*a^3*b^16*c^3*f*h$   
 $*k*z - 29491200*a^8*b^4*c^10*e*h*j*z - 17203200*a^7*b^6*c^9*d*i*j*z + 11796$   
 $480*a^6*b^9*c^7*e*g*k*z + 110886912*a^6*b^4*c^12*d*f*g*z + 7372800*a^7*b^6*$   
 $c^9*e*h*j*z + 40108032*a^8*b^2*c^12*d*h*i*z + 6451200*a^6*b^8*c^8*d*i*j*z +$   
 $2359296*a^8*b^3*c^11*f*h*i*z - 967680*a^5*b^10*c^7*d*i*j*z - 921600*a^6*b^$   
 $8*c^8*e*h*j*z - 829440*a^4*b^13*c^5*d*h*k*z - 589824*a^5*b^11*c^6*e*g*k*z -$   
 $491520*a^6*b^7*c^9*f*h*i*z + 184320*a^5*b^9*c^8*f*h*i*z + 105984*a^3*b^15*$   
 $c^4*d*h*k*z + 69120*a^5*b^11*c^6*d*h*k*z + 53760*a^4*b^12*c^6*d*i*j*z + 460$   
 $80*a^5*b^10*c^7*e*h*j*z - 27648*a^4*b^11*c^7*f*h*i*z - 4608*a^2*b^17*c^3*d*$   
 $h*k*z + 1536*a^3*b^13*c^6*f*h*i*z - 25804800*a^6*b^7*c^9*d*g*j*z - 88473600$   
 $*a^6*b^4*c^12*d*e*h*z + 51609600*a^6*b^6*c^10*d*e*j*z - 84934656*a^7*b^2*c^$   
 $13*d*f*g*z + 117964800*a^5*b^5*c^12*d*e*f*z + 15160320*a^4*b^12*c^6*d*f*k*z$   
 $- 45613056*a^7*b^3*c^12*d*f*i*z + 44236800*a^6*b^5*c^11*d*g*h*z - 10321920$   
 $*a^6*b^6*c^10*d*h*i*z + 7077888*a^7*b^4*c^11*d*h*i*z - 5898240*a^7*b^4*c^11$   
 $*f*g*h*z + 4718592*a^8*b^2*c^12*f*g*h*z + 3225600*a^5*b^9*c^8*d*g*j*z + 294$   
 $9120*a^6*b^6*c^10*f*g*h*z + 2396160*a^5*b^8*c^9*d*h*i*z - 1428480*a^3*b^14*$   
 $c^5*d*f*k*z - 737280*a^5*b^8*c^9*f*g*h*z - 161280*a^4*b^11*c^7*d*g*j*z + 92$   
 $160*a^4*b^10*c^8*f*g*h*z + 73728*a^2*b^16*c^4*d*f*k*z - 50688*a^3*b^12*c^7*$   
 $d*h*i*z - 27648*a^4*b^10*c^8*d*h*i*z - 4608*a^3*b^12*c^7*f*g*h*z + 4608*a^2$   
 $*b^14*c^6*d*h*i*z - 58982400*a^5*b^6*c^11*d*f*g*z + 11796480*a^7*b^3*c^12*e$   
 $*f*h*z + 8847360*a^5*b^7*c^10*d*f*i*z - 6635520*a^5*b^7*c^10*d*g*h*z - 6451$   
 $200*a^5*b^8*c^9*d*e*j*z - 5898240*a^6*b^5*c^11*e*f*h*z - 3809280*a^4*b^9*c^$   
 $9*d*f*i*z + 2359296*a^6*b^5*c^11*d*f*i*z + 1474560*a^5*b^7*c^10*e*f*h*z + 6$   
 $81984*a^3*b^11*c^8*d*f*i*z + 322560*a^4*b^10*c^8*d*e*j*z - 276480*a^4*b^9*c^$   
 $9*d*g*h*z - 184320*a^4*b^9*c^9*e*f*h*z + 179712*a^3*b^11*c^8*d*g*h*z - 552$   
 $96*a^2*b^13*c^7*d*f*i*z - 13824*a^2*b^13*c^7*d*g*h*z + 9216*a^3*b^11*c^8*e*$   
 $f*h*z + 16220160*a^4*b^8*c^10*d*f*g*z + 13271040*a^5*b^6*c^11*d*e*h*z - 239$   
 $6160*a^3*b^10*c^9*d*f*g*z + 552960*a^4*b^8*c^10*d*e*h*z - 359424*a^3*b^10*c^$   
 $9*d*e*h*z + 175104*a^2*b^12*c^8*d*f*g*z + 27648*a^2*b^12*c^8*d*e*h*z - 324$   
 $40320*a^4*b^7*c^11*d*e*f*z + 4792320*a^3*b^9*c^10*d*e*f*z - 350208*a^2*b^11$

$$\begin{aligned}
& *c^9*d*e*f*z + 1439170560*a^{10}*b*c^{11}*d*h*k*z - 3361603584*a^{10}*b^3*c^9*d*j \\
& *k*z + 603979776*a^{10}*b*c^{11}*e*g*k*z + 407371776*a^{12}*b*c^9*h*j*k*z + 20132 \\
& 6592*a^{11}*b*c^{10}*g*i*k*z + 346816512*a^7*b*c^{14}*d^2*g*z + 129761280*a^{11}*b* \\
& c^{10}*h^2*k*z + 121896960*a^{10}*b*c^{11}*f^2*k*z + 458752*a^6*b^{15}*c*i*k^2*z + \\
& 19660800*a^{11}*b*c^{10}*g*j^2*z + 49152*a^5*b^{16}*c*g*k^2*z + 7077888*a^9*b*c^{11} \\
& 2*g*h^2*z + 94464*a*b^{17}*c^4*d^2*k*z - 19660800*a^8*b*c^{13}*f^2*g*z - 66816* \\
& a*b^{14}*c^7*d^2*i*z + 214272*a*b^{13}*c^8*d^2*g*z - 428544*a*b^{12}*c^9*d^2*e*z \\
& + 2390753280*a^{11}*b^4*c^7*g*k^2*z - 2411421696*a^6*b^7*c^9*d^2*k*z - 660307 \\
& 9680*a^8*b^3*c^{11}*d^2*k*z + 3715891200*a^9*b*c^{12}*d^2*k*z - 880803840*a^{10}* \\
& c^{12}*d*f*k*z - 1623195648*a^{10}*b^6*c^6*g*k^2*z - 402653184*a^{11}*c^{11}*e*i*k* \\
& z - 1509949440*a^{12}*b^2*c^8*g*k^2*z - 209715200*a^{12}*c^{10}*f*j*k*z - 3303014 \\
& 40*a^9*c^{13}*d*e*j*z + 3019898880*a^{12}*b*c^9*e*k^2*z - 125829120*a^{11}*c^{11}*f \\
& *h*k*z - 110100480*a^{10}*c^{12}*d*i*j*z - 198180864*a^8*c^{14}*d*e*h*z - 1572864 \\
& 0*a^{11}*c^{11}*h*i*j*z - 1226833920*a^9*b^7*c^6*e*k^2*z - 47185920*a^{10}*c^{12}*e \\
& *h*j*z - 66060288*a^9*c^{13}*d*h*i*z - 1090519040*a^{12}*b^3*c^7*i*k^2*z + 1022 \\
& 754816*a^6*b^2*c^{14}*d^2*e*z + 5216108544*a^7*b^5*c^{10}*d^2*k*z + 754974720*a \\
& ^9*b^2*c^{11}*e^2*k*z + 721529856*a^5*b^9*c^8*d^2*k*z + 613416960*a^9*b^8*c^5 \\
& *g*k^2*z - 642318336*a^5*b^4*c^{13}*d^2*e*z - 4781506560*a^{11}*b^3*c^8*e*k^2*z \\
& - 398131200*a^{12}*b^3*c^7*j^2*k*z - 511377408*a^6*b^3*c^{13}*d^2*g*z - 377487 \\
& 360*a^8*b^4*c^{10}*e^2*k*z + 285212672*a^{11}*b^5*c^6*i*k^2*z + 199065600*a^{11}* \\
& b^5*c^6*j^2*k*z + 279183360*a^8*b^9*c^5*e*k^2*z + 321159168*a^5*b^5*c^{12}*d^ \\
& 2*g*z + 188743680*a^9*b^4*c^9*g^2*k*z + 132120576*a^{10}*b^7*c^5*i*k^2*z - 15 \\
& 0994944*a^{10}*b^2*c^{10}*g^2*k*z - 111411200*a^9*b^9*c^4*i*k^2*z - 126812160*a \\
& ^{10}*b^3*c^9*h^2*k*z + 225312768*a^7*b^2*c^{13}*d^2*i*z - 139591680*a^8*b^{10}*c \\
& ^4*g*k^2*z - 49766400*a^{10}*b^7*c^5*j^2*k*z - 145463040*a^4*b^{11}*c^7*d^2*k*z \\
& - 94371840*a^8*b^6*c^8*g^2*k*z + 223395840*a^4*b^6*c^{12}*d^2*e*z + 33751040 \\
& *a^8*b^{11}*c^3*i*k^2*z - 78970880*a^9*b^3*c^{10}*f^2*k*z + 94371840*a^7*b^6*c^ \\
& 9*e^2*k*z + 25165824*a^{10}*b^4*c^8*i^2*k*z + 6220800*a^9*b^9*c^4*j^2*k*z + 3 \\
& 9223296*a^9*b^5*c^8*h^2*k*z - 311040*a^8*b^{11}*c^3*j^2*k*z + 16777216*a^{11}*b \\
& ^2*c^9*i^2*k*z - 10485760*a^9*b^6*c^7*i^2*k*z - 5406720*a^7*b^{13}*c^2*i*k^2* \\
& z + 1376256*a^7*b^{10}*c^5*i^2*k*z - 1310720*a^8*b^8*c^6*i^2*k*z - 262144*a^6 \\
& *b^{12}*c^4*i^2*k*z + 16384*a^5*b^{14}*c^3*i^2*k*z + 10354688*a^{11}*b^2*c^9*i*j^ \\
& 2*z + 23592960*a^7*b^8*c^7*g^2*k*z + 38559744*a^7*b^7*c^8*f^2*k*z + 1916928 \\
& 0*a^7*b^{12}*c^3*g*k^2*z - 2048000*a^9*b^6*c^7*i*j^2*z - 1520640*a^7*b^9*c^6* \\
& h^2*k*z - 1105920*a^8*b^7*c^7*h^2*k*z + 849920*a^8*b^8*c^6*i*j^2*z - 393216 \\
& *a^{10}*b^4*c^8*i*j^2*z + 195840*a^6*b^{11}*c^5*h^2*k*z - 145920*a^7*b^{10}*c^5*i \\
& *j^2*z + 11520*a^5*b^{13}*c^4*h^2*k*z + 11008*a^6*b^{12}*c^4*i*j^2*z - 2304*a^4 \\
& *b^{15}*c^3*h^2*k*z - 256*a^5*b^{14}*c^3*i*j^2*z - 25362432*a^{10}*b^3*c^9*g*j^2* \\
& z - 24739840*a^8*b^5*c^9*f^2*k*z - 38338560*a^7*b^{11}*c^4*e*k^2*z - 2949120* \\
& a^6*b^{10}*c^6*g^2*k*z - 1474560*a^6*b^{14}*c^2*g*k^2*z + 50724864*a^{10}*b^2*c^1 \\
& 0*e*j^2*z + 147456*a^5*b^{12}*c^5*g^2*k*z - 15150080*a^6*b^9*c^7*f^2*k*z + 13 \\
& 271040*a^9*b^5*c^8*g*j^2*z - 111697920*a^4*b^7*c^{11}*d^2*g*z - 3563520*a^8*b \\
& ^7*c^7*g*j^2*z + 3538944*a^9*b^2*c^{11}*h^2*i*z + 2912000*a^5*b^{11}*c^6*f^2*k* \\
& z - 737280*a^7*b^6*c^9*h^2*i*z + 506880*a^7*b^9*c^6*g*j^2*z - 291840*a^4*b^ \\
& 13*c^5*f^2*k*z + 276480*a^6*b^8*c^8*h^2*i*z - 41472*a^5*b^{10}*c^7*h^2*i*z -
\end{aligned}$$

$34560a^6b^{11}c^5g^jz^2 + 14080a^3b^{15}c^4f^2kz + 2304a^4b^{12}c^6$   
 $h^2iz + 768a^5b^{13}c^4g^jz^2 - 256a^2b^{17}c^3f^2kz - 11796480a$   
 $^6b^8c^8e^2kz - 26542080a^9b^4c^9e^jz^2 + 19837440a^3b^{13}c^6d$   
 $^2kz + 2949120a^6b^{13}c^3e^kz^2 + 589824a^5b^{10}c^7e^2kz - 98304$   
 $a^5b^{15}c^2e^kz^2 - 10354688a^8b^2c^{12}f^2iz - 43646976a^6b^4c^$   
 $^{12}d^2iz - 8847360a^8b^3c^{11}g^h^2z + 7127040a^8b^6c^8e^jz^2 + 4$   
 $423680a^7b^5c^{10}g^h^2z + 2048000a^6b^6c^{10}f^2iz - 1771776a^2b^$   
 $^{15}c^5d^2kz - 1105920a^6b^7c^9g^h^2z - 1013760a^7b^8c^7e^jz^2$   
 $- 849920a^5b^8c^9f^2iz + 393216a^7b^4c^{11}f^2iz + 145920a^4b^1$   
 $0c^8f^2iz + 138240a^5b^9c^8g^h^2z + 69120a^6b^{10}c^6e^jz^2 - 1$   
 $1008a^3b^{12}c^7f^2iz - 6912a^4b^{11}c^7g^h^2z - 1536a^5b^{12}c^5e$   
 $^jz^2 + 256a^2b^{14}c^6f^2iz - 32587776a^5b^6c^{11}d^2iz + 2536243$   
 $2a^7b^3c^{12}f^2gz + 21657600a^4b^8c^{10}d^2iz + 17694720a^8b^2c^$   
 $^{12}e^h^2z - 50724864a^7b^2c^{13}e^fz^2 - 13271040a^6b^5c^{11}f^2gz$   
 $- 8847360a^7b^4c^{11}e^h^2z - 5810688a^3b^{10}c^9d^2iz + 3563520a^$   
 $5b^7c^{10}f^2gz + 2211840a^6b^6c^{10}e^h^2z + 845568a^2b^{12}c^8d^2$   
 $iz - 506880a^4b^9c^9f^2gz - 276480a^5b^8c^9e^h^2z + 34560a^3b$   
 $^{11}c^8f^2gz + 13824a^4b^{10}c^8e^h^2z - 768a^2b^{13}c^7f^2gz +$   
 $26542080a^6b^4c^{12}e^fz^2 + 23362560a^3b^9c^{10}d^2gz - 46725120a^$   
 $3b^8c^{11}d^2ez - 7127040a^5b^6c^{11}e^fz^2 - 2965248a^2b^{11}c^9d^$   
 $2gz + 1013760a^4b^8c^{10}e^fz^2 - 69120a^3b^{10}c^9e^fz^2 + 1536a^$   
 $2b^{12}c^8e^fz^2 + 5930496a^2b^{10}c^{10}d^2ez + 1006632960a^{13}b^c^8$   
 $ik^2z + 3246391296a^{10}b^5c^7e^kz^2 + 318504960a^{13}b^c^8j^2kz +$   
 $61538304a^{10}b^{10}c^2k^3z - 603979776a^{10}c^{12}e^2kz - 693633024a^7c$   
 $^{15}d^2ez - 231211008a^8c^{14}d^2iz - 67108864a^{12}c^{10}i^2kz - 13$   
 $107200a^{12}c^{10}ij^2z - 16384a^5b^{17}ik^2z - 39321600a^{11}c^{11}e^j^$   
 $2z - 4718592a^{10}c^{12}h^2iz - 2304b^{19}c^3d^2kz + 13107200a^9c^{13}$   
 $f^2iz + 2304b^{16}c^6d^2iz - 14155776a^9c^{13}e^h^2z + 39321600a^8$   
 $c^{14}e^fz^2 - 4833280a^9b^{12}c^k^3z - 6912b^{15}c^7d^2gz + 69625446$   
 $40a^{14}b^2c^6k^3z + 13824b^{14}c^8d^2ez + 1876951040a^{12}b^6c^4k^$   
 $3z - 4844421120a^{13}b^4c^5k^3z - 437780480a^{11}b^8c^3k^3z - 429496$   
 $7296a^{15}c^7k^3z + 163840a^8b^{14}k^3z + 6144000a^{10}b^c^8f^i^j^k -$   
 $5898240a^{10}b^c^8g^h^j^k - 41287680a^9b^c^9d^g^j^k + 4472832a^9b^c^9$   
 $f^h^i^k + 18432000a^9b^c^9e^f^j^k + 3391488a^8b^c^{10}e^h^i^j + 122880$   
 $0a^8b^c^{10}f^g^i^j - 24772608a^8b^c^{10}d^g^h^k + 13418496a^8b^c^{10}e^$   
 $f^h^k + 11649024a^8b^c^{10}d^f^i^k + 737280a^7b^c^{11}f^g^h^i - 768a^ab^1$   
 $5c^3d^f^i^k - 19307520a^7b^c^{11}d^f^h^j + 16367616a^7b^c^{11}d^e^i^j +$   
 $3686400a^7b^c^{11}e^f^g^j + 34947072a^7b^c^{11}d^e^f^k + 2304a^ab^{14}c^4$   
 $d^f^g^k - 180a^ab^{13}c^5d^f^h^j + 11059200a^6b^c^{12}d^e^h^i + 5160960a^$   
 $^6b^c^{12}d^f^g^i + 2211840a^6b^c^{12}e^f^g^h - 4608a^ab^{13}c^5d^e^f^k -$   
 $2304a^ab^{11}c^7d^f^g^i + 4608a^ab^{10}c^8d^e^f^i + 15482880a^5b^c^{13}d^e$   
 $^f^g - 13824a^ab^9c^9d^e^f^g - 225976320a^8b^2c^9d^e^j^k + 112988160a$   
 $^8b^3c^8d^g^j^k - 11427840a^{10}b^2c^7h^i^j^k - 4177920a^9b^4c^6h$   
 $^i^j^k + 1399296a^8b^6c^5h^i^j^k - 26880a^6b^{10}c^3h^i^j^k + 16128a^$   
 $^7b^8c^4h^i^j^k - 61562880a^9b^2c^8d^i^j^k + 20090880a^9b^3c^7g^$

$h*j*k + 119623680*a^7*b^4*c^8*d*e*j*k + 10485760*a^9*b^3*c^7*f*i*j*k - 4018$   
 $1760*a^9*b^2*c^8*e*h*j*k - 3778560*a^8*b^5*c^6*g*h*j*k - 137797632*a^7*b^2*$   
 $c^{10}*d*e*h*k - 1248768*a^7*b^7*c^5*f*i*j*k + 229376*a^6*b^9*c^4*f*i*j*k + 2$   
 $20160*a^8*b^5*c^6*f*i*j*k - 209664*a^7*b^7*c^5*g*h*j*k + 80640*a^6*b^9*c^4*$   
 $g*h*j*k - 8960*a^5*b^{11}*c^3*f*i*j*k - 59811840*a^7*b^5*c^7*d*g*j*k + 530841$   
 $60*a^8*b^2*c^9*e*g*i*k - 11120640*a^8*b^4*c^7*f*g*j*k + 10455552*a^7*b^6*c^$   
 $6*d*i*j*k - 9216000*a^9*b^2*c^8*f*g*j*k + 7557120*a^8*b^4*c^7*e*h*j*k + 739$   
 $7376*a^8*b^3*c^8*f*h*i*k + 5230080*a^7*b^6*c^6*f*g*j*k - 37675008*a^8*b^2*c$   
 $^9*d*h*i*k - 3633408*a^6*b^8*c^5*d*i*j*k + 2211840*a^8*b^4*c^7*d*i*j*k + 68$   
 $898816*a^7*b^3*c^9*d*g*h*k - 1695744*a^8*b^2*c^9*g*h*i*j - 1400832*a^7*b^4*$   
 $c^8*g*h*i*j + 967680*a^7*b^5*c^7*f*h*i*k - 783360*a^6*b^7*c^6*f*h*i*k - 741$   
 $888*a^6*b^8*c^5*f*g*j*k + 499968*a^5*b^{10}*c^4*d*i*j*k + 419328*a^7*b^6*c^6*$   
 $e*h*j*k - 253440*a^6*b^6*c^7*g*h*i*j - 161280*a^6*b^8*c^5*e*h*j*k + 42240*a$   
 $^5*b^9*c^5*f*h*i*k + 26880*a^5*b^{10}*c^4*f*g*j*k - 26880*a^4*b^{12}*c^3*d*i*j*$   
 $k + 13824*a^4*b^{11}*c^4*f*h*i*k + 11520*a^5*b^8*c^6*g*h*i*j - 768*a^3*b^{13}*c$   
 $^3*f*h*i*k + 22241280*a^8*b^3*c^8*e*f*j*k + 14222592*a^6*b^7*c^6*d*g*j*k -$   
 $10460160*a^7*b^5*c^7*e*f*j*k + 8847360*a^7*b^4*c^8*e*g*i*k - 7741440*a^7*b^$   
 $4*c^8*f*g*h*k - 7077888*a^6*b^6*c^7*e*g*i*k + 6935040*a^6*b^6*c^7*d*h*i*k -$   
 $6709248*a^8*b^2*c^9*f*g*h*k - 3612672*a^7*b^4*c^8*d*h*i*k + 2801664*a^7*b^$   
 $3*c^9*e*h*i*j + 2506752*a^7*b^3*c^9*f*g*i*j + 2419200*a^6*b^6*c^7*f*g*h*k -$   
 $1661184*a^5*b^9*c^5*d*g*j*k + 1483776*a^6*b^7*c^6*e*f*j*k - 1463040*a^5*b^$   
 $8*c^6*d*h*i*k + 884736*a^5*b^8*c^6*e*g*i*k + 838656*a^6*b^5*c^8*f*g*i*j + 5$   
 $06880*a^6*b^5*c^8*e*h*i*j + 80640*a^4*b^{11}*c^4*d*g*j*k - 53760*a^5*b^9*c^5*$   
 $e*f*j*k - 53760*a^5*b^7*c^7*f*g*i*j - 46080*a^4*b^{10}*c^5*f*g*h*k - 34560*a^$   
 $5*b^8*c^6*f*g*h*k + 25344*a^3*b^{12}*c^4*d*h*i*k - 23040*a^5*b^7*c^7*e*h*i*j$   
 $+ 13824*a^4*b^{10}*c^5*d*h*i*k + 2304*a^3*b^{12}*c^4*f*g*h*k - 2304*a^2*b^{14}*c^$   
 $3*d*h*i*k - 29030400*a^6*b^5*c^8*d*g*h*k + 28606464*a^7*b^3*c^9*d*f*i*k - 2$   
 $8445184*a^6*b^6*c^7*d*e*j*k + 58060800*a^6*b^4*c^9*d*e*h*k + 15482880*a^7*b$   
 $^3*c^9*e*f*h*k - 8183808*a^7*b^2*c^{10}*d*g*i*j - 6718464*a^6*b^5*c^8*d*f*i*k$   
 $- 5087232*a^7*b^2*c^{10}*e*g*h*j - 5013504*a^7*b^2*c^{10}*e*f*i*j - 4838400*a^$   
 $6*b^5*c^8*e*f*h*k + 4112640*a^5*b^7*c^7*d*g*h*k - 3663360*a^5*b^7*c^7*d*f*i$   
 $*k + 3322368*a^5*b^8*c^6*d*e*j*k - 2285568*a^6*b^4*c^9*d*g*i*j + 1896960*a^$   
 $4*b^9*c^6*d*f*i*k + 1843200*a^6*b^3*c^{10}*f*g*h*i - 1677312*a^6*b^4*c^9*e*f*$   
 $i*j - 1658880*a^6*b^4*c^9*e*g*h*j + 68345856*a^6*b^3*c^{10}*d*e*f*k + 783360*$   
 $a^5*b^5*c^9*f*g*h*i + 741888*a^5*b^6*c^8*d*g*i*j - 34172928*a^6*b^4*c^9*d*f$   
 $*g*k - 340992*a^3*b^{11}*c^5*d*f*i*k - 161280*a^4*b^{10}*c^5*d*e*j*k + 138240*a$   
 $^4*b^9*c^6*d*g*h*k + 107520*a^5*b^6*c^8*e*f*i*j + 92160*a^4*b^9*c^6*e*f*h*k$   
 $- 89856*a^3*b^{11}*c^5*d*g*h*k - 80640*a^4*b^8*c^7*d*g*i*j + 69120*a^5*b^7*c$   
 $^7*e*f*h*k + 69120*a^5*b^6*c^8*e*g*h*j + 27648*a^2*b^{13}*c^4*d*f*i*k + 18432$   
 $*a^4*b^7*c^8*f*g*h*i + 6912*a^2*b^{13}*c^4*d*g*h*k - 4608*a^3*b^{11}*c^5*e*f*h*$   
 $k - 2304*a^3*b^9*c^7*f*g*h*i + 27164160*a^5*b^6*c^8*d*f*g*k - 22164480*a^6*$   
 $b^3*c^{10}*d*f*h*j - 54328320*a^5*b^5*c^9*d*e*f*k - 17473536*a^7*b^2*c^{10}*d*f$   
 $*g*k - 8225280*a^5*b^6*c^8*d*e*h*k - 8087040*a^4*b^8*c^7*d*f*g*k + 5677056*$   
 $a^6*b^3*c^{10}*e*f*g*j - 5529600*a^6*b^2*c^{11}*d*g*h*i + 4571136*a^6*b^3*c^{10}$   
 $d*e*i*j - 3686400*a^6*b^2*c^{11}*e*f*h*i + 2805120*a^5*b^5*c^9*d*f*h*j - 2211$



$840*a^5*b^4*c^{10}*d*g*h*i - 1566720*a^5*b^4*c^{10}*e*f*h*i - 1483776*a^5*b^5*c^9*d*e*i*j + 1198080*a^3*b^{10}*c^6*d*f*g*k + 437184*a^4*b^7*c^8*d*f*h*j - 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 - 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 + 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^{12}*b*c^6*h*j*k^2 - 169344*a^7*b^{11}*c^h*j*k^2 - 25165824*a^{11}*b*c^7*g*i*k^2 - 4915200*a^{11}*b*c^7*g*j^2*k - 53084160*a^8*b*c^{10}*e^2*i*k - 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 - 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 - 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 + 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 - 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$

$7136a^7b^6c^6d^2fk^2 - 49904640a^{10}b^5c^4h^2jk^2 - 178513920a^8b^4c^7d^2fk^2 - 152865792a^5b^5c^9d^2g^2k - 114388992a^7b^2c^{10}d^2i^2k + 94961664a^{10}b^2c^7e^2ik^2 - 9039872a^{11}b^2c^6ij^2k - 56494080a^{10}b^4c^5f^2jk^2 - 2052096a^{10}b^4c^5ij^2k + 1327360a^9b^6c^4ij^2k - 158080a^8b^8c^3ij^2k - 47480832a^{10}b^3c^6g^2ik^2 + 45576960a^9b^6c^4f^2jk^2 + 7954560a^9b^7c^3h^2jk^2 - 104693760a^9b^3c^7eg^2k + 142080a^8b^9c^2h^2jk^2 + 16017408a^{10}b^3c^6g^2jk^2 - 4930560a^9b^5c^5g^2jk^2 - 3649536a^9b^2c^8h^2ik^2 - 1843200a^8b^4c^7h^2ik^2 + 85524480a^8b^5c^6eg^2k + 474240a^8b^7c^4g^2jk^2 + 288000a^7b^6c^6h^2ik^2 + 63360a^6b^8c^5h^2ik^2 - 8064a^5b^{10}c^4h^2ik^2 - 1152a^4b^{12}c^3h^2ik^2 - 15437824a^{11}b^2c^6f^2jk^2 - 32034816a^{10}b^2c^7e^2jk^2 - 14369280a^8b^8c^3f^2jk^2 - 13271040a^8b^3c^8g^2ik^2 + 80267904a^7b^7c^5d^2hk^2 + 79626240a^7b^2c^{10}e^2g^2k + 11059200a^9b^5c^5g^2ik^2 + 8847360a^9b^2c^8g^2ik^2 - 42113280a^7b^9c^3d^2jk^2 + 6389760a^8b^7c^4g^2ik^2 + 5898240a^8b^4c^7g^2ik^2 - 37601280a^9b^4c^6f^2hk^2 - 2949120a^7b^9c^3g^2ik^2 + 2242560a^7b^{10}c^2f^2jk^2 - 2211840a^7b^5c^7g^2ik^2 + 1769472a^6b^7c^6g^2ik^2 + 749568a^8b^3c^8h^2ij - 442368a^7b^6c^6g^2ik^2 + 442368a^6b^{11}c^2g^2ik^2 - 442368a^6b^8c^5g^2ik^2 + 317952a^7b^5c^7h^2ij - 221184a^5b^9c^5g^2ik^2 + 73728a^5b^{10}c^4g^2ik^2 + 38400a^6b^7c^6h^2ij - 1920a^5b^9c^5h^2ij + 9861120a^9b^4c^6e^2jk^2 - 110280960a^4b^6c^9d^2ek^2 - 93330432a^6b^8c^5d^2fk^2 + 24645888a^8b^6c^5f^2hk^2 + 6359040a^8b^3c^8g^2hk^2 - 22118400a^9b^4c^6e^2ik^2 - 3862528a^8b^2c^9f^2ik^2 - 2248704a^7b^4c^8f^2ik^2 - 1290240a^9b^2c^8g^2ij^2 - 948480a^8b^6c^5e^2jk^2 - 860160a^8b^4c^7g^2ij^2 - 414720a^7b^5c^7g^2hk^2 + 303360a^6b^6c^7f^2ik^2 + 266880a^5b^8c^6f^2ik^2 - 224640a^6b^7c^6g^2hk^2 - 80640a^7b^6c^6g^2ij^2 - 72960a^4b^{10}c^5f^2ik^2 + 17280a^5b^9c^5g^2hk^2 + 12672a^6b^8c^5g^2ij^2 + 5504a^3b^{12}c^4f^2ik^2 + 3456a^4b^{11}c^4g^2hk^2 - 384a^5b^{10}c^4g^2ij^2 - 128a^2b^{14}c^3f^2ik^2 + 30265344a^6b^4c^9d^2ik^2 - 12779520a^8b^6c^5e^2ik^2 - 11796480a^8b^3c^8e^2ik^2 - 8847360a^7b^3c^9e^2ik^2 - 7925760a^{10}b^2c^7f^2hk^2 + 7077888a^6b^5c^8e^2ik^2 - 39813120a^7b^3c^9e^2g^2k - 73175040a^9b^2c^8d^2fk^2 + 5898240a^7b^8c^4e^2ik^2 + 5542272a^6b^{11}c^2d^2jk^2 - 5420160a^7b^8c^4f^2hk^2 + 55140480a^4b^7c^8d^2g^2k + 1271808a^7b^3c^9g^2h^2j - 1040384a^8b^2c^9f^2ij^2 + 884736a^7b^5c^7e^2ik^2 - 884736a^6b^{10}c^3e^2ik^2 + 884736a^6b^7c^6e^2ik^2 - 884736a^5b^7c^7e^2ik^2 - 697344a^7b^4c^8f^2ij^2 + 414720a^6b^5c^8g^2h^2j + 226560a^6b^{10}c^3f^2hk^2 - 147456a^5b^9c^5e^2ik^2 - 121856a^6b^6c^7f^2ij^2 + 82560a^5b^{12}c^2f^2hk^2 + 49152a^5b^{12}c^2e^2ik^2 - 17280a^5b^7c^7g^2h^2j + 8960a^5b^8c^6f^2ij^2 + 14194944a^5b^6c^8d^2ik^2 - 12718080a^8b^2c^9e^2hk^2 - 10615680a^4b^8c^7d^2ik^2 - 26542080a^6b^4c^9e^2g^2k - 23592960a^7b^7c^5eg^2k^2 - 5142528a^8b^3c^8f^2hk^2 + 5068800a^7b^2c^{10}f^2h^2j - 3755520a^7b^3c^9f^2g^2k + 3336192a^7b^3c^9f^2g^2k + 3000960a^6b^4c^9f^2h^2j + 2893824a^3b^{10}c^6d^2ik^2 + 1720320a^8b^3c^8h^2k$

$$\begin{aligned}
& e*i*j^2 + 1704960*a^6*b^5*c^8*f^2*g*k - 1307520*a^5*b^7*c^7*f^2*g*k - 10857 \\
& 60*a^6*b^5*c^8*f*h^2*j - 959040*a^7*b^5*c^7*f*h*j^2 + 829440*a^7*b^4*c^8*e* \\
& h^2*k - 552960*a^7*b^2*c^10*g*h^2*i - 552960*a^6*b^4*c^9*g*h^2*i + 449280*a \\
& ^6*b^6*c^7*e*h^2*k - 422784*a^2*b^12*c^5*d^2*i*k + 253440*a^4*b^9*c^6*f^2*g \\
& *k + 161280*a^7*b^5*c^7*e*i*j^2 - 145152*a^5*b^6*c^8*g*h^2*i + 103200*a^6*b \\
& ^7*c^6*f*h*j^2 + 41280*a^5*b^6*c^8*f^2*h*j - 37188*a^4*b^8*c^7*f^2*h*j - 34 \\
& 560*a^5*b^8*c^6*e*h^2*k - 25344*a^6*b^7*c^6*e*i*j^2 - 17280*a^3*b^11*c^5*f^ \\
& 2*g*k + 13536*a^5*b^7*c^7*f*h^2*j - 6912*a^4*b^10*c^5*e*h^2*k + 5490*a^4*b^ \\
& 9*c^6*f*h^2*j - 3456*a^4*b^8*c^7*g*h^2*i + 1980*a^3*b^10*c^6*f^2*h*j + 810* \\
& a^5*b^9*c^5*f*h*j^2 + 768*a^5*b^9*c^5*e*i*j^2 + 384*a^2*b^13*c^4*f^2*g*k - \\
& 270*a^4*b^11*c^4*f*h*j^2 - 180*a^3*b^11*c^5*f*h^2*j - 30*a^2*b^12*c^5*f^2*h \\
& *j + 6*a^3*b^13*c^3*f*h*j^2 + 30067200*a^6*b^2*c^11*d^2*h*j + 13271040*a^6* \\
& b^5*c^8*e*g^2*k - 10857600*a^6*b^9*c^4*d*h*k^2 + 2949120*a^6*b^9*c^4*e*g*k^ \\
& 2 + 2654208*a^5*b^6*c^8*e^2*g*k + 2125824*a^7*b^3*c^9*d*i^2*j + 1658880*a^6 \\
& *b^3*c^10*e^2*h*j - 1419264*a^6*b^4*c^9*f*g^2*j - 1327104*a^5*b^7*c^7*e*g^2 \\
& *k - 921600*a^7*b^2*c^10*f*g^2*j - 737280*a^7*b^2*c^10*f*h*i^2 - 568320*a^6 \\
& *b^4*c^9*f*h*i^2 + 207360*a^4*b^13*c^2*d*h*k^2 - 147456*a^5*b^11*c^3*e*g*k^ \\
& 2 - 136704*a^5*b^6*c^8*f*h*i^2 + 133632*a^6*b^5*c^8*d*i^2*j - 96768*a^5*b^7 \\
& *c^7*d*i^2*j + 80640*a^5*b^6*c^8*f*g^2*j - 69120*a^5*b^5*c^9*e^2*h*j + 1344 \\
& 0*a^4*b^9*c^6*d*i^2*j - 5760*a^5*b^11*c^3*d*h*k^2 - 2304*a^4*b^8*c^7*f*h*i^ \\
& 2 + 384*a^3*b^10*c^6*f*h*i^2 + 11930112*a^8*b^2*c^9*d*h*j^2 - 11646720*a^3* \\
& b^9*c^7*d^2*g*k + 8432640*a^7*b^2*c^10*d*h^2*j + 24140160*a^5*b^10*c^4*d*f* \\
& k^2 - 6672384*a^7*b^2*c^10*e*f^2*k + 4450176*a^7*b^4*c^8*d*h*j^2 + 4337280* \\
& a^6*b^4*c^9*d*h^2*j - 3870720*a^8*b^2*c^9*e*g*j^2 - 3409920*a^6*b^4*c^9*e*f \\
& ^2*k - 2885760*a^5*b^4*c^10*d^2*h*j - 2844288*a^4*b^6*c^9*d^2*h*j + 2615040 \\
& *a^5*b^6*c^8*e*f^2*k - 1687680*a^6*b^6*c^7*d*h*j^2 + 1482624*a^2*b^11*c^6*d \\
& ^2*g*k - 1290240*a^6*b^2*c^11*f^2*g*i + 1105920*a^6*b^3*c^10*e*h^2*i + 1019 \\
& 412*a^3*b^8*c^8*d^2*h*j - 1007424*a^5*b^6*c^8*d*h^2*j - 860160*a^5*b^4*c^10 \\
& *f^2*g*i - 645120*a^7*b^4*c^8*e*g*j^2 - 506880*a^4*b^8*c^7*e*f^2*k + 290304 \\
& *a^5*b^5*c^9*e*h^2*i + 197460*a^5*b^8*c^6*d*h*j^2 - 143802*a^2*b^10*c^7*d^2 \\
& *h*j + 80640*a^6*b^6*c^7*e*g*j^2 - 80640*a^4*b^6*c^9*f^2*g*i + 51948*a^4*b^ \\
& 8*c^7*d*h^2*j + 34560*a^3*b^10*c^6*e*f^2*k + 12672*a^3*b^8*c^8*f^2*g*i + 10 \\
& 800*a^3*b^10*c^6*d*h^2*j + 6912*a^4*b^7*c^8*e*h^2*i - 2304*a^5*b^8*c^6*e*g* \\
& j^2 - 768*a^2*b^12*c^5*e*f^2*k - 684*a^3*b^12*c^4*d*h*j^2 - 540*a^2*b^12*c^ \\
& 5*d*h^2*j - 384*a^2*b^10*c^7*f^2*g*i - 90*a^4*b^10*c^5*d*h*j^2 + 18*a^2*b^1 \\
& 4*c^3*d*h*j^2 + 23385600*a^6*b^2*c^11*d*f^2*j + 23293440*a^3*b^8*c^8*d^2*e* \\
& k + 6137856*a^6*b^3*c^10*d*g^2*j - 5677056*a^6*b^2*c^11*e^2*f*j + 5308416*a \\
& ^6*b^2*c^11*e*g^2*i - 5308416*a^5*b^3*c^11*e^2*g*i - 3786240*a^4*b^12*c^3*d \\
& *f*k^2 - 3538944*a^6*b^3*c^10*e*g*i^2 + 2654208*a^5*b^4*c^10*e*g^2*i + 1658 \\
& 880*a^6*b^3*c^10*d*h*i^2 - 1354752*a^5*b^5*c^9*d*g^2*j - 1105920*a^5*b^4*c^ \\
& 10*f*g^2*h - 884736*a^5*b^5*c^9*e*g*i^2 - 552960*a^6*b^2*c^11*f*g^2*h + 357 \\
& 120*a^3*b^14*c^2*d*f*k^2 + 322560*a^5*b^4*c^10*e^2*f*j + 262656*a^5*b^5*c^9 \\
& *d*h*i^2 + 120960*a^4*b^7*c^8*d*g^2*j - 55296*a^4*b^7*c^8*d*h*i^2 - 34560*a \\
& ^4*b^6*c^9*f*g^2*h + 3456*a^3*b^8*c^8*f*g^2*h + 1152*a^3*b^9*c^7*d*h*i^2 + \\
& 1152*a^2*b^11*c^6*d*h*i^2 - 13149696*a^7*b^3*c^9*d*f*j^2 - 11612160*a^5*b^2
\end{aligned}$$

$$\begin{aligned}
& *c^{12}d^2g^i + 10906560a^4b^5c^{10}d^2f^j - 7418880a^5b^3c^{11}d^2f^j \\
& j + 3148992a^6b^5c^8d^2f^j - 2985696a^3b^7c^9d^2f^j - 2965248a^2 \\
& *b^{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^2f^2j - 829440a \\
& a^5b^4c^{10}e^g*h^2 - 508032a^2b^8c^9d^2g^i + 378954a^2b^9c^8d^2f \\
& f^j + 362880a^5b^4c^{10}d^2f^2j + 296964a^3b^8c^8d^2f^2j + 161280a^4 \\
& *b^5c^{10}e^f^2i - 77070a^4b^9c^6d^2f^j - 30240a^5b^7c^7d^2f^j - \\
& 25344a^3b^7c^9e^f^2i - 20736a^4b^6c^9e^g*h^2 - 19278a^2b^{10}c^7 \\
& *d^2f^2j + 8820a^3b^{11}c^5d^2f^j + 768a^2b^9c^8e^f^2i - 378a^2b^ \\
& 13c^4d^2f^j - 5419008a^5b^3c^{11}d^2e^2j - 4423680a^5b^2c^{12}e^2f^ \\
& h + 4147200a^5b^3c^{11}d^2g^2h - 2580480a^6b^2c^{11}d^2f^i^2 - 967680a^ \\
& 5b^4c^{10}d^2f^i^2 + 483840a^4b^5c^{10}d^2e^2j - 414720a^4b^5c^{10}d^2g^ \\
& 2h - 138240a^4b^4c^{11}e^2f^h + 64512a^4b^6c^9d^2f^i^2 + 39168a^3b \\
& ^8c^8d^2f^i^2 - 31104a^3b^7c^9d^2g^2h + 13824a^3b^6c^{10}e^2f^h + 1 \\
& 0368a^2b^9c^8d^2g^2h - 9216a^2b^{10}c^7d^2f^i^2 + 15630336a^5b^2c^{1 \\
& 2}d^2f^2h - 14459904a^4b^3c^{12}d^2f^h + 9630144a^3b^5c^{11}d^2f^h - \\
& 8764416a^5b^3c^{11}d^2f^h^2 - 3870720a^5b^2c^{12}e^f^2g - 3193344a^3b \\
& ^5c^{11}d^2e^i + 2867328a^4b^4c^{11}d^2f^2h - 2095200a^2b^7c^{10}d^2f \\
& *h - 1414080a^3b^6c^{10}d^2f^2h - 34836480a^4b^2c^{13}d^2e^g + 1016064 \\
& *a^2b^7c^{10}d^2e^i - 645120a^4b^4c^{11}e^f^2g + 306720a^3b^7c^9d^ \\
& f^h^2 + 197820a^2b^8c^9d^2f^2h + 146880a^4b^5c^{10}d^2f^h^2 + 80640a^ \\
& 3b^6c^{10}e^f^2g - 55350a^2b^9c^8d^2f^h^2 - 2304a^2b^8c^9e^f^2g - \\
& 3870720a^5b^2c^{12}d^2f^g^2 - 1935360a^4b^4c^{11}d^2f^g^2 - 1658880a^4 \\
& b^3c^{12}d^2e^2h + 725760a^3b^6c^{10}d^2f^g^2 + 17418240a^3b^4c^{12}d^2 \\
& e^g - 124416a^3b^5c^{11}d^2e^2h - 96768a^2b^8c^9d^2f^g^2 + 41472a^2b \\
& ^7c^{10}d^2e^2h - 3919104a^2b^6c^{11}d^2e^g - 7741440a^4b^2c^{13}d^2e^ \\
& *f + 2903040a^3b^4c^{12}d^2e^2f - 387072a^2b^6c^{11}d^2e^2f - 681246720 \\
& *a^9b^3c^9d^2k^2 + 265912320a^{11}b^3c^5e^k^3 + 188743680a^{12}b^2c^5 \\
& g^k^3 - 132956160a^{11}b^4c^4g^k^3 - 52101120a^{13}b^3c^5j^2k^2 + 257228 \\
& 80a^{12}b^3c^4i^k^3 + 19644416a^{11}b^5c^3i^k^3 - 1583680a^9b^9c^j^2 \\
& *k^2 - 9142272a^{10}b^7c^2i^k^3 - 74022912a^{10}b^5c^4e^k^3 - 20643840 \\
& a^{11}b^3c^7h^2k^2 + 37011456a^{10}b^6c^3g^k^3 - 2293760a^9b^3c^7i^3 \\
& k - 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 - 479232 \\
& 0a^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^8 \\
& b^6c^5h^j^3 - 5796a^7b^8c^4h^j^3 + 540a^5b^8c^6h^3j - 270a^4b^ \\
& 10c^5h^3j + 210a^6b^{10}c^3h^j^3 - 2949120a^{10}b^3c^8f^2k^2 + 176947 \\
& 20a^6b^3c^{10}e^3k + 184320a^8b^3c^{10}h^2i^2 - 3520a^3b^{15}c^f^2k^2 \\
& + 9584640a^9b^7c^3e^k^3 - 2293760a^9b^3c^7f^j^3 - 2293760a^6b^3 \\
& c^{10}f^3j - 1769472a^5b^5c^9e^3k - 884736a^6b^3c^{10}g^3i - 589824 \\
& *a^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^
\end{aligned}$$

$$\begin{aligned}
& 3*j + 61920*a^7*b^7*c^5*f*j^3 + 61920*a^4*b^7*c^8*f^3*j - 49152*a^5*b^7*c^7 \\
& *g*i^3 - 3682*a^6*b^9*c^4*f*j^3 - 3682*a^3*b^9*c^7*f^3*j + 70*a^5*b^11*c^3* \\
& f*j^3 + 70*a^2*b^11*c^6*f^3*j + 3870720*a^8*b*c^10*e^2*j^2 + 430080*a^7*b*c \\
& ^11*f^2*i^2 - 14152320*a^4*b^4*c^11*d^3*j + 10644480*a^5*b^2*c^12*d^3*j + 5 \\
& 483520*a^9*b^2*c^8*d*j^3 + 4269888*a^3*b^6*c^10*d^3*j + 3538944*a^5*b^2*c^1 \\
& 2*e^3*i - 1648128*a^5*b^3*c^11*f^3*h + 1330560*a^8*b^4*c^7*d*j^3 + 1179648* \\
& a^7*b^2*c^10*e*i^3 - 898560*a^6*b^3*c^10*f*h^3 - 826560*a^7*b^6*c^6*d*j^3 - \\
& 607068*a^2*b^8*c^9*d^3*j + 589824*a^6*b^4*c^9*e*i^3 - 354240*a^5*b^5*c^9*f \\
& *h^3 - 354240*a^4*b^5*c^10*f^3*h + 145188*a^6*b^8*c^5*d*j^3 + 98304*a^5*b^6 \\
& *c^8*e*i^3 + 43680*a^3*b^7*c^9*f^3*h - 21600*a^4*b^7*c^8*f*h^3 - 9576*a^5*b \\
& ^10*c^4*d*j^3 + 1350*a^3*b^9*c^7*f*h^3 - 1050*a^2*b^9*c^8*f^3*h - 504*a*b^1 \\
& 4*c^4*d^2*j^2 + 210*a^4*b^12*c^3*d*j^3 + 3870720*a^6*b*c^12*d^2*i^2 + 16588 \\
& 80*a^6*b*c^12*e^2*h^2 - 9792*a*b^11*c^7*d^2*i^2 + 16547328*a^4*b^2*c^13*d^3 \\
& *h - 12306816*a^3*b^4*c^12*d^3*h + 37310976*a^3*b^3*c^13*d^3*f + 3037824*a^ \\
& 2*b^6*c^11*d^3*h - 2654208*a^5*b^3*c^11*e*g^3 + 1949184*a^6*b^2*c^11*d*h^3 \\
& + 1296000*a^5*b^4*c^10*d*h^3 - 155520*a^4*b^6*c^9*d*h^3 - 40500*a*b^10*c^8* \\
& d^2*h^2 - 8100*a^3*b^8*c^8*d*h^3 + 4050*a^2*b^10*c^7*d*h^3 + 3870720*a^5*b* \\
& c^13*e^2*f^2 + 34836480*a^4*b*c^14*d^2*e^2 - 108864*a*b^9*c^9*d^2*g^2 - 806 \\
& 8032*a^2*b^5*c^12*d^3*f - 5623296*a^4*b^3*c^12*d*f^3 + 1737792*a^3*b^5*c^11 \\
& *d*f^3 - 260190*a*b^8*c^10*d^2*f^2 - 211680*a^2*b^7*c^10*d*f^3 - 435456*a*b \\
& ^7*c^11*d^2*e^2 - 377487360*a^12*b*c^6*e*k^3 + 1434977280*a^8*b^3*c^8*d^2*k \\
& ^2 + 173408256*a^7*c^12*d^2*e*k + 3276800*a^12*c^7*i*j^2*k - 125829120*a^13 \\
& *b*c^5*i*k^3 + 26214400*a^12*c^7*f*j*k^2 + 1179648*a^10*c^9*h^2*i*k + 13440 \\
& *a^6*b^13*h*j*k^2 + 50331648*a^11*c^8*e*i*k^2 + 110100480*a^10*c^9*d*f*k^2 \\
& + 57802752*a^8*c^11*d^2*i*k + 9830400*a^11*c^8*e*j^2*k - 3276800*a^9*c^10*f \\
& ^2*i*k + 4480*a^5*b^14*f*j*k^2 + 15728640*a^11*c^8*f*h*k^2 - 409600*a^9*c^1 \\
& 0*f*i^2*j - 1152*b^16*c^3*d^2*i*k - 1220516352*a^7*b^5*c^7*d^2*k^2 + 353894 \\
& 4*a^9*c^10*e*h^2*k + 384000*a^8*c^11*f^2*h*j + 13440*a^4*b^15*d*j*k^2 + 384 \\
& *a^3*b^16*f*h*k^2 + 20321280*a^7*c^12*d^2*h*j - 245760*a^8*c^11*f*h*i^2 + 3 \\
& 456*b^15*c^4*d^2*g*k - 270*b^14*c^5*d^2*h*j - 9830400*a^8*c^11*e*f^2*k + 48 \\
& 38400*a^9*c^10*d*h*j^2 + 2903040*a^8*c^11*d*h^2*j - 1966080*a^10*b*c^8*i^3* \\
& k + 1433600*a^9*b^9*c*i*k^3 + 1152*a^2*b^17*d*h*k^2 - 3686400*a^7*c^12*e^2* \\
& f*j - 53084160*a^7*b*c^11*e^3*k - 6912*b^14*c^5*d^2*e*k - 3456*b^12*c^7*d^2 \\
& *g*i + 630*b^13*c^6*d^2*f*j + 2688000*a^7*c^12*d*f^2*j + 245760*a^8*b^10*c* \\
& g*k^3 - 2211840*a^6*c^13*e^2*f*h - 1720320*a^7*c^12*d*f*i^2 - 9450*b^11*c^8 \\
& *d^2*f*h + 6912*b^11*c^8*d^2*e*i + 1612800*a^6*c^13*d*f^2*h - 1344000*a^10* \\
& b*c^8*f*j^3 - 1344000*a^7*b*c^11*f^3*j - 393216*a^8*b*c^10*g*i^3 - 23616*a* \\
& b^17*c*d^2*k^2 - 20736*b^10*c^9*d^2*e*g - 75188736*a^4*b*c^14*d^3*f - 88320 \\
& 0*a^6*b*c^12*f^3*h - 317952*a^7*b*c^11*f*h^3 + 43416*a*b^10*c^8*d^3*j - 154 \\
& 82880*a^5*c^14*d*e^2*f - 10616832*a^5*b*c^13*e^3*g - 345060*a*b^8*c^10*d^3* \\
& h - 4262400*a^5*b*c^13*d*f^3 + 852768*a*b^7*c^11*d^3*f + 7350*a*b^9*c^9*d*f \\
& ^3 + 584578368*a^6*b^7*c^6*d^2*k^2 + 93905920*a^12*b^3*c^4*j^2*k^2 - 177997 \\
& 248*a^5*b^9*c^5*d^2*k^2 - 50967040*a^11*b^5*c^3*j^2*k^2 + 104693760*a^9*b^2 \\
& *c^8*e^2*k^2 + 12849984*a^10*b^7*c^2*j^2*k^2 + 20021248*a^11*b^2*c^6*i^2*k^ \\
& 2 - 85524480*a^8*b^4*c^7*e^2*k^2 + 33223680*a^10*b^3*c^6*h^2*k^2 + 4227072*
\end{aligned}$$

$a^{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^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 + 3538944$

```

*a^7*c^12*e^2*i^2 + 115200*a^7*c^12*f^2*h^2 + 576*b^13*c^6*d^2*i^2 + 2025*b
^12*c^7*d^2*h^2 + 6096384*a^6*c^13*d^2*h^2 + 492800*a^11*b^2*c^6*j^4 + 3514
56*a^10*b^4*c^5*j^4 - 43120*a^9*b^6*c^4*j^4 + 5184*b^11*c^8*d^2*g^2 + 1225*
a^8*b^8*c^3*j^4 + 131072*a^8*b^2*c^9*i^4 + 98304*a^7*b^4*c^8*i^4 + 32768*a^
6*b^6*c^7*i^4 + 11025*b^10*c^9*d^2*f^2 + 4096*a^5*b^8*c^6*i^4 + 5644800*a^5
*c^14*d^2*f^2 + 142560*a^6*b^4*c^9*h^4 + 103680*a^7*b^2*c^10*h^4 + 32400*a^
5*b^6*c^8*h^4 + 20736*b^9*c^10*d^2*e^2 + 2025*a^4*b^8*c^7*h^4 + 331776*a^5*
b^4*c^10*g^4 + 492800*a^5*b^2*c^12*f^4 + 351456*a^4*b^4*c^11*f^4 - 43120*a^
3*b^6*c^10*f^4 + 1225*a^2*b^8*c^9*f^4 - 27433728*a^3*b^2*c^14*d^4 + 6446304
*a^2*b^4*c^13*d^4 + a^2*b^14*c^3*f^2*j^2 - 81920*a^8*b^11*i*k^3 + 384000*a^
11*c^8*h*j^3 + 138240*a^9*c^10*h^3*j + 47416320*a^6*c^13*d^3*j - 1134*b^12*
c^7*d^3*j + 7077888*a^6*c^13*e^3*i + 2688000*a^10*c^9*d*j^3 + 786432*a^8*c^
11*e*i^3 + 28449792*a^5*c^14*d^3*h - 7782400*a^12*b^6*c*k^4 + 17010*b^10*c^
9*d^3*h + 580608*a^7*c^12*d*h^3 - 39690*b^9*c^10*d^3*f - 734832*a*b^6*c^12*
d^4 + 268435456*a^15*c^4*k^4 + 576*b^19*d^2*k^2 + 409600*a^11*b^8*k^4 + 160
000*a^12*c^7*j^4 + 65536*a^9*c^10*i^4 + 20736*a^8*c^11*h^4 + 49787136*a^4*c
^15*d^4 + 160000*a^6*c^13*f^4 + 5308416*a^5*c^14*e^4 + 35721*b^8*c^11*d^4,
z, n), n, 1, 4)

```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```

[In] integrate((k*x**11+j*x**8+i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2
+a)**3,x)

```

```

[Out] Timed out

```

## 3.60

$$\int (a + bx^2 + cx^4)^3 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5$$

**Optimal.** Leaf size=416

$$a^4 dx + \frac{1}{2} a^4 ex^2 + \frac{1}{3} a^3 x^3 (af + 4bd) + a^3 bex^4 + \frac{2}{5} a^2 x^5 (2abf + 2acd + 3b^2d) + \frac{1}{3} a^2 ex^6 (2ac + 3b^2) + \frac{1}{10} ex^{10} (6a^2c^2 + 12ab$$

**Rubi [A]** time = 0.63, antiderivative size = 416, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 63,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.016$ , Rules used = {1671}

$$\frac{1}{10} a^{10} (6a^2c^2 + 12ab^2c) + \frac{1}{9} a^9 (12ab^2c + 6a^2c^2 + 12ab^2c + 6a^2c^2) + \frac{1}{8} a^8 (6a^2c^2 + 12ab^2c) + \frac{1}{7} a^7 (12ab^2c + 6a^2c^2 + 12ab^2c + 6a^2c^2) + \frac{1}{6} a^6 (12ab^2c + 6a^2c^2 + 12ab^2c + 6a^2c^2) + \frac{1}{5} a^5 (12ab^2c + 6a^2c^2 + 12ab^2c + 6a^2c^2) + \frac{1}{4} a^4 (12ab^2c + 6a^2c^2 + 12ab^2c + 6a^2c^2) + \frac{1}{3} a^3 (12ab^2c + 6a^2c^2 + 12ab^2c + 6a^2c^2) + \frac{1}{2} a^2 (12ab^2c + 6a^2c^2 + 12ab^2c + 6a^2c^2) + a (12ab^2c + 6a^2c^2 + 12ab^2c + 6a^2c^2) + 12ab^2c + 6a^2c^2$$

Antiderivative was successfully verified.

[In] Int[(a + b\*x^2 + c\*x^4)^3\*(a\*d + a\*e\*x + (b\*d + a\*f)\*x^2 + b\*e\*x^3 + (c\*d + b\*f)\*x^4 + c\*e\*x^5 + c\*f\*x^6), x]

[Out] a^4\*d\*x + (a^4\*e\*x^2)/2 + (a^3\*(4\*b\*d + a\*f)\*x^3)/3 + a^3\*b\*e\*x^4 + (2\*a^2\*(3\*b^2\*d + 2\*a\*c\*d + 2\*a\*b\*f)\*x^5)/5 + (a^2\*(3\*b^2 + 2\*a\*c)\*e\*x^6)/3 + (2\*a\*(2\*b^3\*d + 6\*a\*b\*c\*d + 3\*a\*b^2\*f + 2\*a^2\*c\*f)\*x^7)/7 + (a\*b\*(b^2 + 3\*a\*c)\*e\*x^8)/2 + ((b^4\*d + 12\*a\*b^2\*c\*d + 6\*a^2\*c^2\*d + 4\*a\*b^3\*f + 12\*a^2\*b\*c\*f)\*x^9)/9 + ((b^4 + 12\*a\*b^2\*c + 6\*a^2\*c^2)\*e\*x^10)/10 + ((4\*b^3\*c\*d + 12\*a\*b\*c^2\*d + b^4\*f + 12\*a\*b^2\*c\*f + 6\*a^2\*c^2\*f)\*x^11)/11 + (b\*c\*(b^2 + 3\*a\*c)\*e\*x^12)/3 + (2\*c\*(3\*b^2\*c\*d + 2\*a\*c^2\*d + 2\*b^3\*f + 6\*a\*b\*c\*f)\*x^13)/13 + (c^2\*(3\*b^2 + 2\*a\*c)\*e\*x^14)/7 + (2\*c^2\*(2\*b\*c\*d + 3\*b^2\*f + 2\*a\*c\*f)\*x^15)/15 + (b\*c^3\*e\*x^16)/4 + (c^3\*(c\*d + 4\*b\*f)\*x^17)/17 + (c^4\*e\*x^18)/18 + (c^4\*f\*x^19)/19

Rule 1671

Int[(Pq\_)\*((a\_) + (b\_)\*(x\_)^2 + (c\_)\*(x\_)^4)^(p\_), x\_Symbol] := Int[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

$$\int (a + bx^2 + cx^4)^3 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx = \int (a^4d + a^4ex + a^3(4bd + 3b^2d + 2ac*d + 2ab*f)x^5 + (a^2(3b^2 + 2ac)*e + 2a(2b^3d + 6ab*c*d + 3ab^2*f + 2a^2*c*f)x^7 + ab(b^2 + 3ac)*e)x^8 + ((b^4d + 12ab^2*c*d + 6a^2*c^2*d + 4ab^3*f + 12a^2*b*c*f)x^9 + (b^4 + 12ab^2*c + 6a^2*c^2)*e)x^{10} + ((4b^3*c*d + 12ab*c^2*d + b^4*f + 12ab^2*c*f + 6a^2*c^2*f)x^{11} + b*c*(b^2 + 3ac)*e)x^{12} + (2c(3b^2*c*d + 2ac^2*d + 2b^3*f + 6ab*c*f)x^{13} + c^2(3b^2 + 2ac)*e)x^{14} + (2c^2(2b*c*d + 3b^2*f + 2ac*f)x^{15} + b*c^3*e)x^{16} + c^3(c*d + 4b*f)x^{17} + c^4*e)x^{18} + c^4*f)x^{19} dx = a^4 dx + \frac{1}{2} a^4 ex^2 + \frac{1}{3} a^3 (4bd + 3b^2d + 2ac*d + 2ab*f)x^5 + \frac{1}{3} a^2 (3b^2 + 2ac) e x^6 + \frac{1}{7} a (2b^3d + 6ab*c*d + 3ab^2*f + 2a^2*c*f)x^7 + \frac{1}{2} ab(b^2 + 3ac) e x^8 + \frac{1}{9} (b^4d + 12ab^2*c*d + 6a^2*c^2*d + 4ab^3*f + 12a^2*b*c*f)x^9 + \frac{1}{10} (b^4 + 12ab^2*c + 6a^2*c^2) e x^{10} + \frac{1}{11} ((4b^3*c*d + 12ab*c^2*d + b^4*f + 12ab^2*c*f + 6a^2*c^2*f)x^{11} + b*c*(b^2 + 3ac)*e)x^{12} + \frac{1}{13} (2c(3b^2*c*d + 2ac^2*d + 2b^3*f + 6ab*c*f)x^{13} + c^2(3b^2 + 2ac)*e)x^{14} + \frac{1}{15} (2c^2(2b*c*d + 3b^2*f + 2ac*f)x^{15} + b*c^3*e)x^{16} + \frac{1}{17} c^3(c*d + 4b*f)x^{17} + \frac{1}{18} c^4*e)x^{18} + \frac{1}{19} c^4*f)x^{19}$$





$$\begin{aligned} & 12/11*x^{11}*f*c*b^2*a + 6/11*x^{11}*f*c^2*a^2 + 1/10*x^{10}*e*b^4 + 6/5*x^{10}*e* \\ & c*b^2*a + 3/5*x^{10}*e*c^2*a^2 + 1/9*x^9*d*b^4 + 4/3*x^9*d*c*b^2*a + 4/9*x^9* \\ & f*b^3*a + 2/3*x^9*d*c^2*a^2 + 4/3*x^9*f*c*b*a^2 + 1/2*x^8*e*b^3*a + 3/2*x^8 \\ & *e*c*b*a^2 + 4/7*x^7*d*b^3*a + 12/7*x^7*d*c*b*a^2 + 6/7*x^7*f*b^2*a^2 + 4/7 \\ & *x^7*f*c*a^3 + x^6*e*b^2*a^2 + 2/3*x^6*e*c*a^3 + 6/5*x^5*d*b^2*a^2 + 4/5*x^5 \\ & *d*c*a^3 + 4/5*x^5*f*b*a^3 + x^4*e*b*a^3 + 4/3*x^3*d*b*a^3 + 1/3*x^3*f*a^4 \\ & + 1/2*x^2*e*a^4 + x*d*a^4 \end{aligned}$$

**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] int((c\*x^4+b\*x^2+a)^3\*(a\*d+a\*e\*x+(a\*f+b\*d)\*x^2+b\*e\*x^3+(b\*f+c\*d)\*x^4+c\*e\*x^5+c\*f\*x^6),x)

[Out] 1/19\*c^4\*f\*x^19+1/18\*c^4\*e\*x^18+1/17\*(3\*b\*c^3\*f+c^3\*(b\*f+c\*d))\*x^17+1/4\*b\*c^3\*e\*x^16+1/15\*((a\*c^2+2\*b^2\*c+(2\*a\*c+b^2)\*c)\*c\*f+3\*b\*c^2\*(b\*f+c\*d)+c^3\*(a\*f+b\*d))\*x^15+1/14\*((a\*c^2+2\*b^2\*c+(2\*a\*c+b^2)\*c)\*c\*e+3\*b^2\*c^2\*e+a\*c^3\*e)\*x^14+1/13\*((4\*a\*b\*c+(2\*a\*c+b^2)\*b)\*c\*f+(a\*c^2+2\*b^2\*c+(2\*a\*c+b^2)\*c)\*(b\*f+c\*d)+3\*b\*c^2\*(a\*f+b\*d)+a\*c^3\*d)\*x^13+1/12\*((4\*a\*b\*c+(2\*a\*c+b^2)\*b)\*c\*e+(a\*c^2+2\*b^2\*c+(2\*a\*c+b^2)\*c)\*b\*e+3\*a\*b\*c^2\*e)\*x^12+1/11\*((a^2\*c+2\*a\*b^2+(2\*a\*c+b^2)\*a)\*c\*f+(4\*a\*b\*c+(2\*a\*c+b^2)\*b)\*(b\*f+c\*d)+(a\*c^2+2\*b^2\*c+(2\*a\*c+b^2)\*c)\*

$$(a*f+b*d)+3*d*a*b*c^2)*x^{11}+1/10*((a^2*c+2*a*b^2+(2*a*c+b^2)*a)*c*e+(4*a*b*c+(2*a*c+b^2)*b)*b*e+(a*c^2+2*b^2*c+(2*a*c+b^2)*c)*a*e)*x^{10}+1/9*(3*a^2*b*c*f+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*(b*f+c*d)+(4*a*b*c+(2*a*c+b^2)*b)*(a*f+b*d)+(a*c^2+2*b^2*c+(2*a*c+b^2)*c)*a*d)*x^9+1/8*(3*a^2*b*c*e+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*b*e+(4*a*b*c+(2*a*c+b^2)*b)*a*e)*x^8+1/7*(a^3*c*f+3*a^2*b*(b*f+c*d)+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*(a*f+b*d)+(4*a*b*c+(2*a*c+b^2)*b)*a*d)*x^7+1/6*(a^3*c*e+3*a^2*b^2*e+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*a*e)*x^6+1/5*(a^3*(b*f+c*d)+3*a^2*b*(a*f+b*d)+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*a*d)*x^5+a^3*b*e*x^4+1/3*(a^3*(a*f+b*d)+3*a^3*b*d)*x^3+1/2*a^4*e*x^2+a^4*d*x$$

**maxima [A]** time = 0.52, size = 418, normalized size = 1.00

$\frac{1}{10} (a^2 c + 2 a b^2 + (2 a c + b^2) a) c e + \frac{1}{9} (3 a^2 b c f + (a^2 c + 2 a b^2 + (2 a c + b^2) a) (b f + c d) + (4 a b c + (2 a c + b^2) b) (a f + b d) + (a c^2 + 2 b^2 c + (2 a c + b^2) c) a d) x^9 + \frac{1}{8} (3 a^2 b c e + (a^2 c + 2 a b^2 + (2 a c + b^2) a) b e + (4 a b c + (2 a c + b^2) b) a e) x^8 + \frac{1}{7} (a^3 c f + 3 a^2 b (b f + c d) + (a^2 c + 2 a b^2 + (2 a c + b^2) a) (a f + b d) + (4 a b c + (2 a c + b^2) b) a d) x^7 + \frac{1}{6} (a^3 c e + 3 a^2 b^2 e + (a^2 c + 2 a b^2 + (2 a c + b^2) a) a e) x^6 + \frac{1}{5} (a^3 (b f + c d) + 3 a^2 b (a f + b d) + (a^2 c + 2 a b^2 + (2 a c + b^2) a) a d) x^5 + a^3 b e x^4 + \frac{1}{3} (a^3 (a f + b d) + 3 a^3 b d) x^3 + \frac{1}{2} a^4 e x^2 + a^4 d x$

Verification of antiderivative is not currently implemented for this CAS.

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

$$[Out] \frac{1}{19}c^4f*x^{19} + \frac{1}{18}c^4e*x^{18} + \frac{1}{4}b*c^3e*x^{16} + \frac{1}{17}(c^4*d + 4*b*c^3*f)*x^{17} + \frac{1}{7}(3*b^2*c^2 + 2*a*c^3)*e*x^{14} + \frac{2}{15}(2*b*c^3*d + (3*b^2*c^2 + 2*a*c^3)*f)*x^{15} + \frac{1}{3}(b^3*c + 3*a*b*c^2)*e*x^{12} + \frac{2}{13}((3*b^2*c^2 + 2*a*c^3)*d + 2*(b^3*c + 3*a*b*c^2)*f)*x^{13} + \frac{1}{10}(b^4 + 12*a*b^2*c + 6*a^2*c^2)*e*x^{10} + \frac{1}{11}(4*(b^3*c + 3*a*b*c^2)*d + (b^4 + 12*a*b^2*c + 6*a^2*c^2)*f)*x^{11} + \frac{1}{2}(a*b^3 + 3*a^2*b*c)*e*x^8 + \frac{1}{9}((b^4 + 12*a*b^2*c + 6*a^2*c^2)*d + 4*(a*b^3 + 3*a^2*b*c)*f)*x^9 + a^3*b*e*x^4 + \frac{1}{3}(3*a^2*b^2 + 2*a^3*c)*e*x^6 + \frac{2}{7}(2*(a*b^3 + 3*a^2*b*c)*d + (3*a^2*b^2 + 2*a^3*c)*f)*x^7 + \frac{1}{2}a^4*e*x^2 + a^4*d*x + \frac{2}{5}(2*a^3*b*f + (3*a^2*b^2 + 2*a^3*c)*d)*x^5 + \frac{1}{3}(4*a^3*b*d + a^4*f)*x^3$$

**mupad [B]** time = 0.38, size = 398, normalized size = 0.96

$\frac{1}{19} (c^4 f) x^{19} + \frac{1}{18} (c^4 e) x^{18} + \frac{1}{4} (b c^3 e) x^{16} + \frac{1}{17} (c^4 d + 4 b c^3 f) x^{17} + \frac{1}{7} (3 b^2 c^2 + 2 a c^3) e x^{14} + \frac{2}{15} (2 b c^3 d + (3 b^2 c^2 + 2 a c^3) f) x^{15} + \frac{1}{3} (b^3 c + 3 a b c^2) e x^{12} + \frac{2}{13} ((3 b^2 c^2 + 2 a c^3) d + 2 (b^3 c + 3 a b c^2) f) x^{13} + \frac{1}{10} (b^4 + 12 a b^2 c + 6 a^2 c^2) e x^{10} + \frac{1}{11} (4 (b^3 c + 3 a b c^2) d + (b^4 + 12 a b^2 c + 6 a^2 c^2) f) x^{11} + \frac{1}{2} (a b^3 + 3 a^2 b c) e x^8 + \frac{1}{9} ((b^4 + 12 a b^2 c + 6 a^2 c^2) d + 4 (a b^3 + 3 a^2 b c) f) x^9 + a^3 b e x^4 + \frac{1}{3} (3 a^2 b^2 + 2 a^3 c) e x^6 + \frac{2}{7} (2 (a b^3 + 3 a^2 b c) d + (3 a^2 b^2 + 2 a^3 c) f) x^7 + \frac{1}{2} a^4 e x^2 + a^4 d x + \frac{2}{5} (2 a^3 b f + (3 a^2 b^2 + 2 a^3 c) d) x^5 + \frac{1}{3} (4 a^3 b d + a^4 f) x^3$

Verification of antiderivative is not currently implemented for this CAS.

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

$$[Out] x^3*((a^4*f)/3 + (4*a^3*b*d)/3) + x^{17}*((c^4*d)/17 + (4*b*c^3*f)/17) + x^5*((6*a^2*b^2*d)/5 + (4*a^3*c*d)/5 + (4*a^3*b*f)/5) + x^{15}*((2*b^2*c^2*f)/5 + (4*b*c^3*d)/15 + (4*a*c^3*f)/15) + x^9*((b^4*d)/9 + (2*a^2*c^2*d)/3 + (4*a*b^3*f)/9 + (4*a*b^2*c*d)/3 + (4*a^2*b*c*f)/3) + x^{11}*((b^4*f)/11 + (6*a^2*c^2*f)/11 + (4*b^3*c*d)/11 + (12*a*b*c^2*d)/11 + (12*a*b^2*c*f)/11) + x^7*((6*a^2*b^2*f)/7 + (4*a*b^3*d)/7 + (4*a^3*c*f)/7 + (12*a^2*b*c*d)/7) + x^{13}*((6*b^2*c^2*d)/13 + (4*a*c^3*d)/13 + (4*b^3*c*f)/13 + (12*a*b*c^2*f)/13) + (a^4*e*x^2)/2 + (c^4*e*x^18)/18 + (c^4*f*x^19)/19 + (e*x^10*(b^4 + 6*a^2*c^2$$

$$2 + 12*a*b^2*c))/10 + a^4*d*x + (a^2*e*x^6*(2*a*c + 3*b^2))/3 + (c^2*e*x^14*(2*a*c + 3*b^2))/7 + a^3*b*e*x^4 + (b*c^3*e*x^16)/4 + (a*b*e*x^8*(3*a*c + b^2))/2 + (b*c*e*x^12*(3*a*c + b^2))/3$$

**sympy [A]** time = 0.16, size = 503, normalized size = 1.21

$\int \frac{d}{dx} (c^2 e x^{14} (2 a c + 3 b^2) / 7 + a^3 b e x^4 + (b c^3 e x^{16}) / 4 + (a b e x^8 (3 a c + b^2)) / 2 + (b c e x^{12} (3 a c + b^2)) / 3 + a^4 d x + (a^2 e x^6 (2 a c + 3 b^2)) / 3 + 2 + 12 a b^2 c) dx = c^2 e x^{14} (2 a c + 3 b^2) / 7 + a^3 b e x^4 + (b c^3 e x^{16}) / 4 + (a b e x^8 (3 a c + b^2)) / 2 + (b c e x^{12} (3 a c + b^2)) / 3 + a^4 d x + (a^2 e x^6 (2 a c + 3 b^2)) / 3 + 2 + 12 a b^2 c$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] a\*\*4\*d\*x + a\*\*4\*e\*x\*\*2/2 + a\*\*3\*b\*e\*x\*\*4 + b\*c\*\*3\*e\*x\*\*16/4 + c\*\*4\*e\*x\*\*18/18 + c\*\*4\*f\*x\*\*19/19 + x\*\*17\*(4\*b\*c\*\*3\*f/17 + c\*\*4\*d/17) + x\*\*15\*(4\*a\*c\*\*3\*f/15 + 2\*b\*\*2\*c\*\*2\*f/5 + 4\*b\*c\*\*3\*d/15) + x\*\*14\*(2\*a\*c\*\*3\*e/7 + 3\*b\*\*2\*c\*\*2\*e/7) + x\*\*13\*(12\*a\*b\*c\*\*2\*f/13 + 4\*a\*c\*\*3\*d/13 + 4\*b\*\*3\*c\*f/13 + 6\*b\*\*2\*c\*\*2\*d/13) + x\*\*12\*(a\*b\*c\*\*2\*e + b\*\*3\*c\*e/3) + x\*\*11\*(6\*a\*\*2\*c\*\*2\*f/11 + 12\*a\*b\*\*2\*c\*f/11 + 12\*a\*b\*c\*\*2\*d/11 + b\*\*4\*f/11 + 4\*b\*\*3\*c\*d/11) + x\*\*10\*(3\*a\*\*2\*c\*\*2\*e/5 + 6\*a\*b\*\*2\*c\*e/5 + b\*\*4\*e/10) + x\*\*9\*(4\*a\*\*2\*b\*c\*f/3 + 2\*a\*\*2\*c\*\*2\*d/3 + 4\*a\*b\*\*3\*f/9 + 4\*a\*b\*\*2\*c\*d/3 + b\*\*4\*d/9) + x\*\*8\*(3\*a\*\*2\*b\*c\*e/2 + a\*b\*\*3\*e/2) + x\*\*7\*(4\*a\*\*3\*c\*f/7 + 6\*a\*\*2\*b\*\*2\*f/7 + 12\*a\*\*2\*b\*c\*d/7 + 4\*a\*b\*\*3\*d/7) + x\*\*6\*(2\*a\*\*3\*c\*e/3 + a\*\*2\*b\*\*2\*e) + x\*\*5\*(4\*a\*\*3\*b\*f/5 + 4\*a\*\*3\*c\*d/5 + 6\*a\*\*2\*b\*\*2\*d/5) + x\*\*3\*(a\*\*4\*f/3 + 4\*a\*\*3\*b\*d/3)

## 3.61

$$\int (a + bx^2 + cx^4)^2 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cf x^6) dx$$

**Optimal.** Leaf size=259

$$a^3 dx + \frac{1}{2} a^3 ex^2 + \frac{1}{7} x^7 (3a^2 cf + 3ab^2 f + 6abcd + b^3 d) + \frac{1}{3} a^2 x^3 (af + 3bd) + \frac{3}{4} a^2 bex^4 + \frac{3}{11} cx^{11} (acf + b^2 f + bcd) + \frac{3}{5} ax^5$$

**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}

$$\frac{1}{7} x^7 (3a^2 cf + 3ab^2 f + 6abcd + b^3 d) + \frac{1}{3} a^2 x^3 (af + 3bd) + \frac{3}{4} a^2 bex^4 + \frac{3}{11} cx^{11} (acf + b^2 f + bcd) + \frac{3}{5} ax^5$$

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**

$$\int (a + bx^2 + cx^4)^2 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cf x^6) dx = \int (a^3 d + a^3 ex + a^2(3bd + a^2 cf + 3ab^2 f + 6abcd + b^3 d) + a^2 x^3 (af + 3bd) + \frac{3}{4} a^2 bex^4 + \frac{3}{11} cx^{11} (acf + b^2 f + bcd) + \frac{3}{5} ax^5) dx$$

$$= a^3 dx + \frac{1}{2} a^3 ex^2 + \frac{1}{3} a^2 (3bd + a^2 cf + 3ab^2 f + 6abcd + b^3 d) x^3 + \frac{1}{3} a^2 x^3 (af + 3bd) x^3 + \frac{3}{4} a^2 bex^4 + \frac{3}{11} cx^{11} (acf + b^2 f + bcd) + \frac{3}{5} ax^5$$

**Mathematica [A]** time = 0.05, size = 259, normalized size = 1.00

$$a^3 dx + \frac{1}{2} a^3 ex^2 + \frac{1}{3} a^2 (3bd + a^2 cf + 3ab^2 f + 6abcd + b^3 d) x^3 + \frac{1}{3} a^2 x^3 (af + 3bd) x^3 + \frac{3}{4} a^2 bex^4 + \frac{3}{11} cx^{11} (acf + b^2 f + bcd) + \frac{3}{5} ax^5$$

Antiderivative was successfully verified.

[In] Integrate[(a + b\*x^2 + c\*x^4)^2\*(a\*d + a\*e\*x + (b\*d + a\*f)\*x^2 + b\*e\*x^3 + (c\*d + b\*f)\*x^4 + c\*e\*x^5 + c\*f\*x^6),x]

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

$\frac{1}{15}x^{15}f^3 + \frac{1}{14}x^{14}e^3 + \frac{1}{13}x^{13}d^3 + \frac{3}{13}x^{13}f^2b + \frac{1}{4}x^{12}c^2b + \frac{3}{11}x^{11}d^2b + \frac{3}{11}x^{11}f^2a + \frac{3}{10}x^{10}c^2a + \frac{3}{10}x^{10}d^2b + \frac{1}{9}x^9f^3b + \frac{1}{3}x^9d^2a + \frac{2}{3}x^9f^2a + \frac{1}{8}x^8e^3b + \frac{3}{4}x^8e^2cb + \frac{1}{2}x^8d^2b + \frac{3}{2}x^8f^2ba + \frac{1}{2}x^8c^2a + \frac{1}{2}x^8e^2ca + \frac{3}{5}x^8d^2a + \frac{3}{5}x^8e^2da + \frac{3}{5}x^8f^2ba + \frac{3}{4}x^8e^2ba + x^7d^3a + \frac{1}{3}x^7f^3a + \frac{1}{2}x^7e^3a + x^6d^3a$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] 1/15\*x^15\*f\*c^3 + 1/14\*x^14\*e\*c^3 + 1/13\*x^13\*d\*c^3 + 3/13\*x^13\*f\*c^2\*b + 1/4\*x^12\*e\*c^2\*b + 3/11\*x^11\*d\*c^2\*b + 3/11\*x^11\*f\*c\*b^2 + 3/11\*x^11\*f\*c^2\*a + 3/10\*x^10\*e\*c\*b^2 + 3/10\*x^10\*e\*c^2\*a + 1/3\*x^9\*d\*c\*b^2 + 1/9\*x^9\*f\*b^3 + 1/3\*x^9\*d\*c^2\*a + 2/3\*x^9\*f\*c\*b\*a + 1/8\*x^8\*e\*b^3 + 3/4\*x^8\*e\*c\*b\*a + 1/7\*x^7\*d\*b^3 + 6/7\*x^7\*d\*c\*b\*a + 3/7\*x^7\*f\*b^2\*a + 3/7\*x^7\*f\*c\*a^2 + 1/2\*x^6\*e\*b^2\*a + 1/2\*x^6\*e\*c\*a^2 + 3/5\*x^5\*d\*b^2\*a + 3/5\*x^5\*d\*c\*a^2 + 3/5\*x^5\*f\*b\*a^2 + 3/4\*x^4\*e\*b\*a^2 + x^3\*d\*b\*a^2 + 1/3\*x^3\*f\*a^3 + 1/2\*x^2\*e\*a^3 + x\*d\*a^3

giac [A] time = 0.31, size = 295, normalized size = 1.14

$\frac{1}{15}x^{15}f^3 + \frac{1}{14}x^{14}e^3 + \frac{1}{13}x^{13}d^3 + \frac{3}{13}x^{13}f^2b + \frac{1}{4}x^{12}c^2b + \frac{3}{11}x^{11}d^2b + \frac{3}{11}x^{11}f^2a + \frac{3}{10}x^{10}c^2a + \frac{3}{10}x^{10}d^2b + \frac{1}{9}x^9f^3b + \frac{1}{3}x^9d^2a + \frac{2}{3}x^9f^2a + \frac{1}{8}x^8e^3b + \frac{3}{4}x^8e^2cb + \frac{1}{2}x^8d^2b + \frac{3}{2}x^8f^2ba + \frac{1}{2}x^8c^2a + \frac{1}{2}x^8e^2ca + \frac{3}{5}x^8d^2a + \frac{3}{5}x^8e^2da + \frac{3}{5}x^8f^2ba + \frac{3}{4}x^8e^2ba + x^7d^3a + \frac{1}{3}x^7f^3a + \frac{1}{2}x^7e^3a + x^6d^3a$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] 1/15\*c^3\*f\*x^15 + 1/14\*c^3\*x^14\*e + 1/13\*c^3\*d\*x^13 + 3/13\*b\*c^2\*f\*x^13 + 1/4\*b\*c^2\*x^12\*e + 3/11\*b\*c^2\*d\*x^11 + 3/11\*b^2\*c\*f\*x^11 + 3/11\*a\*c^2\*f\*x^11 + 3/10\*b^2\*c\*x^10\*e + 3/10\*a\*c^2\*x^10\*e + 1/3\*b^2\*c\*d\*x^9 + 1/3\*a\*c^2\*d\*x^9 + 1/9\*b^3\*f\*x^9 + 2/3\*a\*b\*c\*f\*x^9 + 1/8\*b^3\*x^8\*e + 3/4\*a\*b\*c\*x^8\*e + 1/7\*b^3\*d\*x^7 + 6/7\*a\*b\*c\*d\*x^7 + 3/7\*a\*b^2\*f\*x^7 + 3/7\*a^2\*c\*f\*x^7 + 1/2\*a\*b^2\*x^6\*e + 1/2\*a^2\*c\*x^6\*e + 3/5\*a\*b^2\*d\*x^5 + 3/5\*a^2\*c\*d\*x^5 + 3/5\*a^2\*b\*f\*x^5 + 3/4\*a^2\*b\*x^4\*e + a^2\*b\*d\*x^3 + 1/3\*a^3\*f\*x^3 + 1/2\*a^3\*x^2\*e + a^3\*d\*x

**maple [A]** time = 0.00, size = 354, normalized size = 1.37

$\frac{d^3e^5}{15}, \frac{d^3e^4}{14}, \frac{d^3e^3}{13}, \frac{(2b^2c^2 + (bf+ad)^2)e^{10}}{10}, \frac{(2bf+ad)(b^2c + (bf+ad)^2e^9)}{9}, \frac{(b^2c + 2b^2c + (2ac+b^2)e^8)}{8}, \frac{(2bf+ad)(b^2c + (bf+ad)^2e^7)}{7}, \frac{2ab^2cd}{4}, \frac{(ab^2c + (2ac+b^2)e^6)}{6}, \frac{(b^2c + 2ab^2 + 2(bf+ad)(bf+ad)e^5)}{5}, \frac{d^2e^5}{2}, \frac{(d^2c + 2ab^2 + (2ac+b^2)e^4)}{4}, \frac{d^2e^4}{4}, \frac{(bf+ad)^2 + 2(bf+ad)(bf+ad)e^3}{3}, \frac{(2b^2d + (bf+ad)^2e^2)}{2}$

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

$\frac{1}{15}c^3fx^{15} + \frac{1}{14}c^3ex^{14} + \frac{1}{4}b^2cx^{12} + \frac{1}{13}(c^2d + 3b^2c^2f)x^{13} + \frac{3}{10}(b^2c + (b^2c + ac^2)e^9)x^{10} + \frac{1}{8}(b^3 + 6abc)e^8 + \frac{1}{9}(3(b^2c + ac^2)d + (b^3 + 6abc)f)x^9 + \frac{3}{4}a^2cx^4 + \frac{1}{2}(ab^2 + a^2c)e^5 + \frac{1}{7}(b^3 + 6abc)d + 3(ab^2 + a^2c)f)x^7 + \frac{1}{6}(a^2c^2e + 2a^2b^2e + (2a^2c + b^2)a^2e)x^6 + \frac{1}{5}(a^2(b^2c + ac^2)d + 2a^2b^2(a^2c + b^2)d)x^5 + \frac{1}{3}(3a^2bd + a^3f)x^3$

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

$x^3 \left( \frac{f d^3}{3} + b d a^3 \right) + x^{13} \left( \frac{d^3 c^3}{15} + \frac{3 b f c^2}{13} \right) + x^5 \left( \frac{3 f a^2 b}{5} + \frac{3 c d a^2}{5} + \frac{3 d a b^2}{5} \right) + x^{11} \left( \frac{3 f b^2 c}{11} + \frac{3 d b c^2}{11} + \frac{3 a f c^2}{11} \right) + x^7 \left( \frac{3 c f a^2}{7} + \frac{3 f a b^2}{7} + \frac{6 c d a b}{7} + \frac{d b^3}{7} \right) + x^9 \left( \frac{b^3}{9} + \frac{d b^2 c}{3} + \frac{2 a f b c}{3} + \frac{a d c^2}{3} \right) + \frac{a^3 e x^2}{2} + \frac{c^3 e x^{14}}{14} + \frac{c^3 f x^{15}}{15} + a^3 d x + \frac{a e x^6 (b^2 + a c)}{2} + \frac{b e x^8 (b^2 + 6 a c)}{8} + \frac{3 c e x^{10} (b^2 + a c)}{10} + \frac{3 a^2 b e x^4}{4} + \frac{b^2 c e x^{12}}{4}$

Verification of antiderivative is not currently implemented for this CAS.

[In]  $\text{int}((a + b*x^2 + c*x^4)^2*(a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 + c*f*x^6), x)$

[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

$$a^3 dx + \frac{a^2 c x^2}{2} + \frac{3 a^2 b e x^4}{4} + \frac{b c^2 e x^{12}}{4} + \frac{c^3 e x^{14}}{14} + \frac{c^3 f x^{15}}{15} + x^{13} \left( \frac{3 b c^2 f}{13} + \frac{c^3 d}{13} \right) + x^{11} \left( \frac{3 a c^2 f}{11} + \frac{3 b^2 c f}{11} + \frac{3 b c^2 d}{11} \right) + x^{10} \left( \frac{3 a c^2 e}{10} + \frac{3 b^2 c e}{10} \right) + x^9 \left( \frac{2 a b c f}{3} + \frac{a c^2 d}{3} + \frac{b^2 f}{9} + \frac{b^2 c d}{3} \right) + x^8 \left( \frac{3 a b c e}{4} + \frac{b^2 e}{8} \right) + x^7 \left( \frac{3 a^2 c f}{7} + \frac{3 a b^2 f}{7} + \frac{6 a b c d}{7} + \frac{b^2 d}{7} \right) + x^6 \left( \frac{a^2 c e}{2} + \frac{a b^2 e}{2} \right) + x^5 \left( \frac{3 a^2 b f}{5} + \frac{3 a^2 c d}{5} + \frac{3 a b^2 d}{5} \right) + x^3 \left( \frac{a^3 f}{3} + a^2 b d \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In]  $\text{integrate}((c*x**4+b*x**2+a)**2*(a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x**4+c*e*x**5+c*f*x**6), x)$

[Out]  $a**3*d*x + a**3*e*x**2/2 + 3*a**2*b*e*x**4/4 + b*c**2*e*x**12/4 + c**3*e*x**14/14 + c**3*f*x**15/15 + x**13*(3*b*c**2*f/13 + c**3*d/13) + x**11*(3*a*c**2*f/11 + 3*b**2*c*f/11 + 3*b*c**2*d/11) + x**10*(3*a*c**2*e/10 + 3*b**2*c*e/10) + x**9*(2*a*b*c*f/3 + a*c**2*d/3 + b**3*f/9 + b**2*c*d/3) + x**8*(3*a*b*c*e/4 + b**3*e/8) + x**7*(3*a**2*c*f/7 + 3*a*b**2*f/7 + 6*a*b*c*d/7 + b**3*d/7) + x**6*(a**2*c*e/2 + a*b**2*e/2) + x**5*(3*a**2*b*f/5 + 3*a**2*c*d/5 + 3*a*b**2*d/5) + x**3*(a**3*f/3 + a**2*b*d)$



## 3.62

$$\int (a + bx^2 + cx^4) (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5$$

**Optimal.** Leaf size=154

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

**Rubi [A]** time = 0.15, antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 61,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.016$ , Rules used = {1671}

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

Antiderivative was successfully verified.

[In] Int[(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

$$\int (a + bx^2 + cx^4) (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx = \int (a^2d + a^2ex + a(2bd + b^2f) + a^2cx^2 + a^2ex^3 + a^2cx^4 + a^2ex^5 + a^2cx^6) dx = a^2dx + \frac{1}{2}a^2ex^2 + \frac{1}{3}a(2bd + b^2f)x^3 + \frac{1}{4}a^2cx^4 + \frac{1}{5}a^2ex^5 + \frac{1}{6}a^2cx^6$$

**Mathematica [A]** time = 0.03, size = 154, normalized size = 1.00

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

Antiderivative was successfully verified.

[In] Integrate[(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

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

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((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

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

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

$$\frac{1}{11} c^2 f x^{11} + \frac{1}{10} c^2 e x^{10} + \frac{1}{4} b c e x^8 + \frac{1}{9} (c^2 d + 2 b c f) x^9 + \frac{1}{6} (b^2 + 2 a c) e x^6 + \frac{1}{7} (2 b c d + (b^2 + 2 a c) f) x^7 + \frac{1}{2} a b e x^4 + \frac{1}{5} (2 a b f + (b^2 + 2 a c) d) x^5 + \frac{1}{2} a^2 e x^2 + a^2 d x + \frac{1}{3} (2 a b d + a^2 f) x^3$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

**mupad [B]** time = 0.09, size = 138, normalized size = 0.90

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

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

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

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)

$$3.63 \quad \int \frac{ad+aux+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{a+bx^2+cx^4} dx$$

**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**

$$\int \frac{ad + aux + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{a + bx^2 + cx^4} dx = \int (d + ex + fx^2) dx = dx + \frac{ex^2}{2} + \frac{fx^3}{3}$$

**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] && (Gt



$Q[a, 0] \parallel \text{LtQ}[b, 0]$ )

### Rule 618

$\text{Int}[(a_.) + (b_.)(x_) + (c_.)(x_)^2]^{-1}, x\_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4ac - x^2, x], x], x, b + 2cx], x] /;$   $\text{FreeQ}\{a, b, c, x\}$  &&  $\text{NeQ}[b^2 - 4ac, 0]$

### Rule 1107

$\text{Int}[(x_)((a_) + (b_)(x_)^2 + (c_)(x_)^4)^{p_.}, x\_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(a + bx + cx^2)^p, x], x, x^2], x] /;$   $\text{FreeQ}\{a, b, c, p, x\}$

### Rule 1166

$\text{Int}[(d_) + (e_)(x_)^2]/((a_) + (b_)(x_)^2 + (c_)(x_)^4), x\_Symbol] \rightarrow \text{With}\{q = \text{Rt}[b^2 - 4ac, 2]\}, \text{Dist}[e/2 + (2cd - be)/(2q), \text{Int}[1/(b/2 - q/2 + cx^2), x], x] + \text{Dist}[e/2 - (2cd - be)/(2q), \text{Int}[1/(b/2 + q/2 + cx^2), x], x] /;$   $\text{FreeQ}\{a, b, c, d, e, x\}$  &&  $\text{NeQ}[b^2 - 4ac, 0]$  &&  $\text{NeQ}[c^2d^2 - a^2e^2, 0]$  &&  $\text{PosQ}[b^2 - 4ac]$

### Rule 1586

$\text{Int}[(u_)(Px_)^{p_})(Qx_)^{q_}, x\_Symbol] \rightarrow \text{Int}[u \cdot \text{PolynomialQuotient}[Px, Qx, x]^p \cdot Qx^{p+q}, x] /;$   $\text{FreeQ}[q, x]$  &&  $\text{PolyQ}[Px, x]$  &&  $\text{PolyQ}[Qx, x]$  &&  $\text{EqQ}[\text{PolynomialRemainder}[Px, Qx, x], 0]$  &&  $\text{IntegerQ}[p]$  &&  $\text{LtQ}[p \cdot q, 0]$

### Rule 1673

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

### Rubi steps

$$\begin{aligned}
\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cf x^6}{(a + bx^2 + cx^4)^2} dx &= \int \frac{d + ex + fx^2}{a + bx^2 + cx^4} dx \\
&= \int \frac{ex}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2}{a + bx^2 + cx^4} dx \\
&= e \int \frac{x}{a + bx^2 + cx^4} dx + \frac{1}{2} \left( f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \cdot \\
&\quad \frac{\left( f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left( \frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left( f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left( \frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} \\
&= \frac{\left( f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left( \frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left( f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left( \frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} \\
&= \frac{\left( f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left( \frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left( f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left( \frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}}
\end{aligned}$$

**Mathematica [A]** time = 0.06, size = 234, normalized size = 1.11

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

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)/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

$$\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{(a + bx^2 + cx^4)^2} dx$$

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] 
$$-1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*\text{sqrt}(b^2 - 4*a*c)*e*\log(x^2 + 1/2*(b + \text{sqrt}(b^2 - 4*a*c)))/c)/((b^4 - 8*a*b^2*c - 2*b^3*c + 16*a^2*c^2 + 8*a*b*c^2 + b^2*c^2 - 4*a*c^3)*c^2) + 1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*\text{sqrt}(b^2 - 4*a*c)*e*\log(x^2 + 1/2*(b - \text{sqrt}(b^2 - 4*a*c)))/c)/((b^4 - 8*a*b^2*c - 2*b^3*c + 16*a^2*c^2 + 8*a*b*c^2 + b^2*c^2 - 4*a*c^3)*c^2) + 1/4*((\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^4 - 8*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^2*c - 2*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^3*c - 2*b^4*c + 16*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*c^2 + 8*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^2*c^2 + 16*a*b^2*c^2 + 2*b^3*c^2 - 4*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a*c^3 - 32*a^2*c^3 - 8*a*b*c^3 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^3 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^2*c - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b*c^2$$

$$\begin{aligned}
& + 2*(b^2 - 4*a*c)*b^2*c - 8*(b^2 - 4*a*c)*a*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*d \\
& - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}} \\
& *c)*a*b^2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)* \\
& a*b*c - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*c^2 - 2 \\
& *(b^2 - 4*a*c)*a*c^2)*f)*\arctan(2*\sqrt{1/2}*x/\sqrt{(b + \sqrt{b^2 - 4*a*c})/ \\
& c}))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 \\
& - 4*a^2*c^3)*\text{abs}(c)) + 1/4*((\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}})*b^4 \\
& - 8*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}})*a*b^2*c - 2*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& *b^3*c + 2*b^4*c + 16*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*c^2 + 8*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)* \\
& a*b*c^2 + \sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^2*c^2 - 16*a*b^2*c^2 - 2*b^3*c^2 - 4*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)* \\
& a*c^3 + 32*a^2*c^3 + 8*a*b*c^3 + \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^3 - 4*\sqrt{2}*\sqrt{b^2 - 4*a*c} \\
& *\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b*c - 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^2*c + \sqrt{2}*\sqrt{b^2 - 4*a*c} \\
& *\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b*c^2 - 2*(b^2 - 4*a*c)*b^2*c + 8*(b^2 - 4*a*c) \\
& *a*c^2 + 2*(b^2 - 4*a*c)*b*c^2)*d + 2*(2*a*b^2*c^2 - 8*a^2*c^3 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& *c)*a*b^2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c} \\
& *c)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b*c - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*c^2 - 2*(b^2 - 4*a*c) \\
& *a*c^2)*f)*\arctan(2*\sqrt{1/2}*x/\sqrt{(b - \sqrt{b^2 - 4*a*c})/c}))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3) \\
& *\text{abs}(c))
\end{aligned}$$

**maple [B]** time = 0.02, size = 616, normalized size = 2.92

$$\frac{2\sqrt{2}af\operatorname{arctanh}\left(\frac{\sqrt{2}a}{\sqrt{(b+\sqrt{4ac+b^2})}}\right)}{(4ac-b^2)\sqrt{(b+\sqrt{4ac+b^2})}} - \frac{2\sqrt{2}af\operatorname{arctanh}\left(\frac{\sqrt{2}a}{\sqrt{(b-\sqrt{4ac+b^2})}}\right)}{(4ac-b^2)\sqrt{(b-\sqrt{4ac+b^2})}} - \frac{\sqrt{2}P^f\operatorname{arctanh}\left(\frac{\sqrt{2}a}{\sqrt{(b+\sqrt{4ac+b^2})}}\right)}{2(4ac-b^2)\sqrt{(b+\sqrt{4ac+b^2})}} - \frac{\sqrt{2}P^f\operatorname{arctanh}\left(\frac{\sqrt{2}a}{\sqrt{(b-\sqrt{4ac+b^2})}}\right)}{2(4ac-b^2)\sqrt{(b-\sqrt{4ac+b^2})}} - \frac{\sqrt{-4a+b^2}\sqrt{2}f\operatorname{arctanh}\left(\frac{\sqrt{2}a}{\sqrt{(b+\sqrt{4ac+b^2})}}\right)}{2(4ac-b^2)\sqrt{(b+\sqrt{4ac+b^2})}} - \frac{\sqrt{-4a+b^2}\sqrt{2}f\operatorname{arctanh}\left(\frac{\sqrt{2}a}{\sqrt{(b-\sqrt{4ac+b^2})}}\right)}{2(4ac-b^2)\sqrt{(b-\sqrt{4ac+b^2})}} - \frac{\sqrt{-4a+b^2}\sqrt{2}f\operatorname{arctanh}\left(\frac{\sqrt{2}a}{\sqrt{(b+\sqrt{4ac+b^2})}}\right)}{(4ac-b^2)\sqrt{(b+\sqrt{4ac+b^2})}} - \frac{\sqrt{-4a+b^2}\sqrt{2}f\operatorname{arctanh}\left(\frac{\sqrt{2}a}{\sqrt{(b-\sqrt{4ac+b^2})}}\right)}{(4ac-b^2)\sqrt{(b-\sqrt{4ac+b^2})}} - \frac{\sqrt{-4a+b^2}\operatorname{ch}\left(2a^2-b+\sqrt{4ac+b^2}\right)}{2(4ac-b^2)} - \frac{\sqrt{-4a+b^2}\operatorname{sh}\left(2a^2+b+\sqrt{4ac+b^2}\right)}{8ac-2b^2}$$

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

$$\frac{\operatorname{ctan}\left(2^{\frac{1}{2}}\right)/\left(\left(b+\left(-4ac+b^2\right)^{\frac{1}{2}}\right) * c\right)^{\frac{1}{2}} * c * x - \frac{1}{2} * \left(-4ac+b^2\right)^{\frac{1}{2}} / \left(4ac-b^2\right) * 2^{\frac{1}{2}} / \left(\left(b+\left(-4ac+b^2\right)^{\frac{1}{2}}\right) * c\right)^{\frac{1}{2}} * b * f * \arctan\left(2^{\frac{1}{2}}\right) / \left(\left(b+\left(-4ac+b^2\right)^{\frac{1}{2}}\right) * c\right)^{\frac{1}{2}} * c * x + \left(-4ac+b^2\right)^{\frac{1}{2}} / \left(4ac-b^2\right) * 2^{\frac{1}{2}} / \left(\left(b+\left(-4ac+b^2\right)^{\frac{1}{2}}\right) * c\right)^{\frac{1}{2}} * c * d * \arctan\left(2^{\frac{1}{2}}\right) / \left(\left(b+\left(-4ac+b^2\right)^{\frac{1}{2}}\right) * c\right)^{\frac{1}{2}} * c * x}{\left(cx^4 + bx^2 + a\right)^2} dx$$

**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)

[Out] symsum(log(c^2\*d\*e^2 - c^2\*d^2\*f + c^2\*e^3\*x - a\*c\*f^3 - 8\*root(16\*a\*b^4\*c\*z^4 - 128\*a^2\*b^2\*c^2\*z^4 + 256\*a^3\*c^3\*z^4 - 16\*a\*b^2\*c\*d\*f\*z^2 + 64\*a^2\*c^2\*d\*f\*z^2 - 16\*a^2\*b\*c\*f^2\*z^2 - 8\*a\*b^2\*c\*e^2\*z^2 - 16\*a\*b\*c^2\*d^2\*z^2 + 32\*a^2\*c^2\*e^2\*z^2 + 4\*b^3\*c\*d^2\*z^2 + 4\*a\*b^3\*f^2\*z^2 + 16\*a^2\*c\*e\*f^2\*z + 4\*b^2\*c\*d^2\*e\*z - 4\*a\*b^2\*e\*f^2\*z - 16\*a\*c^2\*d^2\*e\*z - 4\*a\*c\*d\*e^2\*f + 2\*a\*c\*d^2\*f^2 - 2\*b\*c\*d^3\*f - 2\*a\*b\*d\*f^3 + b\*c\*d^2\*e^2 + a\*b\*e^2\*f^2 + a\*c\*e^4 + b^2\*d^2\*f^2 + c^2\*d^4 + a^2\*f^4, z, k)^3\*b^3\*c^2\*x + b\*c\*d\*f^2 - 16\*root(16\*a\*b^4\*c\*z^4 - 128\*a^2\*b^2\*c^2\*z^4 + 256\*a^3\*c^3\*z^4 - 16\*a\*b^2\*c\*d\*f\*z^2 + 64\*a^2\*c^2\*d\*f\*z^2 - 16\*a^2\*b\*c\*f^2\*z^2 - 8\*a\*b^2\*c\*e^2\*z^2 - 16\*a\*b\*c^2\*d^2\*z^2 + 32\*a^2\*c^2\*e^2\*z^2 + 4\*b^3\*c\*d^2\*z^2 + 4\*a\*b^3\*f^2\*z^2 + 16\*a^2\*c\*e\*f^2\*z + 4\*b^2\*c\*d^2\*e\*z - 4\*a\*b^2\*e\*f^2\*z - 16\*a\*c^2\*d^2\*e\*z - 4\*a\*c\*d\*e^2\*f + 2\*a\*c\*d^2\*f^2 - 2\*b\*c\*d^3\*f - 2\*a\*b\*d\*f^3 + b\*c\*d^2\*e^2 + a\*b\*e^2\*f^2 + a\*c\*e^4 + b^2\*d^2\*f^2 + c^2\*d^4 + a^2\*f^4, z, k)^2\*a\*c^3\*d - 4\*root(16\*a\*b^4\*c\*z^4 - 128\*a^2\*b^2\*c^2\*z^4 + 256\*a^3\*c^3\*z^4 - 16\*a\*b^2\*c\*d\*f\*z^2 + 64\*a^2\*c^2\*d\*f\*z^2 - 16\*a^2\*b\*c\*f^2\*z^2 - 8\*a\*b^2\*c\*e^2\*z^2 - 16\*a\*b\*c^2\*d^2\*z^2 + 32\*a^2\*c^2\*e^2\*z^2 + 4\*b^3\*c\*d^2\*z^2 + 4\*a\*b^3\*f^2\*z^2 + 16\*a^2\*c\*e\*f^2\*z + 4\*b^2\*c\*d^2\*e\*z - 4\*a\*b^2\*e\*f^2\*z - 16\*a\*c^2\*d^2\*e\*z - 4\*a\*c\*d\*e^2\*f + 2\*a\*c\*d^2\*f^2 - 2\*b\*c\*d^3\*f - 2\*a\*b\*d\*f^3 + b\*c\*d^2\*e^2 + a\*b\*e^2\*f^2 + a\*c\*e^4 + b^2\*d^2\*f^2 + c^2\*d^4 + a^2\*f^4, z, k)\*c^3\*d^2\*x + 4\*root(16

$$\begin{aligned}
& *a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + \\
& 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d \\
& ^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c* \\
& e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^ \\
& ^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 \\
& + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*b^2*c^2*d + 32*root(1 \\
& 6*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 \\
& + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2* \\
& d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c \\
& *e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^ \\
& ^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^ \\
& ^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^3*a*b*c^3*x + 16*root( \\
& 16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 \\
& + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2 \\
& *d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c \\
& *e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d* \\
& e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f \\
& ^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*a*c^3*e*x + 4*root( \\
& 16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 \\
& + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2 \\
& *d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c \\
& *e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d* \\
& e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f \\
& ^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*a*c^2*f^2*x + 2*root( \\
& 16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 \\
& + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2 \\
& *d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c \\
& *e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d* \\
& e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f \\
& ^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*b*c^2*e^2*x - 2*root( \\
& 16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 \\
& + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2 \\
& *d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c \\
& *e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d* \\
& e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f \\
& ^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*b^2*c*f^2*x - 4*root( \\
& 16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 \\
& + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2 \\
& *d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c \\
& *e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d* \\
& e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f \\
& ^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*b^2*c^2*e*x + 4*roo \\
& t(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z \\
& ^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c \\
& ^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^
\end{aligned}$$

```

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

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c}\left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}-2af+bd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c}\left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}}\right)}{2\sqrt{2}a(b^2-4ac)}$$

**Rubi [A]** time = 0.92, 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}

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

Antiderivative was successfully verified.

[In] Int[(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] && (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] /; 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

$$\begin{aligned}
\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cf x^6}{(a + bx^2 + cx^4)^3} dx &= \int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^2} dx \\
&= \int \frac{ex}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \int \frac{d + fx^2}{(a + bx^2 + cx^4)} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} e^{\int \frac{ex}{a + bx^2 + cx^4} dx} \\
&= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

**Mathematica [A]** time = 1.20, size = 398, normalized size = 1.08

$$\frac{1}{4} \left( \frac{2ab(e + fs) + 4acx(d + x(e + fs)) - 2bx^2(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} + \frac{\sqrt{2} \sqrt{c} (b(d\sqrt{b^2 - 4ac} + 4af) - 2a(f\sqrt{b^2 - 4ac} + 6cd) + b^2d) \tan^{-1}\left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right)}{a(b^2 - 4ac)^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\sqrt{2} \sqrt{c} (bd\sqrt{b^2 - 4ac} - 2af\sqrt{b^2 - 4ac} - 4abf + 12acd + b^2(-d)) \tan^{-1}\left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b^2 - 4ac + b}}\right)}{a(b^2 - 4ac)^{3/2} \sqrt{b^2 - 4ac + b}} - \frac{4cx \log(\sqrt{b^2 - 4ac} - b - 2cx^2)}{(b^2 - 4ac)^{3/2}} + \frac{4cx \log(\sqrt{b^2 - 4ac} + b + 2cx^2)}{(b^2 - 4ac)^{3/2}} \right)$$

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] 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))*b^3 + 4*sq
rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b*c + 2*sqrt(2)*s
qrt(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 + sqr
t(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))*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*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 + sqr
t(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*abs(a*b^2 - 4*a^2
*c) + (2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b^3*c^4 - 384*a^5*b*c^5 - s
qrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*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)*s
qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^4*b^3*c^2 - 32*sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*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)*sqr
t(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)*s
qrt(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 +
```

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

$$\begin{aligned}
& t(b*c - \sqrt{b^2 - 4*a*c})*c)*a^3*b^6 + 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c} \\
& - \sqrt{b^2 - 4*a*c})*c)*a^4*b^4*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c} - \\
& \sqrt{b^2 - 4*a*c})*c)*a^3*b^5*c - 16*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c} - \sqrt{b^2 - 4*a*c})*c)*a^5*b^2*c^2 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c} - \sqrt{b^2 - 4*a*c})*c)*a^4*b^3*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c} - \sqrt{b^2 - 4*a*c})*c)*a^3*b^4*c^2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c} - \sqrt{b^2 - 4*a*c})*c)*a^4*b^2*c^3 - 2*(b^2 - 4*a*c)*a^3*b^4*c^2 + 8*(b^2 - 4*a*c)*a^4*b^2*c^3)*f)*\arctan(2*\sqrt{1/2}*x/\sqrt{(a*b^3 - 4*a^2*b*c - \sqrt{(a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2))})/(a*b^2*c - 4*a^2*c^2)))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^5*c + 48*a^5*b^2*c^2 + 16*a^4*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b*c^3 - 8*a^4*b^2*c^3 + 16*a^5*c^4)*\text{abs}(a*b^2 - 4*a^2*c)*\text{abs}(c)) - 1/4*((b^3*c^2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c^4 + (b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*\sqrt{b^2 - 4*a*c}))*\text{abs}(a*b^2 - 4*a^2*c)*e - (a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 + (a*b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*\sqrt{b^2 - 4*a*c}))*e)*\log(x^2 + 1/2*(a*b^3 - 4*a^2*b*c + \sqrt{(a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)})))/(a*b^2*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*\text{abs}(a*b^2 - 4*a^2*c)) - 1/4*((b^3*c^2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c^4 - (b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*\sqrt{b^2 - 4*a*c}))*\text{abs}(a*b^2 - 4*a^2*c)*e - (a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 - (a*b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*\sqrt{b^2 - 4*a*c}))*e)*\log(x^2 + 1/2*(a*b^3 - 4*a^2*b*c - \sqrt{(a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)})))/(a*b^2*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*\text{abs}(a*b^2 - 4*a^2*c))
\end{aligned}$$

**maple [B]** time = 0.14, size = 1813, normalized size = 4.93

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In]  $\text{int}((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^3,x)$

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

$$\begin{aligned}
& 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)} * \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 * \\
& ^{(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 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * a * c^2 * f * \operatorname{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 * \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 * f * x + 2 / (4 * a * c - b^2)^2 / (x^2 + 1/2 * b / c - 1/2 * (-4 * a * c + b^2)^{(1/2)} / c) * a * c * f * x - 1/4 * c / (4 * a * c - b^2)^2 * a^2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \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) * b^2 * f * x + 1 / (4 * a * c - b^2)^2 * (-4 * a * c + b^2)^{(1/2)} * c * e * \ln(2 * c * x^2 + b + (-4 * a * c + b^2)^{(1/2)}) + 2 / (4 * a * c - b^2)^2 / (x^2 + 1/2 * b / c - 1/2 * (-4 * a * c + b^2)^{(1/2)} / c) * a * c * e - 1 / (4 * a * c - b^2)^2 * (-4 * a * c + b^2)^{(1/2)} * c * e * \ln(-2 * c * x^2 - b + (-4 * a * c + b^2)^{(1/2)}) - 1/4 / (4 * a * c - b^2)^2 / (x^2 + 1/2 * b / c + 1/2 * (-4 * a * c + b^2)^{(1/2)} / c) * (-4 * a * c + b^2)^{(1/2)} / a * b^2 * d * x + 3 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * (-4 * a * c + b^2)^{(1/2)} * c^2 * d * \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)} * a * \operatorname{rctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * (-4 * a * c + b^2)^{(1/2)} * d + c^2 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \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) * 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] 
$$\begin{aligned}
& -1/2 * (2 * a * c * e * x^2 - (b * c * d - 2 * a * c * f) * x^3 + a * b * e + (a * b * f - (b^2 - 2 * a * c) * \\
& d) * x) / ((a * b^2 * c - 4 * a^2 * c^2) * x^4 + a^2 * b^2 - 4 * a^3 * c + (a * b^3 - 4 * a^2 * b * c) * \\
& x^2) - 1/2 * \operatorname{integrate}((4 * a * c * e * x - a * b * f - (b * c * d - 2 * a * c * f) * x^2 - (b^2 - 6 * \\
& a * c) * d) / (c * x^4 + b * x^2 + a), x) / (a * b^2 - 4 * a^2 * c)
\end{aligned}$$

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]  $\text{int}((a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^3, x)$

[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 + 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 - 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 - 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)*((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 + 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 - 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*$





```

3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 -
  256*a^3*b^12*z^4 + 576*a^2*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 307
2*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2
+ 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8
192*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*
z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^
4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^1
0*d*f*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 -
4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*d*e*f*z - 76
8*a^2*b^5*c^2*d*e*f*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 1536
*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z
+ 4992*a^2*b^4*c^3*d^2*e*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z +
  32*b^8*c*d^2*e*z - 32*a*b^4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^2*f - 192*a^
3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b
*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 2016*a^2*b*c^4
*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3*c^2*e^2*f^2
- 960*a^2*b^2*c^3*d^2*f^2 - 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^
5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9
*a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c^4*e^4 - 25*
b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k), k, 1, 4) + ((b*e)/(2*(4*a*c - b^2))
+ (c*e*x^2)/(4*a*c - b^2) + (x*(2*a*c*d - b^2*d + a*b*f))/(2*a*(4*a*c - b^2
)) - (c*x^3*(b*d - 2*a*f))/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4)

```

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] Timed out

$$3.66 \quad \int \frac{ad+aux+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^4} dx$$

Optimal. Leaf size=621

$$\frac{x \left( cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d \right) \sqrt{c} \left( -\frac{-52a^2bcf+168a^2c^2d}{\sqrt{b}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} +$$

**Rubi [A]** time = 4.59, antiderivative size = 621, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 10, integrand size = 63,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.159$ , Rules used = {1586, 1673, 1178, 1166, 205, 12, 1107, 614, 618, 206}

$$\frac{x \left( (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d \right) \sqrt{c} \left( -\frac{-52a^2bcf+168a^2c^2d}{\sqrt{b}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} + \frac{\sqrt{c} \left( -\frac{-52a^2bcf+168a^2c^2d}{\sqrt{b}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

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]  $-\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2ac*d - ab*f + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3c^2e(b + 2cx^2)}{2(b^2 - 4ac)^2(a + bx^2 + cx^4)} + \frac{x(3b^4d - 25ab^2cd + 28a^2c^2d + ab^3f + 8a^2b^2cf + c(3b^3d - 24ab^2cd + ab^2f + 20a^2cf)x^2)}{8a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} + \frac{(\sqrt{c}(3b^4d + b^3(3\sqrt{b^2 - 4ac}d + af) - 4ab^2c(6\sqrt{b^2 - 4ac}d + 13af) - ab^2(30cd - \sqrt{b^2 - 4ac}f) + 4a^2c(42cd + 5\sqrt{b^2 - 4ac}f))\text{ArcTan}[\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}}] + (\sqrt{c}(3b^3d - 24ab^2cd + ab^2f + 20a^2cf - (3b^4d - 30ab^2cd + 168a^2c^2d + ab^3f - 52a^2b^2cf)/\sqrt{b^2 - 4ac})\text{ArcTan}[\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b + \sqrt{b^2 - 4ac}}}] - (6c^2e\text{ArcTanh}[\frac{b + 2cx^2}{\sqrt{b^2 - 4ac}}])/(b^2 - 4ac)^{5/2}}{8\sqrt{2}a^2(b^2 - 4ac)^{5/2}\sqrt{b - \sqrt{b^2 - 4ac}}}}$

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

$$\begin{aligned}
\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{(a + bx^2 + cx^4)^4} dx &= \int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^3} dx \\
&= \int \frac{ex}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{\int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx}{4a(b^2 - 4ac)} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3d - 2fx^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}
\end{aligned}$$

**Mathematica [A]** time = 3.58, size = 625, normalized size = 1.01

$$\frac{\frac{1}{4} \frac{b^2 d^2 (b^2 c^2 - 2 a^2 c^2 + c^2 d^2) + 2 a b (b^2 d^2 - 2 a c d^2 + c^2 d^2) + a^2 c^2 (b^2 - c^2)}{a^2 (b^2 - 4 a c)^2 (a + b x^2 + c x^4)^2} - \frac{\sqrt{d} \sqrt{b^2 (c^2 d^2 + 4 a d) + a^2 (c^2 d^2 - 4 a d)} - 4 a b (b^2 d^2 + 4 a d) - a^2 (b^2 d^2 - 4 a d) - 3 a^2 d \sqrt{\frac{d}{c^2 d^2 + 4 a d}}}{a^2 (b^2 - 4 a c)^2 \sqrt{b^2 d^2 + 4 a d}} - \frac{\sqrt{d} \sqrt{b^2 (c^2 d^2 - 4 a d) + a^2 (c^2 d^2 + 4 a d)} + 4 a b (b^2 d^2 - 4 a d) + a^2 (b^2 d^2 + 4 a d) - 3 a^2 d \sqrt{\frac{d}{c^2 d^2 - 4 a d}}}{a^2 (b^2 - 4 a c)^2 \sqrt{b^2 d^2 - 4 a d}}}{4 a (b^2 - 4 a c) (a + b x^2 + c x^4)^2} + \frac{x (b^2 d - 2 a c d - a b f + c (b d - 2 a f) x^2)}{4 a (b^2 - 4 a c) (a + b x^2 + c x^4)^2}$$

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] -3*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(a
^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*
b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^
2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^
6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 -
96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c
^4 - 64*a^3*c^5)*c^2) + 3*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*
a*c)*e*log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5
- 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a
^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^
4*c^3))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*
c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a
^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^2) + 1/32*(3*(sqrt(2)*sqrt(b*c +
sqrt(b^2 - 4*a*c)*c)*b^8 - 17*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6
*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^7*c - 2*b^8*c + 116*sqrt(2
)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + 26*sqrt(2)*sqrt(b*c + sqrt(
b^2 - 4*a*c)*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^6*c^2
+ 34*a*b^6*c^2 + 2*b^7*c^2 - 368*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a
^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^3 - 13*s
qrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^3 - 232*a^2*b^4*c^3 - 30*a*b
^5*c^3 + 448*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*c^4 + 224*sqrt(2)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 64*sqrt(2)*sqrt(b*c + sqrt(b^2
- 4*a*c)*c)*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176*a^2*b^3*c^4 - 112*sqrt(2)*s
qrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^5 - 896*a^4*c^5 - 352*a^3*b*c^5 - sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^7 + 15*sqrt(2)*sqrt
(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c + 2*sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^6*c - 88*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 - 22*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^4*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sq
rt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^2 + 176*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(
b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^3 + 88*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 + 11*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 - 44*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c
+ sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 + 2*(b^2 - 4*a*c)*b^6*c - 26*(b^2 - 4*a*c)
*a*b^4*c^2 - 2*(b^2 - 4*a*c)*b^5*c^2 + 128*(b^2 - 4*a*c)*a^2*b^2*c^3 + 22*(
b^2 - 4*a*c)*a*b^3*c^3 - 224*(b^2 - 4*a*c)*a^3*c^4 - 88*(b^2 - 4*a*c)*a^2*b
*c^4)*d + (sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^7 - 24*sqrt(2)*sqrt(
b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^5*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*
c)*c)*a*b^6*c - 2*a*b^7*c + 144*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3
*b^3*c^2 + 40*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^4*c^2 + sqrt(2)
*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c^2 + 48*a^2*b^5*c^2 + 2*a*b^6*c^2 -
256*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^4*b*c^3 - 128*sqrt(2)*sqrt(b
*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 20*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*
a*c)*c)*a^2*b^3*c^3 - 288*a^3*b^3*c^3 - 44*a^2*b^4*c^3 + 64*sqrt(2)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*a^3*b*c^4 + 512*a^4*b*c^4 + 64*a^3*b^2*c^4 + 320*a
```



$$\begin{aligned}
&^4c^5 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)ab^6 + \\
&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)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\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))}{(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)}\right) \cdot \text{abs}(c) \\
&+ 1/32(3(\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^8 - 17\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)ab^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)ab^5c^2 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^6c^2 - 34ab^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)ab^4c^3 + 232a^2b^4c^3 + 30ab^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)ab^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)ab^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)ab^3c^3 + 44\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^2c^4 - 2(b^2 - 4ac)b^6c + 26(b^2 - 4ac)ab^4c^2 + 2(b^2 - 4ac)b^5c^2 - 128(b^2 - 4ac)a^2b^2c^3 - 22(b^2 - 4ac)ab^3c^3 + 224(b^2 - 4ac)a^3c^4 + 88(b^2 - 4ac)a^2b^2c^4) \\
&d + (\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)ab^7 - 24\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^5c - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)ab^6c + 2ab^7c + 144\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^3c^2 + 40\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)
\end{aligned}$$

$$\begin{aligned}
& 4*a*c)*c)*a^2*b^4*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c - \text{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*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))* \\
& *a^4*b*c^3 - 128*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a^3*b^2*c^3 - 20*s \\
& \text{qrt}(2)*\text{sqrt}(b*c - \text{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*\text{sqrt}(2)*\text{sqrt}(b*c - \text{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 + \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c \\
& - \text{sqrt}(b^2 - 4*a*c))*a*b^6 - 22*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt} \\
& (b^2 - 4*a*c))*a^2*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))*a*b^5*c + 32*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - \\
& 4*a*c))*a^3*b^2*c^2 + 36*\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 + \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 + 160*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a* \\
& c))*a^4*c^3 + 80*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))* \\
& )*a^3*b*c^3 - 18*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))* \\
& a^2*b^2*c^3 - 40*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{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*\text{sqrt}(1/2)*x/\text{sqrt}((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)))/((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)) + 1/8*(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)
\end{aligned}$$

**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]  $\text{int}((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^4,x)$

[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 + 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((48*a^2*c^2*e*x + (3*(b^3*c - 8*a*b*c^2)*d + (a*b^2*c + 20*a^2*c^2)*f)*x^2 + 3*(b^4 - 9*a*b^2*c + 28*a^2*c^2)*d + (a*b^3 - 16*a^2*b*c)*f)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)
```

**mupad [B]** time = 3.16, size = 8689, normalized size = 13.99

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] ((x^2*(5*a*c^2*e + b^2*c*e))/(b^4 + 16*a^2*c^2 - 8*a*b^2*c) - (b^3*e - 10*a*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^5*(28*a^2*c^3*d + 6*b^4*c*d + 2*a*b^3*c*f - 49*a*b^2*c^2*d + 28*a^2*b*c^2*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x*(5*b^4*d + 44*a^2*c^2*d - a*b^3*f - 37*a*b^2*c*d + 16*a^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*c^3*e*x^6)/(b^4 + 16*a^2*c^2 - 8*a*b^2*c) + (x^3*(3*b^5*d + 36*a^3*c^2*f + a*b^4*f - 20*a*b^3*c*d - 4*a^2*b*c^2*d + 5*a^2*b^2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (9*b*c^2*e*x^4)/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^7*(20*a^2*c^2*f + 3*b^3*c*d - 24*a*b*c^2*d + a*b^2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6) + symsum(log(root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 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
```

$$\begin{aligned}
& *c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2* \\
& z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^ \\
& 5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 174325760*a^8*b^5*c^6*f \\
& ^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 + 1 \\
& 1206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^ \\
& 8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 \\
& - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^ \\
& 2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 25 \\
& 6*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216 \\
& *a*b^13*c^2*d*e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^5*b^5*c^6 \\
& *d*e*f*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350 \\
& 208*a^2*b^11*c^3*d*e*f*z - 428544*a*b^12*c^3*d^2*e*z + 1022754816*a^6*b^2*c \\
& ^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z \\
& - 50724864*a^7*b^2*c^7*e*f^2*z + 26542080*a^6*b^4*c^6*e*f^2*z - 46725120*a^ \\
& 3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z + 1013760*a^4*b^8*c^4*e*f^2 \\
& *z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930496*a^2*b \\
& ^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f^2*z + 13 \\
& 824*b^14*c^2*d^2*e*z + 13824*a*b^8*c^4*d*e^2*f - 7741440*a^4*b^2*c^7*d*e^2* \\
& f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 37310976*a^3 \\
& *b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 8 \\
& 068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5* \\
& d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7* \\
& c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f - 4262400 \\
& *a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 35525376 \\
& *a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f \\
& ^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2* \\
& b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^ \\
& 2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c^4*d^2*e^ \\
& 2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 \\
& + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^ \\
& 4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 160 \\
& 000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*(root(5637 \\
& 1445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c \\
& ^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 12 \\
& 8849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^ \\
& 9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536 \\
& *a^5*b^20*z^4 - 73728*a^2*b^16*c*d*f*z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 + \\
& 732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440* \\
& a^8*b^4*c^7*d*f*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 15175680*a^4*b^12*c^3 \\
& *d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 440401920*a^10*b*c^8*f^2*z^2 + 17 \\
& 61607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c \\
& ^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 \\
& - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a \\
& *b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2 \\
& *z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 1887
\end{aligned}$$

$$\begin{aligned}
& 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 \\
& + 1536ab^{18}d^2fz^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^8c^8d^2efz \\
& + 9216a^2b^{13}c^2d^2efz - 221773824a^6b^3c^7d^2efz + 117964800a^5b^5c^6d^2efz - 32440320a^4b^7c^5d^2efz \\
& + 4792320a^3b^9c^4d^2efz - 350208a^2b^{11}c^3d^2efz - 428544ab^{12}c^3d^2ez + 1022754816a^6b^2c^8d^2ez - 642318336a^5b^4c^7d^2ez \\
& + 223395840a^4b^6c^6d^2ez - 50724864a^7b^2c^7ef^2z + 26542080a^6b^4c^6ef^2z - 46725120a^3b^8c^5d^2ez - 7127040a^5b^6c^5ef^2z \\
& + 1013760a^4b^8c^4ef^2z - 69120a^3b^{10}c^3ef^2z + 1536a^2b^{12}c^2ef^2z + 5930496a^2b^{10}c^4d^2ez - 693633024a^7c^9d^2ez \\
& + 39321600a^8c^8ef^2z + 13824b^{14}c^2d^2ez + 13824ab^8c^4d^2ef - 7741440a^4b^2c^7d^2ef + 2903040a^3b^4c^6d^2ef \\
& - 387072a^2b^6c^5d^2ef + 37310976a^3b^3c^7d^3f + 3870720a^5b^7c^2ef^2 + 34836480a^4b^8c^8d^2e^2 - 8068032a^2b^5c^6d^3f \\
& - 5623296a^4b^3c^6d^2f^3 + 1737792a^3b^5c^5d^2f^3 - 260190ab^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 - 435456ab^7c^5d^2e^2 - 75188736a^4b^8c^8d^3f \\
& - 15482880a^5c^8d^2ef - 4262400a^5b^8c^7d^3f^3 + 852768ab^7c^5d^3f + 7350ab^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 \\
& - 734832ab^6c^6d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k) \cdot ((768a^2b^{14}c^2d - 22020096a^9c^9d \\
& - 22272a^3b^{12}c^3d + 282624a^4b^{10}c^4d - 2027520a^5b^8c^5d + 8847360a^6b^6c^6d - 23396352a^7b^4c^7d + 34603008a^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^8c^8f) / (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(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^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 - 73728a^2b^{16}c^2d^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 + 96583680
\end{aligned}$$

$$\begin{aligned}
& *a^5b^{10}c^4d^2f^2z^2 - 15175680a^4b^{12}c^3d^2f^2z^2 + 1428480a^3b^{14}c^2d^2f^2z^2 - 440401920a^{10}b^8c^8f^2z^2 + 1761607680a^{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^5c^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^8b^{18}d^2f^2z^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^8c^8d^2e^2f^2z^2 + 9216a^8b^{13}c^2d^2e^2f^2z^2 - 221773824a^6b^3c^7d^2e^2f^2z^2 + 117964800a^5b^5c^6d^2e^2f^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 - 428544a^8b^{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^2e^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^2z^2 - 693633024a^7c^9d^2e^2z^2 + 39321600a^8c^8e^2f^2z^2 + 13824b^{14}c^2d^2e^2z^2 + 13824a^8b^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^3f^2 + 3870720a^5b^5c^7e^2f^2 + 34836480a^4b^8c^8d^2e^2 - 8068032a^2b^5c^6d^3f^2 - 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^2 - 15482880a^5c^8d^2e^2f^2 - 4262400a^5b^8c^7d^2f^3 + 852768a^8b^7c^5d^3f^2 + 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^2 - 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^8c^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 - 252
\end{aligned}$$

$$\begin{aligned}
& *a*b^{10}*c^4*d^2 - 36864*a^6*b*c^8*e^2 + 3114*a^2*b^8*c^5*d^2 - 21312*a^3*b^6*c^6*d^2 + 88128*a^4*b^4*c^7*d^2 - 211968*a^5*b^2*c^8*d^2 - 2304*a^4*b^5*c^6*e^2 + 18432*a^5*b^3*c^7*e^2 + a^2*b^{10}*c^3*f^2 - 42*a^3*b^8*c^4*f^2 + 1760*a^4*b^6*c^5*f^2 - 13120*a^5*b^4*c^6*f^2 + 29952*a^6*b^2*c^7*f^2 + 6*a*b^{11}*c^3*d*f - 109056*a^6*b*c^8*d*f - 210*a^2*b^9*c^4*d*f + 2496*a^3*b^7*c^5*d*f - 18240*a^4*b^5*c^6*d*f + 72192*a^5*b^3*c^7*d*f) / (32*(a^4*b^{12} + 4096*a^{10}*c^6 - 24*a^5*b^{10}*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - (567*b^7*c^5*d^3 + 8000*a^5*c^7*f^3 - 10368*a*b^5*c^6*d^3 - 169344*a^3*b*c^8*d^3 - 193536*a^4*c^8*d*e^2 + 141120*a^4*c^8*d^2*f - 315*b^8*c^4*d^2*f + 67824*a^2*b^3*c^7*d^3 - 35*a^2*b^6*c^4*f^3 - 84*a^3*b^4*c^5*f^3 + 12720*a^4*b^2*c^6*f^3 + 6237*a*b^6*c^5*d^2*f - 210*a*b^7*c^4*d*f^2 - 116160*a^4*b*c^7*d*f^2 + 36864*a^4*b*c^7*e^2*f - 6912*a^2*b^4*c^6*d*e^2 + 62208*a^3*b^2*c^7*d*e^2 - 42372*a^2*b^4*c^6*d^2*f + 1764*a^2*b^5*c^5*d*f^2 + 96048*a^3*b^2*c^7*d^2*f + 4608*a^3*b^3*c^6*d*f^2 - 2304*a^3*b^3*c^6*e^2*f) / (512*(a^4*b^{12} + 4096*a^{10}*c^6 - 24*a^5*b^{10}*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(6912*a^4*c^8*e^3 - 27*b^7*c^5*d^2*e - 10080*a^4*c^8*d*e*f + 486*a*b^5*c^6*d^2*e + 12096*a^3*b*c^8*d^2*e + 3120*a^4*b*c^7*e*f^2 - 3672*a^2*b^3*c^7*d^2*e - 3*a^2*b^5*c^5*e*f^2 + 96*a^3*b^3*c^6*e*f^2 - 18*a*b^6*c^5*d*e*f + 450*a^2*b^4*c^6*d*e*f - 2448*a^3*b^2*c^7*d*e*f) / (32*(a^4*b^{12} + 4096*a^{10}*c^6 - 24*a^5*b^{10}*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) * root(56371445760*a^{11}*b^8*c^6*z^4 - 503316480*a^8*b^{14}*c^3*z^4 + 47185920*a^7*b^{16}*c^2*z^4 - 171798691840*a^{14}*b^2*c^9*z^4 + 193273528320*a^{13}*b^4*c^8*z^4 - 128849018880*a^{12}*b^6*c^7*z^4 - 16911433728*a^{10}*b^{10}*c^5*z^4 + 3523215360*a^9*b^{12}*c^4*z^4 - 2621440*a^6*b^{18}*c*z^4 + 68719476736*a^{15}*c^{10}*z^4 + 65536*a^5*b^{20}*z^4 - 73728*a^2*b^{16}*c*d*f*z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 + 732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 96583680*a^5*b^{10}*c^4*d*f*z^2 - 15175680*a^4*b^{12}*c^3*d*f*z^2 + 1428480*a^3*b^{14}*c^2*d*f*z^2 - 440401920*a^{10}*b*c^8*f^2*z^2 + 1761607680*a^{10}*c^9*d*f*z^2 - 14080*a^3*b^{15}*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 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 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^{11}*c^3*f^2*z^2 + 291840*a^4*b^{13}*c^2*f^2*z^2 - 19860480*a^3*b^{13}*c^3*d^2*z^2 - 1179648*a^5*b^{10}*c^4*e^2*z^2 + 1771776*a^2*b^{15}*c^2*d^2*z^2 + 1536*a*b^{18}*d*f*z^2 + 1207959552*a^{10}*c^9*e^2*z^2 + 256*a^2*b^{17}*f^2*z^2 + 2304*b^{19}*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^{13}*c^2*d*e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^5*b^5*c^6*d*e*f*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^{11}*c^3*d*e*f*z - 428544*a*b^{12}*c^3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z - 50724864*a^7*b^2*c^7*e*f^2*z + 26542080*a^6*b^4*c^6*e*f^2*z - 46
\end{aligned}$$

$$\begin{aligned}
&725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z + 1013760*a^4*b^8* \\
&c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930 \\
&496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f \\
&^2*z + 13824*b^14*c^2*d^2*e*z + 13824*a*b^8*c^4*d*e^2*f - 7741440*a^4*b^2*c \\
&^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 373 \\
&10976*a^3*b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^ \\
&2*e^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3 \\
&*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 4354 \\
&56*a*b^7*c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f \\
&- 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + \\
&35525376*a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5* \\
&c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 287 \\
&0784*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c \\
&^6*d^2*e^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c \\
&^4*d^2*e^2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^ \\
&6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b \\
&^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9* \\
&d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k), \\
&k, 1, 4)
\end{aligned}$$

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[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]

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]  $\text{int}(-(x + 2x^2 - x^3 - 2)/(x^4 - 5x^2 + 4), x)$

[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]  $\text{integrate}((x^3 - 2x^2 - x + 2)/(x^4 - 5x^2 + 4), x)$

[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]  $\frac{1}{3}gx^3 + \frac{1}{2}fx^2 - gx^2 - 2fx + 4gx + xe + (d + 4f - 8g - 2e) \cdot \log(\text{abs}(x + 2))$

**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]  $\frac{1}{3}gx^3 + \frac{1}{2}fx^2 - gx^2 + e \cdot x - 2e \ln(x + 2) + 4fx + 4f \ln(x + 2) - 8g \ln(x + 2)$

**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]  $\frac{1}{3}gx^3 + \frac{1}{2}(f - 2g)x^2 + (e - 2f + 4g)x + (d - 2e + 4f - 8g) \cdot \log(x + 2)$

**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]  $x^2 \cdot (f/2 - g) + x(e - 2f + 4g) + (gx^3)/3 + \log(x + 2) \cdot (d - 2e + 4f - 8g)$

**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]  $gx^3/3 + x^2 \cdot (f/2 - g) + x(e - 2f + 4g) + (d - 2e + 4f - 8g) \cdot \log(x + 2)$

$$3.71 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{2+x} dx \\ &= \int \left( e \left( 1 - \frac{2(f-2g+4h)}{e} \right) + (f-2g+4h)x + (g-2h)x \right) dx \\ &= (e-2f+4g-8h)x + \frac{1}{2}(f-2g+4h)x^2 + \frac{1}{3}(g-2h)x^3 + \dots \end{aligned}$$

**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]  $\frac{1}{4}hx^4 + \frac{1}{3}gx^3 - \frac{2}{3}hx^3 + \frac{1}{2}fx^2 - gx^2 + 2hx^2 - 2fx + 4gx - 8hx + xe + (d + 4f - 8g + 16h - 2e)\log(\text{abs}(x + 2))$

**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]  $\text{int}((x^3 - 2x^2 - x + 2)(hx^4 + gx^3 + fx^2 + ex + d)/(x^4 - 5x^2 + 4), x)$

[Out]  $\frac{1}{4}hx^4 + \frac{1}{3}gx^3 - \frac{2}{3}hx^3 + \frac{1}{2}fx^2 - gx^2 + 2hx^2 + ex - 2fx + 4gx - 8hx + d\ln(x+2) - 2e\ln(x+2) + 4f\ln(x+2) - 8g\ln(x+2) + 16h\ln(x+2)$

**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]  $\text{integrate}((x^3 - 2x^2 - x + 2)(hx^4 + gx^3 + fx^2 + ex + d)/(x^4 - 5x^2 + 4), x, \text{algorithm} = \text{"maxima"})$

[Out]  $\frac{1}{4}hx^4 + \frac{1}{3}(g - 2h)x^3 + \frac{1}{2}(f - 2g + 4h)x^2 + (e - 2f + 4g - 8h)x + (d - 2e + 4f - 8g + 16h)\log(x + 2)$

**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]  $\text{int}(-((x + 2x^2 - x^3 - 2)(d + ex + fx^2 + gx^3 + hx^4))/(x^4 - 5x^2 + 4), x)$

[Out]  $x^3(g/3 - (2h)/3) + \log(x + 2)(d - 2e + 4f - 8g + 16h) + (hx^4)/4 + x^2(f/2 - g + 2h) + x(e - 2f + 4g - 8h)$

**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]  $\text{integrate}((x**3 - 2*x**2 - x + 2)(h*x**4 + g*x**3 + f*x**2 + e*x + d)/(x**4 - 5*x**2 + 4), x)$

[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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+72x^5)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+72x^5}{2+x} dx \\ &= \int \left( 1152 \left( 1 + \frac{e-2f+4g-8h}{1152} \right) + (-576+f-2g) \right) dx \\ &= (1152+e-2f+4g-8h)x - \frac{1}{2}(576-f+2g-4h) \end{aligned}$$



**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]  $1/5*i*x^5 + 1/4*h*x^4 - 1/2*i*x^4 + 1/3*g*x^3 - 2/3*h*x^3 + 4/3*i*x^3 + 1/2*f*x^2 - g*x^2 + 2*h*x^2 - 4*i*x^2 - 2*f*x + 4*g*x - 8*h*x + 16*i*x + x*e + (d + 4*f - 8*g + 16*h - 32*i - 2*e)*\log(\text{abs}(x + 2))$

**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]  $\text{int}((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4), x)$

[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]  $\text{integrate}((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4), x, \text{algorithm}="maxima")$

[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]  $\text{int}(-((x + 2*x^2 - x^3 - 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(x^4 - 5*x^2 + 4), x)$

[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

$$-2 \operatorname{atanh}(2x+3)$$

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]  $-2*\operatorname{atanh}(2*x + 3)$

**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]  $-(d - 2e) \log(\text{abs}(x + 2)) + (d - e) \log(\text{abs}(x + 1))$

**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]  $d \ln(x+1) - e \ln(x+1) - d \ln(x+2) + 2e \ln(x+2)$

**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]  $-(d - 2e) \log(x + 2) + (d - e) \log(x + 1)$

**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]  $\log(x + 1) (d - e) - \log(x + 2) (d - 2e)$

**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]  $(-d + 2e) \log(x + (4d - 6e)/(2d - 3e)) + (d - e) \log(x + 1)$

$$3.75 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2)}{4-5x^2+x^4} dx$$

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

Rubi steps

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

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

Rubi steps

$$\begin{aligned}
\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3}{2+3x+x^2} dx \\
&= \int \left( f-3g+gx + \frac{d-2f+6g+(e-3f+7g)x}{2+3x+x^2} \right) dx \\
&= (f-3g)x + \frac{gx^2}{2} + \int \frac{d-2f+6g+(e-3f+7g)x}{2+3x+x^2} dx \\
&= (f-3g)x + \frac{gx^2}{2} - (d-2e+4f-8g) \int \frac{1}{2+x} dx + (d-e+f-g) \int \frac{1}{1+x} dx \\
&= (f-3g)x + \frac{gx^2}{2} + (d-e+f-g) \log(1+x) - (d-2e+4f-8g) \log(2+x)
\end{aligned}$$

**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

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

**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(abs(x + 2)) + (d + f - g + h - e)\*log(abs(x + 1))

**maple** [A] time = 0.01, size = 98, normalized size = 1.48

$$\frac{hx^3}{3} + \frac{gx^2}{2} - \frac{3hx^2}{2} - d\ln(x+2) + d\ln(x+1) + 2e\ln(x+2) - e\ln(x+1) + fx - 4f\ln(x+2) + f\ln(x+1) - 3gx + 8g\ln(x+2) - g\ln(x+1) + 7hx - 16h\ln(x+2) + h\ln(x+1)$$

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[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

$$\begin{aligned}
 \int \frac{(2 - 3x + x^2)(d + ex + fx^2 + gx^3 + hx^4 + 78x^5)}{4 - 5x^2 + x^4} dx &= \int \frac{d + ex + fx^2 + gx^3 + hx^4 + 78x^5}{2 + 3x + x^2} dx \\
 &= \int \left( -1170 + f - 3g + 7h + (546 + g - 3h)x - (234 - h)x^2 \right) dx \\
 &= -((1170 - f + 3g - 7h)x) + \frac{1}{2}(546 + g - 3h)x^2 - \frac{1}{3}(234 - h)x^3 \\
 &= -((1170 - f + 3g - 7h)x) + \frac{1}{2}(546 + g - 3h)x^2 - \frac{1}{3}(234 - h)x^3 \\
 &= -((1170 - f + 3g - 7h)x) + \frac{1}{2}(546 + g - 3h)x^2 - \frac{1}{3}(234 - h)x^3
 \end{aligned}$$

**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] 1/4\*i\*x^4 + 1/3\*h\*x^3 - i\*x^3 + 1/2\*g\*x^2 - 3/2\*h\*x^2 + 7/2\*i\*x^2 + f\*x - 3\*g\*x + 7\*h\*x - 15\*i\*x - (d + 4\*f - 8\*g + 16\*h - 32\*i - 2\*e)\*log(abs(x + 2)) + (d + f - g + h - i - e)\*log(abs(x + 1))

**maple** [A] time = 0.01, size = 134, normalized size = 1.49

$$\frac{ix^4}{4} + \frac{hx^3}{3} - ix^3 + \frac{gx^2}{2} - \frac{3hx^2}{2} + \frac{7ix^2}{2} - d\ln(x+2) + d\ln(x+1) + 2e\ln(x+2) - e\ln(x+1) + fx - 4f\ln(x+2) + f\ln(x+1) - 3gx + 8g\ln(x+2) - g\ln(x+1) + 7hx - 16h\ln(x+2) + h\ln(x+1) - 15ix + 32i\ln(x+2) - i\ln(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] 1/4\*i\*x^4+1/3\*h\*x^3-i\*x^3+1/2\*g\*x^2-3/2\*h\*x^2+7/2\*i\*x^2+f\*x-3\*g\*x+7\*h\*x-15\*i\*x+d\*ln(x+1)-e\*ln(x+1)+f\*ln(x+1)-g\*ln(x+1)+h\*ln(x+1)-i\*ln(x+1)-d\*ln(x+2)+2\*e\*ln(x+2)-4\*f\*ln(x+2)+8\*g\*ln(x+2)-16\*h\*ln(x+2)+32\*i\*ln(x+2)

**maxima** [A] time = 0.44, size = 84, normalized size = 0.93

$$\frac{1}{4}ix^4 + \frac{1}{3}(h-3i)x^3 + \frac{1}{2}(g-3h+7i)x^2 + (f-3g+7h-15i)x - (d-2e+4f-8g+16h-32i)\log(x+2) + (d-e+f-g+h-i)\log(x+1)$$

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="maxima")

[Out]  $\frac{1}{4}ix^4 + \frac{1}{3}(h - 3i)x^3 + \frac{1}{2}(g - 3h + 7i)x^2 + (f - 3g + 7h - 15i)x - (d - 2e + 4f - 8g + 16h - 32i)\log(x + 2) + (d - e + f - g + h - i)\log(x + 1)$

**mupad [B]** time = 0.08, size = 86, normalized size = 0.96

$$x^3 \left( \frac{h}{3} - i \right) - \ln(x+2) (d - 2e + 4f - 8g + 16h - 32i) + \ln(x+1) (d - e + f - g + h - i) + \frac{ix^4}{4} + x^2 \left( \frac{g}{2} - \frac{3h}{2} + \frac{7i}{2} \right) + x (f - 3g + 7h - 15i)$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out]  $x^3(h/3 - i) - \log(x + 2)(d - 2e + 4f - 8g + 16h - 32i) + \log(x + 1)(d - e + f - g + h - i) + (ix^4)/4 + x^2(g/2 - (3h)/2 + (7i)/2) + x(f - 3g + 7h - 15i)$

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

[Out]  $i*x**4/4 + x**3*(h/3 - i) + x**2*(g/2 - 3*h/2 + 7*i/2) + x*(f - 3*g + 7*h - 15*i) + (-d + 2*e - 4*f + 8*g - 16*h + 32*i)*\log(x + (4*d - 6*e + 10*f - 18*g + 34*h - 66*i)/(2*d - 3*e + 5*f - 9*g + 17*h - 33*i)) + (d - e + f - g + h - i)*\log(x + 1)$



$$3.79 \quad \int \frac{2+x}{4-5x^2+x^4} dx$$

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\_)\*(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

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

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

**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]  $\frac{1}{6}(d - e) \log(x + 1) - \frac{1}{2}(d + e) \log(x - 1) + \frac{1}{3}(d + 2e) \log(x - 2)$

**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

$$\frac{(d - e) \log\left(x + \frac{26d^3 + 66d^2e - 9d^2(d - e) + 78d(d - e) - 12d(d - e)^2 - 7d(d - e)^2 + 46e^3 + 3e^2(d - e) - 8e(d - e)^2}{10d^3 + 69d^2e + 102d^2e^2 + 35e^3}\right)}{6} - \frac{(d + e) \log\left(x + \frac{26d^3 + 66d^2e + 27d^2(d + e) + 78d(d + e) - 63d(d + e)^2 + 46e^3 - 9e^2(d + e) - 72e(d + e)^2}{10d^3 + 69d^2e + 102d^2e^2 + 35e^3}\right)}{2} + \frac{(d + 2e) \log\left(x + \frac{26d^3 + 66d^2e - 18d^2(d + 2e) + 78d(d + 2e) - 24d(d + 2e)^2 - 28d(d + 2e)^2 + 46e^3 + 6e^2(d + 2e) - 32e(d + 2e)^2}{10d^3 + 69d^2e + 102d^2e^2 + 35e^3}\right)}{3}$$

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]  $(d - e) \log(x + (26*d**3 + 66*d**2*e - 9*d**2*(d - e) + 78*d*e**2 - 12*d*e*(d - e) - 7*d*(d - e)**2 + 46*e**3 + 3*e**2*(d - e) - 8*e*(d - e)**2)/(10*d**3 + 69*d**2*e + 102*d*e**2 + 35*e**3))/6 - (d + e) \log(x + (26*d**3 + 66*d**2*e + 27*d**2*(d + e) + 78*d*e**2 + 36*d*e*(d + e) - 63*d*(d + e)**2 + 46*e**3 - 9*e**2*(d + e) - 72*e*(d + e)**2)/(10*d**3 + 69*d**2*e + 102*d*e**2 + 35*e**3))/2 + (d + 2*e) \log(x + (26*d**3 + 66*d**2*e - 18*d**2*(d + 2*e) + 78*d*e**2 - 24*d*e*(d + 2*e) - 28*d*(d + 2*e)**2 + 46*e**3 + 6*e**2*(d + 2*e) - 32*e*(d + 2*e)**2)/(10*d**3 + 69*d**2*e + 102*d*e**2 + 35*e**3))/3$

$$3.81 \quad \int \frac{(2+x)(d+ex+fx^2)}{4-5x^2+x^4} dx$$

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 + (26\*d\*\*3 + 66\*d\*\*2\*e + 132\*d\*\*2\*f - 9\*d\*\*2\*(d - e + f) + 78\*d\*e\*\*2 + 276\*d\*e\*f - 12\*d\*e\*(d - e + f) + 222\*d\*f\*\*2 + 6\*d\*f\*(d - e + f) - 7\*d\*(d - e + f)\*\*2 + 46\*e\*\*3 + 204\*e\*\*2\*f + 3\*e\*\*2\*(d - e + f) + 282\*e\*f\*\*2 + 36\*e\*f\*(d - e + f) - 8\*e\*(d - e + f)\*\*2 + 116\*f\*\*3 + 51\*f\*\*2\*(d - e

$$\begin{aligned}
& + f) - 13*f*(d - e + f)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 102*d*e**2 \\
& + 318*d*e*f + 246*d*f**2 + 35*e**3 + 174*e**2*f + 285*e*f**2 + 154*f**3))/ \\
& 6 - (d + e + f)*\log(x + (26*d**3 + 66*d**2*e + 132*d**2*f + 27*d**2*(d + e \\
& + f) + 78*d*e**2 + 276*d*e*f + 36*d*e*(d + e + f) + 222*d*f**2 - 18*d*f*(d \\
& + e + f) - 63*d*(d + e + f)**2 + 46*e**3 + 204*e**2*f - 9*e**2*(d + e + f) \\
& + 282*e*f**2 - 108*e*f*(d + e + f) - 72*e*(d + e + f)**2 + 116*f**3 - 153*f \\
& **2*(d + e + f) - 117*f*(d + e + f)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + \\
& 102*d*e**2 + 318*d*e*f + 246*d*f**2 + 35*e**3 + 174*e**2*f + 285*e*f**2 + \\
& 154*f**3))/2 + (d + 2*e + 4*f)*\log(x + (26*d**3 + 66*d**2*e + 132*d**2*f - \\
& 18*d**2*(d + 2*e + 4*f) + 78*d*e**2 + 276*d*e*f - 24*d*e*(d + 2*e + 4*f) + \\
& 222*d*f**2 + 12*d*f*(d + 2*e + 4*f) - 28*d*(d + 2*e + 4*f)**2 + 46*e**3 + 2 \\
& 04*e**2*f + 6*e**2*(d + 2*e + 4*f) + 282*e*f**2 + 72*e*f*(d + 2*e + 4*f) - \\
& 32*e*(d + 2*e + 4*f)**2 + 116*f**3 + 102*f**2*(d + 2*e + 4*f) - 52*f*(d + 2 \\
& *e + 4*f)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 102*d*e**2 + 318*d*e*f + \\
& 246*d*f**2 + 35*e**3 + 174*e**2*f + 285*e*f**2 + 154*f**3))/3
\end{aligned}$$

$$3.82 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx$$

**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 -

$$\begin{aligned}
& e + f - g) + 930*e*g**2 + 102*e*g*(d - e + f - g) - 8*e*(d - e + f - g)**2 \\
& + 116*f**3 + 534*f**2*g + 51*f**2*(d - e + f - g) + 924*f*g**2 + 228*f*g*(d \\
& - e + f - g) - 13*f*(d - e + f - g)**2 + 586*g**3 + 243*g**2*(d - e + f - \\
& g) - 20*g*(d - e + f - g)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 213*d**2*g \\
& + 102*d*e**2 + 318*d*e*f + 564*d*e*g + 246*d*f**2 + 894*d*f*g + 750*d*g** \\
& 2 + 35*e**3 + 174*e**2*f + 249*e**2*g + 285*e*f**2 + 852*e*f*g + 537*e*g**2 \\
& + 154*f**3 + 717*f**2*g + 966*f*g**2 + 323*g**3))/6 - (d + e + f + g)*log( \\
& x + (26*d**3 + 66*d**2*e + 132*d**2*f + 174*d**2*g + 27*d**2*(d + e + f + g \\
& ) + 78*d*e**2 + 276*d*e*f + 444*d*e*g + 36*d*e*(d + e + f + g) + 222*d*f**2 \\
& + 636*d*f*g - 18*d*f*(d + e + f + g) + 510*d*g**2 - 108*d*g*(d + e + f + g \\
& ) - 63*d*(d + e + f + g)**2 + 46*e**3 + 204*e**2*f + 390*e**2*g - 9*e**2*(d \\
& + e + f + g) + 282*e*f**2 + 984*e*f*g - 108*e*f*(d + e + f + g) + 930*e*g* \\
& **2 - 306*e*g*(d + e + f + g) - 72*e*(d + e + f + g)**2 + 116*f**3 + 534*f** \\
& 2*g - 153*f**2*(d + e + f + g) + 924*f*g**2 - 684*f*g*(d + e + f + g) - 117 \\
& *f*(d + e + f + g)**2 + 586*g**3 - 729*g**2*(d + e + f + g) - 180*g*(d + e \\
& + f + g)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 213*d**2*g + 102*d*e**2 + \\
& 318*d*e*f + 564*d*e*g + 246*d*f**2 + 894*d*f*g + 750*d*g**2 + 35*e**3 + 174 \\
& *e**2*f + 249*e**2*g + 285*e*f**2 + 852*e*f*g + 537*e*g**2 + 154*f**3 + 717 \\
& *f**2*g + 966*f*g**2 + 323*g**3))/2 + (d + 2*e + 4*f + 8*g)*log(x + (26*d** \\
& 3 + 66*d**2*e + 132*d**2*f + 174*d**2*g - 18*d**2*(d + 2*e + 4*f + 8*g) + 7 \\
& 8*d*e**2 + 276*d*e*f + 444*d*e*g - 24*d*e*(d + 2*e + 4*f + 8*g) + 222*d*f** \\
& 2 + 636*d*f*g + 12*d*f*(d + 2*e + 4*f + 8*g) + 510*d*g**2 + 72*d*g*(d + 2*e \\
& + 4*f + 8*g) - 28*d*(d + 2*e + 4*f + 8*g)**2 + 46*e**3 + 204*e**2*f + 390* \\
& e**2*g + 6*e**2*(d + 2*e + 4*f + 8*g) + 282*e*f**2 + 984*e*f*g + 72*e*f*(d \\
& + 2*e + 4*f + 8*g) + 930*e*g**2 + 204*e*g*(d + 2*e + 4*f + 8*g) - 32*e*(d + \\
& 2*e + 4*f + 8*g)**2 + 116*f**3 + 534*f**2*g + 102*f**2*(d + 2*e + 4*f + 8* \\
& g) + 924*f*g**2 + 456*f*g*(d + 2*e + 4*f + 8*g) - 52*f*(d + 2*e + 4*f + 8*g \\
& )**2 + 586*g**3 + 486*g**2*(d + 2*e + 4*f + 8*g) - 80*g*(d + 2*e + 4*f + 8* \\
& g)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 213*d**2*g + 102*d*e**2 + 318*d* \\
& e*f + 564*d*e*g + 246*d*f**2 + 894*d*f*g + 750*d*g**2 + 35*e**3 + 174*e**2* \\
& f + 249*e**2*g + 285*e*f**2 + 852*e*f*g + 537*e*g**2 + 154*f**3 + 717*f**2* \\
& g + 966*f*g**2 + 323*g**3))/3
\end{aligned}$$

$$3.83 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$$

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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{2-x-2x^2+x^3} dx \\ &= \int \left( g \left( 1 + \frac{2h}{g} \right) + \frac{d+2e+4f+8g+16h}{3(-2+x)} + \frac{-d-e-f-g-h}{2(-1+x)} + h \right) dx \\ &= (g+2h)x + \frac{hx^2}{2} - \frac{1}{2}(d+e+f+g+h) \log(1-x) + \frac{1}{3}(d+2e+4f \end{aligned}$$

**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]  $\frac{1}{2}hx^2 + gx + 2hx + \frac{1}{3}d \ln(x-2) + \frac{2}{3}e \ln(x-2) + \frac{4}{3}f \ln(x-2) + \frac{8}{3}g \ln(x-2) + \frac{16}{3}h \ln(x-2) + \frac{1}{6}d \ln(x+1) - \frac{1}{6}e \ln(x+1) + \frac{1}{6}f \ln(x+1) - \frac{1}{6}g \ln(x+1) + \frac{1}{6}h \ln(x+1) - \frac{1}{2}d \ln(x-1) - \frac{1}{2}e \ln(x-1) - \frac{1}{2}f \ln(x-1) - \frac{1}{2}g \ln(x-1) - \frac{1}{2}h \ln(x-1)$

**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]  $\frac{1}{2}hx^2 + (g+2h)x + \frac{1}{6}(d-e+f-g+h)\log(x+1) - \frac{1}{2}(d+e+f+g+h)\log(x-1) + \frac{1}{3}(d+2e+4f+8g+16h)\log(x-2)$

**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]  $x(g+2h) + \frac{(hx^2)}{2} - \log(x-1) \left( \frac{d}{2} + \frac{e}{2} + \frac{f}{2} + \frac{g}{2} + \frac{h}{2} \right) + \log(x+1) \left( \frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} \right) + \log(x-2) \left( \frac{d}{3} + \frac{(2e)}{3} + \frac{(4f)}{3} + \frac{(8g)}{3} + \frac{(16h)}{3} \right)$

**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

$$-\frac{1}{2} \log(1-x)(d+e+f+g+h+i) + \frac{1}{3} \log(2-x)(d+2e+4f+8g+16h+32i) + \frac{1}{6} \log(x+1)(d-e+f-g+h-i) + x(g+2h+5i) + \frac{1}{2}x^2(h+2i) + \frac{ix^3}{3}$$

**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\_)\*(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]

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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+84x^5)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+84x^5}{2-x-2x^2+x^3} dx \\ &= \int \left( 420 \left( 1 + \frac{1}{420}(g+2h) \right) + \frac{2688+d+2e+4f+8g+16h}{3(-2+x)} \right) dx \\ &= (420+g+2h)x + \frac{1}{2}(168+h)x^2 + 28x^3 - \frac{1}{2}(84+d+e+f+ \end{aligned}$$

**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]  $\frac{1}{3}ix^3 + \frac{1}{2}hx^2 + ix^2 + gx + 2hx + 5ix + \frac{1}{6}(d + f - g + h - i - e) \log(\text{abs}(x + 1)) - \frac{1}{2}(d + f + g + h + i + e) \log(\text{abs}(x - 1)) + \frac{1}{3}(d + 4f + 8g + 16h + 32i + 2e) \log(\text{abs}(x - 2))$

**maple [A]** time = 0.01, size = 156, normalized size = 1.62

$$\frac{ix^3}{3} + \frac{hx^2}{2} + ix^2 + gx + 2hx + 5ix + \frac{1}{6}(d + f - g + h - i - e) \log(\text{abs}(x + 1)) - \frac{1}{2}(d + f + g + h + i + e) \log(\text{abs}(x - 1)) + \frac{1}{3}(d + 4f + 8g + 16h + 32i + 2e) \log(\text{abs}(x - 2))$$

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]  $\frac{1}{3}d \ln(x-2) + \frac{2}{3}e \ln(x-2) + \frac{4}{3}f \ln(x-2) + \frac{8}{3}g \ln(x-2) + \frac{16}{3}h \ln(x-2) + \frac{32}{3}i \ln(x-2) + \frac{1}{3}ix^3 + \frac{1}{2}hx^2 + ix^2 + gx + 2hx + 5ix + \frac{1}{6}d \ln(x+1) - \frac{1}{6}e \ln(x+1) + \frac{1}{6}f \ln(x+1) - \frac{1}{6}g \ln(x+1) + \frac{1}{6}h \ln(x+1) - \frac{1}{6}i \ln(x+1) - \frac{1}{2}d \ln(x-1) - \frac{1}{2}e \ln(x-1) - \frac{1}{2}f \ln(x-1) - \frac{1}{2}g \ln(x-1) - \frac{1}{2}h \ln(x-1) - \frac{1}{2}i \ln(x-1)$

**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]  $\frac{1}{3}ix^3 + \frac{1}{2}(h + 2i)x^2 + (g + 2h + 5i)x + \frac{1}{6}(d - e + f - g + h - i) \log(x + 1) - \frac{1}{2}(d + e + f + g + h + i) \log(x - 1) + \frac{1}{3}(d + 2e + 4f + 8g + 16h + 32i) \log(x - 2)$

**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]  $x(g + 2h + 5i) + \frac{(ix^3)}{3} - \log(x - 1) \left( \frac{d}{2} + \frac{e}{2} + \frac{f}{2} + \frac{g}{2} + \frac{h}{2} + \frac{i}{2} \right) + \log(x + 1) \left( \frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} - \frac{i}{6} \right) + \log(x - 2) \left( \frac{d}{3} + \frac{2e}{3} + \frac{4f}{3} + \frac{8g}{3} + \frac{16h}{3} + \frac{32i}{3} \right) + x^2 \left( \frac{h}{2} + i \right)$

**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**

$$\begin{aligned} \int \frac{(d+ex)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left( \frac{d+2e}{48(-2+x)} + \frac{-d-e}{18(-1+x)} + \frac{d-e}{6(1+x)} + \frac{-d+2e}{12(2+x)^2} + \frac{-19d+26e}{144(2+x)} \right) dx \\ &= \frac{d-2e}{12(2+x)} - \frac{1}{18}(d+e)\log(1-x) + \frac{1}{48}(d+2e)\log(2-x) + \frac{1}{6}(d-e)\log(1+x) - \frac{1}{144}(19d-26e)\log(x+2) \end{aligned}$$

**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 - 2\*e)/(12\*x + 24) + (d - e)\*log(x + (-1534775\*d\*\*6 + 8032360\*d\*\*5\*e - 984027\*d\*\*5\*(d - e) - 12991180\*d\*\*4\*e\*\*2 + 11797266\*d\*\*4\*e\*(d - e) + 3567168\*d\*\*4\*(d - e)\*\*2 + 1075200\*d\*\*3\*e\*\*3 - 32721528\*d\*\*3\*e\*\*2\*(d - e) - 8725248\*d\*\*3\*e\*(d - e)\*\*2 - 247104\*d\*\*3\*(d - e)\*\*3 + 16959280\*d\*\*2\*e\*\*4 + 38977296\*d\*\*2\*e\*\*3\*(d - e) - 2820096\*d\*\*2\*e\*\*2\*(d - e)\*\*2 - 10357632\*d\*\*2\*e\*(d - e)

$$\begin{aligned}
& **3 - 15836800*d*e**5 - 21294960*d*e**4*(d - e) + 15436800*d*e**3*(d - e)**2 \\
& + 16277760*d*e**2*(d - e)**3 + 4283840*e**6 + 3876000*e**5*(d - e) - 6865 \\
& 920*e**4*(d - e)**2 - 4078080*e**3*(d - e)**3)/(801262*d**6 - 4662251*d**5*e \\
& + 7296938*d**4*e**2 + 1388616*d**3*e**3 - 12447440*d**2*e**4 + 9990800*d* \\
& e**5 - 2380000*e**6))/6 - (d + e)*\log(x + (-1534775*d**6 + 8032360*d**5*e + \\
& 328009*d**5*(d + e) - 12991180*d**4*e**2 - 3932422*d**4*e*(d + e) + 396352 \\
& *d**4*(d + e)**2 + 1075200*d**3*e**3 + 10907176*d**3*e**2*(d + e) - 969472* \\
& d**3*e*(d + e)**2 + 9152*d**3*(d + e)**3 + 16959280*d**2*e**4 - 12992432*d* \\
& **2*e**3*(d + e) - 313344*d**2*e**2*(d + e)**2 + 383616*d**2*e*(d + e)**3 - \\
& 15836800*d*e**5 + 7098320*d*e**4*(d + e) + 1715200*d*e**3*(d + e)**2 - 6028 \\
& 80*d*e**2*(d + e)**3 + 4283840*e**6 - 1292000*e**5*(d + e) - 762880*e**4*(d \\
& + e)**2 + 151040*e**3*(d + e)**3)/(801262*d**6 - 4662251*d**5*e + 7296938* \\
& d**4*e**2 + 1388616*d**3*e**3 - 12447440*d**2*e**4 + 9990800*d*e**5 - 23800 \\
& 00*e**6))/18 + (d + 2*e)*\log(x + (-1534775*d**6 + 8032360*d**5*e - 984027*d \\
& **5*(d + 2*e)/8 - 12991180*d**4*e**2 + 5898633*d**4*e*(d + 2*e)/4 + 55737*d \\
& **4*(d + 2*e)**2 + 1075200*d**3*e**3 - 4090191*d**3*e**2*(d + 2*e) - 136332 \\
& *d**3*e*(d + 2*e)**2 - 3861*d**3*(d + 2*e)**3/8 + 16959280*d**2*e**4 + 4872 \\
& 162*d**2*e**3*(d + 2*e) - 44064*d**2*e**2*(d + 2*e)**2 - 80919*d**2*e*(d + \\
& 2*e)**3/4 - 15836800*d*e**5 - 2661870*d*e**4*(d + 2*e) + 241200*d*e**3*(d + \\
& 2*e)**2 + 63585*d*e**2*(d + 2*e)**3/2 + 4283840*e**6 + 484500*e**5*(d + 2* \\
& e) - 107280*e**4*(d + 2*e)**2 - 7965*e**3*(d + 2*e)**3)/(801262*d**6 - 4662 \\
& 251*d**5*e + 7296938*d**4*e**2 + 1388616*d**3*e**3 - 12447440*d**2*e**4 + 9 \\
& 990800*d*e**5 - 2380000*e**6))/48 - (19*d - 26*e)*\log(x + (-1534775*d**6 + \\
& 8032360*d**5*e + 328009*d**5*(19*d - 26*e)/8 - 12991180*d**4*e**2 - 1966211 \\
& *d**4*e*(19*d - 26*e)/4 + 6193*d**4*(19*d - 26*e)**2 + 1075200*d**3*e**3 + \\
& 1363397*d**3*e**2*(19*d - 26*e) - 15148*d**3*e*(19*d - 26*e)**2 + 143*d**3* \\
& (19*d - 26*e)**3/8 + 16959280*d**2*e**4 - 1624054*d**2*e**3*(19*d - 26*e) - \\
& 4896*d**2*e**2*(19*d - 26*e)**2 + 2997*d**2*e*(19*d - 26*e)**3/4 - 1583680 \\
& 0*d*e**5 + 887290*d*e**4*(19*d - 26*e) + 26800*d*e**3*(19*d - 26*e)**2 - 23 \\
& 55*d*e**2*(19*d - 26*e)**3/2 + 4283840*e**6 - 161500*e**5*(19*d - 26*e) - 1 \\
& 1920*e**4*(19*d - 26*e)**2 + 295*e**3*(19*d - 26*e)**3)/(801262*d**6 - 4662 \\
& 251*d**5*e + 7296938*d**4*e**2 + 1388616*d**3*e**3 - 12447440*d**2*e**4 + 9 \\
& 990800*d*e**5 - 2380000*e**6))/144
\end{aligned}$$

$$3.87 \quad \int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx$$

**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

$$\begin{aligned} \int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left( \frac{d+2e+4f}{48(-2+x)} + \frac{-d-e-f}{18(-1+x)} + \frac{d-e+f}{6(1+x)} + \frac{-d+2e-4f}{12(2+x)^2} + \frac{-19d+26e-28f}{144(2+x)} \right) dx \\ &= \frac{d-2e+4f}{12(2+x)} - \frac{1}{18}(d+e+f) \log(1-x) + \frac{1}{48}(d+2e+4f) \log(2-x) \end{aligned}$$

**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]  $-1/144*(19*d + 28*f - 26*e)*\log(\text{abs}(x + 2)) + 1/6*(d + f - e)*\log(\text{abs}(x + 1)) - 1/18*(d + f + e)*\log(\text{abs}(x - 1)) + 1/48*(d + 4*f + 2*e)*\log(\text{abs}(x - 2)) + 1/12*(d + 4*f - 2*e)/(x + 2)$

**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

$$\frac{d-2e+4f-8g}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g) + \frac{1}{48} \log(2-x)(d+2e+4f+8g) + \frac{1}{6} \log(x+1)(d-e+f-g) - \frac{1}{144} \log(x+2)$$

**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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left( \frac{d+2e+4f+8g}{48(-2+x)} + \frac{-d-e-f-g}{18(-1+x)} + \frac{d-e+f-g}{6(1+x)} + \frac{-d-2e+4f-8g}{12(2+x)} \right) dx \\ &= \frac{d-2e+4f-8g}{12(2+x)} - \frac{1}{18} (d+e+f+g) \log(1-x) + \frac{1}{48} (d+2e+4f+8g) \log(2-x) + \frac{1}{6} (d-e+f-g) \log(x+1) - \frac{1}{144} (19d-26e+28f-8g) \log(x+2) \end{aligned}$$

**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]  $-1/144*(19*d + 28*f - 8*g - 26*e)*\log(\text{abs}(x + 2)) + 1/6*(d + f - g - e)*\log(\text{abs}(x + 1)) - 1/18*(d + f + g + e)*\log(\text{abs}(x - 1)) + 1/48*(d + 4*f + 8*g + 2*e)*\log(\text{abs}(x - 2)) + 1/12*(d + 4*f - 8*g - 2*e)/(x + 2)$

**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

$$\frac{1}{144} \left( \frac{12(d-2e+4f-8g+16h)}{x+2} + 24 \log(-x-1)(d-e+f-g+h) - 8 \log(1-x)(d+e+f+g+h) + 3 \log(2-x)(d+2(e+2f+4g+8h)) + \log(x+2)(-19d+26e-28f+8g+80h) \right)$$

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

$$\frac{(19d-26e+28f-8g-80h)x+38d-52e+56f-16g-160h}{144(x+2)} \log(x+2) - 24((d-e+f-g+h)x+2d-2e+2f-2g+2h) \log(x+1) + 8((d+e+f+g+h)x+2d+2e+2f+2g+2h) \log(x-1) - 3((d+2e+4f+8g+16h)x+2d+4e+8f+16g+32h) \log(x-2) - 12d+24e-48f+96g-192h$$

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

$$-\frac{1}{144} (19d + 28f - 8g - 80h - 26e) \log(|x+2|) + \frac{1}{6} (d + f - g + h - e) \log(|x+1|) - \frac{1}{18} (d + f + g + h + e) \log(|x-1|) + \frac{1}{48} (d + 4f + 8g + 16h + 2e) \log(|x-2|) + \frac{d + 4f - 8g + 16h - 2e}{12(x+2)}$$

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]  $-1/144*(19*d + 28*f - 8*g - 80*h - 26*e)*\log(\text{abs}(x + 2)) + 1/6*(d + f - g + h - e)*\log(\text{abs}(x + 1)) - 1/18*(d + f + g + h + e)*\log(\text{abs}(x - 1)) + 1/48*(d + 4*f + 8*g + 16*h + 2*e)*\log(\text{abs}(x - 2)) + 1/12*(d + 4*f - 8*g + 16*h - 2*e)/(x + 2)$

**maple** [A] time = 0.01, size = 182, normalized size = 1.72

$\frac{5h \ln(x+2)}{9} - \frac{h \ln(x-1)}{18} + \frac{h \ln(x+1)}{6} + \frac{h \ln(x-2)}{3} - \frac{g \ln(x-1)}{18} + \frac{g \ln(x+2)}{18} - \frac{g \ln(x-2)}{6} - \frac{g \ln(x+1)}{6} - \frac{19d \ln(x+2)}{144} + \frac{13e \ln(x+2)}{72} - \frac{e \ln(x-1)}{18} - \frac{d \ln(x-1)}{18} - \frac{e \ln(x+1)}{6} - \frac{d \ln(x+1)}{6} - \frac{d \ln(x-2)}{48} - \frac{e \ln(x-2)}{24} + \frac{f \ln(x-2)}{12} - \frac{f \ln(x+1)}{6} - \frac{f \ln(x-1)}{18} - \frac{7f \ln(x+2)}{36} + \frac{f}{3e+6} - \frac{d}{12x+24} + \frac{4h}{3(x+2)} - \frac{2e}{5(x+2)} - \frac{e}{6(x+2)}$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^3-2\*x^2-x+2)\*(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

$-\frac{1}{144}(19d - 26e + 28f - 8g - 80h)\log(x+2) + \frac{1}{6}(d - e + f - g + h)\log(x+1) - \frac{1}{18}(d + e + f + g + h)\log(x-1) + \frac{1}{48}(d + 2e + 4f + 8g + 16h)\log(x-2) + \frac{d - 2e + 4f - 8g + 16h}{12(x+2)}$

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

$\frac{d}{12} - \frac{e}{6} + \frac{f}{3} - \frac{2g}{3} + \frac{4h}{3} + \ln(x+1) \left( \frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} \right) - \ln(x-1) \left( \frac{d}{18} + \frac{e}{18} + \frac{f}{18} + \frac{g}{18} + \frac{h}{18} \right) + \ln(x-2) \left( \frac{d}{48} + \frac{e}{24} + \frac{f}{12} + \frac{g}{6} + \frac{h}{3} \right) + \ln(x+2) \left( \frac{13e}{72} - \frac{19d}{144} - \frac{7f}{36} + \frac{g}{18} + \frac{5h}{9} \right)$

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,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.039$ , Rules used = {1586, 6742}

$$\frac{d-2e+4f-8g+16h-32i}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g+h+i) + \frac{1}{48} \log(2-x)(d+2e+4f+8g+16h+32i) + \frac{1}{6} \log(x+1)(d-e+f-g+h-i) - \frac{1}{144} \log(x+2)(19d-26e+28f-8g-80h+352i) + ix$$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+90x^5)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+90x^5}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left( 90 + \frac{2880+d+2e+4f+8g+16h}{48(-2+x)} + \frac{-90}{12(2+x)} \right) dx \\ &= 90x - \frac{2880-d+2e-4f+8g-16h}{12(2+x)} - \frac{1}{18} (90 + \dots) \end{aligned}$$

**Mathematica [A]** time = 0.06, size = 118, normalized size = 0.97

$$\frac{1}{144} \left( \frac{12(d - 2(e - 2f + 4g - 8h + 16i))}{x + 2} - 8 \log(1 - x)(d + e + f + g + h + i) + 3 \log(2 - x)(d + 2e + 4(f + 2g + 4h + 8i)) + 24 \log(x + 1)(d - e + f - g + h - i) + \log(x + 2)(-19d + 26e - 28f + 8g + 80h - 352i) + 144ix \right)$$

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)\*Log[1 + x] + (-19\*d + 26\*e - 28\*f + 8\*g + 80\*h - 352\*i)\*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

$$\frac{22 \ln(x+2)}{9} - \frac{\ln(x-1)}{18} - \frac{\ln(x+1)}{6} + \frac{2 \ln(x-2)}{3} + \frac{5 \ln(x+2)}{9} - \frac{h \ln(x-1)}{18} + \frac{h \ln(x+1)}{6} - \frac{h \ln(x-2)}{3} - \frac{g \ln(x-1)}{18} + \frac{g \ln(x+1)}{6} - \frac{g \ln(x-2)}{3} + \frac{19 d \ln(x+2)}{144} + \frac{13 h \ln(x+2)}{72} - \frac{e \ln(x-1)}{18} + \frac{e \ln(x+1)}{6} + \frac{e \ln(x-2)}{3} + \frac{d \ln(x-2)}{48} + \frac{f \ln(x+1)}{12} + \frac{f \ln(x-1)}{18} - \frac{f \ln(x-2)}{36} + \frac{7 i \ln(x+2)}{36} + i + \frac{d}{3} + \frac{e}{12} + \frac{f}{24} + \frac{g}{36} + \frac{h}{36} + \frac{2i}{3} + \frac{f}{6(x+2)}$$

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] + 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

$$\begin{aligned}
\int \frac{2 - 3x + x^2}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{1}{(2 - 3x + x^2)(2 + 3x + x^2)^2} dx \\
&= -\frac{5 + 3x}{12(2 + 3x + x^2)} + \frac{1}{72} \int \frac{-18 + 48x - 18x^2}{(2 - 3x + x^2)(2 + 3x + x^2)} dx \\
&= -\frac{5 + 3x}{12(2 + 3x + x^2)} + \frac{\int \frac{252 - 108x}{2 - 3x + x^2} dx}{5184} + \frac{\int \frac{-900 + 108x}{2 + 3x + x^2} dx}{5184} \\
&= -\frac{5 + 3x}{12(2 + 3x + x^2)} + \frac{1}{144} \int \frac{1}{-2 + x} dx - \frac{1}{36} \int \frac{1}{-1 + x} dx - \frac{7}{36} \int \frac{1}{1 + x} dx + \frac{31}{144} \int \frac{1}{2 + x} dx \\
&= -\frac{5 + 3x}{12(2 + 3x + x^2)} - \frac{1}{36} \log(1 - x) + \frac{1}{144} \log(2 - x) - \frac{7}{36} \log(1 + x) + \frac{31}{144} \log(2 + x)
\end{aligned}$$

**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+1), x]

```

x^2)^q*Simp[(b*h - 2*g*c)*((c*d - a*f)^2 - (b*d - a*e)*(c*e - b*f))*(p + 1)
+ (b^2*(g*f) - b*(h*c*d + g*c*e + a*h*f) + 2*(g*c*(c*d - a*f) - a*(-(h*c*e
))))*(a*f*(p + 1) - c*d*(p + 2)) - e*((g*c)*(2*a*c*e - b*(c*d + a*f)) + (g*
b - a*h)*(2*c^2*d + b^2*f - c*(b*e + 2*a*f)))*(p + q + 2) - (2*f*((g*c)*(2*
a*c*e - b*(c*d + a*f)) + (g*b - a*h)*(2*c^2*d + b^2*f - c*(b*e + 2*a*f)))*(
p + q + 2) - (b^2*g*f - b*(h*c*d + g*c*e + a*h*f) + 2*(g*c*(c*d - a*f) - a*
(-(h*c*e))))*(b*f*(p + 1) - c*e*(2*p + q + 4)))*x - c*f*(b^2*(g*f) - b*(h*c
*d + g*c*e + a*h*f) + 2*(g*c*(c*d - a*f) + a*h*c*e))*(2*p + 2*q + 5)*x^2, x
], x], x] /; FreeQ[{a, b, c, d, e, f, g, h, q}, x] && NeQ[b^2 - 4*a*c, 0] &
& NeQ[e^2 - 4*d*f, 0] && LtQ[p, -1] && NeQ[(c*d - a*f)^2 - (b*d - a*e)*(c*e
- b*f), 0] && !( !IntegerQ[p] && ILtQ[q, -1])

```

### Rule 1072

```

Int[((A_.) + (B_.)*(x_) + (C_.)*(x_)^2)/(((a_) + (b_.)*(x_) + (c_.)*(x_)^2)
*((d_) + (e_.)*(x_) + (f_.)*(x_)^2)), x_Symbol] := With[{q = c^2*d^2 - b*c*
d*e + a*c*e^2 + b^2*d*f - 2*a*c*d*f - a*b*e*f + a^2*f^2}, Dist[1/q, Int[(A*
c^2*d - a*c*C*d - A*b*c*e + a*B*c*e + A*b^2*f - a*b*B*f - a*A*c*f + a^2*C*f
+ c*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B*f)*x]/(a + b*x + c*x^2),
x], x] + Dist[1/q, Int[(c*C*d^2 - B*c*d*e + A*c*e^2 + b*B*d*f - A*c*d*f - a
*C*d*f - A*b*e*f + a*A*f^2 - f*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B
*f)*x]/(d + e*x + f*x^2), x], x] /; NeQ[q, 0] /; FreeQ[{a, b, c, d, e, f,
A, B, C}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0]

```

### Rule 1586

```

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

```

### Rubi steps

$$\begin{aligned}
\int \frac{(d+ex)(2-3x+x^2)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex}{(2-3x+x^2)(2+3x+x^2)^2} dx \\
&= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{1}{72} \int \frac{6(3d-10e)-24(2d-3e)x+6(3d-4e)x^2}{(2-3x+x^2)(2+3x+x^2)} dx \\
&= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{\int \frac{108(3d-10e)-288(2d-3e)+(-36(3d-10e)+72(3d-4e))x}{2-3x+x^2} dx}{5184} - \int \frac{108(3d-4e)x^2}{(2+3x+x^2)^2} dx \\
&= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{1}{36}(7d-13e) \int \frac{1}{1+x} dx - \frac{1}{144}(-d-2e) \int \frac{1}{-2+x} dx \\
&= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{1}{36}(d+e) \log(1-x) + \frac{1}{144}(d+2e) \log(2-x) - \frac{1}{36}(7d-13e) \log(x+1) + \frac{1}{144}(31d-50e) \log(x+2)
\end{aligned}$$

**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

$$\frac{12(3d-4e)x - (31d-50e)x^2 + 3(31d-50e)x + 62d-100e}{144(x^2+3x+2)} \log(x+2) + 4(7d-13e)x^2 + 3(7d-13e)x + 14d-26e}{144(x^2+3x+2)} \log(x+1) + 4((d+e)x^2 + 3(d+e)x + 2d+2e) \log(x-1) - ((d+2e)x^2 + 3(d+2e)x + 2d+4e) \log(x-2) + 60d-72e}{144(x^2+3x+2)}$$

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="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 + (-24383100\*d\*\*6 + 187408066\*d\*\*5\*e + 10439775\*d\*\*5\*(d + e) - 511591980\*d\*\*4\*e\*\*2 - 94132290\*d\*\*4\*e\*(d + e) + 667200\*d\*\*4\*(d + e)\*\*2 + 469491120\*d\*\*3\*e\*\*3 + 333672552\*d\*\*3\*e\*\*2\*(d + e) - 2703328\*d\*\*3\*e\*(d + e)\*\*2 - 198000\*d\*\*3\*(d + e)\*\*3 + 322778400\*d\*\*2\*e\*\*4 - 582497712\*d\*\*2\*e\*\*3\*(d + e) + 1752768\*d\*\*2\*e\*\*2\*(d + e)\*\*2 + 1107552\*d\*\*2\*e\*(d + e)\*\*3 - 863493856\*d\*\*2\*e\*\*5 + 500776560\*d\*\*2\*e\*\*4\*(d + e) + 4226944\*d\*\*2\*e\*\*3\*(d + e)\*\*2 - 1880640\*d\*\*2\*e\*\*2\*(d + e)\*\*3 + 429000000\*e\*\*6 - 169242912\*e\*\*5\*(d + e) - 4538112\*e\*\*4\*(d + e)\*\*2 + 964224\*e\*\*3\*(d + e)\*\*3)/(13474125\*d\*\*6 - 102860175\*d\*\*5\*e + 274190390\*d\*\*4\*e\*\*2 - 224142072\*d\*\*3\*e\*\*3 - 245084096\*d\*\*2\*e\*\*4 + 535797456\*d\*\*2\*e\*\*5 - 256183200\*e\*\*6))/36 + (d + 2\*e)\*log(x + (-24383100\*d\*\*6 + 187408066\*d\*\*5\*e - 10439775\*d\*\*5\*(d + 2\*e)/4 - 511591980\*d\*\*4\*e\*\*2 + 47066145\*d\*\*4\*e\*(d + 2\*e)/2 + 41700\*d\*\*4\*(d + 2\*e)\*\*2 + 469491120\*d\*\*3\*e\*\*3 - 83418138\*d\*\*3\*e\*\*2\*(d + 2\*e) - 168958\*d\*\*3\*e\*(d + 2\*e)\*\*2 + 12375\*d\*\*3\*(d + 2\*e)\*\*3/4 + 322778400\*d\*\*2\*e\*\*4 + 145624428\*d\*\*2\*e\*\*3\*(d + 2\*e) + 109548\*d\*\*2\*e\*\*2\*(d + 2\*e)\*\*2 - 34611\*d\*\*2\*e\*(d + 2\*e)\*\*3/2 - 863493856\*d\*\*2\*e\*\*5 - 125194140\*d\*\*2\*e\*\*4\*(d + 2\*e) + 264184\*d\*\*2\*e\*\*3\*(d + 2\*e)\*\*2 + 29385\*d\*\*2\*e\*\*2\*(d + 2\*e)\*\*3 + 429000000\*e\*\*6 + 42310728\*e\*\*5\*(d + 2\*e) - 283632\*e\*\*4\*(d + 2\*e)\*\*2 - 15066\*e\*\*3\*(d + 2\*e)\*\*3)/(13474125\*d\*\*6 - 102860175\*d\*\*5\*e + 274190390\*d\*\*4\*e\*\*2 - 224142072\*d\*\*3\*e\*\*3 - 245084096\*d\*\*2\*e\*\*4 + 535797456\*d\*\*2\*e\*\*5 - 256183200\*e\*\*6))/144 - (7\*d - 13\*e)\*log(x + (-24383100\*d\*\*6 + 187408066\*d\*\*5\*e + 10439775\*d\*\*5\*(7\*d - 13\*e) - 511591980\*d\*\*4\*e\*\*2 - 94132290\*d\*\*4\*e\*(7\*d - 13\*e) + 667200\*d\*\*4\*(7\*d - 13\*e)\*\*2 + 469491120\*d\*\*3\*e\*\*3 + 333672552\*d\*\*3\*e\*\*2\*(7\*d - 13\*e) - 2703328\*d\*\*3\*e\*(7\*d - 13\*e)\*\*2 - 198000\*d\*\*3\*(7\*d - 13\*e)\*\*3 + 322778400\*d\*\*2\*e\*\*4 - 582497712\*d\*\*2\*e\*\*3\*(7\*d - 13\*e) + 1752768\*d\*\*2\*e\*\*2\*(7\*d - 13\*e)\*\*2 + 1107552\*d\*\*2\*e\*(7\*d - 13\*e)\*\*3 - 863493856\*d\*\*2\*e\*\*5 + 500776560\*d\*\*2\*e\*\*4\*(7\*d - 13\*e) + 4226944\*d\*\*2\*e\*\*3\*(7\*d - 13\*e)\*\*2 - 1880640\*d\*\*2\*e\*\*2\*

$$\begin{aligned}
& (7*d - 13*e)**3 + 429000000*e**6 - 169242912*e**5*(7*d - 13*e) - 4538112*e* \\
& *4*(7*d - 13*e)**2 + 964224*e**3*(7*d - 13*e)**3)/(13474125*d**6 - 10286017 \\
& 5*d**5*e + 274190390*d**4*e**2 - 224142072*d**3*e**3 - 245084096*d**2*e**4 \\
& + 535797456*d*e**5 - 256183200*e**6))/36 + (31*d - 50*e)*log(x + (-24383100 \\
& *d**6 + 187408066*d**5*e - 10439775*d**5*(31*d - 50*e)/4 - 511591980*d**4*e \\
& **2 + 47066145*d**4*e*(31*d - 50*e)/2 + 41700*d**4*(31*d - 50*e)**2 + 46949 \\
& 1120*d**3*e**3 - 83418138*d**3*e**2*(31*d - 50*e) - 168958*d**3*e*(31*d - 5 \\
& 0*e)**2 + 12375*d**3*(31*d - 50*e)**3/4 + 322778400*d**2*e**4 + 145624428*d \\
& **2*e**3*(31*d - 50*e) + 109548*d**2*e**2*(31*d - 50*e)**2 - 34611*d**2*e*( \\
& 31*d - 50*e)**3/2 - 863493856*d*e**5 - 125194140*d*e**4*(31*d - 50*e) + 264 \\
& 184*d*e**3*(31*d - 50*e)**2 + 29385*d*e**2*(31*d - 50*e)**3 + 429000000*e** \\
& 6 + 42310728*e**5*(31*d - 50*e) - 283632*e**4*(31*d - 50*e)**2 - 15066*e**3 \\
& *(31*d - 50*e)**3)/(13474125*d**6 - 102860175*d**5*e + 274190390*d**4*e**2 \\
& - 224142072*d**3*e**3 - 245084096*d**2*e**4 + 535797456*d*e**5 - 256183200* \\
& e**6))/144 + (-5*d + 6*e + x*(-3*d + 4*e))/(12*x**2 + 36*x + 24)
\end{aligned}$$

$$3.93 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$$

**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) - (2*f*((A*c - a*C)*(2*a*c*e - b*(c*d + a*f)) + (A*b - a*B)*(2*c^
2*d + b^2*f - c*(b*e + 2*a*f)))*(p + q + 2) - (b^2*(C*d + A*f) - b*(B*c*d +
A*c*e + a*C*e + a*B*f) + 2*(A*c*(c*d - a*f) - a*(c*C*d - B*c*e - a*C*f)))*
(b*f*(p + 1) - c*e*(2*p + q + 4)))*x - c*f*(b^2*(C*d + A*f) - b*(B*c*d + A
c*e + a*C*e + a*B*f) + 2*(A*c*(c*d - a*f) - a*(c*C*d - B*c*e - a*C*f)))*(2*
p + 2*q + 5)*x^2, x], x], x] /; FreeQ[{a, b, c, d, e, f, A, B, C, q}, x] &&
NeQ[b^2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0] && LtQ[p, -1] && NeQ[(c*d - a*f
)^2 - (b*d - a*e)*(c*e - b*f), 0] && !( !IntegerQ[p] && ILtQ[q, -1]) && !
IGtQ[q, 0]

```

### Rule 1072

```

Int[((A_.) + (B_.)*(x_) + (C_.)*(x_)^2)/(((a_) + (b_.)*(x_) + (c_.)*(x_)^2)
*((d_) + (e_.)*(x_) + (f_.)*(x_)^2)), x_Symbol] := With[{q = c^2*d^2 - b*c*
d*e + a*c*e^2 + b^2*d*f - 2*a*c*d*f - a*b*e*f + a^2*f^2}, Dist[1/q, Int[(A*
c^2*d - a*c*C*d - A*b*c*e + a*B*c*e + A*b^2*f - a*b*B*f - a*A*c*f + a^2*C*f
+ c*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B*f)*x]/(a + b*x + c*x^2),
x], x] + Dist[1/q, Int[(c*C*d^2 - B*c*d*e + A*c*e^2 + b*B*d*f - A*c*d*f - a
*C*d*f - A*b*e*f + a*A*f^2 - f*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B
*f)*x]/(d + e*x + f*x^2), x], x] /; NeQ[q, 0] /; FreeQ[{a, b, c, d, e, f,
A, B, C}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0]

```

### Rule 1586

```

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

```

### Rubi steps



$$\begin{aligned}
\int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2}{(2-3x+x^2)(2+3x+x^2)^2} dx \\
&= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{1}{72} \int \frac{6(3d-10e+12f)-24(2d-3e)}{(2-3x+x^2)(2+3x+x^2)} dx \\
&= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{\int \frac{-288(2d-3e+5f)+108(3d-10e+12f)+(72(3d-10e+12f)-24(2d-3e+5f))}{2-3x+x^2} dx}{5184} \\
&= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{1}{144}(-31d+50e-76f) \int \frac{1}{2+x} dx - \frac{1}{36}(d+e+f) \log(1-x) + \frac{1}{144}(d+2e+f) \log(2+x)
\end{aligned}$$

**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

$$\frac{12(3d-4e+6f)x - ((31d-50e+76f)^2+3(31d-50e+76f)x+62d-100e+152f)\log(x+2)+4((7d-13e+19f)^2+3(7d-13e+19f)x+14d-26e+38f)\log(x+1)+4((d+e+f)^2+3(d+e+f)x+2d+2e+2f)\log(x-1)-((d+2e+4f)^2+3(d+2e+4f)x+2d+4e+8f)\log(x-2)+60d-72e+96f}{144(x^2+3x+2)}$$

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] 
$$1/144*(31*d + 76*f - 50*e)*\log(\text{abs}(x + 2)) - 1/36*(7*d + 19*f - 13*e)*\log(\text{abs}(x + 1)) - 1/36*(d + f + e)*\log(\text{abs}(x - 1)) + 1/144*(d + 4*f + 2*e)*\log(\text{abs}(x - 2)) - 1/12*((3*d + 6*f - 4*e)*x + 5*d + 8*f - 6*e)/((x + 2)*(x + 1))$$

**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)\*(d/144 + e/72 + f/36) - log(x + 1)\*((7\*d)/36 - (13\*e)/36 + (19\*f)/36) - log(x - 1)\*(d/36 + e/36 + f/36) + log(x + 2)\*((31\*d)/144 - (25\*e)/72 + (19\*f)/36) - ((5\*d)/12 - e/2 + (2\*f)/3 + x\*(d/4 - e/3 + f/2))/(3\*x + x^2 + 2)

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] Timed out

$$3.94 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$$

**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,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$ , Rules used = {1586, 6728}

$$-\frac{d-2e+4f-8g}{12(x+2)} - \frac{d-e+f-g}{6(x+1)} - \frac{1}{36} \log(1-x)(d+e+f+g) + \frac{1}{144} \log(2-x)(d+2e+4f+8g) - \frac{1}{36} \log(x+1)(7d-13e+19f-25g) + \frac{1}{144} \log(x+2)(31d-50e+76f-104g)$$

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

$$\begin{aligned} \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3}{(2-3x+x^2)(2+3x+x^2)^2} dx \\ &= \int \left( \frac{d+2e+4f+8g}{144(-2+x)} + \frac{-d-e-f-g}{36(-1+x)} + \frac{d-e+f-g}{6(1+x)^2} + \frac{-7d+13e+19f-25g}{36(1+x)} \right) dx \\ &= -\frac{d-e+f-g}{6(1+x)} - \frac{d-2e+4f-8g}{12(2+x)} - \frac{1}{36} (d+e+f+g) \log(1-x) + \frac{1}{144} (d+2e+4f+8g) \log(2-x) - \frac{1}{36} (7d-13e+19f-25g) \log(1+x) + \frac{1}{144} (31d-50e+76f-104g) \log(x+2) \end{aligned}$$

**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)\*Log[1 + x] + (31\*d - 50\*e + 76\*f - 104\*g)\*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

$$\frac{12(3d - 4e + 6f - 10g)x - ((31d - 50e + 76f - 104g)x^2 + 3(31d - 50e + 76f - 104g)x + 62d - 100e + 152f - 208g)\log(x + 2) + 4((7d - 13e + 19f - 25g)x^2 + 3(7d - 13e + 19f - 25g)x + 14d - 26e + 38f - 50g)\log(x + 1) + 4((d + e + f + g)x^2 + 3(d + e + f + g)x + 2d + 2e + 2f + 2g)\log(x - 1) - ((d + 2e + 4f + 8g)x^2 + 3(d + 2e + 4f + 8g)x + 2d + 4e + 8f + 16g)\log(x - 2) + 60d - 72e - 96f - 144g}{144(x^2 + 3x + 2)}$$

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(abs(x + 2)) - 1/36\*(7\*d + 19\*f - 25\*g - 13\*e)\*log(abs(x + 1)) - 1/36\*(d + f + g + e)\*log(abs(x - 1)) + 1/144\*(d + 4\*f + 8\*g + 2\*e)\*log(abs(x - 2)) - 1/12\*((3\*d + 6\*f - 10\*g - 4\*e)\*x + 5\*d + 8\*f - 12\*g - 6\*e)/((x + 2)\*(x + 1))

**maple [A]** time = 0.02, size = 178, normalized size = 1.52

$$\frac{3d \ln(x+2)}{144} + \frac{d \ln(x-2)}{144} - \frac{d \ln(x-1)}{36} - \frac{7d \ln(x+1)}{36} - \frac{25e \ln(x+2)}{72} + \frac{e \ln(x-2)}{72} - \frac{e \ln(x-1)}{36} + \frac{13e \ln(x+1)}{36} + \frac{19f \ln(x+2)}{36} + \frac{f \ln(x-2)}{36} - \frac{f \ln(x-1)}{36} + \frac{19f \ln(x+1)}{36} + \frac{13g \ln(x+2)}{18} + \frac{g \ln(x-2)}{18} - \frac{g \ln(x-1)}{36} + \frac{25g \ln(x+1)}{36} - \frac{d}{6(x+1)} - \frac{d}{12(x+2)} + \frac{e}{6x+6} + \frac{e}{6x+12} - \frac{f}{6(x+1)} - \frac{f}{3(x+2)} + \frac{g}{6x+6} + \frac{2e}{3(x+2)}$$

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

$$\ln(x-2) \left( \frac{d}{144} + \frac{e}{72} + \frac{f}{36} + \frac{g}{18} \right) - \ln(x+1) \left( \frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} - \frac{25g}{36} \right) - \ln(x-1) \left( \frac{d}{36} + \frac{e}{36} + \frac{f}{36} + \frac{g}{36} \right) + \ln(x+2) \left( \frac{31d}{144} - \frac{25e}{72} + \frac{19f}{36} - \frac{13g}{18} \right) - \frac{5d}{12} - \frac{e}{2} + \frac{2f}{3} - g + x \left( \frac{d}{4} - \frac{e}{3} + \frac{f}{2} - \frac{5g}{6} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

$$-\frac{d-e+f-g+h}{6(x+1)} - \frac{d-2e+4f-8g+16h}{12(x+2)} - \frac{1}{36} \log(1-x)(d+e+f+g+h) + \frac{1}{144} \log(2-x)(d+2e+4f+8g+16h) - \frac{1}{36}$$

**Rubi [A]** time = 0.28, antiderivative size = 131, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 41,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.049$ , Rules used = {1586, 6728}

$$-\frac{d-e+f-g+h}{6(x+1)} - \frac{d-2e+4f-8g+16h}{12(x+2)} - \frac{1}{36} \log(1-x)(d+e+f+g+h) + \frac{1}{144} \log(2-x)(d+2e+4f+8g+16h) - \frac{1}{36} \log(x+1)(7d-13e+19f-25g+31h) + \frac{1}{144} \log(x+2)(31d-50e+76f-104g+112h)$$

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**



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

$$= \int \left( \frac{d+2e+4f+8g+16h}{144(-2+x)} + \frac{-d-e-f-g-h}{36(-1+x)} + \frac{d-e+f}{6(1+x)} \right) dx$$

$$= -\frac{d-e+f-g+h}{6(1+x)} - \frac{d-2e+4f-8g+16h}{12(2+x)} - \frac{1}{36}(d+e+f)$$

**Mathematica [A]** time = 0.06, size = 136, normalized size = 1.04

$$\frac{1}{144} \left( \frac{12(d(3x+5)+2(-e(2x+3)+3fx+4f-5gx-6g+9hx+10h))}{x^2+3x+2} - 4 \log(1-x)(d+e+f+g+h) + \log(2-x)(d+2(e+2f+4g+8h)) - 4 \log(x+1)(7d-13e+19f-25g+31h) + \log(x+2)(31d-50e+76f-104g+112h) \right)$$

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

$$\frac{11(12d^2+4d^2f-10g^2-104g^2-112h^2-12(d^2-3d-20e-76f-104g+112h)^2+52(-10d^2-30g+224)log(2-x)+4(7d-13e+19f-25g+31h)^2-12(13e-19f-25g+31h)(d+2(e+2f+4g+8h))-4(7d-13e+19f-25g+31h)(d+2(e+2f+4g+8h))}{144(1-x)^2(1+x)^2}$$

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="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

$$\frac{1}{144}(31d + 76f - 104g + 112h - 50e)\log(x+2) - \frac{1}{36}(7d + 19f - 25g + 31h - 13e)\log(x+1) - \frac{1}{36}(d + f + g + h + e)\log(x-1) + \frac{1}{144}(d + 4f + 8g + 16h + 2e)\log(x-2) - \frac{(3d + 6f - 10g + 18h - 4e)x + 5d + 8f - 12g + 20h - 6e}{12(x+2)(x+1)}$$

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]  $1/144*(31*d + 76*f - 104*g + 112*h - 50*e)*\log(\text{abs}(x + 2)) - 1/36*(7*d + 19*f - 25*g + 31*h - 13*e)*\log(\text{abs}(x + 1)) - 1/36*(d + f + g + h + e)*\log(\text{abs}(x - 1)) + 1/144*(d + 4*f + 8*g + 16*h + 2*e)*\log(\text{abs}(x - 2)) - 1/12*((3*d + 6*f - 10*g + 18*h - 4*e)*x + 5*d + 8*f - 12*g + 20*h - 6*e)/((x + 2)*(x + 1))$

**maple** [A] time = 0.01, size = 222, normalized size = 1.69

$$\frac{7h\ln(x+2)}{9} + \frac{h\ln(x-1)}{36} + \frac{30h\ln(x+1)}{36} + \frac{h\ln(x-2)}{9} + \frac{g\ln(x-1)}{36} + \frac{13g\ln(x+2)}{18} + \frac{g\ln(x-2)}{18} + \frac{25g\ln(x+1)}{36} + \frac{31g\ln(x+2)}{144} + \frac{25g\ln(x+2)}{72} + \frac{e\ln(x-1)}{36} + \frac{d\ln(x-1)}{36} + \frac{13d\ln(x+1)}{36} + \frac{7d\ln(x+1)}{144} + \frac{d\ln(x-2)}{72} + \frac{e\ln(x-2)}{36} + \frac{f\ln(x-2)}{36} + \frac{19f\ln(x+1)}{36} + \frac{f\ln(x-1)}{36} + \frac{19f\ln(x+2)}{36} + \frac{d}{6x+6} + \frac{e}{6x+6} + \frac{f}{6x+12} + \frac{4g}{3(x+2)} + \frac{h}{6(x+1)} + \frac{2e}{3(x+2)} + \frac{d}{12(x+2)} + \frac{d}{6(x+1)} + \frac{f}{3(x+2)} + \frac{f}{6(x+1)}$$

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)^2,x)`

[Out]  $7/9*h*\ln(x+2) - 1/36*h*\ln(x-1) - 31/36*h*\ln(x+1) + 1/9*h*\ln(x-2) - 1/36*g*\ln(x-1) - 13/18*g*\ln(x+2) + 1/18*g*\ln(x-2) + 25/36*g*\ln(x+1) + 31/144*d*\ln(x+2) - 25/72*e*\ln(x+2) - 1/36*e*\ln(x-1) - 1/36*d*\ln(x-1) + 13/36*e*\ln(x+1) - 7/36*d*\ln(x+1) + 1/144*d*\ln(x-2) + 1/72*e*\ln(x-2) + 1/36*f*\ln(x-2) - 19/36*f*\ln(x+1) - 1/36*f*\ln(x-1) + 19/36*f*\ln(x+2) - 4/3/(x+2)*h - 1/6/(x+1)*h + 2/3/(x+2)*g + 1/6/(x+1)*g - 1/12/(x+2)*d + 1/6/(x+2)*e - 1/6/(x+1)*d + 1/6/(x+1)*e - 1/3/(x+2)*f - 1/6/(x+1)*f$

**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

$$-\frac{d-2e+4f-8g+16h-32i}{12(x+2)} - \frac{d-e+f-g+h-i}{6(x+1)} - \frac{1}{36} \log(1-x)(d+e+f+g+h+i) + \frac{1}{144} \log(2-x)(d+2e+4f+8g$$

**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**

$$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+96x^5)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex+fx^2+gx^3+hx^4+96x^5}{(2-3x+x^2)(2+3x+x^2)^2} dx$$

$$= \int \left( \frac{3072+d+2e+4f+8g+16h}{144(-2+x)} + \frac{-96-d-e-j}{36(-1+x)} \right) dx$$

$$= \frac{96-d+e-f+g-h}{6(1+x)} + \frac{3072-d+2e-4f+8g-1}{12(2+x)}$$

**Mathematica [A]** time = 0.08, size = 153, normalized size = 1.04

$$\frac{1}{144} \left( \frac{12(2e(2x+3) - 3fx - 4f + 5gx + 6g - 9ix - 10h + 17ix + 18i) - d(3x+5)}{x^2+3x+2} - 4 \log(1-x)(d+e+f+g+h+i) + \log(2-x)(d+2e+4(f+2g+4h+8i)) + 4 \log(x+1)(-7d+13e-19f+25g-31h+37i) + \log(x+2)(31d-50e+76f-104g+112h-32i) \right)$$

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 - x] + (d + 2\*e + 4\*(f + 2\*g + 4\*h + 8\*i))\*Log[2 - x] + 4\*(-7\*d + 13\*e - 19\*f + 25\*g - 31\*h + 37\*i)\*Log[1 + x] + (31\*d - 50\*e + 76\*f - 104\*g + 112\*h - 32\*i)\*Log[2 + x])/144

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

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

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 + i\*x^5))/(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 + i\*x^5))/(4 - 5\*x^2 + x^4)^2, x]

**fricas [B]** time = 104.67, size = 305, normalized size = 2.07

$$\frac{1}{144} \left( \frac{12(2e(2x+3) - 3fx - 4f + 5gx + 6g - 9ix - 10h + 17ix + 18i) - d(3x+5)}{x^2+3x+2} - 4 \log(1-x)(d+e+f+g+h+i) + \log(2-x)(d+2e+4(f+2g+4h+8i)) + 4 \log(x+1)(-7d+13e-19f+25g-31h+37i) + \log(x+2)(31d-50e+76f-104g+112h-32i) \right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] -1/144\*(12\*(3\*d - 4\*e + 6\*f - 10\*g + 18\*h - 34\*i)\*x - ((31\*d - 50\*e + 76\*f - 104\*g + 112\*h - 32\*i)\*x^2 + 3\*(31\*d - 50\*e + 76\*f - 104\*g + 112\*h - 32\*i)\*x + 62\*d - 100\*e + 152\*f - 208\*g + 224\*h - 64\*i)\*log(x + 2) + 4\*((7\*d - 13\*e + 19\*f - 25\*g + 31\*h - 37\*i)\*x^2 + 3\*(7\*d - 13\*e + 19\*f - 25\*g + 31\*h - 37\*i)\*x + 14\*d - 26\*e + 38\*f - 50\*g + 62\*h - 74\*i)\*log(x + 1) + 4\*((d + e + f + g + h + i)\*x^2 + 3\*(d + e + f + g + h + i)\*x + 2\*d + 2\*e + 2\*f + 2\*g + 2\*h + 2\*i)\*log(x - 1) - ((d + 2\*e + 4\*f + 8\*g + 16\*h + 32\*i)\*x^2 + 3\*(d + 2\*e + 4\*f + 8\*g + 16\*h + 32\*i)\*x + 2\*d + 4\*e + 8\*f + 16\*g + 32\*h + 64\*i)\*log(x - 2) + 60\*d - 72\*e + 96\*f - 144\*g + 240\*h - 432\*i)/(x^2 + 3\*x + 2)

**giac** [A] time = 0.39, size = 149, normalized size = 1.01

$$\frac{1}{144}(31d + 76f - 104g + 112h - 32i) \log(x+2) - \frac{1}{36}(7d + 19f - 25g + 31h - 37i) \log(x+1) - \frac{1}{36}(d + f + g + h + i) \log(x-1) + \frac{1}{144}(d + 4f + 8g + 16h + 32i) \log(x-2) - \frac{(3d + 6f - 10g + 18h - 34i)x + 5d + 8f - 12g + 20h - 36i - 6e}{12(x+2)(x+1)}$$

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

[Out] 1/144\*(31\*d + 76\*f - 104\*g + 112\*h - 32\*i - 50\*e)\*log(abs(x + 2)) - 1/36\*(7\*d + 19\*f - 25\*g + 31\*h - 37\*i - 13\*e)\*log(abs(x + 1)) - 1/36\*(d + f + g + h + i + e)\*log(abs(x - 1)) + 1/144\*(d + 4\*f + 8\*g + 16\*h + 32\*i + 2\*e)\*log(abs(x - 2)) - 1/12\*((3\*d + 6\*f - 10\*g + 18\*h - 34\*i - 4\*e)\*x + 5\*d + 8\*f - 12\*g + 20\*h - 36\*i - 6\*e)/((x + 2)\*(x + 1))

**maple** [A] time = 0.01, size = 266, normalized size = 1.81

$$\frac{31d+76f-104g+112h-32i-50e}{144} \ln|x+2| - \frac{7d+19f-25g+31h-37i-13e}{36} \ln|x+1| - \frac{d+f+g+h+i+e}{36} \ln|x-1| + \frac{d+4f+8g+16h+32i+2e}{144} \ln|x-2| - \frac{(3d+6f-10g+18h-34i-4e)x+5d+8f-12g+20h-36i-6e}{12(x+2)(x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] -2/9\*i\*ln(x+2)-1/36\*i\*ln(x-1)+37/36\*i\*ln(x+1)+2/9\*i\*ln(x-2)+7/9\*h\*ln(x+2)-1/36\*h\*ln(x-1)-31/36\*h\*ln(x+1)+1/9\*h\*ln(x-2)-1/36\*g\*ln(x-1)-13/18\*g\*ln(x+2)+1/18\*g\*ln(x-2)+25/36\*g\*ln(x+1)+31/144\*d\*ln(x+2)-25/72\*e\*ln(x+2)-1/36\*e\*ln(x-1)-1/36\*d\*ln(x-1)+13/36\*e\*ln(x+1)-7/36\*d\*ln(x+1)+1/144\*d\*ln(x-2)+1/72\*e\*ln(x-2)+1/36\*f\*ln(x-2)-19/36\*f\*ln(x+1)-1/36\*f\*ln(x-1)+19/36\*f\*ln(x+2)+8/3/(x+2)\*i+1/6/(x+1)\*i-4/3/(x+2)\*h-1/6/(x+1)\*h+2/3/(x+2)\*g+1/6/(x+1)\*g-1/12/(x+2)\*d+1/6/(x+2)\*e-1/6/(x+1)\*d+1/6/(x+1)\*e-1/3/(x+2)\*f-1/6/(x+1)\*f

**maxima** [A] time = 0.45, size = 139, normalized size = 0.95

$$\frac{1}{144}(31d - 50e + 76f - 104g + 112h - 32i) \log(x+2) - \frac{1}{36}(7d - 13e + 19f - 25g + 31h - 37i) \log(x+1) - \frac{1}{36}(d + e + f + g + h + i) \log(x-1) + \frac{1}{144}(d + 2e + 4f + 8g + 16h + 32i) \log(x-2) - \frac{(3d - 4e + 6f - 10g + 18h - 34i)x + 5d - 6e + 8f - 12g + 20h - 36i}{12(x^2 + 3x + 2)}$$

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

$$\ln(x-2) \left( \frac{d}{144} + \frac{e}{72} + \frac{f}{36} + \frac{g}{18} + \frac{h}{9} + \frac{2i}{9} \right) - \ln(x-1) \left( \frac{d}{36} + \frac{e}{36} + \frac{f}{36} + \frac{g}{36} + \frac{h}{36} + \frac{i}{36} \right) - \ln(x+1) \left( \frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} - \frac{25g}{36} + \frac{31h}{36} - \frac{37i}{36} \right) + \ln(x+2) \left( \frac{31d}{144} - \frac{25e}{72} + \frac{19f}{36} - \frac{13g}{18} + \frac{7h}{9} - \frac{2i}{9} \right) - \frac{\frac{5d}{12} - \frac{e}{3} + \frac{2f}{3} - g + \frac{5h}{3} - 3i + x \left( \frac{d}{4} - \frac{e}{3} + \frac{f}{2} - \frac{5g}{6} + \frac{3h}{2} - \frac{17i}{6} \right)}{x^2 + 3x + 2}$$

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

$$\begin{aligned} \int \frac{2+x}{(4-5x^2+x^4)^2} dx &= \int \frac{1}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left( \frac{1}{36(-2+x)^2} - \frac{35}{432(-2+x)} + \frac{1}{12(-1+x)^2} + \frac{1}{18(-1+x)} + \frac{1}{36(1+x)^2} + \frac{1}{54(1+x)} \right) dx \\ &= \frac{1}{12(1-x)} + \frac{1}{36(2-x)} - \frac{1}{36(1+x)} + \frac{1}{18} \log(1-x) - \frac{35}{432} \log(2-x) + \frac{1}{54} \log(1+x) + \frac{1}{144} \log(x+2) \end{aligned}$$



**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 + 1\*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

$$\begin{aligned} \int \frac{(2+x)(d+ex)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left( \frac{d+2e}{36(-2+x)^2} + \frac{-35d-58e}{432(-2+x)} + \frac{d+e}{12(-1+x)^2} + \frac{2d+5e}{36(-1+x)} + \frac{d-e}{36(1+x)^2} + \frac{2d+e}{108(1+x)} \right) dx \\ &= \frac{d+e}{12(1-x)} + \frac{d+2e}{36(2-x)} - \frac{d-e}{36(1+x)} + \frac{1}{36}(2d+5e)\log(1-x) - \frac{1}{432}(35d+58e)\log(2-x) + \frac{1}{108}(2d+e)\log(x+1) + \frac{1}{144}(d-2e)\log(x+2) \end{aligned}$$

**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

$$\frac{12(5d+4e)x^2-72dx-3(d-2e)x^3-2(d-2e)x^2-(d-2e)x+2d-4e}{432(x^3-2x^2-x+2)} \log(x+2) - 4(2d+5e)x^3-2(2d+5e)x^2-(2d+5e)x+4d+10e}{432(x^3-2x^2-x+2)} \log(x-1) - 12(2d+5e)x^3-2(2d+5e)x^2-(2d+5e)x+4d+10e}{432(x^3-2x^2-x+2)} \log(x-1) + ((35d+58e)x^3-2(35d+58e)x^2-(35d+58e)x+70d+116e) \log(x-2) - 60d-120e}{432(x^3-2x^2-x+2)}$$

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]  $1/144*(d - 2*e)*\log(\text{abs}(x + 2)) + 1/108*(2*d + e)*\log(\text{abs}(x + 1)) + 1/36*(2*d + 5*e)*\log(\text{abs}(x - 1)) - 1/432*(35*d + 58*e)*\log(\text{abs}(x - 2)) - 1/36*((5*d + 4*e)*x^2 - 6*d*x - 5*d - 10*e)/((x + 1)*(x - 1)*(x - 2))$

**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]  $\text{int}((x+2)*(e*x+d)/(x^4-5*x^2+4)^2, x)$

[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]  $\text{integrate}((2+x)*(e*x+d)/(x^4-5*x^2+4)^2, x, \text{algorithm}="maxima")$

[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]  $\text{int}(((x + 2)*(d + e*x))/(x^4 - 5*x^2 + 4)^2, x)$

[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]  $\text{integrate}((2+x)*(e*x+d)/(x**4-5*x**2+4)**2, x)$

```
[Out] (d - 2*e)*log(x + (8710660*d**5 + 91884504*d**4*e - 7579779*d**4*(d - 2*e)/
4 + 364910432*d**3*e**2 - 18128055*d**3*e*(d - 2*e) - 83772*d**3*(d - 2*e)*
*2 + 686697536*d**2*e**3 - 60296868*d**2*e**2*(d - 2*e) - 597816*d**2*e*(d
- 2*e)**2 + 65907*d**2*(d - 2*e)**3/4 + 614357568*d*e**4 - 85949220*d*e**3*
(d - 2*e) - 1500048*d*e**2*(d - 2*e)**2 + 105840*d*e*(d - 2*e)**3 + 2084704
00*e**5 - 45136356*e**4*(d - 2*e) - 1196064*e**3*(d - 2*e)**2 + 128277*e**2
*(d - 2*e)**3)/(3374210*d**5 + 38645295*d**4*e + 170558380*d**3*e**2 + 3620
61760*d**2*e**3 + 370298160*d*e**4 + 146466320*e**5))/144 + (2*d + e)*log(x
+ (8710660*d**5 + 91884504*d**4*e - 2526593*d**4*(2*d + e) + 364910432*d**
3*e**2 - 24170740*d**3*e*(2*d + e) - 148928*d**3*(2*d + e)**2 + 686697536*d
**2*e**3 - 80395824*d**2*e**2*(2*d + e) - 1062784*d**2*e*(2*d + e)**2 + 390
56*d**2*(2*d + e)**3 + 614357568*d*e**4 - 114598960*d*e**3*(2*d + e) - 2666
752*d*e**2*(2*d + e)**2 + 250880*d*e*(2*d + e)**3 + 208470400*e**5 - 601818
08*e**4*(2*d + e) - 2126336*e**3*(2*d + e)**2 + 304064*e**2*(2*d + e)**3)/(
3374210*d**5 + 38645295*d**4*e + 170558380*d**3*e**2 + 362061760*d**2*e**3
+ 370298160*d*e**4 + 146466320*e**5))/108 + (2*d + 5*e)*log(x + (8710660*d*
*5 + 91884504*d**4*e - 7579779*d**4*(2*d + 5*e) + 364910432*d**3*e**2 - 725
12220*d**3*e*(2*d + 5*e) - 1340352*d**3*(2*d + 5*e)**2 + 686697536*d**2*e**
3 - 241187472*d**2*e**2*(2*d + 5*e) - 9565056*d**2*e*(2*d + 5*e)**2 + 10545
12*d**2*(2*d + 5*e)**3 + 614357568*d*e**4 - 343796880*d*e**3*(2*d + 5*e) -
24000768*d*e**2*(2*d + 5*e)**2 + 6773760*d*e*(2*d + 5*e)**3 + 208470400*e**
5 - 180545424*e**4*(2*d + 5*e) - 19137024*e**3*(2*d + 5*e)**2 + 8209728*e**
2*(2*d + 5*e)**3)/(3374210*d**5 + 38645295*d**4*e + 170558380*d**3*e**2 + 3
62061760*d**2*e**3 + 370298160*d*e**4 + 146466320*e**5))/36 - (35*d + 58*e)
*log(x + (8710660*d**5 + 91884504*d**4*e + 2526593*d**4*(35*d + 58*e)/4 + 3
64910432*d**3*e**2 + 6042685*d**3*e*(35*d + 58*e) - 9308*d**3*(35*d + 58*e)
**2 + 686697536*d**2*e**3 + 20098956*d**2*e**2*(35*d + 58*e) - 66424*d**2*e
*(35*d + 58*e)**2 - 2441*d**2*(35*d + 58*e)**3/4 + 614357568*d*e**4 + 28649
740*d*e**3*(35*d + 58*e) - 166672*d*e**2*(35*d + 58*e)**2 - 3920*d*e*(35*d
+ 58*e)**3 + 208470400*e**5 + 15045452*e**4*(35*d + 58*e) - 132896*e**3*(35
*d + 58*e)**2 - 4751*e**2*(35*d + 58*e)**3)/(3374210*d**5 + 38645295*d**4*e
+ 170558380*d**3*e**2 + 362061760*d**2*e**3 + 370298160*d*e**4 + 146466320
*e**5))/432 + (6*d*x + 5*d + 10*e + x**2*(-5*d - 4*e))/(36*x**3 - 72*x**2 -
36*x + 72)
```

$$3.99 \quad \int \frac{(2+x)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$$

**Optimal.** Leaf size=122

$$-\frac{d-e+f}{36(x+1)} + \frac{d+e+f}{12(1-x)} + \frac{d+2e+4f}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f) - \frac{1}{432} \log(2-x)(35d+58e+92f) + \frac{1}{108} \log(x+1)(2d+e-4f) + \frac{1}{144} \log(x+2)(d-2e+4f)$$

**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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left( \frac{d+2e+4f}{36(-2+x)^2} + \frac{-35d-58e-92f}{432(-2+x)} + \frac{d+e+f}{12(-1+x)^2} + \frac{2d+5e+8f}{36(-1+x)} + \frac{d-e+f}{36(1+x)} \right) dx \\ &= \frac{d+e+f}{12(1-x)} + \frac{d+2e+4f}{36(2-x)} - \frac{d-e+f}{36(1+x)} + \frac{1}{36} (2d+5e+8f) \log(1-x) - \frac{1}{432} (35d+58e+92f) \log(2-x) + \frac{1}{108} (2d+e-4f) \log(1+x) + \frac{1}{144} (d-2e+4f) \log(2+x) \end{aligned}$$

**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

$$\frac{12(2d+4e+8f)x^2-72(d+f)x-3((d-2e+4f)^2-2(d-2e+4f)^2-(d-2e+4f)^2+2d-4e+8f)\log(x+2)-4((2d+e-4f)^2-2(2d+e-4f)^2-(2d+e-4f)^2+2d+5e+8f)\log(x+1)-12((2d+5e+8f)^2-2(2d+5e+8f)^2-(2d+5e+8f)^2+4d+10e+16f)\log(x-1)+((35d+58e+92f)^2-2(35d+58e+92f)^2-(35d+58e+92f)^2+70d+116e+184f)\log(x-2)-60d-120e-96f}{432(x^3-2x^2-x+2)}$$

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

$$\frac{d \ln(x+2)}{144} - \frac{35d \ln(x-2)}{432} + \frac{d \ln(x-1)}{18} + \frac{d \ln(x+1)}{54} - \frac{e \ln(x+2)}{72} - \frac{29e \ln(x-2)}{216} + \frac{5e \ln(x-1)}{36} + \frac{e \ln(x+1)}{108} + \frac{f \ln(x+2)}{36} - \frac{23f \ln(x-2)}{108} + \frac{2f \ln(x-1)}{9} - \frac{f \ln(x+1)}{27} - \frac{d}{36(x-2)} - \frac{d}{36(x+1)} - \frac{d}{12(x-1)} - \frac{e}{18(x-2)} + \frac{e}{36(x+36)} - \frac{e}{12(x-1)} - \frac{f}{9(x-2)} - \frac{f}{36(x+1)} - \frac{f}{12(x-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In]  $\text{int}((x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2, x)$

[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]  $\text{integrate}((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2, x, \text{algorithm}="maxima")$

[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]  $\text{int}(((x + 2)*(d + e*x + f*x^2))/(x^4 - 5*x^2 + 4)^2, x)$

[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,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.065$ , Rules used = {1586, 6742}

$$-\frac{d-e+f-g}{36(x+1)} + \frac{d+e+f+g}{12(1-x)} + \frac{d+2e+4f+8g}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g) - \frac{1}{432} \log(2-x)(35d+58e+92f+136g) + \frac{1}{108} \log(x+1)(2d+e-4f+7g) + \frac{1}{144} \log(x+2)(d-2e+4f-8g)$$

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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left( \frac{d+2e+4f+8g}{36(-2+x)^2} + \frac{-35d-58e-92f-136g}{432(-2+x)} + \frac{d+e+f+g}{12(-1+x)^2} + \frac{2d+5e+8f+11g}{36} \right) dx \\ &= \frac{d+e+f+g}{12(1-x)} + \frac{d+2e+4f+8g}{36(2-x)} - \frac{d-e+f-g}{36(1+x)} + \frac{1}{36} (2d+5e+8f+11g) \log(1-x) \\ &\quad - \frac{1}{432} (35d+58e+92f+136g) \log(2-x) + \frac{1}{108} (2d+e-4f+7g) \log(x+1) + \frac{1}{144} (d-2e+4f-8g) \log(x+2) \end{aligned}$$

**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

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

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

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)^2, x]

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

**fricas [B]** time = 3.68, size = 321, normalized size = 2.28

$$\frac{12(d + 4e + f + 10g)x^3 - 72(d + f)x^2 - 3((d - 2e + 4f - 8g)x^3 - 2(d - 2e + 4f - 8g)x + 2d - 4e + 8f - 16g) \log(x + 2) - 4((2d + e - 4f + 7g)x^3 - 2(2d + e - 4f + 7g)x^2 - (2d + e - 4f + 7g)x + 4d + 2e - 8f + 14g) \log(x + 1) - 12((2d + 5e + 8f + 11g)x^3 - 2(2d + 5e + 8f + 11g)x^2 - (2d + 5e + 8f + 11g)x + 4d + 10e + 16f + 22g) \log(x - 1) + ((35d + 58e + 92f + 136g)x^3 - 2(35d + 58e + 92f + 136g)x^2 - (35d + 58e + 92f + 136g)x + 70d + 116e + 184f + 272g) \log(x - 2) - 60d - 120e - 96f - 192g}{(x^3 - 2x^2 - x + 2)^2}$$

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

[Out] -1/432\*(12\*(5\*d + 4\*e + 8\*f + 10\*g)\*x^2 - 72\*(d + f)\*x - 3\*((d - 2\*e + 4\*f - 8\*g)\*x^3 - 2\*(d - 2\*e + 4\*f - 8\*g)\*x + 2\*d - 4\*e + 8\*f - 16\*g)\*log(x + 2) - 4\*((2\*d + e - 4\*f + 7\*g)\*x^3 - 2\*(2\*d + e - 4\*f + 7\*g)\*x^2 - (2\*d + e - 4\*f + 7\*g)\*x + 4\*d + 2\*e - 8\*f + 14\*g)\*log(x + 1) - 12\*((2\*d + 5\*e + 8\*f + 11\*g)\*x^3 - 2\*(2\*d + 5\*e + 8\*f + 11\*g)\*x^2 - (2\*d + 5\*e + 8\*f + 11\*g)\*x + 4\*d + 10\*e + 16\*f + 22\*g)\*log(x - 1) + ((35\*d + 58\*e + 92\*f + 136\*g)\*x^3 - 2\*(35\*d + 58\*e + 92\*f + 136\*g)\*x^2 - (35\*d + 58\*e + 92\*f + 136\*g)\*x + 70\*d + 116\*e + 184\*f + 272\*g)\*log(x - 2) - 60\*d - 120\*e - 96\*f - 192\*g)/(x^3 - 2\*x^2 - x + 2)

**giac [A]** time = 0.32, size = 136, normalized size = 0.96

$$\frac{1}{144}(d + 4f - 8g - 2e) \log(x + 2) + \frac{1}{108}(2d - 4f + 7g + e) \log(x + 1) + \frac{1}{36}(2d + 8f + 11g + 5e) \log(x - 1) - \frac{1}{432}(35d + 92f + 136g + 58e) \log(x - 2) - \frac{(5d + 8f + 10g + 4e)x^2 - 6(d + f)x - 5d - 8f - 16g - 10e}{36(x + 1)(x - 1)(x - 2)}$$

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

[Out]  $\frac{1}{144}(d + 4f - 8g - 2e) \log(\text{abs}(x + 2)) + \frac{1}{108}(2d - 4f + 7g + e) \log(\text{abs}(x + 1)) + \frac{1}{36}(2d + 8f + 11g + 5e) \log(\text{abs}(x - 1)) - \frac{1}{432}(35d + 92f + 136g + 58e) \log(\text{abs}(x - 2)) - \frac{1}{36}((5d + 8f + 10g + 4e)x^2 - 6(d + f)x - 5d - 8f - 16g - 10e) / ((x + 1)(x - 1)(x - 2))$

**maple [A]** time = 0.02, size = 210, normalized size = 1.49

$\frac{1}{36} \ln(x-1) - \frac{g}{18} \ln(x+2) + \frac{17}{54} \ln(x-2) + \frac{7}{108} \ln(x+1) + \frac{d}{144} \ln(x+2) - \frac{e}{72} \ln(x+2) + \frac{5}{36} \ln(x-1) - \frac{f}{18} \ln(x-1) + \frac{c}{108} \ln(x+1) + \frac{d}{54} \ln(x+1) - \frac{35d \ln(x-2) - 29e \ln(x-2) - 23f \ln(x-2) - 17g \ln(x-2) - 2f \ln(x-1) - f \ln(x+2) + \frac{g}{36x+36} + \frac{e}{36x+36} - \frac{g}{12(x-1)} - \frac{2e}{9(x-2)} - \frac{d}{36(x-2)} - \frac{e}{18(x-2)} - \frac{d}{36(x+1)} - \frac{d}{12(x-1)} - \frac{e}{12(x-1)} - \frac{f}{12(x-1)} - \frac{f}{9(x-2)} - \frac{f}{36(x+1)}}$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out]  $\frac{11}{36}g \ln(x-1) - \frac{1}{18}g \ln(x+2) - \frac{17}{54}g \ln(x-2) + \frac{7}{108}g \ln(x+1) + \frac{1}{144}d \ln(x+2) - \frac{1}{72}e \ln(x+2) + \frac{5}{36}e \ln(x-1) + \frac{1}{18}d \ln(x-1) + \frac{1}{108}e \ln(x+1) + \frac{1}{54}d \ln(x+1) - \frac{35}{432}d \ln(x-2) - \frac{29}{216}e \ln(x-2) - \frac{23}{108}f \ln(x-2) - \frac{1}{27}f \ln(x+1) + \frac{2}{9}f \ln(x-1) + \frac{1}{36}f \ln(x+2) + \frac{1}{36} \frac{g}{(x+1)} - \frac{1}{12} \frac{g}{(x-1)} - \frac{2}{9} \frac{g}{(x-2)} - \frac{1}{36} \frac{g}{(x-2)}d - \frac{1}{18} \frac{e}{(x-2)} - \frac{1}{36} \frac{e}{(x+1)}d + \frac{1}{36} \frac{e}{(x+1)} - \frac{1}{12} \frac{e}{(x-1)}d - \frac{1}{12} \frac{e}{(x-1)} - \frac{1}{12} \frac{e}{(x-1)}f - \frac{1}{9} \frac{f}{(x-2)} - \frac{1}{36} \frac{f}{(x+1)}f$

**maxima [A]** time = 0.45, size = 126, normalized size = 0.89

$\frac{1}{144}(d - 2e + 4f - 8g) \log(x + 2) + \frac{1}{108}(2d + e - 4f + 7g) \log(x + 1) + \frac{1}{36}(2d + 5e + 8f + 11g) \log(x - 1) - \frac{1}{432}(35d + 58e + 92f + 136g) \log(x - 2) - \frac{(5d + 4e + 8f + 10g)x^2 - 6(d + f)x - 5d - 10e - 8f - 16g}{36(x^3 - 2x^2 - x + 2)}$

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

[Out]  $\frac{1}{144}(d - 2e + 4f - 8g) \log(x + 2) + \frac{1}{108}(2d + e - 4f + 7g) \log(x + 1) + \frac{1}{36}(2d + 5e + 8f + 11g) \log(x - 1) - \frac{1}{432}(35d + 58e + 92f + 136g) \log(x - 2) - \frac{1}{36}((5d + 4e + 8f + 10g)x^2 - 6(d + f)x - 5d - 10e - 8f - 16g) / (x^3 - 2x^2 - x + 2)$

**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]  $\log(x - 1) \left( \frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} + \frac{11g}{36} \right) + \log(x + 2) \left( \frac{d}{144} - \frac{e}{72} + \frac{f}{36} - \frac{g}{18} \right) + \log(x + 1) \left( \frac{d}{54} + \frac{e}{108} - \frac{f}{27} + \frac{7g}{108} \right) - \log(x -$

$$2) * ((35*d)/432 + (29*e)/216 + (23*f)/108 + (17*g)/54) - ((5*d)/36 + (5*e)/18 + (2*f)/9 + (4*g)/9 - x^2 * ((5*d)/36 + e/9 + (2*f)/9 + (5*g)/18) + x * (d/6 + f/6)) / (x + 2*x^2 - x^3 - 2)$$

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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left( \frac{d+2e+4f+8g+16h}{36(-2+x)^2} + \frac{-35d-58e-92f-136g-176h}{432(-2+x)} + \dots \right) dx \\ &= \frac{d+e+f+g+h}{12(1-x)} + \frac{d+2e+4f+8g+16h}{36(2-x)} - \frac{d-e+f-g+h}{36(1+x)} + \dots \end{aligned}$$

**Mathematica [A]** time = 0.09, size = 169, normalized size = 1.07

$$\frac{1}{432} \left( \frac{12(d(-5x^2 + 6x + 5) + 2(e(5 - 2x^2) + f(-4x^2 + 3x + 4) - 5gx^2 + 8g - 10hx^2 + 3fx + 10h))}{x^3 - 2x^2 - x + 2} + 12 \log(1 - x)(2d + 5e + 8f + 11g + 14h) - \log(2 - x)(35d + 58e + 92f + 136g + 176h) + 4 \log(x + 1)(2d + e - 4f + 7g - 10h) + 3 \log(x + 2)(d - 2e + 4f - 8g + 16h) \right)$$

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)\*Log[1 + x] + 3\*(d - 2\*e + 4\*f - 8\*g + 16\*h)\*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 + 11



$6*e + 184*f + 272*g + 352*h)*\log(x - 2) - 60*d - 120*e - 96*f - 192*g - 240*h)/(x^3 - 2*x^2 - x + 2)$

**giac** [A] time = 0.37, size = 155, normalized size = 0.98

$$\frac{1}{144}(d+4f-8g+16h-2e)\log(x+2) + \frac{1}{108}(2d-4f+7g-10h+e)\log(x+1) + \frac{1}{36}(2d+8f+11g+14h+5e)\log(x-1) - \frac{1}{432}(35d+92f+136g+176h+58e)\log(x-2) - \frac{(5d+8f+10g+20h+4e)x^2 - 6(d+f+h)x - 5d - 8f - 16g - 20h - 10e}{36(x+1)(x-1)(x-2)}$$

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]  $\frac{1}{144}(d+4f-8g+16h-2e)\log(\text{abs}(x+2)) + \frac{1}{108}(2d-4f+7g-10h+e)\log(\text{abs}(x+1)) + \frac{1}{36}(2d+8f+11g+14h+5e)\log(\text{abs}(x-1)) - \frac{1}{432}(35d+92f+136g+176h+58e)\log(\text{abs}(x-2)) - \frac{1}{3}6*((5d+8f+10g+20h+4e)*x^2 - 6*(d+f+h)*x - 5d - 8f - 16g - 20h - 10e)/((x+1)*(x-1)*(x-2))$

**maple** [A] time = 0.02, size = 262, normalized size = 1.66

$$\frac{h \ln(x+2)}{144} + \frac{7 h \ln(x-1)}{108} + \frac{5 h \ln(x-2)}{144} + \frac{11 h \ln(x+1)}{36} + \frac{d \ln(x+2)}{144} - \frac{e \ln(x+2)}{72} + \frac{5 e \ln(x-1)}{36} + \frac{1 e \ln(x-1)}{18} + \frac{1 e \ln(x+1)}{108} + \frac{1 e \ln(x+1)}{54} - \frac{35 d \ln(x-2)}{432} - \frac{29 e \ln(x-2)}{216} - \frac{23 f \ln(x-2)}{108} - \frac{1 f \ln(x+1)}{27} + \frac{2 f \ln(x-1)}{9} + \frac{1 f \ln(x+1)}{36} - \frac{1 f \ln(x+2)}{36} - \frac{1}{36} \frac{h}{x+1} - \frac{1}{12} \frac{h}{x-1} - \frac{4}{9} \frac{h}{x-2} + \frac{1}{36} \frac{g}{x+1} - \frac{1}{12} \frac{g}{x-1} - \frac{2}{9} \frac{g}{x-2} - \frac{1}{36} \frac{d}{x-2} - \frac{1}{18} \frac{e}{x-2} - \frac{1}{36} \frac{d}{x+1} + \frac{1}{36} \frac{d}{x+1} - \frac{1}{12} \frac{e}{x-1} - \frac{1}{12} \frac{d}{x-1} + \frac{1}{9} \frac{f}{x-2} - \frac{1}{36} \frac{f}{x+1} + \frac{1}{36} \frac{f}{x+1}$$

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]  $\frac{1}{9}h*\ln(x+2) + \frac{7}{18}h*\ln(x-1) - \frac{5}{54}h*\ln(x+1) - \frac{11}{27}h*\ln(x-2) + \frac{11}{36}g*\ln(x-1) - \frac{1}{18}g*\ln(x+2) - \frac{17}{54}g*\ln(x-2) + \frac{7}{108}g*\ln(x+1) + \frac{1}{144}d*\ln(x+2) - \frac{1}{72}e*\ln(x+2) + \frac{5}{36}e*\ln(x-1) + \frac{1}{18}d*\ln(x-1) + \frac{1}{108}e*\ln(x+1) + \frac{1}{54}d*\ln(x+1) - \frac{35}{432}d*\ln(x-2) - \frac{29}{216}e*\ln(x-2) - \frac{23}{108}f*\ln(x-2) - \frac{1}{27}f*\ln(x+1) + \frac{2}{9}f*\ln(x-1) + \frac{1}{36}f*\ln(x+2) - \frac{1}{36} \frac{h}{x+1} - \frac{1}{12} \frac{h}{x-1} - \frac{4}{9} \frac{h}{x-2} + \frac{1}{36} \frac{g}{x+1} - \frac{1}{12} \frac{g}{x-1} - \frac{2}{9} \frac{g}{x-2} - \frac{1}{36} \frac{d}{x-2} - \frac{1}{18} \frac{e}{x-2} - \frac{1}{36} \frac{d}{x+1} + \frac{1}{36} \frac{d}{x+1} - \frac{1}{12} \frac{e}{x-1} - \frac{1}{12} \frac{d}{x-1} + \frac{1}{9} \frac{f}{x-2} - \frac{1}{36} \frac{f}{x+1} + \frac{1}{36} \frac{f}{x+1}$

**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]  $\frac{1}{144}(d-2e+4f-8g+16h)\log(x+2) + \frac{1}{108}(2d+e-4f+7g-10h)\log(x+1) + \frac{1}{36}(2d+5e+8f+11g+14h)\log(x-1) - \frac{1}{432}(35d+58e+92f+136g+176h)\log(x-2) - \frac{1}{36}((5d+4e+8f+10g+20h)*x^2 - 6*(d+f+h)*x - 5d - 10e - 8f - 16g - 20h)/(x^3 - 2*x^2 - x + 2)$

**mupad [B]** time = 1.39, size = 152, normalized size = 0.96

$$\ln(x-1) \left( \frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} + \frac{11g}{36} + \frac{7h}{18} \right) - \frac{\left( -\frac{5d}{36} - \frac{e}{9} - \frac{2f}{18} - \frac{5g}{18} - \frac{5h}{9} \right) x^2 + \left( \frac{d}{6} + \frac{f}{6} + \frac{h}{6} \right) x + \frac{5d}{36} + \frac{5e}{18} + \frac{2f}{9} + \frac{4g}{9} + \frac{5h}{9}}{-x^3 + 2x^2 + x - 2} + \ln(x+2) \left( \frac{d}{144} - \frac{e}{72} + \frac{f}{36} - \frac{g}{18} + \frac{h}{9} \right) + \ln(x+1) \left( \frac{d}{54} + \frac{e}{108} - \frac{f}{27} + \frac{7g}{108} - \frac{5h}{54} \right) - \ln(x-2) \left( \frac{35d}{432} + \frac{29e}{216} + \frac{23f}{108} + \frac{17g}{54} + \frac{11h}{27} \right)$$

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

$$-\frac{d-e+f-g+h-i}{36(x+1)} + \frac{d+e+f+g+h+i}{12(1-x)} + \frac{d+2e+4f+8g+16h+32i}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14h+17i)$$

Rubi [A] time = 0.34, antiderivative size = 177, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 41,  $\frac{\text{number of rules}}{\text{integrand size}} = 0.049$ , Rules used = {1586, 6742}

$$-\frac{d-e+f-g+h-i}{36(x+1)} + \frac{d+e+f+g+h+i}{12(1-x)} + \frac{d+2e+4f+8g+16h+32i}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14h+17i) - \frac{1}{432} \log(2-x)(35d+58e+92f+136g+176h+160i) + \frac{1}{108} \log(x+1)(2d+e-4f+7g-10h+13i) + \frac{1}{144} \log(x+2)(d-2e+4f-8g+16h-32i)$$

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

$$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+102x^5)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex+fx^2+gx^3+hx^4+102x^5}{(2+x)(2-x-2x^2+x^3)^2} dx$$

$$= \int \left( \frac{3264+d+2e+4f+8g+16h}{36(-2+x)^2} + \frac{-16320-35d-58e-92f-136g-176h-160i}{432(-2+x)} \right) dx$$

$$= \frac{102+d+e+f+g+h}{12(1-x)} + \frac{3264+d+2e+4f+8g+16h}{36(2-x)} + \frac{-16320-35d-58e-92f-136g-176h-160i}{432(2-x)}$$

**Mathematica [A]** time = 0.11, size = 195, normalized size = 1.10

$$\frac{-5dx^2+6dx+5d-4e^2+10e-8fx^2+6fx+8f-10gx^2+16g-20hx^2+6hx+20h-34ix^2+40i}{36(x^3-2x^2-x+2)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14h+17i) + \frac{1}{432} \log(2-x)(-35d-58e-92f-136g-176h-160i) + \frac{1}{108} \log(x+1)(2d+e-4f+7g-10h+13i) + \frac{1}{144} \log(x+2)(d-2e+4f-8g+16h-32i)$$

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^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

$$\frac{1}{144}(d+4f-8g+16h-32i-2e)\log(x+2) + \frac{1}{108}(2d-4f+7g-10h+13i+e)\log(x+1) + \frac{1}{36}(2d+8f+11g+14h+17i+5e)\log(x-1) - \frac{1}{432}(35d+58e+92f+136g+176h+160i)\log(x-2) - \frac{(5d+8f+10g+20h+34i)^2-6(d+f+h)x-5d-8f-16g-20h-40i-10e}{36(x+1)(x-1)(x-2)}$$

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] 
$$1/144*(d + 4*f - 8*g + 16*h - 32*i - 2*e)*\log(\text{abs}(x + 2)) + 1/108*(2*d - 4*f + 7*g - 10*h + 13*i + e)*\log(\text{abs}(x + 1)) + 1/36*(2*d + 8*f + 11*g + 14*h + 17*i + 5*e)*\log(\text{abs}(x - 1)) - 1/432*(35*d + 92*f + 136*g + 176*h + 160*i + 58*e)*\log(\text{abs}(x - 2)) - 1/36*((5*d + 8*f + 10*g + 20*h + 34*i + 4*e)*x^2 - 6*(d + f + h)*x - 5*d - 8*f - 16*g - 20*h - 40*i - 10*e)/((x + 1)*(x - 1))*(x - 2))$$

**maple** [A] time = 0.02, size = 314, normalized size = 1.77

$$\frac{2d+2}{144} - \frac{4f-8g+16h-32i-2e}{108} - \frac{2d-4f+7g-10h+13i+e}{36} - \frac{35d+58e+92f+136g+176h+160i}{432} - \frac{1}{36} \frac{(5d+8f+10g+20h+34i)^2-6(d+f+h)x-5d-8f-16g-20h-40i-10e}{(x+1)(x-1)(x-2)}$$

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

$$\frac{1}{144}(d-2e+4f-8g+16h-32i)\log(x+2) + \frac{1}{108}(2d+e-4f+7g-10h+13i)\log(x+1) + \frac{1}{36}(2d+5e+8f+11g+14h+17i)\log(x-1) - \frac{1}{432}(35d+58e+92f+136g+176h+160i)\log(x-2) - \frac{(5d+4e+8f+10g+20h+34i)x^2-6(d+f+h)x-5d-10e-8f-16g-20h-40i}{36(x^3-2x^2-x+2)}$$

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  
m="maxima")

[Out] 1/144\*(d - 2\*e + 4\*f - 8\*g + 16\*h - 32\*i)\*log(x + 2) + 1/108\*(2\*d + e - 4\*f  
+ 7\*g - 10\*h + 13\*i)\*log(x + 1) + 1/36\*(2\*d + 5\*e + 8\*f + 11\*g + 14\*h + 17  
\*i)\*log(x - 1) - 1/432\*(35\*d + 58\*e + 92\*f + 136\*g + 176\*h + 160\*i)\*log(x -  
2) - 1/36\*((5\*d + 4\*e + 8\*f + 10\*g + 20\*h + 34\*i)\*x^2 - 6\*(d + f + h)\*x -  
5\*d - 10\*e - 8\*f - 16\*g - 20\*h - 40\*i)/(x^3 - 2\*x^2 - x + 2)

**mupad [B]** time = 1.75, size = 170, normalized size = 0.96

$$\ln(x-1)\left(\frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} + \frac{11g}{36} + \frac{7h}{18} + \frac{17i}{36}\right) + \ln(x+2)\left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} + \frac{g}{18} + \frac{h}{9} + \frac{2i}{9}\right) + \ln(x+1)\left(\frac{d}{54} + \frac{e}{108} + \frac{f}{27} + \frac{7g}{108} + \frac{5h}{54} + \frac{13i}{108}\right) - \ln(x-2)\left(\frac{35d}{432} + \frac{29e}{216} + \frac{23f}{108} + \frac{17g}{54} + \frac{11h}{27} + \frac{10i}{27}\right) - \frac{\left(\frac{5d}{36} + \frac{e}{9} + \frac{2f}{9} + \frac{5g}{18} + \frac{5h}{9} + \frac{17i}{18}\right)x^2 + \left(\frac{d}{6} + \frac{f}{3} + \frac{2}{3}\right)x + \frac{5d}{36} + \frac{5e}{18} + \frac{2f}{9} + \frac{4g}{9} + \frac{5h}{9} + \frac{10i}{9}}{-x^3+2x^2+x-2}$$

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)/4  
32 + (29\*e)/216 + (23\*f)/108 + (17\*g)/54 + (11\*h)/27 + (10\*i)/27) - ((5\*d)/  
36 + (5\*e)/18 + (2\*f)/9 + (4\*g)/9 + (5\*h)/9 + (10\*i)/9 - x^2\*((5\*d)/36 + e/  
9 + (2\*f)/9 + (5\*g)/18 + (5\*h)/9 + (17\*i)/18) + x\*(d/6 + f/6 + h/6))/(x + 2  
\*x^2 - x^3 - 2)

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

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] Timed out

$$3.103 \quad \int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx$$

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

$$\frac{g x}{\sqrt{c x^4 + b x^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*g - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x)
```

```
[Out] (g*x)/(a + b*x^2 + c*x^4)^(1/2)
```

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

$$-g \left( \int \left( -\frac{a}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} \right) dx + \int \frac{cx^4}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} dx \right)$$

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])] /; Free

$Q[m, x] \ \&\& \ \text{PolyQ}[Pp, x] \ \&\& \ \text{PolyQ}[Qq, x] \ \&\& \ \text{NeQ}[m, -1]$

### 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

$$\begin{aligned} \int \frac{ag + ex - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx &= \int \frac{ex}{(a + bx^2 + cx^4)^{3/2}} dx + \int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + e \int \frac{x}{(a + bx^2 + cx^4)^{3/2}} dx \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + \frac{1}{2} e \text{Subst} \left( \int \frac{1}{(a + bx + cx^2)^{3/2}} dx, x, x^2 \right) \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} - \frac{e(b + 2cx^2)}{(b^2 - 4ac) \sqrt{a + bx^2 + cx^4}} \end{aligned}$$

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

**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]  $-\text{sqrt}(c*x^4 + b*x^2 + a)*(2*c*e*x^2 - (b^2 - 4*a*c)*g*x + b*e)/((b^2*c - 4*a*c^2)*x^4 + a*b^2 - 4*a^2*c + (b^3 - 4*a*b*c)*x^2)$

**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]  $-\left(\frac{2*(b^2*c*e - 4*a*c^2*e)*x}{(b^4 - 8*a*b^2*c + 16*a^2*c^2)} - \frac{(b^4*g - 8*a*b^2*c*g + 16*a^2*c^2*g)}{(b^4 - 8*a*b^2*c + 16*a^2*c^2)}\right)*x + \frac{(b^3*e - 4*a*b*c*e)}{(b^4 - 8*a*b^2*c + 16*a^2*c^2)}/\text{sqrt}(c*x^4 + b*x^2 + a)$

**maple** [A] time = 0.00, size = 52, normalized size = 0.91

$$\frac{4acgx - b^2gx + 2cex^2 + be}{\sqrt{cx^4 + bx^2 + a} (4ac - b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((-c*g*x^4+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]  $-(2*c*e*x^2 + b*e - (b^2*g - 4*a*c*g)*x)/(\sqrt{c*x^4 + b*x^2 + a}*(b^2 - 4*a*c))$

**mupad [B]** time = 0.93, size = 51, normalized size = 0.89

$$\frac{-g b^2 x + e b + 2 c e x^2 + 4 a c g x}{(4 a c - b^2) \sqrt{c x^4 + b x^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a\*g + 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

$$-\int \left( \frac{ag}{a\sqrt{a+bx^2+cx^4} + b\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} \right) dx - \int \left( \frac{ex}{a\sqrt{a+bx^2+cx^4} + b\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} \right) dx - \int \frac{cgx^4}{a\sqrt{a+bx^2+cx^4} + b\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} dx$$

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])]] /; Free
Q[m, x] && PolyQ[Pp, x] && PolyQ[Qq, x] && NeQ[m, -1]
```

### Rule 1673

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

### Rubi steps

$$\begin{aligned} \int \frac{ag + fx^3 - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx &= \int \frac{fx^3}{(a + bx^2 + cx^4)^{3/2}} dx + \int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + f \int \frac{x^3}{(a + bx^2 + cx^4)^{3/2}} dx \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + \frac{1}{2} f \text{Subst} \left( \int \frac{x}{(a + bx + cx^2)^{3/2}} dx, x, x^2 \right) \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + \frac{f(2a + bx^2)}{(b^2 - 4ac) \sqrt{a + bx^2 + cx^4}} \end{aligned}$$

**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

$$\frac{\sqrt{cx^4 + bx^2 + a} (bf x^2 + (b^2 - 4ac)gx + 2af)}{(b^2c - 4ac^2)x^4 + ab^2 - 4a^2c + (b^3 - 4abc)x^2}$$

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^3\*f - 4\*a\*b\*c\*f)\*x/(b^4 - 8\*a\*b^2\*c + 16\*a^2\*c^2) + (b^4\*g - 8\*a\*b^2\*c\*g + 16\*a^2\*c^2\*g)/(b^4 - 8\*a\*b^2\*c + 16\*a^2\*c^2))\*x + 2\*(a\*b^2\*f - 4\*a^2\*c\*f)/(b^4 - 8\*a\*b^2\*c + 16\*a^2\*c^2))/sqrt(c\*x^4 + b\*x^2 + a)

**maple** [A] time = 0.00, size = 53, normalized size = 0.93

$$\frac{4acgx - b^2gx - bf x^2 - 2af}{\sqrt{cx^4 + bx^2 + a} (4ac - b^2)}$$

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] (4\*a\*c\*g\*x - b^2\*g\*x - b\*f\*x^2 - 2\*a\*f)/(c\*x^4 + b\*x^2 + a)^(1/2)/(4\*a\*c - b^2)

**maxima** [A] time = 0.63, size = 49, normalized size = 0.86

$$\frac{bf x^2 + 2af + (b^2g - 4acg)x}{\sqrt{cx^4 + bx^2 + a} (b^2 - 4ac)}$$



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))

mupad [B] time = 0.96, size = 51, normalized size = 0.89

$$\frac{g b^2 x + f b x^2 - 4 a c g x + 2 a f}{(4 a c - b^2) \sqrt{c x^4 + b x^2 + a}}$$

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

$$-\int \left( -\frac{a g}{a \sqrt{a + b x^2 + c x^4} + b x^2 \sqrt{a + b x^2 + c x^4} + c x^4 \sqrt{a + b x^2 + c x^4}} \right) dx - \int \left( -\frac{f x^3}{a \sqrt{a + b x^2 + c x^4} + b x^2 \sqrt{a + b x^2 + c x^4} + c x^4 \sqrt{a + b x^2 + c x^4}} \right) dx - \int \frac{c g x^4}{a \sqrt{a + b x^2 + c x^4} + b x^2 \sqrt{a + b x^2 + c x^4} + c x^4 \sqrt{a + b x^2 + c x^4}} dx$$

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] -Integral(-a\*g/(a\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + b\*x\*\*2\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + c\*x\*\*4\*sqrt(a + b\*x\*\*2 + c\*x\*\*4)), x) - Integral(-f\*x\*\*3/(a\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + b\*x\*\*2\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + c\*x\*\*4\*sqrt(a + b\*x\*\*2 + c\*x\*\*4)), x) - Integral(c\*g\*x\*\*4/(a\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + b\*x\*\*2\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + c\*x\*\*4\*sqrt(a + b\*x\*\*2 + c\*x\*\*4)), x)

$$3.106 \quad \int \frac{ag+ex+fx^3-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$$

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] 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^3\*f - 4\*a\*b\*c\*f - 2\*b^2\*c\*e + 8\*a\*c^2\*e)\*x/(b^4 - 8\*a\*b^2\*c + 16\*a^2\*c^2) + (b^4\*g - 8\*a\*b^2\*c\*g + 16\*a^2\*c^2\*g)/(b^4 - 8\*a\*b^2\*c + 16\*a^2\*c^2))\*x + (2\*a\*b^2\*f - 8\*a^2\*c\*f - b^3\*e + 4\*a\*b\*c\*e)/(b^4 - 8\*a\*b^2\*c + 16\*a^2\*c^2))/sqrt(c\*x^4 + b\*x^2 + a)

**maple** [A] time = 0.00, size = 63, normalized size = 0.91

$$\frac{4acgx - b^2gx - bfx^2 + 2cex^2 - 2af + be}{\sqrt{cx^4 + bx^2 + a} (4ac - b^2)}$$

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] (4\*a\*c\*g\*x - b^2\*g\*x - b\*f\*x^2 + 2\*c\*e\*x^2 - 2\*a\*f + b\*e)/(c\*x^4 + b\*x^2 + a)^(1/2)/(4\*a\*c - b^2)

**maxima** [A] time = 0.68, size = 94, normalized size = 1.36

$$\frac{\sqrt{cx^4 + bx^2 + a} \left( (2ce - bf)x^2 + be - 2af - (b^2g - 4acg)x \right)}{(b^2c - 4ac^2)x^4 + ab^2 - 4a^2c + (b^3 - 4abc)x^2}$$

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="maxima")

[Out] -sqrt(c\*x^4 + b\*x^2 + a)\*((2\*c\*e - b\*f)\*x^2 + b\*e - 2\*a\*f - (b^2\*g - 4\*a\*c\*g)\*x)/((b^2\*c - 4\*a\*c^2)\*x^4 + a\*b^2 - 4\*a^2\*c + (b^3 - 4\*a\*b\*c)\*x^2)

**mupad** [B] time = 0.98, size = 62, normalized size = 0.90

$$\frac{g b^2 x + f b x^2 - e b - 2 c e x^2 - 4 a c g x + 2 a f}{(4 a c - b^2) \sqrt{c x^4 + b x^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] -(2\*a\*f - b\*e + b\*f\*x^2 - 2\*c\*e\*x^2 + b^2\*g\*x - 4\*a\*c\*g\*x)/((4\*a\*c - b^2)\*(a + b\*x^2 + c\*x^4)^(1/2))

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

$$-\int\left(\frac{ag}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}\right)dx - \int\left(\frac{ex}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}\right)dx - \int\left(\frac{fx^3}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}\right)dx - \int\frac{cgx^4}{a\sqrt{a+bx^2+cx^4}+bx^2\sqrt{a+bx^2+cx^4}+cx^4\sqrt{a+bx^2+cx^4}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((-c\*g\*x\*\*4+f\*x\*\*3+a\*g+e\*x)/(c\*x\*\*4+b\*x\*\*2+a)\*\*(3/2),x)

[Out] -Integral(-a\*g/(a\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + b\*x\*\*2\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + c\*x\*\*4\*sqrt(a + b\*x\*\*2 + c\*x\*\*4)), x) - Integral(-e\*x/(a\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + b\*x\*\*2\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + c\*x\*\*4\*sqrt(a + b\*x\*\*2 + c\*x\*\*4)), x) - Integral(-f\*x\*\*3/(a\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + b\*x\*\*2\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + c\*x\*\*4\*sqrt(a + b\*x\*\*2 + c\*x\*\*4)), x) - Integral(c\*g\*x\*\*4/(a\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + b\*x\*\*2\*sqrt(a + b\*x\*\*2 + c\*x\*\*4) + c\*x\*\*4\*sqrt(a + b\*x\*\*2 + c\*x\*\*4)), x)



# Chapter 4

# 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;

```

```

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)])))
  end if
end proc:

```

```

elif HypergeometricFunctionQ(op(0,expn)) then
  max(5,apply(max,map(ExpnType,[op(expn)])))
elif AppellFunctionQ(op(0,expn)) then
  max(6,apply(max,map(ExpnType,[op(expn)])))
elif op(0,expn)='int' then
  max(8,apply(max,map(ExpnType,[op(expn)]))) else
9
end if
end proc:

ElementaryFunctionQ := proc(func)
  member(func,[
    exp,log,ln,
    sin,cos,tan,cot,sec,csc,
    arcsin,arccos,arctan,arccot,arcsec,arccsc,
    sinh,cosh,tanh,coth,sech,csch,
    arcsinh,arccosh,arctanh,arccoth,arcsech,arccsch])
end proc:

SpecialFunctionQ := proc(func)
  member(func,[
    erf,erfc,erfi,
    FresnelS,FresnelC,
    Ei,Ei,Li,Si,Ci,Shi,Chi,
    GAMMA,lnGAMMA,Psi,Zeta,polylog,dilog,LambertW,
    EllipticF,EllipticE,EllipticPi])
end proc:

HypergeometricFunctionQ := proc(func)
  member(func,[Hypergeometric1F1,hypergeom,HypergeometricPFQ])
end proc:

AppellFunctionQ := proc(func)
  member(func,[AppellF1])
end proc:

# u is a sum or product. rest(u) returns all but the
# first term or factor of u.
rest := proc(u) local v;
  if nops(u)=2 then
    op(2,u)
  else
    apply(op(0,u),op(2..nops(u),u))
  end if
end proc:

```

```
#leafcount(u) returns the number of nodes in u.
#Nasser 3/23/17 Replaced by build-in leafCount from package in Maple
leafcount := proc(u)
  MmaTranslator[Mma][LeafCount](u);
end proc:
```

### 4.2.3 Sympy grading function

```
#Dec 24, 2019. Nasser M. Abbasi:
#           Port of original Maple grading function by
#           Albert Rich to use with Sympy/Python
#Dec 27, 2019 Nasser. Added `RootSum`. See problem 177, Timofeev file
#           added 'exp_polar'
from sympy import *

def leaf_count(expr):
  #sympy do not have leaf count function. This is approximation
  return round(1.7*count_ops(expr))

def is_sqrt(expr):
  if isinstance(expr,Pow):
    if expr.args[1] == Rational(1,2):
      return True
    else:
      return False
  else:
    return False

def is_elementary_function(func):
  return func in [exp,log,ln,sin,cos,tan,cot,sec,csc,
                 asin,acos,atan,acot,asec,acsc,sinh,cosh,tanh,coth,sech,csch,
                 asinh,acosh,atanh,acoth,asech,acsch
                 ]

def is_special_function(func):
  return func in [ erf,erfc,erfi,
                 fresnels,fresnelc,Ei,Ei,Li,Si,Ci,Shi,Chi,
                 gamma,loggamma,digamma,zeta,polylog,LambertW,
                 elliptic_f,elliptic_e,elliptic_pi,exp_polar
                 ]

def is_hypergeometric_function(func):
  return func in [hyper]

def is_appell_function(func):
  return func in [appellf1]
```

```

def is_atom(expn):
    try:
        if expn.isAtom or isinstance(expn,int) or isinstance(expn,float):
            return True
        else:
            return False

    except AttributeError as error:
        return False

def expnType(expn):
    debug=False
    if debug:
        print("expn=",expn,"type(expn)=",type(expn))

    if is_atom(expn):
        return 1
    elif isinstance(expn,list):
        return max(map(expnType, expn)) #apply(max,map(ExpnType,expn))
    elif is_sqrt(expn):
        if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
            return 1
        else:
            return max(2,expnType(expn.args[0])) #max(2,ExpnType(op(1,expn)))
    elif isinstance(expn,Pow): #type(expn,'^^')
        if isinstance(expn.args[1],Integer): #type(op(2,expn),'integer')
            return expnType(expn.args[0]) #ExpnType(op(1,expn))
        elif isinstance(expn.args[1],Rational): #type(op(2,expn),'rational')
            if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
                return 1
            else:
                return max(2,expnType(expn.args[0])) #max(2,ExpnType(op(1,expn)
    ))
    else:
        return max(3,expnType(expn.args[0]),expnType(expn.args[1])) #max(3,
ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    elif isinstance(expn,Add) or isinstance(expn,Mul): #type(expn,'`+`') or type
(expn,'`*`')
        m1 = expnType(expn.args[0])
        m2 = expnType(list(expn.args[1:]))
        return max(m1,m2) #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.func): #ElementaryFunctionQ(op(0,expn))
        return max(3,expnType(expn.args[0])) #max(3,ExpnType(op(1,expn)))
    elif is_special_function(expn.func): #SpecialFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(4,m1) #max(4,apply(max,map(ExpnType,[op(expn)])))

```



```

elif is_hypergeometric_function(expn.func): #HypergeometricFunctionQ(op(0,
expn))
    m1 = max(map(expnType, list(expn.args)))
    return max(5,m1) #max(5,apply(max,map(ExpnType,[op(expn)])))
elif is_appell_function(expn.func):
    m1 = max(map(expnType, list(expn.args)))
    return max(6,m1) #max(5,apply(max,map(ExpnType,[op(expn)])))
elif isinstance(expn,RootSum):
    m1 = max(map(expnType, list(expn.args))) #Apply[Max,Append[Map[ExpnType,
Apply[List,expn]],7]],
    return max(7,m1)
elif str(expn).find("Integral") != -1:
    m1 = max(map(expnType, list(expn.args)))
    return max(8,m1) #max(5,apply(max,map(ExpnType,[op(expn)])))
else:
    return 9

#main function
def grade_antiderivative(result,optimal):

    leaf_count_result = leaf_count(result)
    leaf_count_optimal = leaf_count(optimal)

    expnType_result = expnType(result)
    expnType_optimal = expnType(optimal)

    if str(result).find("Integral") != -1:
        return "F"

    if expnType_result <= expnType_optimal:
        if result.has(I):
            if optimal.has(I): #both result and optimal complex
                if leaf_count_result <= 2*leaf_count_optimal:
                    return "A"
                else:
                    return "B"
            else: #result contains complex but optimal is not
                return "C"
        else: # result do not contain complex, this assumes optimal do not as
well
            if leaf_count_result <= 2*leaf_count_optimal:
                return "A"
            else:
                return "B"
    else:
        return "C"

```

## 4.2.4 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"
```