Computer algebra independent integration tests

5-Inverse-trig-functions/5.1-Inverse-sine/5.1.2-d-x-^m-a+b-arcsin-c-x-^n

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3.143 $\int \left(a + b \sin^{-1}(cx)\right)\, dx$ 656

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3.175 $\int \sqrt{a+b\sin^{-1}(cx)}\,dx$ 790

3.176 $\int \frac{\sqrt{a+b\sin^{-1}(cx)}}{x}\,dx$ 795

3.177 $\int \frac{\sqrt{a+b\sin^{-1}(cx)}}{x^2}\,dx$ 798

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3.179 $\int x\left(a+b\sin^{-1}(cx)\right)^{3/2}\,dx$ 808

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3.182 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x^2}\,dx$ 822

3.183 $\int x^2 \left(a+b\sin^{-1}(cx)\right)^{5/2} dx$ 825

3.184 $\int x \left(a+b\sin^{-1}(cx)\right)^{5/2} dx$ 833

3.185 $\int \left(a+b\sin^{-1}(cx)\right)^{5/2} dx$ 840

3.186 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x} dx$ 846

3.187 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x^2} dx$ 849

3.188 $\int \frac{x^2}{\sqrt{a+b\sin^{-1}(cx)}} dx$ 852

3.189 $\int \frac{x}{\sqrt{a+b\sin^{-1}(cx)}} dx$ 857

3.190 $\int \frac{1}{\sqrt{a+b\sin^{-1}(cx)}} dx$ 862

3.191 $\int \frac{1}{x\sqrt{a+b\sin^{-1}(cx)}} dx$ 866

3.192 $\int \frac{1}{x^2\sqrt{a+b\sin^{-1}(cx)}} dx$ 869

3.193 $\int \frac{x^2}{\left(a+b\sin^{-1}(cx)\right)^{3/2}} dx$ 872

3.194 $\int \frac{x}{\left(a+b\sin^{-1}(cx)\right)^{3/2}} dx$ 877

3.195 $\int \frac{1}{\left(a+b\sin^{-1}(cx)\right)^{3/2}} dx$ 882

3.196 $\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{3/2}} dx$ 887

3.197 $\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{3/2}} dx$ 890

3.198 $\int \frac{x^2}{\left(a+b\sin^{-1}(cx)\right)^{5/2}} dx$ 893

3.199 $\int \frac{x}{\left(a+b\sin^{-1}(cx)\right)^{5/2}} dx$ 900

3.200 $\int \frac{1}{\left(a+b\sin^{-1}(cx)\right)^{5/2}} dx$ 906

3.201 $\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{5/2}} dx$ 911

3.202 $\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{5/2}} dx$ 914

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3.205 $\int \sqrt{dx} \left(a+b\sin^{-1}(cx)\right) dx$ 926

3.206 $\int \frac{a+b\sin^{-1}(cx)}{\sqrt{dx}} dx$ 930

3.207 $\int \frac{a+b\sin^{-1}(cx)}{(dx)^{3/2}} dx$ 935

3.208 $\int \frac{a+b\sin^{-1}(cx)}{(dx)^{5/2}} dx$ 939

3.209 $\int (dx)^{5/2} \left(a+b\sin^{-1}(cx)\right)^2 dx$ 944

3.210 $\int (dx)^{3/2} \left(a+b\sin^{-1}(cx)\right)^2 dx$ 948

3.211 $\int \sqrt{dx} \left(a+b\sin^{-1}(cx)\right)^2 dx$ 952

3.212 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{dx}} dx$ 956

3.213 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{(dx)^{3/2}} dx$ 960

3.214 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{(dx)^{5/2}} dx$ 964

3.215 $\int (dx)^{3/2} \left(a+b\sin^{-1}(cx)\right)^3 dx$ 968

3.216 $\int \sqrt{dx} \left(a+b\sin^{-1}(cx)\right)^3 dx$ 971

3.217 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{\sqrt{dx}} dx$ 974

3.218 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{(dx)^{3/2}} dx$ 977

3.219 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{(dx)^{5/2}} dx$ 980

3.220 $\int \frac{(dx)^{3/2}}{a+b\sin^{-1}(cx)} dx$ 983

3.221 $\int \frac{\sqrt{dx}}{a+b\sin^{-1}(cx)} dx$ 986

3.222 $\int \frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)} dx$ 989

3.223 $\int \frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)} dx$ 992

3.224 $\int \frac{(dx)^{3/2}}{\left(a+b\sin^{-1}(cx)\right)^2} dx$ 995

3.225 $\int \frac{\sqrt{dx}}{\left(a+b\sin^{-1}(cx)\right)^2} dx$ 998

3.226 $\int \frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2} dx$ 1001

3.227 $\int \frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2} dx$ 1004

4 Listing of Grading functions **1007**

Chapter 1

Introduction

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

The number of integrals in this report is [227]. This is test number [142].

1.1 Listing of CAS systems tested

The following systems were tested at this time.

1. Mathematica 12.1 (64 bit) on windows 10.
2. Rubi 4.16.1 in Mathematica 12 on windows 10.
3. Maple 2020 (64 bit) on windows 10.
4. Maxima 5.43 on Linux. (via sagemath 8.9)
5. Fricas 1.3.6 on Linux (via sagemath 9.0)
6. Sympy 1.5 under Python 3.7.3 using Anaconda distribution.
7. Giac/Xcas 1.5 on Linux. (via sagemath 8.9)

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. (227)	% 0. (0)
Mathematica	% 99.56 (226)	% 0.44 (1)
Maple	% 95.59 (217)	% 4.41 (10)
Maxima	% 27.75 (63)	% 72.25 (164)
Fricas	% 34.8 (79)	% 65.2 (148)
Sympy	% 40.09 (91)	% 59.91 (136)
Giac	% 74.01 (168)	% 25.99 (59)

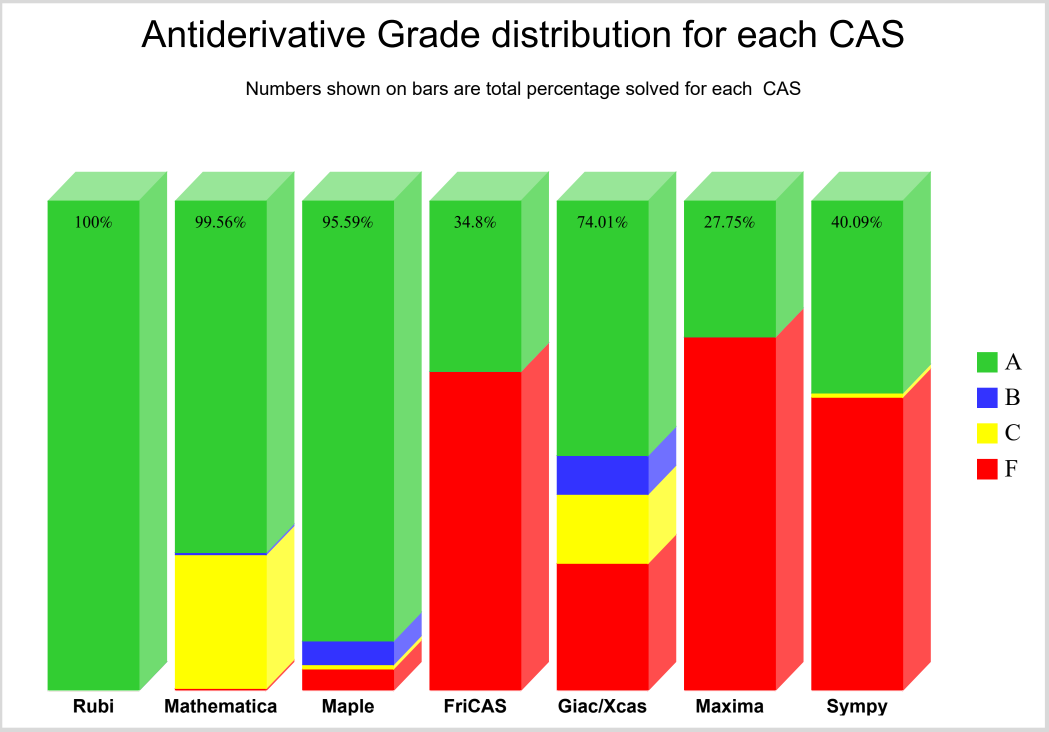
The table below gives additional break down of the grading of quality of the antiderivatives generated by each CAS. The grading is given using the letters A,B,C and F with A being the best quality. The grading is accomplished by comparing the antiderivative generated with the optimal antiderivatives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

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

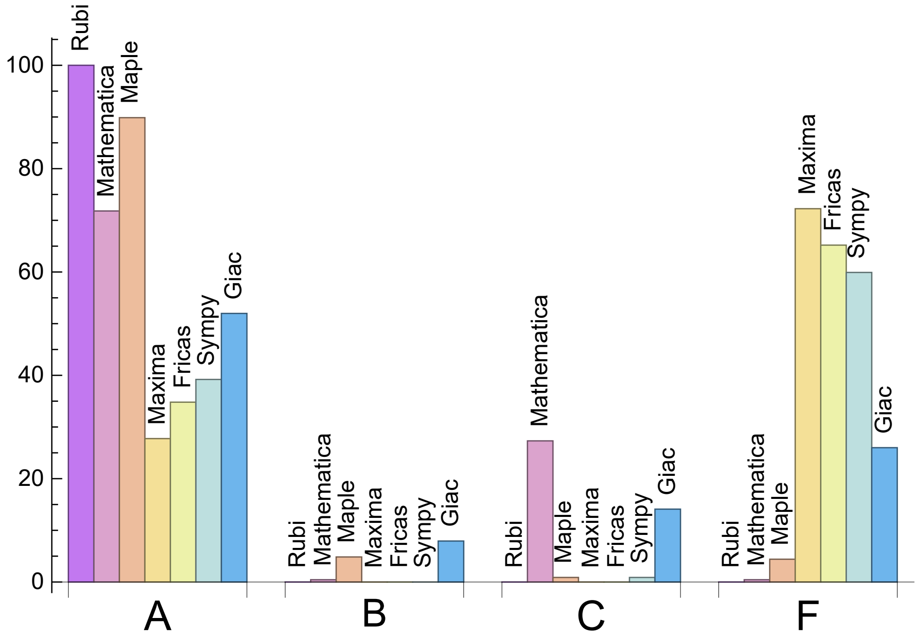
Grading is implemented for all CAS systems. Based on the above, the following table summarizes the grading for this test suite.

System	% A grade	% B grade	% C grade	% F grade
Rubi	100.	0.	0.	0.
Mathematica	71.81	0.44	27.31	0.44
Maple	89.87	4.85	0.88	4.41
Maxima	27.75	0.	0.	72.25
Fricas	34.8	0.	0.	65.2
Sympy	39.21	0.	0.88	59.91
Giac	51.98	7.93	14.1	25.99

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.



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	0.16	81.81	0.73	75.	1.
Mathematica	1.6	86.96	0.78	69.5	0.83
Maple	0.08	98.41	0.85	67.	0.89
Maxima	0.85	56.56	0.73	32.	1.12
Fricas	1.06	91.96	1.13	66.	1.36
Sympy	4.06	49.03	0.54	0.	0.
Giac	0.96	195.97	1.62	88.5	1.42

1.4 list of integrals that has no closed form antiderivative

{49, 50, 58, 59, 65, 66, 72, 73, 79, 85, 91, 97, 98, 106, 112, 118, 119, 120, 123, 124, 125, 126, 127, 128, 129, 134, 135, 136, 137, 138, 139, 161, 162, 166, 167, 171, 172, 176, 177, 181, 182, 186, 187, 191, 192, 196, 197, 201, 202, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227}

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

Rubi {}

Mathematica {}

Maple {}

Maxima {}

Fricas {}

Sympy {}

Giac {}

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 {17, 18, 20, 27, 28, 30, 38, 39, 40, 41, 74, 75, 76, 77, 78, 80, 81, 82, 83, 84, 86, 87, 88, 89, 90, 92, 93, 94, 95, 96, 99, 100, 101, 102, 103, 104, 105, 107, 108, 109, 110, 111, 113, 114, 115, 116, 117, 144, 151, 152, 156, 157, 173, 174, 175, 178, 179, 180, 183, 184, 185, 188, 189, 190, 193, 194, 195, 198, 199, 200}

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.

1.7 Timing

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

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

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

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

1.8 Verification

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

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

1.9 Important notes about some of the results

1.9.1 Important note about Maxima results

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

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

The percentage of such failures were not counted for each test file, but for an example, for the Timofeev test file, there were about 30 such integrals out of total 705, or about 4 percent. This pecrentage can be higher or lower depending on the specific input test file.

Such integrals can be indentified by looking at the output of the integration in each section for Maxima. If the output was an exception `ValueError` then this is most likely due to this reason.

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 is determined as follows.

For Fricas, Giac and Maxima (all called via sagemath) the following code is used

```
#see https://stackoverflow.com/questions/25202346/how-to-obtain-leaf-count-expression-size-in

def tree(expr):
    if expr.operator() is None:
       return expr
    else:
       return [expr.operator()]+map(tree, expr.operands())

try:
    # 1.35 is a fudge factor since this estimate of leaf count is bit lower than
    #what it should be compared to Mathematica's
    leafCount = round(1.35*len(flatten(tree(anti))))
except Exception as ee:
    leafCount =1
```

For Sympy, called directly from Python, the following code is used

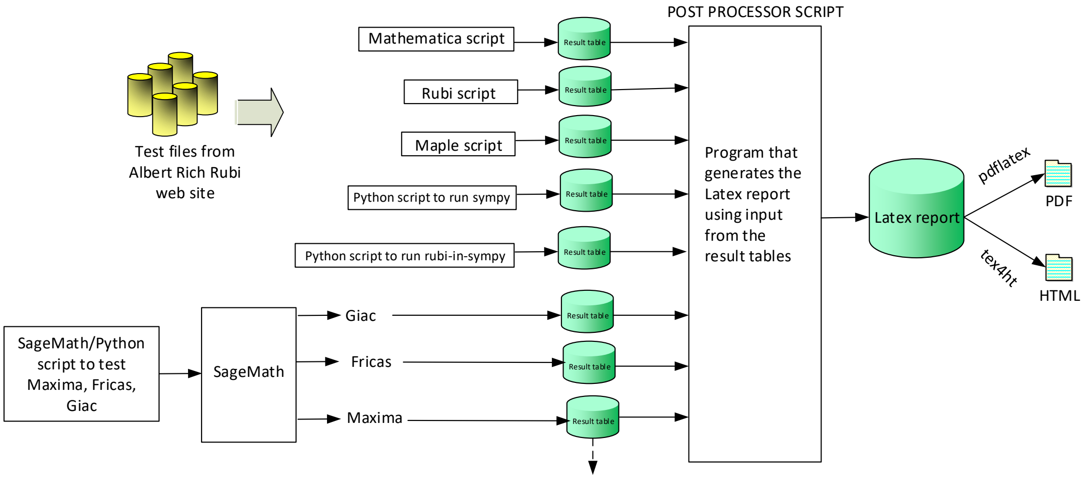
```
try:
  # 1.7 is a fudge factor since it is low side from actual leaf count
  leafCount = round(1.7*count_ops(anti))

  except Exception as ee:
         leafCount =1
```

When these cas systems have a buildin function to find the leaf size of expressions, it will be used instead, and these tests run again.

1.10 Design of the test system

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


POST PROCESSOR SCRIPT
Test files from Albert Rich Rubi web site
Mathematica script
Rubi script
Maple script
Python script to run sympy
Python script to run rubi-in-sympy
Result table
Program that generates the Latex report using input from the result tables
Latex report
pdflatex
tex4ht
PDF
HTML
SageMath/Python script to test Maxima, Fricas, Giac
SageMath
Giac
Fricas
Maxima

One record (line) per one integral result. The line is CSV comma separated. It contains 13 fields. This is description of each record (line)

1. integer, the problem number.
2. integer. 0 or 1 for failed or passed. (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 syntx.
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. String. The optimal antiderivative in CAS own syntax.

High level overview of the CAS independent integration test build system

Nasser M. Abbasi
June 22, 2018

Chapter 2

detailed summary tables of results

2.1 List of integrals sorted by grade for each CAS

2.1.1 Rubi

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227 }

B grade: { }

C grade: { }

F grade: { }

2.1.2 Mathematica

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 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, 79, 85, 91, 97, 98, 106, 112, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 176, 177, 181, 182, 186, 187, 191, 192, 196, 197, 201, 202, 209, 210, 211, 212, 213, 214, 215, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227 }

B grade: { 157 }

C grade: { 11, 74, 75, 76, 77, 78, 80, 81, 82, 83, 84, 86, 87, 88, 89, 90, 92, 93, 94, 95, 96, 99, 100, 101, 102, 103, 104, 105, 107, 108, 109, 110, 111, 113, 114, 115, 116, 117, 173, 174, 175, 178, 179, 180, 183, 184, 185, 188, 189, 190, 193, 194, 195, 198, 199, 200, 203, 204, 205, 206, 207, 208 }

F grade: { 216}

2.1.3 Maple

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 123, 124, 125, 126, 127, 128, 129, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 152, 153, 154, 155, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 179, 181, 182, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 201, 202, 203, 204, 205, 206, 207, 208, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227 }

B grade: { 151, 156, 157, 178, 180, 183, 184, 185, 198, 199, 200 }

C grade: { 132, 133 }

F grade: { 121, 122, 130, 131, 209, 210, 211, 212, 213, 214 }

2.1.4 Maxima

A grade: { 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 14, 16, 19, 21, 22, 24, 26, 33, 35, 37, 49, 50, 65, 66, 72, 73, 123, 140, 141, 142, 143, 145, 146, 147, 148, 150, 153, 155, 161, 162, 171, 172, 176, 177, 181, 182, 186, 187, 191, 192, 196, 197, 201, 202, 220, 221, 222, 223, 224, 225, 226, 227

B grade: { }

C grade: { }

F grade: { 6, 13, 15, 17, 18, 20, 23, 25, 27, 28, 29, 30, 31, 32, 34, 36, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 67, 68, 69, 70, 71, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 144, 149, 151, 152, 154, 156, 157, 158, 159, 160, 163, 164, 165, 166, 167, 168, 169, 170, 173, 174, 175, 178, 179, 180, 183, 184, 185, 188, 189, 190, 193, 194, 195, 198, 199, 200, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219 }

2.1.5 FriCAS

A grade: { 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 19, 21, 22, 23, 24, 25, 26, 32, 33, 34, 35, 36, 37, 49, 50, 58, 59, 65, 66, 72, 73, 119, 120, 123, 124, 129, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 145, 146, 147, 148, 149, 150, 153, 154, 155, 161, 162, 166, 167, 171, 172, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227 }

B grade: { }

C grade: { }

F grade: { 6, 17, 18, 20, 27, 28, 29, 30, 31, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 51, 52, 53, 54, 55, 56, 57, 60, 61, 62, 63, 64, 67, 68, 69, 70, 71, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 121, 122, 125, 126, 127, 128, 130, 131, 132, 133, 144, 151, 152, 156, 157, 158, 159, 160, 163, 164, 165, 168, 169, 170, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214 }

2.1.6 Sympy

A grade: { 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 22, 23, 24, 25, 26, 32, 33, 34, 35, 36, 37, 49, 50, 58, 59, 65, 66, 72, 73, 79, 85, 97, 98, 106, 112, 119, 120, 123, 124, 126, 127, 128, 129, 134, 135, 137, 138, 140, 141, 142, 143, 145, 146, 147, 148, 149, 150, 153, 154, 155, 161, 162, 166, 167, 171, 172, 176, 177, 181, 182, 191, 192, 196, 197, 201, 204, 205, 216, 220, 221, 222, 223, 224, 225, 226, 227 }

B grade: { }

C grade: { 7, 8 }

F grade: { 6, 17, 18, 19, 20, 21, 27, 28, 29, 30, 31, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 51, 52, 53, 54, 55, 56, 57, 60, 61, 62, 63, 64, 67, 68, 69, 70, 71, 74, 75, 76, 77, 78, 80, 81, 82, 83, 84, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 99, 100, 101, 102, 103, 104, 105, 107, 108, 109, 110, 111, 113, 114, 115, 116, 117, 118, 121, 122, 125, 130, 131, 132, 133, 136, 139, 144, 151, 152, 156, 157, 158, 159, 160, 163, 164, 165, 168, 169, 170, 173, 174, 175, 178, 179, 180, 183, 184, 185, 186, 187, 188, 189, 190, 193, 194, 195, 198, 199, 200, 202, 203, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 217, 218, 219 }

2.1.7 Giac

A grade: { 1, 2, 3, 4, 5, 7, 9, 11, 12, 13, 14, 15, 16, 22, 23, 24, 25, 26, 32, 33, 34, 35, 36, 37, 42, 43, 44, 45, 46, 47, 48, 49, 50, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 79, 85, 91, 97, 98, 106, 112, 118, 119, 120, 123, 124, 125, 126, 127, 128, 129, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 150, 155, 158, 159, 160, 161, 162, 166, 167, 171, 172, 176, 177, 181, 182, 186, 187, 191, 192, 196, 197, 201, 202, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227 }

B grade: { 8, 10, 19, 21, 51, 145, 146, 147, 148, 149, 153, 154, 163, 164, 165, 168, 169, 170 }

C grade: { 74, 75, 76, 77, 78, 80, 81, 82, 83, 84, 86, 87, 88, 89, 90, 92, 93, 94, 95, 96, 173, 174, 175, 178, 179, 180, 183, 184, 185, 188, 189, 190 }

F grade: { 6, 17, 18, 20, 27, 28, 29, 30, 31, 38, 39, 40, 41, 99, 100, 101, 102, 103, 104, 105, 107, 108, 109, 110, 111, 113, 114, 115, 116, 117, 121, 122, 130, 131, 132, 133, 144, 151, 152, 156, 157, 193, 194, 195, 198, 199, 200, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214 }

2.2 Detailed conclusion table per each integral for all CAS systems

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

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

Problem 1	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	75	75	51	72	96	113	70	153
normalized size	1	1.	0.68	0.96	1.28	1.51	0.93	2.04
time (sec)	N/A	0.049	0.032	0.032	1.686	2.134	7.083	1.222

Problem 2	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	69	69	50	60	99	109	61	113
normalized size	1	1.	0.72	0.87	1.43	1.58	0.88	1.64
time (sec)	N/A	0.029	0.019	0.004	1.727	2.026	1.645	1.448

Problem 3	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	54	54	41	52	68	92	48	86
normalized size	1	1.	0.76	0.96	1.26	1.7	0.89	1.59
time (sec)	N/A	0.035	0.025	0.003	1.709	2.138	0.82	1.303

Problem 4	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	45	45	40	40	70	86	37	62
normalized size	1	1.	0.89	0.89	1.56	1.91	0.82	1.38
time (sec)	N/A	0.016	0.011	0.004	1.671	2.2	0.346	1.239

Problem 5	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	25	25	25	25	32	57	20	32
normalized size	1	1.	1.	1.	1.28	2.28	0.8	1.28
time (sec)	N/A	0.008	0.008	0.001	1.689	2.106	0.619	1.331

Problem 6	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	51	51	46	111	0	0	0	0
normalized size	1	1.	0.9	2.18	0.	0.	0.	0.
time (sec)	N/A	0.058	0.028	0.158	0.	0.	0.	0.

Problem 7	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	C	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	28	28	28	31	53	124	32	65
normalized size	1	1.	1.	1.11	1.89	4.43	1.14	2.32
time (sec)	N/A	0.022	0.002	0.003	1.624	2.235	4.859	1.475

Problem 8	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	C	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	34	34	29	38	38	66	51	92
normalized size	1	1.	0.85	1.12	1.12	1.94	1.5	2.71
time (sec)	N/A	0.014	0.007	0.003	1.658	2.191	2.114	1.282

Problem 9	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	56	56	53	53	81	176	109	95
normalized size	1	1.	0.95	0.95	1.45	3.14	1.95	1.7
time (sec)	N/A	0.033	0.014	0.003	1.731	2.743	7.035	1.315

Problem 10	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	58	58	41	58	68	89	100	176
normalized size	1	1.	0.71	1.	1.17	1.53	1.72	3.03
time (sec)	N/A	0.022	0.019	0.003	1.656	2.535	3.911	1.354

Problem 11	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	80	80	51	73	111	204	182	120
normalized size	1	1.	0.64	0.91	1.39	2.55	2.28	1.5
time (sec)	N/A	0.045	0.013	0.004	1.764	2.794	24.051	1.302

Problem 12	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	120	120	82	76	138	189	114	228
normalized size	1	1.	0.68	0.63	1.15	1.58	0.95	1.9
time (sec)	N/A	0.194	0.034	0.126	1.67	2.428	7.614	1.344

Problem 13	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	98	98	74	93	0	162	90	180
normalized size	1	1.	0.76	0.95	0.	1.65	0.92	1.84
time (sec)	N/A	0.163	0.029	0.063	0.	2.402	4.84	1.229

Problem 14	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	82	82	64	59	97	143	76	131
normalized size	1	1.	0.78	0.72	1.18	1.74	0.93	1.6
time (sec)	N/A	0.121	0.028	0.059	1.735	2.415	2.594	1.312

Problem 15	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	60	60	55	65	0	123	51	99
normalized size	1	1.	0.92	1.08	0.	2.05	0.85	1.65
time (sec)	N/A	0.093	0.017	0.025	0.	2.339	0.77	1.215

Problem 16	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	35	35	35	37	45	89	32	45
normalized size	1	1.	1.	1.06	1.29	2.54	0.91	1.29
time (sec)	N/A	0.045	0.011	0.021	1.821	2.352	0.239	1.348

Problem 17	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	71	71	71	169	0	0	0	0
normalized size	1	1.	1.	2.38	0.	0.	0.	0.
time (sec)	N/A	0.095	0.04	0.042	0.	0.	0.	0.

Problem 18	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	66	66	87	119	0	0	0	0
normalized size	1	1.	1.32	1.8	0.	0.	0.	0.
time (sec)	N/A	0.103	0.162	0.092	0.	0.	0.	0.

Problem 19	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	44	44	44	43	54	112	0	116
normalized size	1	1.	1.	0.98	1.23	2.55	0.	2.64
time (sec)	N/A	0.08	0.025	0.026	1.628	2.568	0.	1.382

Problem 20	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	116	116	139	157	0	0	0	0
normalized size	1	1.	1.2	1.35	0.	0.	0.	0.
time (sec)	N/A	0.17	0.615	0.196	0.	0.	0.	0.

Problem 21	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	87	87	69	76	100	149	0	223
normalized size	1	1.	0.79	0.87	1.15	1.71	0.	2.56
time (sec)	N/A	0.14	0.038	0.032	1.613	2.309	0.	1.457

Problem 22	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	201	201	122	159	231	265	196	336
normalized size	1	1.	0.61	0.79	1.15	1.32	0.98	1.67
time (sec)	N/A	0.385	0.07	0.059	1.692	2.2	13.62	1.386

Problem 23	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	167	167	112	154	0	234	160	250
normalized size	1	1.	0.67	0.92	0.	1.4	0.96	1.5
time (sec)	N/A	0.297	0.048	0.06	0.	2.05	6.943	1.302

Problem 24	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	136	136	95	106	162	189	128	192
normalized size	1	1.	0.7	0.78	1.19	1.39	0.94	1.41
time (sec)	N/A	0.225	0.045	0.045	1.726	2.169	5.895	1.3

Problem 25	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	99	99	82	96	0	170	92	136
normalized size	1	1.	0.83	0.97	0.	1.72	0.93	1.37
time (sec)	N/A	0.156	0.025	0.041	0.	2.035	1.609	1.305

Problem 26	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	60	60	60	57	77	116	54	76
normalized size	1	1.	1.	0.95	1.28	1.93	0.9	1.27
time (sec)	N/A	0.08	0.011	0.024	1.681	2.047	0.832	1.36

Problem 27	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	97	97	97	229	0	0	0	0
normalized size	1	1.	1.	2.36	0.	0.	0.	0.
time (sec)	N/A	0.109	0.056	0.046	0.	0.	0.	0.

Problem 28	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	108	108	133	179	0	0	0	0
normalized size	1	1.	1.23	1.66	0.	0.	0.	0.
time (sec)	N/A	0.163	0.124	0.074	0.	0.	0.	0.

Problem 29	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	102	102	92	163	0	0	0	0
normalized size	1	1.	0.9	1.6	0.	0.	0.	0.
time (sec)	N/A	0.169	0.253	0.098	0.	0.	0.	0.

Problem 30	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	179	179	284	250	0	0	0	0
normalized size	1	1.	1.59	1.4	0.	0.	0.	0.
time (sec)	N/A	0.285	2.795	0.148	0.	0.	0.	0.

Problem 31	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	169	169	116	225	0	0	0	0
normalized size	1	1.	0.69	1.33	0.	0.	0.	0.
time (sec)	N/A	0.292	0.679	0.156	0.	0.	0.	0.

Problem 32	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	282	282	167	320	0	383	269	489
normalized size	1	1.	0.59	1.13	0.	1.36	0.95	1.73
time (sec)	N/A	0.869	0.098	0.1	0.	2.22	33.002	1.375

Problem 33	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	250	250	150	197	279	352	241	412
normalized size	1	1.	0.6	0.79	1.12	1.41	0.96	1.65
time (sec)	N/A	0.663	0.075	0.059	1.853	2.149	18.648	1.29

Problem 34	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	198	198	135	209	0	292	190	316
normalized size	1	1.	0.68	1.06	0.	1.47	0.96	1.6
time (sec)	N/A	0.516	0.059	0.059	0.	2.209	15.126	1.414

Problem 35	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	166	166	114	130	198	247	158	238
normalized size	1	1.	0.69	0.78	1.19	1.49	0.95	1.43
time (sec)	N/A	0.353	0.048	0.048	1.687	2.01	5.592	1.404

Problem 36	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	111	111	96	117	0	205	104	171
normalized size	1	1.	0.86	1.05	0.	1.85	0.94	1.54
time (sec)	N/A	0.238	0.029	0.039	0.	2.211	3.343	1.404

Problem 37	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	69	69	69	67	101	149	65	88
normalized size	1	1.	1.	0.97	1.46	2.16	0.94	1.28
time (sec)	N/A	0.118	0.016	0.026	1.768	1.926	1.988	1.39

Problem 38	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	113	113	113	287	0	0	0	0
normalized size	1	1.	1.	2.54	0.	0.	0.	0.
time (sec)	N/A	0.122	0.044	0.046	0.	0.	0.	0.

Problem 39	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	156	156	198	241	0	0	0	0
normalized size	1	1.	1.27	1.54	0.	0.	0.	0.
time (sec)	N/A	0.194	0.267	0.077	0.	0.	0.	0.

Problem 40	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	119	119	124	227	0	0	0	0
normalized size	1	1.	1.04	1.91	0.	0.	0.	0.
time (sec)	N/A	0.216	0.283	0.091	0.	0.	0.	0.

Problem 41	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	276	276	399	409	0	0	0	0
normalized size	1	1.	1.45	1.48	0.	0.	0.	0.
time (sec)	N/A	0.41	4.27	0.145	0.	0.	0.	0.

Problem 42	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	55	55	40	40	0	0	0	63
normalized size	1	1.	0.73	0.73	0.	0.	0.	1.15
time (sec)	N/A	0.097	0.016	0.039	0.	0.	0.	1.318

Problem 43	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	43	43	33	33	0	0	0	50
normalized size	1	1.	0.77	0.77	0.	0.	0.	1.16
time (sec)	N/A	0.08	0.115	0.031	0.	0.	0.	1.275

Problem 44	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	41	41	31	31	0	0	0	47
normalized size	1	1.	0.76	0.76	0.	0.	0.	1.15
time (sec)	N/A	0.081	0.009	0.023	0.	0.	0.	1.352

Problem 45	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	29	29	24	24	0	0	0	34
normalized size	1	1.	0.83	0.83	0.	0.	0.	1.17
time (sec)	N/A	0.062	0.079	0.022	0.	0.	0.	1.339

Problem 46	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	27	27	22	22	0	0	0	31
normalized size	1	1.	0.81	0.81	0.	0.	0.	1.15
time (sec)	N/A	0.063	0.006	0.021	0.	0.	0.	1.371

Problem 47	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	14	14	14	13	0	0	0	16
normalized size	1	1.	1.	0.93	0.	0.	0.	1.14
time (sec)	N/A	0.035	0.023	0.025	0.	0.	0.	1.346

Problem 48	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	9	9	9	10	0	0	0	12
normalized size	1	1.	1.	1.11	0.	0.	0.	1.33
time (sec)	N/A	0.017	0.009	0.017	0.	0.	0.	1.356

Problem 49	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.013	0.191	0.09	0.	0.	0.	0.

Problem 50	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.014	1.098	0.123	0.	0.	0.	0.

Problem 51	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F(-1)	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	83	83	86	105	0	0	0	217
normalized size	1	1.	1.04	1.27	0.	0.	0.	2.61
time (sec)	N/A	0.074	0.244	0.042	0.	0.	0.	1.287

Problem 52	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F(-1)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	71	71	78	78	0	0	0	162
normalized size	1	1.	1.1	1.1	0.	0.	0.	2.28
time (sec)	N/A	0.063	0.045	0.033	0.	0.	0.	1.311

Problem 53	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F(-1)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	69	69	61	81	0	0	0	155
normalized size	1	1.	0.88	1.17	0.	0.	0.	2.25
time (sec)	N/A	0.058	0.209	0.026	0.	0.	0.	1.305

Problem 54	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F(-1)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	57	57	56	54	0	0	0	97
normalized size	1	1.	0.98	0.95	0.	0.	0.	1.7
time (sec)	N/A	0.049	0.017	0.021	0.	0.	0.	1.385

Problem 55	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F(-1)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	55	55	50	57	0	0	0	92
normalized size	1	1.	0.91	1.04	0.	0.	0.	1.67
time (sec)	N/A	0.044	0.165	0.023	0.	0.	0.	1.36

Problem 56	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F(-1)	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	38	38	32	28	0	0	0	49
normalized size	1	1.	0.84	0.74	0.	0.	0.	1.29
time (sec)	N/A	0.025	0.003	0.024	0.	0.	0.	1.374

Problem 57	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	36	36	32	33	0	0	0	46
normalized size	1	1.	0.89	0.92	0.	0.	0.	1.28
time (sec)	N/A	0.078	0.059	0.019	0.	0.	0.	1.33

Problem 58	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-1)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.012	0.904	0.078	0.	0.	0.	0.

Problem 59	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-1)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.014	9.711	0.141	0.	0.	0.	0.

Problem 60	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	98	98	103	121	0	0	0	230
normalized size	1	1.	1.05	1.23	0.	0.	0.	2.35
time (sec)	N/A	0.343	0.185	0.042	0.	0.	0.	1.328

Problem 61	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	83	83	73	82	0	0	0	169
normalized size	1	1.	0.88	0.99	0.	0.	0.	2.04
time (sec)	N/A	0.3	0.187	0.034	0.	0.	0.	1.362

Problem 62	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	82	82	68	82	0	0	0	138
normalized size	1	1.	0.83	1.	0.	0.	0.	1.68
time (sec)	N/A	0.249	0.136	0.026	0.	0.	0.	1.371

Problem 63	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	64	64	61	45	0	0	0	90
normalized size	1	1.	0.95	0.7	0.	0.	0.	1.41
time (sec)	N/A	0.168	0.06	0.026	0.	0.	0.	1.418

Problem 64	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	51	51	48	43	0	0	0	58
normalized size	1	1.	0.94	0.84	0.	0.	0.	1.14
time (sec)	N/A	0.085	0.022	0.021	0.	0.	0.	1.339

Problem 65	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.012	0.541	0.078	0.	0.	0.	0.

Problem 66	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.013	6.431	0.122	0.	0.	0.	0.

Problem 67	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	158	158	159	171	0	0	0	338
normalized size	1	1.	1.01	1.08	0.	0.	0.	2.14
time (sec)	N/A	0.314	0.338	0.04	0.	0.	0.	1.271

Problem 68	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	144	144	107	114	0	0	0	235
normalized size	1	1.	0.74	0.79	0.	0.	0.	1.63
time (sec)	N/A	0.282	0.36	0.03	0.	0.	0.	1.377

Problem 69	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	141	141	102	117	0	0	0	200
normalized size	1	1.	0.72	0.83	0.	0.	0.	1.42
time (sec)	N/A	0.303	0.259	0.028	0.	0.	0.	1.329

Problem 70	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	97	97	86	60	0	0	0	124
normalized size	1	1.	0.89	0.62	0.	0.	0.	1.28
time (sec)	N/A	0.164	0.138	0.027	0.	0.	0.	1.257

Problem 71	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	78	78	70	63	0	0	0	89
normalized size	1	1.	0.9	0.81	0.	0.	0.	1.14
time (sec)	N/A	0.153	0.062	0.023	0.	0.	0.	1.245

Problem 72	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.012	2.34	0.075	0.	0.	0.	0.

Problem 73	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.014	17.869	0.118	0.	0.	0.	0.

Problem 74	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	121	121	204	143	0	0	0	333
normalized size	1	1.	1.69	1.18	0.	0.	0.	2.75
time (sec)	N/A	0.242	0.099	0.074	0.	0.	0.	1.345

Problem 75	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	95	95	138	91	0	0	0	207
normalized size	1	1.	1.45	0.96	0.	0.	0.	2.18
time (sec)	N/A	0.189	0.061	0.049	0.	0.	0.	1.432

Problem 76	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	86	86	126	96	0	0	0	223
normalized size	1	1.	1.47	1.12	0.	0.	0.	2.59
time (sec)	N/A	0.181	0.05	0.044	0.	0.	0.	1.488

Problem 77	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	59	59	81	42	0	0	0	96
normalized size	1	1.	1.37	0.71	0.	0.	0.	1.63
time (sec)	N/A	0.151	0.021	0.033	0.	0.	0.	1.378

Problem 78	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	44	44	66	49	0	0	0	112
normalized size	1	1.	1.5	1.11	0.	0.	0.	2.55
time (sec)	N/A	0.09	0.031	0.032	0.	0.	0.	1.361

Problem 79	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	14	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.013	0.399	0.078	0.	0.	0.	0.

Problem 80	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F(-1)	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	214	282	202	193	0	0	0	479
normalized size	1	1.32	0.94	0.9	0.	0.	0.	2.24
time (sec)	N/A	0.533	0.065	0.079	0.	0.	0.	1.401

Problem 81	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	157	157	130	121	0	0	0	304
normalized size	1	1.	0.83	0.77	0.	0.	0.	1.94
time (sec)	N/A	0.379	0.033	0.053	0.	0.	0.	1.398

Problem 82	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	147	147	136	131	0	0	0	320
normalized size	1	1.	0.93	0.89	0.	0.	0.	2.18
time (sec)	N/A	0.303	0.059	0.05	0.	0.	0.	1.392

Problem 83	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	89	89	71	64	0	0	0	144
normalized size	1	1.	0.8	0.72	0.	0.	0.	1.62
time (sec)	N/A	0.183	0.015	0.036	0.	0.	0.	1.342

Problem 84	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	75	75	76	72	0	0	0	161
normalized size	1	1.	1.01	0.96	0.	0.	0.	2.15
time (sec)	N/A	0.099	0.043	0.036	0.	0.	0.	1.469

Problem 85	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	14	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.013	0.372	0.063	0.	0.	0.	0.

Problem 86	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F(-1)	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	263	298	204	233	0	0	0	625
normalized size	1	1.13	0.78	0.89	0.	0.	0.	2.38
time (sec)	N/A	0.803	0.071	0.077	0.	0.	0.	1.475

Problem 87	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F(-1)	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	205	205	140	154	0	0	0	401
normalized size	1	1.	0.68	0.75	0.	0.	0.	1.96
time (sec)	N/A	0.6	0.041	0.056	0.	0.	0.	1.494

Problem 88	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F(-1)	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	178	178	125	156	0	0	0	417
normalized size	1	1.	0.7	0.88	0.	0.	0.	2.34
time (sec)	N/A	0.469	0.047	0.055	0.	0.	0.	1.436

Problem 89	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F(-1)	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	119	119	81	79	0	0	0	193
normalized size	1	1.	0.68	0.66	0.	0.	0.	1.62
time (sec)	N/A	0.313	0.02	0.036	0.	0.	0.	1.463

Problem 90	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F(-1)	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	88	88	68	88	0	0	0	209
normalized size	1	1.	0.77	1.	0.	0.	0.	2.38
time (sec)	N/A	0.165	0.035	0.037	0.	0.	0.	1.514

Problem 91	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	F(-2)	F(-1)	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	14	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.013	0.373	0.063	0.	0.	0.	0.

Problem 92	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	106	106	193	72	0	0	0	188
normalized size	1	1.	1.82	0.68	0.	0.	0.	1.77
time (sec)	N/A	0.112	0.057	0.055	0.	0.	0.	1.452

Problem 93	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	65	65	128	44	0	0	0	109
normalized size	1	1.	1.97	0.68	0.	0.	0.	1.68
time (sec)	N/A	0.083	0.032	0.039	0.	0.	0.	1.476

Problem 94	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	71	71	128	51	0	0	0	126
normalized size	1	1.	1.8	0.72	0.	0.	0.	1.77
time (sec)	N/A	0.089	0.051	0.039	0.	0.	0.	1.434

Problem 95	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	28	28	71	21	0	0	0	47
normalized size	1	1.	2.54	0.75	0.	0.	0.	1.68
time (sec)	N/A	0.045	0.017	0.029	0.	0.	0.	1.479

Problem 96	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	30	30	69	25	0	0	0	63
normalized size	1	1.	2.3	0.83	0.	0.	0.	2.1
time (sec)	N/A	0.024	0.026	0.028	0.	0.	0.	1.369

Problem 97	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	14	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.014	0.356	0.069	0.	0.	0.	0.

Problem 98	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	14	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.013	2.993	0.122	0.	0.	0.	0.

Problem 99	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	171	171	427	184	0	0	0	0
normalized size	1	1.	2.5	1.08	0.	0.	0.	0.
time (sec)	N/A	0.144	0.234	0.077	0.	0.	0.	0.

Problem 100	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	127	127	231	121	0	0	0	0
normalized size	1	1.	1.82	0.95	0.	0.	0.	0.
time (sec)	N/A	0.107	0.135	0.067	0.	0.	0.	0.

Problem 101	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	136	136	319	138	0	0	0	0
normalized size	1	1.	2.35	1.01	0.	0.	0.	0.
time (sec)	N/A	0.098	0.152	0.051	0.	0.	0.	0.

Problem 102	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	90	90	154	83	0	0	0	0
normalized size	1	1.	1.71	0.92	0.	0.	0.	0.
time (sec)	N/A	0.07	0.046	0.042	0.	0.	0.	0.

Problem 103	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	96	96	211	95	0	0	0	0
normalized size	1	1.	2.2	0.99	0.	0.	0.	0.
time (sec)	N/A	0.069	0.072	0.046	0.	0.	0.	0.

Problem 104	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	55	55	91	43	0	0	0	0
normalized size	1	1.	1.65	0.78	0.	0.	0.	0.
time (sec)	N/A	0.032	0.033	0.031	0.	0.	0.	0.

Problem 105	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	59	59	87	65	0	0	0	0
normalized size	1	1.	1.47	1.1	0.	0.	0.	0.
time (sec)	N/A	0.09	0.095	0.035	0.	0.	0.	0.

Problem 106	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	14	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.014	0.455	0.063	0.	0.	0.	0.

Problem 107	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	171	235	418	175	0	0	0	0
normalized size	1	1.37	2.44	1.02	0.	0.	0.	0.
time (sec)	N/A	0.434	0.329	0.07	0.	0.	0.	0.

Problem 108	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	126	126	200	109	0	0	0	0
normalized size	1	1.	1.59	0.87	0.	0.	0.	0.
time (sec)	N/A	0.338	0.394	0.057	0.	0.	0.	0.

Problem 109	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	125	125	277	117	0	0	0	0
normalized size	1	1.	2.22	0.94	0.	0.	0.	0.
time (sec)	N/A	0.301	0.208	0.055	0.	0.	0.	0.

Problem 110	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	89	89	112	56	0	0	0	0
normalized size	1	1.	1.26	0.63	0.	0.	0.	0.
time (sec)	N/A	0.18	0.225	0.039	0.	0.	0.	0.

Problem 111	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	76	76	138	83	0	0	0	0
normalized size	1	1.	1.82	1.09	0.	0.	0.	0.
time (sec)	N/A	0.099	0.127	0.042	0.	0.	0.	0.

Problem 112	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	14	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.013	0.462	0.069	0.	0.	0.	0.

Problem 113	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	264	264	417	225	0	0	0	0
normalized size	1	1.	1.58	0.85	0.	0.	0.	0.
time (sec)	N/A	0.396	0.772	0.083	0.	0.	0.	0.

Problem 114	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	190	190	272	139	0	0	0	0
normalized size	1	1.	1.43	0.73	0.	0.	0.	0.
time (sec)	N/A	0.319	1.187	0.055	0.	0.	0.	0.

Problem 115	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	191	191	280	154	0	0	0	0
normalized size	1	1.	1.47	0.81	0.	0.	0.	0.
time (sec)	N/A	0.348	0.476	0.055	0.	0.	0.	0.

Problem 116	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	119	119	146	73	0	0	0	0
normalized size	1	1.	1.23	0.61	0.	0.	0.	0.
time (sec)	N/A	0.172	0.412	0.038	0.	0.	0.	0.

Problem 117	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F(-2)	F(-1)	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	105	105	143	110	0	0	0	0
normalized size	1	1.	1.36	1.05	0.	0.	0.	0.
time (sec)	N/A	0.166	0.26	0.04	0.	0.	0.	0.

Problem 118	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	F(-2)	F(-1)	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	14	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.013	0.462	0.066	0.	0.	0.	0.

Problem 119	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	64	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.122	1.064	0.828	0.	0.	0.	0.

Problem 120	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	64	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.118	0.941	0.548	0.	0.	0.	0.

Problem 121	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	150	150	122	0	0	0	0	0
normalized size	1	1.	0.81	0.	0.	0.	0.	0.
time (sec)	N/A	0.114	0.043	0.525	0.	0.	0.	0.

Problem 122	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	69	69	56	0	0	0	0	0
normalized size	1	1.	0.81	0.	0.	0.	0.	0.
time (sec)	N/A	0.025	0.02	0.531	0.	0.	0.	0.

Problem 123	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	14	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.017	0.561	0.434	0.	0.	0.	0.

Problem 124	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-1)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	14	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.015	0.576	0.434	0.	0.	0.	0.

Problem 125	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	F(-2)	F(-1)	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.016	2.626	0.07	0.	0.	0.	0.

Problem 126	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.015	2.929	0.062	0.	0.	0.	0.

Problem 127	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.015	2.204	0.066	0.	0.	0.	0.

Problem 128	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.015	2.192	0.059	0.	0.	0.	0.

Problem 129	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	14	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.016	0.798	0.758	0.	0.	0.	0.

Problem 130	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	167	167	132	0	0	0	0	0
normalized size	1	1.	0.79	0.	0.	0.	0.	0.
time (sec)	N/A	0.177	0.088	0.144	0.	0.	0.	0.

Problem 131	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	171	171	137	0	0	0	0	0
normalized size	1	1.	0.8	0.	0.	0.	0.	0.
time (sec)	N/A	0.166	0.072	0.154	0.	0.	0.	0.

Problem 132	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	C	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	85	85	75	138	0	0	0	0
normalized size	1	1.	0.88	1.62	0.	0.	0.	0.
time (sec)	N/A	0.082	0.019	0.117	0.	0.	0.	0.

Problem 133	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	C	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	79	79	73	240	0	0	0	0
normalized size	1	1.	0.92	3.04	0.	0.	0.	0.
time (sec)	N/A	0.055	0.035	0.082	0.	0.	0.	0.

Problem 134	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.015	0.278	0.102	0.	0.	0.	0.

Problem 135	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	12	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.016	0.525	0.072	0.	0.	0.	0.

Problem 136	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	F(-1)	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.021	3.571	0.089	0.	0.	0.	0.

Problem 137	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.017	4.269	0.07	0.	0.	0.	0.

Problem 138	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.018	1.552	0.069	0.	0.	0.	0.

Problem 139	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	F(-1)	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.021	1.9	0.069	0.	0.	0.	0.

Problem 140	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	76	76	81	72	111	139	80	163
normalized size	1	1.	1.07	0.95	1.46	1.83	1.05	2.14
time (sec)	N/A	0.035	0.03	0.005	1.591	1.436	2.371	1.37

Problem 141	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	60	60	49	64	80	119	65	100
normalized size	1	1.	0.82	1.07	1.33	1.98	1.08	1.67
time (sec)	N/A	0.039	0.039	0.003	1.686	1.53	0.922	1.347

Problem 142	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	51	51	56	52	82	111	54	86
normalized size	1	1.	1.1	1.02	1.61	2.18	1.06	1.69
time (sec)	N/A	0.019	0.019	0.003	1.598	1.484	0.435	1.316

Problem 143	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	30	30	30	30	39	73	26	39
normalized size	1	1.	1.	1.	1.3	2.43	0.87	1.3
time (sec)	N/A	0.014	0.012	0.003	1.517	1.459	0.17	1.286

Problem 144	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	63	63	52	122	0	0	0	0
normalized size	1	1.	0.83	1.94	0.	0.	0.	0.
time (sec)	N/A	0.07	0.032	0.03	0.	0.	0.	0.

Problem 145	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	33	33	36	43	63	140	39	439
normalized size	1	1.	1.09	1.3	1.91	4.24	1.18	13.3
time (sec)	N/A	0.027	0.003	0.004	1.505	1.552	3.323	1.583

Problem 146	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	39	39	44	50	49	88	61	220
normalized size	1	1.	1.13	1.28	1.26	2.26	1.56	5.64
time (sec)	N/A	0.019	0.013	0.004	1.538	1.489	2.896	1.402

Problem 147	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	62	62	67	65	93	194	119	383
normalized size	1	1.	1.08	1.05	1.5	3.13	1.92	6.18
time (sec)	N/A	0.038	0.018	0.003	1.55	1.663	5.744	2.034

Problem 148	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	102	102	95	126	192	255	170	262
normalized size	1	1.	0.93	1.24	1.88	2.5	1.67	2.57
time (sec)	N/A	0.154	0.189	0.025	1.549	1.436	2.059	1.347

Problem 149	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	76	76	73	120	0	221	126	209
normalized size	1	1.	0.96	1.58	0.	2.91	1.66	2.75
time (sec)	N/A	0.119	0.073	0.023	0.	1.482	1.174	1.3

Problem 150	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	47	47	47	72	97	159	82	101
normalized size	1	1.	1.	1.53	2.06	3.38	1.74	2.15
time (sec)	N/A	0.06	0.04	0.023	1.566	1.555	0.528	1.351

Problem 151	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	B	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	90	90	143	319	0	0	0	0
normalized size	1	1.	1.59	3.54	0.	0.	0.	0.
time (sec)	N/A	0.123	0.156	0.03	0.	0.	0.	0.

Problem 152	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	81	81	126	171	0	0	0	0
normalized size	1	1.	1.56	2.11	0.	0.	0.	0.
time (sec)	N/A	0.128	0.225	0.056	0.	0.	0.	0.

Problem 153	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	178	178	163	235	369	441	328	497
normalized size	1	1.	0.92	1.32	2.07	2.48	1.84	2.79
time (sec)	N/A	0.297	0.409	0.029	1.888	1.804	3.745	1.458

Problem 154	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	125	125	114	219	0	378	264	385
normalized size	1	1.	0.91	1.75	0.	3.02	2.11	3.08
time (sec)	N/A	0.205	0.148	0.027	0.	1.681	1.893	1.478

Problem 155	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	82	82	77	132	190	262	160	203
normalized size	1	1.	0.94	1.61	2.32	3.2	1.95	2.48
time (sec)	N/A	0.109	0.088	0.024	1.869	1.793	1.209	1.374

Problem 156	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	B	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	123	123	244	592	0	0	0	0
normalized size	1	1.	1.98	4.81	0.	0.	0.	0.
time (sec)	N/A	0.147	0.239	0.026	0.	0.	0.	0.

Problem 157	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	B	B	F	F	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	137	137	283	378	0	0	0	0
normalized size	1	1.	2.07	2.76	0.	0.	0.	0.
time (sec)	N/A	0.213	0.314	0.042	0.	0.	0.	0.

Problem 158	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	121	117	91	102	0	0	0	234
normalized size	1	0.97	0.75	0.84	0.	0.	0.	1.93
time (sec)	N/A	0.254	0.2	0.025	0.	0.	0.	1.302

Problem 159	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	63	63	56	58	0	0	0	116
normalized size	1	1.	0.89	0.92	0.	0.	0.	1.84
time (sec)	N/A	0.132	0.079	0.023	0.	0.	0.	1.288

Problem 160	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	53	53	44	48	0	0	0	66
normalized size	1	1.	0.83	0.91	0.	0.	0.	1.25
time (sec)	N/A	0.067	0.065	0.023	0.	0.	0.	1.412

Problem 161	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.024	0.245	0.145	0.	0.	0.	0.

Problem 162	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.025	2.167	0.243	0.	0.	0.	0.

Problem 163	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F(-1)	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	156	152	125	149	0	0	0	872
normalized size	1	0.97	0.8	0.96	0.	0.	0.	5.59
time (sec)	N/A	0.182	0.531	0.037	0.	0.	0.	1.403

Problem 164	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F(-1)	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	90	90	79	77	0	0	0	440
normalized size	1	1.	0.88	0.86	0.	0.	0.	4.89
time (sec)	N/A	0.1	0.266	0.027	0.	0.	0.	1.413

Problem 165	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F(-1)	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	86	82	72	76	0	0	0	259
normalized size	1	0.95	0.84	0.88	0.	0.	0.	3.01
time (sec)	N/A	0.169	0.156	0.03	0.	0.	0.	1.359

Problem 166	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-1)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.023	3.985	0.184	0.	0.	0.	0.

Problem 167	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-1)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.023	33.323	0.339	0.	0.	0.	0.

Problem 168	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	197	245	168	290	0	0	0	2078
normalized size	1	1.24	0.85	1.47	0.	0.	0.	10.55
time (sec)	N/A	0.542	0.861	0.034	0.	0.	0.	1.705

Problem 169	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	130	130	108	157	0	0	0	1166
normalized size	1	1.	0.83	1.21	0.	0.	0.	8.97
time (sec)	N/A	0.323	0.33	0.027	0.	0.	0.	1.687

Problem 170	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	A	F	F	F	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	111	111	93	138	0	0	0	651
normalized size	1	1.	0.84	1.24	0.	0.	0.	5.86
time (sec)	N/A	0.172	0.418	0.03	0.	0.	0.	1.426

Problem 171	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.023	2.128	0.276	0.	0.	0.	0.

Problem 172	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	16	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.023	17.855	0.5	0.	0.	0.	0.

Problem 173	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	242	242	246	356	0	0	0	531
normalized size	1	1.	1.02	1.47	0.	0.	0.	2.19
time (sec)	N/A	0.756	0.304	0.083	0.	0.	0.	2.105

Problem 174	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	137	137	141	173	0	0	0	236
normalized size	1	1.	1.03	1.26	0.	0.	0.	1.72
time (sec)	N/A	0.453	0.072	0.052	0.	0.	0.	1.805

Problem 175	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	120	120	119	178	0	0	0	266
normalized size	1	1.	0.99	1.48	0.	0.	0.	2.22
time (sec)	N/A	0.331	0.089	0.043	0.	0.	0.	1.687

Problem 176	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.046	3.254	0.128	0.	0.	0.	0.

Problem 177	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.037	11.4	0.165	0.	0.	0.	0.

Problem 178	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	B	F	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	313	313	245	540	0	0	0	1740
normalized size	1	1.	0.78	1.73	0.	0.	0.	5.56
time (sec)	N/A	1.046	0.285	0.105	0.	0.	0.	3.5

Problem 179	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	172	172	126	267	0	0	0	757
normalized size	1	1.	0.73	1.55	0.	0.	0.	4.4
time (sec)	N/A	0.525	0.059	0.092	0.	0.	0.	2.23

Problem 180	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	B	F	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	159	159	291	270	0	0	0	879
normalized size	1	1.	1.83	1.7	0.	0.	0.	5.53
time (sec)	N/A	0.281	2.796	0.056	0.	0.	0.	2.469

Problem 181	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.045	2.901	0.11	0.	0.	0.	0.

Problem 182	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.042	10.143	0.169	0.	0.	0.	0.

Problem 183	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	B	F	F(-2)	F(-1)	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	358	358	228	792	0	0	0	3357
normalized size	1	1.	0.64	2.21	0.	0.	0.	9.38
time (sec)	N/A	1.409	0.273	0.118	0.	0.	0.	5.104

Problem 184	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	B	F	F(-2)	F(-1)	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	216	216	141	394	0	0	0	1570
normalized size	1	1.	0.65	1.82	0.	0.	0.	7.27
time (sec)	N/A	0.743	0.095	0.068	0.	0.	0.	2.798

Problem 185	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	B	F	F(-2)	F(-1)	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	179	179	379	393	0	0	0	1578
normalized size	1	1.	2.12	2.2	0.	0.	0.	8.82
time (sec)	N/A	0.502	2.899	0.067	0.	0.	0.	3.193

Problem 186	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	F(-2)	F(-1)	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.044	3.06	0.101	0.	0.	0.	0.

Problem 187	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	F(-2)	F(-1)	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.043	10.216	0.161	0.	0.	0.	0.

Problem 188	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	223	223	228	168	0	0	0	428
normalized size	1	1.	1.02	0.75	0.	0.	0.	1.92
time (sec)	N/A	0.421	0.266	0.058	0.	0.	0.	2.271

Problem 189	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	99	99	123	80	0	0	0	178
normalized size	1	1.	1.24	0.81	0.	0.	0.	1.8
time (sec)	N/A	0.176	0.061	0.038	0.	0.	0.	1.992

Problem 190	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F	F(-2)	F	C
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	101	101	121	83	0	0	0	215
normalized size	1	1.	1.2	0.82	0.	0.	0.	2.13
time (sec)	N/A	0.091	0.087	0.029	0.	0.	0.	1.912

Problem 191	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.037	2.866	0.082	0.	0.	0.	0.

Problem 192	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.037	11.63	0.137	0.	0.	0.	0.

Problem 193	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	250	250	343	295	0	0	0	0
normalized size	1	1.	1.37	1.18	0.	0.	0.	0.
time (sec)	N/A	0.418	0.443	0.066	0.	0.	0.	0.

Problem 194	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	130	130	155	143	0	0	0	0
normalized size	1	1.	1.19	1.1	0.	0.	0.	0.
time (sec)	N/A	0.163	0.145	0.045	0.	0.	0.	0.

Problem 195	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	137	137	167	149	0	0	0	0
normalized size	1	1.	1.22	1.09	0.	0.	0.	0.
time (sec)	N/A	0.294	0.298	0.042	0.	0.	0.	0.

Problem 196	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.044	3.458	0.079	0.	0.	0.	0.

Problem 197	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.043	11.405	0.158	0.	0.	0.	0.

Problem 198	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	B	F	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	291	291	370	660	0	0	0	0
normalized size	1	1.	1.27	2.27	0.	0.	0.	0.
time (sec)	N/A	1.007	1.855	0.088	0.	0.	0.	0.

Problem 199	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	B	F	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	180	180	173	311	0	0	0	0
normalized size	1	1.	0.96	1.73	0.	0.	0.	0.
time (sec)	N/A	0.506	1.231	0.059	0.	0.	0.	0.

Problem 200	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	B	F	F(-2)	F	F
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD
size	163	163	214	325	0	0	0	0
normalized size	1	1.	1.31	1.99	0.	0.	0.	0.
time (sec)	N/A	0.276	0.852	0.053	0.	0.	0.	0.

Problem 201	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	F(-2)	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.045	3.613	0.073	0.	0.	0.	0.

Problem 202	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	F(-2)	F(-1)	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	18	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.045	11.448	0.161	0.	0.	0.	0.

Problem 203	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F	F(-1)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	120	120	100	144	0	0	0	0
normalized size	1	1.	0.83	1.2	0.	0.	0.	0.
time (sec)	N/A	0.076	0.039	0.036	0.	0.	0.	0.

Problem 204	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	124	124	66	138	0	0	82	0
normalized size	1	1.	0.53	1.11	0.	0.	0.66	0.
time (sec)	N/A	0.098	0.025	0.01	0.	0.	163.098	0.

Problem 205	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	88	88	66	119	0	0	76	0
normalized size	1	1.	0.75	1.35	0.	0.	0.86	0.
time (sec)	N/A	0.045	0.017	0.008	0.	0.	4.419	0.

Problem 206	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F	F(-2)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	89	89	45	98	0	0	0	0
normalized size	1	1.	0.51	1.1	0.	0.	0.	0.
time (sec)	N/A	0.078	0.015	0.009	0.	0.	0.	0.

Problem 207	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F	F(-2)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	55	55	40	85	0	0	0	0
normalized size	1	1.	0.73	1.55	0.	0.	0.	0.
time (sec)	N/A	0.038	0.013	0.009	0.	0.	0.	0.

Problem 208	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	C	A	F(-2)	F	F(-2)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	125	125	42	129	0	0	0	0
normalized size	1	1.	0.34	1.03	0.	0.	0.	0.
time (sec)	N/A	0.097	0.015	0.013	0.	0.	0.	0.

Problem 209	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	F	F(-2)	F	F(-1)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	109	109	90	0	0	0	0	0
normalized size	1	1.	0.83	0.	0.	0.	0.	0.
time (sec)	N/A	0.141	0.061	0.158	0.	0.	0.	0.

Problem 210	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	F	F(-2)	F	F(-1)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	109	109	90	0	0	0	0	0
normalized size	1	1.	0.83	0.	0.	0.	0.	0.
time (sec)	N/A	0.141	0.056	0.143	0.	0.	0.	0.

Problem 211	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	F	F(-2)	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	109	109	90	0	0	0	0	0
normalized size	1	1.	0.83	0.	0.	0.	0.	0.
time (sec)	N/A	0.143	0.052	0.184	0.	0.	0.	0.

Problem 212	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	F	F(-2)	F	F(-2)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	107	107	90	0	0	0	0	0
normalized size	1	1.	0.84	0.	0.	0.	0.	0.
time (sec)	N/A	0.13	0.049	0.358	0.	0.	0.	0.

Problem 213	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	F	F(-2)	F	F(-2)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	105	105	87	0	0	0	0	0
normalized size	1	1.	0.83	0.	0.	0.	0.	0.
time (sec)	N/A	0.135	0.047	0.154	0.	0.	0.	0.

Problem 214	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	A	A	A	F	F(-2)	F	F(-2)	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD
size	109	109	87	0	0	0	0	0
normalized size	1	1.	0.8	0.	0.	0.	0.	0.
time (sec)	N/A	0.145	0.054	0.144	0.	0.	0.	0.

Problem 215	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	F(-1)	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	68	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.17	36.379	0.144	0.	0.	0.	0.

Problem 216	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	F	A	F(-2)	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	66	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.168	180.002	0.142	0.	0.	0.	0.

Problem 217	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	F(-2)	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	64	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.16	8.126	0.199	0.	0.	0.	0.

Problem 218	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	F(-2)	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	64	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.159	7.576	0.145	0.	0.	0.	0.

Problem 219	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	F(-2)	A	F(-2)	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	66	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.173	13.129	0.139	0.	0.	0.	0.

Problem 220	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	20	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.03	2.676	0.093	0.	0.	0.	0.

Problem 221	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	20	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.026	2.565	0.092	0.	0.	0.	0.

Problem 222	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	20	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.029	0.769	0.1	0.	0.	0.	0.

Problem 223	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	20	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.032	3.841	0.099	0.	0.	0.	0.

Problem 224	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	20	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.029	5.683	0.098	0.	0.	0.	0.

Problem 225	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	20	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.026	4.897	0.095	0.	0.	0.	0.

Problem 226	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	20	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.025	8.376	0.102	0.	0.	0.	0.

Problem 227	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac
grade	N/A	A	A	A	A	A	A	A
verified	N/A	N/A	N/A	TBD	TBD	TBD	TBD	TBD
size	20	0	0	0	0	0	0	0
normalized size	1	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.028	13.561	0.092	0.	0.	0.	0.

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 [30] had the largest ratio of [1.]

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	4	3	1.	8	0.375
2	A	4	3	1.	8	0.375
3	A	4	3	1.	8	0.375
4	A	3	3	1.	6	0.5
5	A	2	2	1.	4	0.5
6	A	5	5	1.	8	0.625
7	A	4	4	1.	8	0.5
8	A	2	2	1.	8	0.25
9	A	5	5	1.	8	0.625
10	A	3	3	1.	8	0.375
11	A	6	5	1.	8	0.625
12	A	7	5	1.	10	0.5
13	A	6	4	1.	10	0.4
14	A	5	5	1.	10	0.5
15	A	4	4	1.	8	0.5
16	A	3	3	1.	6	0.5
17	A	6	6	1.	10	0.6
18	A	7	5	1.	10	0.5
19	A	3	3	1.	10	0.3
20	A	9	7	1.	10	0.7
21	A	5	5	1.	10	0.5
22	A	14	7	1.	10	0.7
23	A	11	5	1.	10	0.5
24	A	9	7	1.	10	0.7
25	A	6	5	1.	8	0.625
26	A	4	3	1.	6	0.5
27	A	7	7	1.	10	0.7
28	A	9	6	1.	10	0.6
29	A	7	7	1.	10	0.7
30	A	14	10	1.	10	1.
31	A	10	9	1.	10	0.9

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
32	A	23	4	1.	10	0.4
33	A	19	6	1.	10	0.6
34	A	14	4	1.	10	0.4
35	A	11	6	1.	10	0.6
36	A	7	4	1.	8	0.5
37	A	5	3	1.	6	0.5
38	A	8	7	1.	10	0.7
39	A	11	7	1.	10	0.7
40	A	8	8	1.	10	0.8
41	A	19	10	1.	10	1.
42	A	7	3	1.	10	0.3
43	A	6	3	1.	10	0.3
44	A	6	3	1.	10	0.3
45	A	5	3	1.	10	0.3
46	A	5	3	1.	10	0.3
47	A	4	4	1.	8	0.5
48	A	2	2	1.	6	0.333
49	A	0	0	0.	0	0.
50	A	0	0	0.	0	0.
51	A	6	2	1.	10	0.2
52	A	5	2	1.	10	0.2
53	A	5	2	1.	10	0.2
54	A	4	2	1.	10	0.2
55	A	4	2	1.	10	0.2
56	A	2	2	1.	8	0.25
57	A	3	3	1.	6	0.5
58	A	0	0	0.	0	0.
59	A	0	0	0.	0	0.
60	A	14	5	1.	10	0.5
61	A	12	6	1.	10	0.6
62	A	10	6	1.	10	0.6
63	A	7	7	1.	8	0.875

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
64	A	4	4	1.	6	0.667
65	A	0	0	0.	0	0.
66	A	0	0	0.	0	0.
67	A	12	4	1.	10	0.4
68	A	9	4	1.	10	0.4
69	A	10	6	1.	10	0.6
70	A	5	5	1.	8	0.625
71	A	5	4	1.	6	0.667
72	A	0	0	0.	0	0.
73	A	0	0	0.	0	0.
74	A	10	5	1.	12	0.417
75	A	8	5	1.	12	0.417
76	A	8	5	1.	12	0.417
77	A	6	5	1.	10	0.5
78	A	4	4	1.	8	0.5
79	A	0	0	0.	0	0.
80	A	23	8	1.32	12	0.667
81	A	16	8	1.	12	0.667
82	A	13	8	1.	12	0.667
83	A	8	8	1.	10	0.8
84	A	5	5	1.	8	0.625
85	A	0	0	0.	0	0.
86	A	26	8	1.13	12	0.667
87	A	18	7	1.	12	0.583
88	A	15	8	1.	12	0.667
89	A	9	7	1.	10	0.7
90	A	6	5	1.	8	0.625
91	A	0	0	0.	0	0.
92	A	9	4	1.	12	0.333
93	A	7	4	1.	12	0.333
94	A	7	4	1.	12	0.333
95	A	5	5	1.	10	0.5

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
96	A	3	3	1.	8	0.375
97	A	0	0	0.	0	0.
98	A	0	0	0.	0	0.
99	A	10	3	1.	12	0.25
100	A	8	3	1.	12	0.25
101	A	8	3	1.	12	0.25
102	A	6	3	1.	12	0.25
103	A	6	3	1.	12	0.25
104	A	3	3	1.	10	0.3
105	A	4	4	1.	8	0.5
106	A	0	0	0.	0	0.
107	A	19	6	1.37	12	0.5
108	A	15	7	1.	12	0.583
109	A	13	7	1.	12	0.583
110	A	8	8	1.	10	0.8
111	A	5	5	1.	8	0.625
112	A	0	0	0.	0	0.
113	A	17	5	1.	12	0.417
114	A	12	5	1.	12	0.417
115	A	13	7	1.	12	0.583
116	A	6	6	1.	10	0.6
117	A	6	5	1.	8	0.625
118	A	0	0	0.	0	0.
119	A	0	0	0.	0	0.
120	A	0	0	0.	0	0.
121	A	2	2	1.	12	0.167
122	A	2	2	1.	10	0.2
123	A	0	0	0.	0	0.
124	A	0	0	0.	0	0.
125	A	0	0	0.	0	0.
126	A	0	0	0.	0	0.
127	A	0	0	0.	0	0.

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
128	A	0	0	0.	0	0.
129	A	0	0	0.	0	0.
130	A	9	4	1.	10	0.4
131	A	9	4	1.	10	0.4
132	A	6	5	1.	8	0.625
133	A	4	3	1.	6	0.5
134	A	0	0	0.	0	0.
135	A	0	0	0.	0	0.
136	A	0	0	0.	0	0.
137	A	0	0	0.	0	0.
138	A	0	0	0.	0	0.
139	A	0	0	0.	0	0.
140	A	4	3	1.	12	0.25
141	A	4	3	1.	12	0.25
142	A	3	3	1.	10	0.3
143	A	3	2	1.	8	0.25
144	A	5	5	1.	12	0.417
145	A	4	4	1.	12	0.333
146	A	2	2	1.	12	0.167
147	A	5	5	1.	12	0.417
148	A	5	5	1.	14	0.357
149	A	4	4	1.	12	0.333
150	A	3	3	1.	10	0.3
151	A	6	6	1.	14	0.429
152	A	7	5	1.	14	0.357
153	A	10	7	1.	14	0.5
154	A	6	5	1.	12	0.417
155	A	5	3	1.	10	0.3
156	A	7	7	1.	14	0.5
157	A	9	6	1.	14	0.429
158	A	9	5	0.97	14	0.357
159	A	6	6	1.	12	0.5

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
160	A	4	4	1.	10	0.4
161	A	0	0	0.	0	0.
162	A	0	0	0.	0	0.
163	A	8	4	0.97	14	0.286
164	A	4	4	1.	12	0.333
165	A	5	5	0.95	10	0.5
166	A	0	0	0.	0	0.
167	A	0	0	0.	0	0.
168	A	16	8	1.24	14	0.571
169	A	9	9	1.	12	0.75
170	A	6	6	1.	10	0.6
171	A	0	0	0.	0	0.
172	A	0	0	0.	0	0.
173	A	14	8	1.	16	0.5
174	A	9	8	1.	14	0.571
175	A	7	7	1.	12	0.583
176	A	0	0	0.	0	0.
177	A	0	0	0.	0	0.
178	A	22	11	1.	16	0.688
179	A	11	11	1.	14	0.786
180	A	8	8	1.	12	0.667
181	A	0	0	0.	0	0.
182	A	0	0	0.	0	0.
183	A	24	11	1.	16	0.688
184	A	12	10	1.	14	0.714
185	A	9	8	1.	12	0.667
186	A	0	0	0.	0	0.
187	A	0	0	0.	0	0.
188	A	13	7	1.	16	0.438
189	A	8	8	1.	14	0.571
190	A	6	6	1.	12	0.5
191	A	0	0	0.	0	0.

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
192	A	0	0	0.	0	0.
193	A	12	6	1.	16	0.375
194	A	6	6	1.	14	0.429
195	A	7	7	1.	12	0.583
196	A	0	0	0.	0	0.
197	A	0	0	0.	0	0.
198	A	22	10	1.	16	0.625
199	A	11	11	1.	14	0.786
200	A	8	8	1.	12	0.667
201	A	0	0	0.	0	0.
202	A	0	0	0.	0	0.
203	A	5	4	1.	16	0.25
204	A	7	7	1.	16	0.438
205	A	4	4	1.	16	0.25
206	A	6	6	1.	16	0.375
207	A	3	3	1.	16	0.188
208	A	7	7	1.	16	0.438
209	A	2	2	1.	18	0.111
210	A	2	2	1.	18	0.111
211	A	2	2	1.	18	0.111
212	A	2	2	1.	18	0.111
213	A	2	2	1.	18	0.111
214	A	2	2	1.	18	0.111
215	A	0	0	0.	0	0.
216	A	0	0	0.	0	0.
217	A	0	0	0.	0	0.
218	A	0	0	0.	0	0.
219	A	0	0	0.	0	0.
220	A	0	0	0.	0	0.
221	A	0	0	0.	0	0.
222	A	0	0	0.	0	0.
223	A	0	0	0.	0	0.

Continued on next page

Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
224	A	0	0	0.	0	0.
225	A	0	0	0.	0	0.
226	A	0	0	0.	0	0.
227	A	0	0	0.	0	0.

Chapter 3

Listing of integrals

3.1 $\int x^4 \sin^{-1}(ax)\,dx$

Optimal. Leaf size=75

$$\frac{\left(1-a^2x^2\right)^{5/2}}{25a^5}-\frac{2\left(1-a^2x^2\right)^{3/2}}{15a^5}+\frac{\sqrt{1-a^2x^2}}{5a^5}+\frac{1}{5}x^5\sin^{-1}(ax)$$

```
[Out] Sqrt[1 - a^2*x^2]/(5*a^5) - (2*(1 - a^2*x^2)^(3/2))/(15*a^5) + (1 - a^2*x^2
)^(5/2)/(25*a^5) + (x^5*ArcSin[a*x])/5
```

Rubi [A] time = 0.0489039, antiderivative size = 75, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.375, Rules used = {4627, 266, 43}

$$\frac{\left(1-a^2x^2\right)^{5/2}}{25a^5}-\frac{2\left(1-a^2x^2\right)^{3/2}}{15a^5}+\frac{\sqrt{1-a^2x^2}}{5a^5}+\frac{1}{5}x^5\sin^{-1}(ax)$$

Antiderivative was successfully verified.

```
[In] Int[x^4*ArcSin[a*x],x]
```

```
[Out] Sqrt[1 - a^2*x^2]/(5*a^5) - (2*(1 - a^2*x^2)^(3/2))/(15*a^5) + (1 - a^2*x^2
)^(5/2)/(25*a^5) + (x^5*ArcSin[a*x])/5
```

Rule 4627

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

Rule 266

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rubi steps

$$
\begin{aligned}
\int x^4 \sin^{-1}(ax)\,dx &= \frac{1}{5}x^5\sin^{-1}(ax) - \frac{1}{5}a\int \frac{x^5}{\sqrt{1-a^2x^2}}\,dx\\
&= \frac{1}{5}x^5\sin^{-1}(ax) - \frac{1}{10}a\,\text{Subst}\left(\int \frac{x^2}{\sqrt{1-a^2x}}\,dx, x, x^2\right)\\
&= \frac{1}{5}x^5\sin^{-1}(ax) - \frac{1}{10}a\,\text{Subst}\left(\int\left(\frac{1}{a^4\sqrt{1-a^2x}} - \frac{2\sqrt{1-a^2x}}{a^4} + \frac{\left(1-a^2x\right)^{3/2}}{a^4}\right)dx, x, x^2\right)\\
&= \frac{\sqrt{1-a^2x^2}}{5a^5} - \frac{2\left(1-a^2x^2\right)^{3/2}}{15a^5} + \frac{\left(1-a^2x^2\right)^{5/2}}{25a^5} + \frac{1}{5}x^5\sin^{-1}(ax)
\end{aligned}
$$

Mathematica [A] time = 0.0320767, size = 51, normalized size = 0.68

$$\frac{\sqrt{1-a^2x^2}\left(3a^4x^4+4a^2x^2+8\right)}{75a^5} + \frac{1}{5}x^5\sin^{-1}(ax)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4*ArcSin[a*x],x]
```

```
[Out] (Sqrt[1 - a^2*x^2]*(8 + 4*a^2*x^2 + 3*a^4*x^4))/(75*a^5) + (x^5*ArcSin[a*x]
)/5
```

Maple [A] time = 0.032, size = 72, normalized size = 1.

$$\frac{1}{a^5}\left(\frac{a^5x^5\arcsin(ax)}{5}+\frac{a^4x^4}{25}\sqrt{-a^2x^2+1}+\frac{4\,a^2x^2}{75}\sqrt{-a^2x^2+1}+\frac{8}{75}\sqrt{-a^2x^2+1}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*arcsin(a*x),x)
```

```
[Out] 1/a^5*(1/5*a^5*x^5*arcsin(a*x)+1/25*a^4*x^4*(-a^2*x^2+1)^(1/2)+4/75*a^2*x^2
*(-a^2*x^2+1)^(1/2)+8/75*(-a^2*x^2+1)^(1/2))
```

Maxima [A] time = 1.68565, size = 96, normalized size = 1.28

$$\frac{1}{5}\,x^5\arcsin(ax)+\frac{1}{75}\left(\frac{3\,\sqrt{-a^2x^2+1}x^4}{a^2}+\frac{4\,\sqrt{-a^2x^2+1}x^2}{a^4}+\frac{8\,\sqrt{-a^2x^2+1}}{a^6}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x),x, algorithm="maxima")
```

```
[Out] 1/5*x^5*arcsin(a*x) + 1/75*(3*sqrt(-a^2*x^2 + 1)*x^4/a^2 + 4*sqrt(-a^2*x^2
+ 1)*x^2/a^4 + 8*sqrt(-a^2*x^2 + 1)/a^6)*a
```

Fricas [A] time = 2.13446, size = 113, normalized size = 1.51

$$\frac{15\,a^5x^5\arcsin(ax)+\left(3\,a^4x^4+4\,a^2x^2+8\right)\sqrt{-a^2x^2+1}}{75\,a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x),x, algorithm="fricas")
```

```
[Out] 1/75*(15*a^5*x^5*arcsin(a*x) + (3*a^4*x^4 + 4*a^2*x^2 + 8)*sqrt(-a^2*x^2 +
1))/a^5
```

Sympy [A] time = 7.08271, size = 70, normalized size = 0.93

$$\begin{cases} \frac{x^5 \operatorname{asin}{(ax)}}{5} + \frac{x^4\sqrt{-a^2x^2+1}}{25a} + \frac{4x^2\sqrt{-a^2x^2+1}}{75a^3} + \frac{8\sqrt{-a^2x^2+1}}{75a^5} & \text{for}\ a \neq 0 \\ 0 & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*asin(a*x),x)
```

```
[Out] Piecewise((x**5*asin(a*x)/5 + x**4*sqrt(-a**2*x**2 + 1)/(25*a) + 4*x**2*sqr
t(-a**2*x**2 + 1)/(75*a**3) + 8*sqrt(-a**2*x**2 + 1)/(75*a**5), Ne(a, 0)),
(0, True))
```

Giac [A] time = 1.2218, size = 153, normalized size = 2.04

$$\frac{\left(a^2x^2-1\right)^2 x \arcsin(ax)}{5\,a^4} + \frac{2\left(a^2x^2-1\right)x \arcsin(ax)}{5\,a^4} + \frac{x \arcsin(ax)}{5\,a^4} + \frac{\left(a^2x^2-1\right)^2\sqrt{-a^2x^2+1}}{25\,a^5} - \frac{2\left(-a^2x^2+1\right)^{\frac{3}{2}}}{15\,a^5} +$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x),x, algorithm="giac")
```

```
[Out] 1/5*(a^2*x^2 - 1)^2*x*arcsin(a*x)/a^4 + 2/5*(a^2*x^2 - 1)*x*arcsin(a*x)/a^4
 + 1/5*x*arcsin(a*x)/a^4 + 1/25*(a^2*x^2 - 1)^2*sqrt(-a^2*x^2 + 1)/a^5 - 2/
15*(-a^2*x^2 + 1)^(3/2)/a^5 + 1/5*sqrt(-a^2*x^2 + 1)/a^5
```

3.2 $\int x^3 \sin^{-1}(ax)\,dx$

Optimal. Leaf size=69

$$\frac{x^3\sqrt{1-a^2x^2}}{16a}+\frac{3x\sqrt{1-a^2x^2}}{32a^3}-\frac{3\sin^{-1}(ax)}{32a^4}+\frac{1}{4}x^4\sin^{-1}(ax)$$

```
[Out] (3*x*Sqrt[1 - a^2*x^2])/(32*a^3) + (x^3*Sqrt[1 - a^2*x^2])/(16*a) - (3*ArcS
in[a*x])/(32*a^4) + (x^4*ArcSin[a*x])/4
```

Rubi [A] time = 0.0285116, antiderivative size = 69, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.375, Rules used = {4627, 321, 216}

$$\frac{x^3\sqrt{1-a^2x^2}}{16a}+\frac{3x\sqrt{1-a^2x^2}}{32a^3}-\frac{3\sin^{-1}(ax)}{32a^4}+\frac{1}{4}x^4\sin^{-1}(ax)$$

Antiderivative was successfully verified.

```
[In] Int[x^3*ArcSin[a*x],x]
```

```
[Out] (3*x*Sqrt[1 - a^2*x^2])/(32*a^3) + (x^3*Sqrt[1 - a^2*x^2])/(16*a) - (3*ArcS
in[a*x])/(32*a^4) + (x^4*ArcSin[a*x])/4
```

Rule 4627

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

Rule 321

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

Rule 216

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

Rubi steps

$$\begin{aligned}
\int x^3\sin^{-1}(ax)\,dx &= \frac{1}{4}x^4\sin^{-1}(ax) - \frac{1}{4}a\int \frac{x^4}{\sqrt{1-a^2x^2}}\,dx \\
&= \frac{x^3\sqrt{1-a^2x^2}}{16a} + \frac{1}{4}x^4\sin^{-1}(ax) - \frac{3\int \frac{x^2}{\sqrt{1-a^2x^2}}\,dx}{16a} \\
&= \frac{3x\sqrt{1-a^2x^2}}{32a^3} + \frac{x^3\sqrt{1-a^2x^2}}{16a} + \frac{1}{4}x^4\sin^{-1}(ax) - \frac{3\int \frac{1}{\sqrt{1-a^2x^2}}\,dx}{32a^3} \\
&= \frac{3x\sqrt{1-a^2x^2}}{32a^3} + \frac{x^3\sqrt{1-a^2x^2}}{16a} - \frac{3\sin^{-1}(ax)}{32a^4} + \frac{1}{4}x^4\sin^{-1}(ax)
\end{aligned}$$

Mathematica [A] time = 0.0185745, size = 50, normalized size = 0.72

$$\frac{ax\sqrt{1-a^2x^2}\left(2a^2x^2+3\right)+\left(8a^4x^4-3\right)\sin^{-1}(ax)}{32a^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*ArcSin[a*x],x]
```

```
[Out] (a*x*Sqrt[1 - a^2*x^2]*(3 + 2*a^2*x^2) + (-3 + 8*a^4*x^4)*ArcSin[a*x])/(32*
a^4)
```

Maple [A] time = 0.004, size = 60, normalized size = 0.9

$$\frac{1}{a^4}\left(\frac{a^4x^4\arcsin(ax)}{4}+\frac{a^3x^3}{16}\sqrt{-a^2x^2+1}+\frac{3\,ax}{32}\sqrt{-a^2x^2+1}-\frac{3\arcsin(ax)}{32}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*arcsin(a*x),x)
```

```
[Out] 1/a^4*(1/4*a^4*x^4*arcsin(a*x)+1/16*a^3*x^3*(-a^2*x^2+1)^(1/2)+3/32*a*x*(-a
^2*x^2+1)^(1/2)-3/32*arcsin(a*x))
```

Maxima [A] time = 1.7267, size = 99, normalized size = 1.43

$$\frac{1}{4}\,x^{4}\arcsin\left(ax\right)+\frac{1}{32}\left(\frac{2\,\sqrt{-a^{2}x^{2}+1}x^{3}}{a^{2}}+\frac{3\,\sqrt{-a^{2}x^{2}+1}x}{a^{4}}-\frac{3\,\arcsin\left(\frac{a^{2}x}{\sqrt{a^{2}}}\right)}{\sqrt{a^{2}}a^{4}}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*x^4*arcsin(a*x) + 1/32*(2*sqrt(-a^2*x^2 + 1)*x^3/a^2 + 3*sqrt(-a^2*x^2
+ 1)*x/a^4 - 3*arcsin(a^2*x/sqrt(a^2))/(sqrt(a^2)*a^4))*a
```

Fricas [A] time = 2.02599, size = 109, normalized size = 1.58

$$\frac{\left(8\,a^{4}x^{4}-3\right)\arcsin\left(ax\right)+\left(2\,a^{3}x^{3}+3\,ax\right)\sqrt{-a^{2}x^{2}+1}}{32\,a^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/32*((8*a^4*x^4 - 3)*arcsin(a*x) + (2*a^3*x^3 + 3*a*x)*sqrt(-a^2*x^2 + 1))
/a^4
```

Sympy [A] time = 1.64484, size = 61, normalized size = 0.88

$$\begin{cases}\frac{x^{4}\operatorname{asin}\left(ax\right)}{4}+\frac{x^{3}\sqrt{-a^{2}x^{2}+1}}{16a}+\frac{3x\sqrt{-a^{2}x^{2}+1}}{32a^{3}}-\frac{3\operatorname{asin}\left(ax\right)}{32a^{4}} & \text{for}\ a\neq 0\\ 0 & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*asin(a*x),x)
```

```
[Out] Piecewise((x**4*asin(a*x)/4 + x**3*sqrt(-a**2*x**2 + 1)/(16*a) + 3*x*sqrt(-
a**2*x**2 + 1)/(32*a**3) - 3*asin(a*x)/(32*a**4), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.44762, size = 113, normalized size = 1.64

$$-\frac{\left(-a^{2}x^{2}+1\right)^{\frac{3}{2}}x}{16\,a^{3}}+\frac{\left(a^{2}x^{2}-1\right)^{2}\arcsin\left(ax\right)}{4\,a^{4}}+\frac{5\,\sqrt{-a^{2}x^{2}+1}x}{32\,a^{3}}+\frac{\left(a^{2}x^{2}-1\right)\arcsin\left(ax\right)}{2\,a^{4}}+\frac{5\,\arcsin\left(ax\right)}{32\,a^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/16*(-a^2*x^2 + 1)^(3/2)*x/a^3 + 1/4*(a^2*x^2 - 1)^2*arcsin(a*x)/a^4 + 5/
32*sqrt(-a^2*x^2 + 1)*x/a^3 + 1/2*(a^2*x^2 - 1)*arcsin(a*x)/a^4 + 5/32*arcs
in(a*x)/a^4
```

3.3 $\int x^2 \sin^{-1}(ax)\,dx$

Optimal. Leaf size=54

$$-\frac{\left(1-a^2x^2\right)^{3/2}}{9a^3}+\frac{\sqrt{1-a^2x^2}}{3a^3}+\frac{1}{3}x^3\sin^{-1}(ax)$$

```
[Out] Sqrt[1 - a^2*x^2]/(3*a^3) - (1 - a^2*x^2)^(3/2)/(9*a^3) + (x^3*ArcSin[a*x])
/3
```

Rubi [A] time = 0.034606, antiderivative size = 54, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.375, Rules used = {4627, 266, 43}

$$-\frac{\left(1-a^2x^2\right)^{3/2}}{9a^3}+\frac{\sqrt{1-a^2x^2}}{3a^3}+\frac{1}{3}x^3\sin^{-1}(ax)$$

Antiderivative was successfully verified.

```
[In] Int[x^2*ArcSin[a*x],x]
```

```
[Out] Sqrt[1 - a^2*x^2]/(3*a^3) - (1 - a^2*x^2)^(3/2)/(9*a^3) + (x^3*ArcSin[a*x])
/3
```

Rule 4627

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

Rule 266

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rubi steps

$$\begin{aligned}
\int x^2 \sin^{-1}(ax)\,dx &= \frac{1}{3}x^3 \sin^{-1}(ax) - \frac{1}{3}a\int \frac{x^3}{\sqrt{1-a^2x^2}}\,dx \\
&= \frac{1}{3}x^3 \sin^{-1}(ax) - \frac{1}{6}a\,\text{Subst}\left(\int \frac{x}{\sqrt{1-a^2x}}\,dx, x, x^2\right) \\
&= \frac{1}{3}x^3 \sin^{-1}(ax) - \frac{1}{6}a\,\text{Subst}\left(\int \left(\frac{1}{a^2\sqrt{1-a^2x}} - \frac{\sqrt{1-a^2x}}{a^2}\right) dx, x, x^2\right) \\
&= \frac{\sqrt{1-a^2x^2}}{3a^3} - \frac{\left(1-a^2x^2\right)^{3/2}}{9a^3} + \frac{1}{3}x^3 \sin^{-1}(ax)
\end{aligned}$$

Mathematica [A] time = 0.0249748, size = 41, normalized size = 0.76

$$\frac{1}{9}\left(\frac{\sqrt{1-a^2x^2}\left(a^2x^2+2\right)}{a^3} + 3x^3\sin^{-1}(ax)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*ArcSin[a*x],x]
```

```
[Out] ((Sqrt[1 - a^2*x^2]*(2 + a^2*x^2))/a^3 + 3*x^3*ArcSin[a*x])/9
```

Maple [A] time = 0.003, size = 52, normalized size = 1.

$$\frac{1}{a^3}\left(\frac{a^3x^3\arcsin(ax)}{3} + \frac{a^2x^2}{9}\sqrt{-a^2x^2+1} + \frac{2}{9}\sqrt{-a^2x^2+1}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*arcsin(a*x),x)
```

```
[Out] 1/a^3*(1/3*a^3*x^3*arcsin(a*x)+1/9*a^2*x^2*(-a^2*x^2+1)^(1/2)+2/9*(-a^2*x^2
+1)^(1/2))
```

Maxima [A] time = 1.70877, size = 68, normalized size = 1.26

$$\frac{1}{3}\,x^{3}\arcsin\left(ax\right)+\frac{1}{9}\,a\left(\frac{\sqrt{-a^{2}x^{2}+1}x^{2}}{a^{2}}+\frac{2\,\sqrt{-a^{2}x^{2}+1}}{a^{4}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*x^3*arcsin(a*x) + 1/9*a*(sqrt(-a^2*x^2 + 1)*x^2/a^2 + 2*sqrt(-a^2*x^2 +
 1)/a^4)
```

Fricas [A] time = 2.13791, size = 92, normalized size = 1.7

$$\frac{3\,a^{3}x^{3}\arcsin\left(ax\right)+\left(a^{2}x^{2}+2\right)\sqrt{-a^{2}x^{2}+1}}{9\,a^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/9*(3*a^3*x^3*arcsin(a*x) + (a^2*x^2 + 2)*sqrt(-a^2*x^2 + 1))/a^3
```

Sympy [A] time = 0.819754, size = 48, normalized size = 0.89

$$\begin{cases}\frac{x^{3}\operatorname{asin}\left(ax\right)}{3}+\frac{x^{2}\sqrt{-a^{2}x^{2}+1}}{9a}+\frac{2\sqrt{-a^{2}x^{2}+1}}{9a^{3}} & \text{for}\: a\neq 0\\0 & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*asin(a*x),x)
```

```
[Out] Piecewise((x**3*asin(a*x)/3 + x**2*sqrt(-a**2*x**2 + 1)/(9*a) + 2*sqrt(-a**
2*x**2 + 1)/(9*a**3), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.30279, size = 86, normalized size = 1.59

$$\frac{\left(a^2x^2-1\right)x\arcsin\left(ax\right)}{3\,a^2}+\frac{x\arcsin\left(ax\right)}{3\,a^2}-\frac{\left(-a^2x^2+1\right)^{\frac{3}{2}}}{9\,a^3}+\frac{\sqrt{-a^2x^2+1}}{3\,a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*(a^2*x^2 - 1)*x*arcsin(a*x)/a^2 + 1/3*x*arcsin(a*x)/a^2 - 1/9*(-a^2*x^2
 + 1)^(3/2)/a^3 + 1/3*sqrt(-a^2*x^2 + 1)/a^3
```

3.4 $\int x \sin^{-1}(ax)\, dx$

Optimal. Leaf size=45

$$\frac{x\sqrt{1-a^2x^2}}{4a}-\frac{\sin^{-1}(ax)}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)$$

```
[Out] (x*Sqrt[1 - a^2*x^2])/(4*a) - ArcSin[a*x]/(4*a^2) + (x^2*ArcSin[a*x])/2
```

Rubi [A] time = 0.0158949, antiderivative size = 45, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4627, 321, 216}

$$\frac{x\sqrt{1-a^2x^2}}{4a}-\frac{\sin^{-1}(ax)}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)$$

Antiderivative was successfully verified.

```
[In] Int[x*ArcSin[a*x],x]
```

```
[Out] (x*Sqrt[1 - a^2*x^2])/(4*a) - ArcSin[a*x]/(4*a^2) + (x^2*ArcSin[a*x])/2
```

Rule 4627

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

Rule 321

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

Rule 216

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

Rubi steps

$$
\begin{aligned}
\int x\sin^{-1}(ax)\,dx &= \frac{1}{2}x^2\sin^{-1}(ax)-\frac{1}{2}a\int\frac{x^2}{\sqrt{1-a^2x^2}}\,dx\\
&= \frac{x\sqrt{1-a^2x^2}}{4a}+\frac{1}{2}x^2\sin^{-1}(ax)-\frac{\int\frac{1}{\sqrt{1-a^2x^2}}\,dx}{4a}\\
&= \frac{x\sqrt{1-a^2x^2}}{4a}-\frac{\sin^{-1}(ax)}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)
\end{aligned}
$$

Mathematica [A] time = 0.0112639, size = 40, normalized size = 0.89

$$\frac{ax\sqrt{1-a^2x^2}+\left(2a^2x^2-1\right)\sin^{-1}(ax)}{4a^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*ArcSin[a*x],x]
```

```
[Out] (a*x*Sqrt[1 - a^2*x^2] + (-1 + 2*a^2*x^2)*ArcSin[a*x])/(4*a^2)
```

Maple [A] time = 0.004, size = 40, normalized size = 0.9

$$\frac{1}{a^2}\left(\frac{a^2x^2\arcsin(ax)}{2}+\frac{ax}{4}\sqrt{-a^2x^2+1}-\frac{\arcsin(ax)}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*arcsin(a*x),x)
```

```
[Out] 1/a^2*(1/2*a^2*x^2*arcsin(a*x)+1/4*a*x*(-a^2*x^2+1)^(1/2)-1/4*arcsin(a*x))
```

Maxima [A] time = 1.67149, size = 70, normalized size = 1.56

$$\frac{1}{2}x^2\arcsin(ax)+\frac{1}{4}a\left(\frac{\sqrt{-a^2x^2+1}x}{a^2}-\frac{\arcsin\left(\frac{a^2x}{\sqrt{a^2}}\right)}{\sqrt{a^2}a^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x),x, algorithm="maxima")
```

```
[Out] 1/2*x^2*arcsin(a*x) + 1/4*a*(sqrt(-a^2*x^2 + 1)*x/a^2 - arcsin(a^2*x/sqrt(a
^2))/(sqrt(a^2)*a^2))
```

Fricas [A] time = 2.20046, size = 86, normalized size = 1.91

$$\frac{\sqrt{-a^2x^2+1}ax+\left(2\,a^2x^2-1\right)\arcsin\left(ax\right)}{4\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x),x, algorithm="fricas")
```

```
[Out] 1/4*(sqrt(-a^2*x^2 + 1)*a*x + (2*a^2*x^2 - 1)*arcsin(a*x))/a^2
```

Sympy [A] time = 0.345889, size = 37, normalized size = 0.82

$$\begin{cases} \frac{x^2\operatorname{asin}\left(ax\right)}{2}+\frac{x\sqrt{-a^2x^2+1}}{4a}-\frac{\operatorname{asin}\left(ax\right)}{4a^2} & \text{for}\ a\neq 0\\ 0 & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*asin(a*x),x)
```

```
[Out] Piecewise((x**2*asin(a*x)/2 + x*sqrt(-a**2*x**2 + 1)/(4*a) - asin(a*x)/(4*a
**2), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.23908, size = 62, normalized size = 1.38

$$\frac{\sqrt{-a^2x^2+1}x}{4\,a}+\frac{\left(a^2x^2-1\right)\arcsin\left(ax\right)}{2\,a^2}+\frac{\arcsin\left(ax\right)}{4\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x),x, algorithm="giac")
```

```
[Out] 1/4*sqrt(-a^2*x^2 + 1)*x/a + 1/2*(a^2*x^2 - 1)*arcsin(a*x)/a^2 + 1/4*arcsin
(a*x)/a^2
```

3.5 $\int \sin^{-1}(ax)\,dx$

Optimal. Leaf size=25

$$\frac{\sqrt{1-a^2x^2}}{a}+x\sin^{-1}(ax)$$

```
[Out] Sqrt[1 - a^2*x^2]/a + x*ArcSin[a*x]
```

Rubi [A] time = 0.0075506, antiderivative size = 25, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 4, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4619, 261}

$$\frac{\sqrt{1-a^2x^2}}{a}+x\sin^{-1}(ax)$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x],x]
```

```
[Out] Sqrt[1 - a^2*x^2]/a + x*ArcSin[a*x]
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 261

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

Rubi steps

$$\begin{aligned}\int \sin^{-1}(ax)\,dx &= x\sin^{-1}(ax)-a\int \frac{x}{\sqrt{1-a^2x^2}}\,dx\\ &= \frac{\sqrt{1-a^2x^2}}{a}+x\sin^{-1}(ax)\end{aligned}$$

Mathematica [A] time = 0.0075927, size = 25, normalized size = 1.

$$\frac{\sqrt{1-a^2x^2}}{a}+x\sin^{-1}(ax)$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x],x]
```

```
[Out] Sqrt[1 - a^2*x^2]/a + x*ArcSin[a*x]
```

Maple [A] time = 0.001, size = 25, normalized size = 1.

$$\frac{1}{a}\left(ax\arcsin(ax)+\sqrt{-a^2x^2+1}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x),x)
```

```
[Out] 1/a*(a*x*arcsin(a*x)+(-a^2*x^2+1)^(1/2))
```

Maxima [A] time = 1.68877, size = 32, normalized size = 1.28

$$\frac{ax\arcsin(ax)+\sqrt{-a^2x^2+1}}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x),x, algorithm="maxima")
```

```
[Out] (a*x*arcsin(a*x) + sqrt(-a^2*x^2 + 1))/a
```

Fricas [A] time = 2.10614, size = 57, normalized size = 2.28

$$\frac{ax\arcsin(ax)+\sqrt{-a^2x^2+1}}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x),x, algorithm="fricas")
```

```
[Out] (a*x*arcsin(a*x) + sqrt(-a^2*x^2 + 1))/a
```

Sympy [A] time = 0.618542, size = 20, normalized size = 0.8

$$\begin{cases} x \operatorname{asin}{\left(ax \right)} + \frac{\sqrt{-a^{2}x^{2}+1}}{a} & \text{for}\: a \neq 0 \\ 0 & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x),x)
```

```
[Out] Piecewise((x*asin(a*x) + sqrt(-a**2*x**2 + 1)/a, Ne(a, 0)), (0, True))
```

Giac [A] time = 1.33051, size = 32, normalized size = 1.28

$$\frac{ax \arcsin\left(ax\right) + \sqrt{-a^{2}x^{2} + 1}}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x),x, algorithm="giac")
```

```
[Out] (a*x*arcsin(a*x) + sqrt(-a^2*x^2 + 1))/a
```

3.6 $\int \frac{\sin^{-1}(ax)}{x}\,dx$

Optimal. Leaf size=51

$$-\frac{1}{2}i\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)-\frac{1}{2}i\sin^{-1}(ax)^2+\sin^{-1}(ax)\log\left(1-e^{2i\sin^{-1}(ax)}\right)$$

```
[Out] (-I/2)*ArcSin[a*x]^2 + ArcSin[a*x]*Log[1 - E^((2*I)*ArcSin[a*x])] - (I/2)*P
olyLog[2, E^((2*I)*ArcSin[a*x])]
```

Rubi [A] time = 0.0584378, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {4625, 3717, 2190, 2279, 2391}

$$-\frac{1}{2}i\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)-\frac{1}{2}i\sin^{-1}(ax)^2+\sin^{-1}(ax)\log\left(1-e^{2i\sin^{-1}(ax)}\right)$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]/x,x]
```

```
[Out] (-I/2)*ArcSin[a*x]^2 + ArcSin[a*x]*Log[1 - E^((2*I)*ArcSin[a*x])] - (I/2)*P
olyLog[2, E^((2*I)*ArcSin[a*x])]
```

Rule 4625

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n/Tan[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Rule 3717

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[(I*(c + d*x)^(m + 1))/(d*(m + 1)), x] - Dist[2*I, Int[((c + d*x)^
m*E^(2*I*k*Pi)*E^(2*I*(e + f*x)))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x))), x],
 x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

Rule 2190

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m*Log[1 + (b*(F^(g*(e + f*x)))^n)/a])/(b*f*g*n*Log[F]), x] - Di
st[(d*m)/(b*f*g*n*Log[F]), Int[(c + d*x)^(m - 1)*Log[1 + (b*(F^(g*(e + f*x)
))^n)/a], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2279

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2391

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> -Simp[PolyLog[2
, -(c*e*x^n)]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{\sin^{-1}(ax)}{x}\,dx &= \text{Subst}\left(\int x\cot(x)\,dx, x, \sin^{-1}(ax)\right)\\
&= -\frac{1}{2}i\sin^{-1}(ax)^2 - 2i\,\text{Subst}\left(\int \frac{e^{2ix}x}{1-e^{2ix}}\,dx, x, \sin^{-1}(ax)\right)\\
&= -\frac{1}{2}i\sin^{-1}(ax)^2 + \sin^{-1}(ax)\log\left(1-e^{2i\sin^{-1}(ax)}\right) - \text{Subst}\left(\int \log\left(1-e^{2ix}\right)\,dx, x, \sin^{-1}(ax)\right)\\
&= -\frac{1}{2}i\sin^{-1}(ax)^2 + \sin^{-1}(ax)\log\left(1-e^{2i\sin^{-1}(ax)}\right) + \frac{1}{2}i\,\text{Subst}\left(\int \frac{\log(1-x)}{x}\,dx, x, e^{2i\sin^{-1}(ax)}\right)\\
&= -\frac{1}{2}i\sin^{-1}(ax)^2 + \sin^{-1}(ax)\log\left(1-e^{2i\sin^{-1}(ax)}\right) - \frac{1}{2}i\text{Li}_2\left(e^{2i\sin^{-1}(ax)}\right)
\end{aligned}$$

Mathematica [A] time = 0.0278319, size = 46, normalized size = 0.9

$$\sin^{-1}(ax)\log\left(1-e^{2i\sin^{-1}(ax)}\right) - \frac{1}{2}i\left(\sin^{-1}(ax)^2 + \text{PolyLog}\left(2, e^{2i\sin^{-1}(ax)}\right)\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]/x,x]
```

```
[Out] ArcSin[a*x]*Log[1 - E^((2*I)*ArcSin[a*x])] - (I/2)*(ArcSin[a*x]^2 + PolyLog
[2, E^((2*I)*ArcSin[a*x])])
```

Maple [A] time = 0.158, size = 111, normalized size = 2.2

$$-\frac{i}{2}\left(\arcsin\left(ax\right)\right)^{2}+\arcsin\left(ax\right)\ln\left(1-iax-\sqrt{-a^{2}x^{2}+1}\right)+\arcsin\left(ax\right)\ln\left(1+iax+\sqrt{-a^{2}x^{2}+1}\right)-i\mathrm{polylog}\left(2,-iax-\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)/x,x)
```

```
[Out] -1/2*I*arcsin(a*x)^2+arcsin(a*x)*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))+arcsin(a*x)
*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))-I*polylog(2,-I*a*x-(-a^2*x^2+1)^(1/2))-I*po
lylog(2,I*a*x+(-a^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin\left(ax\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x,x, algorithm="maxima")
```

```
[Out] integrate(arcsin(a*x)/x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\arcsin\left(ax\right)}{x},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)/x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\mathrm{asin}\left(ax\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)/x,x)
```

```
[Out] Integral(asin(a*x)/x, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin{(ax)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)/x, x)
```

3.7 $\int \frac{\sin^{-1}(ax)}{x^2}\,dx$

Optimal. Leaf size=28

$$-a\tanh^{-1}\left(\sqrt{1-a^2x^2}\right)-\frac{\sin^{-1}(ax)}{x}$$

```
[Out] -(ArcSin[a*x]/x) - a*ArcTanh[Sqrt[1 - a^2*x^2]]
```

Rubi [A] time = 0.0218774, antiderivative size = 28, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4627, 266, 63, 208}

$$-a\tanh^{-1}\left(\sqrt{1-a^2x^2}\right)-\frac{\sin^{-1}(ax)}{x}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]/x^2,x]
```

```
[Out] -(ArcSin[a*x]/x) - a*ArcTanh[Sqrt[1 - a^2*x^2]]
```

Rule 4627

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

Rule 266

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 63

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - (a*d)/b +
(d*x^p)/b)^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 208

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

Rubi steps

$$\begin{aligned}\int \frac{\sin^{-1}(ax)}{x^2}\,dx &= -\frac{\sin^{-1}(ax)}{x}+a\int \frac{1}{x\sqrt{1-a^2x^2}}\,dx\\ &= -\frac{\sin^{-1}(ax)}{x}+\frac{1}{2}a\,\text{Subst}\left(\int \frac{1}{x\sqrt{1-a^2x}}\,dx,x,x^2\right)\\ &= -\frac{\sin^{-1}(ax)}{x}-\frac{\text{Subst}\left(\int \frac{1}{\frac{1}{a^2}-\frac{x^2}{a^2}}\,dx,x,\sqrt{1-a^2x^2}\right)}{a}\\ &= -\frac{\sin^{-1}(ax)}{x}-a\tanh^{-1}\left(\sqrt{1-a^2x^2}\right)\end{aligned}$$

Mathematica [A] time = 0.0023416, size = 28, normalized size = 1.

$$-a\tanh^{-1}\left(\sqrt{1-a^2x^2}\right)-\frac{\sin^{-1}(ax)}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]/x^2,x]
```

```
[Out] -(ArcSin[a*x]/x) - a*ArcTanh[Sqrt[1 - a^2*x^2]]
```

Maple [A] time = 0.003, size = 31, normalized size = 1.1

$$a\left(-\frac{\arcsin(ax)}{ax}-\text{Artanh}\left(\frac{1}{\sqrt{-a^2x^2+1}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)/x^2,x)
```

```
[Out] a*(-arcsin(a*x)/a/x-arctanh(1/(-a^2*x^2+1)^(1/2)))
```

Maxima [A] time = 1.62401, size = 53, normalized size = 1.89

$$-a\log\left(\frac{2\sqrt{-a^2x^2+1}}{|x|}+\frac{2}{|x|}\right)-\frac{\arcsin(ax)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x^2,x, algorithm="maxima")
```

```
[Out] -a*log(2*sqrt(-a^2*x^2 + 1)/abs(x) + 2/abs(x)) - arcsin(a*x)/x
```

Fricas [A] time = 2.23544, size = 124, normalized size = 4.43

$$-\frac{ax\log\left(\sqrt{-a^2x^2+1}+1\right)-ax\log\left(\sqrt{-a^2x^2+1}-1\right)+2\arcsin(ax)}{2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x^2,x, algorithm="fricas")
```

```
[Out] -1/2*(a*x*log(sqrt(-a^2*x^2 + 1) + 1) - a*x*log(sqrt(-a^2*x^2 + 1) - 1) + 2
*arcsin(a*x))/x
```

Sympy [C] time = 4.85904, size = 32, normalized size = 1.14

$$a\left(\begin{cases}-\operatorname{acosh}\left(\frac{1}{ax}\right) & \text{for } \frac{1}{|a^2x^2|}>1\\ i\operatorname{asin}\left(\frac{1}{ax}\right) & \text{otherwise}\end{cases}\right)-\frac{\operatorname{asin}(ax)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)/x**2,x)
```

```
[Out] a*Piecewise((-acosh(1/(a*x)), 1/Abs(a**2*x**2) > 1), (I*asin(1/(a*x)), True
)) - asin(a*x)/x
```

Giac [A] time = 1.47518, size = 65, normalized size = 2.32

$$-\frac{1}{2}\,a\left(\log\left(\sqrt{-a^2x^2+1}+1\right)-\log\left(-\sqrt{-a^2x^2+1}+1\right)\right)-\frac{\arcsin\left(ax\right)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x^2,x, algorithm="giac")
```

```
[Out] -1/2*a*(log(sqrt(-a^2*x^2 + 1) + 1) - log(-sqrt(-a^2*x^2 + 1) + 1)) - arcsi
n(a*x)/x
```

3.8 $\int \frac{\sin^{-1}(ax)}{x^3}\,dx$

Optimal. Leaf size=34

$$-\frac{a\sqrt{1-a^2x^2}}{2x}-\frac{\sin^{-1}(ax)}{2x^2}$$

```
[Out] -(a*Sqrt[1 - a^2*x^2])/(2*x) - ArcSin[a*x]/(2*x^2)
```

Rubi [A] time = 0.01436, antiderivative size = 34, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25, Rules used = {4627, 264}

$$-\frac{a\sqrt{1-a^2x^2}}{2x}-\frac{\sin^{-1}(ax)}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]/x^3,x]
```

```
[Out] -(a*Sqrt[1 - a^2*x^2])/(2*x) - ArcSin[a*x]/(2*x^2)
```

Rule 4627

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

Rule 264

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

Rubi steps

$$\begin{aligned}\int \frac{\sin^{-1}(ax)}{x^3}\,dx &= -\frac{\sin^{-1}(ax)}{2x^2} + \frac{1}{2}a\int \frac{1}{x^2\sqrt{1-a^2x^2}}\,dx \\ &= -\frac{a\sqrt{1-a^2x^2}}{2x} - \frac{\sin^{-1}(ax)}{2x^2}\end{aligned}$$

Mathematica [A] time = 0.0071846, size = 29, normalized size = 0.85

$$-\frac{ax\sqrt{1-a^2x^2}+\sin^{-1}(ax)}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]/x^3,x]
```

```
[Out] -(a*x*Sqrt[1 - a^2*x^2] + ArcSin[a*x])/(2*x^2)
```

Maple [A] time = 0.003, size = 38, normalized size = 1.1

$$a^2\left(-\frac{\arcsin(ax)}{2\,a^2x^2}-\frac{1}{2\,ax}\sqrt{-a^2x^2+1}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)/x^3,x)
```

```
[Out] a^2*(-1/2*arcsin(a*x)/a^2/x^2-1/2/a/x*(-a^2*x^2+1)^(1/2))
```

Maxima [A] time = 1.65813, size = 38, normalized size = 1.12

$$-\frac{\sqrt{-a^2x^2+1}a}{2\,x}-\frac{\arcsin(ax)}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*sqrt(-a^2*x^2 + 1)*a/x - 1/2*arcsin(a*x)/x^2
```

Fricas [A] time = 2.1906, size = 66, normalized size = 1.94

$$-\frac{\sqrt{-a^2x^2+1}ax+\arcsin(ax)}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(sqrt(-a^2*x^2 + 1)*a*x + arcsin(a*x))/x^2
```

Sympy [C] time = 2.11402, size = 51, normalized size = 1.5

$$\frac{a\left(\begin{cases}-\frac{i\sqrt{a^2x^2-1}}{x} & \text{for } \left|a^2x^2\right|>1\\ -\frac{\sqrt{-a^2x^2+1}}{x} & \text{otherwise}\end{cases}\right)}{2}-\frac{\operatorname{asin}(ax)}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)/x**3,x)
```

```
[Out] a*Piecewise((-I*sqrt(a**2*x**2 - 1)/x, Abs(a**2*x**2) > 1), (-sqrt(-a**2*x*
*2 + 1)/x, True))/2 - asin(a*x)/(2*x**2)
```

Giac [B] time = 1.28193, size = 92, normalized size = 2.71

$$\frac{1}{4}\left(\frac{a^4x}{\left(\sqrt{-a^2x^2+1}|a|+a\right)|a|}-\frac{\sqrt{-a^2x^2+1}|a|+a}{x|a|}\right)a-\frac{\arcsin(ax)}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*(a^4*x/((sqrt(-a^2*x^2 + 1)*abs(a) + a)*abs(a)) - (sqrt(-a^2*x^2 + 1)*a
bs(a) + a)/(x*abs(a)))*a - 1/2*arcsin(a*x)/x^2
```

3.9 $\int \frac{\sin^{-1}(ax)}{x^4}\,dx$

Optimal. Leaf size=56

$$-\frac{a\sqrt{1-a^2x^2}}{6x^2}-\frac{1}{6}a^3\tanh^{-1}\left(\sqrt{1-a^2x^2}\right)-\frac{\sin^{-1}(ax)}{3x^3}$$

```
[Out] -(a*Sqrt[1 - a^2*x^2])/(6*x^2) - ArcSin[a*x]/(3*x^3) - (a^3*ArcTanh[Sqrt[1
- a^2*x^2]])/6
```

Rubi [A] time = 0.0328187, antiderivative size = 56, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {4627, 266, 51, 63, 208}

$$-\frac{a\sqrt{1-a^2x^2}}{6x^2}-\frac{1}{6}a^3\tanh^{-1}\left(\sqrt{1-a^2x^2}\right)-\frac{\sin^{-1}(ax)}{3x^3}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]/x^4,x]
```

```
[Out] -(a*Sqrt[1 - a^2*x^2])/(6*x^2) - ArcSin[a*x]/(3*x^3) - (a^3*ArcTanh[Sqrt[1
- a^2*x^2]])/6
```

Rule 4627

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

Rule 266

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 51

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
((a + b*x)^(m + 1)*(c + d*x)^(n + 1))/((b*c - a*d)*(m + 1)), x] - Dist[(d*(
m + n + 2))/((b*c - a*d)*(m + 1)), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && LtQ[m, -1] &&  !(LtQ
[n, -1] && (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && I
ntLinearQ[a, b, c, d, m, n, x]
```

Rule 63

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - (a*d)/b +
(d*x^p)/b)^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 208

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

Rubi steps

$$\begin{aligned}
\int \frac{\sin^{-1}(ax)}{x^4}\,dx &= -\frac{\sin^{-1}(ax)}{3x^3}+\frac{1}{3}a\int \frac{1}{x^3\sqrt{1-a^2x^2}}\,dx\\
&= -\frac{\sin^{-1}(ax)}{3x^3}+\frac{1}{6}a\,\text{Subst}\left(\int \frac{1}{x^2\sqrt{1-a^2x}}\,dx,x,x^2\right)\\
&= -\frac{a\sqrt{1-a^2x^2}}{6x^2}-\frac{\sin^{-1}(ax)}{3x^3}+\frac{1}{12}a^3\,\text{Subst}\left(\int \frac{1}{x\sqrt{1-a^2x}}\,dx,x,x^2\right)\\
&= -\frac{a\sqrt{1-a^2x^2}}{6x^2}-\frac{\sin^{-1}(ax)}{3x^3}-\frac{1}{6}a\,\text{Subst}\left(\int \frac{1}{\frac{1}{a^2}-\frac{x^2}{a^2}}\,dx,x,\sqrt{1-a^2x^2}\right)\\
&= -\frac{a\sqrt{1-a^2x^2}}{6x^2}-\frac{\sin^{-1}(ax)}{3x^3}-\frac{1}{6}a^3\tanh^{-1}\left(\sqrt{1-a^2x^2}\right)
\end{aligned}$$

Mathematica [A] time = 0.0136419, size = 53, normalized size = 0.95

$$-\frac{ax\sqrt{1-a^2x^2}+a^3x^3\tanh^{-1}\left(\sqrt{1-a^2x^2}\right)+2\sin^{-1}(ax)}{6x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]/x^4,x]
```

```
[Out] -(a*x*Sqrt[1 - a^2*x^2] + 2*ArcSin[a*x] + a^3*x^3*ArcTanh[Sqrt[1 - a^2*x^2]
])/(6*x^3)
```

Maple [A] time = 0.003, size = 53, normalized size = 1.

$$a^{3}\left(-\frac{\arcsin\left(ax\right)}{3\,a^{3}x^{3}}-\frac{1}{6\,a^{2}x^{2}}\sqrt{-a^{2}x^{2}+1}-\frac{1}{6}\mathrm{Artanh}\left(\frac{1}{\sqrt{-a^{2}x^{2}+1}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)/x^4,x)
```

```
[Out] a^3*(-1/3*arcsin(a*x)/a^3/x^3-1/6/a^2/x^2*(-a^2*x^2+1)^(1/2)-1/6*arctanh(1/
(-a^2*x^2+1)^(1/2)))
```

Maxima [A] time = 1.73144, size = 81, normalized size = 1.45

$$-\frac{1}{6}\left(a^{2}\log\left(\frac{2\sqrt{-a^{2}x^{2}+1}}{|x|}+\frac{2}{|x|}\right)+\frac{\sqrt{-a^{2}x^{2}+1}}{x^{2}}\right)a-\frac{\arcsin\left(ax\right)}{3\,x^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x^4,x, algorithm="maxima")
```

```
[Out] -1/6*(a^2*log(2*sqrt(-a^2*x^2 + 1)/abs(x) + 2/abs(x)) + sqrt(-a^2*x^2 + 1)/
x^2)*a - 1/3*arcsin(a*x)/x^3
```

Fricas [A] time = 2.74306, size = 176, normalized size = 3.14

$$-\frac{a^{3}x^{3}\log\left(\sqrt{-a^{2}x^{2}+1}+1\right)-a^{3}x^{3}\log\left(\sqrt{-a^{2}x^{2}+1}-1\right)+2\sqrt{-a^{2}x^{2}+1}ax+4\,\arcsin\left(ax\right)}{12\,x^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x^4,x, algorithm="fricas")
```

```
[Out] -1/12*(a^3*x^3*log(sqrt(-a^2*x^2 + 1) + 1) - a^3*x^3*log(sqrt(-a^2*x^2 + 1)
 - 1) + 2*sqrt(-a^2*x^2 + 1)*a*x + 4*arcsin(a*x))/x^3
```

Sympy [A] time = 7.03483, size = 109, normalized size = 1.95

$$\frac{a\left(\begin{cases} -\frac{a^2\operatorname{acosh}\left(\frac{1}{ax}\right)}{2}-\frac{a\sqrt{-1+\frac{1}{a^2x^2}}}{2x} & \text{for } \frac{1}{|a^2x^2|}>1\\ \frac{ia^2\operatorname{asin}\left(\frac{1}{ax}\right)}{2}-\frac{ia}{2x\sqrt{1-\frac{1}{a^2x^2}}}+\frac{i}{2ax^3\sqrt{1-\frac{1}{a^2x^2}}} & \text{otherwise} \end{cases}\right)}{3}-\frac{\operatorname{asin}(ax)}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)/x**4,x)
```

```
[Out] a*Piecewise((-a**2*acosh(1/(a*x))/2 - a*sqrt(-1 + 1/(a**2*x**2))/(2*x), 1/A
bs(a**2*x**2) > 1), (I*a**2*asin(1/(a*x))/2 - I*a/(2*x*sqrt(1 - 1/(a**2*x**
2))) + I/(2*a*x**3*sqrt(1 - 1/(a**2*x**2))), True))/3 - asin(a*x)/(3*x**3)
```

Giac [A] time = 1.31479, size = 95, normalized size = 1.7

$$-\frac{1}{12}a^3\left(\frac{2\sqrt{-a^2x^2+1}}{a^2x^2}+\log\left(\sqrt{-a^2x^2+1}+1\right)-\log\left(-\sqrt{-a^2x^2+1}+1\right)\right)-\frac{\arcsin(ax)}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x^4,x, algorithm="giac")
```

```
[Out] -1/12*a^3*(2*sqrt(-a^2*x^2 + 1)/(a^2*x^2) + log(sqrt(-a^2*x^2 + 1) + 1) - l
og(-sqrt(-a^2*x^2 + 1) + 1)) - 1/3*arcsin(a*x)/x^3
```

3.10 $\int \frac{\sin^{-1}(ax)}{x^5}\,dx$

Optimal. Leaf size=58

$$-\frac{a^3\sqrt{1-a^2x^2}}{6x}-\frac{a\sqrt{1-a^2x^2}}{12x^3}-\frac{\sin^{-1}(ax)}{4x^4}$$

```
[Out] -(a*Sqrt[1 - a^2*x^2])/(12*x^3) - (a^3*Sqrt[1 - a^2*x^2])/(6*x) - ArcSin[a*
x]/(4*x^4)
```

Rubi [A] time = 0.0224819, antiderivative size = 58, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.375, Rules used = {4627, 271, 264}

$$-\frac{a^3\sqrt{1-a^2x^2}}{6x}-\frac{a\sqrt{1-a^2x^2}}{12x^3}-\frac{\sin^{-1}(ax)}{4x^4}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]/x^5,x]
```

```
[Out] -(a*Sqrt[1 - a^2*x^2])/(12*x^3) - (a^3*Sqrt[1 - a^2*x^2])/(6*x) - ArcSin[a*
x]/(4*x^4)
```

Rule 4627

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

Rule 271

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

Rule 264

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

Rubi steps

$$
\begin{aligned}
\int \frac{\sin^{-1}(ax)}{x^5}\,dx &= -\frac{\sin^{-1}(ax)}{4x^4}+\frac{1}{4}a\int \frac{1}{x^4\sqrt{1-a^2x^2}}\,dx\\
&= -\frac{a\sqrt{1-a^2x^2}}{12x^3}-\frac{\sin^{-1}(ax)}{4x^4}+\frac{1}{6}a^3\int \frac{1}{x^2\sqrt{1-a^2x^2}}\,dx\\
&= -\frac{a\sqrt{1-a^2x^2}}{12x^3}-\frac{a^3\sqrt{1-a^2x^2}}{6x}-\frac{\sin^{-1}(ax)}{4x^4}
\end{aligned}
$$

Mathematica [A] time = 0.0186953, size = 41, normalized size = 0.71

$$
-\frac{ax\sqrt{1-a^2x^2}\left(2a^2x^2+1\right)+3\sin^{-1}(ax)}{12x^4}
$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]/x^5,x]
```

```
[Out] -(a*x*Sqrt[1 - a^2*x^2]*(1 + 2*a^2*x^2) + 3*ArcSin[a*x])/(12*x^4)
```

Maple [A] time = 0.003, size = 58, normalized size = 1.

$$
a^4\left(-\frac{\arcsin(ax)}{4\,a^4x^4}-\frac{1}{12\,a^3x^3}\sqrt{-a^2x^2+1}-\frac{1}{6\,ax}\sqrt{-a^2x^2+1}\right)
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)/x^5,x)
```

```
[Out] a^4*(-1/4*arcsin(a*x)/a^4/x^4-1/12/a^3/x^3*(-a^2*x^2+1)^(1/2)-1/6/a/x*(-a^2
*x^2+1)^(1/2))
```

Maxima [A] time = 1.65557, size = 68, normalized size = 1.17

$$-\frac{1}{12}\left(\frac{2\sqrt{-a^2x^2+1}a^2}{x}+\frac{\sqrt{-a^2x^2+1}}{x^3}\right)a-\frac{\arcsin\left(ax\right)}{4\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x^5,x, algorithm="maxima")
```

```
[Out] -1/12*(2*sqrt(-a^2*x^2 + 1)*a^2/x + sqrt(-a^2*x^2 + 1)/x^3)*a - 1/4*arcsin(
a*x)/x^4
```

Fricas [A] time = 2.53501, size = 89, normalized size = 1.53

$$-\frac{\left(2\,a^3x^3+ax\right)\sqrt{-a^2x^2+1}+3\,\arcsin\left(ax\right)}{12\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x^5,x, algorithm="fricas")
```

```
[Out] -1/12*((2*a^3*x^3 + a*x)*sqrt(-a^2*x^2 + 1) + 3*arcsin(a*x))/x^4
```

Sympy [A] time = 3.91116, size = 100, normalized size = 1.72

$$\frac{a\left(\begin{cases}-\frac{2ia^2\sqrt{a^2x^2-1}}{3x}-\frac{i\sqrt{a^2x^2-1}}{3x^3} & \text{for}\ \left|a^2x^2\right|>1\\ -\frac{2a^2\sqrt{-a^2x^2+1}}{3x}-\frac{\sqrt{-a^2x^2+1}}{3x^3} & \text{otherwise}\end{cases}\right)}{4}-\frac{\operatorname{asin}\left(ax\right)}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)/x**5,x)
```

```
[Out] a*Piecewise((-2*I*a**2*sqrt(a**2*x**2 - 1)/(3*x) - I*sqrt(a**2*x**2 - 1)/(3
*x**3), Abs(a**2*x**2) > 1), (-2*a**2*sqrt(-a**2*x**2 + 1)/(3*x) - sqrt(-a*
*2*x**2 + 1)/(3*x**3), True))/4 - asin(a*x)/(4*x**4)
```

<u>Giac</u> [B] time = 1.35443, size = 176, normalized size = 3.03

$$\frac{1}{96}\left(\frac{\left(a^4+\frac{9\left(\sqrt{-a^2x^2+1}|a|+a\right)^2}{x^2}\right)a^6x^3}{\left(\sqrt{-a^2x^2+1}|a|+a\right)^3|a|}-\frac{\frac{9\left(\sqrt{-a^2x^2+1}|a|+a\right)a^4}{x}+\frac{\left(\sqrt{-a^2x^2+1}|a|+a\right)^3}{x^3}}{a^2|a|}\right)a-\frac{\arcsin\left(ax\right)}{4\,x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x^5,x, algorithm="giac")
```

```
[Out] 1/96*((a^4 + 9*(sqrt(-a^2*x^2 + 1)*abs(a) + a)^2/x^2)*a^6*x^3/((sqrt(-a^2*x
^2 + 1)*abs(a) + a)^3*abs(a)) - (9*(sqrt(-a^2*x^2 + 1)*abs(a) + a)*a^4/x +
(sqrt(-a^2*x^2 + 1)*abs(a) + a)^3/x^3)/(a^2*abs(a)))*a - 1/4*arcsin(a*x)/x^
4
```

3.11 $\int \frac{\sin^{-1}(ax)}{x^6}\,dx$

Optimal. Leaf size=80

$$-\frac{3a^3\sqrt{1-a^2x^2}}{40x^2}-\frac{a\sqrt{1-a^2x^2}}{20x^4}-\frac{3}{40}a^5\tanh^{-1}\left(\sqrt{1-a^2x^2}\right)-\frac{\sin^{-1}(ax)}{5x^5}$$

```
[Out] -(a*Sqrt[1 - a^2*x^2])/(20*x^4) - (3*a^3*Sqrt[1 - a^2*x^2])/(40*x^2) - ArcS
in[a*x]/(5*x^5) - (3*a^5*ArcTanh[Sqrt[1 - a^2*x^2]])/40
```

Rubi [A] time = 0.0454824, antiderivative size = 80, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {4627, 266, 51, 63, 208}

$$-\frac{3a^3\sqrt{1-a^2x^2}}{40x^2}-\frac{a\sqrt{1-a^2x^2}}{20x^4}-\frac{3}{40}a^5\tanh^{-1}\left(\sqrt{1-a^2x^2}\right)-\frac{\sin^{-1}(ax)}{5x^5}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]/x^6,x]
```

```
[Out] -(a*Sqrt[1 - a^2*x^2])/(20*x^4) - (3*a^3*Sqrt[1 - a^2*x^2])/(40*x^2) - ArcS
in[a*x]/(5*x^5) - (3*a^5*ArcTanh[Sqrt[1 - a^2*x^2]])/40
```

Rule 4627

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

Rule 266

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 51

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
((a + b*x)^(m + 1)*(c + d*x)^(n + 1))/((b*c - a*d)*(m + 1)), x] - Dist[(d*(
m + n + 2))/((b*c - a*d)*(m + 1)), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && LtQ[m, -1] &&  !(LtQ
[n, -1] && (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && I
ntLinearQ[a, b, c, d, m, n, x]
```

Rule 63

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - (a*d)/b +
(d*x^p)/b)^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 208

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

Rubi steps

$$\begin{aligned}
\int \frac{\sin^{-1}(ax)}{x^6}\,dx &= -\frac{\sin^{-1}(ax)}{5x^5}+\frac{1}{5}a\int \frac{1}{x^5\sqrt{1-a^2x^2}}\,dx\\
&= -\frac{\sin^{-1}(ax)}{5x^5}+\frac{1}{10}a\,\text{Subst}\left(\int \frac{1}{x^3\sqrt{1-a^2x}}\,dx,x,x^2\right)\\
&= -\frac{a\sqrt{1-a^2x^2}}{20x^4}-\frac{\sin^{-1}(ax)}{5x^5}+\frac{1}{40}\left(3a^3\right)\text{Subst}\left(\int \frac{1}{x^2\sqrt{1-a^2x}}\,dx,x,x^2\right)\\
&= -\frac{a\sqrt{1-a^2x^2}}{20x^4}-\frac{3a^3\sqrt{1-a^2x^2}}{40x^2}-\frac{\sin^{-1}(ax)}{5x^5}+\frac{1}{80}\left(3a^5\right)\text{Subst}\left(\int \frac{1}{x\sqrt{1-a^2x}}\,dx,x,x^2\right)\\
&= -\frac{a\sqrt{1-a^2x^2}}{20x^4}-\frac{3a^3\sqrt{1-a^2x^2}}{40x^2}-\frac{\sin^{-1}(ax)}{5x^5}-\frac{1}{40}\left(3a^3\right)\text{Subst}\left(\int \frac{1}{\frac{1}{a^2}-\frac{x^2}{a^2}}\,dx,x,\sqrt{1-a^2x^2}\right)\\
&= -\frac{a\sqrt{1-a^2x^2}}{20x^4}-\frac{3a^3\sqrt{1-a^2x^2}}{40x^2}-\frac{\sin^{-1}(ax)}{5x^5}-\frac{3}{40}a^5\tanh^{-1}\left(\sqrt{1-a^2x^2}\right)
\end{aligned}$$

Mathematica [C] time = 0.0126055, size = 51, normalized size = 0.64

$$-\frac{1}{5}a^5\sqrt{1-a^2x^2}\text{Hypergeometric2F1}\left(\frac{1}{2},3,\frac{3}{2},1-a^2x^2\right)-\frac{\sin^{-1}(ax)}{5x^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]/x^6,x]
```

```
[Out] -ArcSin[a*x]/(5*x^5) - (a^5*Sqrt[1 - a^2*x^2]*Hypergeometric2F1[1/2, 3, 3/2
, 1 - a^2*x^2])/5
```

Maple [A] time = 0.004, size = 73, normalized size = 0.9

$$a^{5}\left(-\frac{\arcsin (ax)}{5\,a^{5}x^{5}}-\frac{1}{20\,a^{4}x^{4}}\sqrt{-a^{2}x^{2}+1}-\frac{3}{40\,a^{2}x^{2}}\sqrt{-a^{2}x^{2}+1}-\frac{3}{40}\mathrm{Artanh}\left(\frac{1}{\sqrt{-a^{2}x^{2}+1}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)/x^6,x)
```

```
[Out] a^5*(-1/5*arcsin(a*x)/a^5/x^5-1/20/a^4/x^4*(-a^2*x^2+1)^(1/2)-3/40/a^2/x^2*
(-a^2*x^2+1)^(1/2)-3/40*arctanh(1/(-a^2*x^2+1)^(1/2)))
```

Maxima [A] time = 1.76392, size = 111, normalized size = 1.39

$$-\frac{1}{40}\left(3\,a^{4}\log\left(\frac{2\,\sqrt{-a^{2}x^{2}+1}}{|x|}+\frac{2}{|x|}\right)+\frac{3\,\sqrt{-a^{2}x^{2}+1}a^{2}}{x^{2}}+\frac{2\,\sqrt{-a^{2}x^{2}+1}}{x^{4}}\right)a-\frac{\arcsin (ax)}{5\,x^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x^6,x, algorithm="maxima")
```

```
[Out] -1/40*(3*a^4*log(2*sqrt(-a^2*x^2 + 1)/abs(x) + 2/abs(x)) + 3*sqrt(-a^2*x^2
+ 1)*a^2/x^2 + 2*sqrt(-a^2*x^2 + 1)/x^4)*a - 1/5*arcsin(a*x)/x^5
```

Fricas [A] time = 2.79369, size = 204, normalized size = 2.55

$$-\frac{3\,a^{5}x^{5}\log\left(\sqrt{-a^{2}x^{2}+1}+1\right)-3\,a^{5}x^{5}\log\left(\sqrt{-a^{2}x^{2}+1}-1\right)+2\left(3\,a^{3}x^{3}+2\,ax\right)\sqrt{-a^{2}x^{2}+1}+16\,\arcsin (ax)}{80\,x^{5}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x^6,x, algorithm="fricas")
```

```
[Out] -1/80*(3*a^5*x^5*log(sqrt(-a^2*x^2 + 1) + 1) - 3*a^5*x^5*log(sqrt(-a^2*x^2
+ 1) - 1) + 2*(3*a^3*x^3 + 2*a*x)*sqrt(-a^2*x^2 + 1) + 16*arcsin(a*x))/x^5
```

Sympy [A] time = 24.0507, size = 182, normalized size = 2.28

$$\frac{a\left(\begin{cases} -\frac{3a^4\operatorname{acosh}\left(\frac{1}{ax}\right)}{8} + \frac{3a^3}{8x\sqrt{-1+\frac{1}{a^2x^2}}} - \frac{a}{8x^3\sqrt{-1+\frac{1}{a^2x^2}}} - \frac{1}{4ax^5\sqrt{-1+\frac{1}{a^2x^2}}} & \text{for } \frac{1}{|a^2x^2|} > 1 \\ \frac{3ia^4\operatorname{asin}\left(\frac{1}{ax}\right)}{8} - \frac{3ia^3}{8x\sqrt{1-\frac{1}{a^2x^2}}} + \frac{ia}{8x^3\sqrt{1-\frac{1}{a^2x^2}}} + \frac{i}{4ax^5\sqrt{1-\frac{1}{a^2x^2}}} & \text{otherwise} \end{cases}\right)}{5} - \frac{\operatorname{asin}(ax)}{5x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)/x**6,x)
```

```
[Out] a*Piecewise((-3*a**4*acosh(1/(a*x))/8 + 3*a**3/(8*x*sqrt(-1 + 1/(a**2*x**2)
)) - a/(8*x**3*sqrt(-1 + 1/(a**2*x**2))) - 1/(4*a*x**5*sqrt(-1 + 1/(a**2*x*
*2))), 1/Abs(a**2*x**2) > 1), (3*I*a**4*asin(1/(a*x))/8 - 3*I*a**3/(8*x*sqr
t(1 - 1/(a**2*x**2))) + I*a/(8*x**3*sqrt(1 - 1/(a**2*x**2))) + I/(4*a*x**5*
sqrt(1 - 1/(a**2*x**2))), True))/5 - asin(a*x)/(5*x**5)
```

Giac [A] time = 1.30165, size = 120, normalized size = 1.5

$$\frac{1}{80}a^5\left(\frac{2\left(3\left(-a^2x^2+1\right)^{\frac{3}{2}} - 5\sqrt{-a^2x^2+1}\right)}{a^4x^4} - 3\log\left(\sqrt{-a^2x^2+1}+1\right) + 3\log\left(-\sqrt{-a^2x^2+1}+1\right)\right) - \frac{\arcsin(ax)}{5x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)/x^6,x, algorithm="giac")
```

```
[Out] 1/80*a^5*(2*(3*(-a^2*x^2 + 1)^(3/2) - 5*sqrt(-a^2*x^2 + 1))/(a^4*x^4) - 3*l
og(sqrt(-a^2*x^2 + 1) + 1) + 3*log(-sqrt(-a^2*x^2 + 1) + 1)) - 1/5*arcsin(a
*x)/x^5
```

3.12 $\int x^4 \sin^{-1}(ax)^2\,dx$

<u>**Optimal**</u>. Leaf size=120

$$-\frac{8x^3}{225a^2}+\frac{2x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{25a}+\frac{8x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{75a^3}+\frac{16\sqrt{1-a^2x^2}\sin^{-1}(ax)}{75a^5}-\frac{16x}{75a^4}+\frac{1}{5}x^5\sin^{-1}(ax)^2-\frac{2x^5}{125}$$

```
[Out] (-16*x)/(75*a^4) - (8*x^3)/(225*a^2) - (2*x^5)/125 + (16*Sqrt[1 - a^2*x^2]*
ArcSin[a*x])/(75*a^5) + (8*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(75*a^3) + (2
*x^4*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(25*a) + (x^5*ArcSin[a*x]^2)/5
```

<u>**Rubi**</u> **[A]** time = 0.193986, antiderivative size = 120, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4627, 4707, 4677, 8, 30}

$$-\frac{8x^3}{225a^2}+\frac{2x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{25a}+\frac{8x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{75a^3}+\frac{16\sqrt{1-a^2x^2}\sin^{-1}(ax)}{75a^5}-\frac{16x}{75a^4}+\frac{1}{5}x^5\sin^{-1}(ax)^2-\frac{2x^5}{125}$$

Antiderivative was successfully verified.

```
[In] Int[x^4*ArcSin[a*x]^2,x]
```

```
[Out] (-16*x)/(75*a^4) - (8*x^3)/(225*a^2) - (2*x^5)/125 + (16*Sqrt[1 - a^2*x^2]*
ArcSin[a*x])/(75*a^5) + (8*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(75*a^3) + (2
*x^4*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(25*a) + (x^5*ArcSin[a*x]^2)/5
```

<u>Rule 4627</u>

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

<u>Rule 4707</u>

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

```
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 8

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

Rule 30

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

Rubi steps

$$\begin{aligned}
\int x^4\sin^{-1}(ax)^2\,dx &= \frac{1}{5}x^5\sin^{-1}(ax)^2-\frac{1}{5}(2a)\int\frac{x^5\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx\\
&= \frac{2x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{25a}+\frac{1}{5}x^5\sin^{-1}(ax)^2-\frac{2\int x^4\,dx}{25}-\frac{8\int\frac{x^3\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx}{25a}\\
&= -\frac{2x^5}{125}+\frac{8x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{75a^3}+\frac{2x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{25a}+\frac{1}{5}x^5\sin^{-1}(ax)^2-\frac{16\int\frac{x\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx}{75a^3}\\
&= -\frac{8x^3}{225a^2}-\frac{2x^5}{125}+\frac{16\sqrt{1-a^2x^2}\sin^{-1}(ax)}{75a^5}+\frac{8x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{75a^3}+\frac{2x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{25a}+\\
&= -\frac{16x}{75a^4}-\frac{8x^3}{225a^2}-\frac{2x^5}{125}+\frac{16\sqrt{1-a^2x^2}\sin^{-1}(ax)}{75a^5}+\frac{8x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{75a^3}+\frac{2x^4\sqrt{1-a^2x^2}\sin^{-1}}{25a}
\end{aligned}$$

Mathematica [A] time = 0.0336199, size = 82, normalized size = 0.68

$$\frac{-2ax\left(9a^4x^4+20a^2x^2+120\right)+225a^5x^5\sin^{-1}(ax)^2+30\sqrt{1-a^2x^2}\left(3a^4x^4+4a^2x^2+8\right)\sin^{-1}(ax)}{1125a^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4*ArcSin[a*x]^2,x]
```

```
[Out] (-2*a*x*(120 + 20*a^2*x^2 + 9*a^4*x^4) + 30*Sqrt[1 - a^2*x^2]*(8 + 4*a^2*x^
2 + 3*a^4*x^4)*ArcSin[a*x] + 225*a^5*x^5*ArcSin[a*x]^2)/(1125*a^5)
```

Maple [A] time = 0.126, size = 76, normalized size = 0.6

$$\frac{1}{a^5}\left(\frac{a^5x^5\left(\arcsin\left(ax\right)\right)^2}{5}+\frac{2\arcsin\left(ax\right)\left(3\,a^4x^4+4\,a^2x^2+8\right)}{75}\sqrt{-a^2x^2+1}-\frac{2\,a^5x^5}{125}-\frac{8\,a^3x^3}{225}-\frac{16\,ax}{75}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*arcsin(a*x)^2,x)
```

```
[Out] 1/a^5*(1/5*a^5*x^5*arcsin(a*x)^2+2/75*arcsin(a*x)*(3*a^4*x^4+4*a^2*x^2+8)*(
-a^2*x^2+1)^(1/2)-2/125*a^5*x^5-8/225*a^3*x^3-16/75*a*x)
```

Maxima [A] time = 1.67013, size = 138, normalized size = 1.15

$$\frac{1}{5}\,x^5\arcsin\left(ax\right)^2+\frac{2}{75}\left(\frac{3\sqrt{-a^2x^2+1}x^4}{a^2}+\frac{4\sqrt{-a^2x^2+1}x^2}{a^4}+\frac{8\sqrt{-a^2x^2+1}}{a^6}\right)a\arcsin\left(ax\right)-\frac{2\left(9\,a^4x^5+20\,a^2x^3+120\,x\right)}{1125\,a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^2,x, algorithm="maxima")
```

```
[Out] 1/5*x^5*arcsin(a*x)^2 + 2/75*(3*sqrt(-a^2*x^2 + 1)*x^4/a^2 + 4*sqrt(-a^2*x^
2 + 1)*x^2/a^4 + 8*sqrt(-a^2*x^2 + 1)/a^6)*a*arcsin(a*x) - 2/1125*(9*a^4*x^
5 + 20*a^2*x^3 + 120*x)/a^4
```

Fricas [A] time = 2.42754, size = 189, normalized size = 1.58

$$\frac{225\,a^5x^5\arcsin\left(ax\right)^2-18\,a^5x^5-40\,a^3x^3+30\left(3\,a^4x^4+4\,a^2x^2+8\right)\sqrt{-a^2x^2+1}\arcsin\left(ax\right)-240\,ax}{1125\,a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^2,x, algorithm="fricas")
```

```
[Out] 1/1125*(225*a^5*x^5*arcsin(a*x)^2 - 18*a^5*x^5 - 40*a^3*x^3 + 30*(3*a^4*x^4
 + 4*a^2*x^2 + 8)*sqrt(-a^2*x^2 + 1)*arcsin(a*x) - 240*a*x)/a^5
```

Sympy [A] time = 7.61404, size = 114, normalized size = 0.95

$$\begin{cases} \frac{x^5\operatorname{asin}^2(ax)}{5} - \frac{2x^5}{125} + \frac{2x^4\sqrt{-a^2x^2+1}\operatorname{asin}(ax)}{25a} - \frac{8x^3}{225a^2} + \frac{8x^2\sqrt{-a^2x^2+1}\operatorname{asin}(ax)}{75a^3} - \frac{16x}{75a^4} + \frac{16\sqrt{-a^2x^2+1}\operatorname{asin}(ax)}{75a^5} & \text{for } a \neq 0 \\ 0 & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*asin(a*x)**2,x)
```

```
[Out] Piecewise((x**5*asin(a*x)**2/5 - 2*x**5/125 + 2*x**4*sqrt(-a**2*x**2 + 1)*a
sin(a*x)/(25*a) - 8*x**3/(225*a**2) + 8*x**2*sqrt(-a**2*x**2 + 1)*asin(a*x)
/(75*a**3) - 16*x/(75*a**4) + 16*sqrt(-a**2*x**2 + 1)*asin(a*x)/(75*a**5),
Ne(a, 0)), (0, True))
```

Giac [A] time = 1.34402, size = 228, normalized size = 1.9

$$\frac{\left(a^2x^2-1\right)^2 x\arcsin(ax)^2}{5a^4} + \frac{2\left(a^2x^2-1\right)x\arcsin(ax)^2}{5a^4} - \frac{2\left(a^2x^2-1\right)^2 x}{125a^4} + \frac{x\arcsin(ax)^2}{5a^4} + \frac{2\left(a^2x^2-1\right)^2\sqrt{-a^2x^2+1}\,\mathrm{ar}}{25a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^2,x, algorithm="giac")
```

```
[Out] 1/5*(a^2*x^2 - 1)^2*x*arcsin(a*x)^2/a^4 + 2/5*(a^2*x^2 - 1)*x*arcsin(a*x)^2
/a^4 - 2/125*(a^2*x^2 - 1)^2*x/a^4 + 1/5*x*arcsin(a*x)^2/a^4 + 2/25*(a^2*x^
2 - 1)^2*sqrt(-a^2*x^2 + 1)*arcsin(a*x)/a^5 - 76/1125*(a^2*x^2 - 1)*x/a^4 -
 4/15*(-a^2*x^2 + 1)^(3/2)*arcsin(a*x)/a^5 - 298/1125*x/a^4 + 2/5*sqrt(-a^2
*x^2 + 1)*arcsin(a*x)/a^5
```

3.13 $\int x^3 \sin^{-1}(ax)^2 \, dx$

Optimal. Leaf size=98

$$-\frac{3x^2}{32a^2}+\frac{x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{8a}+\frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{16a^3}-\frac{3\sin^{-1}(ax)^2}{32a^4}+\frac{1}{4}x^4\sin^{-1}(ax)^2-\frac{x^4}{32}$$

```
[Out] (-3*x^2)/(32*a^2) - x^4/32 + (3*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(16*a^3) +
 (x^3*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(8*a) - (3*ArcSin[a*x]^2)/(32*a^4) + (
x^4*ArcSin[a*x]^2)/4
```

Rubi [A] time = 0.162577, antiderivative size = 98, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4, Rules used = {4627, 4707, 4641, 30}

$$-\frac{3x^2}{32a^2}+\frac{x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{8a}+\frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{16a^3}-\frac{3\sin^{-1}(ax)^2}{32a^4}+\frac{1}{4}x^4\sin^{-1}(ax)^2-\frac{x^4}{32}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*ArcSin[a*x]^2,x]
```

```
[Out] (-3*x^2)/(32*a^2) - x^4/32 + (3*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(16*a^3) +
 (x^3*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(8*a) - (3*ArcSin[a*x]^2)/(32*a^4) + (
x^4*ArcSin[a*x]^2)/4
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

```
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 30

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

Rubi steps

$$\begin{aligned}
\int x^3 \sin^{-1}(ax)^2\,dx &= \frac{1}{4}x^4\sin^{-1}(ax)^2 - \frac{1}{2}a\int \frac{x^4\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx \\
&= \frac{x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{8a} + \frac{1}{4}x^4\sin^{-1}(ax)^2 - \frac{\int x^3\,dx}{8} - \frac{3\int \frac{x^2\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx}{8a} \\
&= -\frac{x^4}{32} + \frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{16a^3} + \frac{x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{8a} + \frac{1}{4}x^4\sin^{-1}(ax)^2 - \frac{3\int \frac{\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx}{16a^3} - \\
&= -\frac{3x^2}{32a^2} - \frac{x^4}{32} + \frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{16a^3} + \frac{x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{8a} - \frac{3\sin^{-1}(ax)^2}{32a^4} + \frac{1}{4}x^4\sin^{-1}(ax)^2
\end{aligned}$$

Mathematica [A] time = 0.0289285, size = 74, normalized size = 0.76

$$\frac{-a^2x^2\left(a^2x^2+3\right)+2ax\sqrt{1-a^2x^2}\left(2a^2x^2+3\right)\sin^{-1}(ax)+\left(8a^4x^4-3\right)\sin^{-1}(ax)^2}{32a^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*ArcSin[a*x]^2,x]
```

```
[Out] (-(a^2*x^2*(3 + a^2*x^2)) + 2*a*x*Sqrt[1 - a^2*x^2]*(3 + 2*a^2*x^2)*ArcSin[
a*x] + (-3 + 8*a^4*x^4)*ArcSin[a*x]^2)/(32*a^4)
```

Maple [A] time = 0.063, size = 93, normalized size = 1.

$$\frac{1}{a^4}\left(\frac{a^4x^4\left(\arcsin\left(ax\right)\right)^2}{4}-\frac{\arcsin\left(ax\right)}{16}\left(-2\,a^3x^3\sqrt{-a^2x^2+1}-3\,ax\sqrt{-a^2x^2+1}+3\,\arcsin\left(ax\right)\right)+\frac{3\,\left(\arcsin\left(ax\right)\right)^2}{32}-\frac{a^4x^4}{32}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*arcsin(a*x)^2,x)
```

```
[Out] 1/a^4*(1/4*a^4*x^4*arcsin(a*x)^2-1/16*arcsin(a*x)*(-2*a^3*x^3*(-a^2*x^2+1)^
(1/2)-3*a*x*(-a^2*x^2+1)^(1/2)+3*arcsin(a*x))+3/32*arcsin(a*x)^2-1/32*a^4*x
^4-3/32*a^2*x^2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{1}{4}\,x^4\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2+a\int\frac{\sqrt{ax+1}\sqrt{-ax+1}x^4\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}{2\left(a^2x^2-1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*x^4*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2 + a*integrate(1/2*sqrt
(a*x + 1)*sqrt(-a*x + 1)*x^4*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))/(a^
2*x^2 - 1), x)
```

Fricas [A] time = 2.40165, size = 162, normalized size = 1.65

$$-\frac{a^4x^4+3\,a^2x^2-\left(8\,a^4x^4-3\right)\arcsin\left(ax\right)^2-2\left(2\,a^3x^3+3\,ax\right)\sqrt{-a^2x^2+1}\arcsin\left(ax\right)}{32\,a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/32*(a^4*x^4 + 3*a^2*x^2 - (8*a^4*x^4 - 3)*arcsin(a*x)^2 - 2*(2*a^3*x^3 +
 3*a*x)*sqrt(-a^2*x^2 + 1)*arcsin(a*x))/a^4
```

Sympy [A] time = 4.84024, size = 90, normalized size = 0.92

$$\begin{cases} \frac{x^{4} \operatorname{asin}^{2}{\left(a x \right)}}{4} - \frac{x^{4}}{32} + \frac{x^{3} \sqrt{- a^{2} x^{2} + 1} \operatorname{asin}{\left(a x \right)}}{8 a} - \frac{3 x^{2}}{32 a^{2}} + \frac{3 x \sqrt{- a^{2} x^{2} + 1} \operatorname{asin}{\left(a x \right)}}{16 a^{3}} - \frac{3 \operatorname{asin}^{2}{\left(a x \right)}}{32 a^{4}} & \text{for}\: a \neq 0 \\0 & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*asin(a*x)**2,x)
```

```
[Out] Piecewise((x**4*asin(a*x)**2/4 - x**4/32 + x**3*sqrt(-a**2*x**2 + 1)*asin(a
*x)/(8*a) - 3*x**2/(32*a**2) + 3*x*sqrt(-a**2*x**2 + 1)*asin(a*x)/(16*a**3)
 - 3*asin(a*x)**2/(32*a**4), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.22945, size = 180, normalized size = 1.84

$$-\frac{\left(-a^{2} x^{2} + 1\right)^{\frac{3}{2}} x \arcsin\left(a x\right)}{8 \, a^{3}} + \frac{{\left(a^{2} x^{2} - 1\right)}^{2} \arcsin\left(a x\right)^{2}}{4 \, a^{4}} + \frac{5 \, \sqrt{-a^{2} x^{2} + 1} x \arcsin\left(a x\right)}{16 \, a^{3}} + \frac{{\left(a^{2} x^{2} - 1\right)} \arcsin\left(a x\right)^{2}}{2 \, a^{4}} - \frac{\left(a^{2} x^{2}\right.}{32}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/8*(-a^2*x^2 + 1)^(3/2)*x*arcsin(a*x)/a^3 + 1/4*(a^2*x^2 - 1)^2*arcsin(a*
x)^2/a^4 + 5/16*sqrt(-a^2*x^2 + 1)*x*arcsin(a*x)/a^3 + 1/2*(a^2*x^2 - 1)*ar
csin(a*x)^2/a^4 - 1/32*(a^2*x^2 - 1)^2/a^4 + 5/32*arcsin(a*x)^2/a^4 - 5/32*
(a^2*x^2 - 1)/a^4 - 17/256/a^4
```

3.14 $\int x^2 \sin^{-1}(ax)^2\,dx$

Optimal. Leaf size=82

$$\frac{2x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{9a}+\frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{9a^3}-\frac{4x}{9a^2}+\frac{1}{3}x^3\sin^{-1}(ax)^2-\frac{2x^3}{27}$$

```
[Out] (-4*x)/(9*a^2) - (2*x^3)/27 + (4*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(9*a^3) + (
2*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(9*a) + (x^3*ArcSin[a*x]^2)/3
```

Rubi [A] time = 0.121434, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4627, 4707, 4677, 8, 30}

$$\frac{2x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{9a}+\frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{9a^3}-\frac{4x}{9a^2}+\frac{1}{3}x^3\sin^{-1}(ax)^2-\frac{2x^3}{27}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*ArcSin[a*x]^2,x]
```

```
[Out] (-4*x)/(9*a^2) - (2*x^3)/27 + (4*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(9*a^3) + (
2*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(9*a) + (x^3*ArcSin[a*x]^2)/3
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 8

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

Rule 30

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

Rubi steps

$$\begin{aligned}
\int x^2 \sin^{-1}(ax)^2\,dx &= \frac{1}{3}x^3\sin^{-1}(ax)^2 - \frac{1}{3}(2a)\int \frac{x^3\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx \\
&= \frac{2x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{9a} + \frac{1}{3}x^3\sin^{-1}(ax)^2 - \frac{2\int x^2\,dx}{9} - \frac{4\int \frac{x\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx}{9a} \\
&= -\frac{2x^3}{27} + \frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{9a^3} + \frac{2x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{9a} + \frac{1}{3}x^3\sin^{-1}(ax)^2 - \frac{4\int 1\,dx}{9a^2} \\
&= -\frac{4x}{9a^2} - \frac{2x^3}{27} + \frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{9a^3} + \frac{2x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{9a} + \frac{1}{3}x^3\sin^{-1}(ax)^2
\end{aligned}$$

Mathematica [A] time = 0.0280522, size = 64, normalized size = 0.78

$$\frac{-2ax\left(a^2x^2+6\right)+9a^3x^3\sin^{-1}(ax)^2+6\sqrt{1-a^2x^2}\left(a^2x^2+2\right)\sin^{-1}(ax)}{27a^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*ArcSin[a*x]^2,x]
```

```
[Out] (-2*a*x*(6 + a^2*x^2) + 6*Sqrt[1 - a^2*x^2]*(2 + a^2*x^2)*ArcSin[a*x] + 9*a
^3*x^3*ArcSin[a*x]^2)/(27*a^3)
```

Maple [A] time = 0.059, size = 59, normalized size = 0.7

$$\frac{1}{a^{3}}\left(\frac{a^{3}x^{3}\left(\arcsin\left(ax\right)\right)^{2}}{3}+\frac{2\arcsin\left(ax\right)\left(a^{2}x^{2}+2\right)}{9}\sqrt{-a^{2}x^{2}+1}-\frac{2\,a^{3}x^{3}}{27}-\frac{4\,ax}{9}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*arcsin(a*x)^2,x)
```

```
[Out] 1/a^3*(1/3*a^3*x^3*arcsin(a*x)^2+2/9*arcsin(a*x)*(a^2*x^2+2)*(-a^2*x^2+1)^(
1/2)-2/27*a^3*x^3-4/9*a*x)
```

Maxima [A] time = 1.73538, size = 97, normalized size = 1.18

$$\frac{1}{3}\,x^{3}\arcsin\left(ax\right)^{2}+\frac{2}{9}\,a\left(\frac{\sqrt{-a^{2}x^{2}+1}x^{2}}{a^{2}}+\frac{2\sqrt{-a^{2}x^{2}+1}}{a^{4}}\right)\arcsin\left(ax\right)-\frac{2\left(a^{2}x^{3}+6\,x\right)}{27\,a^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*x^3*arcsin(a*x)^2 + 2/9*a*(sqrt(-a^2*x^2 + 1)*x^2/a^2 + 2*sqrt(-a^2*x^2
 + 1)/a^4)*arcsin(a*x) - 2/27*(a^2*x^3 + 6*x)/a^2
```

Fricas [A] time = 2.41462, size = 143, normalized size = 1.74

$$\frac{9\,a^{3}x^{3}\arcsin\left(ax\right)^{2}-2\,a^{3}x^{3}+6\left(a^{2}x^{2}+2\right)\sqrt{-a^{2}x^{2}+1}\arcsin\left(ax\right)-12\,ax}{27\,a^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/27*(9*a^3*x^3*arcsin(a*x)^2 - 2*a^3*x^3 + 6*(a^2*x^2 + 2)*sqrt(-a^2*x^2 +
 1)*arcsin(a*x) - 12*a*x)/a^3
```

Sympy [A] time = 2.59436, size = 76, normalized size = 0.93

$$\begin{cases} \frac{x^3 \operatorname{asin}^2(ax)}{3} - \frac{2x^3}{27} + \frac{2x^2\sqrt{-a^2x^2+1}\operatorname{asin}(ax)}{9a} - \frac{4x}{9a^2} + \frac{4\sqrt{-a^2x^2+1}\operatorname{asin}(ax)}{9a^3} & \text{for } a \neq 0 \\ 0 & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*asin(a*x)**2,x)
```

```
[Out] Piecewise((x**3*asin(a*x)**2/3 - 2*x**3/27 + 2*x**2*sqrt(-a**2*x**2 + 1)*as
in(a*x)/(9*a) - 4*x/(9*a**2) + 4*sqrt(-a**2*x**2 + 1)*asin(a*x)/(9*a**3), N
e(a, 0)), (0, True))
```

Giac [A] time = 1.31157, size = 131, normalized size = 1.6

$$\frac{\left(a^2x^2-1\right)x \arcsin(ax)^2}{3\,a^2} + \frac{x \arcsin(ax)^2}{3\,a^2} - \frac{2\left(a^2x^2-1\right)x}{27\,a^2} - \frac{2\left(-a^2x^2+1\right)^{\frac{3}{2}} \arcsin(ax)}{9\,a^3} - \frac{14\,x}{27\,a^2} + \frac{2\sqrt{-a^2x^2+1}\,\mathrm{arcsin}}{3\,a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*(a^2*x^2 - 1)*x*arcsin(a*x)^2/a^2 + 1/3*x*arcsin(a*x)^2/a^2 - 2/27*(a^2
*x^2 - 1)*x/a^2 - 2/9*(-a^2*x^2 + 1)^(3/2)*arcsin(a*x)/a^3 - 14/27*x/a^2 +
2/3*sqrt(-a^2*x^2 + 1)*arcsin(a*x)/a^3
```

3.15 $\int x\sin^{-1}(ax)^2\,dx$

Optimal. Leaf size=60

$$\frac{x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{2a}-\frac{\sin^{-1}(ax)^2}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^2-\frac{x^2}{4}$$

```
[Out] -x^2/4 + (x*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(2*a) - ArcSin[a*x]^2/(4*a^2) +
(x^2*ArcSin[a*x]^2)/2
```

Rubi [A] time = 0.0932273, antiderivative size = 60, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4627, 4707, 4641, 30}

$$\frac{x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{2a}-\frac{\sin^{-1}(ax)^2}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^2-\frac{x^2}{4}$$

Antiderivative was successfully verified.

```
[In] Int[x*ArcSin[a*x]^2,x]
```

```
[Out] -x^2/4 + (x*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(2*a) - ArcSin[a*x]^2/(4*a^2) +
(x^2*ArcSin[a*x]^2)/2
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 30

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

Rubi steps

$$\begin{aligned}\int x\sin^{-1}(ax)^2\,dx &= \frac{1}{2}x^2\sin^{-1}(ax)^2 - a\int\frac{x^2\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx\\ &= \frac{x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{2a} + \frac{1}{2}x^2\sin^{-1}(ax)^2 - \frac{\int x\,dx}{2} - \frac{\int\frac{\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx}{2a}\\ &= -\frac{x^2}{4} + \frac{x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{2a} - \frac{\sin^{-1}(ax)^2}{4a^2} + \frac{1}{2}x^2\sin^{-1}(ax)^2\end{aligned}$$

Mathematica [A] time = 0.016981, size = 55, normalized size = 0.92

$$\frac{-a^2x^2 + 2ax\sqrt{1-a^2x^2}\sin^{-1}(ax) + \left(2a^2x^2-1\right)\sin^{-1}(ax)^2}{4a^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*ArcSin[a*x]^2,x]
```

```
[Out] (-(a^2*x^2) + 2*a*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x] + (-1 + 2*a^2*x^2)*ArcSin
[a*x]^2)/(4*a^2)
```

Maple [A] time = 0.025, size = 65, normalized size = 1.1

$$\frac{1}{a^2}\left(\frac{\left(a^2x^2-1\right)(\arcsin(ax))^2}{2} + \frac{\arcsin(ax)}{2}\left(ax\sqrt{-a^2x^2+1} + \arcsin(ax)\right) - \frac{(\arcsin(ax))^2}{4} - \frac{a^2x^2}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*arcsin(a*x)^2,x)
```

```
[Out] 1/a^2*(1/2*(a^2*x^2-1)*arcsin(a*x)^2+1/2*arcsin(a*x)*(a*x*(-a^2*x^2+1)^(1/2
)+arcsin(a*x))-1/4*arcsin(a*x)^2-1/4*a^2*x^2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{1}{2}x^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2+a\int\frac{\sqrt{ax+1}\sqrt{-ax+1}x^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}{a^2x^2-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*x^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2 + a*integrate(sqrt(a*x
 + 1)*sqrt(-a*x + 1)*x^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))/(a^2*x^
2 - 1), x)
```

Fricas [A] time = 2.33855, size = 123, normalized size = 2.05

$$-\frac{a^2x^2-2\sqrt{-a^2x^2+1}ax\arcsin\left(ax\right)-\left(2\,a^2x^2-1\right)\arcsin\left(ax\right)^2}{4\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/4*(a^2*x^2 - 2*sqrt(-a^2*x^2 + 1)*a*x*arcsin(a*x) - (2*a^2*x^2 - 1)*arcs
in(a*x)^2)/a^2
```

Sympy [A] time = 0.769838, size = 51, normalized size = 0.85

$$\begin{cases}\frac{x^2\operatorname{asin}^2\left(ax\right)}{2}-\frac{x^2}{4}+\frac{x\sqrt{-a^2x^2+1}\operatorname{asin}\left(ax\right)}{2a}-\frac{\operatorname{asin}^2\left(ax\right)}{4a^2} & \text{for } a\neq 0\\ 0 & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*asin(a*x)**2,x)
```

```
[Out] Piecewise((x**2*asin(a*x)**2/2 - x**2/4 + x*sqrt(-a**2*x**2 + 1)*asin(a*x)/
(2*a) - asin(a*x)**2/(4*a**2), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.21496, size = 99, normalized size = 1.65

$$\frac{\sqrt{-a^2x^2+1}x\arcsin(ax)}{2a}+\frac{\left(a^2x^2-1\right)\arcsin(ax)^2}{2a^2}+\frac{\arcsin(ax)^2}{4a^2}-\frac{a^2x^2-1}{4a^2}-\frac{1}{8a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*sqrt(-a^2*x^2 + 1)*x*arcsin(a*x)/a + 1/2*(a^2*x^2 - 1)*arcsin(a*x)^2/a^
2 + 1/4*arcsin(a*x)^2/a^2 - 1/4*(a^2*x^2 - 1)/a^2 - 1/8/a^2
```

3.16 $\int \sin^{-1}(ax)^2\,dx$

Optimal. Leaf size=35

$$\frac{2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{a}+x\sin^{-1}(ax)^2-2x$$

```
[Out] -2*x + (2*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/a + x*ArcSin[a*x]^2
```

Rubi [A] time = 0.0449068, antiderivative size = 35, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4619, 4677, 8}

$$\frac{2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{a}+x\sin^{-1}(ax)^2-2x$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^2,x]
```

```
[Out] -2*x + (2*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/a + x*ArcSin[a*x]^2
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 8

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

Rubi steps

$$\begin{aligned}\int \sin^{-1}(ax)^2\,dx &= x\sin^{-1}(ax)^2 - (2a)\int \frac{x\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx\\ &= \frac{2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{a} + x\sin^{-1}(ax)^2 - 2\int 1\,dx\\ &= -2x + \frac{2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{a} + x\sin^{-1}(ax)^2\end{aligned}$$

Mathematica [A] time = 0.0109879, size = 35, normalized size = 1.

$$\frac{2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{a} + x\sin^{-1}(ax)^2 - 2x$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]^2,x]
```

```
[Out] -2*x + (2*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/a + x*ArcSin[a*x]^2
```

Maple [A] time = 0.021, size = 37, normalized size = 1.1

$$\frac{1}{a}\left(ax\left(\arcsin\left(ax\right)\right)^2 - 2\,ax + 2\,\arcsin\left(ax\right)\sqrt{-a^2x^2+1}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^2,x)
```

```
[Out] 1/a*(a*x*arcsin(a*x)^2-2*a*x+2*arcsin(a*x)*(-a^2*x^2+1)^(1/2))
```

Maxima [A] time = 1.82134, size = 45, normalized size = 1.29

$$x\arcsin\left(ax\right)^2 - 2\,x + \frac{2\,\sqrt{-a^2x^2+1}\arcsin\left(ax\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x*arcsin(a*x)^2 - 2*x + 2*sqrt(-a^2*x^2 + 1)*arcsin(a*x)/a
```

Fricas [A] time = 2.35201, size = 89, normalized size = 2.54

$$\frac{ax\arcsin\left(ax\right)^{2}-2\,ax+2\,\sqrt{-a^{2}x^{2}+1}\arcsin\left(ax\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (a*x*arcsin(a*x)^2 - 2*a*x + 2*sqrt(-a^2*x^2 + 1)*arcsin(a*x))/a
```

Sympy [A] time = 0.23858, size = 32, normalized size = 0.91

$$\begin{cases} x\operatorname{asin}^{2}\left(ax\right)-2x+\frac{2\sqrt{-a^{2}x^{2}+1}\operatorname{asin}\left(ax\right)}{a} & \text{for}\: a \neq 0 \\ 0 & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**2,x)
```

```
[Out] Piecewise((x*asin(a*x)**2 - 2*x + 2*sqrt(-a**2*x**2 + 1)*asin(a*x)/a, Ne(a,
 0)), (0, True))
```

Giac [A] time = 1.34824, size = 45, normalized size = 1.29

$$x\arcsin\left(ax\right)^{2}-2\,x+\frac{2\,\sqrt{-a^{2}x^{2}+1}\arcsin\left(ax\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x*arcsin(a*x)^2 - 2*x + 2*sqrt(-a^2*x^2 + 1)*arcsin(a*x)/a
```

3.17 $\int \frac{\sin^{-1}(ax)^2}{x}\,dx$

Optimal. Leaf size=71

$$-i\sin^{-1}(ax)\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)+\frac{1}{2}\text{PolyLog}\left(3,e^{2i\sin^{-1}(ax)}\right)-\frac{1}{3}i\sin^{-1}(ax)^3+\sin^{-1}(ax)^2\log\left(1-e^{2i\sin^{-1}(ax)}\right)$$

```
[Out] (-I/3)*ArcSin[a*x]^3 + ArcSin[a*x]^2*Log[1 - E^((2*I)*ArcSin[a*x])] - I*Arc
Sin[a*x]*PolyLog[2, E^((2*I)*ArcSin[a*x])] + PolyLog[3, E^((2*I)*ArcSin[a*x
])]/2
```

Rubi [A] time = 0.0945688, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.6, Rules used = {4625, 3717, 2190, 2531, 2282, 6589}

$$-i\sin^{-1}(ax)\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)+\frac{1}{2}\text{PolyLog}\left(3,e^{2i\sin^{-1}(ax)}\right)-\frac{1}{3}i\sin^{-1}(ax)^3+\sin^{-1}(ax)^2\log\left(1-e^{2i\sin^{-1}(ax)}\right)$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^2/x,x]
```

```
[Out] (-I/3)*ArcSin[a*x]^3 + ArcSin[a*x]^2*Log[1 - E^((2*I)*ArcSin[a*x])] - I*Arc
Sin[a*x]*PolyLog[2, E^((2*I)*ArcSin[a*x])] + PolyLog[3, E^((2*I)*ArcSin[a*x
])]/2
```

Rule 4625

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n/Tan[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Rule 3717

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[(I*(c + d*x)^(m + 1))/(d*(m + 1)), x] - Dist[2*I, Int[((c + d*x)^
m*E^(2*I*k*Pi)*E^(2*I*(e + f*x)))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x))), x],
 x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

Rule 2190

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
```

```
[((c + d*x)^m*Log[1 + (b*(F^(g*(e + f*x)))^n)/a])/(b*f*g*n*Log[F]), x] - Di
st[(d*m)/(b*f*g*n*Log[F]), Int[(c + d*x)^(m - 1)*Log[1 + (b*(F^(g*(e + f*x)
))^n)/a], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2531

```
Int[Log[1 + (e_.)*((F_)^((c_.)*((a_.) + (b_.)*(x_))))^(n_.)]*((f_.) + (g_.)
*(x_))^(m_.), x_Symbol] :> -Simp[((f + g*x)^m*PolyLog[2, -(e*(F^(c*(a + b*x
)))^n)])/(b*c*n*Log[F]), x] + Dist[(g*m)/(b*c*n*Log[F]), Int[(f + g*x)^(m -
 1)*PolyLog[2, -(e*(F^(c*(a + b*x)))^n)], x], x] /; FreeQ[{F, a, b, c, e, f
, g, n}, x] && GtQ[m, 0]
```

Rule 2282

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Dist[v/D[v, x]
, Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Functi
onOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ[
{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))*
(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

Rule 6589

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$
\begin{aligned}
\int \frac{\sin^{-1}(ax)^2}{x}\,dx &= \mathrm{Subst}\left(\int x^2\cot(x)\,dx, x, \sin^{-1}(ax)\right)\\
&= -\frac{1}{3}i\sin^{-1}(ax)^3 - 2i\,\mathrm{Subst}\left(\int \frac{e^{2ix}x^2}{1-e^{2ix}}\,dx, x, \sin^{-1}(ax)\right)\\
&= -\frac{1}{3}i\sin^{-1}(ax)^3 + \sin^{-1}(ax)^2\log\left(1-e^{2i\sin^{-1}(ax)}\right) - 2\,\mathrm{Subst}\left(\int x\log\left(1-e^{2ix}\right)dx, x, \sin^{-1}(ax)\right)\\
&= -\frac{1}{3}i\sin^{-1}(ax)^3 + \sin^{-1}(ax)^2\log\left(1-e^{2i\sin^{-1}(ax)}\right) - i\sin^{-1}(ax)\mathbf{Li}_2\left(e^{2i\sin^{-1}(ax)}\right) + i\,\mathrm{Subst}\Big(\int \mathbf{Li}_2\left(e^{2ix}\right)\\
&= -\frac{1}{3}i\sin^{-1}(ax)^3 + \sin^{-1}(ax)^2\log\left(1-e^{2i\sin^{-1}(ax)}\right) - i\sin^{-1}(ax)\mathbf{Li}_2\left(e^{2i\sin^{-1}(ax)}\right) + \frac{1}{2}\,\mathrm{Subst}\Big(\int \frac{\mathbf{Li}_2(x)}{x}\\
&= -\frac{1}{3}i\sin^{-1}(ax)^3 + \sin^{-1}(ax)^2\log\left(1-e^{2i\sin^{-1}(ax)}\right) - i\sin^{-1}(ax)\mathbf{Li}_2\left(e^{2i\sin^{-1}(ax)}\right) + \frac{1}{2}\mathbf{Li}_3\left(e^{2i\sin^{-1}(ax)}\right)
\end{aligned}
$$

Mathematica [A] time = 0.0397966, size = 71, normalized size = 1.

$$i\sin^{-1}(ax)\text{PolyLog}\left(2,e^{-2i\sin^{-1}(ax)}\right)+\frac{1}{2}\text{PolyLog}\left(3,e^{-2i\sin^{-1}(ax)}\right)+\frac{1}{3}i\sin^{-1}(ax)^3+\sin^{-1}(ax)^2\log\left(1-e^{-2i\sin^{-1}(ax)}\right)$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^2/x,x]
```

```
[Out] (I/3)*ArcSin[a*x]^3 + ArcSin[a*x]^2*Log[1 - E^((-2*I)*ArcSin[a*x])] + I*Arc
Sin[a*x]*PolyLog[2, E^((-2*I)*ArcSin[a*x])] + PolyLog[3, E^((-2*I)*ArcSin[a
*x])]/2
```

Maple [A] time = 0.042, size = 169, normalized size = 2.4

$$-\frac{i}{3}(\arcsin(ax))^3+(\arcsin(ax))^2\ln\left(1+iax+\sqrt{-a^2x^2+1}\right)-2\,i\arcsin(ax)\,\mathrm{polylog}\left(2,-iax-\sqrt{-a^2x^2+1}\right)+2\,\mathrm{poly}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^2/x,x)
```

```
[Out] -1/3*I*arcsin(a*x)^3+arcsin(a*x)^2*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))-2*I*arcsi
n(a*x)*polylog(2,-I*a*x-(-a^2*x^2+1)^(1/2))+2*polylog(3,-I*a*x-(-a^2*x^2+1)
^(1/2))+arcsin(a*x)^2*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))-2*I*arcsin(a*x)*polylo
g(2,I*a*x+(-a^2*x^2+1)^(1/2))+2*polylog(3,I*a*x+(-a^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\arcsin(ax)^2}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x,x, algorithm="maxima")
```

```
[Out] integrate(arcsin(a*x)^2/x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\arcsin\left(ax\right)^{2}}{x},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^2/x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\operatorname{asin}^{2}\left(ax\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**2/x,x)
```

```
[Out] Integral(asin(a*x)**2/x, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\arcsin\left(ax\right)^{2}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^2/x, x)
```

3.18 $\int \frac{\sin^{-1}(ax)^2}{x^2}\, dx$

Optimal. Leaf size=66

$$2ia\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-2ia\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-\frac{\sin^{-1}(ax)^2}{x}-4a\sin^{-1}(ax)\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right)$$

```
[Out] -(ArcSin[a*x]^2/x) - 4*a*ArcSin[a*x]*ArcTanh[E^(I*ArcSin[a*x])] + (2*I)*a*P
olyLog[2, -E^(I*ArcSin[a*x])] - (2*I)*a*PolyLog[2, E^(I*ArcSin[a*x])]
```

Rubi [A] time = 0.102522, antiderivative size = 66, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4627, 4709, 4183, 2279, 2391}

$$2ia\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-2ia\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-\frac{\sin^{-1}(ax)^2}{x}-4a\sin^{-1}(ax)\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right)$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^2/x^2,x]
```

```
[Out] -(ArcSin[a*x]^2/x) - 4*a*ArcSin[a*x]*ArcTanh[E^(I*ArcSin[a*x])] + (2*I)*a*P
olyLog[2, -E^(I*ArcSin[a*x])] - (2*I)*a*PolyLog[2, E^(I*ArcSin[a*x])]
```

Rule 4627

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

Rule 4709

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_))/Sqrt[(d_) + (e_.)*
(x_)^2], x_Symbol] :> Dist[1/(c^(m + 1)*Sqrt[d]), Subst[Int[(a + b*x)^n*Sin
[x]^m, x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d +
e, 0] && GtQ[d, 0] && IGtQ[n, 0] && IntegerQ[m]
```

Rule 4183

```
Int[csc[(e_.) + (f_.)*(x_)]*((c_.) + (d_.)*(x_))^(m_.), x_Symbol] :> Simp[(
-2*(c + d*x)^m*ArcTanh[E^(I*(e + f*x))])/f, x] + (-Dist[(d*m)/f, Int[(c + d
*x)^(m - 1)*Log[1 - E^(I*(e + f*x))], x], x] + Dist[(d*m)/f, Int[(c + d*x)^
(m - 1)*Log[1 + E^(I*(e + f*x))], x], x]) /; FreeQ[{c, d, e, f}, x] && IGtQ
[m, 0]
```

Rule 2279

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2391

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> -Simp[PolyLog[2
, -(c*e*x^n)]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\begin{aligned}
\int \frac{\sin^{-1}(ax)^2}{x^2}\,dx &= -\frac{\sin^{-1}(ax)^2}{x} + (2a)\int \frac{\sin^{-1}(ax)}{x\sqrt{1-a^2x^2}}\,dx \\
&= -\frac{\sin^{-1}(ax)^2}{x} + (2a)\,\mathrm{Subst}\left(\int x\csc(x)\,dx, x, \sin^{-1}(ax)\right) \\
&= -\frac{\sin^{-1}(ax)^2}{x} - 4a\sin^{-1}(ax)\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) - (2a)\,\mathrm{Subst}\left(\int \log\left(1-e^{ix}\right)\,dx, x, \sin^{-1}(ax)\right) + (2a) \\
&= -\frac{\sin^{-1}(ax)^2}{x} - 4a\sin^{-1}(ax)\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + (2ia)\,\mathrm{Subst}\left(\int \frac{\log(1-x)}{x}\,dx, x, e^{i\sin^{-1}(ax)}\right) - (2ia)\,\mathrm{S} \\
&= -\frac{\sin^{-1}(ax)^2}{x} - 4a\sin^{-1}(ax)\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + 2ia\mathrm{Li}_2\left(-e^{i\sin^{-1}(ax)}\right) - 2ia\mathrm{Li}_2\left(e^{i\sin^{-1}(ax)}\right)
\end{aligned}$$

Mathematica [A] time = 0.161989, size = 87, normalized size = 1.32

$$a\Bigg(2i\mathrm{PolyLog}\left(2, -e^{i\sin^{-1}(ax)}\right) - 2i\mathrm{PolyLog}\left(2, e^{i\sin^{-1}(ax)}\right) - \sin^{-1}(ax)\Bigg(\frac{\sin^{-1}(ax)}{ax} - 2\log\left(1-e^{i\sin^{-1}(ax)}\right) + 2\log\Big(1+e^{i\sin}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^2/x^2,x]
```

```
[Out] a*(-(ArcSin[a*x]*(ArcSin[a*x]/(a*x) - 2*Log[1 - E^(I*ArcSin[a*x])] + 2*Log[
1 + E^(I*ArcSin[a*x])])) + (2*I)*PolyLog[2, -E^(I*ArcSin[a*x])] - (2*I)*Pol
yLog[2, E^(I*ArcSin[a*x])])
```

Maple [A] time = 0.092, size = 119, normalized size = 1.8

$$-\frac{(\arcsin(ax))^2}{x} - 2\,a\arcsin(ax)\ln\left(1 + iax + \sqrt{-a^2x^2+1}\right) + 2\,a\arcsin(ax)\ln\left(1 - iax - \sqrt{-a^2x^2+1}\right) + 2\,ia\mathrm{polylog}\left(\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^2/x^2,x)
```

```
[Out] -arcsin(a*x)^2/x-2*a*arcsin(a*x)*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))+2*a*arcsin(
a*x)*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))+2*I*a*polylog(2,-I*a*x-(-a^2*x^2+1)^(1/
2))-2*I*a*polylog(2,I*a*x+(-a^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{2\,ax\int \frac{\sqrt{-ax+1}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}{\sqrt{ax+1}(ax-1)x}\,dx + \arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x^2,x, algorithm="maxima")
```

```
[Out] -(2*a*x*integrate(sqrt(a*x + 1)*sqrt(-a*x + 1)*arctan2(a*x, sqrt(a*x + 1)*s
qrt(-a*x + 1))/(a^2*x^3 - x), x) + arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1
))^2)/x
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\arcsin(ax)^2}{x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x^2,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^2/x^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^2(ax)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**2/x**2,x)
```

```
[Out] Integral(asin(a*x)**2/x**2, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin(ax)^2}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x^2,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^2/x^2, x)
```

3.19 $\int \frac{\sin^{-1}(ax)^2}{x^3} \, dx$

Optimal. Leaf size=44

$$-\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{x}+a^2\log(x)-\frac{\sin^{-1}(ax)^2}{2x^2}$$

```
[Out] -((a*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/x) - ArcSin[a*x]^2/(2*x^2) + a^2*Log[x]
```

Rubi [A] time = 0.0798736, antiderivative size = 44, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3, Rules used = {4627, 4681, 29}

$$-\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{x}+a^2\log(x)-\frac{\sin^{-1}(ax)^2}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^2/x^3,x]
```

```
[Out] -((a*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/x) - ArcSin[a*x]^2/(2*x^2) + a^2*Log[x]
```

Rule 4627

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

Rule 4681

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[((f*x)^(m + 1)*(d + e*x^2)^(p + 1)*(a + b
*ArcSin[c*x])^n)/(d*f*(m + 1)), x] - Dist[(b*c*n*d^IntPart[p]*(d + e*x^2)^F
racPart[p])/(f*(m + 1)*(1 - c^2*x^2)^FracPart[p]), Int[(f*x)^(m + 1)*(1 - c
^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && EqQ[m + 2*p + 3, 0] &
& NeQ[m, -1]
```

Rule 29

```
Int[(x_)^(-1), x_Symbol] :> Simp[Log[x], x]
```

Rubi steps

$$\begin{aligned}\int \frac{\sin^{-1}(ax)^2}{x^3}\,dx &= -\frac{\sin^{-1}(ax)^2}{2x^2}+a\int \frac{\sin^{-1}(ax)}{x^2\sqrt{1-a^2x^2}}\,dx\\ &= -\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{x}-\frac{\sin^{-1}(ax)^2}{2x^2}+a^2\int \frac{1}{x}\,dx\\ &= -\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{x}-\frac{\sin^{-1}(ax)^2}{2x^2}+a^2\log(x)\end{aligned}$$

Mathematica [A] time = 0.0254089, size = 44, normalized size = 1.

$$-\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{x}+a^2\log(x)-\frac{\sin^{-1}(ax)^2}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]^2/x^3,x]
```

```
[Out] -((a*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/x) - ArcSin[a*x]^2/(2*x^2) + a^2*Log[x]
```

Maple [A] time = 0.026, size = 43, normalized size = 1.

$$-\frac{(\arcsin(ax))^2}{2x^2}-\frac{a\arcsin(ax)}{x}\sqrt{-a^2x^2+1}+a^2\ln(ax)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^2/x^3,x)
```

```
[Out] -1/2*arcsin(a*x)^2/x^2-a*arcsin(a*x)*(-a^2*x^2+1)^(1/2)/x+a^2*ln(a*x)
```

Maxima [A] time = 1.62754, size = 54, normalized size = 1.23

$$a^2\log(x)-\frac{\sqrt{-a^2x^2+1}a\arcsin(ax)}{x}-\frac{\arcsin(ax)^2}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x^3,x, algorithm="maxima")
```

```
[Out] a^2*log(x) - sqrt(-a^2*x^2 + 1)*a*arcsin(a*x)/x - 1/2*arcsin(a*x)^2/x^2
```

Fricas [A] time = 2.56778, size = 112, normalized size = 2.55

$$\frac{2\,a^2x^2\log\left(x\right) - 2\,\sqrt{-a^2x^2+1}ax\arcsin\left(ax\right) - \arcsin\left(ax\right)^2}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x^3,x, algorithm="fricas")
```

```
[Out] 1/2*(2*a^2*x^2*log(x) - 2*sqrt(-a^2*x^2 + 1)*a*x*arcsin(a*x) - arcsin(a*x)^
2)/x^2
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\operatorname{asin}^2\left(ax\right)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**2/x**3,x)
```

```
[Out] Integral(asin(a*x)**2/x**3, x)
```

Giac [B] time = 1.38224, size = 116, normalized size = 2.64

$$\frac{1}{2}\left(\left(\frac{a^4x}{\left(\sqrt{-a^2x^2+1}|a|+a\right)|a|} - \frac{\sqrt{-a^2x^2+1}|a|+a}{x|a|}\right)\arcsin\left(ax\right) + a\log\left(a^2x^2\right)\right)a - \frac{\arcsin\left(ax\right)^2}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x^3,x, algorithm="giac")
```

```
[Out] 1/2*((a^4*x/((sqrt(-a^2*x^2 + 1)*abs(a) + a)*abs(a)) - (sqrt(-a^2*x^2 + 1)*
abs(a) + a)/(x*abs(a)))*arcsin(a*x) + a*log(a^2*x^2))*a - 1/2*arcsin(a*x)^2
/x^2
```

3.20 $\int \frac{\sin^{-1}(ax)^2}{x^4}\,dx$

Optimal. Leaf size=116

$$\frac{1}{3}ia^3\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-\frac{1}{3}ia^3\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{3x^2}-\frac{a^2}{3x}-\frac{2}{3}a^3\sin^{-1}(ax)\tanh^{-1}\Big(e^{i\sin}$$

```
[Out] -a^2/(3*x) - (a*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(3*x^2) - ArcSin[a*x]^2/(3*x
^3) - (2*a^3*ArcSin[a*x]*ArcTanh[E^(I*ArcSin[a*x])])/3 + (I/3)*a^3*PolyLog[
2, -E^(I*ArcSin[a*x])] - (I/3)*a^3*PolyLog[2, E^(I*ArcSin[a*x])]
```

Rubi [A] time = 0.169508, antiderivative size = 116, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.7, Rules used = {4627, 4701, 4709, 4183, 2279, 2391, 30}

$$\frac{1}{3}ia^3\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-\frac{1}{3}ia^3\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{3x^2}-\frac{a^2}{3x}-\frac{2}{3}a^3\sin^{-1}(ax)\tanh^{-1}\Big(e^{i\sin}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^2/x^4,x]
```

```
[Out] -a^2/(3*x) - (a*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(3*x^2) - ArcSin[a*x]^2/(3*x
^3) - (2*a^3*ArcSin[a*x]*ArcTanh[E^(I*ArcSin[a*x])])/3 + (I/3)*a^3*PolyLog[
2, -E^(I*ArcSin[a*x])] - (I/3)*a^3*PolyLog[2, E^(I*ArcSin[a*x])]
```

Rule 4627

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

Rule 4701

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[((f*x)^(m + 1)*(d + e*x^2)^(p + 1)*(a + b
*ArcSin[c*x])^n)/(d*f*(m + 1)), x] + (Dist[(c^2*(m + 2*p + 3))/(f^2*(m + 1)
), Int[(f*x)^(m + 2)*(d + e*x^2)^p*(a + b*ArcSin[c*x])^n, x], x] - Dist[(b*
c*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(f*(m + 1)*(1 - c^2*x^2)^FracPart
[p]), Int[(f*x)^(m + 1)*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1)
, x], x]) /; FreeQ[{a, b, c, d, e, f, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n,
 0] && LtQ[m, -1] && IntegerQ[m]
```

Rule 4709

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_))/Sqrt[(d_) + (e_.)*
(x_)^2], x_Symbol] :> Dist[1/(c^(m + 1)*Sqrt[d]), Subst[Int[(a + b*x)^n*Sin
[x]^m, x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d +
e, 0] && GtQ[d, 0] && IGtQ[n, 0] && IntegerQ[m]
```

Rule 4183

```
Int[csc[(e_.) + (f_.)*(x_)]*((c_.) + (d_.)*(x_))^(m_.), x_Symbol] :> Simp[(
-2*(c + d*x)^m*ArcTanh[E^(I*(e + f*x))])/f, x] + (-Dist[(d*m)/f, Int[(c + d
*x)^(m - 1)*Log[1 - E^(I*(e + f*x))], x], x] + Dist[(d*m)/f, Int[(c + d*x)^
(m - 1)*Log[1 + E^(I*(e + f*x))], x], x]) /; FreeQ[{c, d, e, f}, x] && IGtQ
[m, 0]
```

Rule 2279

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2391

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> -Simp[PolyLog[2
, -(c*e*x^n)]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 30

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

Rubi steps

$$\begin{aligned}
\int \frac{\sin^{-1}(ax)^2}{x^4}\,dx &= -\frac{\sin^{-1}(ax)^2}{3x^3} + \frac{1}{3}(2a)\int \frac{\sin^{-1}(ax)}{x^3\sqrt{1-a^2x^2}}\,dx \\
&= -\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{3x^2} - \frac{\sin^{-1}(ax)^2}{3x^3} + \frac{1}{3}a^2\int \frac{1}{x^2}\,dx + \frac{1}{3}a^3\int \frac{\sin^{-1}(ax)}{x\sqrt{1-a^2x^2}}\,dx \\
&= -\frac{a^2}{3x} - \frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{3x^2} - \frac{\sin^{-1}(ax)^2}{3x^3} + \frac{1}{3}a^3\,\text{Subst}\left(\int x\csc(x)\,dx, x, \sin^{-1}(ax)\right) \\
&= -\frac{a^2}{3x} - \frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{3x^2} - \frac{\sin^{-1}(ax)^2}{3x^3} - \frac{2}{3}a^3\sin^{-1}(ax)\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) - \frac{1}{3}a^3\,\text{Subst}\Big(\int \log \\
&= -\frac{a^2}{3x} - \frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{3x^2} - \frac{\sin^{-1}(ax)^2}{3x^3} - \frac{2}{3}a^3\sin^{-1}(ax)\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + \frac{1}{3}\left(ia^3\right)\text{Subst}\Big(\int \\
&= -\frac{a^2}{3x} - \frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{3x^2} - \frac{\sin^{-1}(ax)^2}{3x^3} - \frac{2}{3}a^3\sin^{-1}(ax)\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + \frac{1}{3}ia^3\mathbf{Li}_2\Big(-e^{i\sin^{-1}(a}
\end{aligned}$$

Mathematica [A] time = 0.615219, size = 139, normalized size = 1.2

$$-\frac{-ia^3x^3\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right) + ia^3x^3\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right) + a^2x^2 + ax\sqrt{1-a^2x^2}\sin^{-1}(ax) - a^3x^3\sin^{-1}(ax)\log\Big(}{3x^3}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^2/x^4,x]
```

```
[Out] -(a^2*x^2 + a*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x] + ArcSin[a*x]^2 - a^3*x^3*Arc
Sin[a*x]*Log[1 - E^(I*ArcSin[a*x])] + a^3*x^3*ArcSin[a*x]*Log[1 + E^(I*ArcS
in[a*x])] - I*a^3*x^3*PolyLog[2, -E^(I*ArcSin[a*x])] + I*a^3*x^3*PolyLog[2,
 E^(I*ArcSin[a*x])])/(3*x^3)
```

Maple [A] time = 0.196, size = 157, normalized size = 1.4

$$-\frac{a\arcsin(ax)}{3x^2}\sqrt{-a^2x^2+1} - \frac{a^2}{3x} - \frac{(\arcsin(ax))^2}{3x^3} - \frac{a^3\arcsin(ax)}{3}\ln\left(1+iax+\sqrt{-a^2x^2+1}\right) + \frac{i}{3}a^3\text{polylog}\Big(2,-iax-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^2/x^4,x)
```

```
[Out] -1/3*a*arcsin(a*x)*(-a^2*x^2+1)^(1/2)/x^2-1/3*a^2/x-1/3*arcsin(a*x)^2/x^3-1
/3*a^3*arcsin(a*x)*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))+1/3*I*a^3*polylog(2,-I*a*
x-(-a^2*x^2+1)^(1/2))+1/3*a^3*arcsin(a*x)*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))-1/
3*I*a^3*polylog(2,I*a*x+(-a^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{2\,ax^3\int\frac{\sqrt{ax+1}\sqrt{-ax+1}\,\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}{a^2x^5-x^3}\,dx+\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x^4,x, algorithm="maxima")
```

```
[Out] -1/3*(6*a*x^3*integrate(1/3*sqrt(a*x + 1)*sqrt(-a*x + 1)*arctan2(a*x, sqrt(
a*x + 1)*sqrt(-a*x + 1))/(a^2*x^5 - x^3), x) + arctan2(a*x, sqrt(a*x + 1)*s
qrt(-a*x + 1))^2)/x^3
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\arcsin\left(ax\right)^2}{x^4},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x^4,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^2/x^4, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\operatorname{asin}^2\left(ax\right)}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**2/x**4,x)
```

```
[Out] Integral(asin(a*x)**2/x**4, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin(ax)^2}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x^4,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^2/x^4, x)
```

3.21 $\int \frac{\sin^{-1}(ax)^2}{x^5}\,dx$

Optimal. Leaf size=87

$$-\frac{a^2}{12x^2}-\frac{a^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{3x}-\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{6x^3}+\frac{1}{3}a^4\log(x)-\frac{\sin^{-1}(ax)^2}{4x^4}$$

```
[Out] -a^2/(12*x^2) - (a*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(6*x^3) - (a^3*Sqrt[1 - a
^2*x^2]*ArcSin[a*x])/(3*x) - ArcSin[a*x]^2/(4*x^4) + (a^4*Log[x])/3
```

Rubi [A] time = 0.140384, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4627, 4701, 4681, 29, 30}

$$-\frac{a^2}{12x^2}-\frac{a^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{3x}-\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{6x^3}+\frac{1}{3}a^4\log(x)-\frac{\sin^{-1}(ax)^2}{4x^4}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^2/x^5,x]
```

```
[Out] -a^2/(12*x^2) - (a*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(6*x^3) - (a^3*Sqrt[1 - a
^2*x^2]*ArcSin[a*x])/(3*x) - ArcSin[a*x]^2/(4*x^4) + (a^4*Log[x])/3
```

Rule 4627

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

Rule 4701

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[((f*x)^(m + 1)*(d + e*x^2)^(p + 1)*(a + b
*ArcSin[c*x])^n)/(d*f*(m + 1)), x] + (Dist[(c^2*(m + 2*p + 3))/(f^2*(m + 1)
), Int[(f*x)^(m + 2)*(d + e*x^2)^p*(a + b*ArcSin[c*x])^n, x], x] - Dist[(b*
c*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(f*(m + 1)*(1 - c^2*x^2)^FracPart
[p]), Int[(f*x)^(m + 1)*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1)
, x], x]) /; FreeQ[{a, b, c, d, e, f, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n,
 0] && LtQ[m, -1] && IntegerQ[m]
```

Rule 4681

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[((f*x)^(m + 1)*(d + e*x^2)^(p + 1)*(a + b
*ArcSin[c*x])^n)/(d*f*(m + 1)), x] - Dist[(b*c*n*d^IntPart[p]*(d + e*x^2)^F
racPart[p])/(f*(m + 1)*(1 - c^2*x^2)^FracPart[p]), Int[(f*x)^(m + 1)*(1 - c
^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && EqQ[m + 2*p + 3, 0] &
& NeQ[m, -1]
```

Rule 29

```
Int[(x_)^(-1), x_Symbol] :> Simp[Log[x], x]
```

Rule 30

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

Rubi steps

$$\begin{aligned}
\int \frac{\sin^{-1}(ax)^2}{x^5}\,dx &= -\frac{\sin^{-1}(ax)^2}{4x^4}+\frac{1}{2}a\int \frac{\sin^{-1}(ax)}{x^4\sqrt{1-a^2x^2}}\,dx\\
&= -\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{6x^3}-\frac{\sin^{-1}(ax)^2}{4x^4}+\frac{1}{6}a^2\int \frac{1}{x^3}\,dx+\frac{1}{3}a^3\int \frac{\sin^{-1}(ax)}{x^2\sqrt{1-a^2x^2}}\,dx\\
&= -\frac{a^2}{12x^2}-\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{6x^3}-\frac{a^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{3x}-\frac{\sin^{-1}(ax)^2}{4x^4}+\frac{1}{3}a^4\int \frac{1}{x}\,dx\\
&= -\frac{a^2}{12x^2}-\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)}{6x^3}-\frac{a^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{3x}-\frac{\sin^{-1}(ax)^2}{4x^4}+\frac{1}{3}a^4\log(x)
\end{aligned}$$

Mathematica [A] time = 0.0380599, size = 69, normalized size = 0.79

$$-\frac{a^2}{12x^2}-\frac{a\sqrt{1-a^2x^2}\left(2a^2x^2+1\right)\sin^{-1}(ax)}{6x^3}+\frac{1}{3}a^4\log(x)-\frac{\sin^{-1}(ax)^2}{4x^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]^2/x^5,x]
```

```
[Out] -a^2/(12*x^2) - (a*Sqrt[1 - a^2*x^2]*(1 + 2*a^2*x^2)*ArcSin[a*x])/(6*x^3) -
 ArcSin[a*x]^2/(4*x^4) + (a^4*Log[x])/3
```

Maple [A] time = 0.032, size = 76, normalized size = 0.9

$$-\frac{(\arcsin(ax))^2}{4x^4}-\frac{a\arcsin(ax)}{6x^3}\sqrt{-a^2x^2+1}-\frac{a^2}{12x^2}-\frac{a^3\arcsin(ax)}{3x}\sqrt{-a^2x^2+1}+\frac{a^4\ln(ax)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^2/x^5,x)
```

```
[Out] -1/4*arcsin(a*x)^2/x^4-1/6*a*arcsin(a*x)*(-a^2*x^2+1)^(1/2)/x^3-1/12*a^2/x^
2-1/3*a^3*arcsin(a*x)*(-a^2*x^2+1)^(1/2)/x+1/3*a^4*ln(a*x)
```

Maxima [A] time = 1.61304, size = 100, normalized size = 1.15

$$\frac{1}{12}\left(4a^2\log(x)-\frac{1}{x^2}\right)a^2-\frac{1}{6}\left(\frac{2\sqrt{-a^2x^2+1}a^2}{x}+\frac{\sqrt{-a^2x^2+1}}{x^3}\right)a\arcsin(ax)-\frac{\arcsin(ax)^2}{4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x^5,x, algorithm="maxima")
```

```
[Out] 1/12*(4*a^2*log(x) - 1/x^2)*a^2 - 1/6*(2*sqrt(-a^2*x^2 + 1)*a^2/x + sqrt(-a
^2*x^2 + 1)/x^3)*a*arcsin(a*x) - 1/4*arcsin(a*x)^2/x^4
```

Fricas [A] time = 2.30886, size = 149, normalized size = 1.71

$$\frac{4a^4x^4\log(x)-a^2x^2-2\left(2a^3x^3+ax\right)\sqrt{-a^2x^2+1}\arcsin(ax)-3\arcsin(ax)^2}{12x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x^5,x, algorithm="fricas")
```

```
[Out] 1/12*(4*a^4*x^4*log(x) - a^2*x^2 - 2*(2*a^3*x^3 + a*x)*sqrt(-a^2*x^2 + 1)*a
rcsin(a*x) - 3*arcsin(a*x)^2)/x^4
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^2(ax)}{x^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**2/x**5,x)
```

```
[Out] Integral(asin(a*x)**2/x**5, x)
```

Giac [B] time = 1.4574, size = 223, normalized size = 2.56

$$\frac{1}{48}\left(\left(\left(\frac{\left(a^4+\frac{9\left(\sqrt{-a^2x^2+1}|a|+a\right)^2}{x^2}\right)a^6x^3}{\left(\sqrt{-a^2x^2+1}|a|+a\right)^3|a|}-\frac{\frac{9\left(\sqrt{-a^2x^2+1}|a|+a\right)a^4}{x}+\frac{\left(\sqrt{-a^2x^2+1}|a|+a\right)^3}{x^3}}{a^2|a|}\right)\arcsin(ax)+\frac{4\left(2\,a^4\log\left(a^2x^2\right)-\frac{a^2}{x^2}\right)}{a}\right)a-\mathrm{arcs}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^2/x^5,x, algorithm="giac")
```

```
[Out] 1/48*(((a^4 + 9*(sqrt(-a^2*x^2 + 1)*abs(a) + a)^2/x^2)*a^6*x^3/((sqrt(-a^2*
x^2 + 1)*abs(a) + a)^3*abs(a)) - (9*(sqrt(-a^2*x^2 + 1)*abs(a) + a)*a^4/x +
 (sqrt(-a^2*x^2 + 1)*abs(a) + a)^3/x^3)/(a^2*abs(a)))*arcsin(a*x) + 4*(2*a^
4*log(a^2*x^2) - a^2/x^2)/a)*a - 1/4*arcsin(a*x)^2/x^4
```

3.22 $\int x^4 \sin^{-1}(ax)^3 \, dx$

Optimal. Leaf size=201

$$-\frac{6\left(1-a^2x^2\right)^{5/2}}{625a^5}+\frac{76\left(1-a^2x^2\right)^{3/2}}{1125a^5}-\frac{298\sqrt{1-a^2x^2}}{375a^5}+\frac{3x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{25a}-\frac{8x^3\sin^{-1}(ax)}{75a^2}+\frac{4x^2\sqrt{1-a^2x^2}\sin^{-1}(a}{25a^3}$$

```
[Out] (-298*Sqrt[1 - a^2*x^2])/(375*a^5) + (76*(1 - a^2*x^2)^(3/2))/(1125*a^5) -
(6*(1 - a^2*x^2)^(5/2))/(625*a^5) - (16*x*ArcSin[a*x])/(25*a^4) - (8*x^3*Ar
cSin[a*x])/(75*a^2) - (6*x^5*ArcSin[a*x])/125 + (8*Sqrt[1 - a^2*x^2]*ArcSin
[a*x]^2)/(25*a^5) + (4*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(25*a^3) + (3*x
^4*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(25*a) + (x^5*ArcSin[a*x]^3)/5
```

Rubi [A] time = 0.384514, antiderivative size = 201, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 7, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.7, Rules used = {4627, 4707, 4677, 4619, 261, 266, 43}

$$-\frac{6\left(1-a^2x^2\right)^{5/2}}{625a^5}+\frac{76\left(1-a^2x^2\right)^{3/2}}{1125a^5}-\frac{298\sqrt{1-a^2x^2}}{375a^5}+\frac{3x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{25a}-\frac{8x^3\sin^{-1}(ax)}{75a^2}+\frac{4x^2\sqrt{1-a^2x^2}\sin^{-1}(a}{25a^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^4*ArcSin[a*x]^3,x]
```

```
[Out] (-298*Sqrt[1 - a^2*x^2])/(375*a^5) + (76*(1 - a^2*x^2)^(3/2))/(1125*a^5) -
(6*(1 - a^2*x^2)^(5/2))/(625*a^5) - (16*x*ArcSin[a*x])/(25*a^4) - (8*x^3*Ar
cSin[a*x])/(75*a^2) - (6*x^5*ArcSin[a*x])/125 + (8*Sqrt[1 - a^2*x^2]*ArcSin
[a*x]^2)/(25*a^5) + (4*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(25*a^3) + (3*x
^4*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(25*a) + (x^5*ArcSin[a*x]^3)/5
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 261

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

Rule 266

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rubi steps

$$
\begin{aligned}
\int x^4 \sin^{-1}(ax)^3\,dx &= \frac{1}{5}x^5\sin^{-1}(ax)^3 - \frac{1}{5}(3a)\int \frac{x^5\sin^{-1}(ax)^2}{\sqrt{1-a^2x^2}}\,dx \\
&= \frac{3x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{25a} + \frac{1}{5}x^5\sin^{-1}(ax)^3 - \frac{6}{25}\int x^4\sin^{-1}(ax)\,dx - \frac{12\int \frac{x^3\sin^{-1}(ax)^2}{\sqrt{1-a^2x^2}}\,dx}{25a} \\
&= -\frac{6}{125}x^5\sin^{-1}(ax) + \frac{4x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{25a^3} + \frac{3x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{25a} + \frac{1}{5}x^5\sin^{-1}(ax)^3 - \frac{8\int}{} \\
&= -\frac{8x^3\sin^{-1}(ax)}{75a^2} - \frac{6}{125}x^5\sin^{-1}(ax) + \frac{8\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{25a^5} + \frac{4x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{25a^3} + \frac{3x^4\sqrt{1-}}{} \\
&= -\frac{16x\sin^{-1}(ax)}{25a^4} - \frac{8x^3\sin^{-1}(ax)}{75a^2} - \frac{6}{125}x^5\sin^{-1}(ax) + \frac{8\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{25a^5} + \frac{4x^2\sqrt{1-a^2x^2}\sin^{-1}}{25a^3} \\
&= -\frac{86\sqrt{1-a^2x^2}}{125a^5} + \frac{4\left(1-a^2x^2\right)^{3/2}}{125a^5} - \frac{6\left(1-a^2x^2\right)^{5/2}}{625a^5} - \frac{16x\sin^{-1}(ax)}{25a^4} - \frac{8x^3\sin^{-1}(ax)}{75a^2} - \frac{6}{125}x^5\sin^{-1}(\\
&= -\frac{298\sqrt{1-a^2x^2}}{375a^5} + \frac{76\left(1-a^2x^2\right)^{3/2}}{1125a^5} - \frac{6\left(1-a^2x^2\right)^{5/2}}{625a^5} - \frac{16x\sin^{-1}(ax)}{25a^4} - \frac{8x^3\sin^{-1}(ax)}{75a^2} - \frac{6}{125}x^5\sin^{-}
\end{aligned}
$$

Mathematica [A] time = 0.0700747, size = 122, normalized size = 0.61

$$
\frac{-2\sqrt{1-a^2x^2}\left(27a^4x^4+136a^2x^2+2072\right)+1125a^5x^5\sin^{-1}(ax)^3-30ax\left(9a^4x^4+20a^2x^2+120\right)\sin^{-1}(ax)+225\sqrt{1-a^2x}}{5625a^5}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4*ArcSin[a*x]^3,x]
```

```
[Out] (-2*Sqrt[1 - a^2*x^2]*(2072 + 136*a^2*x^2 + 27*a^4*x^4) - 30*a*x*(120 + 20*
a^2*x^2 + 9*a^4*x^4)*ArcSin[a*x] + 225*Sqrt[1 - a^2*x^2]*(8 + 4*a^2*x^2 + 3
*a^4*x^4)*ArcSin[a*x]^2 + 1125*a^5*x^5*ArcSin[a*x]^3)/(5625*a^5)
```

Maple [A] time = 0.059, size = 159, normalized size = 0.8

$$
\frac{1}{a^5}\left(\frac{a^5x^5\left(\arcsin(ax)\right)^3}{5} + \frac{\left(\arcsin(ax)\right)^2\left(3\,a^4x^4+4\,a^2x^2+8\right)}{25}\sqrt{-a^2x^2+1} - \frac{16}{25}\sqrt{-a^2x^2+1} - \frac{16\,ax\arcsin(ax)}{25} - \frac{6\,a^5x^5}{}\right.
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*arcsin(a*x)^3,x)
```

```
[Out] 1/a^5*(1/5*a^5*x^5*arcsin(a*x)^3+1/25*arcsin(a*x)^2*(3*a^4*x^4+4*a^2*x^2+8)
*(-a^2*x^2+1)^(1/2)-16/25*(-a^2*x^2+1)^(1/2)-16/25*a*x*arcsin(a*x)-6/125*a^
5*x^5*arcsin(a*x)-2/625*(3*a^4*x^4+4*a^2*x^2+8)*(-a^2*x^2+1)^(1/2)-8/75*a^3
*x^3*arcsin(a*x)-8/225*(a^2*x^2+2)*(-a^2*x^2+1)^(1/2))
```

Maxima [A] time = 1.69177, size = 231, normalized size = 1.15

$$\frac{1}{5}\,x^5\arcsin\left(ax\right)^3+\frac{1}{25}\Bigg(\frac{3\,\sqrt{-a^2x^2+1}x^4}{a^2}+\frac{4\,\sqrt{-a^2x^2+1}x^2}{a^4}+\frac{8\,\sqrt{-a^2x^2+1}}{a^6}\Bigg)a\arcsin\left(ax\right)^2-\frac{2}{5625}\,a\Bigg(\frac{27\,\sqrt{-a^2x^2+1}a^2}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^3,x, algorithm="maxima")
```

```
[Out] 1/5*x^5*arcsin(a*x)^3 + 1/25*(3*sqrt(-a^2*x^2 + 1)*x^4/a^2 + 4*sqrt(-a^2*x^
2 + 1)*x^2/a^4 + 8*sqrt(-a^2*x^2 + 1)/a^6)*a*arcsin(a*x)^2 - 2/5625*a*((27*
sqrt(-a^2*x^2 + 1)*a^2*x^4 + 136*sqrt(-a^2*x^2 + 1)*x^2 + 2072*sqrt(-a^2*x^
2 + 1)/a^2)/a^4 + 15*(9*a^4*x^5 + 20*a^2*x^3 + 120*x)*arcsin(a*x)/a^5)
```

Fricas [A] time = 2.19976, size = 265, normalized size = 1.32

$$\frac{1125\,a^5x^5\arcsin\left(ax\right)^3-30\,\left(9\,a^5x^5+20\,a^3x^3+120\,ax\right)\arcsin\left(ax\right)-\Big(54\,a^4x^4+272\,a^2x^2-225\,\left(3\,a^4x^4+4\,a^2x^2+8\right)a}{5625\,a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^3,x, algorithm="fricas")
```

```
[Out] 1/5625*(1125*a^5*x^5*arcsin(a*x)^3 - 30*(9*a^5*x^5 + 20*a^3*x^3 + 120*a*x)*
arcsin(a*x) - (54*a^4*x^4 + 272*a^2*x^2 - 225*(3*a^4*x^4 + 4*a^2*x^2 + 8)*a
rcsin(a*x)^2 + 4144)*sqrt(-a^2*x^2 + 1))/a^5
```

Sympy [A] time = 13.6204, size = 196, normalized size = 0.98

$$\begin{cases} \frac{x^5 \operatorname{asin}^3(ax)}{5} - \frac{6x^5 \operatorname{asin}(ax)}{125} + \frac{3x^4\sqrt{-a^2x^2+1}\operatorname{asin}^2(ax)}{25a} - \frac{6x^4\sqrt{-a^2x^2+1}}{625a} - \frac{8x^3\operatorname{asin}(ax)}{75a^2} + \frac{4x^2\sqrt{-a^2x^2+1}\operatorname{asin}^2(ax)}{25a^3} - \frac{272x^2\sqrt{-a^2x^2+1}}{5625a^3} - \frac{16x\operatorname{asin}(}{25a^4} \\ 0 \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*asin(a*x)**3,x)
```

```
[Out] Piecewise((x**5*asin(a*x)**3/5 - 6*x**5*asin(a*x)/125 + 3*x**4*sqrt(-a**2*x
**2 + 1)*asin(a*x)**2/(25*a) - 6*x**4*sqrt(-a**2*x**2 + 1)/(625*a) - 8*x**3
*asin(a*x)/(75*a**2) + 4*x**2*sqrt(-a**2*x**2 + 1)*asin(a*x)**2/(25*a**3) -
 272*x**2*sqrt(-a**2*x**2 + 1)/(5625*a**3) - 16*x*asin(a*x)/(25*a**4) + 8*s
qrt(-a**2*x**2 + 1)*asin(a*x)**2/(25*a**5) - 4144*sqrt(-a**2*x**2 + 1)/(562
5*a**5), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.38628, size = 336, normalized size = 1.67

$$\frac{\left(a^2x^2-1\right)^2 x \arcsin(ax)^3}{5\,a^4} + \frac{2\left(a^2x^2-1\right) x \arcsin(ax)^3}{5\,a^4} - \frac{6\left(a^2x^2-1\right)^2 x \arcsin(ax)}{125\,a^4} + \frac{x \arcsin(ax)^3}{5\,a^4} + \frac{3\left(a^2x^2-1\right)^2 \sqrt{-a}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^3,x, algorithm="giac")
```

```
[Out] 1/5*(a^2*x^2 - 1)^2*x*arcsin(a*x)^3/a^4 + 2/5*(a^2*x^2 - 1)*x*arcsin(a*x)^3
/a^4 - 6/125*(a^2*x^2 - 1)^2*x*arcsin(a*x)/a^4 + 1/5*x*arcsin(a*x)^3/a^4 +
3/25*(a^2*x^2 - 1)^2*sqrt(-a^2*x^2 + 1)*arcsin(a*x)^2/a^5 - 76/375*(a^2*x^2
 - 1)*x*arcsin(a*x)/a^4 - 2/5*(-a^2*x^2 + 1)^(3/2)*arcsin(a*x)^2/a^5 - 298/
375*x*arcsin(a*x)/a^4 - 6/625*(a^2*x^2 - 1)^2*sqrt(-a^2*x^2 + 1)/a^5 + 3/5*
sqrt(-a^2*x^2 + 1)*arcsin(a*x)^2/a^5 + 76/1125*(-a^2*x^2 + 1)^(3/2)/a^5 - 2
98/375*sqrt(-a^2*x^2 + 1)/a^5
```

3.23 $\int x^3 \sin^{-1}(ax)^3 \, dx$

Optimal. Leaf size=167

$$-\frac{3x^3\sqrt{1-a^2x^2}}{128a}-\frac{45x\sqrt{1-a^2x^2}}{256a^3}+\frac{3x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{16a}-\frac{9x^2\sin^{-1}(ax)}{32a^2}+\frac{9x\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{32a^3}-\frac{3\sin^{-1}(ax)^3}{32a^4}$$

```
[Out] (-45*x*Sqrt[1 - a^2*x^2])/(256*a^3) - (3*x^3*Sqrt[1 - a^2*x^2])/(128*a) + (
45*ArcSin[a*x])/(256*a^4) - (9*x^2*ArcSin[a*x])/(32*a^2) - (3*x^4*ArcSin[a*
x])/32 + (9*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(32*a^3) + (3*x^3*Sqrt[1 - a
^2*x^2]*ArcSin[a*x]^2)/(16*a) - (3*ArcSin[a*x]^3)/(32*a^4) + (x^4*ArcSin[a*
x]^3)/4
```

Rubi [A] time = 0.297097, antiderivative size = 167, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 5, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4627, 4707, 4641, 321, 216}

$$-\frac{3x^3\sqrt{1-a^2x^2}}{128a}-\frac{45x\sqrt{1-a^2x^2}}{256a^3}+\frac{3x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{16a}-\frac{9x^2\sin^{-1}(ax)}{32a^2}+\frac{9x\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{32a^3}-\frac{3\sin^{-1}(ax)^3}{32a^4}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*ArcSin[a*x]^3,x]
```

```
[Out] (-45*x*Sqrt[1 - a^2*x^2])/(256*a^3) - (3*x^3*Sqrt[1 - a^2*x^2])/(128*a) + (
45*ArcSin[a*x])/(256*a^4) - (9*x^2*ArcSin[a*x])/(32*a^2) - (3*x^4*ArcSin[a*
x])/32 + (9*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(32*a^3) + (3*x^3*Sqrt[1 - a
^2*x^2]*ArcSin[a*x]^2)/(16*a) - (3*ArcSin[a*x]^3)/(32*a^4) + (x^4*ArcSin[a*
x]^3)/4
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 321

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

Rule 216

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

Rubi steps

$$
\begin{aligned}
\int x^3\sin^{-1}(ax)^3\,dx &= \frac{1}{4}x^4\sin^{-1}(ax)^3-\frac{1}{4}(3a)\int\frac{x^4\sin^{-1}(ax)^2}{\sqrt{1-a^2x^2}}\,dx\\
&= \frac{3x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{16a}+\frac{1}{4}x^4\sin^{-1}(ax)^3-\frac{3}{8}\int x^3\sin^{-1}(ax)\,dx-\frac{9\int\frac{x^2\sin^{-1}(ax)^2}{\sqrt{1-a^2x^2}}\,dx}{16a}\\
&= -\frac{3}{32}x^4\sin^{-1}(ax)+\frac{9x\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{32a^3}+\frac{3x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{16a}+\frac{1}{4}x^4\sin^{-1}(ax)^3-\\
&= -\frac{3x^3\sqrt{1-a^2x^2}}{128a}-\frac{9x^2\sin^{-1}(ax)}{32a^2}-\frac{3}{32}x^4\sin^{-1}(ax)+\frac{9x\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{32a^3}+\\
&= -\frac{45x\sqrt{1-a^2x^2}}{256a^3}-\frac{3x^3\sqrt{1-a^2x^2}}{128a}-\frac{9x^2\sin^{-1}(ax)}{32a^2}-\frac{3}{32}x^4\sin^{-1}(ax)+\frac{9x\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{32a^3}+\\
&= -\frac{45x\sqrt{1-a^2x^2}}{256a^3}-\frac{3x^3\sqrt{1-a^2x^2}}{128a}+\frac{45\sin^{-1}(ax)}{256a^4}-\frac{9x^2\sin^{-1}(ax)}{32a^2}-\frac{3}{32}x^4\sin^{-1}(ax)+
\end{aligned}
$$

Mathematica [A] time = 0.0483489, size = 112, normalized size = 0.67

$$\frac{-3ax\sqrt{1-a^2x^2}\left(2a^2x^2+15\right)+8\left(8a^4x^4-3\right)\sin^{-1}(ax)^3+24ax\sqrt{1-a^2x^2}\left(2a^2x^2+3\right)\sin^{-1}(ax)^2-3\left(8a^4x^4+24a^2x^2-\right.}{256a^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*ArcSin[a*x]^3,x]
```

```
[Out] (-3*a*x*Sqrt[1 - a^2*x^2]*(15 + 2*a^2*x^2) - 3*(-15 + 24*a^2*x^2 + 8*a^4*x^
4)*ArcSin[a*x] + 24*a*x*Sqrt[1 - a^2*x^2]*(3 + 2*a^2*x^2)*ArcSin[a*x]^2 + 8
*(-3 + 8*a^4*x^4)*ArcSin[a*x]^3)/(256*a^4)
```

Maple [A] time = 0.06, size = 154, normalized size = 0.9

$$\frac{1}{a^4}\left(\frac{a^4x^4\left(\arcsin(ax)\right)^3}{4}-\frac{3\left(\arcsin(ax)\right)^2}{32}\left(-2a^3x^3\sqrt{-a^2x^2+1}-3ax\sqrt{-a^2x^2+1}+3\arcsin(ax)\right)-\frac{3a^4x^4\arcsin(ax}{32}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*arcsin(a*x)^3,x)
```

```
[Out] 1/a^4*(1/4*a^4*x^4*arcsin(a*x)^3-3/32*arcsin(a*x)^2*(-2*a^3*x^3*(-a^2*x^2+1
)^(1/2)-3*a*x*(-a^2*x^2+1)^(1/2)+3*arcsin(a*x))-3/32*a^4*x^4*arcsin(a*x)-3/
256*a*x*(2*a^2*x^2+3)*(-a^2*x^2+1)^(1/2)-27/256*arcsin(a*x)-9/32*(a^2*x^2-1
)*arcsin(a*x)-9/64*a*x*(-a^2*x^2+1)^(1/2)+3/16*arcsin(a*x)^3)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{1}{4}x^4\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^3+3a\int\frac{\sqrt{ax+1}\sqrt{-ax+1}x^4\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2}{4\left(a^2x^2-1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*x^4*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3 + 3*a*integrate(1/4*sq
rt(a*x + 1)*sqrt(-a*x + 1)*x^4*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2
/(a^2*x^2 - 1), x)
```

Fricas [A] time = 2.05025, size = 234, normalized size = 1.4

$$\frac{8\left(8\,a^4x^4-3\right)\arcsin\left(ax\right)^3-3\left(8\,a^4x^4+24\,a^2x^2-15\right)\arcsin\left(ax\right)-3\left(2\,a^3x^3-8\left(2\,a^3x^3+3\,ax\right)\arcsin\left(ax\right)^2+15\,ax\right)\sqrt{-}}{256\,a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/256*(8*(8*a^4*x^4 - 3)*arcsin(a*x)^3 - 3*(8*a^4*x^4 + 24*a^2*x^2 - 15)*ar
csin(a*x) - 3*(2*a^3*x^3 - 8*(2*a^3*x^3 + 3*a*x)*arcsin(a*x)^2 + 15*a*x)*sq
rt(-a^2*x^2 + 1))/a^4
```

Sympy [A] time = 6.94277, size = 160, normalized size = 0.96

$$\begin{cases}\frac{x^4\operatorname{asin}^3(ax)}{4}-\frac{3x^4\operatorname{asin}(ax)}{32}+\frac{3x^3\sqrt{-a^2x^2+1}\operatorname{asin}^2(ax)}{16a}-\frac{3x^3\sqrt{-a^2x^2+1}}{128a}-\frac{9x^2\operatorname{asin}(ax)}{32a^2}+\frac{9x\sqrt{-a^2x^2+1}\operatorname{asin}^2(ax)}{32a^3}-\frac{45x\sqrt{-a^2x^2+1}}{256a^3}-\frac{3\operatorname{asin}^3(ax)}{32a^4} \\ 0\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*asin(a*x)**3,x)
```

```
[Out] Piecewise((x**4*asin(a*x)**3/4 - 3*x**4*asin(a*x)/32 + 3*x**3*sqrt(-a**2*x*
*2 + 1)*asin(a*x)**2/(16*a) - 3*x**3*sqrt(-a**2*x**2 + 1)/(128*a) - 9*x**2*
asin(a*x)/(32*a**2) + 9*x*sqrt(-a**2*x**2 + 1)*asin(a*x)**2/(32*a**3) - 45*
x*sqrt(-a**2*x**2 + 1)/(256*a**3) - 3*asin(a*x)**3/(32*a**4) + 45*asin(a*x)
/(256*a**4), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.30246, size = 250, normalized size = 1.5

$$-\frac{3\left(-a^2x^2+1\right)^{\frac{3}{2}}x\arcsin\left(ax\right)^2}{16\,a^3}+\frac{\left(a^2x^2-1\right)^2\arcsin\left(ax\right)^3}{4\,a^4}+\frac{15\,\sqrt{-a^2x^2+1}x\arcsin\left(ax\right)^2}{32\,a^3}+\frac{\left(a^2x^2-1\right)\arcsin\left(ax\right)^3}{2\,a^4}+$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -3/16*(-a^2*x^2 + 1)^(3/2)*x*arcsin(a*x)^2/a^3 + 1/4*(a^2*x^2 - 1)^2*arcsin
(a*x)^3/a^4 + 15/32*sqrt(-a^2*x^2 + 1)*x*arcsin(a*x)^2/a^3 + 1/2*(a^2*x^2 -
 1)*arcsin(a*x)^3/a^4 + 3/128*(-a^2*x^2 + 1)^(3/2)*x/a^3 - 3/32*(a^2*x^2 -
1)^2*arcsin(a*x)/a^4 + 5/32*arcsin(a*x)^3/a^4 - 51/256*sqrt(-a^2*x^2 + 1)*x
/a^3 - 15/32*(a^2*x^2 - 1)*arcsin(a*x)/a^4 - 51/256*arcsin(a*x)/a^4
```

3.24 $\int x^2 \sin^{-1}(ax)^3 \, dx$

Optimal. Leaf size=136

$$\frac{2\left(1-a^2x^2\right)^{3/2}}{27a^3}-\frac{14\sqrt{1-a^2x^2}}{9a^3}+\frac{x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{3a}+\frac{2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{3a^3}-\frac{4x\sin^{-1}(ax)}{3a^2}+\frac{1}{3}x^3\sin^{-1}(ax)^3-\frac{2}{9}x$$

```
[Out] (-14*Sqrt[1 - a^2*x^2])/(9*a^3) + (2*(1 - a^2*x^2)^(3/2))/(27*a^3) - (4*x*A
rcSin[a*x])/(3*a^2) - (2*x^3*ArcSin[a*x])/9 + (2*Sqrt[1 - a^2*x^2]*ArcSin[a
*x]^2)/(3*a^3) + (x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(3*a) + (x^3*ArcSin[
a*x]^3)/3
```

Rubi [A] time = 0.224747, antiderivative size = 136, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.7, Rules used = {4627, 4707, 4677, 4619, 261, 266, 43}

$$\frac{2\left(1-a^2x^2\right)^{3/2}}{27a^3}-\frac{14\sqrt{1-a^2x^2}}{9a^3}+\frac{x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{3a}+\frac{2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{3a^3}-\frac{4x\sin^{-1}(ax)}{3a^2}+\frac{1}{3}x^3\sin^{-1}(ax)^3-\frac{2}{9}x$$

Antiderivative was successfully verified.

```
[In] Int[x^2*ArcSin[a*x]^3,x]
```

```
[Out] (-14*Sqrt[1 - a^2*x^2])/(9*a^3) + (2*(1 - a^2*x^2)^(3/2))/(27*a^3) - (4*x*A
rcSin[a*x])/(3*a^2) - (2*x^3*ArcSin[a*x])/9 + (2*Sqrt[1 - a^2*x^2]*ArcSin[a
*x]^2)/(3*a^3) + (x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(3*a) + (x^3*ArcSin[
a*x]^3)/3
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 261

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

Rule 266

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rubi steps

$$
\begin{aligned}
\int x^2 \sin^{-1}(ax)^3\,dx &= \frac{1}{3}x^3\sin^{-1}(ax)^3 - a\int \frac{x^3\sin^{-1}(ax)^2}{\sqrt{1-a^2x^2}}\,dx \\
&= \frac{x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{3a} + \frac{1}{3}x^3\sin^{-1}(ax)^3 - \frac{2}{3}\int x^2\sin^{-1}(ax)\,dx - \frac{2\int \frac{x\sin^{-1}(ax)^2}{\sqrt{1-a^2x^2}}\,dx}{3a} \\
&= -\frac{2}{9}x^3\sin^{-1}(ax) + \frac{2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{3a^3} + \frac{x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{3a} + \frac{1}{3}x^3\sin^{-1}(ax)^3 - \frac{4\int \sin^{-1}(a}{3a^2} \\
&= -\frac{4x\sin^{-1}(ax)}{3a^2} - \frac{2}{9}x^3\sin^{-1}(ax) + \frac{2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{3a^3} + \frac{x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{3a} + \frac{1}{3}x^3\sin^{-1}(ax \\
&= -\frac{4\sqrt{1-a^2x^2}}{3a^3} - \frac{4x\sin^{-1}(ax)}{3a^2} - \frac{2}{9}x^3\sin^{-1}(ax) + \frac{2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{3a^3} + \frac{x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{3a} + \\
&= -\frac{14\sqrt{1-a^2x^2}}{9a^3} + \frac{2\left(1-a^2x^2\right)^{3/2}}{27a^3} - \frac{4x\sin^{-1}(ax)}{3a^2} - \frac{2}{9}x^3\sin^{-1}(ax) + \frac{2\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{3a^3} + \frac{x^2\sqrt{1 -}}{}
\end{aligned}
$$

Mathematica [A] time = 0.0446312, size = 95, normalized size = 0.7

$$
\frac{-2\sqrt{1-a^2x^2}\left(a^2x^2+20\right) + 9a^3x^3\sin^{-1}(ax)^3 + 9\sqrt{1-a^2x^2}\left(a^2x^2+2\right)\sin^{-1}(ax)^2 - 6ax\left(a^2x^2+6\right)\sin^{-1}(ax)}{27a^3}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*ArcSin[a*x]^3,x]
```

```
[Out] (-2*Sqrt[1 - a^2*x^2]*(20 + a^2*x^2) - 6*a*x*(6 + a^2*x^2)*ArcSin[a*x] + 9*
Sqrt[1 - a^2*x^2]*(2 + a^2*x^2)*ArcSin[a*x]^2 + 9*a^3*x^3*ArcSin[a*x]^3)/(2
7*a^3)
```

Maple [A] time = 0.045, size = 106, normalized size = 0.8

$$
\frac{1}{a^3}\left(\frac{a^3x^3\left(\arcsin(ax)\right)^3}{3} + \frac{\left(\arcsin(ax)\right)^2\left(a^2x^2+2\right)}{3}\sqrt{-a^2x^2+1} - \frac{4}{3}\sqrt{-a^2x^2+1} - \frac{4\,ax\arcsin(ax)}{3} - \frac{2\,a^3x^3\arcsin(ax)}{9} -
\right.
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*arcsin(a*x)^3,x)
```

```
[Out] 1/a^3*(1/3*a^3*x^3*arcsin(a*x)^3+1/3*arcsin(a*x)^2*(a^2*x^2+2)*(-a^2*x^2+1)
^(1/2)-4/3*(-a^2*x^2+1)^(1/2)-4/3*a*x*arcsin(a*x)-2/9*a^3*x^3*arcsin(a*x)-2
/27*(a^2*x^2+2)*(-a^2*x^2+1)^(1/2))
```

Maxima [A] time = 1.72559, size = 162, normalized size = 1.19

$$\frac{1}{3}\,x^3\arcsin\left(ax\right)^3+\frac{1}{3}\,a\left(\frac{\sqrt{-a^2x^2+1}x^2}{a^2}+\frac{2\sqrt{-a^2x^2+1}}{a^4}\right)\arcsin\left(ax\right)^2-\frac{2}{27}\,a\left(\frac{\sqrt{-a^2x^2+1}x^2+\frac{20\sqrt{-a^2x^2+1}}{a^2}}{a^2}+\frac{3\left(a^2x^3+6\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*x^3*arcsin(a*x)^3 + 1/3*a*(sqrt(-a^2*x^2 + 1)*x^2/a^2 + 2*sqrt(-a^2*x^2
 + 1)/a^4)*arcsin(a*x)^2 - 2/27*a*((sqrt(-a^2*x^2 + 1)*x^2 + 20*sqrt(-a^2*x
^2 + 1)/a^2)/a^2 + 3*(a^2*x^3 + 6*x)*arcsin(a*x)/a^3)
```

Fricas [A] time = 2.16897, size = 189, normalized size = 1.39

$$\frac{9\,a^3x^3\arcsin\left(ax\right)^3-6\left(a^3x^3+6\,ax\right)\arcsin\left(ax\right)-\left(2\,a^2x^2-9\left(a^2x^2+2\right)\arcsin\left(ax\right)^2+40\right)\sqrt{-a^2x^2+1}}{27\,a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/27*(9*a^3*x^3*arcsin(a*x)^3 - 6*(a^3*x^3 + 6*a*x)*arcsin(a*x) - (2*a^2*x^
2 - 9*(a^2*x^2 + 2)*arcsin(a*x)^2 + 40)*sqrt(-a^2*x^2 + 1))/a^3
```

Sympy [A] time = 5.89492, size = 128, normalized size = 0.94

$$\begin{cases} \frac{x^3\operatorname{asin}^3\left(ax\right)}{3}-\frac{2x^3\operatorname{asin}\left(ax\right)}{9}+\frac{x^2\sqrt{-a^2x^2+1}\operatorname{asin}^2\left(ax\right)}{3a}-\frac{2x^2\sqrt{-a^2x^2+1}}{27a}-\frac{4x\operatorname{asin}\left(ax\right)}{3a^2}+\frac{2\sqrt{-a^2x^2+1}\operatorname{asin}^2\left(ax\right)}{3a^3}-\frac{40\sqrt{-a^2x^2+1}}{27a^3} & \text{for}\ a\neq 0\\ 0 & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*asin(a*x)**3,x)
```

```
[Out] Piecewise((x**3*asin(a*x)**3/3 - 2*x**3*asin(a*x)/9 + x**2*sqrt(-a**2*x**2
+ 1)*asin(a*x)**2/(3*a) - 2*x**2*sqrt(-a**2*x**2 + 1)/(27*a) - 4*x*asin(a*x
)/(3*a**2) + 2*sqrt(-a**2*x**2 + 1)*asin(a*x)**2/(3*a**3) - 40*sqrt(-a**2*x
**2 + 1)/(27*a**3), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.29957, size = 192, normalized size = 1.41

$$\frac{\left(a^{2}x^{2}-1\right)x\arcsin\left(ax\right)^{3}}{3\,a^{2}}+\frac{x\arcsin\left(ax\right)^{3}}{3\,a^{2}}-\frac{2\left(a^{2}x^{2}-1\right)x\arcsin\left(ax\right)}{9\,a^{2}}-\frac{\left(-a^{2}x^{2}+1\right)^{\frac{3}{2}}\arcsin\left(ax\right)^{2}}{3\,a^{3}}-\frac{14\,x\arcsin\left(ax\right)}{9\,a^{2}}+$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*(a^2*x^2 - 1)*x*arcsin(a*x)^3/a^2 + 1/3*x*arcsin(a*x)^3/a^2 - 2/9*(a^2*
x^2 - 1)*x*arcsin(a*x)/a^2 - 1/3*(-a^2*x^2 + 1)^(3/2)*arcsin(a*x)^2/a^3 - 1
4/9*x*arcsin(a*x)/a^2 + sqrt(-a^2*x^2 + 1)*arcsin(a*x)^2/a^3 + 2/27*(-a^2*x
^2 + 1)^(3/2)/a^3 - 14/9*sqrt(-a^2*x^2 + 1)/a^3
```

3.25 $\int x \sin^{-1}(ax)^3 \, dx$

Optimal. Leaf size=99

$$-\frac{3x\sqrt{1-a^2x^2}}{8a}+\frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4a}-\frac{\sin^{-1}(ax)^3}{4a^2}+\frac{3\sin^{-1}(ax)}{8a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^3-\frac{3}{4}x^2\sin^{-1}(ax)$$

```
[Out] (-3*x*Sqrt[1 - a^2*x^2])/(8*a) + (3*ArcSin[a*x])/(8*a^2) - (3*x^2*ArcSin[a*
x])/4 + (3*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(4*a) - ArcSin[a*x]^3/(4*a^2)
 + (x^2*ArcSin[a*x]^3)/2
```

Rubi [A] time = 0.155988, antiderivative size = 99, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {4627, 4707, 4641, 321, 216}

$$-\frac{3x\sqrt{1-a^2x^2}}{8a}+\frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4a}-\frac{\sin^{-1}(ax)^3}{4a^2}+\frac{3\sin^{-1}(ax)}{8a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^3-\frac{3}{4}x^2\sin^{-1}(ax)$$

Antiderivative was successfully verified.

```
[In] Int[x*ArcSin[a*x]^3,x]
```

```
[Out] (-3*x*Sqrt[1 - a^2*x^2])/(8*a) + (3*ArcSin[a*x])/(8*a^2) - (3*x^2*ArcSin[a*
x])/4 + (3*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(4*a) - ArcSin[a*x]^3/(4*a^2)
 + (x^2*ArcSin[a*x]^3)/2
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

```
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 321

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

Rule 216

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

Rubi steps

$$\begin{aligned}
\int x \sin^{-1}(ax)^3\,dx &= \frac{1}{2}x^2 \sin^{-1}(ax)^3 - \frac{1}{2}(3a)\int \frac{x^2 \sin^{-1}(ax)^2}{\sqrt{1-a^2x^2}}\,dx\\
&= \frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4a} + \frac{1}{2}x^2 \sin^{-1}(ax)^3 - \frac{3}{2}\int x \sin^{-1}(ax)\,dx - \frac{3\int \frac{\sin^{-1}(ax)^2}{\sqrt{1-a^2x^2}}\,dx}{4a}\\
&= -\frac{3}{4}x^2 \sin^{-1}(ax) + \frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4a} - \frac{\sin^{-1}(ax)^3}{4a^2} + \frac{1}{2}x^2 \sin^{-1}(ax)^3 + \frac{1}{4}(3a)\int \frac{x^2}{\sqrt{1-a^2x^2}}\,dx\\
&= -\frac{3x\sqrt{1-a^2x^2}}{8a} - \frac{3}{4}x^2 \sin^{-1}(ax) + \frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4a} - \frac{\sin^{-1}(ax)^3}{4a^2} + \frac{1}{2}x^2 \sin^{-1}(ax)^3 +\\
&= -\frac{3x\sqrt{1-a^2x^2}}{8a} + \frac{3\sin^{-1}(ax)}{8a^2} - \frac{3}{4}x^2 \sin^{-1}(ax) + \frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4a} - \frac{\sin^{-1}(ax)^3}{4a^2} + \frac{1}{2}x^2 \sin^{-1}
\end{aligned}$$

Mathematica [A] time = 0.025192, size = 82, normalized size = 0.83

$$\frac{-3ax\sqrt{1-a^2x^2} + \left(4a^2x^2-2\right)\sin^{-1}(ax)^3 + 6ax\sqrt{1-a^2x^2}\sin^{-1}(ax)^2 + \left(3-6a^2x^2\right)\sin^{-1}(ax)}{8a^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x*ArcSin[a*x]^3,x]
```

```
[Out] (-3*a*x*Sqrt[1 - a^2*x^2] + (3 - 6*a^2*x^2)*ArcSin[a*x] + 6*a*x*Sqrt[1 - a^
2*x^2]*ArcSin[a*x]^2 + (-2 + 4*a^2*x^2)*ArcSin[a*x]^3)/(8*a^2)
```

Maple [A] time = 0.041, size = 96, normalized size = 1.

$$\frac{1}{a^2}\left(\frac{\left(a^2x^2-1\right)(\arcsin(ax))^3}{2}+\frac{3\,(\arcsin(ax))^2}{4}\left(ax\sqrt{-a^2x^2+1}+\arcsin(ax)\right)-\frac{\left(3\,a^2x^2-3\right)\arcsin(ax)}{4}-\frac{3\,ax}{8}\sqrt{-a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*arcsin(a*x)^3,x)
```

```
[Out] 1/a^2*(1/2*(a^2*x^2-1)*arcsin(a*x)^3+3/4*arcsin(a*x)^2*(a*x*(-a^2*x^2+1)^(1
/2)+arcsin(a*x))-3/4*(a^2*x^2-1)*arcsin(a*x)-3/8*a*x*(-a^2*x^2+1)^(1/2)-3/8
*arcsin(a*x)-1/2*arcsin(a*x)^3)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{1}{2}\,x^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^3+3\,a\int\frac{\sqrt{ax+1}\sqrt{-ax+1}x^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2}{2\left(a^2x^2-1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*x^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3 + 3*a*integrate(1/2*sq
rt(a*x + 1)*sqrt(-a*x + 1)*x^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2
/(a^2*x^2 - 1), x)
```

Fricas [A] time = 2.03548, size = 170, normalized size = 1.72

$$\frac{2\left(2\,a^2x^2-1\right)\arcsin(ax)^3-3\left(2\,a^2x^2-1\right)\arcsin(ax)+3\,\sqrt{-a^2x^2+1}\left(2\,ax\arcsin(ax)^2-ax\right)}{8\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*(2*(2*a^2*x^2 - 1)*arcsin(a*x)^3 - 3*(2*a^2*x^2 - 1)*arcsin(a*x) + 3*sq
rt(-a^2*x^2 + 1)*(2*a*x*arcsin(a*x)^2 - a*x))/a^2
```

Sympy [A] time = 1.60898, size = 92, normalized size = 0.93

$$\begin{cases} \frac{x^{2} \operatorname{asin}^{3}{\left(ax \right)}}{2} - \frac{3x^{2} \operatorname{asin}{\left(ax \right)}}{4} + \frac{3x\sqrt{-a^{2}x^{2}+1} \operatorname{asin}^{2}{\left(ax \right)}}{4a} - \frac{3x\sqrt{-a^{2}x^{2}+1}}{8a} - \frac{\operatorname{asin}^{3}{\left(ax \right)}}{4a^{2}} + \frac{3 \operatorname{asin}{\left(ax \right)}}{8a^{2}} & \text{for}\: a \neq 0 \\ 0 & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*asin(a*x)**3,x)
```

```
[Out] Piecewise((x**2*asin(a*x)**3/2 - 3*x**2*asin(a*x)/4 + 3*x*sqrt(-a**2*x**2 +
 1)*asin(a*x)**2/(4*a) - 3*x*sqrt(-a**2*x**2 + 1)/(8*a) - asin(a*x)**3/(4*a
**2) + 3*asin(a*x)/(8*a**2), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.30534, size = 136, normalized size = 1.37

$$\frac{3\,\sqrt{-a^{2}x^{2}+1}x \arcsin\left(ax\right)^{2}}{4\,a} + \frac{\left(a^{2}x^{2}-1\right)\arcsin\left(ax\right)^{3}}{2\,a^{2}} + \frac{\arcsin\left(ax\right)^{3}}{4\,a^{2}} - \frac{3\,\sqrt{-a^{2}x^{2}+1}x}{8\,a} - \frac{3\left(a^{2}x^{2}-1\right)\arcsin\left(ax\right)}{4\,a^{2}} - 3\,\mathrm{ar}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 3/4*sqrt(-a^2*x^2 + 1)*x*arcsin(a*x)^2/a + 1/2*(a^2*x^2 - 1)*arcsin(a*x)^3/
a^2 + 1/4*arcsin(a*x)^3/a^2 - 3/8*sqrt(-a^2*x^2 + 1)*x/a - 3/4*(a^2*x^2 - 1
)*arcsin(a*x)/a^2 - 3/8*arcsin(a*x)/a^2
```

3.26 $\int \sin^{-1}(ax)^3\,dx$

Optimal. Leaf size=60

$$-\frac{6\sqrt{1-a^2x^2}}{a}+\frac{3\sqrt{1-a^2x^2}\,\sin^{-1}(ax)^2}{a}+x\sin^{-1}(ax)^3-6x\sin^{-1}(ax)$$

```
[Out] (-6*Sqrt[1 - a^2*x^2])/a - 6*x*ArcSin[a*x] + (3*Sqrt[1 - a^2*x^2]*ArcSin[a*
x]^2)/a + x*ArcSin[a*x]^3
```

Rubi [A] time = 0.0801758, antiderivative size = 60, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4619, 4677, 261}

$$-\frac{6\sqrt{1-a^2x^2}}{a}+\frac{3\sqrt{1-a^2x^2}\,\sin^{-1}(ax)^2}{a}+x\sin^{-1}(ax)^3-6x\sin^{-1}(ax)$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^3,x]
```

```
[Out] (-6*Sqrt[1 - a^2*x^2])/a - 6*x*ArcSin[a*x] + (3*Sqrt[1 - a^2*x^2]*ArcSin[a*
x]^2)/a + x*ArcSin[a*x]^3
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 261

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

Rubi steps

$$
\begin{aligned}
\int \sin^{-1}(ax)^3\,dx &= x\sin^{-1}(ax)^3-(3a)\int \frac{x\sin^{-1}(ax)^2}{\sqrt{1-a^2x^2}}\,dx\\
&= \frac{3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{a}+x\sin^{-1}(ax)^3-6\int \sin^{-1}(ax)\,dx\\
&= -6x\sin^{-1}(ax)+\frac{3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{a}+x\sin^{-1}(ax)^3+(6a)\int \frac{x}{\sqrt{1-a^2x^2}}\,dx\\
&= -\frac{6\sqrt{1-a^2x^2}}{a}-6x\sin^{-1}(ax)+\frac{3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{a}+x\sin^{-1}(ax)^3
\end{aligned}
$$

Mathematica [A] time = 0.0112293, size = 60, normalized size = 1.

$$
-\frac{6\sqrt{1-a^2x^2}}{a}+\frac{3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{a}+x\sin^{-1}(ax)^3-6x\sin^{-1}(ax)
$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]^3,x]
```

```
[Out] (-6*Sqrt[1 - a^2*x^2])/a - 6*x*ArcSin[a*x] + (3*Sqrt[1 - a^2*x^2]*ArcSin[a*
x]^2)/a + x*ArcSin[a*x]^3
```

Maple [A] time = 0.024, size = 57, normalized size = 1.

$$
\frac{1}{a}\left(ax\left(\arcsin(ax)\right)^3+3\left(\arcsin(ax)\right)^2\sqrt{-a^2x^2+1}-6\sqrt{-a^2x^2+1}-6\,ax\arcsin(ax)\right)
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^3,x)
```

```
[Out] 1/a*(a*x*arcsin(a*x)^3+3*arcsin(a*x)^2*(-a^2*x^2+1)^(1/2)-6*(-a^2*x^2+1)^(1
/2)-6*a*x*arcsin(a*x))
```

Maxima [A] time = 1.68067, size = 77, normalized size = 1.28

$$x \arcsin(ax)^3 + \frac{3\sqrt{-a^2x^2+1}\arcsin(ax)^2}{a} - \frac{6\left(ax\arcsin(ax)+\sqrt{-a^2x^2+1}\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x*arcsin(a*x)^3 + 3*sqrt(-a^2*x^2 + 1)*arcsin(a*x)^2/a - 6*(a*x*arcsin(a*x)
 + sqrt(-a^2*x^2 + 1))/a
```

Fricas [A] time = 2.04743, size = 116, normalized size = 1.93

$$\frac{ax\arcsin(ax)^3 - 6\,ax\arcsin(ax) + 3\sqrt{-a^2x^2+1}\left(\arcsin(ax)^2-2\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (a*x*arcsin(a*x)^3 - 6*a*x*arcsin(a*x) + 3*sqrt(-a^2*x^2 + 1)*(arcsin(a*x)^
2 - 2))/a
```

Sympy [A] time = 0.832359, size = 54, normalized size = 0.9

$$\begin{cases} x\operatorname{asin}^3(ax) - 6x\operatorname{asin}(ax) + \frac{3\sqrt{-a^2x^2+1}\operatorname{asin}^2(ax)}{a} - \frac{6\sqrt{-a^2x^2+1}}{a} & \text{for } a \neq 0 \\ 0 & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**3,x)
```

```
[Out] Piecewise((x*asin(a*x)**3 - 6*x*asin(a*x) + 3*sqrt(-a**2*x**2 + 1)*asin(a*x
)**2/a - 6*sqrt(-a**2*x**2 + 1)/a, Ne(a, 0)), (0, True))
```

Giac [A] time = 1.36035, size = 76, normalized size = 1.27

$$x\arcsin(ax)^3 - 6\,x\arcsin(ax) + \frac{3\,\sqrt{-a^2x^2+1}\arcsin(ax)^2}{a} - \frac{6\,\sqrt{-a^2x^2+1}}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x*arcsin(a*x)^3 - 6*x*arcsin(a*x) + 3*sqrt(-a^2*x^2 + 1)*arcsin(a*x)^2/a -
6*sqrt(-a^2*x^2 + 1)/a
```

3.27 $\int \frac{\sin^{-1}(ax)^3}{x}\,dx$

Optimal. Leaf size=97

$$-\frac{3}{2}i\sin^{-1}(ax)^2\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)+\frac{3}{2}\sin^{-1}(ax)\text{PolyLog}\left(3,e^{2i\sin^{-1}(ax)}\right)+\frac{3}{4}i\text{PolyLog}\left(4,e^{2i\sin^{-1}(ax)}\right)-\frac{1}{4}i\sin^{-1}($$

```
[Out] (-I/4)*ArcSin[a*x]^4 + ArcSin[a*x]^3*Log[1 - E^((2*I)*ArcSin[a*x])] - ((3*I
)/2)*ArcSin[a*x]^2*PolyLog[2, E^((2*I)*ArcSin[a*x])] + (3*ArcSin[a*x]*PolyL
og[3, E^((2*I)*ArcSin[a*x])])/2 + ((3*I)/4)*PolyLog[4, E^((2*I)*ArcSin[a*x]
)]
```

Rubi [A] time = 0.108999, antiderivative size = 97, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.7, Rules used = {4625, 3717, 2190, 2531, 6609, 2282, 6589}

$$-\frac{3}{2}i\sin^{-1}(ax)^2\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)+\frac{3}{2}\sin^{-1}(ax)\text{PolyLog}\left(3,e^{2i\sin^{-1}(ax)}\right)+\frac{3}{4}i\text{PolyLog}\left(4,e^{2i\sin^{-1}(ax)}\right)-\frac{1}{4}i\sin^{-1}($$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^3/x,x]
```

```
[Out] (-I/4)*ArcSin[a*x]^4 + ArcSin[a*x]^3*Log[1 - E^((2*I)*ArcSin[a*x])] - ((3*I
)/2)*ArcSin[a*x]^2*PolyLog[2, E^((2*I)*ArcSin[a*x])] + (3*ArcSin[a*x]*PolyL
og[3, E^((2*I)*ArcSin[a*x])])/2 + ((3*I)/4)*PolyLog[4, E^((2*I)*ArcSin[a*x]
)]
```

Rule 4625

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n/Tan[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Rule 3717

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[(I*(c + d*x)^(m + 1))/(d*(m + 1)), x] - Dist[2*I, Int[((c + d*x)^
m*E^(2*I*k*Pi)*E^(2*I*(e + f*x)))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x))), x],
 x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

Rule 2190

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m*Log[1 + (b*(F^(g*(e + f*x)))^n)/a])/(b*f*g*n*Log[F]), x] - Di
st[(d*m)/(b*f*g*n*Log[F]), Int[(c + d*x)^(m - 1)*Log[1 + (b*(F^(g*(e + f*x)
))^n)/a], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2531

```
Int[Log[1 + (e_.)*((F_)^((c_.)*((a_.) + (b_.)*(x_))))^(n_.)]*((f_.) + (g_.)
*(x_))^(m_.), x_Symbol] :> -Simp[((f + g*x)^m*PolyLog[2, -(e*(F^(c*(a + b*x
)))^n)])/(b*c*n*Log[F]), x] + Dist[(g*m)/(b*c*n*Log[F]), Int[(f + g*x)^(m -
 1)*PolyLog[2, -(e*(F^(c*(a + b*x)))^n)], x], x] /; FreeQ[{F, a, b, c, e, f
, g, n}, x] && GtQ[m, 0]
```

Rule 6609

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

Rule 2282

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Dist[v/D[v, x]
, Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Functi
onOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ[
{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))*
(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

Rule 6589

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\begin{aligned}\int \frac{\sin^{-1}(ax)^3}{x}\,dx &= \text{Subst}\Big(\int x^3\cot(x)\,dx, x, \sin^{-1}(ax)\Big)\\
&= -\frac{1}{4}i\sin^{-1}(ax)^4 - 2i\,\text{Subst}\Big(\int \frac{e^{2ix}x^3}{1-e^{2ix}}\,dx, x, \sin^{-1}(ax)\Big)\\
&= -\frac{1}{4}i\sin^{-1}(ax)^4 + \sin^{-1}(ax)^3\log\Big(1-e^{2i\sin^{-1}(ax)}\Big) - 3\,\text{Subst}\Big(\int x^2\log\big(1-e^{2ix}\big)\,dx, x, \sin^{-1}(ax)\Big)\\
&= -\frac{1}{4}i\sin^{-1}(ax)^4 + \sin^{-1}(ax)^3\log\Big(1-e^{2i\sin^{-1}(ax)}\Big) - \frac{3}{2}i\sin^{-1}(ax)^2\text{Li}_2\Big(e^{2i\sin^{-1}(ax)}\Big) + 3i\,\text{Subst}\Big(\int x\text{Li}\\
&= -\frac{1}{4}i\sin^{-1}(ax)^4 + \sin^{-1}(ax)^3\log\Big(1-e^{2i\sin^{-1}(ax)}\Big) - \frac{3}{2}i\sin^{-1}(ax)^2\text{Li}_2\Big(e^{2i\sin^{-1}(ax)}\Big) + \frac{3}{2}\sin^{-1}(ax)\text{Li}_3\Big(\\
&= -\frac{1}{4}i\sin^{-1}(ax)^4 + \sin^{-1}(ax)^3\log\Big(1-e^{2i\sin^{-1}(ax)}\Big) - \frac{3}{2}i\sin^{-1}(ax)^2\text{Li}_2\Big(e^{2i\sin^{-1}(ax)}\Big) + \frac{3}{2}\sin^{-1}(ax)\text{Li}_3\Big(\\
&= -\frac{1}{4}i\sin^{-1}(ax)^4 + \sin^{-1}(ax)^3\log\Big(1-e^{2i\sin^{-1}(ax)}\Big) - \frac{3}{2}i\sin^{-1}(ax)^2\text{Li}_2\Big(e^{2i\sin^{-1}(ax)}\Big) + \frac{3}{2}\sin^{-1}(ax)\text{Li}_3\Big(\end{aligned}$$

Mathematica [A] time = 0.0556827, size = 97, normalized size = 1.

$$-\frac{1}{64}i\Big(-96\sin^{-1}(ax)^2\text{PolyLog}\Big(2, e^{-2i\sin^{-1}(ax)}\Big) + 96i\sin^{-1}(ax)\text{PolyLog}\Big(3, e^{-2i\sin^{-1}(ax)}\Big) + 48\text{PolyLog}\Big(4, e^{-2i\sin^{-1}(ax)}\Big)$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^3/x,x]
```

```
[Out] (-I/64)*(Pi^4 - 16*ArcSin[a*x]^4 + (64*I)*ArcSin[a*x]^3*Log[1 - E^((-2*I)*A
rcSin[a*x])] - 96*ArcSin[a*x]^2*PolyLog[2, E^((-2*I)*ArcSin[a*x])] + (96*I)
*ArcSin[a*x]*PolyLog[3, E^((-2*I)*ArcSin[a*x])] + 48*PolyLog[4, E^((-2*I)*A
rcSin[a*x])])
```

Maple [A] time = 0.046, size = 229, normalized size = 2.4

$$-\frac{i}{4}(\arcsin(ax))^4 + (\arcsin(ax))^3\ln\Big(1+iax+\sqrt{-a^2x^2+1}\Big) - 3i(\arcsin(ax))^2\,\text{polylog}\Big(2, -iax-\sqrt{-a^2x^2+1}\Big) + 6$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^3/x,x)
```

```
[Out] -1/4*I*arcsin(a*x)^4+arcsin(a*x)^3*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))-3*I*arcsi
n(a*x)^2*polylog(2,-I*a*x-(-a^2*x^2+1)^(1/2))+6*arcsin(a*x)*polylog(3,-I*a*
x-(-a^2*x^2+1)^(1/2))+6*I*polylog(4,-I*a*x-(-a^2*x^2+1)^(1/2))+arcsin(a*x)^
3*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))-3*I*arcsin(a*x)^2*polylog(2,I*a*x+(-a^2*x^
2+1)^(1/2))+6*arcsin(a*x)*polylog(3,I*a*x+(-a^2*x^2+1)^(1/2))+6*I*polylog(4
,I*a*x+(-a^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin(ax)^3}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(arcsin(a*x)^3/x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\arcsin(ax)^3}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(arcsin(a*x)^3/x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^3(ax)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**3/x,x)
```

```
[Out] Integral(asin(a*x)**3/x, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin{(ax)}^{3}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(arcsin(a*x)^3/x, x)
```

3.28 $\int \frac{\sin^{-1}(ax)^3}{x^2}\,dx$

Optimal. Leaf size=108

$$6ia\sin^{-1}(ax)\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-6ia\sin^{-1}(ax)\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-6a\text{PolyLog}\left(3,-e^{i\sin^{-1}(ax)}\right)+6a\text{PolyLog}$$

```
[Out] -(ArcSin[a*x]^3/x) - 6*a*ArcSin[a*x]^2*ArcTanh[E^(I*ArcSin[a*x])] + (6*I)*a
*ArcSin[a*x]*PolyLog[2, -E^(I*ArcSin[a*x])] - (6*I)*a*ArcSin[a*x]*PolyLog[2
, E^(I*ArcSin[a*x])] - 6*a*PolyLog[3, -E^(I*ArcSin[a*x])] + 6*a*PolyLog[3,
E^(I*ArcSin[a*x])]
```

Rubi [A] time = 0.1632, antiderivative size = 108, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 6, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}} = 0.6$, Rules used = {4627, 4709, 4183, 2531, 2282, 6589}

$$6ia\sin^{-1}(ax)\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-6ia\sin^{-1}(ax)\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-6a\text{PolyLog}\left(3,-e^{i\sin^{-1}(ax)}\right)+6a\text{PolyLog}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^3/x^2,x]
```

```
[Out] -(ArcSin[a*x]^3/x) - 6*a*ArcSin[a*x]^2*ArcTanh[E^(I*ArcSin[a*x])] + (6*I)*a
*ArcSin[a*x]*PolyLog[2, -E^(I*ArcSin[a*x])] - (6*I)*a*ArcSin[a*x]*PolyLog[2
, E^(I*ArcSin[a*x])] - 6*a*PolyLog[3, -E^(I*ArcSin[a*x])] + 6*a*PolyLog[3,
E^(I*ArcSin[a*x])]
```

Rule 4627

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

Rule 4709

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_))/Sqrt[(d_) + (e_.)*
(x_)^2], x_Symbol] :> Dist[1/(c^(m + 1)*Sqrt[d]), Subst[Int[(a + b*x)^n*Sin
[x]^m, x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d +
e, 0] && GtQ[d, 0] && IGtQ[n, 0] && IntegerQ[m]
```

Rule 4183

```
Int[csc[(e_.) + (f_.)*(x_)]*((c_.) + (d_.)*(x_))^(m_.), x_Symbol] :> Simp[(
-2*(c + d*x)^m*ArcTanh[E^(I*(e + f*x))])/f, x] + (-Dist[(d*m)/f, Int[(c + d
*x)^(m - 1)*Log[1 - E^(I*(e + f*x))], x], x] + Dist[(d*m)/f, Int[(c + d*x)^
(m - 1)*Log[1 + E^(I*(e + f*x))], x], x]) /; FreeQ[{c, d, e, f}, x] && IGtQ
[m, 0]
```

Rule 2531

```
Int[Log[1 + (e_.)*((F_)^((c_.)*((a_.) + (b_.)*(x_))))^(n_.)]*((f_.) + (g_.)
*(x_))^(m_.), x_Symbol] :> -Simp[((f + g*x)^m*PolyLog[2, -(e*(F^(c*(a + b*x
)))^n)])/(b*c*n*Log[F]), x] + Dist[(g*m)/(b*c*n*Log[F]), Int[(f + g*x)^(m -
 1)*PolyLog[2, -(e*(F^(c*(a + b*x)))^n)], x], x] /; FreeQ[{F, a, b, c, e, f
, g, n}, x] && GtQ[m, 0]
```

Rule 2282

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Dist[v/D[v, x]
, Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Functi
onOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ[
{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))*
(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

Rule 6589

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\begin{aligned}
\int \frac{\sin^{-1}(ax)^3}{x^2}\,dx &= -\frac{\sin^{-1}(ax)^3}{x} + (3a)\int \frac{\sin^{-1}(ax)^2}{x\sqrt{1-a^2x^2}}\,dx \\
&= -\frac{\sin^{-1}(ax)^3}{x} + (3a)\,\mathrm{Subst}\left(\int x^2\csc(x)\,dx, x, \sin^{-1}(ax)\right) \\
&= -\frac{\sin^{-1}(ax)^3}{x} - 6a\sin^{-1}(ax)^2\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) - (6a)\,\mathrm{Subst}\left(\int x\log\left(1-e^{ix}\right)\,dx, x, \sin^{-1}(ax)\right) + (6 \\
&= -\frac{\sin^{-1}(ax)^3}{x} - 6a\sin^{-1}(ax)^2\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + 6ia\sin^{-1}(ax)\mathrm{Li}_2\left(-e^{i\sin^{-1}(ax)}\right) - 6ia\sin^{-1}(ax)\mathrm{Li}_2\big(e \\
&= -\frac{\sin^{-1}(ax)^3}{x} - 6a\sin^{-1}(ax)^2\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + 6ia\sin^{-1}(ax)\mathrm{Li}_2\left(-e^{i\sin^{-1}(ax)}\right) - 6ia\sin^{-1}(ax)\mathrm{Li}_2\big(e \\
&= -\frac{\sin^{-1}(ax)^3}{x} - 6a\sin^{-1}(ax)^2\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + 6ia\sin^{-1}(ax)\mathrm{Li}_2\left(-e^{i\sin^{-1}(ax)}\right) - 6ia\sin^{-1}(ax)\mathrm{Li}_2\big(e
\end{aligned}$$

Mathematica [A] time = 0.12395, size = 133, normalized size = 1.23

$$a\Big(6i\sin^{-1}(ax)\mathrm{PolyLog}\left(2, -e^{i\sin^{-1}(ax)}\right) - 6i\sin^{-1}(ax)\mathrm{PolyLog}\left(2, e^{i\sin^{-1}(ax)}\right) - 6\mathrm{PolyLog}\left(3, -e^{i\sin^{-1}(ax)}\right) + 6\mathrm{PolyLog}\big(3$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^3/x^2,x]
```

```
[Out] a*(-(ArcSin[a*x]^3/(a*x)) + 3*ArcSin[a*x]^2*Log[1 - E^(I*ArcSin[a*x])] - 3*
ArcSin[a*x]^2*Log[1 + E^(I*ArcSin[a*x])] + (6*I)*ArcSin[a*x]*PolyLog[2, -E^
(I*ArcSin[a*x])] - (6*I)*ArcSin[a*x]*PolyLog[2, E^(I*ArcSin[a*x])] - 6*Poly
Log[3, -E^(I*ArcSin[a*x])] + 6*PolyLog[3, E^(I*ArcSin[a*x])])
```

Maple [A] time = 0.074, size = 179, normalized size = 1.7

$$-\frac{(\arcsin(ax))^3}{x} - 3a(\arcsin(ax))^2\ln\left(1+iax+\sqrt{-a^2x^2+1}\right) + 6ia\arcsin(ax)\,\mathrm{polylog}\left(2, -iax-\sqrt{-a^2x^2+1}\right) - 6a\mathrm{po}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^3/x^2,x)
```

```
[Out] -arcsin(a*x)^3/x-3*a*arcsin(a*x)^2*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))+6*I*a*arc
sin(a*x)*polylog(2,-I*a*x-(-a^2*x^2+1)^(1/2))-6*a*polylog(3,-I*a*x-(-a^2*x^
2+1)^(1/2))+3*a*arcsin(a*x)^2*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))-6*I*a*arcsin(a
*x)*polylog(2,I*a*x+(-a^2*x^2+1)^(1/2))+6*a*polylog(3,I*a*x+(-a^2*x^2+1)^(1
/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{\arctan\left(ax, \sqrt{ax+1}\sqrt{-ax+1}\right)^{3} + 3\,ax\int \frac{\sqrt{-ax+1}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^{2}}{\sqrt{ax+1}(ax-1)x}\,dx}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^3/x^2,x, algorithm="maxima")
```

```
[Out] -(arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3 + 3*a*x*integrate(sqrt(a*x +
 1)*sqrt(-a*x + 1)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2/(a^2*x^3 -
x), x))/x
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\operatorname{integral}\left(\frac{\arcsin\left(ax\right)^{3}}{x^{2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^3/x^2,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^3/x^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^{3}\left(ax\right)}{x^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**3/x**2,x)
```

```
[Out] Integral(asin(a*x)**3/x**2, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin(ax)^3}{x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^3/x^2,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^3/x^2, x)
```

3.29 $\int \frac{\sin^{-1}(ax)^3}{x^3}\,dx$

Optimal. Leaf size=102

$$-\frac{3}{2}ia^2\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)-\frac{3a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x}-\frac{3}{2}ia^2\sin^{-1}(ax)^2+3a^2\sin^{-1}(ax)\log\left(1-e^{2i\sin^{-1}(ax)}\right)-\frac{\sin^{-1}}{2}$$

```
[Out] ((-3*I)/2)*a^2*ArcSin[a*x]^2 - (3*a*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(2*x)
- ArcSin[a*x]^3/(2*x^2) + 3*a^2*ArcSin[a*x]*Log[1 - E^((2*I)*ArcSin[a*x])]
- ((3*I)/2)*a^2*PolyLog[2, E^((2*I)*ArcSin[a*x])]
```

Rubi [A] time = 0.169331, antiderivative size = 102, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.7, Rules used = {4627, 4681, 4625, 3717, 2190, 2279, 2391}

$$-\frac{3}{2}ia^2\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)-\frac{3a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x}-\frac{3}{2}ia^2\sin^{-1}(ax)^2+3a^2\sin^{-1}(ax)\log\left(1-e^{2i\sin^{-1}(ax)}\right)-\frac{\sin^{-1}}{2}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^3/x^3,x]
```

```
[Out] ((-3*I)/2)*a^2*ArcSin[a*x]^2 - (3*a*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(2*x)
- ArcSin[a*x]^3/(2*x^2) + 3*a^2*ArcSin[a*x]*Log[1 - E^((2*I)*ArcSin[a*x])]
- ((3*I)/2)*a^2*PolyLog[2, E^((2*I)*ArcSin[a*x])]
```

Rule 4627

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

Rule 4681

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[((f*x)^(m + 1)*(d + e*x^2)^(p + 1)*(a + b
*ArcSin[c*x])^n)/(d*f*(m + 1)), x] - Dist[(b*c*n*d^IntPart[p]*(d + e*x^2)^F
racPart[p])/(f*(m + 1)*(1 - c^2*x^2)^FracPart[p]), Int[(f*x)^(m + 1)*(1 - c
^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && EqQ[m + 2*p + 3, 0] &
```

```
& NeQ[m, -1]
```

Rule 4625

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n/Tan[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Rule 3717

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[(I*(c + d*x)^(m + 1))/(d*(m + 1)), x] - Dist[2*I, Int[((c + d*x)^
m*E^(2*I*k*Pi)*E^(2*I*(e + f*x)))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x))), x],
 x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

Rule 2190

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m*Log[1 + (b*(F^(g*(e + f*x)))^n)/a])/(b*f*g*n*Log[F]), x] - Di
st[(d*m)/(b*f*g*n*Log[F]), Int[(c + d*x)^(m - 1)*Log[1 + (b*(F^(g*(e + f*x)
))^n)/a], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2279

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2391

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> -Simp[PolyLog[2
, -(c*e*x^n)]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$\int \frac{\sin^{-1}(ax)^3}{x^3}\,dx = -\frac{\sin^{-1}(ax)^3}{2x^2} + \frac{1}{2}(3a)\int \frac{\sin^{-1}(ax)^2}{x^2\sqrt{1-a^2x^2}}\,dx$$

$$= -\frac{3a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x} - \frac{\sin^{-1}(ax)^3}{2x^2} + \left(3a^2\right)\int \frac{\sin^{-1}(ax)}{x}\,dx$$

$$= -\frac{3a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x} - \frac{\sin^{-1}(ax)^3}{2x^2} + \left(3a^2\right)\text{Subst}\left(\int x\cot(x)\,dx, x, \sin^{-1}(ax)\right)$$

$$= -\frac{3}{2}ia^2\sin^{-1}(ax)^2 - \frac{3a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x} - \frac{\sin^{-1}(ax)^3}{2x^2} - \left(6ia^2\right)\text{Subst}\left(\int \frac{e^{2ix}x}{1-e^{2ix}}\,dx, x, \sin^{-1}(ax\right.$$

$$= -\frac{3}{2}ia^2\sin^{-1}(ax)^2 - \frac{3a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x} - \frac{\sin^{-1}(ax)^3}{2x^2} + 3a^2\sin^{-1}(ax)\log\left(1-e^{2i\sin^{-1}(ax)}\right) - \left(3a\right.$$

$$= -\frac{3}{2}ia^2\sin^{-1}(ax)^2 - \frac{3a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x} - \frac{\sin^{-1}(ax)^3}{2x^2} + 3a^2\sin^{-1}(ax)\log\left(1-e^{2i\sin^{-1}(ax)}\right) + \frac{1}{2}\left(\right.$$

$$= -\frac{3}{2}ia^2\sin^{-1}(ax)^2 - \frac{3a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x} - \frac{\sin^{-1}(ax)^3}{2x^2} + 3a^2\sin^{-1}(ax)\log\left(1-e^{2i\sin^{-1}(ax)}\right) - \frac{3}{2}ia$$

Mathematica [A] time = 0.252512, size = 92, normalized size = 0.9

$$-\frac{3}{2}ia^2\text{PolyLog}\left(2, e^{2i\sin^{-1}(ax)}\right) - \frac{\sin^{-1}(ax)\left(3ax\left(\sqrt{1-a^2x^2}+iax\right)\sin^{-1}(ax) - 6a^2x^2\log\left(1-e^{2i\sin^{-1}(ax)}\right) + \sin^{-1}(ax)^2\right)}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]^3/x^3,x]
```

```
[Out] -(ArcSin[a*x]*(3*a*x*(I*a*x + Sqrt[1 - a^2*x^2])*ArcSin[a*x] + ArcSin[a*x]^
2 - 6*a^2*x^2*Log[1 - E^((2*I)*ArcSin[a*x])]))/(2*x^2) - ((3*I)/2)*a^2*Poly
Log[2, E^((2*I)*ArcSin[a*x])]
```

Maple [A] time = 0.098, size = 163, normalized size = 1.6

$$-\frac{3i}{2}a^2(\arcsin(ax))^2 - \frac{3a(\arcsin(ax))^2}{2x}\sqrt{-a^2x^2+1} - \frac{(\arcsin(ax))^3}{2x^2} + 3a^2\arcsin(ax)\ln\left(1+iax+\sqrt{-a^2x^2+1}\right) + 3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^3/x^3,x)
```

```
[Out] -3/2*I*a^2*arcsin(a*x)^2-3/2*a*arcsin(a*x)^2*(-a^2*x^2+1)^(1/2)/x-1/2*arcsi
n(a*x)^3/x^2+3*a^2*arcsin(a*x)*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))+3*a^2*arcsin(
a*x)*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))-3*I*a^2*polylog(2,-I*a*x-(-a^2*x^2+1)^(
1/2))-3*I*a^2*polylog(2,I*a*x+(-a^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{\frac{3}{4}\Big(\sqrt{ax+1}\sqrt{-ax+1}\arctan\big(ax,\sqrt{ax+1}\sqrt{-ax+1}\big)^{2}+4\,x\int\frac{3\sqrt{ax+1}\sqrt{-ax+1}\arctan\big(ax,\sqrt{ax+1}\sqrt{-ax+1}\big)^{2}-2\,\big(a^{3}x^{3}-ax\big)\arctan\big(ax,\sqrt{ax}}{4\,\big(a^{2}x^{4}-x^{2}\big)}}{2\,x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(6*a*x^2*integrate(1/2*sqrt(a*x + 1)*sqrt(-a*x + 1)*arctan2(a*x, sqrt(
a*x + 1)*sqrt(-a*x + 1))^2/(a^2*x^4 - x^2), x) + arctan2(a*x, sqrt(a*x + 1)
*sqrt(-a*x + 1))^3)/x^2
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\arcsin\left(ax\right)^{3}}{x^{3}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(arcsin(a*x)^3/x^3, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{\operatorname{asin}^{3}\left(ax\right)}{x^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**3/x**3,x)
```

```
[Out] Integral(asin(a*x)**3/x**3, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin{(ax)}^3}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(arcsin(a*x)^3/x^3, x)
```

3.30 $\int \frac{\sin^{-1}(ax)^3}{x^4}\,dx$

Optimal. Leaf size=179

$$ia^3\sin^{-1}(ax)\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-ia^3\sin^{-1}(ax)\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-a^3\text{PolyLog}\left(3,-e^{i\sin^{-1}(ax)}\right)+a^3\text{PolyLog}\bigl($$

```
[Out] -((a^2*ArcSin[a*x])/x) - (a*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(2*x^2) - ArcS
in[a*x]^3/(3*x^3) - a^3*ArcSin[a*x]^2*ArcTanh[E^(I*ArcSin[a*x])] - a^3*ArcT
anh[Sqrt[1 - a^2*x^2]] + I*a^3*ArcSin[a*x]*PolyLog[2, -E^(I*ArcSin[a*x])] -
 I*a^3*ArcSin[a*x]*PolyLog[2, E^(I*ArcSin[a*x])] - a^3*PolyLog[3, -E^(I*Arc
Sin[a*x])] + a^3*PolyLog[3, E^(I*ArcSin[a*x])]
```

Rubi [A] time = 0.284581, antiderivative size = 179, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 10, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 1., Rules used = {4627, 4701, 4709, 4183, 2531, 2282, 6589, 266, 63, 208}

$$ia^3\sin^{-1}(ax)\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-ia^3\sin^{-1}(ax)\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-a^3\text{PolyLog}\left(3,-e^{i\sin^{-1}(ax)}\right)+a^3\text{PolyLog}\bigl($$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^3/x^4,x]
```

```
[Out] -((a^2*ArcSin[a*x])/x) - (a*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(2*x^2) - ArcS
in[a*x]^3/(3*x^3) - a^3*ArcSin[a*x]^2*ArcTanh[E^(I*ArcSin[a*x])] - a^3*ArcT
anh[Sqrt[1 - a^2*x^2]] + I*a^3*ArcSin[a*x]*PolyLog[2, -E^(I*ArcSin[a*x])] -
 I*a^3*ArcSin[a*x]*PolyLog[2, E^(I*ArcSin[a*x])] - a^3*PolyLog[3, -E^(I*Arc
Sin[a*x])] + a^3*PolyLog[3, E^(I*ArcSin[a*x])]
```

Rule 4627

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

Rule 4701

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[((f*x)^(m + 1)*(d + e*x^2)^(p + 1)*(a + b
*ArcSin[c*x])^n)/(d*f*(m + 1)), x] + (Dist[(c^2*(m + 2*p + 3))/(f^2*(m + 1)
), Int[(f*x)^(m + 2)*(d + e*x^2)^p*(a + b*ArcSin[c*x])^n, x], x] - Dist[(b*
c*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(f*(m + 1)*(1 - c^2*x^2)^FracPart
[p]), Int[(f*x)^(m + 1)*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1)
, x], x]) /; FreeQ[{a, b, c, d, e, f, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n,
 0] && LtQ[m, -1] && IntegerQ[m]
```

Rule 4709

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_))/Sqrt[(d_) + (e_.)*
(x_)^2], x_Symbol] :> Dist[1/(c^(m + 1)*Sqrt[d]), Subst[Int[(a + b*x)^n*Sin
[x]^m, x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d +
e, 0] && GtQ[d, 0] && IGtQ[n, 0] && IntegerQ[m]
```

Rule 4183

```
Int[csc[(e_.) + (f_.)*(x_)]*((c_.) + (d_.)*(x_))^(m_.), x_Symbol] :> Simp[(
-2*(c + d*x)^m*ArcTanh[E^(I*(e + f*x))])/f, x] + (-Dist[(d*m)/f, Int[(c + d
*x)^(m - 1)*Log[1 - E^(I*(e + f*x))], x], x] + Dist[(d*m)/f, Int[(c + d*x)^
(m - 1)*Log[1 + E^(I*(e + f*x))], x], x]) /; FreeQ[{c, d, e, f}, x] && IGtQ
[m, 0]
```

Rule 2531

```
Int[Log[1 + (e_.)*((F_)^((c_.)*((a_.) + (b_.)*(x_))))^(n_.)]*((f_.) + (g_.)
*(x_))^(m_.), x_Symbol] :> -Simp[((f + g*x)^m*PolyLog[2, -(e*(F^(c*(a + b*x
)))^n)])/(b*c*n*Log[F]), x] + Dist[(g*m)/(b*c*n*Log[F]), Int[(f + g*x)^(m -
 1)*PolyLog[2, -(e*(F^(c*(a + b*x)))^n)], x], x] /; FreeQ[{F, a, b, c, e, f
, g, n}, x] && GtQ[m, 0]
```

Rule 2282

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Dist[v/D[v, x]
, Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Functi
onOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ[
{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))*
(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

Rule 6589

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rule 266

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 63

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - (a*d)/b +
(d*x^p)/b)^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 208

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

Rubi steps

$$\begin{aligned}
\int \frac{\sin^{-1}(ax)^3}{x^4}\,dx &= -\frac{\sin^{-1}(ax)^3}{3x^3} + a\int \frac{\sin^{-1}(ax)^2}{x^3\sqrt{1-a^2x^2}}\,dx \\
&= -\frac{a\sqrt{1-a^2x^2}\,\sin^{-1}(ax)^2}{2x^2} - \frac{\sin^{-1}(ax)^3}{3x^3} + a^2\int \frac{\sin^{-1}(ax)}{x^2}\,dx + \frac{1}{2}a^3\int \frac{\sin^{-1}(ax)^2}{x\sqrt{1-a^2x^2}}\,dx \\
&= -\frac{a^2\sin^{-1}(ax)}{x} - \frac{a\sqrt{1-a^2x^2}\,\sin^{-1}(ax)^2}{2x^2} - \frac{\sin^{-1}(ax)^3}{3x^3} + \frac{1}{2}a^3\,\mathrm{Subst}\left(\int x^2\csc(x)\,dx, x, \sin^{-1}(ax)\right) + a^3 \\
&= -\frac{a^2\sin^{-1}(ax)}{x} - \frac{a\sqrt{1-a^2x^2}\,\sin^{-1}(ax)^2}{2x^2} - \frac{\sin^{-1}(ax)^3}{3x^3} - a^3\sin^{-1}(ax)^2\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + \frac{1}{2}a^3\,\mathrm{Subs} \\
&= -\frac{a^2\sin^{-1}(ax)}{x} - \frac{a\sqrt{1-a^2x^2}\,\sin^{-1}(ax)^2}{2x^2} - \frac{\sin^{-1}(ax)^3}{3x^3} - a^3\sin^{-1}(ax)^2\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + ia^3\sin^{-1}(a \\
&= -\frac{a^2\sin^{-1}(ax)}{x} - \frac{a\sqrt{1-a^2x^2}\,\sin^{-1}(ax)^2}{2x^2} - \frac{\sin^{-1}(ax)^3}{3x^3} - a^3\sin^{-1}(ax)^2\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) - a^3\tanh^{-1} \\
&= -\frac{a^2\sin^{-1}(ax)}{x} - \frac{a\sqrt{1-a^2x^2}\,\sin^{-1}(ax)^2}{2x^2} - \frac{\sin^{-1}(ax)^3}{3x^3} - a^3\sin^{-1}(ax)^2\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) - a^3\tanh^{-1}
\end{aligned}$$

Mathematica [A] time = 2.79478, size = 284, normalized size = 1.59

$$\frac{1}{48}a^3\left(48i\sin^{-1}(ax)\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-48i\sin^{-1}(ax)\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-48\text{PolyLog}\left(3,-e^{i\sin^{-1}(ax)}\right)+48\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^3/x^4,x]
```

```
[Out] (a^3*(-24*ArcSin[a*x]*Cot[ArcSin[a*x]/2] - 4*ArcSin[a*x]^3*Cot[ArcSin[a*x]/
2] - 6*ArcSin[a*x]^2*Csc[ArcSin[a*x]/2]^2 - a*x*ArcSin[a*x]^3*Csc[ArcSin[a*
x]/2]^4 + 24*ArcSin[a*x]^2*Log[1 - E^(I*ArcSin[a*x])] - 24*ArcSin[a*x]^2*Lo
g[1 + E^(I*ArcSin[a*x])] + 48*Log[Tan[ArcSin[a*x]/2]] + (48*I)*ArcSin[a*x]*
PolyLog[2, -E^(I*ArcSin[a*x])] - (48*I)*ArcSin[a*x]*PolyLog[2, E^(I*ArcSin[
a*x])] - 48*PolyLog[3, -E^(I*ArcSin[a*x])] + 48*PolyLog[3, E^(I*ArcSin[a*x]
)] + 6*ArcSin[a*x]^2*Sec[ArcSin[a*x]/2]^2 - (16*ArcSin[a*x]^3*Sin[ArcSin[a*
x]/2]^4)/(a^3*x^3) - 24*ArcSin[a*x]*Tan[ArcSin[a*x]/2] - 4*ArcSin[a*x]^3*Ta
n[ArcSin[a*x]/2]))/48
```

Maple [A] time = 0.148, size = 250, normalized size = 1.4

$$-\frac{a(\arcsin(ax))^2}{2x^2}\sqrt{-a^2x^2+1}-\frac{a^2\arcsin(ax)}{x}-\frac{(\arcsin(ax))^3}{3x^3}-\frac{a^3(\arcsin(ax))^2}{2}\ln\left(1+iax+\sqrt{-a^2x^2+1}\right)+ia^3\,\mathrm{arc}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^3/x^4,x)
```

```
[Out] -1/2*a*arcsin(a*x)^2*(-a^2*x^2+1)^(1/2)/x^2-a^2*arcsin(a*x)/x-1/3*arcsin(a*
x)^3/x^3-1/2*a^3*arcsin(a*x)^2*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))+I*a^3*arcsin(
a*x)*polylog(2,-I*a*x-(-a^2*x^2+1)^(1/2))-a^3*polylog(3,-I*a*x-(-a^2*x^2+1)
^(1/2))+1/2*a^3*arcsin(a*x)^2*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))-I*a^3*arcsin(a
*x)*polylog(2,I*a*x+(-a^2*x^2+1)^(1/2))+a^3*polylog(3,I*a*x+(-a^2*x^2+1)^(1
/2))-2*a^3*arctanh(I*a*x+(-a^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{3\,ax^3\int\frac{\sqrt{-ax+1}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2}{\sqrt{ax+1}(ax-1)x^3}\,dx+\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^3}{3\,x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^3/x^4,x, algorithm="maxima")
```

```
[Out] -1/3*(3*a*x^3*integrate(sqrt(a*x + 1)*sqrt(-a*x + 1)*arctan2(a*x, sqrt(a*x
+ 1)*sqrt(-a*x + 1))^2/(a^2*x^5 - x^3), x) + arctan2(a*x, sqrt(a*x + 1)*sqr
t(-a*x + 1))^3)/x^3
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\arcsin(ax)^3}{x^4}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^3/x^4,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^3/x^4, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^3(ax)}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**3/x**4,x)
```

```
[Out] Integral(asin(a*x)**3/x**4, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin(ax)^3}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^3/x^4,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^3/x^4, x)
```

3.31 $\int \frac{\sin^{-1}(ax)^3}{x^5}\,dx$

Optimal. Leaf size=169

$$-\frac{1}{2}ia^4\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)-\frac{a^3\sqrt{1-a^2x^2}}{4x}-\frac{a^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x}-\frac{a^2\sin^{-1}(ax)}{4x^2}-\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4x^3}-\frac{1}{2}ia^4$$

```
[Out] -(a^3*Sqrt[1 - a^2*x^2])/(4*x) - (a^2*ArcSin[a*x])/(4*x^2) - (I/2)*a^4*ArcS
in[a*x]^2 - (a*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(4*x^3) - (a^3*Sqrt[1 - a^2
*x^2]*ArcSin[a*x]^2)/(2*x) - ArcSin[a*x]^3/(4*x^4) + a^4*ArcSin[a*x]*Log[1
- E^((2*I)*ArcSin[a*x])] - (I/2)*a^4*PolyLog[2, E^((2*I)*ArcSin[a*x])]
```

Rubi [A] time = 0.291772, antiderivative size = 169, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 9, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.9, Rules used = {4627, 4701, 4681, 4625, 3717, 2190, 2279, 2391, 264}

$$-\frac{1}{2}ia^4\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)-\frac{a^3\sqrt{1-a^2x^2}}{4x}-\frac{a^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x}-\frac{a^2\sin^{-1}(ax)}{4x^2}-\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4x^3}-\frac{1}{2}ia^4$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^3/x^5,x]
```

```
[Out] -(a^3*Sqrt[1 - a^2*x^2])/(4*x) - (a^2*ArcSin[a*x])/(4*x^2) - (I/2)*a^4*ArcS
in[a*x]^2 - (a*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2)/(4*x^3) - (a^3*Sqrt[1 - a^2
*x^2]*ArcSin[a*x]^2)/(2*x) - ArcSin[a*x]^3/(4*x^4) + a^4*ArcSin[a*x]*Log[1
- E^((2*I)*ArcSin[a*x])] - (I/2)*a^4*PolyLog[2, E^((2*I)*ArcSin[a*x])]
```

Rule 4627

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

Rule 4701

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[((f*x)^(m + 1)*(d + e*x^2)^(p + 1)*(a + b
*ArcSin[c*x])^n)/(d*f*(m + 1)), x] + (Dist[(c^2*(m + 2*p + 3))/(f^2*(m + 1)
), Int[(f*x)^(m + 2)*(d + e*x^2)^p*(a + b*ArcSin[c*x])^n, x], x] - Dist[(b*
c*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(f*(m + 1)*(1 - c^2*x^2)^FracPart
[p]), Int[(f*x)^(m + 1)*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1)
, x], x]) /; FreeQ[{a, b, c, d, e, f, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n,
 0] && LtQ[m, -1] && IntegerQ[m]
```

Rule 4681

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[((f*x)^(m + 1)*(d + e*x^2)^(p + 1)*(a + b
*ArcSin[c*x])^n)/(d*f*(m + 1)), x] - Dist[(b*c*n*d^IntPart[p]*(d + e*x^2)^F
racPart[p])/(f*(m + 1)*(1 - c^2*x^2)^FracPart[p]), Int[(f*x)^(m + 1)*(1 - c
^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && EqQ[m + 2*p + 3, 0] &
& NeQ[m, -1]
```

Rule 4625

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n/Tan[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Rule 3717

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[(I*(c + d*x)^(m + 1))/(d*(m + 1)), x] - Dist[2*I, Int[((c + d*x)^
m*E^(2*I*k*Pi)*E^(2*I*(e + f*x)))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x))), x],
 x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

Rule 2190

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m*Log[1 + (b*(F^(g*(e + f*x)))^n)/a])/(b*f*g*n*Log[F]), x] - Di
st[(d*m)/(b*f*g*n*Log[F]), Int[(c + d*x)^(m - 1)*Log[1 + (b*(F^(g*(e + f*x)
))^n)/a], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2279

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2391

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> -Simp[PolyLog[2
, -(c*e*x^n)]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rule 264

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

Rubi steps

$$
\begin{aligned}
\int \frac{\sin^{-1}(ax)^3}{x^5}\,dx &= -\frac{\sin^{-1}(ax)^3}{4x^4} + \frac{1}{4}(3a)\int \frac{\sin^{-1}(ax)^2}{x^4\sqrt{1-a^2x^2}}\,dx \\
&= -\frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4x^3} - \frac{\sin^{-1}(ax)^3}{4x^4} + \frac{1}{2}a^2\int \frac{\sin^{-1}(ax)}{x^3}\,dx + \frac{1}{2}a^3\int \frac{\sin^{-1}(ax)^2}{x^2\sqrt{1-a^2x^2}}\,dx \\
&= -\frac{a^2\sin^{-1}(ax)}{4x^2} - \frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4x^3} - \frac{a^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x} - \frac{\sin^{-1}(ax)^3}{4x^4} + \frac{1}{4}a^3\int \frac{1}{x^2\sqrt{1-a^2x}} \\
&= -\frac{a^3\sqrt{1-a^2x^2}}{4x} - \frac{a^2\sin^{-1}(ax)}{4x^2} - \frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4x^3} - \frac{a^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x} - \frac{\sin^{-1}(ax)^3}{4x^4} + a^4\,\mathrm{S} \\
&= -\frac{a^3\sqrt{1-a^2x^2}}{4x} - \frac{a^2\sin^{-1}(ax)}{4x^2} - \frac{1}{2}ia^4\sin^{-1}(ax)^2 - \frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4x^3} - \frac{a^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x} - \\
&= -\frac{a^3\sqrt{1-a^2x^2}}{4x} - \frac{a^2\sin^{-1}(ax)}{4x^2} - \frac{1}{2}ia^4\sin^{-1}(ax)^2 - \frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4x^3} - \frac{a^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x} - \\
&= -\frac{a^3\sqrt{1-a^2x^2}}{4x} - \frac{a^2\sin^{-1}(ax)}{4x^2} - \frac{1}{2}ia^4\sin^{-1}(ax)^2 - \frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4x^3} - \frac{a^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x} - \\
&= -\frac{a^3\sqrt{1-a^2x^2}}{4x} - \frac{a^2\sin^{-1}(ax)}{4x^2} - \frac{1}{2}ia^4\sin^{-1}(ax)^2 - \frac{a\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{4x^3} - \frac{a^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}{2x} -
\end{aligned}
$$

Mathematica [A] time = 0.679215, size = 116, normalized size = 0.69

$$
\frac{1}{4}\left(-\frac{\sin^{-1}(ax)^3}{x^4} + a^4\left(-2i\text{PolyLog}\left(2, e^{2i\sin^{-1}(ax)}\right) - \frac{\sqrt{1-a^2x^2}\left(\left(\frac{1}{a^2x^2}+2\right)\sin^{-1}(ax)^2+1\right)}{ax} - \sin^{-1}(ax)\left(\frac{1}{a^2x^2} + 2i\sin^{-1}(\right.\right.\right.
$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]^3/x^5,x]
```

```
[Out] (-(ArcSin[a*x]^3/x^4) + a^4*(-((Sqrt[1 - a^2*x^2]*(1 + (2 + 1/(a^2*x^2))*Ar
cSin[a*x]^2))/(a*x)) - ArcSin[a*x]*(1/(a^2*x^2) + (2*I)*ArcSin[a*x] - 4*Log
[1 - E^((2*I)*ArcSin[a*x])]) - (2*I)*PolyLog[2, E^((2*I)*ArcSin[a*x])]))/4
```

Maple [A] time = 0.156, size = 225, normalized size = 1.3

$$-\frac{i}{2}a^{4}(\arcsin(ax))^{2}-\frac{a^{3}(\arcsin(ax))^{2}}{2x}\sqrt{-a^{2}x^{2}+1}+\frac{i}{4}a^{4}-\frac{a^{3}}{4x}\sqrt{-a^{2}x^{2}+1}-\frac{a(\arcsin(ax))^{2}}{4x^{3}}\sqrt{-a^{2}x^{2}+1}-\frac{a^{2}\arcsin(}{4x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^3/x^5,x)
```

```
[Out] -1/2*I*a^4*arcsin(a*x)^2-1/2*a^3*arcsin(a*x)^2*(-a^2*x^2+1)^(1/2)/x+1/4*I*a
^4-1/4*a^3*(-a^2*x^2+1)^(1/2)/x-1/4*a*arcsin(a*x)^2*(-a^2*x^2+1)^(1/2)/x^3-
1/4*a^2*arcsin(a*x)/x^2-1/4*arcsin(a*x)^3/x^4+a^4*arcsin(a*x)*ln(1+I*a*x+(-
a^2*x^2+1)^(1/2))+a^4*arcsin(a*x)*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))-I*a^4*poly
log(2,-I*a*x-(-a^2*x^2+1)^(1/2))-I*a^4*polylog(2,I*a*x+(-a^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{\frac{1}{4}\Big(\left(2a^{2}x^{2}+1\right)\sqrt{ax+1}\sqrt{-ax+1}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^{2}+12x^{3}\int\frac{9\sqrt{ax+1}\sqrt{-ax+1}\arctan(ax,\sqrt{ax+1}\sqrt{-ax+1})^{2}-2(2a^{5}x}{12\left(a^{2}x^{6}-x^{4}\right)}}{4x^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^3/x^5,x, algorithm="maxima")
```

```
[Out] -1/4*(12*a*x^4*integrate(1/4*sqrt(a*x + 1)*sqrt(-a*x + 1)*arctan2(a*x, sqrt
(a*x + 1)*sqrt(-a*x + 1))^2/(a^2*x^6 - x^4), x) + arctan2(a*x, sqrt(a*x + 1
)*sqrt(-a*x + 1))^3)/x^4
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\arcsin(ax)^{3}}{x^{5}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^3/x^5,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^3/x^5, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^{3}(ax)}{x^{5}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**3/x**5,x)
```

```
[Out] Integral(asin(a*x)**3/x**5, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin(ax)^{3}}{x^{5}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^3/x^5,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^3/x^5, x)
```

3.32 $\int x^5 \sin^{-1}(ax)^4 \, dx$

Optimal. Leaf size=282

$$\frac{65x^4}{3456a^2}+\frac{245x^2}{1152a^4}+\frac{x^5\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{9a}-\frac{x^5\sqrt{1-a^2x^2}\sin^{-1}(ax)}{54a}-\frac{5x^4\sin^{-1}(ax)^2}{48a^2}+\frac{5x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{36a^3}-$$

```
[Out] (245*x^2)/(1152*a^4) + (65*x^4)/(3456*a^2) + x^6/324 - (245*x*Sqrt[1 - a^2*
x^2]*ArcSin[a*x])/(576*a^5) - (65*x^3*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(864*a
^3) - (x^5*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(54*a) + (245*ArcSin[a*x]^2)/(115
2*a^6) - (5*x^2*ArcSin[a*x]^2)/(16*a^4) - (5*x^4*ArcSin[a*x]^2)/(48*a^2) -
(x^6*ArcSin[a*x]^2)/18 + (5*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(24*a^5) + (
5*x^3*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(36*a^3) + (x^5*Sqrt[1 - a^2*x^2]*Ar
cSin[a*x]^3)/(9*a) - (5*ArcSin[a*x]^4)/(96*a^6) + (x^6*ArcSin[a*x]^4)/6
```

Rubi [A] time = 0.869246, antiderivative size = 282, normalized size of antiderivative = 1., number of steps used = 23, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4, Rules used = {4627, 4707, 4641, 30}

$$\frac{65x^4}{3456a^2}+\frac{245x^2}{1152a^4}+\frac{x^5\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{9a}-\frac{x^5\sqrt{1-a^2x^2}\sin^{-1}(ax)}{54a}-\frac{5x^4\sin^{-1}(ax)^2}{48a^2}+\frac{5x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{36a^3}-$$

Antiderivative was successfully verified.

```
[In] Int[x^5*ArcSin[a*x]^4,x]
```

```
[Out] (245*x^2)/(1152*a^4) + (65*x^4)/(3456*a^2) + x^6/324 - (245*x*Sqrt[1 - a^2*
x^2]*ArcSin[a*x])/(576*a^5) - (65*x^3*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(864*a
^3) - (x^5*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(54*a) + (245*ArcSin[a*x]^2)/(115
2*a^6) - (5*x^2*ArcSin[a*x]^2)/(16*a^4) - (5*x^4*ArcSin[a*x]^2)/(48*a^2) -
(x^6*ArcSin[a*x]^2)/18 + (5*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(24*a^5) + (
5*x^3*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(36*a^3) + (x^5*Sqrt[1 - a^2*x^2]*Ar
cSin[a*x]^3)/(9*a) - (5*ArcSin[a*x]^4)/(96*a^6) + (x^6*ArcSin[a*x]^4)/6
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 30

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

Rubi steps

$$\int x^5 \sin^{-1}(ax)^4\,dx = \frac{1}{6}x^6\sin^{-1}(ax)^4 - \frac{1}{3}(2a)\int \frac{x^6\sin^{-1}(ax)^3}{\sqrt{1-a^2x^2}}\,dx$$

$$= \frac{x^5\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{9a} + \frac{1}{6}x^6\sin^{-1}(ax)^4 - \frac{1}{3}\int x^5\sin^{-1}(ax)^2\,dx - \frac{5\int \frac{x^4\sin^{-1}(ax)^3}{\sqrt{1-a^2x^2}}\,dx}{9a}$$

$$= -\frac{1}{18}x^6\sin^{-1}(ax)^2 + \frac{5x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{36a^3} + \frac{x^5\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{9a} + \frac{1}{6}x^6\sin^{-1}(ax)^4 -$$

$$= -\frac{x^5\sqrt{1-a^2x^2}\sin^{-1}(ax)}{54a} - \frac{5x^4\sin^{-1}(ax)^2}{48a^2} - \frac{1}{18}x^6\sin^{-1}(ax)^2 + \frac{5x\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{24a^5} +$$

$$= \frac{x^6}{324} - \frac{65x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{864a^3} - \frac{x^5\sqrt{1-a^2x^2}\sin^{-1}(ax)}{54a} - \frac{5x^2\sin^{-1}(ax)^2}{16a^4} - \frac{5x^4\sin^{-1}(ax)^2}{48a^2} - \frac{1}{18}$$

$$= \frac{65x^4}{3456a^2} + \frac{x^6}{324} - \frac{245x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{576a^5} - \frac{65x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{864a^3} - \frac{x^5\sqrt{1-a^2x^2}\sin^{-1}(ax)}{54a} -$$

$$= \frac{245x^2}{1152a^4} + \frac{65x^4}{3456a^2} + \frac{x^6}{324} - \frac{245x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{576a^5} - \frac{65x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{864a^3} -$$

Mathematica [A] time = 0.0977085, size = 167, normalized size = 0.59

$$\frac{a^2x^2\left(32a^4x^4+195a^2x^2+2205\right)+108\left(16a^6x^6-5\right)\sin^{-1}(ax)^4+144ax\sqrt{1-a^2x^2}\left(8a^4x^4+10a^2x^2+15\right)\sin^{-1}(ax)^3-9}{10368a^6}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5*ArcSin[a*x]^4,x]
```

```
[Out] (a^2*x^2*(2205 + 195*a^2*x^2 + 32*a^4*x^4) - 6*a*x*Sqrt[1 - a^2*x^2]*(735 +
 130*a^2*x^2 + 32*a^4*x^4)*ArcSin[a*x] - 9*(-245 + 360*a^2*x^2 + 120*a^4*x^
4 + 64*a^6*x^6)*ArcSin[a*x]^2 + 144*a*x*Sqrt[1 - a^2*x^2]*(15 + 10*a^2*x^2
+ 8*a^4*x^4)*ArcSin[a*x]^3 + 108*(-5 + 16*a^6*x^6)*ArcSin[a*x]^4)/(10368*a^
6)
```

Maple [A] time = 0.1, size = 320, normalized size = 1.1

$$\frac{1}{a^6}\left(\frac{a^6x^6\left(\arcsin\left(ax\right)\right)^4}{6}-\frac{\left(\arcsin\left(ax\right)\right)^3}{72}\left(-8\sqrt{-a^2x^2+1}a^5x^5-10\,a^3x^3\sqrt{-a^2x^2+1}-15\,ax\sqrt{-a^2x^2+1}+15\,\arcsin\left(ax\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5*arcsin(a*x)^4,x)
```

```
[Out] 1/a^6*(1/6*a^6*x^6*arcsin(a*x)^4-1/72*arcsin(a*x)^3*(-8*(-a^2*x^2+1)^(1/2)*
a^5*x^5-10*a^3*x^3*(-a^2*x^2+1)^(1/2)-15*a*x*(-a^2*x^2+1)^(1/2)+15*arcsin(a
*x))-1/18*arcsin(a*x)^2*a^6*x^6+1/432*arcsin(a*x)*(-8*(-a^2*x^2+1)^(1/2)*a^
5*x^5-10*a^3*x^3*(-a^2*x^2+1)^(1/2)-15*a*x*(-a^2*x^2+1)^(1/2)+15*arcsin(a*x
))+115/1152*arcsin(a*x)^2+1/324*a^6*x^6+65/3456*a^4*x^4+245/1152*a^2*x^2-5/
48*a^4*x^4*arcsin(a*x)^2+5/192*arcsin(a*x)*(-2*a^3*x^3*(-a^2*x^2+1)^(1/2)-3
*a*x*(-a^2*x^2+1)^(1/2)+3*arcsin(a*x))-5/16*(a^2*x^2-1)*arcsin(a*x)^2-5/16*
arcsin(a*x)*(a*x*(-a^2*x^2+1)^(1/2)+arcsin(a*x))+5/32*arcsin(a*x)^4)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{1}{6}\,x^6\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^4+2\,a\int\frac{\sqrt{ax+1}\sqrt{-ax+1}x^6\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^3}{3\left(a^2x^2-1\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] 1/6*x^6*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^4 + 2*a*integrate(1/3*sq
rt(a*x + 1)*sqrt(-a*x + 1)*x^6*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3
/(a^2*x^2 - 1), x)
```

Fricas [A] time = 2.21951, size = 383, normalized size = 1.36

$$\frac{32\,a^6x^6+195\,a^4x^4+108\left(16\,a^6x^6-5\right)\arcsin\left(ax\right)^4+2205\,a^2x^2-9\left(64\,a^6x^6+120\,a^4x^4+360\,a^2x^2-245\right)\arcsin\left(ax\right)^2+}{10368\,a^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] 1/10368*(32*a^6*x^6 + 195*a^4*x^4 + 108*(16*a^6*x^6 - 5)*arcsin(a*x)^4 + 22
05*a^2*x^2 - 9*(64*a^6*x^6 + 120*a^4*x^4 + 360*a^2*x^2 - 245)*arcsin(a*x)^2
 + 6*sqrt(-a^2*x^2 + 1)*(24*(8*a^5*x^5 + 10*a^3*x^3 + 15*a*x)*arcsin(a*x)^3
 - (32*a^5*x^5 + 130*a^3*x^3 + 735*a*x)*arcsin(a*x)))/a^6
```

Sympy [A] time = 33.0018, size = 269, normalized size = 0.95

$$\begin{cases} \frac{x^6\operatorname{asin}^4(ax)}{6}-\frac{x^6\operatorname{asin}^2(ax)}{18}+\frac{x^6}{324}+\frac{x^5\sqrt{-a^2x^2+1}\operatorname{asin}^3(ax)}{9a}-\frac{x^5\sqrt{-a^2x^2+1}\operatorname{asin}(ax)}{54a}-\frac{5x^4\operatorname{asin}^2(ax)}{48a^2}+\frac{65x^4}{3456a^2}+\frac{5x^3\sqrt{-a^2x^2+1}\operatorname{asin}^3(ax)}{36a^3}- \\ 0 \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5*asin(a*x)**4,x)
```

```
[Out] Piecewise((x**6*asin(a*x)**4/6 - x**6*asin(a*x)**2/18 + x**6/324 + x**5*sqr
t(-a**2*x**2 + 1)*asin(a*x)**3/(9*a) - x**5*sqrt(-a**2*x**2 + 1)*asin(a*x)/
(54*a) - 5*x**4*asin(a*x)**2/(48*a**2) + 65*x**4/(3456*a**2) + 5*x**3*sqrt(
-a**2*x**2 + 1)*asin(a*x)**3/(36*a**3) - 65*x**3*sqrt(-a**2*x**2 + 1)*asin(
a*x)/(864*a**3) - 5*x**2*asin(a*x)**2/(16*a**4) + 245*x**2/(1152*a**4) + 5*
x*sqrt(-a**2*x**2 + 1)*asin(a*x)**3/(24*a**5) - 245*x*sqrt(-a**2*x**2 + 1)*
asin(a*x)/(576*a**5) - 5*asin(a*x)**4/(96*a**6) + 245*asin(a*x)**2/(1152*a*
*6), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.37513, size = 489, normalized size = 1.73

$$\frac{\left(a^{2}x^{2}-1\right)^{2}\sqrt{-a^{2}x^{2}+1}x\arcsin\left(ax\right)^{3}}{9\,a^{5}}+\frac{\left(a^{2}x^{2}-1\right)^{3}\arcsin\left(ax\right)^{4}}{6\,a^{6}}-\frac{13\left(-a^{2}x^{2}+1\right)^{\frac{3}{2}}x\arcsin\left(ax\right)^{3}}{36\,a^{5}}+\frac{\left(a^{2}x^{2}-1\right)^{2}\arcsin}{2\,a^{6}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5*arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] 1/9*(a^2*x^2 - 1)^2*sqrt(-a^2*x^2 + 1)*x*arcsin(a*x)^3/a^5 + 1/6*(a^2*x^2 -
 1)^3*arcsin(a*x)^4/a^6 - 13/36*(-a^2*x^2 + 1)^(3/2)*x*arcsin(a*x)^3/a^5 +
1/2*(a^2*x^2 - 1)^2*arcsin(a*x)^4/a^6 - 1/54*(a^2*x^2 - 1)^2*sqrt(-a^2*x^2
+ 1)*x*arcsin(a*x)/a^5 + 11/24*sqrt(-a^2*x^2 + 1)*x*arcsin(a*x)^3/a^5 - 1/1
8*(a^2*x^2 - 1)^3*arcsin(a*x)^2/a^6 + 1/2*(a^2*x^2 - 1)*arcsin(a*x)^4/a^6 +
 97/864*(-a^2*x^2 + 1)^(3/2)*x*arcsin(a*x)/a^5 - 13/48*(a^2*x^2 - 1)^2*arcs
in(a*x)^2/a^6 + 11/96*arcsin(a*x)^4/a^6 - 299/576*sqrt(-a^2*x^2 + 1)*x*arcs
in(a*x)/a^5 + 1/324*(a^2*x^2 - 1)^3/a^6 - 11/16*(a^2*x^2 - 1)*arcsin(a*x)^2
/a^6 + 97/3456*(a^2*x^2 - 1)^2/a^6 - 299/1152*arcsin(a*x)^2/a^6 + 299/1152*
(a^2*x^2 - 1)/a^6 + 9971/82944/a^6
```

3.33 $\int x^4 \sin^{-1}(ax)^4 \, dx$

Optimal. Leaf size=250

$$\frac{1088x^3}{16875a^2}+\frac{4x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{25a}-\frac{24x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{625a}-\frac{16x^3\sin^{-1}(ax)^2}{75a^2}+\frac{16x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{75a^3}-1088x$$

```
[Out] (16576*x)/(5625*a^4) + (1088*x^3)/(16875*a^2) + (24*x^5)/3125 - (16576*Sqrt
[1 - a^2*x^2]*ArcSin[a*x])/(5625*a^5) - (1088*x^2*Sqrt[1 - a^2*x^2]*ArcSin[
a*x])/(5625*a^3) - (24*x^4*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(625*a) - (32*x*A
rcSin[a*x]^2)/(25*a^4) - (16*x^3*ArcSin[a*x]^2)/(75*a^2) - (12*x^5*ArcSin[a
*x]^2)/125 + (32*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(75*a^5) + (16*x^2*Sqrt[1
 - a^2*x^2]*ArcSin[a*x]^3)/(75*a^3) + (4*x^4*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^
3)/(25*a) + (x^5*ArcSin[a*x]^4)/5
```

Rubi [A] time = 0.662997, antiderivative size = 250, normalized size of antiderivative = 1., number of steps used = 19, number of rules used = 6, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.6, Rules used = {4627, 4707, 4677, 4619, 8, 30}

$$\frac{1088x^3}{16875a^2}+\frac{4x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{25a}-\frac{24x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{625a}-\frac{16x^3\sin^{-1}(ax)^2}{75a^2}+\frac{16x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{75a^3}-1088x$$

Antiderivative was successfully verified.

```
[In] Int[x^4*ArcSin[a*x]^4,x]
```

```
[Out] (16576*x)/(5625*a^4) + (1088*x^3)/(16875*a^2) + (24*x^5)/3125 - (16576*Sqrt
[1 - a^2*x^2]*ArcSin[a*x])/(5625*a^5) - (1088*x^2*Sqrt[1 - a^2*x^2]*ArcSin[
a*x])/(5625*a^3) - (24*x^4*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(625*a) - (32*x*A
rcSin[a*x]^2)/(25*a^4) - (16*x^3*ArcSin[a*x]^2)/(75*a^2) - (12*x^5*ArcSin[a
*x]^2)/125 + (32*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(75*a^5) + (16*x^2*Sqrt[1
 - a^2*x^2]*ArcSin[a*x]^3)/(75*a^3) + (4*x^4*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^
3)/(25*a) + (x^5*ArcSin[a*x]^4)/5
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 8

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

Rule 30

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

Rubi steps

$$\int x^4 \sin^{-1}(ax)^4\,dx = \frac{1}{5}x^5\sin^{-1}(ax)^4 - \frac{1}{5}(4a)\int \frac{x^5\sin^{-1}(ax)^3}{\sqrt{1-a^2x^2}}\,dx$$

$$= \frac{4x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{25a} + \frac{1}{5}x^5\sin^{-1}(ax)^4 - \frac{12}{25}\int x^4\sin^{-1}(ax)^2\,dx - \frac{16\int \frac{x^3\sin^{-1}(ax)^3}{\sqrt{1-a^2x^2}}\,dx}{25a}$$

$$= -\frac{12}{125}x^5\sin^{-1}(ax)^2 + \frac{16x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{75a^3} + \frac{4x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{25a} + \frac{1}{5}x^5\sin^{-1}(ax)^4 - \frac{32}{}$$

$$= -\frac{24x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{625a} - \frac{16x^3\sin^{-1}(ax)^2}{75a^2} - \frac{12}{125}x^5\sin^{-1}(ax)^2 + \frac{32\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{75a^5} + \frac{16x}{}$$

$$= \frac{24x^5}{3125} - \frac{1088x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{5625a^3} - \frac{24x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)}{625a} - \frac{32x\sin^{-1}(ax)^2}{25a^4} - \frac{16x^3\sin^{-1}(ax)}{75a^2}$$

$$= \frac{1088x^3}{16875a^2} + \frac{24x^5}{3125} - \frac{16576\sqrt{1-a^2x^2}\sin^{-1}(ax)}{5625a^5} - \frac{1088x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{5625a^3} - \frac{24x^4\sqrt{1-a^2x^2}\sin^{-}}{625a}$$

$$= \frac{16576x}{5625a^4} + \frac{1088x^3}{16875a^2} + \frac{24x^5}{3125} - \frac{16576\sqrt{1-a^2x^2}\sin^{-1}(ax)}{5625a^5} - \frac{1088x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{5625a^3} - \frac{24x^4\sqrt{1-}}{}$$

Mathematica [A] time = 0.0747238, size = 150, normalized size = 0.6

$$\frac{8ax\left(81a^4x^4+680a^2x^2+31080\right)+16875a^5x^5\sin^{-1}(ax)^4-900ax\left(9a^4x^4+20a^2x^2+120\right)\sin^{-1}(ax)^2+4500\sqrt{1-a^2x^2}\left(3\right.}{84375a^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4*ArcSin[a*x]^4,x]
```

```
[Out] (8*a*x*(31080 + 680*a^2*x^2 + 81*a^4*x^4) - 120*Sqrt[1 - a^2*x^2]*(2072 + 1
36*a^2*x^2 + 27*a^4*x^4)*ArcSin[a*x] - 900*a*x*(120 + 20*a^2*x^2 + 9*a^4*x^
4)*ArcSin[a*x]^2 + 4500*Sqrt[1 - a^2*x^2]*(8 + 4*a^2*x^2 + 3*a^4*x^4)*ArcSi
n[a*x]^3 + 16875*a^5*x^5*ArcSin[a*x]^4)/(84375*a^5)
```

Maple [A] time = 0.059, size = 197, normalized size = 0.8

$$\frac{1}{a^5}\left(\frac{a^5x^5(\arcsin(ax))^4}{5} + \frac{4(\arcsin(ax))^3\left(3a^4x^4+4a^2x^2+8\right)}{75}\sqrt{-a^2x^2+1} - \frac{32ax(\arcsin(ax))^2}{25} + \frac{16576ax}{5625} - \frac{64\,\mathrm{arc}}{2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*arcsin(a*x)^4,x)
```

```
[Out] 1/a^5*(1/5*a^5*x^5*arcsin(a*x)^4+4/75*arcsin(a*x)^3*(3*a^4*x^4+4*a^2*x^2+8)
*(-a^2*x^2+1)^(1/2)-32/25*a*x*arcsin(a*x)^2+16576/5625*a*x-64/25*arcsin(a*x
)*(-a^2*x^2+1)^(1/2)-12/125*a^5*x^5*arcsin(a*x)^2-8/625*arcsin(a*x)*(3*a^4*
x^4+4*a^2*x^2+8)*(-a^2*x^2+1)^(1/2)+24/3125*a^5*x^5+1088/16875*a^3*x^3-16/7
5*a^3*x^3*arcsin(a*x)^2-32/225*arcsin(a*x)*(a^2*x^2+2)*(-a^2*x^2+1)^(1/2))
```

Maxima [A] time = 1.8534, size = 279, normalized size = 1.12

$$\frac{1}{5}x^5\arcsin(ax)^4+\frac{4}{75}\left(\frac{3\sqrt{-a^2x^2+1}x^4}{a^2}+\frac{4\sqrt{-a^2x^2+1}x^2}{a^4}+\frac{8\sqrt{-a^2x^2+1}}{a^6}\right)a\arcsin(ax)^3-\frac{4}{84375}\Bigg(2a\Bigg(\frac{15\Big(27\sqrt{-a^2x}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] 1/5*x^5*arcsin(a*x)^4 + 4/75*(3*sqrt(-a^2*x^2 + 1)*x^4/a^2 + 4*sqrt(-a^2*x^
2 + 1)*x^2/a^4 + 8*sqrt(-a^2*x^2 + 1)/a^6)*a*arcsin(a*x)^3 - 4/84375*(2*a*(
15*(27*sqrt(-a^2*x^2 + 1)*a^2*x^4 + 136*sqrt(-a^2*x^2 + 1)*x^2 + 2072*sqrt(
-a^2*x^2 + 1)/a^2)*arcsin(a*x)/a^5 - (81*a^4*x^5 + 680*a^2*x^3 + 31080*x)/a
^6) + 225*(9*a^4*x^5 + 20*a^2*x^3 + 120*x)*arcsin(a*x)^2/a^5)*a
```

Fricas [A] time = 2.14933, size = 352, normalized size = 1.41

$$\frac{16875a^5x^5\arcsin(ax)^4+648a^5x^5+5440a^3x^3-900\left(9a^5x^5+20a^3x^3+120ax\right)\arcsin(ax)^2+248640ax+60\sqrt{-a^2}}{84375a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] 1/84375*(16875*a^5*x^5*arcsin(a*x)^4 + 648*a^5*x^5 + 5440*a^3*x^3 - 900*(9*
a^5*x^5 + 20*a^3*x^3 + 120*a*x)*arcsin(a*x)^2 + 248640*a*x + 60*sqrt(-a^2*x
^2 + 1)*(75*(3*a^4*x^4 + 4*a^2*x^2 + 8)*arcsin(a*x)^3 - 2*(27*a^4*x^4 + 136
*a^2*x^2 + 2072)*arcsin(a*x)))/a^5
```

Sympy [A] time = 18.6481, size = 241, normalized size = 0.96

$$\begin{cases} \frac{x^5 \operatorname{asin}^4(ax)}{5} - \frac{12x^5 \operatorname{asin}^2(ax)}{125} + \frac{24x^5}{3125} + \frac{4x^4\sqrt{-a^2x^2+1}\operatorname{asin}^3(ax)}{25a} - \frac{24x^4\sqrt{-a^2x^2+1}\operatorname{asin}(ax)}{625a} - \frac{16x^3\operatorname{asin}^2(ax)}{75a^2} + \frac{1088x^3}{16875a^2} + \frac{16x^2\sqrt{-a^2x^2+1}\operatorname{asin}^3}{75a^3} & \\ 0 & \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*asin(a*x)**4,x)
```

```
[Out] Piecewise((x**5*asin(a*x)**4/5 - 12*x**5*asin(a*x)**2/125 + 24*x**5/3125 +
4*x**4*sqrt(-a**2*x**2 + 1)*asin(a*x)**3/(25*a) - 24*x**4*sqrt(-a**2*x**2 +
 1)*asin(a*x)/(625*a) - 16*x**3*asin(a*x)**2/(75*a**2) + 1088*x**3/(16875*a
**2) + 16*x**2*sqrt(-a**2*x**2 + 1)*asin(a*x)**3/(75*a**3) - 1088*x**2*sqrt
(-a**2*x**2 + 1)*asin(a*x)/(5625*a**3) - 32*x*asin(a*x)**2/(25*a**4) + 1657
6*x/(5625*a**4) + 32*sqrt(-a**2*x**2 + 1)*asin(a*x)**3/(75*a**5) - 16576*sq
rt(-a**2*x**2 + 1)*asin(a*x)/(5625*a**5), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.29041, size = 412, normalized size = 1.65

$$\frac{\left(a^2x^2-1\right)^2 x\arcsin(ax)^4}{5\,a^4} + \frac{2\left(a^2x^2-1\right)x\arcsin(ax)^4}{5\,a^4} - \frac{12\left(a^2x^2-1\right)^2 x\arcsin(ax)^2}{125\,a^4} + \frac{x\arcsin(ax)^4}{5\,a^4} +$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] 1/5*(a^2*x^2 - 1)^2*x*arcsin(a*x)^4/a^4 + 2/5*(a^2*x^2 - 1)*x*arcsin(a*x)^4
/a^4 - 12/125*(a^2*x^2 - 1)^2*x*arcsin(a*x)^2/a^4 + 1/5*x*arcsin(a*x)^4/a^4
 + 4/25*(a^2*x^2 - 1)^2*sqrt(-a^2*x^2 + 1)*arcsin(a*x)^3/a^5 - 152/375*(a^2
*x^2 - 1)*x*arcsin(a*x)^2/a^4 - 8/15*(-a^2*x^2 + 1)^(3/2)*arcsin(a*x)^3/a^5
 + 24/3125*(a^2*x^2 - 1)^2*x/a^4 - 596/375*x*arcsin(a*x)^2/a^4 - 24/625*(a^
2*x^2 - 1)^2*sqrt(-a^2*x^2 + 1)*arcsin(a*x)/a^5 + 4/5*sqrt(-a^2*x^2 + 1)*ar
csin(a*x)^3/a^5 + 6736/84375*(a^2*x^2 - 1)*x/a^4 + 304/1125*(-a^2*x^2 + 1)^
(3/2)*arcsin(a*x)/a^5 + 254728/84375*x/a^4 - 1192/375*sqrt(-a^2*x^2 + 1)*ar
csin(a*x)/a^5
```

3.34 $\int x^3 \sin^{-1}(ax)^4 \, dx$

Optimal. Leaf size=198

$$\frac{45x^2}{128a^2} + \frac{x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{4a} - \frac{3x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{32a} - \frac{9x^2\sin^{-1}(ax)^2}{16a^2} + \frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{8a^3} - \frac{45x\sqrt{1-a^2x}{64a}$$

```
[Out] (45*x^2)/(128*a^2) + (3*x^4)/128 - (45*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(64
*a^3) - (3*x^3*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(32*a) + (45*ArcSin[a*x]^2)/(
128*a^4) - (9*x^2*ArcSin[a*x]^2)/(16*a^2) - (3*x^4*ArcSin[a*x]^2)/16 + (3*x
*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(8*a^3) + (x^3*Sqrt[1 - a^2*x^2]*ArcSin[a
*x]^3)/(4*a) - (3*ArcSin[a*x]^4)/(32*a^4) + (x^4*ArcSin[a*x]^4)/4
```

Rubi [A] time = 0.516077, antiderivative size = 198, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4, Rules used = {4627, 4707, 4641, 30}

$$\frac{45x^2}{128a^2} + \frac{x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{4a} - \frac{3x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{32a} - \frac{9x^2\sin^{-1}(ax)^2}{16a^2} + \frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{8a^3} - \frac{45x\sqrt{1-a^2x}{64a}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*ArcSin[a*x]^4,x]
```

```
[Out] (45*x^2)/(128*a^2) + (3*x^4)/128 - (45*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(64
*a^3) - (3*x^3*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(32*a) + (45*ArcSin[a*x]^2)/(
128*a^4) - (9*x^2*ArcSin[a*x]^2)/(16*a^2) - (3*x^4*ArcSin[a*x]^2)/16 + (3*x
*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(8*a^3) + (x^3*Sqrt[1 - a^2*x^2]*ArcSin[a
*x]^3)/(4*a) - (3*ArcSin[a*x]^4)/(32*a^4) + (x^4*ArcSin[a*x]^4)/4
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 30

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

Rubi steps

$$\begin{aligned}
\int x^3\sin^{-1}(ax)^4\,dx &= \frac{1}{4}x^4\sin^{-1}(ax)^4 - a\int\frac{x^4\sin^{-1}(ax)^3}{\sqrt{1-a^2x^2}}\,dx\\
&= \frac{x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{4a} + \frac{1}{4}x^4\sin^{-1}(ax)^4 - \frac{3}{4}\int x^3\sin^{-1}(ax)^2\,dx - \frac{3\int\frac{x^2\sin^{-1}(ax)^3}{\sqrt{1-a^2x^2}}\,dx}{4a}\\
&= -\frac{3}{16}x^4\sin^{-1}(ax)^2 + \frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{8a^3} + \frac{x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{4a} + \frac{1}{4}x^4\sin^{-1}(ax)^4 -\\
&= -\frac{3x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{32a} - \frac{9x^2\sin^{-1}(ax)^2}{16a^2} - \frac{3}{16}x^4\sin^{-1}(ax)^2 + \frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{8a^3} +\\
&= \frac{3x^4}{128} - \frac{45x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{64a^3} - \frac{3x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{32a} - \frac{9x^2\sin^{-1}(ax)^2}{16a^2} - \frac{3}{16}x^4\sin^{-1}(ax)^2 +\\
&= \frac{45x^2}{128a^2} + \frac{3x^4}{128} - \frac{45x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{64a^3} - \frac{3x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)}{32a} + \frac{45\sin^{-1}(ax)^2}{128a^4} - \frac{9x^2\sin^{-1}(ax}{16a^2}
\end{aligned}$$

Mathematica [A] time = 0.0589461, size = 135, normalized size = 0.68

$$\frac{3a^2x^2\left(a^2x^2+15\right)+4\left(8a^4x^4-3\right)\sin^{-1}(ax)^4+16ax\sqrt{1-a^2x^2}\left(2a^2x^2+3\right)\sin^{-1}(ax)^3-3\left(8a^4x^4+24a^2x^2-15\right)\sin^{-1}(ax}{128a^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*ArcSin[a*x]^4,x]
```

```
[Out] (3*a^2*x^2*(15 + a^2*x^2) - 6*a*x*Sqrt[1 - a^2*x^2]*(15 + 2*a^2*x^2)*ArcSin
[a*x] - 3*(-15 + 24*a^2*x^2 + 8*a^4*x^4)*ArcSin[a*x]^2 + 16*a*x*Sqrt[1 - a^
2*x^2]*(3 + 2*a^2*x^2)*ArcSin[a*x]^3 + 4*(-3 + 8*a^4*x^4)*ArcSin[a*x]^4)/(1
28*a^4)
```

Maple [A] time = 0.059, size = 209, normalized size = 1.1

$$\frac{1}{a^4}\left(\frac{a^4x^4(\arcsin(ax))^4}{4} - \frac{(\arcsin(ax))^3}{8}\left(-2\,a^3x^3\sqrt{-a^2x^2+1} - 3\,ax\sqrt{-a^2x^2+1} + 3\,\arcsin(ax)\right) - \frac{3\,a^4x^4(\arcsin(ax))}{16}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*arcsin(a*x)^4,x)
```

```
[Out] 1/a^4*(1/4*a^4*x^4*arcsin(a*x)^4-1/8*arcsin(a*x)^3*(-2*a^3*x^3*(-a^2*x^2+1)
^(1/2)-3*a*x*(-a^2*x^2+1)^(1/2)+3*arcsin(a*x))-3/16*a^4*x^4*arcsin(a*x)^2+3
/64*arcsin(a*x)*(-2*a^3*x^3*(-a^2*x^2+1)^(1/2)-3*a*x*(-a^2*x^2+1)^(1/2)+3*a
rcsin(a*x))+27/128*arcsin(a*x)^2+3/128*a^4*x^4+45/128*a^2*x^2-9/16*(a^2*x^2
-1)*arcsin(a*x)^2-9/16*arcsin(a*x)*(a*x*(-a^2*x^2+1)^(1/2)+arcsin(a*x))+9/3
2*arcsin(a*x)^4)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{1}{4}\,x^4\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^4 + a\int\frac{\sqrt{ax+1}\sqrt{-ax+1}x^4\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^3}{a^2x^2-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] 1/4*x^4*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^4 + a*integrate(sqrt(a*x
 + 1)*sqrt(-a*x + 1)*x^4*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3/(a^2*
x^2 - 1), x)
```

Fricas [A] time = 2.2093, size = 292, normalized size = 1.47

$$\frac{3\,a^4x^4 + 4\left(8\,a^4x^4 - 3\right)\arcsin\left(ax\right)^4 + 45\,a^2x^2 - 3\left(8\,a^4x^4 + 24\,a^2x^2 - 15\right)\arcsin\left(ax\right)^2 + 2\,\sqrt{-a^2x^2+1}\left(8\left(2\,a^3x^3 + 3\,ax\right)a}{128\,a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] 1/128*(3*a^4*x^4 + 4*(8*a^4*x^4 - 3)*arcsin(a*x)^4 + 45*a^2*x^2 - 3*(8*a^4*
x^4 + 24*a^2*x^2 - 15)*arcsin(a*x)^2 + 2*sqrt(-a^2*x^2 + 1)*(8*(2*a^3*x^3 +
 3*a*x)*arcsin(a*x)^3 - 3*(2*a^3*x^3 + 15*a*x)*arcsin(a*x)))/a^4
```

Sympy [A] time = 15.126, size = 190, normalized size = 0.96

$$\begin{cases} \frac{x^4\operatorname{asin}^4(ax)}{4} - \frac{3x^4\operatorname{asin}^2(ax)}{16} + \frac{3x^4}{128} + \frac{x^3\sqrt{-a^2x^2+1}\operatorname{asin}^3(ax)}{4a} - \frac{3x^3\sqrt{-a^2x^2+1}\operatorname{asin}(ax)}{32a} - \frac{9x^2\operatorname{asin}^2(ax)}{16a^2} + \frac{45x^2}{128a^2} + \frac{3x\sqrt{-a^2x^2+1}\operatorname{asin}^3(ax)}{8a^3} - 45x \\ 0 \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*asin(a*x)**4,x)
```

```
[Out] Piecewise((x**4*asin(a*x)**4/4 - 3*x**4*asin(a*x)**2/16 + 3*x**4/128 + x**3
*sqrt(-a**2*x**2 + 1)*asin(a*x)**3/(4*a) - 3*x**3*sqrt(-a**2*x**2 + 1)*asin
(a*x)/(32*a) - 9*x**2*asin(a*x)**2/(16*a**2) + 45*x**2/(128*a**2) + 3*x*sqr
t(-a**2*x**2 + 1)*asin(a*x)**3/(8*a**3) - 45*x*sqrt(-a**2*x**2 + 1)*asin(a*
x)/(64*a**3) - 3*asin(a*x)**4/(32*a**4) + 45*asin(a*x)**2/(128*a**4), Ne(a,
 0)), (0, True))
```

Giac [A] time = 1.41395, size = 316, normalized size = 1.6

$$-\frac{\left(-a^2x^2+1\right)^{\frac{3}{2}}x\arcsin\left(ax\right)^3}{4\,a^3} + \frac{\left(a^2x^2-1\right)^2\arcsin\left(ax\right)^4}{4\,a^4} + \frac{5\,\sqrt{-a^2x^2+1}x\arcsin\left(ax\right)^3}{8\,a^3} + \frac{\left(a^2x^2-1\right)\arcsin\left(ax\right)^4}{2\,a^4} + 3\,(-a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] -1/4*(-a^2*x^2 + 1)^(3/2)*x*arcsin(a*x)^3/a^3 + 1/4*(a^2*x^2 - 1)^2*arcsin(
a*x)^4/a^4 + 5/8*sqrt(-a^2*x^2 + 1)*x*arcsin(a*x)^3/a^3 + 1/2*(a^2*x^2 - 1)
*arcsin(a*x)^4/a^4 + 3/32*(-a^2*x^2 + 1)^(3/2)*x*arcsin(a*x)/a^3 - 3/16*(a^
2*x^2 - 1)^2*arcsin(a*x)^2/a^4 + 5/32*arcsin(a*x)^4/a^4 - 51/64*sqrt(-a^2*x
^2 + 1)*x*arcsin(a*x)/a^3 - 15/16*(a^2*x^2 - 1)*arcsin(a*x)^2/a^4 + 3/128*(
a^2*x^2 - 1)^2/a^4 - 51/128*arcsin(a*x)^2/a^4 + 51/128*(a^2*x^2 - 1)/a^4 +
195/1024/a^4
```

3.35 $\int x^2 \sin^{-1}(ax)^4 \, dx$

Optimal. Leaf size=166

$$\frac{4x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{9a}+\frac{8\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{9a^3}-\frac{8x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{27a}-\frac{160\sqrt{1-a^2x^2}\sin^{-1}(ax)}{27a^3}+\frac{160x}{27a^2}-\frac{8x\sin}{3}$$

```
[Out] (160*x)/(27*a^2) + (8*x^3)/81 - (160*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(27*a^3
) - (8*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(27*a) - (8*x*ArcSin[a*x]^2)/(3*a
^2) - (4*x^3*ArcSin[a*x]^2)/9 + (8*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(9*a^3)
 + (4*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(9*a) + (x^3*ArcSin[a*x]^4)/3
```

Rubi [A] time = 0.353041, antiderivative size = 166, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 6, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.6, Rules used = {4627, 4707, 4677, 4619, 8, 30}

$$\frac{4x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{9a}+\frac{8\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{9a^3}-\frac{8x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{27a}-\frac{160\sqrt{1-a^2x^2}\sin^{-1}(ax)}{27a^3}+\frac{160x}{27a^2}-\frac{8x\sin}{3}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*ArcSin[a*x]^4,x]
```

```
[Out] (160*x)/(27*a^2) + (8*x^3)/81 - (160*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(27*a^3
) - (8*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(27*a) - (8*x*ArcSin[a*x]^2)/(3*a
^2) - (4*x^3*ArcSin[a*x]^2)/9 + (8*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(9*a^3)
 + (4*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(9*a) + (x^3*ArcSin[a*x]^4)/3
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 8

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

Rule 30

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

Rubi steps

$$
\begin{aligned}
\int x^2 \sin^{-1}(ax)^4\,dx &= \frac{1}{3}x^3\sin^{-1}(ax)^4 - \frac{1}{3}(4a)\int \frac{x^3\sin^{-1}(ax)^3}{\sqrt{1-a^2x^2}}\,dx \\
&= \frac{4x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{9a} + \frac{1}{3}x^3\sin^{-1}(ax)^4 - \frac{4}{3}\int x^2\sin^{-1}(ax)^2\,dx - \frac{8\int \frac{x\sin^{-1}(ax)^3}{\sqrt{1-a^2x^2}}\,dx}{9a} \\
&= -\frac{4}{9}x^3\sin^{-1}(ax)^2 + \frac{8\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{9a^3} + \frac{4x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{9a} + \frac{1}{3}x^3\sin^{-1}(ax)^4 - \\
&= -\frac{8x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{27a} - \frac{8x\sin^{-1}(ax)^2}{3a^2} - \frac{4}{9}x^3\sin^{-1}(ax)^2 + \frac{8\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{9a^3} + \\
&= \frac{8x^3}{81} - \frac{160\sqrt{1-a^2x^2}\sin^{-1}(ax)}{27a^3} - \frac{8x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{27a} - \frac{8x\sin^{-1}(ax)^2}{3a^2} - \frac{4}{9}x^3\sin^{-1}(ax)^2 + \\
&= \frac{160x}{27a^2} + \frac{8x^3}{81} - \frac{160\sqrt{1-a^2x^2}\sin^{-1}(ax)}{27a^3} - \frac{8x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)}{27a} - \frac{8x\sin^{-1}(ax)^2}{3a^2} - \frac{4}{9}x^3\sin^{-1}(ax)
\end{aligned}
$$

Mathematica [A] time = 0.0481252, size = 114, normalized size = 0.69

$$\frac{8ax\left(a^2x^2+60\right) + 27a^3x^3\sin^{-1}(ax)^4 + 36\sqrt{1-a^2x^2}\left(a^2x^2+2\right)\sin^{-1}(ax)^3 - 36ax\left(a^2x^2+6\right)\sin^{-1}(ax)^2 - 24\sqrt{1-a^2x^2}}{81a^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*ArcSin[a*x]^4,x]
```

```
[Out] (8*a*x*(60 + a^2*x^2) - 24*Sqrt[1 - a^2*x^2]*(20 + a^2*x^2)*ArcSin[a*x] - 3
6*a*x*(6 + a^2*x^2)*ArcSin[a*x]^2 + 36*Sqrt[1 - a^2*x^2]*(2 + a^2*x^2)*ArcS
in[a*x]^3 + 27*a^3*x^3*ArcSin[a*x]^4)/(81*a^3)
```

Maple [A] time = 0.048, size = 130, normalized size = 0.8

$$\frac{1}{a^3}\left(\frac{a^3x^3(\arcsin(ax))^4}{3} + \frac{4(\arcsin(ax))^3\left(a^2x^2+2\right)}{9}\sqrt{-a^2x^2+1} - \frac{8ax(\arcsin(ax))^2}{3} + \frac{160ax}{27} - \frac{16\arcsin(ax)}{3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*arcsin(a*x)^4,x)
```

```
[Out] 1/a^3*(1/3*a^3*x^3*arcsin(a*x)^4+4/9*arcsin(a*x)^3*(a^2*x^2+2)*(-a^2*x^2+1)
^(1/2)-8/3*a*x*arcsin(a*x)^2+160/27*a*x-16/3*arcsin(a*x)*(-a^2*x^2+1)^(1/2)
-4/9*a^3*x^3*arcsin(a*x)^2-8/27*arcsin(a*x)*(a^2*x^2+2)*(-a^2*x^2+1)^(1/2)+
8/81*a^3*x^3)
```

Maxima [A] time = 1.68667, size = 198, normalized size = 1.19

$$\frac{1}{3}x^{3}\arcsin(ax)^{4}+\frac{4}{9}a\left(\frac{\sqrt{-a^{2}x^{2}+1}x^{2}}{a^{2}}+\frac{2\sqrt{-a^{2}x^{2}+1}}{a^{4}}\right)\arcsin(ax)^{3}-\frac{4}{81}\left(2a\left(\frac{3\left(\sqrt{-a^{2}x^{2}+1}x^{2}+\frac{20\sqrt{-a^{2}x^{2}+1}}{a^{2}}\right)\arcsin}{a^{3}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] 1/3*x^3*arcsin(a*x)^4 + 4/9*a*(sqrt(-a^2*x^2 + 1)*x^2/a^2 + 2*sqrt(-a^2*x^2
 + 1)/a^4)*arcsin(a*x)^3 - 4/81*(2*a*(3*(sqrt(-a^2*x^2 + 1)*x^2 + 20*sqrt(-
a^2*x^2 + 1)/a^2)*arcsin(a*x)/a^3 - (a^2*x^3 + 60*x)/a^4) + 9*(a^2*x^3 + 6*
x)*arcsin(a*x)^2/a^3)*a
```

Fricas [A] time = 2.01002, size = 247, normalized size = 1.49

$$\frac{27\,a^{3}x^{3}\arcsin(ax)^{4}+8\,a^{3}x^{3}-36\left(a^{3}x^{3}+6\,ax\right)\arcsin(ax)^{2}+480\,ax+12\sqrt{-a^{2}x^{2}+1}\left(3\left(a^{2}x^{2}+2\right)\arcsin(ax)^{3}-2\left(a\right.\right.}{81\,a^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] 1/81*(27*a^3*x^3*arcsin(a*x)^4 + 8*a^3*x^3 - 36*(a^3*x^3 + 6*a*x)*arcsin(a*
x)^2 + 480*a*x + 12*sqrt(-a^2*x^2 + 1)*(3*(a^2*x^2 + 2)*arcsin(a*x)^3 - 2*(
a^2*x^2 + 20)*arcsin(a*x)))/a^3
```

Sympy [A] time = 5.59197, size = 158, normalized size = 0.95

$$\begin{cases}\frac{x^{3}\operatorname{asin}^{4}(ax)}{3}-\frac{4x^{3}\operatorname{asin}^{2}(ax)}{9}+\frac{8x^{3}}{81}+\frac{4x^{2}\sqrt{-a^{2}x^{2}+1}\operatorname{asin}^{3}(ax)}{9a}-\frac{8x^{2}\sqrt{-a^{2}x^{2}+1}\operatorname{asin}(ax)}{27a}-\frac{8x\operatorname{asin}^{2}(ax)}{3a^{2}}+\frac{160x}{27a^{2}}+\frac{8\sqrt{-a^{2}x^{2}+1}\operatorname{asin}^{3}(ax)}{9a^{3}}-160 \\ 0\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*asin(a*x)**4,x)
```

```
[Out] Piecewise((x**3*asin(a*x)**4/3 - 4*x**3*asin(a*x)**2/9 + 8*x**3/81 + 4*x**2
*sqrt(-a**2*x**2 + 1)*asin(a*x)**3/(9*a) - 8*x**2*sqrt(-a**2*x**2 + 1)*asin
(a*x)/(27*a) - 8*x*asin(a*x)**2/(3*a**2) + 160*x/(27*a**2) + 8*sqrt(-a**2*x
**2 + 1)*asin(a*x)**3/(9*a**3) - 160*sqrt(-a**2*x**2 + 1)*asin(a*x)/(27*a**
3), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.40388, size = 238, normalized size = 1.43

$$\frac{\left(a^2x^2-1\right)x\arcsin\left(ax\right)^4}{3\,a^2}+\frac{x\arcsin\left(ax\right)^4}{3\,a^2}-\frac{4\left(a^2x^2-1\right)x\arcsin\left(ax\right)^2}{9\,a^2}-\frac{4\left(-a^2x^2+1\right)^{\frac{3}{2}}\arcsin\left(ax\right)^3}{9\,a^3}-\frac{28\,x\arcsin\left(ax\right)^2}{9\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] 1/3*(a^2*x^2 - 1)*x*arcsin(a*x)^4/a^2 + 1/3*x*arcsin(a*x)^4/a^2 - 4/9*(a^2*
x^2 - 1)*x*arcsin(a*x)^2/a^2 - 4/9*(-a^2*x^2 + 1)^(3/2)*arcsin(a*x)^3/a^3 -
 28/9*x*arcsin(a*x)^2/a^2 + 4/3*sqrt(-a^2*x^2 + 1)*arcsin(a*x)^3/a^3 + 8/81
*(a^2*x^2 - 1)*x/a^2 + 8/27*(-a^2*x^2 + 1)^(3/2)*arcsin(a*x)/a^3 + 488/81*x
/a^2 - 56/9*sqrt(-a^2*x^2 + 1)*arcsin(a*x)/a^3
```

3.36 $\int x \sin^{-1}(ax)^4 \, dx$

Optimal. Leaf size=111

$$\frac{x\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}-\frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{2a}-\frac{\sin^{-1}(ax)^4}{4a^2}+\frac{3\sin^{-1}(ax)^2}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^4-\frac{3}{2}x^2\sin^{-1}(ax)^2+\frac{3x^2}{4}$$

```
[Out] (3*x^2)/4 - (3*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(2*a) + (3*ArcSin[a*x]^2)/(
4*a^2) - (3*x^2*ArcSin[a*x]^2)/2 + (x*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/a -
ArcSin[a*x]^4/(4*a^2) + (x^2*ArcSin[a*x]^4)/2
```

Rubi [A] time = 0.237692, antiderivative size = 111, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 4, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4627, 4707, 4641, 30}

$$\frac{x\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}-\frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{2a}-\frac{\sin^{-1}(ax)^4}{4a^2}+\frac{3\sin^{-1}(ax)^2}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^4-\frac{3}{2}x^2\sin^{-1}(ax)^2+\frac{3x^2}{4}$$

Antiderivative was successfully verified.

```
[In] Int[x*ArcSin[a*x]^4,x]
```

```
[Out] (3*x^2)/4 - (3*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/(2*a) + (3*ArcSin[a*x]^2)/(
4*a^2) - (3*x^2*ArcSin[a*x]^2)/2 + (x*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/a -
ArcSin[a*x]^4/(4*a^2) + (x^2*ArcSin[a*x]^4)/2
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

```
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 30

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

Rubi steps

$$
\begin{aligned}
\int x\sin^{-1}(ax)^4\,dx &= \frac{1}{2}x^2\sin^{-1}(ax)^4-(2a)\int\frac{x^2\sin^{-1}(ax)^3}{\sqrt{1-a^2x^2}}\,dx\\
&= \frac{x\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}+\frac{1}{2}x^2\sin^{-1}(ax)^4-3\int x\sin^{-1}(ax)^2\,dx-\frac{\int\frac{\sin^{-1}(ax)^3}{\sqrt{1-a^2x^2}}\,dx}{a}\\
&= -\frac{3}{2}x^2\sin^{-1}(ax)^2+\frac{x\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}-\frac{\sin^{-1}(ax)^4}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^4+(3a)\int\frac{x^2\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx\\
&= -\frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{2a}-\frac{3}{2}x^2\sin^{-1}(ax)^2+\frac{x\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}-\frac{\sin^{-1}(ax)^4}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^4-\\
&= \frac{3x^2}{4}-\frac{3x\sqrt{1-a^2x^2}\sin^{-1}(ax)}{2a}+\frac{3\sin^{-1}(ax)^2}{4a^2}-\frac{3}{2}x^2\sin^{-1}(ax)^2+\frac{x\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}-\frac{\sin^{-1}(ax}{4a^2}
\end{aligned}
$$

Mathematica [A] time = 0.0289746, size = 96, normalized size = 0.86

$$
\frac{3a^2x^2+\left(2a^2x^2-1\right)\sin^{-1}(ax)^4+4ax\sqrt{1-a^2x^2}\sin^{-1}(ax)^3+\left(3-6a^2x^2\right)\sin^{-1}(ax)^2-6ax\sqrt{1-a^2x^2}\sin^{-1}(ax)}{4a^2}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x*ArcSin[a*x]^4,x]
```

```
[Out] (3*a^2*x^2 - 6*a*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x] + (3 - 6*a^2*x^2)*ArcSin[a
*x]^2 + 4*a*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3 + (-1 + 2*a^2*x^2)*ArcSin[a*x
]^4)/(4*a^2)
```

Maple [A] time = 0.039, size = 117, normalized size = 1.1

$$\frac{1}{a^2}\left(\frac{\left(a^2x^2-1\right)(\arcsin(ax))^4}{2}+(\arcsin(ax))^3\left(ax\sqrt{-a^2x^2+1}+\arcsin(ax)\right)-\frac{\left(3\,a^2x^2-3\right)(\arcsin(ax))^2}{2}-\frac{3\arcsin(}{2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*arcsin(a*x)^4,x)
```

```
[Out] 1/a^2*(1/2*(a^2*x^2-1)*arcsin(a*x)^4+arcsin(a*x)^3*(a*x*(-a^2*x^2+1)^(1/2)+
arcsin(a*x))-3/2*(a^2*x^2-1)*arcsin(a*x)^2-3/2*arcsin(a*x)*(a*x*(-a^2*x^2+1
)^(1/2)+arcsin(a*x))+3/4*arcsin(a*x)^2+3/4*a^2*x^2-3/4*arcsin(a*x)^4)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{1}{2}\,x^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^4+2\,a\int\frac{\sqrt{ax+1}\sqrt{-ax+1}x^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^3}{a^2x^2-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] 1/2*x^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^4 + 2*a*integrate(sqrt(a
*x + 1)*sqrt(-a*x + 1)*x^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3/(a^
2*x^2 - 1), x)
```

Fricas [A] time = 2.21133, size = 205, normalized size = 1.85

$$\frac{\left(2\,a^2x^2-1\right)\arcsin(ax)^4+3\,a^2x^2-3\left(2\,a^2x^2-1\right)\arcsin(ax)^2+2\left(2\,ax\arcsin(ax)^3-3\,ax\arcsin(ax)\right)\sqrt{-a^2x^2+1}}{4\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] 1/4*((2*a^2*x^2 - 1)*arcsin(a*x)^4 + 3*a^2*x^2 - 3*(2*a^2*x^2 - 1)*arcsin(a
*x)^2 + 2*(2*a*x*arcsin(a*x)^3 - 3*a*x*arcsin(a*x))*sqrt(-a^2*x^2 + 1))/a^2
```

Sympy [A] time = 3.34311, size = 104, normalized size = 0.94

$$\begin{cases} \frac{x^2 \operatorname{asin}^4(ax)}{2} - \frac{3x^2 \operatorname{asin}^2(ax)}{2} + \frac{3x^2}{4} + \frac{x\sqrt{-a^2x^2+1}\operatorname{asin}^3(ax)}{a} - \frac{3x\sqrt{-a^2x^2+1}\operatorname{asin}(ax)}{2a} - \frac{\operatorname{asin}^4(ax)}{4a^2} + \frac{3\operatorname{asin}^2(ax)}{4a^2} & \text{for } a \neq 0 \\ 0 & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*asin(a*x)**4,x)
```

```
[Out] Piecewise((x**2*asin(a*x)**4/2 - 3*x**2*asin(a*x)**2/2 + 3*x**2/4 + x*sqrt(
-a**2*x**2 + 1)*asin(a*x)**3/a - 3*x*sqrt(-a**2*x**2 + 1)*asin(a*x)/(2*a) -
 asin(a*x)**4/(4*a**2) + 3*asin(a*x)**2/(4*a**2), Ne(a, 0)), (0, True))
```

Giac [A] time = 1.40401, size = 171, normalized size = 1.54

$$\frac{\sqrt{-a^2x^2+1}\,x\arcsin(ax)^3}{a} + \frac{\left(a^2x^2-1\right)\arcsin(ax)^4}{2\,a^2} + \frac{\arcsin(ax)^4}{4\,a^2} - \frac{3\,\sqrt{-a^2x^2+1}\,x\arcsin(ax)}{2\,a} - \frac{3\left(a^2x^2-1\right)\arcsin(}{2\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] sqrt(-a^2*x^2 + 1)*x*arcsin(a*x)^3/a + 1/2*(a^2*x^2 - 1)*arcsin(a*x)^4/a^2
+ 1/4*arcsin(a*x)^4/a^2 - 3/2*sqrt(-a^2*x^2 + 1)*x*arcsin(a*x)/a - 3/2*(a^2
*x^2 - 1)*arcsin(a*x)^2/a^2 - 3/4*arcsin(a*x)^2/a^2 + 3/4*(a^2*x^2 - 1)/a^2
 + 3/8/a^2
```

3.37 $\int \sin^{-1}(ax)^4\,dx$

Optimal. Leaf size=69

$$\frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}-\frac{24\sqrt{1-a^2x^2}\sin^{-1}(ax)}{a}+x\sin^{-1}(ax)^4-12x\sin^{-1}(ax)^2+24x$$

```
[Out] 24*x - (24*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/a - 12*x*ArcSin[a*x]^2 + (4*Sqrt[
1 - a^2*x^2]*ArcSin[a*x]^3)/a + x*ArcSin[a*x]^4
```

Rubi [A] time = 0.117854, antiderivative size = 69, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4619, 4677, 8}

$$\frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}-\frac{24\sqrt{1-a^2x^2}\sin^{-1}(ax)}{a}+x\sin^{-1}(ax)^4-12x\sin^{-1}(ax)^2+24x$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^4,x]
```

```
[Out] 24*x - (24*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/a - 12*x*ArcSin[a*x]^2 + (4*Sqrt[
1 - a^2*x^2]*ArcSin[a*x]^3)/a + x*ArcSin[a*x]^4
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 8

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

Rubi steps

$$\begin{aligned}\int \sin^{-1}(ax)^4\,dx &= x\sin^{-1}(ax)^4-(4a)\int \frac{x\sin^{-1}(ax)^3}{\sqrt{1-a^2x^2}}\,dx\\ &= \frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}+x\sin^{-1}(ax)^4-12\int \sin^{-1}(ax)^2\,dx\\ &= -12x\sin^{-1}(ax)^2+\frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}+x\sin^{-1}(ax)^4+(24a)\int \frac{x\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx\\ &= -\frac{24\sqrt{1-a^2x^2}\sin^{-1}(ax)}{a}-12x\sin^{-1}(ax)^2+\frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}+x\sin^{-1}(ax)^4+24\int 1\,dx\\ &= 24x-\frac{24\sqrt{1-a^2x^2}\sin^{-1}(ax)}{a}-12x\sin^{-1}(ax)^2+\frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}+x\sin^{-1}(ax)^4\end{aligned}$$

Mathematica [A] time = 0.0155383, size = 69, normalized size = 1.

$$\frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{a}-\frac{24\sqrt{1-a^2x^2}\sin^{-1}(ax)}{a}+x\sin^{-1}(ax)^4-12x\sin^{-1}(ax)^2+24x$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]^4,x]
```

```
[Out] 24*x - (24*Sqrt[1 - a^2*x^2]*ArcSin[a*x])/a - 12*x*ArcSin[a*x]^2 + (4*Sqrt[
1 - a^2*x^2]*ArcSin[a*x]^3)/a + x*ArcSin[a*x]^4
```

Maple [A] time = 0.026, size = 67, normalized size = 1.

$$\frac{1}{a}\left(ax\left(\arcsin\left(ax\right)\right)^{4}+4\left(\arcsin\left(ax\right)\right)^{3}\sqrt{-a^2x^2+1}-12\,ax\left(\arcsin\left(ax\right)\right)^{2}+24\,ax-24\arcsin\left(ax\right)\sqrt{-a^2x^2+1}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^4,x)
```

```
[Out] 1/a*(a*x*arcsin(a*x)^4+4*arcsin(a*x)^3*(-a^2*x^2+1)^(1/2)-12*a*x*arcsin(a*x
)^2+24*a*x-24*arcsin(a*x)*(-a^2*x^2+1)^(1/2))
```

Maxima [A] time = 1.76751, size = 101, normalized size = 1.46

$$x \arcsin(ax)^4 + \frac{4\sqrt{-a^2x^2+1}\arcsin(ax)^3}{a} - 12\left(\frac{x\arcsin(ax)^2}{a} - \frac{2\left(x - \frac{\sqrt{-a^2x^2+1}\arcsin(ax)}{a}\right)}{a}\right)a$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] x*arcsin(a*x)^4 + 4*sqrt(-a^2*x^2 + 1)*arcsin(a*x)^3/a - 12*(x*arcsin(a*x)^
2/a - 2*(x - sqrt(-a^2*x^2 + 1)*arcsin(a*x)/a)/a)*a
```

Fricas [A] time = 1.92647, size = 149, normalized size = 2.16

$$\frac{ax\arcsin(ax)^4 - 12\,ax\arcsin(ax)^2 + 24\,ax + 4\sqrt{-a^2x^2+1}\left(\arcsin(ax)^3 - 6\arcsin(ax)\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] (a*x*arcsin(a*x)^4 - 12*a*x*arcsin(a*x)^2 + 24*a*x + 4*sqrt(-a^2*x^2 + 1)*(
arcsin(a*x)^3 - 6*arcsin(a*x)))/a
```

Sympy [A] time = 1.98801, size = 65, normalized size = 0.94

$$\begin{cases} x\operatorname{asin}^4(ax) - 12x\operatorname{asin}^2(ax) + 24x + \frac{4\sqrt{-a^2x^2+1}\operatorname{asin}^3(ax)}{a} - \frac{24\sqrt{-a^2x^2+1}\operatorname{asin}(ax)}{a} & \text{for } a \neq 0 \\ 0 & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**4,x)
```

```
[Out] Piecewise((x*asin(a*x)**4 - 12*x*asin(a*x)**2 + 24*x + 4*sqrt(-a**2*x**2 +
1)*asin(a*x)**3/a - 24*sqrt(-a**2*x**2 + 1)*asin(a*x)/a, Ne(a, 0)), (0, Tru
e))
```

Giac [A] time = 1.38978, size = 88, normalized size = 1.28

$$x\arcsin(ax)^4 - 12\,x\arcsin(ax)^2 + \frac{4\,\sqrt{-a^2x^2+1}\arcsin(ax)^3}{a} + 24\,x - \frac{24\,\sqrt{-a^2x^2+1}\arcsin(ax)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] x*arcsin(a*x)^4 - 12*x*arcsin(a*x)^2 + 4*sqrt(-a^2*x^2 + 1)*arcsin(a*x)^3/a
 + 24*x - 24*sqrt(-a^2*x^2 + 1)*arcsin(a*x)/a
```

3.38 $\int \frac{\sin^{-1}(ax)^4}{x}\,dx$

Optimal. Leaf size=113

$$-2i\sin^{-1}(ax)^3\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)+3\sin^{-1}(ax)^2\text{PolyLog}\left(3,e^{2i\sin^{-1}(ax)}\right)+3i\sin^{-1}(ax)\text{PolyLog}\left(4,e^{2i\sin^{-1}(ax)}\right)-$$

```
[Out] (-I/5)*ArcSin[a*x]^5 + ArcSin[a*x]^4*Log[1 - E^((2*I)*ArcSin[a*x])] - (2*I)
*ArcSin[a*x]^3*PolyLog[2, E^((2*I)*ArcSin[a*x])] + 3*ArcSin[a*x]^2*PolyLog[
3, E^((2*I)*ArcSin[a*x])] + (3*I)*ArcSin[a*x]*PolyLog[4, E^((2*I)*ArcSin[a*
x])] - (3*PolyLog[5, E^((2*I)*ArcSin[a*x])])/2
```

Rubi [A] time = 0.122287, antiderivative size = 113, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.7, Rules used = {4625, 3717, 2190, 2531, 6609, 2282, 6589}

$$-2i\sin^{-1}(ax)^3\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)+3\sin^{-1}(ax)^2\text{PolyLog}\left(3,e^{2i\sin^{-1}(ax)}\right)+3i\sin^{-1}(ax)\text{PolyLog}\left(4,e^{2i\sin^{-1}(ax)}\right)-$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^4/x,x]
```

```
[Out] (-I/5)*ArcSin[a*x]^5 + ArcSin[a*x]^4*Log[1 - E^((2*I)*ArcSin[a*x])] - (2*I)
*ArcSin[a*x]^3*PolyLog[2, E^((2*I)*ArcSin[a*x])] + 3*ArcSin[a*x]^2*PolyLog[
3, E^((2*I)*ArcSin[a*x])] + (3*I)*ArcSin[a*x]*PolyLog[4, E^((2*I)*ArcSin[a*
x])] - (3*PolyLog[5, E^((2*I)*ArcSin[a*x])])/2
```

Rule 4625

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n/Tan[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Rule 3717

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[(I*(c + d*x)^(m + 1))/(d*(m + 1)), x] - Dist[2*I, Int[((c + d*x)^
m*E^(2*I*k*Pi)*E^(2*I*(e + f*x)))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x))), x],
 x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

Rule 2190

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m*Log[1 + (b*(F^(g*(e + f*x)))^n)/a])/(b*f*g*n*Log[F]), x] - Di
st[(d*m)/(b*f*g*n*Log[F]), Int[(c + d*x)^(m - 1)*Log[1 + (b*(F^(g*(e + f*x)
))^n)/a], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2531

```
Int[Log[1 + (e_.)*((F_)^((c_.)*((a_.) + (b_.)*(x_))))^(n_.)]*((f_.) + (g_.)
*(x_))^(m_.), x_Symbol] :> -Simp[((f + g*x)^m*PolyLog[2, -(e*(F^(c*(a + b*x
)))^n)])/(b*c*n*Log[F]), x] + Dist[(g*m)/(b*c*n*Log[F]), Int[(f + g*x)^(m -
 1)*PolyLog[2, -(e*(F^(c*(a + b*x)))^n)], x], x] /; FreeQ[{F, a, b, c, e, f
, g, n}, x] && GtQ[m, 0]
```

Rule 6609

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

Rule 2282

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Dist[v/D[v, x]
, Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Functi
onOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ[
{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))*
(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

Rule 6589

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\begin{aligned}\int \frac{\sin^{-1}(ax)^4}{x}\,dx &= \text{Subst}\left(\int x^4\cot(x)\,dx, x, \sin^{-1}(ax)\right)\\ &= -\frac{1}{5}i\sin^{-1}(ax)^5 - 2i\,\text{Subst}\left(\int \frac{e^{2ix}x^4}{1-e^{2ix}}\,dx, x, \sin^{-1}(ax)\right)\\ &= -\frac{1}{5}i\sin^{-1}(ax)^5 + \sin^{-1}(ax)^4\log\left(1-e^{2i\sin^{-1}(ax)}\right) - 4\,\text{Subst}\left(\int x^3\log\left(1-e^{2ix}\right)\,dx, x, \sin^{-1}(ax)\right)\\ &= -\frac{1}{5}i\sin^{-1}(ax)^5 + \sin^{-1}(ax)^4\log\left(1-e^{2i\sin^{-1}(ax)}\right) - 2i\sin^{-1}(ax)^3\text{Li}_2\left(e^{2i\sin^{-1}(ax)}\right) + 6i\,\text{Subst}\left(\int x^2\text{L}\right.\\ &= -\frac{1}{5}i\sin^{-1}(ax)^5 + \sin^{-1}(ax)^4\log\left(1-e^{2i\sin^{-1}(ax)}\right) - 2i\sin^{-1}(ax)^3\text{Li}_2\left(e^{2i\sin^{-1}(ax)}\right) + 3\sin^{-1}(ax)^2\text{Li}_3\left(\right.\\ &= -\frac{1}{5}i\sin^{-1}(ax)^5 + \sin^{-1}(ax)^4\log\left(1-e^{2i\sin^{-1}(ax)}\right) - 2i\sin^{-1}(ax)^3\text{Li}_2\left(e^{2i\sin^{-1}(ax)}\right) + 3\sin^{-1}(ax)^2\text{Li}_3\left(\right.\\ &= -\frac{1}{5}i\sin^{-1}(ax)^5 + \sin^{-1}(ax)^4\log\left(1-e^{2i\sin^{-1}(ax)}\right) - 2i\sin^{-1}(ax)^3\text{Li}_2\left(e^{2i\sin^{-1}(ax)}\right) + 3\sin^{-1}(ax)^2\text{Li}_3\left(\right.\\ &= -\frac{1}{5}i\sin^{-1}(ax)^5 + \sin^{-1}(ax)^4\log\left(1-e^{2i\sin^{-1}(ax)}\right) - 2i\sin^{-1}(ax)^3\text{Li}_2\left(e^{2i\sin^{-1}(ax)}\right) + 3\sin^{-1}(ax)^2\text{Li}_3\left(\right.\end{aligned}$$

Mathematica [A] time = 0.0442051, size = 113, normalized size = 1.

$$2i\sin^{-1}(ax)^3\text{PolyLog}\left(2, e^{-2i\sin^{-1}(ax)}\right) + 3\sin^{-1}(ax)^2\text{PolyLog}\left(3, e^{-2i\sin^{-1}(ax)}\right) - 3i\sin^{-1}(ax)\text{PolyLog}\left(4, e^{-2i\sin^{-1}(ax)}\right) -$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^4/x,x]
```

```
[Out] (I/5)*ArcSin[a*x]^5 + ArcSin[a*x]^4*Log[1 - E^((-2*I)*ArcSin[a*x])] + (2*I)
*ArcSin[a*x]^3*PolyLog[2, E^((-2*I)*ArcSin[a*x])] + 3*ArcSin[a*x]^2*PolyLog
[3, E^((-2*I)*ArcSin[a*x])] - (3*I)*ArcSin[a*x]*PolyLog[4, E^((-2*I)*ArcSin
[a*x])] - (3*PolyLog[5, E^((-2*I)*ArcSin[a*x])])/2
```

Maple [A] time = 0.046, size = 287, normalized size = 2.5

$$-\frac{i}{5}\left(\arcsin(ax)\right)^5 + \left(\arcsin(ax)\right)^4\ln\left(1 + iax + \sqrt{-a^2x^2+1}\right) - 4\,i\left(\arcsin(ax)\right)^3\text{polylog}\left(2, -iax - \sqrt{-a^2x^2+1}\right) + 12\,($$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^4/x,x)
```

```
[Out] -1/5*I*arcsin(a*x)^5+arcsin(a*x)^4*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))-4*I*arcsi
n(a*x)^3*polylog(2,-I*a*x-(-a^2*x^2+1)^(1/2))+12*arcsin(a*x)^2*polylog(3,-I
*a*x-(-a^2*x^2+1)^(1/2))+24*I*arcsin(a*x)*polylog(4,-I*a*x-(-a^2*x^2+1)^(1/
2))-24*polylog(5,-I*a*x-(-a^2*x^2+1)^(1/2))+arcsin(a*x)^4*ln(1-I*a*x-(-a^2*
x^2+1)^(1/2))-4*I*arcsin(a*x)^3*polylog(2,I*a*x+(-a^2*x^2+1)^(1/2))+12*arcs
in(a*x)^2*polylog(3,I*a*x+(-a^2*x^2+1)^(1/2))+24*I*arcsin(a*x)*polylog(4,I*
a*x+(-a^2*x^2+1)^(1/2))-24*polylog(5,I*a*x+(-a^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin{(ax)}^4}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4/x,x, algorithm="maxima")
```

```
[Out] integrate(arcsin(a*x)^4/x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\arcsin{(ax)}^4}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4/x,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^4/x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^4{(ax)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**4/x,x)
```

```
[Out] Integral(asin(a*x)**4/x, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin(ax)^4}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4/x,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^4/x, x)
```

3.39 $\int \frac{\sin^{-1}(ax)^4}{x^2}\,dx$

Optimal. Leaf size=156

$$12ia\sin^{-1}(ax)^2\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-12ia\sin^{-1}(ax)^2\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-24a\sin^{-1}(ax)\text{PolyLog}\left(3,-e^{i\sin^{-1}(ax)}\right.$$

```
[Out] -(ArcSin[a*x]^4/x) - 8*a*ArcSin[a*x]^3*ArcTanh[E^(I*ArcSin[a*x])] + (12*I)*
a*ArcSin[a*x]^2*PolyLog[2, -E^(I*ArcSin[a*x])] - (12*I)*a*ArcSin[a*x]^2*Pol
yLog[2, E^(I*ArcSin[a*x])] - 24*a*ArcSin[a*x]*PolyLog[3, -E^(I*ArcSin[a*x])
] + 24*a*ArcSin[a*x]*PolyLog[3, E^(I*ArcSin[a*x])] - (24*I)*a*PolyLog[4, -E
^(I*ArcSin[a*x])] + (24*I)*a*PolyLog[4, E^(I*ArcSin[a*x])]
```

Rubi [A] time = 0.193764, antiderivative size = 156, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 7, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.7, Rules used = {4627, 4709, 4183, 2531, 6609, 2282, 6589}

$$12ia\sin^{-1}(ax)^2\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-12ia\sin^{-1}(ax)^2\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-24a\sin^{-1}(ax)\text{PolyLog}\left(3,-e^{i\sin^{-1}(ax)}\right.$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^4/x^2,x]
```

```
[Out] -(ArcSin[a*x]^4/x) - 8*a*ArcSin[a*x]^3*ArcTanh[E^(I*ArcSin[a*x])] + (12*I)*
a*ArcSin[a*x]^2*PolyLog[2, -E^(I*ArcSin[a*x])] - (12*I)*a*ArcSin[a*x]^2*Pol
yLog[2, E^(I*ArcSin[a*x])] - 24*a*ArcSin[a*x]*PolyLog[3, -E^(I*ArcSin[a*x])
] + 24*a*ArcSin[a*x]*PolyLog[3, E^(I*ArcSin[a*x])] - (24*I)*a*PolyLog[4, -E
^(I*ArcSin[a*x])] + (24*I)*a*PolyLog[4, E^(I*ArcSin[a*x])]
```

Rule 4627

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

Rule 4709

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_))/Sqrt[(d_) + (e_.)*
(x_)^2], x_Symbol] :> Dist[1/(c^(m + 1)*Sqrt[d]), Subst[Int[(a + b*x)^n*Sin
[x]^m, x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d +
e, 0] && GtQ[d, 0] && IGtQ[n, 0] && IntegerQ[m]
```

Rule 4183

```
Int[csc[(e_.) + (f_.)*(x_)]*((c_.) + (d_.)*(x_))^(m_.), x_Symbol] :> Simp[(
-2*(c + d*x)^m*ArcTanh[E^(I*(e + f*x))])/f, x] + (-Dist[(d*m)/f, Int[(c + d
*x)^(m - 1)*Log[1 - E^(I*(e + f*x))], x], x] + Dist[(d*m)/f, Int[(c + d*x)^
(m - 1)*Log[1 + E^(I*(e + f*x))], x], x]) /; FreeQ[{c, d, e, f}, x] && IGtQ
[m, 0]
```

Rule 2531

```
Int[Log[1 + (e_.)*((F_)^((c_.)*((a_.) + (b_.)*(x_))))^(n_.)]*((f_.) + (g_.)
*(x_))^(m_.), x_Symbol] :> -Simp[((f + g*x)^m*PolyLog[2, -(e*(F^(c*(a + b*x
)))^n)])/(b*c*n*Log[F]), x] + Dist[(g*m)/(b*c*n*Log[F]), Int[(f + g*x)^(m -
 1)*PolyLog[2, -(e*(F^(c*(a + b*x)))^n)], x], x] /; FreeQ[{F, a, b, c, e, f
, g, n}, x] && GtQ[m, 0]
```

Rule 6609

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

Rule 2282

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Dist[v/D[v, x]
, Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Functi
onOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ[
{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))*
(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

Rule 6589

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\begin{aligned}\int \frac{\sin^{-1}(ax)^4}{x^2}\,dx &= -\frac{\sin^{-1}(ax)^4}{x} + (4a)\int \frac{\sin^{-1}(ax)^3}{x\sqrt{1-a^2x^2}}\,dx \\
&= -\frac{\sin^{-1}(ax)^4}{x} + (4a)\,\text{Subst}\left(\int x^3\csc(x)\,dx, x, \sin^{-1}(ax)\right) \\
&= -\frac{\sin^{-1}(ax)^4}{x} - 8a\sin^{-1}(ax)^3\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) - (12a)\,\text{Subst}\left(\int x^2\log\left(1-e^{ix}\right)\,dx, x, \sin^{-1}(ax)\right) + \\
&= -\frac{\sin^{-1}(ax)^4}{x} - 8a\sin^{-1}(ax)^3\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + 12ia\sin^{-1}(ax)^2\mathbf{Li}_2\left(-e^{i\sin^{-1}(ax)}\right) - 12ia\sin^{-1}(ax)^2\mathbf{L} \\
&= -\frac{\sin^{-1}(ax)^4}{x} - 8a\sin^{-1}(ax)^3\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + 12ia\sin^{-1}(ax)^2\mathbf{Li}_2\left(-e^{i\sin^{-1}(ax)}\right) - 12ia\sin^{-1}(ax)^2\mathbf{L} \\
&= -\frac{\sin^{-1}(ax)^4}{x} - 8a\sin^{-1}(ax)^3\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + 12ia\sin^{-1}(ax)^2\mathbf{Li}_2\left(-e^{i\sin^{-1}(ax)}\right) - 12ia\sin^{-1}(ax)^2\mathbf{L} \\
&= -\frac{\sin^{-1}(ax)^4}{x} - 8a\sin^{-1}(ax)^3\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) + 12ia\sin^{-1}(ax)^2\mathbf{Li}_2\left(-e^{i\sin^{-1}(ax)}\right) - 12ia\sin^{-1}(ax)^2\mathbf{L}\end{aligned}$$

Mathematica [A] time = 0.266898, size = 198, normalized size = 1.27

$$a\left(12i\sin^{-1}(ax)^2\text{PolyLog}\left(2, e^{-i\sin^{-1}(ax)}\right) + 12i\sin^{-1}(ax)^2\text{PolyLog}\left(2, -e^{i\sin^{-1}(ax)}\right) + 24\sin^{-1}(ax)\text{PolyLog}\left(3, e^{-i\sin^{-1}(ax)}\right.\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^4/x^2,x]
```

```
[Out] a*((-I/2)*Pi^4 + I*ArcSin[a*x]^4 - ArcSin[a*x]^4/(a*x) + 4*ArcSin[a*x]^3*Lo
g[1 - E^((-I)*ArcSin[a*x])] - 4*ArcSin[a*x]^3*Log[1 + E^(I*ArcSin[a*x])] +
(12*I)*ArcSin[a*x]^2*PolyLog[2, E^((-I)*ArcSin[a*x])] + (12*I)*ArcSin[a*x]^
2*PolyLog[2, -E^(I*ArcSin[a*x])] + 24*ArcSin[a*x]*PolyLog[3, E^((-I)*ArcSin
[a*x])] - 24*ArcSin[a*x]*PolyLog[3, -E^(I*ArcSin[a*x])] - (24*I)*PolyLog[4,
 E^((-I)*ArcSin[a*x])] - (24*I)*PolyLog[4, -E^(I*ArcSin[a*x])])
```

Maple [A] time = 0.077, size = 241, normalized size = 1.5

$$-\frac{(\arcsin(ax))^4}{x} + 4a(\arcsin(ax))^3\ln\left(1 - iax - \sqrt{-a^2x^2+1}\right) - 4a(\arcsin(ax))^3\ln\left(1 + iax + \sqrt{-a^2x^2+1}\right) - 24a\,\mathrm{arcsi}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^4/x^2,x)
```

```
[Out] -arcsin(a*x)^4/x+4*a*arcsin(a*x)^3*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))-4*a*arcsi
n(a*x)^3*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))-24*a*arcsin(a*x)*polylog(3,-I*a*x-(
-a^2*x^2+1)^(1/2))+24*a*arcsin(a*x)*polylog(3,I*a*x+(-a^2*x^2+1)^(1/2))+12*
I*a*arcsin(a*x)^2*polylog(2,-I*a*x-(-a^2*x^2+1)^(1/2))-12*I*a*arcsin(a*x)^2
*polylog(2,I*a*x+(-a^2*x^2+1)^(1/2))+24*I*a*polylog(4,I*a*x+(-a^2*x^2+1)^(1
/2))-24*I*a*polylog(4,-I*a*x-(-a^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{\arctan\left(ax, \sqrt{ax+1}\sqrt{-ax+1}\right)^4 + 4\,ax\int \frac{\sqrt{-ax+1}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^3}{\sqrt{ax+1}(ax-1)x}\,dx}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4/x^2,x, algorithm="maxima")
```

```
[Out] -(arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^4 + 4*a*x*integrate(sqrt(a*x +
 1)*sqrt(-a*x + 1)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3/(a^2*x^3 -
x), x))/x
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\arcsin\left(ax\right)^4}{x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4/x^2,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^4/x^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^4\left(ax\right)}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**4/x**2,x)
```

```
[Out] Integral(asin(a*x)**4/x**2, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin{(ax)}^4}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4/x^2,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^4/x^2, x)
```

3.40 $\int \frac{\sin^{-1}(ax)^4}{x^3}\,dx$

Optimal. Leaf size=119

$$-6ia^2\sin^{-1}(ax)\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)+3a^2\text{PolyLog}\left(3,e^{2i\sin^{-1}(ax)}\right)-\frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{x}-2ia^2\sin^{-1}(ax)^3+6a$$

```
[Out] (-2*I)*a^2*ArcSin[a*x]^3 - (2*a*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/x - ArcSin
[a*x]^4/(2*x^2) + 6*a^2*ArcSin[a*x]^2*Log[1 - E^((2*I)*ArcSin[a*x])] - (6*I
)*a^2*ArcSin[a*x]*PolyLog[2, E^((2*I)*ArcSin[a*x])] + 3*a^2*PolyLog[3, E^((
2*I)*ArcSin[a*x])]
```

Rubi [A] time = 0.216142, antiderivative size = 119, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.8, Rules used = {4627, 4681, 4625, 3717, 2190, 2531, 2282, 6589}

$$-6ia^2\sin^{-1}(ax)\text{PolyLog}\left(2,e^{2i\sin^{-1}(ax)}\right)+3a^2\text{PolyLog}\left(3,e^{2i\sin^{-1}(ax)}\right)-\frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{x}-2ia^2\sin^{-1}(ax)^3+6a$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^4/x^3,x]
```

```
[Out] (-2*I)*a^2*ArcSin[a*x]^3 - (2*a*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/x - ArcSin
[a*x]^4/(2*x^2) + 6*a^2*ArcSin[a*x]^2*Log[1 - E^((2*I)*ArcSin[a*x])] - (6*I
)*a^2*ArcSin[a*x]*PolyLog[2, E^((2*I)*ArcSin[a*x])] + 3*a^2*PolyLog[3, E^((
2*I)*ArcSin[a*x])]
```

Rule 4627

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

Rule 4681

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[((f*x)^(m + 1)*(d + e*x^2)^(p + 1)*(a + b
*ArcSin[c*x])^n)/(d*f*(m + 1)), x] - Dist[(b*c*n*d^IntPart[p]*(d + e*x^2)^F
racPart[p])/(f*(m + 1)*(1 - c^2*x^2)^FracPart[p]), Int[(f*x)^(m + 1)*(1 - c
^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1), x], x] /; FreeQ[{a, b, c, d,
 e, f, m, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0] && EqQ[m + 2*p + 3, 0] &
& NeQ[m, -1]
```

Rule 4625

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n/Tan[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Rule 3717

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[(I*(c + d*x)^(m + 1))/(d*(m + 1)), x] - Dist[2*I, Int[((c + d*x)^
m*E^(2*I*k*Pi)*E^(2*I*(e + f*x)))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x))), x],
 x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

Rule 2190

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m*Log[1 + (b*(F^(g*(e + f*x)))^n)/a])/(b*f*g*n*Log[F]), x] - Di
st[(d*m)/(b*f*g*n*Log[F]), Int[(c + d*x)^(m - 1)*Log[1 + (b*(F^(g*(e + f*x)
))^n)/a], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2531

```
Int[Log[1 + (e_.)*((F_)^((c_.)*((a_.) + (b_.)*(x_))))^(n_.)]*((f_.) + (g_.)
*(x_))^(m_.), x_Symbol] :> -Simp[((f + g*x)^m*PolyLog[2, -(e*(F^(c*(a + b*x
)))^n)])/(b*c*n*Log[F]), x] + Dist[(g*m)/(b*c*n*Log[F]), Int[(f + g*x)^(m -
 1)*PolyLog[2, -(e*(F^(c*(a + b*x)))^n)], x], x] /; FreeQ[{F, a, b, c, e, f
, g, n}, x] && GtQ[m, 0]
```

Rule 2282

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Dist[v/D[v, x]
, Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Functi
onOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ[
{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))*
(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

Rule 6589

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$
\begin{aligned}
\int \frac{\sin^{-1}(ax)^4}{x^3}\,dx &= -\frac{\sin^{-1}(ax)^4}{2x^2} + (2a)\int \frac{\sin^{-1}(ax)^3}{x^2\sqrt{1-a^2x^2}}\,dx \\
&= -\frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{x} - \frac{\sin^{-1}(ax)^4}{2x^2} + \left(6a^2\right)\int \frac{\sin^{-1}(ax)^2}{x}\,dx \\
&= -\frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{x} - \frac{\sin^{-1}(ax)^4}{2x^2} + \left(6a^2\right)\mathrm{Subst}\left(\int x^2\cot(x)\,dx, x, \sin^{-1}(ax)\right) \\
&= -2ia^2\sin^{-1}(ax)^3 - \frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{x} - \frac{\sin^{-1}(ax)^4}{2x^2} - \left(12ia^2\right)\mathrm{Subst}\Bigg(\int \frac{e^{2ix}x^2}{1-e^{2ix}}\,dx, x, \sin^{-1}(a \\
&= -2ia^2\sin^{-1}(ax)^3 - \frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{x} - \frac{\sin^{-1}(ax)^4}{2x^2} + 6a^2\sin^{-1}(ax)^2\log\left(1-e^{2i\sin^{-1}(ax)}\right) - \Big(12 \\
&= -2ia^2\sin^{-1}(ax)^3 - \frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{x} - \frac{\sin^{-1}(ax)^4}{2x^2} + 6a^2\sin^{-1}(ax)^2\log\left(1-e^{2i\sin^{-1}(ax)}\right) - 6ia \\
&= -2ia^2\sin^{-1}(ax)^3 - \frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{x} - \frac{\sin^{-1}(ax)^4}{2x^2} + 6a^2\sin^{-1}(ax)^2\log\left(1-e^{2i\sin^{-1}(ax)}\right) - 6ia \\
&= -2ia^2\sin^{-1}(ax)^3 - \frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{x} - \frac{\sin^{-1}(ax)^4}{2x^2} + 6a^2\sin^{-1}(ax)^2\log\left(1-e^{2i\sin^{-1}(ax)}\right) - 6ia
\end{aligned}
$$

Mathematica [A] time = 0.282873, size = 124, normalized size = 1.04

$$
-\frac{\sin^{-1}(ax)^4}{2x^2} + \frac{1}{4}a^2\Bigg(24i\sin^{-1}(ax)\mathrm{PolyLog}\left(2, e^{-2i\sin^{-1}(ax)}\right) + 12\mathrm{PolyLog}\left(3, e^{-2i\sin^{-1}(ax)}\right) - \frac{8\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{ax} + 8i
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^4/x^3,x]
```

```
[Out] -ArcSin[a*x]^4/(2*x^2) + (a^2*((-I)*Pi^3 + (8*I)*ArcSin[a*x]^3 - (8*Sqrt[1
- a^2*x^2]*ArcSin[a*x]^3)/(a*x) + 24*ArcSin[a*x]^2*Log[1 - E^((-2*I)*ArcSin
[a*x])] + (24*I)*ArcSin[a*x]*PolyLog[2, E^((-2*I)*ArcSin[a*x])] + 12*PolyLo
g[3, E^((-2*I)*ArcSin[a*x])]))/4
```

Maple [A] time = 0.091, size = 227, normalized size = 1.9

$$-2\,ia^{2}\left(\arcsin\left(ax\right)\right)^{3}-2\,\frac{a\left(\arcsin\left(ax\right)\right)^{3}\sqrt{-a^{2}x^{2}+1}}{x}-\frac{\left(\arcsin\left(ax\right)\right)^{4}}{2\,x^{2}}+6\,a^{2}\left(\arcsin\left(ax\right)\right)^{2}\ln\left(1+iax+\sqrt{-a^{2}x^{2}+1}\right)-1$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^4/x^3,x)
```

```
[Out] -2*I*a^2*arcsin(a*x)^3-2*a*arcsin(a*x)^3*(-a^2*x^2+1)^(1/2)/x-1/2*arcsin(a*
x)^4/x^2+6*a^2*arcsin(a*x)^2*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))-12*I*a^2*arcsin
(a*x)*polylog(2,-I*a*x-(-a^2*x^2+1)^(1/2))+12*a^2*polylog(3,-I*a*x-(-a^2*x^
2+1)^(1/2))+6*a^2*arcsin(a*x)^2*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))-12*I*a^2*arc
sin(a*x)*polylog(2,I*a*x+(-a^2*x^2+1)^(1/2))+12*a^2*polylog(3,I*a*x+(-a^2*x
^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^{4}+\frac{1}{2}\left(\sqrt{ax+1}\sqrt{-ax+1}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^{3}+8\,x\int\frac{7\,\sqrt{ax+1}\sqrt{-ax+1}\arctan\left(ax,\right.}{}\right.}{2\,x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4/x^3,x, algorithm="maxima")
```

```
[Out] -1/2*(arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^4 + 4*a*x^2*integrate(sqrt
(a*x + 1)*sqrt(-a*x + 1)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3/(a^2*
x^4 - x^2), x))/x^2
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\arcsin\left(ax\right)^{4}}{x^{3}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4/x^3,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^4/x^3, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^4(ax)}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**4/x**3,x)
```

```
[Out] Integral(asin(a*x)**4/x**3, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin(ax)^4}{x^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4/x^3,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^4/x^3, x)
```

3.41 $\int \frac{\sin^{-1}(ax)^4}{x^4}\,dx$

Optimal. Leaf size=276

$$2ia^3\sin^{-1}(ax)^2\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-2ia^3\sin^{-1}(ax)^2\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-4a^3\sin^{-1}(ax)\text{PolyLog}\left(3,-e^{i\sin^{-1}(ax)}\right)$$

```
[Out] (-2*a^2*ArcSin[a*x]^2)/x - (2*a*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(3*x^2) -
ArcSin[a*x]^4/(3*x^3) - 8*a^3*ArcSin[a*x]*ArcTanh[E^(I*ArcSin[a*x])] - (4*a
^3*ArcSin[a*x]^3*ArcTanh[E^(I*ArcSin[a*x])])/3 + (4*I)*a^3*PolyLog[2, -E^(I
*ArcSin[a*x])] + (2*I)*a^3*ArcSin[a*x]^2*PolyLog[2, -E^(I*ArcSin[a*x])] - (
4*I)*a^3*PolyLog[2, E^(I*ArcSin[a*x])] - (2*I)*a^3*ArcSin[a*x]^2*PolyLog[2,
 E^(I*ArcSin[a*x])] - 4*a^3*ArcSin[a*x]*PolyLog[3, -E^(I*ArcSin[a*x])] + 4*
a^3*ArcSin[a*x]*PolyLog[3, E^(I*ArcSin[a*x])] - (4*I)*a^3*PolyLog[4, -E^(I*
ArcSin[a*x])] + (4*I)*a^3*PolyLog[4, E^(I*ArcSin[a*x])]
```

Rubi [A] time = 0.410257, antiderivative size = 276, normalized size of antiderivative = 1., number of steps used = 19, number of rules used = 10, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 1., Rules used = {4627, 4701, 4709, 4183, 2531, 6609, 2282, 6589, 2279, 2391}

$$2ia^3\sin^{-1}(ax)^2\text{PolyLog}\left(2,-e^{i\sin^{-1}(ax)}\right)-2ia^3\sin^{-1}(ax)^2\text{PolyLog}\left(2,e^{i\sin^{-1}(ax)}\right)-4a^3\sin^{-1}(ax)\text{PolyLog}\left(3,-e^{i\sin^{-1}(ax)}\right)$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^4/x^4,x]
```

```
[Out] (-2*a^2*ArcSin[a*x]^2)/x - (2*a*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^3)/(3*x^2) -
ArcSin[a*x]^4/(3*x^3) - 8*a^3*ArcSin[a*x]*ArcTanh[E^(I*ArcSin[a*x])] - (4*a
^3*ArcSin[a*x]^3*ArcTanh[E^(I*ArcSin[a*x])])/3 + (4*I)*a^3*PolyLog[2, -E^(I
*ArcSin[a*x])] + (2*I)*a^3*ArcSin[a*x]^2*PolyLog[2, -E^(I*ArcSin[a*x])] - (
4*I)*a^3*PolyLog[2, E^(I*ArcSin[a*x])] - (2*I)*a^3*ArcSin[a*x]^2*PolyLog[2,
 E^(I*ArcSin[a*x])] - 4*a^3*ArcSin[a*x]*PolyLog[3, -E^(I*ArcSin[a*x])] + 4*
a^3*ArcSin[a*x]*PolyLog[3, E^(I*ArcSin[a*x])] - (4*I)*a^3*PolyLog[4, -E^(I*
ArcSin[a*x])] + (4*I)*a^3*PolyLog[4, E^(I*ArcSin[a*x])]
```

Rule 4627

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

Rule 4701

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_)*((d_) + (e_.
)*(x_)^2)^(p_), x_Symbol] :> Simp[((f*x)^(m + 1)*(d + e*x^2)^(p + 1)*(a + b
*ArcSin[c*x])^n)/(d*f*(m + 1)), x] + (Dist[(c^2*(m + 2*p + 3))/(f^2*(m + 1)
), Int[(f*x)^(m + 2)*(d + e*x^2)^p*(a + b*ArcSin[c*x])^n, x], x] - Dist[(b*
c*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(f*(m + 1)*(1 - c^2*x^2)^FracPart
[p]), Int[(f*x)^(m + 1)*(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n - 1)
, x], x]) /; FreeQ[{a, b, c, d, e, f, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n,
 0] && LtQ[m, -1] && IntegerQ[m]
```

Rule 4709

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_))/Sqrt[(d_) + (e_.)*
(x_)^2], x_Symbol] :> Dist[1/(c^(m + 1)*Sqrt[d]), Subst[Int[(a + b*x)^n*Sin
[x]^m, x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d +
e, 0] && GtQ[d, 0] && IGtQ[n, 0] && IntegerQ[m]
```

Rule 4183

```
Int[csc[(e_.) + (f_.)*(x_)]*((c_.) + (d_.)*(x_))^(m_.), x_Symbol] :> Simp[(
-2*(c + d*x)^m*ArcTanh[E^(I*(e + f*x))])/f, x] + (-Dist[(d*m)/f, Int[(c + d
*x)^(m - 1)*Log[1 - E^(I*(e + f*x))], x], x] + Dist[(d*m)/f, Int[(c + d*x)^
(m - 1)*Log[1 + E^(I*(e + f*x))], x], x]) /; FreeQ[{c, d, e, f}, x] && IGtQ
[m, 0]
```

Rule 2531

```
Int[Log[1 + (e_.)*((F_)^((c_.)*((a_.) + (b_.)*(x_))))^(n_.)]*((f_.) + (g_.)
*(x_))^(m_.), x_Symbol] :> -Simp[((f + g*x)^m*PolyLog[2, -(e*(F^(c*(a + b*x
)))^n)])/(b*c*n*Log[F]), x] + Dist[(g*m)/(b*c*n*Log[F]), Int[(f + g*x)^(m -
 1)*PolyLog[2, -(e*(F^(c*(a + b*x)))^n)], x], x] /; FreeQ[{F, a, b, c, e, f
, g, n}, x] && GtQ[m, 0]
```

Rule 6609

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

Rule 2282

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Dist[v/D[v, x]
, Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Functi
onOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ[
{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))*
(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

Rule 6589

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rule 2279

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2391

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> -Simp[PolyLog[2
, -(c*e*x^n)]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$
\begin{aligned}
\int \frac{\sin^{-1}(ax)^4}{x^4}\,dx &= -\frac{\sin^{-1}(ax)^4}{3x^3} + \frac{1}{3}(4a)\int \frac{\sin^{-1}(ax)^3}{x^3\sqrt{1-a^2x^2}}\,dx \\
&= -\frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{3x^2} - \frac{\sin^{-1}(ax)^4}{3x^3} + \left(2a^2\right)\int \frac{\sin^{-1}(ax)^2}{x^2}\,dx + \frac{1}{3}\left(2a^3\right)\int \frac{\sin^{-1}(ax)^3}{x\sqrt{1-a^2x^2}}\,dx \\
&= -\frac{2a^2\sin^{-1}(ax)^2}{x} - \frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{3x^2} - \frac{\sin^{-1}(ax)^4}{3x^3} + \frac{1}{3}\left(2a^3\right)\mathrm{Subst}\Bigg(\int x^3\csc(x)\,dx, x, \sin^{-1}(\\
&= -\frac{2a^2\sin^{-1}(ax)^2}{x} - \frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{3x^2} - \frac{\sin^{-1}(ax)^4}{3x^3} - \frac{4}{3}a^3\sin^{-1}(ax)^3\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) - \Big(2a \\
&= -\frac{2a^2\sin^{-1}(ax)^2}{x} - \frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{3x^2} - \frac{\sin^{-1}(ax)^4}{3x^3} - 8a^3\sin^{-1}(ax)\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) - \frac{4}{3}a^3 \\
&= -\frac{2a^2\sin^{-1}(ax)^2}{x} - \frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{3x^2} - \frac{\sin^{-1}(ax)^4}{3x^3} - 8a^3\sin^{-1}(ax)\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) - \frac{4}{3}a^3 \\
&= -\frac{2a^2\sin^{-1}(ax)^2}{x} - \frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{3x^2} - \frac{\sin^{-1}(ax)^4}{3x^3} - 8a^3\sin^{-1}(ax)\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) - \frac{4}{3}a^3 \\
&= -\frac{2a^2\sin^{-1}(ax)^2}{x} - \frac{2a\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}{3x^2} - \frac{\sin^{-1}(ax)^4}{3x^3} - 8a^3\sin^{-1}(ax)\tanh^{-1}\left(e^{i\sin^{-1}(ax)}\right) - \frac{4}{3}a^3
\end{aligned}
$$

Mathematica [A] time = 4.26995, size = 399, normalized size = 1.45

$$\frac{1}{24}a^3\Bigg(48i\sin^{-1}(ax)^2\mathrm{PolyLog}\left(2, e^{-i\sin^{-1}(ax)}\right) + 96\sin^{-1}(ax)\mathrm{PolyLog}\left(3, e^{-i\sin^{-1}(ax)}\right) - 96\sin^{-1}(ax)\mathrm{PolyLog}\Big(3, -e^{i\sin^{-}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^4/x^4,x]
```

```
[Out] (a^3*((-2*I)*Pi^4 + (4*I)*ArcSin[a*x]^4 - 24*ArcSin[a*x]^2*Cot[ArcSin[a*x]/
2] - 2*ArcSin[a*x]^4*Cot[ArcSin[a*x]/2] - 4*ArcSin[a*x]^3*Csc[ArcSin[a*x]/2
]^2 - (a*x*ArcSin[a*x]^4*Csc[ArcSin[a*x]/2]^4)/2 + 16*ArcSin[a*x]^3*Log[1 -
 E^((-I)*ArcSin[a*x])] + 96*ArcSin[a*x]*Log[1 - E^(I*ArcSin[a*x])] - 96*Arc
Sin[a*x]*Log[1 + E^(I*ArcSin[a*x])] - 16*ArcSin[a*x]^3*Log[1 + E^(I*ArcSin[
a*x])] + (48*I)*ArcSin[a*x]^2*PolyLog[2, E^((-I)*ArcSin[a*x])] + (48*I)*(2
+ ArcSin[a*x]^2)*PolyLog[2, -E^(I*ArcSin[a*x])] - (96*I)*PolyLog[2, E^(I*Ar
cSin[a*x])] + 96*ArcSin[a*x]*PolyLog[3, E^((-I)*ArcSin[a*x])] - 96*ArcSin[a
*x]*PolyLog[3, -E^(I*ArcSin[a*x])] - (96*I)*PolyLog[4, E^((-I)*ArcSin[a*x])
] - (96*I)*PolyLog[4, -E^(I*ArcSin[a*x])] + 4*ArcSin[a*x]^3*Sec[ArcSin[a*x]
/2]^2 - (8*ArcSin[a*x]^4*Sin[ArcSin[a*x]/2]^4)/(a^3*x^3) - 24*ArcSin[a*x]^2
*Tan[ArcSin[a*x]/2] - 2*ArcSin[a*x]^4*Tan[ArcSin[a*x]/2]))/24
```

Maple [A] time = 0.145, size = 409, normalized size = 1.5

$$-\frac{2\,a\left(\arcsin\left(ax\right)\right)^{3}}{3\,x^{2}}\sqrt{-a^{2}x^{2}+1}-2\,\frac{a^{2}\left(\arcsin\left(ax\right)\right)^{2}}{x}-\frac{\left(\arcsin\left(ax\right)\right)^{4}}{3\,x^{3}}-\frac{2\,a^{3}\left(\arcsin\left(ax\right)\right)^{3}}{3}\ln\left(1+iax+\sqrt{-a^{2}x^{2}+1}\right)+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^4/x^4,x)
```

```
[Out] -2/3*a*arcsin(a*x)^3*(-a^2*x^2+1)^(1/2)/x^2-2*a^2*arcsin(a*x)^2/x-1/3*arcsi
n(a*x)^4/x^3-2/3*a^3*arcsin(a*x)^3*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))+2*I*a^3*a
rcsin(a*x)^2*polylog(2,-I*a*x-(-a^2*x^2+1)^(1/2))-4*a^3*arcsin(a*x)*polylog
(3,-I*a*x-(-a^2*x^2+1)^(1/2))-4*I*a^3*polylog(4,-I*a*x-(-a^2*x^2+1)^(1/2))+
2/3*a^3*arcsin(a*x)^3*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))-2*I*a^3*arcsin(a*x)^2*
polylog(2,I*a*x+(-a^2*x^2+1)^(1/2))+4*a^3*arcsin(a*x)*polylog(3,I*a*x+(-a^2
*x^2+1)^(1/2))+4*I*a^3*polylog(4,I*a*x+(-a^2*x^2+1)^(1/2))-4*a^3*arcsin(a*x
)*ln(1+I*a*x+(-a^2*x^2+1)^(1/2))+4*I*a^3*polylog(2,-I*a*x-(-a^2*x^2+1)^(1/2
))+4*a^3*arcsin(a*x)*ln(1-I*a*x-(-a^2*x^2+1)^(1/2))-4*I*a^3*polylog(2,I*a*x
+(-a^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{4\,ax^{3}\int\frac{\sqrt{ax+1}\sqrt{-ax+1}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^{3}}{a^{2}x^{5}-x^{3}}\,dx+\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^{4}}{3\,x^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4/x^4,x, algorithm="maxima")
```

```
[Out] -1/3*(12*a*x^3*integrate(1/3*sqrt(a*x + 1)*sqrt(-a*x + 1)*arctan2(a*x, sqrt
(a*x + 1)*sqrt(-a*x + 1))^3/(a^2*x^5 - x^3), x) + arctan2(a*x, sqrt(a*x + 1
)*sqrt(-a*x + 1))^4)/x^3
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\arcsin\left(ax\right)^{4}}{x^{4}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4/x^4,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^4/x^4, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^4(ax)}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**4/x**4,x)
```

```
[Out] Integral(asin(a*x)**4/x**4, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin(ax)^4}{x^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^4/x^4,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^4/x^4, x)
```

3.42 $\int \frac{x^6}{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=55

$$\frac{5\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{64a^7}-\frac{9\text{CosIntegral}\left(3\sin^{-1}(ax)\right)}{64a^7}+\frac{5\text{CosIntegral}\left(5\sin^{-1}(ax)\right)}{64a^7}-\frac{\text{CosIntegral}\left(7\sin^{-1}(ax)\right)}{64a^7}$$

```
[Out] (5*CosIntegral[ArcSin[a*x]])/(64*a^7) - (9*CosIntegral[3*ArcSin[a*x]])/(64*
a^7) + (5*CosIntegral[5*ArcSin[a*x]])/(64*a^7) - CosIntegral[7*ArcSin[a*x]]
/(64*a^7)
```

Rubi [A] time = 0.0965148, antiderivative size = 55, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3, Rules used = {4635, 4406, 3302}

$$\frac{5\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{64a^7}-\frac{9\text{CosIntegral}\left(3\sin^{-1}(ax)\right)}{64a^7}+\frac{5\text{CosIntegral}\left(5\sin^{-1}(ax)\right)}{64a^7}-\frac{\text{CosIntegral}\left(7\sin^{-1}(ax)\right)}{64a^7}$$

Antiderivative was successfully verified.

```
[In] Int[x^6/ArcSin[a*x],x]
```

```
[Out] (5*CosIntegral[ArcSin[a*x]])/(64*a^7) - (9*CosIntegral[3*ArcSin[a*x]])/(64*
a^7) + (5*CosIntegral[5*ArcSin[a*x]])/(64*a^7) - CosIntegral[7*ArcSin[a*x]]
/(64*a^7)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3302

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

Rubi steps

$$
\begin{aligned}
\int \frac{x^6}{\sin^{-1}(ax)}\,dx &= \frac{\text{Subst}\left(\int \frac{\cos(x)\sin^6(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{a^7}\\
&= \frac{\text{Subst}\left(\int \left(\frac{5\cos(x)}{64x} - \frac{9\cos(3x)}{64x} + \frac{5\cos(5x)}{64x} - \frac{\cos(7x)}{64x}\right)dx, x, \sin^{-1}(ax)\right)}{a^7}\\
&= -\frac{\text{Subst}\left(\int \frac{\cos(7x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{64a^7} + \frac{5\,\text{Subst}\left(\int \frac{\cos(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{64a^7} + \frac{5\,\text{Subst}\left(\int \frac{\cos(5x)}{x}\,dx, x, \text{s}\right.}{64a^7}\\
&= \frac{5\text{Ci}\left(\sin^{-1}(ax)\right)}{64a^7} - \frac{9\text{Ci}\left(3\sin^{-1}(ax)\right)}{64a^7} + \frac{5\text{Ci}\left(5\sin^{-1}(ax)\right)}{64a^7} - \frac{\text{Ci}\left(7\sin^{-1}(ax)\right)}{64a^7}
\end{aligned}
$$

Mathematica [A] time = 0.0164933, size = 40, normalized size = 0.73

$$
-\frac{-5\text{CosIntegral}\left(\sin^{-1}(ax)\right) + 9\text{CosIntegral}\left(3\sin^{-1}(ax)\right) - 5\text{CosIntegral}\left(5\sin^{-1}(ax)\right) + \text{CosIntegral}\left(7\sin^{-1}(ax\right.}{64a^7}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x^6/ArcSin[a*x],x]
```

```
[Out] -(-5*CosIntegral[ArcSin[a*x]] + 9*CosIntegral[3*ArcSin[a*x]] - 5*CosIntegra
l[5*ArcSin[a*x]] + CosIntegral[7*ArcSin[a*x]])/(64*a^7)
```

Maple [A] time = 0.039, size = 40, normalized size = 0.7

$$
\frac{1}{a^7}\left(\frac{5\,\text{Ci}\,(\arcsin{(ax)})}{64} - \frac{9\,\text{Ci}\,(3\,\arcsin{(ax)})}{64} + \frac{5\,\text{Ci}\,(5\,\arcsin{(ax)})}{64} - \frac{\text{Ci}\,(7\,\arcsin{(ax)})}{64}\right)
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^6/arcsin(a*x),x)
```

```
[Out] 1/a^7*(5/64*Ci(arcsin(a*x))-9/64*Ci(3*arcsin(a*x))+5/64*Ci(5*arcsin(a*x))-1
/64*Ci(7*arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{\arcsin{(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/arcsin(a*x),x, algorithm="maxima")
```

```
[Out] integrate(x^6/arcsin(a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^6}{\arcsin{(ax)}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/arcsin(a*x),x, algorithm="fricas")
```

```
[Out] integral(x^6/arcsin(a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{\operatorname{asin}{(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**6/asin(a*x),x)
```

```
[Out] Integral(x**6/asin(a*x), x)
```

Giac [A] time = 1.31765, size = 63, normalized size = 1.15

$$-\frac{\operatorname{Ci}\left(7\arcsin\left(ax\right)\right)}{64\,a^{7}}+\frac{5\operatorname{Ci}\left(5\arcsin\left(ax\right)\right)}{64\,a^{7}}-\frac{9\operatorname{Ci}\left(3\arcsin\left(ax\right)\right)}{64\,a^{7}}+\frac{5\operatorname{Ci}\left(\arcsin\left(ax\right)\right)}{64\,a^{7}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/arcsin(a*x),x, algorithm="giac")
```

```
[Out] -1/64*cos_integral(7*arcsin(a*x))/a^7 + 5/64*cos_integral(5*arcsin(a*x))/a^
7 - 9/64*cos_integral(3*arcsin(a*x))/a^7 + 5/64*cos_integral(arcsin(a*x))/a
^7
```

3.43 $\int \frac{x^5}{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=43

$$\frac{5\mathrm{Si}\left(2\sin^{-1}(ax)\right)}{32a^6}-\frac{\mathrm{Si}\left(4\sin^{-1}(ax)\right)}{8a^6}+\frac{\mathrm{Si}\left(6\sin^{-1}(ax)\right)}{32a^6}$$

```
[Out] (5*SinIntegral[2*ArcSin[a*x]])/(32*a^6) - SinIntegral[4*ArcSin[a*x]]/(8*a^6
) + SinIntegral[6*ArcSin[a*x]]/(32*a^6)
```

Rubi [A] time = 0.0803015, antiderivative size = 43, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3, Rules used = {4635, 4406, 3299}

$$\frac{5\mathrm{Si}\left(2\sin^{-1}(ax)\right)}{32a^6}-\frac{\mathrm{Si}\left(4\sin^{-1}(ax)\right)}{8a^6}+\frac{\mathrm{Si}\left(6\sin^{-1}(ax)\right)}{32a^6}$$

Antiderivative was successfully verified.

```
[In] Int[x^5/ArcSin[a*x],x]
```

```
[Out] (5*SinIntegral[2*ArcSin[a*x]])/(32*a^6) - SinIntegral[4*ArcSin[a*x]]/(8*a^6
) + SinIntegral[6*ArcSin[a*x]]/(32*a^6)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3299

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

Rubi steps

$$
\begin{aligned}
\int \frac{x^5}{\sin^{-1}(ax)}\,dx &= \frac{\text{Subst}\left(\int \frac{\cos(x)\sin^5(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{a^6}\\
&= \frac{\text{Subst}\left(\int \left(\frac{5\sin(2x)}{32x} - \frac{\sin(4x)}{8x} + \frac{\sin(6x)}{32x}\right)dx, x, \sin^{-1}(ax)\right)}{a^6}\\
&= \frac{\text{Subst}\left(\int \frac{\sin(6x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{32a^6} - \frac{\text{Subst}\left(\int \frac{\sin(4x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{8a^6} + \frac{5\,\text{Subst}\left(\int \frac{\sin(2x)}{x}\,dx, x, \sin\right.}{32a^6}\\
&= \frac{5\text{Si}\left(2\sin^{-1}(ax)\right)}{32a^6} - \frac{\text{Si}\left(4\sin^{-1}(ax)\right)}{8a^6} + \frac{\text{Si}\left(6\sin^{-1}(ax)\right)}{32a^6}
\end{aligned}
$$

Mathematica [A] time = 0.115433, size = 33, normalized size = 0.77

$$\frac{5\text{Si}\left(2\sin^{-1}(ax)\right) - 4\text{Si}\left(4\sin^{-1}(ax)\right) + \text{Si}\left(6\sin^{-1}(ax)\right)}{32a^6}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5/ArcSin[a*x],x]
```

```
[Out] (5*SinIntegral[2*ArcSin[a*x]] - 4*SinIntegral[4*ArcSin[a*x]] + SinIntegral[
6*ArcSin[a*x]])/(32*a^6)
```

Maple [A] time = 0.031, size = 33, normalized size = 0.8

$$\frac{1}{a^6}\left(\frac{5\,\text{Si}\,(2\,\arcsin\,(ax))}{32} - \frac{\text{Si}\,(4\,\arcsin\,(ax))}{8} + \frac{\text{Si}\,(6\,\arcsin\,(ax))}{32}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5/arcsin(a*x),x)
```

```
[Out] 1/a^6*(5/32*Si(2*arcsin(a*x))-1/8*Si(4*arcsin(a*x))+1/32*Si(6*arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\arcsin(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/arcsin(a*x),x, algorithm="maxima")
```

```
[Out] integrate(x^5/arcsin(a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^5}{\arcsin(ax)}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/arcsin(a*x),x, algorithm="fricas")
```

```
[Out] integral(x^5/arcsin(a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\operatorname{asin}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5/asin(a*x),x)
```

```
[Out] Integral(x**5/asin(a*x), x)
```

Giac [A] time = 1.27541, size = 50, normalized size = 1.16

$$\frac{\operatorname{Si}(6\arcsin(ax))}{32\,a^6} - \frac{\operatorname{Si}(4\arcsin(ax))}{8\,a^6} + \frac{5\operatorname{Si}(2\arcsin(ax))}{32\,a^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/arcsin(a*x),x, algorithm="giac")
```

```
[Out] 1/32*sin_integral(6*arcsin(a*x))/a^6 - 1/8*sin_integral(4*arcsin(a*x))/a^6
+ 5/32*sin_integral(2*arcsin(a*x))/a^6
```

3.44 $\int \frac{x^4}{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=41

$$\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{8a^5}-\frac{3\text{CosIntegral}\left(3\sin^{-1}(ax)\right)}{16a^5}+\frac{\text{CosIntegral}\left(5\sin^{-1}(ax)\right)}{16a^5}$$

```
[Out] CosIntegral[ArcSin[a*x]]/(8*a^5) - (3*CosIntegral[3*ArcSin[a*x]])/(16*a^5)
+ CosIntegral[5*ArcSin[a*x]]/(16*a^5)
```

Rubi [A] time = 0.080892, antiderivative size = 41, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3, Rules used = {4635, 4406, 3302}

$$\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{8a^5}-\frac{3\text{CosIntegral}\left(3\sin^{-1}(ax)\right)}{16a^5}+\frac{\text{CosIntegral}\left(5\sin^{-1}(ax)\right)}{16a^5}$$

Antiderivative was successfully verified.

```
[In] Int[x^4/ArcSin[a*x],x]
```

```
[Out] CosIntegral[ArcSin[a*x]]/(8*a^5) - (3*CosIntegral[3*ArcSin[a*x]])/(16*a^5)
+ CosIntegral[5*ArcSin[a*x]]/(16*a^5)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3302

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

Rubi steps

$$
\begin{aligned}
\int \frac{x^4}{\sin^{-1}(ax)}\,dx &= \frac{\text{Subst}\left(\int \frac{\cos(x)\sin^4(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{a^5} \\
&= \frac{\text{Subst}\left(\int \left(\frac{\cos(x)}{8x} - \frac{3\cos(3x)}{16x} + \frac{\cos(5x)}{16x}\right)dx, x, \sin^{-1}(ax)\right)}{a^5} \\
&= \frac{\text{Subst}\left(\int \frac{\cos(5x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{16a^5} + \frac{\text{Subst}\left(\int \frac{\cos(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{8a^5} - \frac{3\,\text{Subst}\left(\int \frac{\cos(3x)}{x}\,dx, x, \sin^{-}\right.}{16a^5} \\
&= \frac{\text{Ci}\left(\sin^{-1}(ax)\right)}{8a^5} - \frac{3\text{Ci}\left(3\sin^{-1}(ax)\right)}{16a^5} + \frac{\text{Ci}\left(5\sin^{-1}(ax)\right)}{16a^5}
\end{aligned}
$$

Mathematica [A] time = 0.0092898, size = 31, normalized size = 0.76

$$\frac{2\text{CosIntegral}\left(\sin^{-1}(ax)\right) - 3\text{CosIntegral}\left(3\sin^{-1}(ax)\right) + \text{CosIntegral}\left(5\sin^{-1}(ax)\right)}{16a^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4/ArcSin[a*x],x]
```

```
[Out] (2*CosIntegral[ArcSin[a*x]] - 3*CosIntegral[3*ArcSin[a*x]] + CosIntegral[5*
ArcSin[a*x]])/(16*a^5)
```

Maple [A] time = 0.023, size = 31, normalized size = 0.8

$$\frac{1}{a^5}\left(\frac{\text{Ci}\left(\arcsin(ax)\right)}{8} - \frac{3\,\text{Ci}\left(3\,\arcsin(ax)\right)}{16} + \frac{\text{Ci}\left(5\,\arcsin(ax)\right)}{16}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4/arcsin(a*x),x)
```

```
[Out] 1/a^5*(1/8*Ci(arcsin(a*x))-3/16*Ci(3*arcsin(a*x))+1/16*Ci(5*arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\arcsin(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x),x, algorithm="maxima")
```

```
[Out] integrate(x^4/arcsin(a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x^4}{\arcsin(ax)}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x),x, algorithm="fricas")
```

```
[Out] integral(x^4/arcsin(a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\operatorname{asin}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4/asin(a*x),x)
```

```
[Out] Integral(x**4/asin(a*x), x)
```

Giac [A] time = 1.3525, size = 47, normalized size = 1.15

$$\frac{\operatorname{Ci}(5\arcsin(ax))}{16\,a^5} - \frac{3\,\operatorname{Ci}(3\arcsin(ax))}{16\,a^5} + \frac{\operatorname{Ci}(\arcsin(ax))}{8\,a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x),x, algorithm="giac")
```

```
[Out] 1/16*cos_integral(5*arcsin(a*x))/a^5 - 3/16*cos_integral(3*arcsin(a*x))/a^5
 + 1/8*cos_integral(arcsin(a*x))/a^5
```

3.45 $\int \frac{x^3}{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=29

$$\frac{\text{Si}\left(2\sin^{-1}(ax)\right)}{4a^4}-\frac{\text{Si}\left(4\sin^{-1}(ax)\right)}{8a^4}$$

```
[Out] SinIntegral[2*ArcSin[a*x]]/(4*a^4) - SinIntegral[4*ArcSin[a*x]]/(8*a^4)
```

Rubi [A] time = 0.0623942, antiderivative size = 29, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3, Rules used = {4635, 4406, 3299}

$$\frac{\text{Si}\left(2\sin^{-1}(ax)\right)}{4a^4}-\frac{\text{Si}\left(4\sin^{-1}(ax)\right)}{8a^4}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/ArcSin[a*x],x]
```

```
[Out] SinIntegral[2*ArcSin[a*x]]/(4*a^4) - SinIntegral[4*ArcSin[a*x]]/(8*a^4)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3299

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

Rubi steps

$$\begin{aligned}
\int \frac{x^3}{\sin^{-1}(ax)}\,dx &= \frac{\text{Subst}\left(\int \frac{\cos(x)\sin^3(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{a^4}\\
&= \frac{\text{Subst}\left(\int \left(\frac{\sin(2x)}{4x}-\frac{\sin(4x)}{8x}\right)dx, x, \sin^{-1}(ax)\right)}{a^4}\\
&= -\frac{\text{Subst}\left(\int \frac{\sin(4x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{8a^4}+\frac{\text{Subst}\left(\int \frac{\sin(2x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{4a^4}\\
&= \frac{\text{Si}\left(2\sin^{-1}(ax)\right)}{4a^4}-\frac{\text{Si}\left(4\sin^{-1}(ax)\right)}{8a^4}
\end{aligned}$$

Mathematica [A] time = 0.0786934, size = 24, normalized size = 0.83

$$-\frac{\text{Si}\left(4\sin^{-1}(ax)\right)-2\text{Si}\left(2\sin^{-1}(ax)\right)}{8a^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/ArcSin[a*x],x]
```

```
[Out] -(-2*SinIntegral[2*ArcSin[a*x]] + SinIntegral[4*ArcSin[a*x]])/(8*a^4)
```

Maple [A] time = 0.022, size = 24, normalized size = 0.8

$$\frac{1}{a^4}\left(\frac{\text{Si}\left(2\arcsin(ax)\right)}{4}-\frac{\text{Si}\left(4\arcsin(ax)\right)}{8}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/arcsin(a*x),x)
```

```
[Out] 1/a^4*(1/4*Si(2*arcsin(a*x))-1/8*Si(4*arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\arcsin(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(x^3/arcsin(a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{\arcsin(ax)}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x^3/arcsin(a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\operatorname{asin}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/asin(a*x),x)
```

```
[Out] Integral(x**3/asin(a*x), x)
```

Giac [A] time = 1.33883, size = 34, normalized size = 1.17

$$-\frac{\operatorname{Si}(4\arcsin(ax))}{8a^4} + \frac{\operatorname{Si}(2\arcsin(ax))}{4a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/8*sin_integral(4*arcsin(a*x))/a^4 + 1/4*sin_integral(2*arcsin(a*x))/a^4
```

3.46 $\int \frac{x^2}{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=27

$$\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{4a^3}-\frac{\text{CosIntegral}\left(3\sin^{-1}(ax)\right)}{4a^3}$$

```
[Out] CosIntegral[ArcSin[a*x]]/(4*a^3) - CosIntegral[3*ArcSin[a*x]]/(4*a^3)
```

Rubi [A] time = 0.0631485, antiderivative size = 27, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3, Rules used = {4635, 4406, 3302}

$$\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{4a^3}-\frac{\text{CosIntegral}\left(3\sin^{-1}(ax)\right)}{4a^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/ArcSin[a*x],x]
```

```
[Out] CosIntegral[ArcSin[a*x]]/(4*a^3) - CosIntegral[3*ArcSin[a*x]]/(4*a^3)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3302

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

Rubi steps

$$\begin{aligned}
\int \frac{x^2}{\sin^{-1}(ax)}\,dx &= \frac{\operatorname{Subst}\left(\int \frac{\cos(x)\sin^2(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{a^3}\\
&= \frac{\operatorname{Subst}\left(\int \left(\frac{\cos(x)}{4x}-\frac{\cos(3x)}{4x}\right)dx, x, \sin^{-1}(ax)\right)}{a^3}\\
&= \frac{\operatorname{Subst}\left(\int \frac{\cos(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{4a^3}-\frac{\operatorname{Subst}\left(\int \frac{\cos(3x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{4a^3}\\
&= \frac{\operatorname{Ci}\left(\sin^{-1}(ax)\right)}{4a^3}-\frac{\operatorname{Ci}\left(3\sin^{-1}(ax)\right)}{4a^3}
\end{aligned}$$

Mathematica [A] time = 0.0060524, size = 22, normalized size = 0.81

$$\frac{\operatorname{CosIntegral}\left(\sin^{-1}(ax)\right)-\operatorname{CosIntegral}\left(3\sin^{-1}(ax)\right)}{4a^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/ArcSin[a*x],x]
```

```
[Out] (CosIntegral[ArcSin[a*x]] - CosIntegral[3*ArcSin[a*x]])/(4*a^3)
```

Maple [A] time = 0.021, size = 22, normalized size = 0.8

$$\frac{1}{a^3}\left(\frac{\operatorname{Ci}(\arcsin(ax))}{4}-\frac{\operatorname{Ci}(3\arcsin(ax))}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/arcsin(a*x),x)
```

```
[Out] 1/a^3*(1/4*Ci(arcsin(a*x))-1/4*Ci(3*arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\arcsin(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x),x, algorithm="maxima")
```

```
[Out] integrate(x^2/arcsin(a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x^2}{\arcsin(ax)}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x),x, algorithm="fricas")
```

```
[Out] integral(x^2/arcsin(a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\operatorname{asin}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/asin(a*x),x)
```

```
[Out] Integral(x**2/asin(a*x), x)
```

Giac [A] time = 1.37149, size = 31, normalized size = 1.15

$$-\frac{\operatorname{Ci}(3\arcsin(ax))}{4a^3} + \frac{\operatorname{Ci}(\arcsin(ax))}{4a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x),x, algorithm="giac")
```

```
[Out] -1/4*cos_integral(3*arcsin(a*x))/a^3 + 1/4*cos_integral(arcsin(a*x))/a^3
```

3.47 $\int \frac{x}{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=14

$$\frac{\text{Si}\left(2\sin^{-1}(ax)\right)}{2a^2}$$

```
[Out] SinIntegral[2*ArcSin[a*x]]/(2*a^2)
```

Rubi [A] time = 0.0349063, antiderivative size = 14, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4635, 4406, 12, 3299}

$$\frac{\text{Si}\left(2\sin^{-1}(ax)\right)}{2a^2}$$

Antiderivative was successfully verified.

```
[In] Int[x/ArcSin[a*x],x]
```

```
[Out] SinIntegral[2*ArcSin[a*x]]/(2*a^2)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 3299

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

Rubi steps

$$
\begin{aligned}
\int \frac{x}{\sin^{-1}(ax)}\,dx &= \frac{\text{Subst}\left(\int \frac{\cos(x)\sin(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{a^2}\\
&= \frac{\text{Subst}\left(\int \frac{\sin(2x)}{2x}\,dx, x, \sin^{-1}(ax)\right)}{a^2}\\
&= \frac{\text{Subst}\left(\int \frac{\sin(2x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{2a^2}\\
&= \frac{\text{Si}\left(2\sin^{-1}(ax)\right)}{2a^2}
\end{aligned}
$$

Mathematica [A] time = 0.0226045, size = 14, normalized size = 1.

$$\frac{\text{Si}\left(2\sin^{-1}(ax)\right)}{2a^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/ArcSin[a*x],x]
```

```
[Out] SinIntegral[2*ArcSin[a*x]]/(2*a^2)
```

Maple [A] time = 0.025, size = 13, normalized size = 0.9

$$\frac{\text{Si}\left(2\arcsin(ax)\right)}{2a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/arcsin(a*x),x)
```

```
[Out] 1/2*Si(2*arcsin(a*x))/a^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\arcsin(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x),x, algorithm="maxima")
```

```
[Out] integrate(x/arcsin(a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{\arcsin(ax)}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x),x, algorithm="fricas")
```

```
[Out] integral(x/arcsin(a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\operatorname{asin}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/asin(a*x),x)
```

```
[Out] Integral(x/asin(a*x), x)
```

Giac [A] time = 1.34604, size = 16, normalized size = 1.14

$$\frac{\operatorname{Si}(2\arcsin(ax))}{2a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x),x, algorithm="giac")
```

```
[Out] 1/2*sin_integral(2*arcsin(a*x))/a^2
```

3.48 $\int \frac{1}{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=9

$$\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{a}$$

```
[Out] CosIntegral[ArcSin[a*x]]/a
```

Rubi [A] time = 0.0168823, antiderivative size = 9, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {4623, 3302}

$$\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{a}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^(-1),x]
```

```
[Out] CosIntegral[ArcSin[a*x]]/a
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3302

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

Rubi steps

$$\int \frac{1}{\sin^{-1}(ax)}\,dx = \frac{\text{Subst}\left(\int \frac{\cos(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{a}$$
$$= \frac{\text{Ci}\left(\sin^{-1}(ax)\right)}{a}$$

Mathematica [A] time = 0.0094762, size = 9, normalized size = 1.

$$\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{a}$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]^(-1),x]
```

```
[Out] CosIntegral[ArcSin[a*x]]/a
```

Maple [A] time = 0.017, size = 10, normalized size = 1.1

$$\frac{\text{Ci}\left(\arcsin\left(ax\right)\right)}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/arcsin(a*x),x)
```

```
[Out] Ci(arcsin(a*x))/a
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\arcsin\left(ax\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x),x, algorithm="maxima")
```

```
[Out] integrate(1/arcsin(a*x), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\arcsin(ax)}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x),x, algorithm="fricas")
```

```
[Out] integral(1/arcsin(a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\operatorname{asin}(ax)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/asin(a*x),x)
```

```
[Out] Integral(1/asin(a*x), x)
```

Giac [A] time = 1.35593, size = 12, normalized size = 1.33

$$\frac{\operatorname{Ci}(\arcsin(ax))}{a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x),x, algorithm="giac")
```

```
[Out] cos_integral(arcsin(a*x))/a
```

3.49 $\int \frac{1}{x \sin^{-1}(ax)} \, dx$

Optimal. Leaf size=12

$$\text{Unintegrable}\left(\frac{1}{x \sin^{-1}(ax)}, x\right)$$

```
[Out] Unintegrable[1/(x*ArcSin[a*x]), x]
```

Rubi [A] time = 0.0131449, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x \sin^{-1}(ax)} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*ArcSin[a*x]),x]
```

```
[Out] Defer[Int][1/(x*ArcSin[a*x]), x]
```

Rubi steps

$$\int \frac{1}{x \sin^{-1}(ax)} \, dx = \int \frac{1}{x \sin^{-1}(ax)} \, dx$$

Mathematica [A] time = 0.19103, size = 0, normalized size = 0.

$$\int \frac{1}{x \sin^{-1}(ax)} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*ArcSin[a*x]),x]
```

```
[Out] Integrate[1/(x*ArcSin[a*x]), x]
```

Maple [A] time = 0.09, size = 0, normalized size = 0.

$$\int \frac{1}{x \arcsin{(ax)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/arcsin(a*x),x)
```

```
[Out] int(1/x/arcsin(a*x),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x \arcsin{(ax)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x),x, algorithm="maxima")
```

```
[Out] integrate(1/(x*arcsin(a*x)), x)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\operatorname{integral}\left(\frac{1}{x \arcsin{(ax)}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x),x, algorithm="fricas")
```

```
[Out] integral(1/(x*arcsin(a*x)), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x \operatorname{asin}{(ax)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/asin(a*x),x)
```

```
[Out] Integral(1/(x*asin(a*x)), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x \arcsin(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x),x, algorithm="giac")
```

```
[Out] integrate(1/(x*arcsin(a*x)), x)
```

3.50 $\int \frac{1}{x^2 \sin^{-1}(ax)}\,dx$

Optimal. Leaf size=12

$$\text{Unintegrable}\left(\frac{1}{x^2 \sin^{-1}(ax)},x\right)$$

```
[Out] Unintegrable[1/(x^2*ArcSin[a*x]), x]
```

Rubi [A] time = 0.0141847, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x^2 \sin^{-1}(ax)}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x^2*ArcSin[a*x]),x]
```

```
[Out] Defer[Int][1/(x^2*ArcSin[a*x]), x]
```

Rubi steps

$$\int \frac{1}{x^2 \sin^{-1}(ax)}\,dx = \int \frac{1}{x^2 \sin^{-1}(ax)}\,dx$$

Mathematica [A] time = 1.0984, size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \sin^{-1}(ax)}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x^2*ArcSin[a*x]),x]
```

```
[Out] Integrate[1/(x^2*ArcSin[a*x]), x]
```

Maple [A] time = 0.123, size = 0, normalized size = 0.

$$\int \frac{1}{x^{2} \arcsin \left(a x\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/arcsin(a*x),x)
```

```
[Out] int(1/x^2/arcsin(a*x),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{2} \arcsin \left(a x\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x),x, algorithm="maxima")
```

```
[Out] integrate(1/(x^2*arcsin(a*x)), x)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{x^{2} \arcsin \left(a x\right)}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x),x, algorithm="fricas")
```

```
[Out] integral(1/(x^2*arcsin(a*x)), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{2} \operatorname{asin}{\left (a x \right)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/asin(a*x),x)
```

```
[Out] Integral(1/(x**2*asin(a*x)), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \arcsin{(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x),x, algorithm="giac")
```

```
[Out] integrate(1/(x^2*arcsin(a*x)), x)
```

3.51 $\int \frac{x^6}{\sin^{-1}(ax)^2}\,dx$

Optimal. Leaf size=83

$$-\frac{5\mathrm{Si}\left(\sin^{-1}(ax)\right)}{64a^7}+\frac{27\mathrm{Si}\left(3\sin^{-1}(ax)\right)}{64a^7}-\frac{25\mathrm{Si}\left(5\sin^{-1}(ax)\right)}{64a^7}+\frac{7\mathrm{Si}\left(7\sin^{-1}(ax)\right)}{64a^7}-\frac{x^6\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}$$

```
[Out] -((x^6*Sqrt[1 - a^2*x^2])/(a*ArcSin[a*x])) - (5*SinIntegral[ArcSin[a*x]])/(
64*a^7) + (27*SinIntegral[3*ArcSin[a*x]])/(64*a^7) - (25*SinIntegral[5*ArcS
in[a*x]])/(64*a^7) + (7*SinIntegral[7*ArcSin[a*x]])/(64*a^7)
```

Rubi [A] time = 0.0744056, antiderivative size = 83, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2, Rules used = {4631, 3299}

$$-\frac{5\mathrm{Si}\left(\sin^{-1}(ax)\right)}{64a^7}+\frac{27\mathrm{Si}\left(3\sin^{-1}(ax)\right)}{64a^7}-\frac{25\mathrm{Si}\left(5\sin^{-1}(ax)\right)}{64a^7}+\frac{7\mathrm{Si}\left(7\sin^{-1}(ax)\right)}{64a^7}-\frac{x^6\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x^6/ArcSin[a*x]^2,x]
```

```
[Out] -((x^6*Sqrt[1 - a^2*x^2])/(a*ArcSin[a*x])) - (5*SinIntegral[ArcSin[a*x]])/(
64*a^7) + (27*SinIntegral[3*ArcSin[a*x]])/(64*a^7) - (25*SinIntegral[5*ArcS
in[a*x]])/(64*a^7) + (7*SinIntegral[7*ArcSin[a*x]])/(64*a^7)
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3299

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

Rubi steps

$$\int \frac{x^6}{\sin^{-1}(ax)^2}\,dx = -\frac{x^6\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} + \frac{\text{Subst}\left(\int\left(-\frac{5\sin(x)}{64x}+\frac{27\sin(3x)}{64x}-\frac{25\sin(5x)}{64x}+\frac{7\sin(7x)}{64x}\right)dx,x,\sin^{-1}(ax)\right)}{a^7}$$

$$= -\frac{x^6\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} - \frac{5\,\text{Subst}\left(\int\frac{\sin(x)}{x}\,dx,x,\sin^{-1}(ax)\right)}{64a^7} + \frac{7\,\text{Subst}\left(\int\frac{\sin(7x)}{x}\,dx,x,\sin^{-1}(ax)\right)}{64a^7} - 25\,\text{Subst}$$

$$= -\frac{x^6\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} - \frac{5\text{Si}\left(\sin^{-1}(ax)\right)}{64a^7} + \frac{27\text{Si}\left(3\sin^{-1}(ax)\right)}{64a^7} - \frac{25\text{Si}\left(5\sin^{-1}(ax)\right)}{64a^7} + \frac{7\text{Si}\left(7\sin^{-1}(ax)\right)}{64a^7}$$

Mathematica [A] time = 0.244355, size = 86, normalized size = 1.04

$$-\frac{64a^6x^6\sqrt{1-a^2x^2}+5\sin^{-1}(ax)\text{Si}\left(\sin^{-1}(ax)\right)-27\sin^{-1}(ax)\text{Si}\left(3\sin^{-1}(ax)\right)+25\sin^{-1}(ax)\text{Si}\left(5\sin^{-1}(ax)\right)-7\sin^{-1}(ax}{64a^7\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^6/ArcSin[a*x]^2,x]
```

```
[Out] -(64*a^6*x^6*Sqrt[1 - a^2*x^2] + 5*ArcSin[a*x]*SinIntegral[ArcSin[a*x]] - 2
7*ArcSin[a*x]*SinIntegral[3*ArcSin[a*x]] + 25*ArcSin[a*x]*SinIntegral[5*Arc
Sin[a*x]] - 7*ArcSin[a*x]*SinIntegral[7*ArcSin[a*x]])/(64*a^7*ArcSin[a*x])
```

Maple [A] time = 0.042, size = 105, normalized size = 1.3

$$\frac{1}{a^7}\left(-\frac{5}{64\arcsin(ax)}\sqrt{-a^2x^2+1}-\frac{5\,\text{Si}(\arcsin(ax))}{64}+\frac{9\cos(3\arcsin(ax))}{64\arcsin(ax)}+\frac{27\,\text{Si}(3\arcsin(ax))}{64}-\frac{5\cos(5\arcsin(}{64\arcsin(ax}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^6/arcsin(a*x)^2,x)
```

```
[Out] 1/a^7*(-5/64/arcsin(a*x)*(-a^2*x^2+1)^(1/2)-5/64*Si(arcsin(a*x))+9/64/arcsi
n(a*x)*cos(3*arcsin(a*x))+27/64*Si(3*arcsin(a*x))-5/64/arcsin(a*x)*cos(5*ar
csin(a*x))-25/64*Si(5*arcsin(a*x))+1/64/arcsin(a*x)*cos(7*arcsin(a*x))+7/64
*Si(7*arcsin(a*x)))
```

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/arcsin(a*x)^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^6}{\arcsin(ax)^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/arcsin(a*x)^2,x, algorithm="fricas")
```

```
[Out] integral(x^6/arcsin(a*x)^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{\operatorname{asin}^2(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**6/asin(a*x)**2,x)
```

```
[Out] Integral(x**6/asin(a*x)**2, x)
```

Giac [B] time = 1.28651, size = 217, normalized size = 2.61

$$-\frac{\left(a^2x^2-1\right)^3\sqrt{-a^2x^2+1}}{a^7\arcsin(ax)}-\frac{3\left(a^2x^2-1\right)^2\sqrt{-a^2x^2+1}}{a^7\arcsin(ax)}+\frac{7\operatorname{Si}(7\arcsin(ax))}{64a^7}-\frac{25\operatorname{Si}(5\arcsin(ax))}{64a^7}+\frac{27\operatorname{Si}(3\arcsin(}{64a^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/arcsin(a*x)^2,x, algorithm="giac")
```

```
[Out] -(a^2*x^2 - 1)^3*sqrt(-a^2*x^2 + 1)/(a^7*arcsin(a*x)) - 3*(a^2*x^2 - 1)^2*s
qrt(-a^2*x^2 + 1)/(a^7*arcsin(a*x)) + 7/64*sin_integral(7*arcsin(a*x))/a^7
- 25/64*sin_integral(5*arcsin(a*x))/a^7 + 27/64*sin_integral(3*arcsin(a*x))
/a^7 - 5/64*sin_integral(arcsin(a*x))/a^7 + 3*(-a^2*x^2 + 1)^(3/2)/(a^7*arc
sin(a*x)) - sqrt(-a^2*x^2 + 1)/(a^7*arcsin(a*x))
```

3.52 $\int \frac{x^5}{\sin^{-1}(ax)^2}\,dx$

Optimal. Leaf size=71

$$\frac{5\text{CosIntegral}\left(2\sin^{-1}(ax)\right)}{16a^6}-\frac{\text{CosIntegral}\left(4\sin^{-1}(ax)\right)}{2a^6}+\frac{3\text{CosIntegral}\left(6\sin^{-1}(ax)\right)}{16a^6}-\frac{x^5\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}$$

```
[Out] -((x^5*Sqrt[1 - a^2*x^2])/(a*ArcSin[a*x])) + (5*CosIntegral[2*ArcSin[a*x]])
/(16*a^6) - CosIntegral[4*ArcSin[a*x]]/(2*a^6) + (3*CosIntegral[6*ArcSin[a*
x]])/(16*a^6)
```

Rubi [A] time = 0.0634923, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2, Rules used = {4631, 3302}

$$\frac{5\text{CosIntegral}\left(2\sin^{-1}(ax)\right)}{16a^6}-\frac{\text{CosIntegral}\left(4\sin^{-1}(ax)\right)}{2a^6}+\frac{3\text{CosIntegral}\left(6\sin^{-1}(ax)\right)}{16a^6}-\frac{x^5\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x^5/ArcSin[a*x]^2,x]
```

```
[Out] -((x^5*Sqrt[1 - a^2*x^2])/(a*ArcSin[a*x])) + (5*CosIntegral[2*ArcSin[a*x]])
/(16*a^6) - CosIntegral[4*ArcSin[a*x]]/(2*a^6) + (3*CosIntegral[6*ArcSin[a*
x]])/(16*a^6)
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3302

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

Rubi steps

$$\begin{aligned}\int \frac{x^5}{\sin^{-1}(ax)^2}\,dx &= -\frac{x^5\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}+\frac{\text{Subst}\left(\int\left(\frac{5\cos(2x)}{16x}-\frac{\cos(4x)}{2x}+\frac{3\cos(6x)}{16x}\right)dx,x,\sin^{-1}(ax)\right)}{a^6}\\ &= -\frac{x^5\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}+\frac{3\,\text{Subst}\left(\int\frac{\cos(6x)}{x}\,dx,x,\sin^{-1}(ax)\right)}{16a^6}+\frac{5\,\text{Subst}\left(\int\frac{\cos(2x)}{x}\,dx,x,\sin^{-1}(ax)\right)}{16a^6}-\text{Subst}\left(\right.\\ &= -\frac{x^5\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}+\frac{5\text{Ci}\left(2\sin^{-1}(ax)\right)}{16a^6}-\frac{\text{Ci}\left(4\sin^{-1}(ax)\right)}{2a^6}+\frac{3\text{Ci}\left(6\sin^{-1}(ax)\right)}{16a^6}\end{aligned}$$

Mathematica [A] time = 0.0445183, size = 78, normalized size = 1.1

$$-\frac{-10\sin^{-1}(ax)\text{CosIntegral}\left(2\sin^{-1}(ax)\right)+16\sin^{-1}(ax)\text{CosIntegral}\left(4\sin^{-1}(ax)\right)-6\sin^{-1}(ax)\text{CosIntegral}\left(6\sin^{-1}(a\right.}{32a^6\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^5/ArcSin[a*x]^2,x]
```

```
[Out] -(-10*ArcSin[a*x]*CosIntegral[2*ArcSin[a*x]] + 16*ArcSin[a*x]*CosIntegral[4
*ArcSin[a*x]] - 6*ArcSin[a*x]*CosIntegral[6*ArcSin[a*x]] + 5*Sin[2*ArcSin[a
*x]] - 4*Sin[4*ArcSin[a*x]] + Sin[6*ArcSin[a*x]])/(32*a^6*ArcSin[a*x])
```

Maple [A] time = 0.033, size = 78, normalized size = 1.1

$$\frac{1}{a^6}\left(-\frac{5\sin(2\arcsin(ax))}{32\arcsin(ax)}+\frac{5\,\text{Ci}(2\arcsin(ax))}{16}+\frac{\sin(4\arcsin(ax))}{8\arcsin(ax)}-\frac{\text{Ci}(4\arcsin(ax))}{2}-\frac{\sin(6\arcsin(ax))}{32\arcsin(ax)}+\frac{3\,\text{C}}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5/arcsin(a*x)^2,x)
```

```
[Out] 1/a^6*(-5/32/arcsin(a*x)*sin(2*arcsin(a*x))+5/16*Ci(2*arcsin(a*x))+1/8/arcs
in(a*x)*sin(4*arcsin(a*x))-1/2*Ci(4*arcsin(a*x))-1/32/arcsin(a*x)*sin(6*arc
sin(a*x))+3/16*Ci(6*arcsin(a*x)))
```

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/arcsin(a*x)^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x^5}{\arcsin\left(ax\right)^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/arcsin(a*x)^2,x, algorithm="fricas")
```

```
[Out] integral(x^5/arcsin(a*x)^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\operatorname{asin}^2\left(ax\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5/asin(a*x)**2,x)
```

```
[Out] Integral(x**5/asin(a*x)**2, x)
```

Giac [A] time = 1.31122, size = 162, normalized size = 2.28

$$-\frac{\left(a^2x^2-1\right)^2\sqrt{-a^2x^2+1}x}{a^5\arcsin\left(ax\right)}+\frac{2\left(-a^2x^2+1\right)^{\frac{3}{2}}x}{a^5\arcsin\left(ax\right)}-\frac{\sqrt{-a^2x^2+1}x}{a^5\arcsin\left(ax\right)}+\frac{3\,\mathrm{Ci}\left(6\arcsin\left(ax\right)\right)}{16\,a^6}-\frac{\mathrm{Ci}\left(4\arcsin\left(ax\right)\right)}{2\,a^6}+\frac{5\,\mathrm{Ci}\,(2\,a}{1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/arcsin(a*x)^2,x, algorithm="giac")
```

```
[Out] -(a^2*x^2 - 1)^2*sqrt(-a^2*x^2 + 1)*x/(a^5*arcsin(a*x)) + 2*(-a^2*x^2 + 1)^
(3/2)*x/(a^5*arcsin(a*x)) - sqrt(-a^2*x^2 + 1)*x/(a^5*arcsin(a*x)) + 3/16*c
os_integral(6*arcsin(a*x))/a^6 - 1/2*cos_integral(4*arcsin(a*x))/a^6 + 5/16
*cos_integral(2*arcsin(a*x))/a^6
```

3.53 $\int \frac{x^4}{\sin^{-1}(ax)^2}\,dx$

Optimal. Leaf size=69

$$-\frac{\text{Si}\left(\sin^{-1}(ax)\right)}{8a^5}+\frac{9\text{Si}\left(3\sin^{-1}(ax)\right)}{16a^5}-\frac{5\text{Si}\left(5\sin^{-1}(ax)\right)}{16a^5}-\frac{x^4\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}$$

```
[Out] -((x^4*Sqrt[1 - a^2*x^2])/(a*ArcSin[a*x])) - SinIntegral[ArcSin[a*x]]/(8*a^
5) + (9*SinIntegral[3*ArcSin[a*x]])/(16*a^5) - (5*SinIntegral[5*ArcSin[a*x]
])/(16*a^5)
```

Rubi [A] time = 0.0576204, antiderivative size = 69, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2, Rules used = {4631, 3299}

$$-\frac{\text{Si}\left(\sin^{-1}(ax)\right)}{8a^5}+\frac{9\text{Si}\left(3\sin^{-1}(ax)\right)}{16a^5}-\frac{5\text{Si}\left(5\sin^{-1}(ax)\right)}{16a^5}-\frac{x^4\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x^4/ArcSin[a*x]^2,x]
```

```
[Out] -((x^4*Sqrt[1 - a^2*x^2])/(a*ArcSin[a*x])) - SinIntegral[ArcSin[a*x]]/(8*a^
5) + (9*SinIntegral[3*ArcSin[a*x]])/(16*a^5) - (5*SinIntegral[5*ArcSin[a*x]
])/(16*a^5)
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3299

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

Rubi steps

$$\int \frac{x^4}{\sin^{-1}(ax)^2}\,dx = -\frac{x^4\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} + \frac{\text{Subst}\left(\int\left(-\frac{\sin(x)}{8x}+\frac{9\sin(3x)}{16x}-\frac{5\sin(5x)}{16x}\right)dx, x, \sin^{-1}(ax)\right)}{a^5}$$

$$= -\frac{x^4\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} - \frac{\text{Subst}\left(\int\frac{\sin(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{8a^5} - \frac{5\,\text{Subst}\left(\int\frac{\sin(5x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{16a^5} + 9\,\text{Subst}\Big(\int$$

$$= -\frac{x^4\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} - \frac{\text{Si}\left(\sin^{-1}(ax)\right)}{8a^5} + \frac{9\text{Si}\left(3\sin^{-1}(ax)\right)}{16a^5} - \frac{5\text{Si}\left(5\sin^{-1}(ax)\right)}{16a^5}$$

Mathematica [A] time = 0.208683, size = 61, normalized size = 0.88

$$-\frac{\frac{16a^4x^4\sqrt{1-a^2x^2}}{\sin^{-1}(ax)} + 2\text{Si}\left(\sin^{-1}(ax)\right) - 9\text{Si}\left(3\sin^{-1}(ax)\right) + 5\text{Si}\left(5\sin^{-1}(ax)\right)}{16a^5}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4/ArcSin[a*x]^2,x]
```

```
[Out] -((16*a^4*x^4*Sqrt[1 - a^2*x^2])/ArcSin[a*x] + 2*SinIntegral[ArcSin[a*x]] -
 9*SinIntegral[3*ArcSin[a*x]] + 5*SinIntegral[5*ArcSin[a*x]])/(16*a^5)
```

Maple [A] time = 0.026, size = 81, normalized size = 1.2

$$\frac{1}{a^5}\Big(-\frac{1}{8\ \arcsin(ax)}\sqrt{-a^2x^2+1} - \frac{\text{Si}(\arcsin(ax))}{8} + \frac{3\ \cos(3\ \arcsin(ax))}{16\ \arcsin(ax)} + \frac{9\,\text{Si}(3\ \arcsin(ax))}{16} - \frac{\cos(5\ \arcsin(ax))}{16\ \arcsin(ax)} -$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4/arcsin(a*x)^2,x)
```

```
[Out] 1/a^5*(-1/8/arcsin(a*x)*(-a^2*x^2+1)^(1/2)-1/8*Si(arcsin(a*x))+3/16/arcsin(
a*x)*cos(3*arcsin(a*x))+9/16*Si(3*arcsin(a*x))-1/16/arcsin(a*x)*cos(5*arcsi
n(a*x))-5/16*Si(5*arcsin(a*x)))
```

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x^{4}}{\arcsin\left(ax\right)^{2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^2,x, algorithm="fricas")
```

```
[Out] integral(x^4/arcsin(a*x)^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{4}}{\operatorname{asin}^{2}\left(ax\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4/asin(a*x)**2,x)
```

```
[Out] Integral(x**4/asin(a*x)**2, x)
```

Giac [A] time = 1.30518, size = 155, normalized size = 2.25

$$-\frac{\left(a^{2}x^{2}-1\right)^{2}\sqrt{-a^{2}x^{2}+1}}{a^{5}\arcsin\left(ax\right)}-\frac{5\,\mathrm{Si}\left(5\arcsin\left(ax\right)\right)}{16\,a^{5}}+\frac{9\,\mathrm{Si}\left(3\arcsin\left(ax\right)\right)}{16\,a^{5}}-\frac{\mathrm{Si}\left(\arcsin\left(ax\right)\right)}{8\,a^{5}}+\frac{2\left(-a^{2}x^{2}+1\right)^{\frac{3}{2}}}{a^{5}\arcsin\left(ax\right)}-\frac{\sqrt{-a^{2}x^{2}}}{a^{5}\,\mathrm{arcsin}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^2,x, algorithm="giac")
```

```
[Out] -(a^2*x^2 - 1)^2*sqrt(-a^2*x^2 + 1)/(a^5*arcsin(a*x)) - 5/16*sin_integral(5
*arcsin(a*x))/a^5 + 9/16*sin_integral(3*arcsin(a*x))/a^5 - 1/8*sin_integral
(arcsin(a*x))/a^5 + 2*(-a^2*x^2 + 1)^(3/2)/(a^5*arcsin(a*x)) - sqrt(-a^2*x^
2 + 1)/(a^5*arcsin(a*x))
```

3.54 $\int \frac{x^3}{\sin^{-1}(ax)^2}\,dx$

Optimal. Leaf size=57

$$\frac{\text{CosIntegral}\left(2\sin^{-1}(ax)\right)}{2a^4}-\frac{\text{CosIntegral}\left(4\sin^{-1}(ax)\right)}{2a^4}-\frac{x^3\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}$$

```
[Out] -((x^3*Sqrt[1 - a^2*x^2])/(a*ArcSin[a*x])) + CosIntegral[2*ArcSin[a*x]]/(2*
a^4) - CosIntegral[4*ArcSin[a*x]]/(2*a^4)
```

Rubi [A] time = 0.0486051, antiderivative size = 57, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2, Rules used = {4631, 3302}

$$\frac{\text{CosIntegral}\left(2\sin^{-1}(ax)\right)}{2a^4}-\frac{\text{CosIntegral}\left(4\sin^{-1}(ax)\right)}{2a^4}-\frac{x^3\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/ArcSin[a*x]^2,x]
```

```
[Out] -((x^3*Sqrt[1 - a^2*x^2])/(a*ArcSin[a*x])) + CosIntegral[2*ArcSin[a*x]]/(2*
a^4) - CosIntegral[4*ArcSin[a*x]]/(2*a^4)
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3302

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

Rubi steps

$$
\begin{aligned}
\int \frac{x^3}{\sin^{-1}(ax)^2}\,dx &= -\frac{x^3\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} + \frac{\text{Subst}\left(\int\left(\frac{\cos(2x)}{2x}-\frac{\cos(4x)}{2x}\right)dx, x, \sin^{-1}(ax)\right)}{a^4}\\
&= -\frac{x^3\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} + \frac{\text{Subst}\left(\int\frac{\cos(2x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{2a^4} - \frac{\text{Subst}\left(\int\frac{\cos(4x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{2a^4}\\
&= -\frac{x^3\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} + \frac{\text{Ci}\left(2\sin^{-1}(ax)\right)}{2a^4} - \frac{\text{Ci}\left(4\sin^{-1}(ax)\right)}{2a^4}
\end{aligned}
$$

Mathematica [A] time = 0.0168856, size = 56, normalized size = 0.98

$$
\frac{4\sin^{-1}(ax)\text{CosIntegral}\left(2\sin^{-1}(ax)\right) - 4\sin^{-1}(ax)\text{CosIntegral}\left(4\sin^{-1}(ax)\right) - 2\sin\left(2\sin^{-1}(ax)\right) + \sin\left(4\sin^{-1}(ax)\right)}{8a^4\sin^{-1}(ax)}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/ArcSin[a*x]^2,x]
```

```
[Out] (4*ArcSin[a*x]*CosIntegral[2*ArcSin[a*x]] - 4*ArcSin[a*x]*CosIntegral[4*Arc
Sin[a*x]] - 2*Sin[2*ArcSin[a*x]] + Sin[4*ArcSin[a*x]])/(8*a^4*ArcSin[a*x])
```

Maple [A] time = 0.021, size = 54, normalized size = 1.

$$
\frac{1}{a^4}\left(-\frac{\sin(2\arcsin(ax))}{4\arcsin(ax)} + \frac{\text{Ci}(2\arcsin(ax))}{2} + \frac{\sin(4\arcsin(ax))}{8\arcsin(ax)} - \frac{\text{Ci}(4\arcsin(ax))}{2}\right)
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/arcsin(a*x)^2,x)
```

```
[Out] 1/a^4*(-1/4/arcsin(a*x)*sin(2*arcsin(a*x))+1/2*Ci(2*arcsin(a*x))+1/8/arcsin
(a*x)*sin(4*arcsin(a*x))-1/2*Ci(4*arcsin(a*x)))
```

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{\arcsin(ax)^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^2,x, algorithm="fricas")
```

```
[Out] integral(x^3/arcsin(a*x)^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\operatorname{asin}^2(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/asin(a*x)**2,x)
```

```
[Out] Integral(x**3/asin(a*x)**2, x)
```

Giac [A] time = 1.38474, size = 97, normalized size = 1.7

$$\frac{\left(-a^2x^2+1\right)^{\frac{3}{2}}x}{a^3\arcsin(ax)} - \frac{\sqrt{-a^2x^2+1}x}{a^3\arcsin(ax)} - \frac{\operatorname{Ci}(4\arcsin(ax))}{2a^4} + \frac{\operatorname{Ci}(2\arcsin(ax))}{2a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^2,x, algorithm="giac")
```

```
[Out] (-a^2*x^2 + 1)^(3/2)*x/(a^3*arcsin(a*x)) - sqrt(-a^2*x^2 + 1)*x/(a^3*arcsin
(a*x)) - 1/2*cos_integral(4*arcsin(a*x))/a^4 + 1/2*cos_integral(2*arcsin(a*
x))/a^4
```

3.55 $\int \frac{x^2}{\sin^{-1}(ax)^2}\,dx$

Optimal. Leaf size=55

$$-\frac{\text{Si}\left(\sin^{-1}(ax)\right)}{4a^3}+\frac{3\text{Si}\left(3\sin^{-1}(ax)\right)}{4a^3}-\frac{x^2\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}$$

```
[Out] -((x^2*Sqrt[1 - a^2*x^2])/(a*ArcSin[a*x])) - SinIntegral[ArcSin[a*x]]/(4*a^
3) + (3*SinIntegral[3*ArcSin[a*x]])/(4*a^3)
```

Rubi [A] time = 0.0439644, antiderivative size = 55, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2, Rules used = {4631, 3299}

$$-\frac{\text{Si}\left(\sin^{-1}(ax)\right)}{4a^3}+\frac{3\text{Si}\left(3\sin^{-1}(ax)\right)}{4a^3}-\frac{x^2\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/ArcSin[a*x]^2,x]
```

```
[Out] -((x^2*Sqrt[1 - a^2*x^2])/(a*ArcSin[a*x])) - SinIntegral[ArcSin[a*x]]/(4*a^
3) + (3*SinIntegral[3*ArcSin[a*x]])/(4*a^3)
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3299

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

Rubi steps

$$\begin{aligned}\int \frac{x^2}{\sin^{-1}(ax)^2}\,dx &= -\frac{x^2\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} + \frac{\text{Subst}\left(\int \left(-\frac{\sin(x)}{4x}+\frac{3\sin(3x)}{4x}\right)dx, x, \sin^{-1}(ax)\right)}{a^3}\\ &= -\frac{x^2\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} - \frac{\text{Subst}\left(\int \frac{\sin(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{4a^3} + \frac{3\,\text{Subst}\left(\int \frac{\sin(3x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{4a^3}\\ &= -\frac{x^2\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} - \frac{\text{Si}\left(\sin^{-1}(ax)\right)}{4a^3} + \frac{3\text{Si}\left(3\sin^{-1}(ax)\right)}{4a^3}\end{aligned}$$

Mathematica [A] time = 0.164837, size = 50, normalized size = 0.91

$$-\frac{\frac{4a^2x^2\sqrt{1-a^2x^2}}{\sin^{-1}(ax)} + \text{Si}\left(\sin^{-1}(ax)\right) - 3\text{Si}\left(3\sin^{-1}(ax)\right)}{4a^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/ArcSin[a*x]^2,x]
```

```
[Out] -((4*a^2*x^2*Sqrt[1 - a^2*x^2])/ArcSin[a*x] + SinIntegral[ArcSin[a*x]] - 3*
SinIntegral[3*ArcSin[a*x]])/(4*a^3)
```

Maple [A] time = 0.023, size = 57, normalized size = 1.

$$\frac{1}{a^3}\left(-\frac{1}{4\arcsin(ax)}\sqrt{-a^2x^2+1} - \frac{\text{Si}(\arcsin(ax))}{4} + \frac{\cos(3\arcsin(ax))}{4\arcsin(ax)} + \frac{3\,\text{Si}(3\arcsin(ax))}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/arcsin(a*x)^2,x)
```

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

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^2}{\arcsin\left(ax\right)^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^2,x, algorithm="fricas")
```

```
[Out] integral(x^2/arcsin(a*x)^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\operatorname{asin}^2\left(ax\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/asin(a*x)**2,x)
```

```
[Out] Integral(x**2/asin(a*x)**2, x)
```

Giac [A] time = 1.35974, size = 92, normalized size = 1.67

$$\frac{3\ \mathrm{Si}\left(3\ \arcsin\left(ax\right)\right)}{4\,a^3} - \frac{\mathrm{Si}\left(\arcsin\left(ax\right)\right)}{4\,a^3} + \frac{\left(-a^2x^2+1\right)^{\frac{3}{2}}}{a^3\arcsin\left(ax\right)} - \frac{\sqrt{-a^2x^2+1}}{a^3\arcsin\left(ax\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^2,x, algorithm="giac")
```

```
[Out] 3/4*sin_integral(3*arcsin(a*x))/a^3 - 1/4*sin_integral(arcsin(a*x))/a^3 + (
-a^2*x^2 + 1)^(3/2)/(a^3*arcsin(a*x)) - sqrt(-a^2*x^2 + 1)/(a^3*arcsin(a*x)
)
```

3.56 $\int \frac{x}{\sin^{-1}(ax)^2}\,dx$

Optimal. Leaf size=38

$$\frac{\text{CosIntegral}\left(2\sin^{-1}(ax)\right)}{a^2}-\frac{x\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}$$

```
[Out] -((x*Sqrt[1 - a^2*x^2])/(a*ArcSin[a*x])) + CosIntegral[2*ArcSin[a*x]]/a^2
```

Rubi [A] time = 0.0247518, antiderivative size = 38, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25, Rules used = {4631, 3302}

$$\frac{\text{CosIntegral}\left(2\sin^{-1}(ax)\right)}{a^2}-\frac{x\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x/ArcSin[a*x]^2,x]
```

```
[Out] -((x*Sqrt[1 - a^2*x^2])/(a*ArcSin[a*x])) + CosIntegral[2*ArcSin[a*x]]/a^2
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3302

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

Rubi steps

$$\begin{aligned}\int \frac{x}{\sin^{-1}(ax)^2}\,dx &= -\frac{x\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} + \frac{\text{Subst}\left(\int \frac{\cos(2x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{a^2} \\ &= -\frac{x\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} + \frac{\text{Ci}\left(2\sin^{-1}(ax)\right)}{a^2}\end{aligned}$$

Mathematica [A] time = 0.0032364, size = 32, normalized size = 0.84

$$\frac{\text{CosIntegral}\left(2\sin^{-1}(ax)\right)}{a^2} - \frac{\sin\left(2\sin^{-1}(ax)\right)}{2a^2\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/ArcSin[a*x]^2,x]
```

```
[Out] CosIntegral[2*ArcSin[a*x]]/a^2 - Sin[2*ArcSin[a*x]]/(2*a^2*ArcSin[a*x])
```

Maple [A] time = 0.024, size = 28, normalized size = 0.7

$$\frac{1}{a^2}\left(-\frac{\sin(2\arcsin(ax))}{2\arcsin(ax)} + \text{Ci}(2\arcsin(ax))\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/arcsin(a*x)^2,x)
```

```
[Out] 1/a^2*(-1/2/arcsin(a*x)*sin(2*arcsin(a*x))+Ci(2*arcsin(a*x)))
```

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{\arcsin\left(ax\right)^{2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^2,x, algorithm="fricas")
```

```
[Out] integral(x/arcsin(a*x)^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\operatorname{asin}^{2}\left(ax\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/asin(a*x)**2,x)
```

```
[Out] Integral(x/asin(a*x)**2, x)
```

Giac [A] time = 1.37361, size = 49, normalized size = 1.29

$$-\frac{\sqrt{-a^{2}x^{2}+1}x}{a\arcsin\left(ax\right)}+\frac{\operatorname{Ci}\left(2\arcsin\left(ax\right)\right)}{a^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^2,x, algorithm="giac")
```

```
[Out] -sqrt(-a^2*x^2 + 1)*x/(a*arcsin(a*x)) + cos_integral(2*arcsin(a*x))/a^2
```

3.57 $\int \frac{1}{\sin^{-1}(ax)^2}\,dx$

Optimal. Leaf size=36

$$-\frac{\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}-\frac{\operatorname{Si}\left(\sin^{-1}(ax)\right)}{a}$$

```
[Out] -(Sqrt[1 - a^2*x^2]/(a*ArcSin[a*x])) - SinIntegral[ArcSin[a*x]]/a
```

Rubi [A] time = 0.0779915, antiderivative size = 36, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4621, 4723, 3299}

$$-\frac{\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)}-\frac{\operatorname{Si}\left(\sin^{-1}(ax)\right)}{a}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^(-2),x]
```

```
[Out] -(Sqrt[1 - a^2*x^2]/(a*ArcSin[a*x])) - SinIntegral[ArcSin[a*x]]/a
```

Rule 4621

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Sqrt[1 - c^
2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + Dist[c/(b*(n + 1)),
 Int[(x*(a + b*ArcSin[c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a,
 b, c}, x] && LtQ[n, -1]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3299

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

Rubi steps

$$
\begin{aligned}
\int \frac{1}{\sin^{-1}(ax)^2}\,dx &= -\frac{\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} - a\int \frac{x}{\sqrt{1-a^2x^2}\sin^{-1}(ax)}\,dx \\
&= -\frac{\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} - \frac{\text{Subst}\left(\int \frac{\sin(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{a} \\
&= -\frac{\sqrt{1-a^2x^2}}{a\sin^{-1}(ax)} - \frac{\text{Si}\left(\sin^{-1}(ax)\right)}{a}
\end{aligned}
$$

Mathematica [A] time = 0.0590502, size = 32, normalized size = 0.89

$$
-\frac{\frac{\sqrt{1-a^2x^2}}{\sin^{-1}(ax)} + \text{Si}\left(\sin^{-1}(ax)\right)}{a}
$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]^(-2),x]
```

```
[Out] -((Sqrt[1 - a^2*x^2]/ArcSin[a*x] + SinIntegral[ArcSin[a*x]])/a)
```

Maple [A] time = 0.019, size = 33, normalized size = 0.9

$$
\frac{1}{a}\left(-\frac{1}{\arcsin(ax)}\sqrt{-a^2x^2+1} - \text{Si}\left(\arcsin(ax)\right)\right)
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/arcsin(a*x)^2,x)
```

```
[Out] 1/a*(-1/arcsin(a*x)*(-a^2*x^2+1)^(1/2)-Si(arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$
\frac{a^2\arctan\left(ax, \sqrt{ax+1}\sqrt{-ax+1}\right)\int \frac{\sqrt{-ax+1}x}{\sqrt{ax+1}(ax-1)\arctan\left(ax, \sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx - \sqrt{ax+1}\sqrt{-ax+1}}{a\arctan\left(ax, \sqrt{ax+1}\sqrt{-ax+1}\right)}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^2,x, algorithm="maxima")
```

```
[Out] (a^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))*integrate(sqrt(a*x + 1)*sqr
t(-a*x + 1)*x/((a^2*x^2 - 1)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))), x
) - sqrt(a*x + 1)*sqrt(-a*x + 1))/(a*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x +
 1)))
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{\arcsin\left(ax\right)^{2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^2,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^(-2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\operatorname{asin}^{2}\left(ax\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/asin(a*x)**2,x)
```

```
[Out] Integral(asin(a*x)**(-2), x)
```

Giac [A] time = 1.33019, size = 46, normalized size = 1.28

$$-\frac{\operatorname{Si}\left(\arcsin\left(ax\right)\right)}{a} - \frac{\sqrt{-a^{2}x^{2} + 1}}{a \arcsin\left(ax\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^2,x, algorithm="giac")
```

```
[Out] -sin_integral(arcsin(a*x))/a - sqrt(-a^2*x^2 + 1)/(a*arcsin(a*x))
```

3.58 $\int \frac{1}{x \sin^{-1}(ax)^2} \, dx$

Optimal. Leaf size=12

$$\text{Unintegrable}\left(\frac{1}{x \sin^{-1}(ax)^2}, x\right)$$

```
[Out] Unintegrable[1/(x*ArcSin[a*x]^2), x]
```

Rubi [A] time = 0.0120926, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x \sin^{-1}(ax)^2} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*ArcSin[a*x]^2),x]
```

```
[Out] Defer[Int][1/(x*ArcSin[a*x]^2), x]
```

Rubi steps

$$\int \frac{1}{x \sin^{-1}(ax)^2} \, dx = \int \frac{1}{x \sin^{-1}(ax)^2} \, dx$$

Mathematica [A] time = 0.903582, size = 0, normalized size = 0.

$$\int \frac{1}{x \sin^{-1}(ax)^2} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*ArcSin[a*x]^2),x]
```

```
[Out] Integrate[1/(x*ArcSin[a*x]^2), x]
```

Maple [A] time = 0.078, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(\arcsin\left(ax\right)\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/arcsin(a*x)^2,x)
```

```
[Out] int(1/x/arcsin(a*x)^2,x)
```

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{x\arcsin\left(ax\right)^{2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^2,x, algorithm="fricas")
```

```
[Out] integral(1/(x*arcsin(a*x)^2), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\,\mathrm{asin}^{2}\left(ax\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/asin(a*x)**2,x)
```

```
[Out] Integral(1/(x*asin(a*x)**2), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x \arcsin{(ax)}^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^2,x, algorithm="giac")
```

```
[Out] integrate(1/(x*arcsin(a*x)^2), x)
```

3.59 $\int \frac{1}{x^2 \sin^{-1}(ax)^2} \, dx$

Optimal. Leaf size=12

$$\text{Unintegrable}\left(\frac{1}{x^2 \sin^{-1}(ax)^2}, x\right)$$

```
[Out] Unintegrable[1/(x^2*ArcSin[a*x]^2), x]
```

Rubi [A] time = 0.0136797, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x^2 \sin^{-1}(ax)^2} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x^2*ArcSin[a*x]^2),x]
```

```
[Out] Defer[Int][1/(x^2*ArcSin[a*x]^2), x]
```

Rubi steps

$$\int \frac{1}{x^2 \sin^{-1}(ax)^2} \, dx = \int \frac{1}{x^2 \sin^{-1}(ax)^2} \, dx$$

Mathematica [A] time = 9.71136, size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \sin^{-1}(ax)^2} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x^2*ArcSin[a*x]^2),x]
```

```
[Out] Integrate[1/(x^2*ArcSin[a*x]^2), x]
```

Maple [A] time = 0.141, size = 0, normalized size = 0.

$$\int \frac{1}{x^{2} \left(\arcsin \left(a x\right)\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/arcsin(a*x)^2,x)
```

```
[Out] int(1/x^2/arcsin(a*x)^2,x)
```

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x)^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{x^{2} \arcsin \left(a x\right)^{2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x)^2,x, algorithm="fricas")
```

```
[Out] integral(1/(x^2*arcsin(a*x)^2), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^{2} \operatorname{asin}^{2}{\left (a x \right)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/asin(a*x)**2,x)
```

```
[Out] Integral(1/(x**2*asin(a*x)**2), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \arcsin{(ax)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x)^2,x, algorithm="giac")
```

```
[Out] integrate(1/(x^2*arcsin(a*x)^2), x)
```

3.60 $\int \frac{x^4}{\sin^{-1}(ax)^3}\,dx$

Optimal. Leaf size=98

$$-\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{16a^5}+\frac{27\text{CosIntegral}\left(3\sin^{-1}(ax)\right)}{32a^5}-\frac{25\text{CosIntegral}\left(5\sin^{-1}(ax)\right)}{32a^5}-\frac{x^4\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{2x^3}{a^2\sin^{-1}(a}$$

```
[Out] -(x^4*Sqrt[1 - a^2*x^2])/(2*a*ArcSin[a*x]^2) - (2*x^3)/(a^2*ArcSin[a*x]) +
(5*x^5)/(2*ArcSin[a*x]) - CosIntegral[ArcSin[a*x]]/(16*a^5) + (27*CosIntegr
al[3*ArcSin[a*x]])/(32*a^5) - (25*CosIntegral[5*ArcSin[a*x]])/(32*a^5)
```

Rubi [A] time = 0.342807, antiderivative size = 98, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 5, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4633, 4719, 4635, 4406, 3302}

$$-\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{16a^5}+\frac{27\text{CosIntegral}\left(3\sin^{-1}(ax)\right)}{32a^5}-\frac{25\text{CosIntegral}\left(5\sin^{-1}(ax)\right)}{32a^5}-\frac{x^4\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{2x^3}{a^2\sin^{-1}(a}$$

Antiderivative was successfully verified.

```
[In] Int[x^4/ArcSin[a*x]^3,x]
```

```
[Out] -(x^4*Sqrt[1 - a^2*x^2])/(2*a*ArcSin[a*x]^2) - (2*x^3)/(a^2*ArcSin[a*x]) +
(5*x^5)/(2*ArcSin[a*x]) - CosIntegral[ArcSin[a*x]]/(16*a^5) + (27*CosIntegr
al[3*ArcSin[a*x]])/(32*a^5) - (25*CosIntegral[5*ArcSin[a*x]])/(32*a^5)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3302

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

Rubi steps

$$
\begin{aligned}
\int \frac{x^4}{\sin^{-1}(ax)^3}\,dx &= -\frac{x^4\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}+\frac{2\int \frac{x^3}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}\,dx}{a}-\frac{1}{2}(5a)\int \frac{x^5}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}\,dx\\
&= -\frac{x^4\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{2x^3}{a^2\sin^{-1}(ax)}+\frac{5x^5}{2\sin^{-1}(ax)}-\frac{25}{2}\int \frac{x^4}{\sin^{-1}(ax)}\,dx+\frac{6\int \frac{x^2}{\sin^{-1}(ax)}\,dx}{a^2}\\
&= -\frac{x^4\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{2x^3}{a^2\sin^{-1}(ax)}+\frac{5x^5}{2\sin^{-1}(ax)}+\frac{6\,\mathrm{Subst}\left(\int \frac{\cos(x)\sin^2(x)}{x}\,dx,x,\sin^{-1}(ax)\right)}{a^5}-25\,\mathrm{Subst}\\
&= -\frac{x^4\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{2x^3}{a^2\sin^{-1}(ax)}+\frac{5x^5}{2\sin^{-1}(ax)}+\frac{6\,\mathrm{Subst}\left(\int \left(\frac{\cos(x)}{4x}-\frac{\cos(3x)}{4x}\right)dx,x,\sin^{-1}(ax)\right)}{a^5}-25\\
&= -\frac{x^4\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{2x^3}{a^2\sin^{-1}(ax)}+\frac{5x^5}{2\sin^{-1}(ax)}-\frac{25\,\mathrm{Subst}\left(\int \frac{\cos(5x)}{x}\,dx,x,\sin^{-1}(ax)\right)}{32a^5}+3\,\mathrm{Subst}(\int\\
&= -\frac{x^4\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{2x^3}{a^2\sin^{-1}(ax)}+\frac{5x^5}{2\sin^{-1}(ax)}-\frac{\mathbf{Ci}\left(\sin^{-1}(ax)\right)}{16a^5}+\frac{27\mathbf{Ci}\left(3\sin^{-1}(ax)\right)}{32a^5}-\frac{25\mathbf{Ci}(5\sin}{32a^5}
\end{aligned}
$$

Mathematica [A] time = 0.184825, size = 103, normalized size = 1.05

$$-\frac{16a^4x^4\sqrt{1-a^2x^2}-80a^5x^5\sin^{-1}(ax)+64a^3x^3\sin^{-1}(ax)+2\sin^{-1}(ax)^2\text{CosIntegral}\left(\sin^{-1}(ax)\right)-27\sin^{-1}(ax)^2\text{CosInt}}{32a^5\sin^{-1}(ax)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4/ArcSin[a*x]^3,x]
```

```
[Out] -(16*a^4*x^4*Sqrt[1 - a^2*x^2] + 64*a^3*x^3*ArcSin[a*x] - 80*a^5*x^5*ArcSin
[a*x] + 2*ArcSin[a*x]^2*CosIntegral[ArcSin[a*x]] - 27*ArcSin[a*x]^2*CosInte
gral[3*ArcSin[a*x]] + 25*ArcSin[a*x]^2*CosIntegral[5*ArcSin[a*x]])/(32*a^5*
ArcSin[a*x]^2)
```

Maple [A] time = 0.042, size = 121, normalized size = 1.2

$$\frac{1}{a^5}\left(-\frac{1}{16\,(\arcsin(ax))^2}\sqrt{-a^2x^2+1}+\frac{ax}{16\arcsin(ax)}-\frac{\mathrm{Ci}(\arcsin(ax))}{16}+\frac{3\cos(3\arcsin(ax))}{32\,(\arcsin(ax))^2}-\frac{9\sin(3\arcsin(ax))}{32\arcsin(ax)}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4/arcsin(a*x)^3,x)
```

```
[Out] 1/a^5*(-1/16/arcsin(a*x)^2*(-a^2*x^2+1)^(1/2)+1/16*a*x/arcsin(a*x)-1/16*Ci(
arcsin(a*x))+3/32/arcsin(a*x)^2*cos(3*arcsin(a*x))-9/32/arcsin(a*x)*sin(3*a
rcsin(a*x))+27/32*Ci(3*arcsin(a*x))-1/32/arcsin(a*x)^2*cos(5*arcsin(a*x))+5
/32/arcsin(a*x)*sin(5*arcsin(a*x))-25/32*Ci(5*arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{\sqrt{ax+1}\sqrt{-ax+1}ax^4+\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2\int\frac{(25a^2x^2-12)x^2}{\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx-\left(5a^2x^5-4x^3\right)\arctan\left(ax,\sqrt{ax+}\right.}{2a^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^3,x, algorithm="maxima")
```

```
[Out] -1/2*(sqrt(a*x + 1)*sqrt(-a*x + 1)*a*x^4 + arctan2(a*x, sqrt(a*x + 1)*sqrt(
-a*x + 1))^2*integrate((25*a^2*x^4 - 12*x^2)/arctan2(a*x, sqrt(a*x + 1)*sqr
t(-a*x + 1)), x) - (5*a^2*x^5 - 4*x^3)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x
 + 1)))/(a^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x^4}{\arcsin\left(ax\right)^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^3,x, algorithm="fricas")
```

```
[Out] integral(x^4/arcsin(a*x)^3, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\operatorname{asin}^3\left(ax\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4/asin(a*x)**3,x)
```

```
[Out] Integral(x**4/asin(a*x)**3, x)
```

Giac [A] time = 1.3283, size = 230, normalized size = 2.35

$$\frac{5\left(a^2x^2-1\right)^2 x}{2\,a^4 \arcsin\left(ax\right)} + \frac{3\left(a^2x^2-1\right)x}{a^4 \arcsin\left(ax\right)} + \frac{x}{2\,a^4 \arcsin\left(ax\right)} - \frac{25\ \operatorname{Ci}\left(5\ \arcsin\left(ax\right)\right)}{32\,a^5} + \frac{27\ \operatorname{Ci}\left(3\ \arcsin\left(ax\right)\right)}{32\,a^5} - \frac{\operatorname{Ci}(\arcsin(ax)}{16\,a^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^3,x, algorithm="giac")
```

```
[Out] 5/2*(a^2*x^2 - 1)^2*x/(a^4*arcsin(a*x)) + 3*(a^2*x^2 - 1)*x/(a^4*arcsin(a*x
)) + 1/2*x/(a^4*arcsin(a*x)) - 25/32*cos_integral(5*arcsin(a*x))/a^5 + 27/3
2*cos_integral(3*arcsin(a*x))/a^5 - 1/16*cos_integral(arcsin(a*x))/a^5 - 1/
2*(a^2*x^2 - 1)^2*sqrt(-a^2*x^2 + 1)/(a^5*arcsin(a*x)^2) + (-a^2*x^2 + 1)^(
3/2)/(a^5*arcsin(a*x)^2) - 1/2*sqrt(-a^2*x^2 + 1)/(a^5*arcsin(a*x)^2)
```

3.61 $\int \frac{x^3}{\sin^{-1}(ax)^3}\,dx$

Optimal. Leaf size=83

$$-\frac{\mathrm{Si}\left(2\sin^{-1}(ax)\right)}{2a^4}+\frac{\mathrm{Si}\left(4\sin^{-1}(ax)\right)}{a^4}-\frac{x^3\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{3x^2}{2a^2\sin^{-1}(ax)}+\frac{2x^4}{\sin^{-1}(ax)}$$

```
[Out] -(x^3*Sqrt[1 - a^2*x^2])/(2*a*ArcSin[a*x]^2) - (3*x^2)/(2*a^2*ArcSin[a*x])
+ (2*x^4)/ArcSin[a*x] - SinIntegral[2*ArcSin[a*x]]/(2*a^4) + SinIntegral[4*
ArcSin[a*x]]/a^4
```

Rubi [A] time = 0.299843, antiderivative size = 83, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 6, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.6, Rules used = {4633, 4719, 4635, 4406, 3299, 12}

$$-\frac{\mathrm{Si}\left(2\sin^{-1}(ax)\right)}{2a^4}+\frac{\mathrm{Si}\left(4\sin^{-1}(ax)\right)}{a^4}-\frac{x^3\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{3x^2}{2a^2\sin^{-1}(ax)}+\frac{2x^4}{\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/ArcSin[a*x]^3,x]
```

```
[Out] -(x^3*Sqrt[1 - a^2*x^2])/(2*a*ArcSin[a*x]^2) - (3*x^2)/(2*a^2*ArcSin[a*x])
+ (2*x^4)/ArcSin[a*x] - SinIntegral[2*ArcSin[a*x]]/(2*a^4) + SinIntegral[4*
ArcSin[a*x]]/a^4
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3299

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

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rubi steps

$$\begin{aligned}
\int \frac{x^3}{\sin^{-1}(ax)^3}\,dx &= -\frac{x^3\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2} + \frac{3\int \frac{x^2}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}\,dx}{2a} - (2a)\int \frac{x^4}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}\,dx \\
&= -\frac{x^3\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2} - \frac{3x^2}{2a^2\sin^{-1}(ax)} + \frac{2x^4}{\sin^{-1}(ax)} - 8\int \frac{x^3}{\sin^{-1}(ax)}\,dx + \frac{3\int \frac{x}{\sin^{-1}(ax)}\,dx}{a^2} \\
&= -\frac{x^3\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2} - \frac{3x^2}{2a^2\sin^{-1}(ax)} + \frac{2x^4}{\sin^{-1}(ax)} + \frac{3\,\mathrm{Subst}\left(\int \frac{\cos(x)\sin(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{a^4} - \frac{8\,\mathrm{Subst}\Big(}{} \\
&= -\frac{x^3\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2} - \frac{3x^2}{2a^2\sin^{-1}(ax)} + \frac{2x^4}{\sin^{-1}(ax)} + \frac{3\,\mathrm{Subst}\left(\int \frac{\sin(2x)}{2x}\,dx, x, \sin^{-1}(ax)\right)}{a^4} - \frac{8\,\mathrm{Subst}\Big(\int \Big(}{} \\
&= -\frac{x^3\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2} - \frac{3x^2}{2a^2\sin^{-1}(ax)} + \frac{2x^4}{\sin^{-1}(ax)} + \frac{\mathrm{Subst}\left(\int \frac{\sin(4x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{a^4} + \frac{3\,\mathrm{Subst}\Big(\int \frac{\sin(2}{x}}{} \\
&= -\frac{x^3\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2} - \frac{3x^2}{2a^2\sin^{-1}(ax)} + \frac{2x^4}{\sin^{-1}(ax)} - \frac{\mathrm{Si}\left(2\sin^{-1}(ax)\right)}{2a^4} + \frac{\mathrm{Si}\left(4\sin^{-1}(ax)\right)}{a^4}
\end{aligned}$$

Mathematica [A] time = 0.186956, size = 73, normalized size = 0.88

$$\frac{\frac{a^2x^2\left(\left(4a^2x^2-3\right)\sin^{-1}(ax)-ax\sqrt{1-a^2x^2}\right)}{\sin^{-1}(ax)^2} - \mathrm{Si}\left(2\sin^{-1}(ax)\right) + 2\mathrm{Si}\left(4\sin^{-1}(ax)\right)}{2a^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/ArcSin[a*x]^3,x]
```

```
[Out] ((a^2*x^2*(-(a*x*Sqrt[1 - a^2*x^2]) + (-3 + 4*a^2*x^2)*ArcSin[a*x]))/ArcSin
[a*x]^2 - SinIntegral[2*ArcSin[a*x]] + 2*SinIntegral[4*ArcSin[a*x]])/(2*a^4
)
```

Maple [A] time = 0.034, size = 82, normalized size = 1.

$$\frac{1}{a^4}\left(-\frac{\sin(2\arcsin(ax))}{8(\arcsin(ax))^2} - \frac{\cos(2\arcsin(ax))}{4\arcsin(ax)} - \frac{\mathrm{Si}(2\arcsin(ax))}{2} + \frac{\sin(4\arcsin(ax))}{16(\arcsin(ax))^2} + \frac{\cos(4\arcsin(ax))}{4\arcsin(ax)} + \mathrm{Si}(4\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/arcsin(a*x)^3,x)
```

```
[Out] 1/a^4*(-1/8/arcsin(a*x)^2*sin(2*arcsin(a*x))-1/4/arcsin(a*x)*cos(2*arcsin(a
*x))-1/2*Si(2*arcsin(a*x))+1/16/arcsin(a*x)^2*sin(4*arcsin(a*x))+1/4/arcsin
(a*x)*cos(4*arcsin(a*x))+Si(4*arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{\sqrt{ax+1}\sqrt{-ax+1}ax^3+2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2\int\frac{(8a^2x^2-3)x}{\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx-\left(4a^2x^4-3x^2\right)\arctan\Big(ax,\sqrt{ax}}{2a^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(sqrt(a*x + 1)*sqrt(-a*x + 1)*a*x^3 + 2*arctan2(a*x, sqrt(a*x + 1)*sqr
t(-a*x + 1))^2*integrate((8*a^2*x^3 - 3*x)/arctan2(a*x, sqrt(a*x + 1)*sqrt(
-a*x + 1)), x) - (4*a^2*x^4 - 3*x^2)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x +
 1)))/(a^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{\arcsin(ax)^3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x^3/arcsin(a*x)^3, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^3}{\operatorname{asin}^3(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/asin(a*x)**3,x)
```

```
[Out] Integral(x**3/asin(a*x)**3, x)
```

Giac [A] time = 1.36199, size = 169, normalized size = 2.04

$$\frac{\left(-a^{2}x^{2}+1\right)^{\frac{3}{2}}x}{2\,a^{3}\arcsin\left(ax\right)^{2}}+\frac{2\left(a^{2}x^{2}-1\right)^{2}}{a^{4}\arcsin\left(ax\right)}+\frac{\mathrm{Si}\left(4\,\arcsin\left(ax\right)\right)}{a^{4}}-\frac{\mathrm{Si}\left(2\,\arcsin\left(ax\right)\right)}{2\,a^{4}}-\frac{\sqrt{-a^{2}x^{2}+1}x}{2\,a^{3}\arcsin\left(ax\right)^{2}}+\frac{5\left(a^{2}x^{2}-1\right)}{2\,a^{4}\arcsin\left(ax\right)}+$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*(-a^2*x^2 + 1)^(3/2)*x/(a^3*arcsin(a*x)^2) + 2*(a^2*x^2 - 1)^2/(a^4*arc
sin(a*x)) + sin_integral(4*arcsin(a*x))/a^4 - 1/2*sin_integral(2*arcsin(a*x
))/a^4 - 1/2*sqrt(-a^2*x^2 + 1)*x/(a^3*arcsin(a*x)^2) + 5/2*(a^2*x^2 - 1)/(
a^4*arcsin(a*x)) + 1/2/(a^4*arcsin(a*x))
```

3.62 $\int \frac{x^2}{\sin^{-1}(ax)^3}\,dx$

Optimal. Leaf size=82

$$-\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{8a^3}+\frac{9\text{CosIntegral}\left(3\sin^{-1}(ax)\right)}{8a^3}-\frac{x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{x}{a^2\sin^{-1}(ax)}+\frac{3x^3}{2\sin^{-1}(ax)}$$

```
[Out] -(x^2*Sqrt[1 - a^2*x^2])/(2*a*ArcSin[a*x]^2) - x/(a^2*ArcSin[a*x]) + (3*x^3
)/(2*ArcSin[a*x]) - CosIntegral[ArcSin[a*x]]/(8*a^3) + (9*CosIntegral[3*Arc
Sin[a*x]])/(8*a^3)
```

Rubi [A] time = 0.248665, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 6, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.6, Rules used = {4633, 4719, 4635, 4406, 3302, 4623}

$$-\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{8a^3}+\frac{9\text{CosIntegral}\left(3\sin^{-1}(ax)\right)}{8a^3}-\frac{x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{x}{a^2\sin^{-1}(ax)}+\frac{3x^3}{2\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/ArcSin[a*x]^3,x]
```

```
[Out] -(x^2*Sqrt[1 - a^2*x^2])/(2*a*ArcSin[a*x]^2) - x/(a^2*ArcSin[a*x]) + (3*x^3
)/(2*ArcSin[a*x]) - CosIntegral[ArcSin[a*x]]/(8*a^3) + (9*CosIntegral[3*Arc
Sin[a*x]])/(8*a^3)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3302

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

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{x^2}{\sin^{-1}(ax)^3}\,dx &= -\frac{x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2} + \frac{\int \frac{x}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}\,dx}{a} - \frac{1}{2}(3a)\int \frac{x^3}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}\,dx \\
&= -\frac{x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2} - \frac{x}{a^2\sin^{-1}(ax)} + \frac{3x^3}{2\sin^{-1}(ax)} - \frac{9}{2}\int \frac{x^2}{\sin^{-1}(ax)}\,dx + \frac{\int \frac{1}{\sin^{-1}(ax)}\,dx}{a^2} \\
&= -\frac{x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2} - \frac{x}{a^2\sin^{-1}(ax)} + \frac{3x^3}{2\sin^{-1}(ax)} + \frac{\text{Subst}\left(\int \frac{\cos(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{a^3} - 9\,\text{Subst}\left(\int \frac{\cos(x)\,\mathrm{s}}{x}\right. \\
&= -\frac{x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2} - \frac{x}{a^2\sin^{-1}(ax)} + \frac{3x^3}{2\sin^{-1}(ax)} + \frac{\mathbf{Ci}\left(\sin^{-1}(ax)\right)}{a^3} - \frac{9\,\text{Subst}\left(\int \left(\frac{\cos(x)}{4x} - \frac{\cos(3x)}{4x}\right) dx, x, \mathrm{s}\right.}{2a^3} \\
&= -\frac{x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2} - \frac{x}{a^2\sin^{-1}(ax)} + \frac{3x^3}{2\sin^{-1}(ax)} + \frac{\mathbf{Ci}\left(\sin^{-1}(ax)\right)}{a^3} - \frac{9\,\text{Subst}\left(\int \frac{\cos(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{8a^3} + \\
&= -\frac{x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2} - \frac{x}{a^2\sin^{-1}(ax)} + \frac{3x^3}{2\sin^{-1}(ax)} - \frac{\mathbf{Ci}\left(\sin^{-1}(ax)\right)}{8a^3} + \frac{9\mathbf{Ci}\left(3\sin^{-1}(ax)\right)}{8a^3}
\end{aligned}$$

Mathematica [A] time = 0.135634, size = 68, normalized size = 0.83

$$\frac{\frac{4ax\left(\left(3a^2x^2-2\right)\sin^{-1}(ax)-ax\sqrt{1-a^2x^2}\right)}{\sin^{-1}(ax)^2} - \mathbf{CosIntegral}\left(\sin^{-1}(ax)\right) + 9\mathbf{CosIntegral}\left(3\sin^{-1}(ax)\right)}{8a^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/ArcSin[a*x]^3,x]
```

```
[Out] ((4*a*x*(-(a*x*Sqrt[1 - a^2*x^2]) + (-2 + 3*a^2*x^2)*ArcSin[a*x]))/ArcSin[a
*x]^2 - CosIntegral[ArcSin[a*x]] + 9*CosIntegral[3*ArcSin[a*x]])/(8*a^3)
```

Maple [A] time = 0.026, size = 82, normalized size = 1.

$$\frac{1}{a^3}\left(-\frac{1}{8\,(\arcsin(ax))^2}\sqrt{-a^2x^2+1} + \frac{ax}{8\arcsin(ax)} - \frac{\mathrm{Ci}(\arcsin(ax))}{8} + \frac{\cos(3\arcsin(ax))}{8\,(\arcsin(ax))^2} - \frac{3\sin(3\arcsin(ax))}{8\arcsin(ax)} + 9\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/arcsin(a*x)^3,x)
```

```
[Out] 1/a^3*(-1/8/arcsin(a*x)^2*(-a^2*x^2+1)^(1/2)+1/8*a*x/arcsin(a*x)-1/8*Ci(arc
sin(a*x))+1/8/arcsin(a*x)^2*cos(3*arcsin(a*x))-3/8/arcsin(a*x)*sin(3*arcsin
(a*x))+9/8*Ci(3*arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{\sqrt{ax+1}\sqrt{-ax+1}ax^2+\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2\int\frac{9\,a^2x^2-2}{\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx-\left(3\,a^2x^3-2\,x\right)\arctan\left(ax,\sqrt{ax}\right.}{2\,a^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^3,x, algorithm="maxima")
```

```
[Out] -1/2*(sqrt(a*x + 1)*sqrt(-a*x + 1)*a*x^2 + arctan2(a*x, sqrt(a*x + 1)*sqrt(
-a*x + 1))^2*integrate((9*a^2*x^2 - 2)/arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x
 + 1)), x) - (3*a^2*x^3 - 2*x)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)))/
(a^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^2}{\arcsin\left(ax\right)^3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^3,x, algorithm="fricas")
```

```
[Out] integral(x^2/arcsin(a*x)^3, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x^2}{\operatorname{asin}^3\left(ax\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/asin(a*x)**3,x)
```

```
[Out] Integral(x**2/asin(a*x)**3, x)
```

Giac [A] time = 1.3707, size = 138, normalized size = 1.68

$$\frac{3\left(a^2x^2-1\right)x}{2\,a^2\arcsin\left(ax\right)}+\frac{x}{2\,a^2\arcsin\left(ax\right)}+\frac{9\,\operatorname{Ci}\left(3\,\arcsin\left(ax\right)\right)}{8\,a^3}-\frac{\operatorname{Ci}\left(\arcsin\left(ax\right)\right)}{8\,a^3}+\frac{\left(-a^2x^2+1\right)^{\frac{3}{2}}}{2\,a^3\arcsin\left(ax\right)^2}-\frac{\sqrt{-a^2x^2+1}}{2\,a^3\arcsin\left(ax\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^3,x, algorithm="giac")
```

```
[Out] 3/2*(a^2*x^2 - 1)*x/(a^2*arcsin(a*x)) + 1/2*x/(a^2*arcsin(a*x)) + 9/8*cos_i
ntegral(3*arcsin(a*x))/a^3 - 1/8*cos_integral(arcsin(a*x))/a^3 + 1/2*(-a^2*
x^2 + 1)^(3/2)/(a^3*arcsin(a*x)^2) - 1/2*sqrt(-a^2*x^2 + 1)/(a^3*arcsin(a*x
)^2)
```

3.63 $\int \frac{x}{\sin^{-1}(ax)^3} \, dx$

Optimal. Leaf size=64

$$-\frac{\mathrm{Si}\left(2\sin^{-1}(ax)\right)}{a^2}-\frac{x\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{1}{2a^2\sin^{-1}(ax)}+\frac{x^2}{\sin^{-1}(ax)}$$

```
[Out] -(x*Sqrt[1 - a^2*x^2])/(2*a*ArcSin[a*x]^2) - 1/(2*a^2*ArcSin[a*x]) + x^2/Ar
cSin[a*x] - SinIntegral[2*ArcSin[a*x]]/a^2
```

Rubi [A] time = 0.168357, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.875, Rules used = {4633, 4719, 4635, 4406, 12, 3299, 4641}

$$-\frac{\mathrm{Si}\left(2\sin^{-1}(ax)\right)}{a^2}-\frac{x\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{1}{2a^2\sin^{-1}(ax)}+\frac{x^2}{\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x/ArcSin[a*x]^3,x]
```

```
[Out] -(x*Sqrt[1 - a^2*x^2])/(2*a*ArcSin[a*x]^2) - 1/(2*a^2*ArcSin[a*x]) + x^2/Ar
cSin[a*x] - SinIntegral[2*ArcSin[a*x]]/a^2
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 3299

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

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rubi steps

$$\begin{aligned}\int \frac{x}{\sin^{-1}(ax)^3}\,dx &= -\frac{x\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}+\frac{\int \frac{1}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}\,dx}{2a}-a\int \frac{x^2}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}\,dx\\
&= -\frac{x\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{1}{2a^2\sin^{-1}(ax)}+\frac{x^2}{\sin^{-1}(ax)}-2\int \frac{x}{\sin^{-1}(ax)}\,dx\\
&= -\frac{x\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{1}{2a^2\sin^{-1}(ax)}+\frac{x^2}{\sin^{-1}(ax)}-\frac{2\,\mathrm{Subst}\left(\int \frac{\cos(x)\sin(x)}{x}\,dx,x,\sin^{-1}(ax)\right)}{a^2}\\
&= -\frac{x\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{1}{2a^2\sin^{-1}(ax)}+\frac{x^2}{\sin^{-1}(ax)}-\frac{2\,\mathrm{Subst}\left(\int \frac{\sin(2x)}{2x}\,dx,x,\sin^{-1}(ax)\right)}{a^2}\\
&= -\frac{x\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{1}{2a^2\sin^{-1}(ax)}+\frac{x^2}{\sin^{-1}(ax)}-\frac{\mathrm{Subst}\left(\int \frac{\sin(2x)}{x}\,dx,x,\sin^{-1}(ax)\right)}{a^2}\\
&= -\frac{x\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{1}{2a^2\sin^{-1}(ax)}+\frac{x^2}{\sin^{-1}(ax)}-\frac{\mathrm{Si}\left(2\sin^{-1}(ax)\right)}{a^2}\end{aligned}$$

Mathematica [A] time = 0.0596291, size = 61, normalized size = 0.95

$$-\frac{ax\sqrt{1-a^2x^2}+\left(1-2a^2x^2\right)\sin^{-1}(ax)+2\sin^{-1}(ax)^2\mathrm{Si}\left(2\sin^{-1}(ax)\right)}{2a^2\sin^{-1}(ax)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/ArcSin[a*x]^3,x]
```

```
[Out] -(a*x*Sqrt[1 - a^2*x^2] + (1 - 2*a^2*x^2)*ArcSin[a*x] + 2*ArcSin[a*x]^2*Sin
Integral[2*ArcSin[a*x]])/(2*a^2*ArcSin[a*x]^2)
```

Maple [A] time = 0.026, size = 45, normalized size = 0.7

$$\frac{1}{a^2}\left(-\frac{\sin(2\arcsin(ax))}{4(\arcsin(ax))^2}-\frac{\cos(2\arcsin(ax))}{2\arcsin(ax)}-\mathrm{Si}(2\arcsin(ax))\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/arcsin(a*x)^3,x)
```

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

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{4\,a^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2\int\frac{x}{\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx+\sqrt{ax+1}\sqrt{-ax+1}ax-\left(2\,a^2x^2-1\right)\arctan\left(ax,\sqrt{ax\right.}{2\,a^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(4*a^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2*integrate(x/arctan
2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)), x) + sqrt(a*x + 1)*sqrt(-a*x + 1)*a*x
 - (2*a^2*x^2 - 1)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)))/(a^2*arctan2
(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{\arcsin\left(ax\right)^3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x/arcsin(a*x)^3, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x}{\operatorname{asin}^3\left(ax\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/asin(a*x)**3,x)
```

```
[Out] Integral(x/asin(a*x)**3, x)
```

Giac [A] time = 1.41823, size = 90, normalized size = 1.41

$$-\frac{\operatorname{Si}\left(2 \arcsin\left(ax\right)\right)}{a^{2}} - \frac{\sqrt{-a^{2}x^{2} + 1}x}{2\,a \arcsin\left(ax\right)^{2}} + \frac{a^{2}x^{2} - 1}{a^{2} \arcsin\left(ax\right)} + \frac{1}{2\,a^{2} \arcsin\left(ax\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -sin_integral(2*arcsin(a*x))/a^2 - 1/2*sqrt(-a^2*x^2 + 1)*x/(a*arcsin(a*x)^
2) + (a^2*x^2 - 1)/(a^2*arcsin(a*x)) + 1/2/(a^2*arcsin(a*x))
```

3.64 $\int \frac{1}{\sin^{-1}(ax)^3}\,dx$

Optimal. Leaf size=51

$$-\frac{\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{2a}+\frac{x}{2\sin^{-1}(ax)}$$

```
[Out] -Sqrt[1 - a^2*x^2]/(2*a*ArcSin[a*x]^2) + x/(2*ArcSin[a*x]) - CosIntegral[Ar
cSin[a*x]]/(2*a)
```

Rubi [A] time = 0.0845015, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.667, Rules used = {4621, 4719, 4623, 3302}

$$-\frac{\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{\text{CosIntegral}\left(\sin^{-1}(ax)\right)}{2a}+\frac{x}{2\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^(-3),x]
```

```
[Out] -Sqrt[1 - a^2*x^2]/(2*a*ArcSin[a*x]^2) + x/(2*ArcSin[a*x]) - CosIntegral[Ar
cSin[a*x]]/(2*a)
```

Rule 4621

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Sqrt[1 - c^
2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + Dist[c/(b*(n + 1)),
 Int[(x*(a + b*ArcSin[c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a,
 b, c}, x] && LtQ[n, -1]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3302

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

Rubi steps

$$\begin{aligned}\int \frac{1}{\sin^{-1}(ax)^3}\,dx &= -\frac{\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}-\frac{1}{2}a\int \frac{x}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^2}\,dx\\ &= -\frac{\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}+\frac{x}{2\sin^{-1}(ax)}-\frac{1}{2}\int \frac{1}{\sin^{-1}(ax)}\,dx\\ &= -\frac{\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}+\frac{x}{2\sin^{-1}(ax)}-\frac{\text{Subst}\left(\int \frac{\cos(x)}{x}\,dx,x,\sin^{-1}(ax)\right)}{2a}\\ &= -\frac{\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)^2}+\frac{x}{2\sin^{-1}(ax)}-\frac{\text{Ci}\left(\sin^{-1}(ax)\right)}{2a}\end{aligned}$$

Mathematica [A] time = 0.0224016, size = 48, normalized size = 0.94

$$-\frac{\sqrt{1-a^2x^2}+\sin^{-1}(ax)^2\text{CosIntegral}\left(\sin^{-1}(ax)\right)-ax\sin^{-1}(ax)}{2a\sin^{-1}(ax)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]^(-3),x]
```

```
[Out] -(Sqrt[1 - a^2*x^2] - a*x*ArcSin[a*x] + ArcSin[a*x]^2*CosIntegral[ArcSin[a*
x]])/(2*a*ArcSin[a*x]^2)
```

Maple [A] time = 0.021, size = 43, normalized size = 0.8

$$\frac{1}{a}\left(-\frac{1}{2\,(\arcsin(ax))^2}\sqrt{-a^2x^2+1}+\frac{ax}{2\,\arcsin(ax)}-\frac{\text{Ci}\,(\arcsin(ax))}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/arcsin(a*x)^3,x)
```

```
[Out] 1/a*(-1/2/arcsin(a*x)^2*(-a^2*x^2+1)^(1/2)+1/2*a*x/arcsin(a*x)-1/2*Ci(arcsi
n(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a \arctan\left(ax, \sqrt{ax+1}\sqrt{-ax+1}\right)^{2} \int \frac{1}{\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx - ax\arctan\left(ax, \sqrt{ax+1}\sqrt{-ax+1}\right) + \sqrt{ax+1}\sqrt{-ax+1}}{2\,a\arctan\left(ax, \sqrt{ax+1}\sqrt{-ax+1}\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^3,x, algorithm="maxima")
```

```
[Out] -1/2*(a*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2*integrate(1/arctan2(a*
x, sqrt(a*x + 1)*sqrt(-a*x + 1)), x) - a*x*arctan2(a*x, sqrt(a*x + 1)*sqrt(
-a*x + 1)) + sqrt(a*x + 1)*sqrt(-a*x + 1))/(a*arctan2(a*x, sqrt(a*x + 1)*sq
rt(-a*x + 1))^2)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{\arcsin\left(ax\right)^{3}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^3,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^(-3), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\operatorname{asin}^{3}\left(ax\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/asin(a*x)**3,x)
```

```
[Out] Integral(asin(a*x)**(-3), x)
```

Giac [A] time = 1.33887, size = 58, normalized size = 1.14

$$\frac{x}{2 \arcsin(ax)} - \frac{\mathrm{Ci}(\arcsin(ax))}{2a} - \frac{\sqrt{-a^2x^2+1}}{2a\arcsin(ax)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^3,x, algorithm="giac")
```

```
[Out] 1/2*x/arcsin(a*x) - 1/2*cos_integral(arcsin(a*x))/a - 1/2*sqrt(-a^2*x^2 + 1
)/(a*arcsin(a*x)^2)
```

3.65 $\int \frac{1}{x \sin^{-1}(ax)^3} \, dx$

Optimal. Leaf size=12

$$\text{Unintegrable}\left(\frac{1}{x \sin^{-1}(ax)^3}, x\right)$$

```
[Out] Unintegrable[1/(x*ArcSin[a*x]^3), x]
```

Rubi [A] time = 0.0124023, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x \sin^{-1}(ax)^3} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*ArcSin[a*x]^3),x]
```

```
[Out] Defer[Int][1/(x*ArcSin[a*x]^3), x]
```

Rubi steps

$$\int \frac{1}{x \sin^{-1}(ax)^3} \, dx = \int \frac{1}{x \sin^{-1}(ax)^3} \, dx$$

Mathematica [A] time = 0.540825, size = 0, normalized size = 0.

$$\int \frac{1}{x \sin^{-1}(ax)^3} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*ArcSin[a*x]^3),x]
```

```
[Out] Integrate[1/(x*ArcSin[a*x]^3), x]
```

Maple [A] time = 0.078, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(\arcsin\left(ax\right)\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/arcsin(a*x)^3,x)
```

```
[Out] int(1/x/arcsin(a*x)^3,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\frac{2\,x^{2}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^{2}\int\frac{1}{x^{3}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx-\sqrt{ax+1}\sqrt{-ax+1}ax+\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+\right.}{2\,a^{2}x^{2}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^3,x, algorithm="maxima")
```

```
[Out] 1/2*(2*x^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2*integrate(1/(x^3*ar
ctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))), x) - sqrt(a*x + 1)*sqrt(-a*x + 1
)*a*x + arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)))/(a^2*x^2*arctan2(a*x, s
qrt(a*x + 1)*sqrt(-a*x + 1))^2)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{x\arcsin\left(ax\right)^{3}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^3,x, algorithm="fricas")
```

```
[Out] integral(1/(x*arcsin(a*x)^3), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\operatorname{asin}^3(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/asin(a*x)**3,x)
```

```
[Out] Integral(1/(x*asin(a*x)**3), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\arcsin(ax)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^3,x, algorithm="giac")
```

```
[Out] integrate(1/(x*arcsin(a*x)^3), x)
```

3.66 $\int \frac{1}{x^2 \sin^{-1}(ax)^3} \, dx$

Optimal. Leaf size=12

$$\text{Unintegrable}\left(\frac{1}{x^2 \sin^{-1}(ax)^3}, x\right)$$

```
[Out] Unintegrable[1/(x^2*ArcSin[a*x]^3), x]
```

Rubi [A] time = 0.0133543, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x^2 \sin^{-1}(ax)^3} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x^2*ArcSin[a*x]^3),x]
```

```
[Out] Defer[Int][1/(x^2*ArcSin[a*x]^3), x]
```

Rubi steps

$$\int \frac{1}{x^2 \sin^{-1}(ax)^3} \, dx = \int \frac{1}{x^2 \sin^{-1}(ax)^3} \, dx$$

Mathematica [A] time = 6.43086, size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \sin^{-1}(ax)^3} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x^2*ArcSin[a*x]^3),x]
```

```
[Out] Integrate[1/(x^2*ArcSin[a*x]^3), x]
```

Maple [A] time = 0.122, size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \left(\arcsin\left(ax\right)\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/arcsin(a*x)^3,x)
```

```
[Out] int(1/x^2/arcsin(a*x)^3,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$-\frac{x^3 \arctan\left(ax, \sqrt{ax+1}\sqrt{-ax+1}\right)^2 \int \frac{a^2x^2-6}{x^4 \arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx + \sqrt{ax+1}\sqrt{-ax+1}ax + \left(a^2x^2-2\right)\arctan\bigl(ax, \sqrt{ax+}}{2\,a^2x^3 \arctan\left(ax, \sqrt{ax+1}\sqrt{-ax+1}\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x)^3,x, algorithm="maxima")
```

```
[Out] -1/2*(x^3*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2*integrate((a^2*x^2 -
 6)/(x^4*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))), x) + sqrt(a*x + 1)*sq
rt(-a*x + 1)*a*x + (a^2*x^2 - 2)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))
)/(a^2*x^3*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{x^2 \arcsin\left(ax\right)^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x)^3,x, algorithm="fricas")
```

```
[Out] integral(1/(x^2*arcsin(a*x)^3), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \operatorname{asin}^3(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/asin(a*x)**3,x)
```

```
[Out] Integral(1/(x**2*asin(a*x)**3), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \arcsin(ax)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x)^3,x, algorithm="giac")
```

```
[Out] integrate(1/(x^2*arcsin(a*x)^3), x)
```

3.67 $\int \frac{x^4}{\sin^{-1}(ax)^4}\,dx$

Optimal. Leaf size=158

$$\frac{\mathrm{Si}\left(\sin^{-1}(ax)\right)}{48a^5}-\frac{27\mathrm{Si}\left(3\sin^{-1}(ax)\right)}{32a^5}+\frac{125\mathrm{Si}\left(5\sin^{-1}(ax)\right)}{96a^5}+\frac{25x^4\sqrt{1-a^2x^2}}{6a\sin^{-1}(ax)}-\frac{x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{2x^3}{3a^2\sin^{-1}(ax)^2}-\frac{2x^2\sqrt{1-}}{a^3\sin}$$

```
[Out] -(x^4*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^3) - (2*x^3)/(3*a^2*ArcSin[a*x]^2
) + (5*x^5)/(6*ArcSin[a*x]^2) - (2*x^2*Sqrt[1 - a^2*x^2])/(a^3*ArcSin[a*x])
 + (25*x^4*Sqrt[1 - a^2*x^2])/(6*a*ArcSin[a*x]) + SinIntegral[ArcSin[a*x]]/
(48*a^5) - (27*SinIntegral[3*ArcSin[a*x]])/(32*a^5) + (125*SinIntegral[5*Ar
cSin[a*x]])/(96*a^5)
```

Rubi [A] time = 0.314241, antiderivative size = 158, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4, Rules used = {4633, 4719, 4631, 3299}

$$\frac{\mathrm{Si}\left(\sin^{-1}(ax)\right)}{48a^5}-\frac{27\mathrm{Si}\left(3\sin^{-1}(ax)\right)}{32a^5}+\frac{125\mathrm{Si}\left(5\sin^{-1}(ax)\right)}{96a^5}+\frac{25x^4\sqrt{1-a^2x^2}}{6a\sin^{-1}(ax)}-\frac{x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{2x^3}{3a^2\sin^{-1}(ax)^2}-\frac{2x^2\sqrt{1-}}{a^3\sin}$$

Antiderivative was successfully verified.

```
[In] Int[x^4/ArcSin[a*x]^4,x]
```

```
[Out] -(x^4*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^3) - (2*x^3)/(3*a^2*ArcSin[a*x]^2
) + (5*x^5)/(6*ArcSin[a*x]^2) - (2*x^2*Sqrt[1 - a^2*x^2])/(a^3*ArcSin[a*x])
 + (25*x^4*Sqrt[1 - a^2*x^2])/(6*a*ArcSin[a*x]) + SinIntegral[ArcSin[a*x]]/
(48*a^5) - (27*SinIntegral[3*ArcSin[a*x]])/(32*a^5) + (125*SinIntegral[5*Ar
cSin[a*x]])/(96*a^5)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3299

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

Rubi steps

$$
\begin{aligned}
\int \frac{x^4}{\sin^{-1}(ax)^4}\,dx &= -\frac{x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}+\frac{4\int\frac{x^3}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}\,dx}{3a}-\frac{1}{3}(5a)\int\frac{x^5}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}\,dx\\
&= -\frac{x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{2x^3}{3a^2\sin^{-1}(ax)^2}+\frac{5x^5}{6\sin^{-1}(ax)^2}-\frac{25}{6}\int\frac{x^4}{\sin^{-1}(ax)^2}\,dx+\frac{2\int\frac{x^2}{\sin^{-1}(ax)^2}\,dx}{a^2}\\
&= -\frac{x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{2x^3}{3a^2\sin^{-1}(ax)^2}+\frac{5x^5}{6\sin^{-1}(ax)^2}-\frac{2x^2\sqrt{1-a^2x^2}}{a^3\sin^{-1}(ax)}+\frac{25x^4\sqrt{1-a^2x^2}}{6a\sin^{-1}(ax)}+\frac{2\,\mathrm{Subst}\left(\int\left(-\right.\right.}{}\\
&= -\frac{x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{2x^3}{3a^2\sin^{-1}(ax)^2}+\frac{5x^5}{6\sin^{-1}(ax)^2}-\frac{2x^2\sqrt{1-a^2x^2}}{a^3\sin^{-1}(ax)}+\frac{25x^4\sqrt{1-a^2x^2}}{6a\sin^{-1}(ax)}-\frac{\mathrm{Subst}\left(\int\frac{\sin(}{x}\right.}{}\\
&= -\frac{x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{2x^3}{3a^2\sin^{-1}(ax)^2}+\frac{5x^5}{6\sin^{-1}(ax)^2}-\frac{2x^2\sqrt{1-a^2x^2}}{a^3\sin^{-1}(ax)}+\frac{25x^4\sqrt{1-a^2x^2}}{6a\sin^{-1}(ax)}+\frac{\mathbf{Si}\left(\sin^{-1}(ax)\right.}{48a^5}
\end{aligned}
$$

Mathematica [A] time = 0.338395, size = 159, normalized size = 1.01

$$
\frac{-32a^4x^4\sqrt{1-a^2x^2}+80a^5x^5\sin^{-1}(ax)+400a^4x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)^2-64a^3x^3\sin^{-1}(ax)-192a^2x^2\sqrt{1-a^2x^2}\sin^{-1}(ax}{96a^5\sin^{-1}(ax)^3}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x^4/ArcSin[a*x]^4,x]
```

```
[Out] (-32*a^4*x^4*Sqrt[1 - a^2*x^2] - 64*a^3*x^3*ArcSin[a*x] + 80*a^5*x^5*ArcSin
[a*x] - 192*a^2*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2 + 400*a^4*x^4*Sqrt[1 -
a^2*x^2]*ArcSin[a*x]^2 + 2*ArcSin[a*x]^3*SinIntegral[ArcSin[a*x]] - 81*ArcS
in[a*x]^3*SinIntegral[3*ArcSin[a*x]] + 125*ArcSin[a*x]^3*SinIntegral[5*ArcS
in[a*x]])/(96*a^5*ArcSin[a*x]^3)
```

Maple [A] time = 0.04, size = 171, normalized size = 1.1

$$\frac{1}{a^5}\left(-\frac{1}{24\left(\arcsin(ax)\right)^3}\sqrt{-a^2x^2+1}+\frac{ax}{48\left(\arcsin(ax)\right)^2}+\frac{1}{48\arcsin(ax)}\sqrt{-a^2x^2+1}+\frac{\mathrm{Si}\left(\arcsin(ax)\right)}{48}+\frac{\cos(3\arcsin}{16\left(\arcsin(a\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4/arcsin(a*x)^4,x)
```

```
[Out] 1/a^5*(-1/24/arcsin(a*x)^3*(-a^2*x^2+1)^(1/2)+1/48*a*x/arcsin(a*x)^2+1/48/a
rcsin(a*x)*(-a^2*x^2+1)^(1/2)+1/48*Si(arcsin(a*x))+1/16/arcsin(a*x)^3*cos(3
*arcsin(a*x))-3/32/arcsin(a*x)^2*sin(3*arcsin(a*x))-9/32/arcsin(a*x)*cos(3*
arcsin(a*x))-27/32*Si(3*arcsin(a*x))-1/48/arcsin(a*x)^3*cos(5*arcsin(a*x))+
5/96/arcsin(a*x)^2*sin(5*arcsin(a*x))+25/96/arcsin(a*x)*cos(5*arcsin(a*x))+
125/96*Si(5*arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a^3\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^3\int\frac{\left(125\,a^4x^5-136\,a^2x^3+24\,x\right)\sqrt{ax+1}\sqrt{-ax+1}}{\left(a^5x^2-a^3\right)\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx+\left(2\,a^2x^4-\left(25\,a^2x^4-12\,x^2\right)\arctan\left(ax,\sqrt{ax}\right.\right.}{6\,a^3\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] -1/6*(6*a^3*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3*integrate(1/6*(125
*a^4*x^5 - 136*a^2*x^3 + 24*x)*sqrt(a*x + 1)*sqrt(-a*x + 1)/((a^5*x^2 - a^3
)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))), x) + (2*a^2*x^4 - (25*a^2*x^
4 - 12*x^2)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2)*sqrt(a*x + 1)*sqr
t(-a*x + 1) - (5*a^3*x^5 - 4*a*x^3)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x +
1)))/(a^3*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x^4}{\arcsin(ax)^4}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] integral(x^4/arcsin(a*x)^4, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\mathrm{asin}^4(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4/asin(a*x)**4,x)
```

```
[Out] Integral(x**4/asin(a*x)**4, x)
```

Giac [A] time = 1.27056, size = 338, normalized size = 2.14

$$\frac{5\left(a^2x^2-1\right)^2x}{6\,a^4\arcsin(ax)^2}+\frac{25\left(a^2x^2-1\right)^2\sqrt{-a^2x^2+1}}{6\,a^5\arcsin(ax)}+\frac{\left(a^2x^2-1\right)x}{a^4\arcsin(ax)^2}+\frac{125\,\mathrm{Si}(5\arcsin(ax))}{96\,a^5}-\frac{27\,\mathrm{Si}(3\arcsin(ax))}{32\,a^5}+\mathrm{Si}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] 5/6*(a^2*x^2 - 1)^2*x/(a^4*arcsin(a*x)^2) + 25/6*(a^2*x^2 - 1)^2*sqrt(-a^2*
x^2 + 1)/(a^5*arcsin(a*x)) + (a^2*x^2 - 1)*x/(a^4*arcsin(a*x)^2) + 125/96*s
```

```
in_integral(5*arcsin(a*x))/a^5 - 27/32*sin_integral(3*arcsin(a*x))/a^5 + 1/
48*sin_integral(arcsin(a*x))/a^5 - 19/3*(-a^2*x^2 + 1)^(3/2)/(a^5*arcsin(a*
x)) + 1/6*x/(a^4*arcsin(a*x)^2) - 1/3*(a^2*x^2 - 1)^2*sqrt(-a^2*x^2 + 1)/(a
^5*arcsin(a*x)^3) + 13/6*sqrt(-a^2*x^2 + 1)/(a^5*arcsin(a*x)) + 2/3*(-a^2*x
^2 + 1)^(3/2)/(a^5*arcsin(a*x)^3) - 1/3*sqrt(-a^2*x^2 + 1)/(a^5*arcsin(a*x)
^3)
```

3.68 $\int \frac{x^3}{\sin^{-1}(ax)^4}\,dx$

Optimal. Leaf size=144

$$-\frac{\text{CosIntegral}\left(2\sin^{-1}(ax)\right)}{3a^4}+\frac{4\text{CosIntegral}\left(4\sin^{-1}(ax)\right)}{3a^4}+\frac{8x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)}-\frac{x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{x^2}{2a^2\sin^{-1}(ax)^2}-\frac{x\sqrt{1}}{a^3\sin}$$

```
[Out] -(x^3*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^3) - x^2/(2*a^2*ArcSin[a*x]^2) +
(2*x^4)/(3*ArcSin[a*x]^2) - (x*Sqrt[1 - a^2*x^2])/(a^3*ArcSin[a*x]) + (8*x^
3*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]) - CosIntegral[2*ArcSin[a*x]]/(3*a^4)
 + (4*CosIntegral[4*ArcSin[a*x]])/(3*a^4)
```

Rubi [A] time = 0.281678, antiderivative size = 144, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4, Rules used = {4633, 4719, 4631, 3302}

$$-\frac{\text{CosIntegral}\left(2\sin^{-1}(ax)\right)}{3a^4}+\frac{4\text{CosIntegral}\left(4\sin^{-1}(ax)\right)}{3a^4}+\frac{8x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)}-\frac{x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{x^2}{2a^2\sin^{-1}(ax)^2}-\frac{x\sqrt{1}}{a^3\sin}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/ArcSin[a*x]^4,x]
```

```
[Out] -(x^3*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^3) - x^2/(2*a^2*ArcSin[a*x]^2) +
(2*x^4)/(3*ArcSin[a*x]^2) - (x*Sqrt[1 - a^2*x^2])/(a^3*ArcSin[a*x]) + (8*x^
3*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]) - CosIntegral[2*ArcSin[a*x]]/(3*a^4)
 + (4*CosIntegral[4*ArcSin[a*x]])/(3*a^4)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3302

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

Rubi steps

$$\begin{aligned}
\int \frac{x^3}{\sin^{-1}(ax)^4}\,dx &= -\frac{x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3} + \frac{\int \frac{x^2}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}\,dx}{a} - \frac{1}{3}(4a)\int \frac{x^4}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}\,dx \\
&= -\frac{x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3} - \frac{x^2}{2a^2\sin^{-1}(ax)^2} + \frac{2x^4}{3\sin^{-1}(ax)^2} - \frac{8}{3}\int \frac{x^3}{\sin^{-1}(ax)^2}\,dx + \frac{\int \frac{x}{\sin^{-1}(ax)^2}\,dx}{a^2} \\
&= -\frac{x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3} - \frac{x^2}{2a^2\sin^{-1}(ax)^2} + \frac{2x^4}{3\sin^{-1}(ax)^2} - \frac{x\sqrt{1-a^2x^2}}{a^3\sin^{-1}(ax)} + \frac{8x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)} + \frac{\text{Subst}\left(\int \frac{\cos(2x)}{x}\right.}{a^4} \\
&= -\frac{x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3} - \frac{x^2}{2a^2\sin^{-1}(ax)^2} + \frac{2x^4}{3\sin^{-1}(ax)^2} - \frac{x\sqrt{1-a^2x^2}}{a^3\sin^{-1}(ax)} + \frac{8x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)} + \frac{\text{Ci}\left(2\sin^{-1}(ax)\right)}{a^4} - \\
&= -\frac{x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3} - \frac{x^2}{2a^2\sin^{-1}(ax)^2} + \frac{2x^4}{3\sin^{-1}(ax)^2} - \frac{x\sqrt{1-a^2x^2}}{a^3\sin^{-1}(ax)} + \frac{8x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)} - \frac{\text{Ci}\left(2\sin^{-1}(ax)\right)}{3a^4} +
\end{aligned}$$

Mathematica [A] time = 0.359611, size = 107, normalized size = 0.74

$$\frac{\frac{ax\left(-2a^2x^2\sqrt{1-a^2x^2}+ax\left(4a^2x^2-3\right)\sin^{-1}(ax)+2\sqrt{1-a^2x^2}\left(8a^2x^2-3\right)\sin^{-1}(ax)^2\right)}{\sin^{-1}(ax)^3} - 2\text{CosIntegral}\left(2\sin^{-1}(ax)\right) + 8\text{CosIntegral}\left(4\sin^{-1}(ax)\right)}{6a^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3/ArcSin[a*x]^4,x]
```

```
[Out] ((a*x*(-2*a^2*x^2*Sqrt[1 - a^2*x^2] + a*x*(-3 + 4*a^2*x^2)*ArcSin[a*x] + 2*
Sqrt[1 - a^2*x^2]*(-3 + 8*a^2*x^2)*ArcSin[a*x]^2))/ArcSin[a*x]^3 - 2*CosInt
egral[2*ArcSin[a*x]] + 8*CosIntegral[4*ArcSin[a*x]])/(6*a^4)
```

Maple [A] time = 0.03, size = 114, normalized size = 0.8

$$\frac{1}{a^4}\left(-\frac{\sin(2\arcsin(ax))}{12(\arcsin(ax))^3}-\frac{\cos(2\arcsin(ax))}{12(\arcsin(ax))^2}+\frac{\sin(2\arcsin(ax))}{6\arcsin(ax)}-\frac{\mathrm{Ci}(2\arcsin(ax))}{3}+\frac{\sin(4\arcsin(ax))}{24(\arcsin(ax))^3}+\frac{\cos}{12}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/arcsin(a*x)^4,x)
```

```
[Out] 1/a^4*(-1/12/arcsin(a*x)^3*sin(2*arcsin(a*x))-1/12/arcsin(a*x)^2*cos(2*arcs
in(a*x))+1/6/arcsin(a*x)*sin(2*arcsin(a*x))-1/3*Ci(2*arcsin(a*x))+1/24/arcs
in(a*x)^3*sin(4*arcsin(a*x))+1/12/arcsin(a*x)^2*cos(4*arcsin(a*x))-1/3/arcs
in(a*x)*sin(4*arcsin(a*x))+4/3*Ci(4*arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{2a^3\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^3\int\frac{\left(32a^4x^4-30a^2x^2+3\right)\sqrt{ax+1}\sqrt{-ax+1}}{\left(a^5x^2-a^3\right)\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx+2\left(a^2x^3-\left(8a^2x^3-3x\right)\arctan\left(ax,\sqrt{ax+\right.\right.}}{6a^3\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] -1/6*(6*a^3*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3*integrate(1/3*(32*
a^4*x^4 - 30*a^2*x^2 + 3)*sqrt(a*x + 1)*sqrt(-a*x + 1)/((a^5*x^2 - a^3)*arc
tan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))), x) + 2*(a^2*x^3 - (8*a^2*x^3 - 3*
x)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2)*sqrt(a*x + 1)*sqrt(-a*x +
1) - (4*a^3*x^4 - 3*a*x^2)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)))/(a^3
*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^3}{\arcsin{(ax)}^4}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] integral(x^3/arcsin(a*x)^4, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\operatorname{asin}^4{(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/asin(a*x)**4,x)
```

```
[Out] Integral(x**3/asin(a*x)**4, x)
```

Giac [A] time = 1.37685, size = 235, normalized size = 1.63

$$-\frac{8\left(-a^2x^2+1\right)^{\frac{3}{2}}x}{3\,a^3\arcsin{(ax)}}+\frac{5\sqrt{-a^2x^2+1}x}{3\,a^3\arcsin{(ax)}}+\frac{4\,\text{Ci}\left(4\,\arcsin{(ax)}\right)}{3\,a^4}-\frac{\text{Ci}\left(2\,\arcsin{(ax)}\right)}{3\,a^4}+\frac{\left(-a^2x^2+1\right)^{\frac{3}{2}}x}{3\,a^3\arcsin{(ax)}^3}+\frac{2\left(a^2x^2-1\right)^2}{3\,a^4\arcsin{(ax)}^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] -8/3*(-a^2*x^2 + 1)^(3/2)*x/(a^3*arcsin(a*x)) + 5/3*sqrt(-a^2*x^2 + 1)*x/(a
^3*arcsin(a*x)) + 4/3*cos_integral(4*arcsin(a*x))/a^4 - 1/3*cos_integral(2*
arcsin(a*x))/a^4 + 1/3*(-a^2*x^2 + 1)^(3/2)*x/(a^3*arcsin(a*x)^3) + 2/3*(a^
2*x^2 - 1)^2/(a^4*arcsin(a*x)^2) - 1/3*sqrt(-a^2*x^2 + 1)*x/(a^3*arcsin(a*x
)^3) + 5/6*(a^2*x^2 - 1)/(a^4*arcsin(a*x)^2) + 1/6/(a^4*arcsin(a*x)^2)
```

3.69 $\int \frac{x^2}{\sin^{-1}(ax)^4}\,dx$

Optimal. Leaf size=141

$$\frac{\mathrm{Si}\left(\sin^{-1}(ax)\right)}{24a^3}-\frac{9\mathrm{Si}\left(3\sin^{-1}(ax)\right)}{8a^3}+\frac{3x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)}-\frac{x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{\sqrt{1-a^2x^2}}{3a^3\sin^{-1}(ax)}-\frac{x}{3a^2\sin^{-1}(ax)^2}+\frac{x^3}{2\sin^{-1}(ax)^2}$$

```
[Out] -(x^2*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^3) - x/(3*a^2*ArcSin[a*x]^2) + x^
3/(2*ArcSin[a*x]^2) - Sqrt[1 - a^2*x^2]/(3*a^3*ArcSin[a*x]) + (3*x^2*Sqrt[1
 - a^2*x^2])/(2*a*ArcSin[a*x]) + SinIntegral[ArcSin[a*x]]/(24*a^3) - (9*Sin
Integral[3*ArcSin[a*x]])/(8*a^3)
```

Rubi [A] time = 0.30341, antiderivative size = 141, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 6, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.6, Rules used = {4633, 4719, 4631, 3299, 4621, 4723}

$$\frac{\mathrm{Si}\left(\sin^{-1}(ax)\right)}{24a^3}-\frac{9\mathrm{Si}\left(3\sin^{-1}(ax)\right)}{8a^3}+\frac{3x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)}-\frac{x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{\sqrt{1-a^2x^2}}{3a^3\sin^{-1}(ax)}-\frac{x}{3a^2\sin^{-1}(ax)^2}+\frac{x^3}{2\sin^{-1}(ax)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/ArcSin[a*x]^4,x]
```

```
[Out] -(x^2*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^3) - x/(3*a^2*ArcSin[a*x]^2) + x^
3/(2*ArcSin[a*x]^2) - Sqrt[1 - a^2*x^2]/(3*a^3*ArcSin[a*x]) + (3*x^2*Sqrt[1
 - a^2*x^2])/(2*a*ArcSin[a*x]) + SinIntegral[ArcSin[a*x]]/(24*a^3) - (9*Sin
Integral[3*ArcSin[a*x]])/(8*a^3)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3299

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

Rule 4621

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Sqrt[1 - c^
2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + Dist[c/(b*(n + 1)),
 Int[(x*(a + b*ArcSin[c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a,
 b, c}, x] && LtQ[n, -1]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rubi steps

$$
\begin{aligned}
\int \frac{x^2}{\sin^{-1}(ax)^4}\,dx &= -\frac{x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3} + \frac{2\int \frac{x}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}\,dx}{3a} - a\int \frac{x^3}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}\,dx \\
&= -\frac{x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3} - \frac{x}{3a^2\sin^{-1}(ax)^2} + \frac{x^3}{2\sin^{-1}(ax)^2} - \frac{3}{2}\int \frac{x^2}{\sin^{-1}(ax)^2}\,dx + \frac{\int \frac{1}{\sin^{-1}(ax)^2}\,dx}{3a^2} \\
&= -\frac{x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3} - \frac{x}{3a^2\sin^{-1}(ax)^2} + \frac{x^3}{2\sin^{-1}(ax)^2} - \frac{\sqrt{1-a^2x^2}}{3a^3\sin^{-1}(ax)} + \frac{3x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)} - \frac{3\,\mathrm{Subst}\left(\int\left(-\right.\right.}{} \\
&= -\frac{x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3} - \frac{x}{3a^2\sin^{-1}(ax)^2} + \frac{x^3}{2\sin^{-1}(ax)^2} - \frac{\sqrt{1-a^2x^2}}{3a^3\sin^{-1}(ax)} + \frac{3x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)} - \frac{\mathrm{Subst}\left(\int \frac{\sin(x)}{x}\right.}{3} \\
&= -\frac{x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3} - \frac{x}{3a^2\sin^{-1}(ax)^2} + \frac{x^3}{2\sin^{-1}(ax)^2} - \frac{\sqrt{1-a^2x^2}}{3a^3\sin^{-1}(ax)} + \frac{3x^2\sqrt{1-a^2x^2}}{2a\sin^{-1}(ax)} + \frac{\mathbf{Si}\left(\sin^{-1}(ax)\right)}{24a^3}
\end{aligned}
$$

Mathematica [A] time = 0.25906, size = 102, normalized size = 0.72

$$
\frac{-\frac{8a^2x^2\sqrt{1-a^2x^2}}{\sin^{-1}(ax)^3} + \frac{4ax\left(3a^2x^2-2\right)}{\sin^{-1}(ax)^2} + \frac{4\sqrt{1-a^2x^2}\left(9a^2x^2-2\right)}{\sin^{-1}(ax)} + \mathrm{Si}\left(\sin^{-1}(ax)\right) - 27\mathrm{Si}\left(3\sin^{-1}(ax)\right)}{24a^3}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/ArcSin[a*x]^4,x]
```

```
[Out] ((-8*a^2*x^2*Sqrt[1 - a^2*x^2])/ArcSin[a*x]^3 + (4*a*x*(-2 + 3*a^2*x^2))/Ar
cSin[a*x]^2 + (4*Sqrt[1 - a^2*x^2]*(-2 + 9*a^2*x^2))/ArcSin[a*x] + SinInteg
ral[ArcSin[a*x]] - 27*SinIntegral[3*ArcSin[a*x]])/(24*a^3)
```

Maple [A] time = 0.028, size = 117, normalized size = 0.8

$$
\frac{1}{a^3}\left(-\frac{1}{12\,(\arcsin(ax))^3}\sqrt{-a^2x^2+1} + \frac{ax}{24\,(\arcsin(ax))^2} + \frac{1}{24\arcsin(ax)}\sqrt{-a^2x^2+1} + \frac{\mathrm{Si}\,(\arcsin(ax))}{24} + \frac{\cos(3\ \mathrm{arcsi}}{12\ (\mathrm{arcsin}}\right.
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/arcsin(a*x)^4,x)
```

```
[Out] 1/a^3*(-1/12/arcsin(a*x)^3*(-a^2*x^2+1)^(1/2)+1/24*a*x/arcsin(a*x)^2+1/24/a
rcsin(a*x)*(-a^2*x^2+1)^(1/2)+1/24*Si(arcsin(a*x))+1/12/arcsin(a*x)^3*cos(3
*arcsin(a*x))-1/8/arcsin(a*x)^2*sin(3*arcsin(a*x))-3/8/arcsin(a*x)*cos(3*ar
csin(a*x))-9/8*Si(3*arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a^3 \arctan\left(ax, \sqrt{ax+1}\sqrt{-ax+1}\right)^3 \int \frac{\left(27\,a^2x^3-20\,x\right)\sqrt{ax+1}\sqrt{-ax+1}}{\left(a^3x^2-a\right)\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx + \left(2\,a^2x^2 - \left(9\,a^2x^2-2\right)\arctan\left(ax, \sqrt{ax+1}\sqrt{-a}\right.\right.}{6\,a^3\arctan\left(ax, \sqrt{ax+1}\sqrt{-ax+1}\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] -1/6*(6*a^3*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3*integrate(1/6*(27*
a^2*x^3 - 20*x)*sqrt(a*x + 1)*sqrt(-a*x + 1)/((a^3*x^2 - a)*arctan2(a*x, sq
rt(a*x + 1)*sqrt(-a*x + 1))), x) + (2*a^2*x^2 - (9*a^2*x^2 - 2)*arctan2(a*x
, sqrt(a*x + 1)*sqrt(-a*x + 1))^2)*sqrt(a*x + 1)*sqrt(-a*x + 1) - (3*a^3*x^
3 - 2*a*x)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)))/(a^3*arctan2(a*x, sq
rt(a*x + 1)*sqrt(-a*x + 1))^3)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^2}{\arcsin\left(ax\right)^4}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] integral(x^2/arcsin(a*x)^4, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\operatorname{asin}^4\left(ax\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/asin(a*x)**4,x)
```

```
[Out] Integral(x**2/asin(a*x)**4, x)
```

Giac [A] time = 1.32898, size = 200, normalized size = 1.42

$$\frac{\left(a^2x^2-1\right)x}{2\,a^2\arcsin\left(ax\right)^2}-\frac{9\,\mathrm{Si}\left(3\,\arcsin\left(ax\right)\right)}{8\,a^3}+\frac{\mathrm{Si}\left(\arcsin\left(ax\right)\right)}{24\,a^3}-\frac{3\left(-a^2x^2+1\right)^{\frac{3}{2}}}{2\,a^3\arcsin\left(ax\right)}+\frac{x}{6\,a^2\arcsin\left(ax\right)^2}+\frac{7\sqrt{-a^2x^2+1}}{6\,a^3\arcsin\left(ax\right)}+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] 1/2*(a^2*x^2 - 1)*x/(a^2*arcsin(a*x)^2) - 9/8*sin_integral(3*arcsin(a*x))/a
^3 + 1/24*sin_integral(arcsin(a*x))/a^3 - 3/2*(-a^2*x^2 + 1)^(3/2)/(a^3*arc
sin(a*x)) + 1/6*x/(a^2*arcsin(a*x)^2) + 7/6*sqrt(-a^2*x^2 + 1)/(a^3*arcsin(
a*x)) + 1/3*(-a^2*x^2 + 1)^(3/2)/(a^3*arcsin(a*x)^3) - 1/3*sqrt(-a^2*x^2 +
1)/(a^3*arcsin(a*x)^3)
```

3.70 $\int \frac{x}{\sin^{-1}(ax)^4} \, dx$

Optimal. Leaf size=97

$$-\frac{2\text{CosIntegral}\left(2\sin^{-1}(ax)\right)}{3a^2}+\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)}-\frac{x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{1}{6a^2\sin^{-1}(ax)^2}+\frac{x^2}{3\sin^{-1}(ax)^2}$$

```
[Out] -(x*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^3) - 1/(6*a^2*ArcSin[a*x]^2) + x^2/
(3*ArcSin[a*x]^2) + (2*x*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]) - (2*CosInteg
ral[2*ArcSin[a*x]])/(3*a^2)
```

Rubi [A] time = 0.163607, antiderivative size = 97, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {4633, 4719, 4631, 3302, 4641}

$$-\frac{2\text{CosIntegral}\left(2\sin^{-1}(ax)\right)}{3a^2}+\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)}-\frac{x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{1}{6a^2\sin^{-1}(ax)^2}+\frac{x^2}{3\sin^{-1}(ax)^2}$$

Antiderivative was successfully verified.

```
[In] Int[x/ArcSin[a*x]^4,x]
```

```
[Out] -(x*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^3) - 1/(6*a^2*ArcSin[a*x]^2) + x^2/
(3*ArcSin[a*x]^2) + (2*x*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]) - (2*CosInteg
ral[2*ArcSin[a*x]])/(3*a^2)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
```

```
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3302

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

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rubi steps

$$\begin{aligned}
\int \frac{x}{\sin^{-1}(ax)^4}\,dx &= -\frac{x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}+\frac{\int \frac{1}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}\,dx}{3a}-\frac{1}{3}(2a)\int \frac{x^2}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}\,dx\\
&= -\frac{x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{1}{6a^2\sin^{-1}(ax)^2}+\frac{x^2}{3\sin^{-1}(ax)^2}-\frac{2}{3}\int \frac{x}{\sin^{-1}(ax)^2}\,dx\\
&= -\frac{x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{1}{6a^2\sin^{-1}(ax)^2}+\frac{x^2}{3\sin^{-1}(ax)^2}+\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)}-\frac{2\,\text{Subst}\left(\int \frac{\cos(2x)}{x}\,dx,x,\sin^{-1}(ax\right.}{3a^2}\\
&= -\frac{x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{1}{6a^2\sin^{-1}(ax)^2}+\frac{x^2}{3\sin^{-1}(ax)^2}+\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)}-\frac{2\text{Ci}\left(2\sin^{-1}(ax)\right)}{3a^2}
\end{aligned}$$

Mathematica [A] time = 0.137627, size = 86, normalized size = 0.89

$$\frac{-2ax\sqrt{1-a^2x^2}+4ax\sqrt{1-a^2x^2}\sin^{-1}(ax)^2+\left(2a^2x^2-1\right)\sin^{-1}(ax)-4\sin^{-1}(ax)^3\text{CosIntegral}\left(2\sin^{-1}(ax)\right)}{6a^2\sin^{-1}(ax)^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/ArcSin[a*x]^4,x]
```

```
[Out] (-2*a*x*Sqrt[1 - a^2*x^2] + (-1 + 2*a^2*x^2)*ArcSin[a*x] + 4*a*x*Sqrt[1 - a
^2*x^2]*ArcSin[a*x]^2 - 4*ArcSin[a*x]^3*CosIntegral[2*ArcSin[a*x]])/(6*a^2*
ArcSin[a*x]^3)
```

Maple [A] time = 0.027, size = 60, normalized size = 0.6

$$\frac{1}{a^2}\left(-\frac{\sin(2\arcsin(ax))}{6(\arcsin(ax))^3}-\frac{\cos(2\arcsin(ax))}{6(\arcsin(ax))^2}+\frac{\sin(2\arcsin(ax))}{3\arcsin(ax)}-\frac{2\,\mathrm{Ci}(2\arcsin(ax))}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/arcsin(a*x)^4,x)
```

```
[Out] 1/a^2*(-1/6/arcsin(a*x)^3*sin(2*arcsin(a*x))-1/6/arcsin(a*x)^2*cos(2*arcsin
(a*x))+1/3/arcsin(a*x)*sin(2*arcsin(a*x))-2/3*Ci(2*arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{4a^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^3\int\frac{\left(2a^2x^2-1\right)\sqrt{ax+1}\sqrt{-ax+1}}{\left(a^3x^2-a\right)\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx-2\left(2ax\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^2-ax\right)}{6a^2\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] -1/6*(6*a^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3*integrate(2/3*(2*a
^2*x^2 - 1)*sqrt(a*x + 1)*sqrt(-a*x + 1)/((a^3*x^2 - a)*arctan2(a*x, sqrt(a
*x + 1)*sqrt(-a*x + 1))), x) - 2*(2*a*x*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*
x + 1))^2 - a*x)*sqrt(a*x + 1)*sqrt(-a*x + 1) - (2*a^2*x^2 - 1)*arctan2(a*x
, sqrt(a*x + 1)*sqrt(-a*x + 1)))/(a^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x
+ 1))^3)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{\arcsin\left(ax\right)^{4}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] integral(x/arcsin(a*x)^4, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\operatorname{asin}^{4}{\left(ax \right)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/asin(a*x)**4,x)
```

```
[Out] Integral(x/asin(a*x)**4, x)
```

Giac [A] time = 1.2573, size = 124, normalized size = 1.28

$$\frac{2\sqrt{-a^{2}x^{2}+1}x}{3\,a\arcsin\left(ax\right)} - \frac{2\,\operatorname{Ci}\left(2\,\arcsin\left(ax\right)\right)}{3\,a^{2}} - \frac{\sqrt{-a^{2}x^{2}+1}x}{3\,a\arcsin\left(ax\right)^{3}} + \frac{a^{2}x^{2}-1}{3\,a^{2}\arcsin\left(ax\right)^{2}} + \frac{1}{6\,a^{2}\arcsin\left(ax\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] 2/3*sqrt(-a^2*x^2 + 1)*x/(a*arcsin(a*x)) - 2/3*cos_integral(2*arcsin(a*x))/
a^2 - 1/3*sqrt(-a^2*x^2 + 1)*x/(a*arcsin(a*x)^3) + 1/3*(a^2*x^2 - 1)/(a^2*a
rcsin(a*x)^2) + 1/6/(a^2*arcsin(a*x)^2)
```

3.71 $\int \frac{1}{\sin^{-1}(ax)^4}\,dx$

Optimal. Leaf size=78

$$\frac{\sqrt{1-a^2x^2}}{6a\sin^{-1}(ax)}-\frac{\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}+\frac{\text{Si}\left(\sin^{-1}(ax)\right)}{6a}+\frac{x}{6\sin^{-1}(ax)^2}$$

```
[Out] -Sqrt[1 - a^2*x^2]/(3*a*ArcSin[a*x]^3) + x/(6*ArcSin[a*x]^2) + Sqrt[1 - a^2
*x^2]/(6*a*ArcSin[a*x]) + SinIntegral[ArcSin[a*x]]/(6*a)
```

Rubi [A] time = 0.152712, antiderivative size = 78, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.667, Rules used = {4621, 4719, 4723, 3299}

$$\frac{\sqrt{1-a^2x^2}}{6a\sin^{-1}(ax)}-\frac{\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}+\frac{\text{Si}\left(\sin^{-1}(ax)\right)}{6a}+\frac{x}{6\sin^{-1}(ax)^2}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^(-4),x]
```

```
[Out] -Sqrt[1 - a^2*x^2]/(3*a*ArcSin[a*x]^3) + x/(6*ArcSin[a*x]^2) + Sqrt[1 - a^2
*x^2]/(6*a*ArcSin[a*x]) + SinIntegral[ArcSin[a*x]]/(6*a)
```

Rule 4621

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Sqrt[1 - c^
2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + Dist[c/(b*(n + 1)),
 Int[(x*(a + b*ArcSin[c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a,
 b, c}, x] && LtQ[n, -1]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3299

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

Rubi steps

$$\begin{aligned}
\int \frac{1}{\sin^{-1}(ax)^4}\,dx &= -\frac{\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}-\frac{1}{3}a\int \frac{x}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^3}\,dx\\
&= -\frac{\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}+\frac{x}{6\sin^{-1}(ax)^2}-\frac{1}{6}\int \frac{1}{\sin^{-1}(ax)^2}\,dx\\
&= -\frac{\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}+\frac{x}{6\sin^{-1}(ax)^2}+\frac{\sqrt{1-a^2x^2}}{6a\sin^{-1}(ax)}+\frac{1}{6}a\int \frac{x}{\sqrt{1-a^2x^2}\sin^{-1}(ax)}\,dx\\
&= -\frac{\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}+\frac{x}{6\sin^{-1}(ax)^2}+\frac{\sqrt{1-a^2x^2}}{6a\sin^{-1}(ax)}+\frac{\text{Subst}\left(\int \frac{\sin(x)}{x}\,dx, x, \sin^{-1}(ax)\right)}{6a}\\
&= -\frac{\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^3}+\frac{x}{6\sin^{-1}(ax)^2}+\frac{\sqrt{1-a^2x^2}}{6a\sin^{-1}(ax)}+\frac{\text{Si}\left(\sin^{-1}(ax)\right)}{6a}
\end{aligned}$$

Mathematica [A] time = 0.0621412, size = 70, normalized size = 0.9

$$\frac{-2\sqrt{1-a^2x^2}+\sqrt{1-a^2x^2}\sin^{-1}(ax)^2+\sin^{-1}(ax)^3\text{Si}\left(\sin^{-1}(ax)\right)+ax\sin^{-1}(ax)}{6a\sin^{-1}(ax)^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]^(-4),x]
```

```
[Out] (-2*Sqrt[1 - a^2*x^2] + a*x*ArcSin[a*x] + Sqrt[1 - a^2*x^2]*ArcSin[a*x]^2 +
 ArcSin[a*x]^3*SinIntegral[ArcSin[a*x]])/(6*a*ArcSin[a*x]^3)
```

Maple [A] time = 0.023, size = 63, normalized size = 0.8

$$\frac{1}{a}\left(-\frac{1}{3\left(\arcsin\left(ax\right)\right)^{3}}\sqrt{-a^{2}x^{2}+1}+\frac{ax}{6\left(\arcsin\left(ax\right)\right)^{2}}+\frac{1}{6\arcsin\left(ax\right)}\sqrt{-a^{2}x^{2}+1}+\frac{\mathrm{Si}\left(\arcsin\left(ax\right)\right)}{6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/arcsin(a*x)^4,x)
```

```
[Out] 1/a*(-1/3/arcsin(a*x)^3*(-a^2*x^2+1)^(1/2)+1/6*a*x/arcsin(a*x)^2+1/6/arcsin
(a*x)*(-a^2*x^2+1)^(1/2)+1/6*Si(arcsin(a*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\frac{a^{2}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^{3}\int\frac{\sqrt{ax+1}\sqrt{-ax+1}x}{\left(a^{2}x^{2}-1\right)\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx-ax\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)-\sqrt{ax+1}\sqrt{-}}{6\,a\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] -1/6*(6*a^2*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3*integrate(1/6*sqrt
(a*x + 1)*sqrt(-a*x + 1)*x/((a^2*x^2 - 1)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-
a*x + 1))), x) - a*x*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)) - sqrt(a*x
+ 1)*sqrt(-a*x + 1)*(arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2 - 2))/(a*
arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{\arcsin\left(ax\right)^{4}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^(-4), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\operatorname{asin}^4(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/asin(a*x)**4,x)
```

```
[Out] Integral(asin(a*x)**(-4), x)
```

Giac [A] time = 1.2452, size = 89, normalized size = 1.14

$$\frac{\operatorname{Si}(\arcsin(ax))}{6a} + \frac{x}{6\arcsin(ax)^2} + \frac{\sqrt{-a^2x^2+1}}{6a\arcsin(ax)} - \frac{\sqrt{-a^2x^2+1}}{3a\arcsin(ax)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] 1/6*sin_integral(arcsin(a*x))/a + 1/6*x/arcsin(a*x)^2 + 1/6*sqrt(-a^2*x^2 +
 1)/(a*arcsin(a*x)) - 1/3*sqrt(-a^2*x^2 + 1)/(a*arcsin(a*x)^3)
```

3.72 $\int \frac{1}{x\sin^{-1}(ax)^4}\,dx$

Optimal. Leaf size=12

$$\text{Unintegrable}\left(\frac{1}{x\sin^{-1}(ax)^4},x\right)$$

```
[Out] Unintegrable[1/(x*ArcSin[a*x]^4), x]
```

Rubi [A] time = 0.0124201, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x\sin^{-1}(ax)^4}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*ArcSin[a*x]^4),x]
```

```
[Out] Defer[Int][1/(x*ArcSin[a*x]^4), x]
```

Rubi steps

$$\int \frac{1}{x\sin^{-1}(ax)^4}\,dx=\int \frac{1}{x\sin^{-1}(ax)^4}\,dx$$

Mathematica [A] time = 2.33967, size = 0, normalized size = 0.

$$\int \frac{1}{x\sin^{-1}(ax)^4}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*ArcSin[a*x]^4),x]
```

```
[Out] Integrate[1/(x*ArcSin[a*x]^4), x]
```

Maple [A] time = 0.075, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(\arcsin\left(ax\right)\right)^{4}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/arcsin(a*x)^4,x)
```

```
[Out] int(1/x/arcsin(a*x)^4,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$-\frac{2\,a^{3}x^{3}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^{3}\int \frac{\left(2\,a^{2}x^{2}-3\right)\sqrt{ax+1}\sqrt{-ax+1}}{\left(a^{5}x^{6}-a^{3}x^{4}\right)\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)}\,dx-ax\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)+2\big(}{6\,a^{3}x^{3}\arctan\left(ax,\sqrt{ax+1}\sqrt{-ax+1}\right)^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] -1/6*(6*a^3*x^3*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3*integrate(1/3*
(2*a^2*x^2 - 3)*sqrt(a*x + 1)*sqrt(-a*x + 1)/((a^5*x^6 - a^3*x^4)*arctan2(a
*x, sqrt(a*x + 1)*sqrt(-a*x + 1))), x) - a*x*arctan2(a*x, sqrt(a*x + 1)*sqr
t(-a*x + 1)) + 2*(a^2*x^2 + arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2)*s
qrt(a*x + 1)*sqrt(-a*x + 1))/(a^3*x^3*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x
+ 1))^3)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{x\arcsin\left(ax\right)^{4}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] integral(1/(x*arcsin(a*x)^4), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\,\mathrm{asin}^4\left(ax\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/asin(a*x)**4,x)
```

```
[Out] Integral(1/(x*asin(a*x)**4), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x \arcsin\left(ax\right)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] integrate(1/(x*arcsin(a*x)^4), x)
```

3.73 $\int \frac{1}{x^2 \sin^{-1}(ax)^4} \, dx$

Optimal. Leaf size=12

$$\text{Unintegrable}\left(\frac{1}{x^2 \sin^{-1}(ax)^4}, x\right)$$

```
[Out] Unintegrable[1/(x^2*ArcSin[a*x]^4), x]
```

Rubi [A] time = 0.0140271, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int \frac{1}{x^2 \sin^{-1}(ax)^4} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x^2*ArcSin[a*x]^4),x]
```

```
[Out] Defer[Int][1/(x^2*ArcSin[a*x]^4), x]
```

Rubi steps

$$\int \frac{1}{x^2 \sin^{-1}(ax)^4} \, dx = \int \frac{1}{x^2 \sin^{-1}(ax)^4} \, dx$$

Mathematica [A] time = 17.8693, size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \sin^{-1}(ax)^4} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x^2*ArcSin[a*x]^4),x]
```

```
[Out] Integrate[1/(x^2*ArcSin[a*x]^4), x]
```

Maple [A] time = 0.118, size = 0, normalized size = 0.

$$\int \frac{1}{x^{2} \left(\arcsin\left(a x\right)\right)^{4}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/arcsin(a*x)^4,x)
```

```
[Out] int(1/x^2/arcsin(a*x)^4,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\frac{a^{3} x^{4} \arctan\Big(a x, \sqrt{a x+1}\sqrt{-a x+1}\Big)^{3} \int \frac{\left(a^{4} x^{4}-20\, a^{2} x^{2}+24\right)\sqrt{a x+1}\sqrt{-a x+1}}{\left(a^{5} x^{7}-a^{3} x^{5}\right)\arctan\left(a x, \sqrt{a x+1}\sqrt{-a x+1}\right)}\, dx - \Big(2\, a^{2} x^{2} - \left(a^{2} x^{2}-6\right)\arctan\Big(a x, \sqrt{a x+1}\sqrt{-}}{6\, a^{3} x^{4} \arctan\Big(a x, \sqrt{a x+1}\sqrt{-a x+1}\Big)^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] 1/6*(6*a^3*x^4*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3*integrate(1/6*(
a^4*x^4 - 20*a^2*x^2 + 24)*sqrt(a*x + 1)*sqrt(-a*x + 1)/((a^5*x^7 - a^3*x^5
)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))), x) - (2*a^2*x^2 - (a^2*x^2 -
 6)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^2)*sqrt(a*x + 1)*sqrt(-a*x +
 1) - (a^3*x^3 - 2*a*x)*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1)))/(a^3*x^
4*arctan2(a*x, sqrt(a*x + 1)*sqrt(-a*x + 1))^3)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{x^{2} \arcsin\left(a x\right)^{4}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] integral(1/(x^2*arcsin(a*x)^4), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \operatorname{asin}^4(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/asin(a*x)**4,x)
```

```
[Out] Integral(1/(x**2*asin(a*x)**4), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \arcsin(ax)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] integrate(1/(x^2*arcsin(a*x)^4), x)
```

3.74 $\int x^4\sqrt{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=121

$$-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^5}+\frac{\sqrt{\frac{\pi}{6}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^5}-\frac{\sqrt{\frac{\pi}{10}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{80a^5}+\frac{1}{5}x^5\sqrt{\sin^{-1}(ax)}$$

```
[Out] (x^5*Sqrt[ArcSin[a*x]])/5 - (Sqrt[Pi/2]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x
]]])/(8*a^5) + (Sqrt[Pi/6]*FresnelS[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(16*a^5)
 - (Sqrt[Pi/10]*FresnelS[Sqrt[10/Pi]*Sqrt[ArcSin[a*x]]])/(80*a^5)
```

Rubi [A] time = 0.241509, antiderivative size = 121, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 5, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.417, Rules used = {4629, 4723, 3312, 3305, 3351}

$$-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^5}+\frac{\sqrt{\frac{\pi}{6}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^5}-\frac{\sqrt{\frac{\pi}{10}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{80a^5}+\frac{1}{5}x^5\sqrt{\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x^4*Sqrt[ArcSin[a*x]],x]
```

```
[Out] (x^5*Sqrt[ArcSin[a*x]])/5 - (Sqrt[Pi/2]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x
]]])/(8*a^5) + (Sqrt[Pi/6]*FresnelS[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(16*a^5)
 - (Sqrt[Pi/10]*FresnelS[Sqrt[10/Pi]*Sqrt[ArcSin[a*x]]])/(80*a^5)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3312

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

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int x^4\sqrt{\sin^{-1}(ax)}\,dx &= \frac{1}{5}x^5\sqrt{\sin^{-1}(ax)}-\frac{1}{10}a\int \frac{x^5}{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}\,dx\\
&= \frac{1}{5}x^5\sqrt{\sin^{-1}(ax)}-\frac{\text{Subst}\left(\int \frac{\sin^5(x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{10a^5}\\
&= \frac{1}{5}x^5\sqrt{\sin^{-1}(ax)}-\frac{\text{Subst}\left(\int \left(\frac{5\sin(x)}{8\sqrt{x}}-\frac{5\sin(3x)}{16\sqrt{x}}+\frac{\sin(5x)}{16\sqrt{x}}\right)dx,x,\sin^{-1}(ax)\right)}{10a^5}\\
&= \frac{1}{5}x^5\sqrt{\sin^{-1}(ax)}-\frac{\text{Subst}\left(\int \frac{\sin(5x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{160a^5}+\frac{\text{Subst}\left(\int \frac{\sin(3x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{32a^5}-\text{Subst}\\
&= \frac{1}{5}x^5\sqrt{\sin^{-1}(ax)}-\frac{\text{Subst}\left(\int \sin\left(5x^2\right)dx,x,\sqrt{\sin^{-1}(ax)}\right)}{80a^5}+\frac{\text{Subst}\left(\int \sin\left(3x^2\right)dx,x,\sqrt{\sin^{-1}(a}\right.}{16a^5}\\
&= \frac{1}{5}x^5\sqrt{\sin^{-1}(ax)}-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^5}+\frac{\sqrt{\frac{\pi}{6}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^5}-\frac{\sqrt{\frac{\pi}{10}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{80a^5}
\end{aligned}
$$

Mathematica [C] time = 0.0990047, size = 204, normalized size = 1.69

$$\frac{i\sqrt{\sin^{-1}(ax)}\left(-150\sqrt{i\sin^{-1}(ax)}\mathrm{Gamma}\left(\frac{3}{2},-i\sin^{-1}(ax)\right)+150\sqrt{-i\sin^{-1}(ax)}\mathrm{Gamma}\left(\frac{3}{2},i\sin^{-1}(ax)\right)+25\sqrt{3}\sqrt{i\sin^{-1}(}\right.}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^4*Sqrt[ArcSin[a*x]],x]
```

```
[Out] ((I/2400)*Sqrt[ArcSin[a*x]]*(-150*Sqrt[I*ArcSin[a*x]]*Gamma[3/2, (-I)*ArcSi
n[a*x]] + 150*Sqrt[(-I)*ArcSin[a*x]]*Gamma[3/2, I*ArcSin[a*x]] + 25*Sqrt[3]
*Sqrt[I*ArcSin[a*x]]*Gamma[3/2, (-3*I)*ArcSin[a*x]] - 25*Sqrt[3]*Sqrt[(-I)*
ArcSin[a*x]]*Gamma[3/2, (3*I)*ArcSin[a*x]] - 3*Sqrt[5]*Sqrt[I*ArcSin[a*x]]*
Gamma[3/2, (-5*I)*ArcSin[a*x]] + 3*Sqrt[5]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[3/2
, (5*I)*ArcSin[a*x]]))/(a^5*Sqrt[ArcSin[a*x]^2])
```

Maple [A] time = 0.074, size = 143, normalized size = 1.2

$$-\frac{1}{2400\,a^{5}}\left(3\,\sqrt{5}\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\mathrm{FresnelS}\left(\frac{\sqrt{5}\sqrt{2}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)-25\,\sqrt{3}\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\mathrm{FresnelS}\left(\frac{\sqrt{3}\sqrt{2}\sqrt{\mathrm{arcsi}}}{\sqrt{\pi}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*arcsin(a*x)^(1/2),x)
```

```
[Out] -1/2400/a^5/arcsin(a*x)^(1/2)*(3*5^(1/2)*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)
*FresnelS(2^(1/2)/Pi^(1/2)*5^(1/2)*arcsin(a*x)^(1/2))-25*3^(1/2)*2^(1/2)*ar
csin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*3^(1/2)*arcsin(a*x)^(1/2
))+150*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*arcsin(
a*x)^(1/2))-300*a*x*arcsin(a*x)+150*arcsin(a*x)*sin(3*arcsin(a*x))-30*arcsi
n(a*x)*sin(5*arcsin(a*x)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^4 \sqrt{\operatorname{asin}(ax)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*asin(a*x)**(1/2),x)
```

```
[Out] Integral(x**4*sqrt(asin(a*x)), x)
```

Giac [C] time = 1.3452, size = 333, normalized size = 2.75

$$-\frac{(i-1)\sqrt{10}\sqrt{\pi}\operatorname{erf}\left(\left(\frac{1}{2}i-\frac{1}{2}\right)\sqrt{10}\sqrt{\arcsin(ax)}\right)}{3200\,a^5}+\frac{(i+1)\sqrt{10}\sqrt{\pi}\operatorname{erf}\left(-\left(\frac{1}{2}i+\frac{1}{2}\right)\sqrt{10}\sqrt{\arcsin(ax)}\right)}{3200\,a^5}+\frac{(i-1)\sqrt{6}\sqrt{\pi}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] -(1/3200*I - 1/3200)*sqrt(10)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(10)*sqrt(arcs
in(a*x)))/a^5 + (1/3200*I + 1/3200)*sqrt(10)*sqrt(pi)*erf(-(1/2*I + 1/2)*sq
rt(10)*sqrt(arcsin(a*x)))/a^5 + (1/384*I - 1/384)*sqrt(6)*sqrt(pi)*erf((1/2
*I - 1/2)*sqrt(6)*sqrt(arcsin(a*x)))/a^5 - (1/384*I + 1/384)*sqrt(6)*sqrt(p
i)*erf(-(1/2*I + 1/2)*sqrt(6)*sqrt(arcsin(a*x)))/a^5 - (1/64*I - 1/64)*sqrt
(2)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(2)*sqrt(arcsin(a*x)))/a^5 + (1/64*I + 1
/64)*sqrt(2)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(2)*sqrt(arcsin(a*x)))/a^5 - 1
/160*I*sqrt(arcsin(a*x))*e^(5*I*arcsin(a*x))/a^5 + 1/32*I*sqrt(arcsin(a*x))
*e^(3*I*arcsin(a*x))/a^5 - 1/16*I*sqrt(arcsin(a*x))*e^(I*arcsin(a*x))/a^5 +
 1/16*I*sqrt(arcsin(a*x))*e^(-I*arcsin(a*x))/a^5 - 1/32*I*sqrt(arcsin(a*x))
*e^(-3*I*arcsin(a*x))/a^5 + 1/160*I*sqrt(arcsin(a*x))*e^(-5*I*arcsin(a*x))/
a^5
```

3.75 $\int x^3\sqrt{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=95

$$-\frac{\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{64a^4}+\frac{\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{16a^4}-\frac{3\sqrt{\sin^{-1}(ax)}}{32a^4}+\frac{1}{4}x^4\sqrt{\sin^{-1}(ax)}$$

```
[Out] (-3*Sqrt[ArcSin[a*x]])/(32*a^4) + (x^4*Sqrt[ArcSin[a*x]])/4 - (Sqrt[Pi/2]*F
resnelC[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(64*a^4) + (Sqrt[Pi]*FresnelC[(2*S
qrt[ArcSin[a*x]])/Sqrt[Pi]])/(16*a^4)
```

Rubi [A] time = 0.189416, antiderivative size = 95, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 5, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.417, Rules used = {4629, 4723, 3312, 3304, 3352}

$$-\frac{\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{64a^4}+\frac{\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{16a^4}-\frac{3\sqrt{\sin^{-1}(ax)}}{32a^4}+\frac{1}{4}x^4\sqrt{\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*Sqrt[ArcSin[a*x]],x]
```

```
[Out] (-3*Sqrt[ArcSin[a*x]])/(32*a^4) + (x^4*Sqrt[ArcSin[a*x]])/4 - (Sqrt[Pi/2]*F
resnelC[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(64*a^4) + (Sqrt[Pi]*FresnelC[(2*S
qrt[ArcSin[a*x]])/Sqrt[Pi]])/(16*a^4)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3312

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

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int x^3\sqrt{\sin^{-1}(ax)}\,dx &= \frac{1}{4}x^4\sqrt{\sin^{-1}(ax)} - \frac{1}{8}a\int \frac{x^4}{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}\,dx \\
&= \frac{1}{4}x^4\sqrt{\sin^{-1}(ax)} - \frac{\text{Subst}\left(\int \frac{\sin^4(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{8a^4} \\
&= \frac{1}{4}x^4\sqrt{\sin^{-1}(ax)} - \frac{\text{Subst}\left(\int \left(\frac{3}{8\sqrt{x}} - \frac{\cos(2x)}{2\sqrt{x}} + \frac{\cos(4x)}{8\sqrt{x}}\right)dx, x, \sin^{-1}(ax)\right)}{8a^4} \\
&= -\frac{3\sqrt{\sin^{-1}(ax)}}{32a^4} + \frac{1}{4}x^4\sqrt{\sin^{-1}(ax)} - \frac{\text{Subst}\left(\int \frac{\cos(4x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{64a^4} + \frac{\text{Subst}\left(\int \frac{\cos(2x)}{\sqrt{x}}\,dx, x, \sin\right.}{16a^4} \\
&= -\frac{3\sqrt{\sin^{-1}(ax)}}{32a^4} + \frac{1}{4}x^4\sqrt{\sin^{-1}(ax)} - \frac{\text{Subst}\left(\int \cos\left(4x^2\right)dx, x, \sqrt{\sin^{-1}(ax)}\right)}{32a^4} + \frac{\text{Subst}\left(\int \cos\left(2x^2\right)\right.}{8a} \\
&= -\frac{3\sqrt{\sin^{-1}(ax)}}{32a^4} + \frac{1}{4}x^4\sqrt{\sin^{-1}(ax)} - \frac{\sqrt{\frac{\pi}{2}}C\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{64a^4} + \frac{\sqrt{\pi}C\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{16a^4}
\end{aligned}
$$

Mathematica [C] time = 0.0610767, size = 138, normalized size = 1.45

$$\frac{\sqrt{\sin^{-1}(ax)}\Big(-4\sqrt{2}\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{3}{2},-2i\sin^{-1}(ax)\right)-4\sqrt{2}\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{3}{2},2i\sin^{-1}(ax)\right)+\sqrt{i\sin^{-1}(}}{128a^4\sqrt{\sin^{-1}(ax)^2}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^3*Sqrt[ArcSin[a*x]],x]
```

```
[Out] (Sqrt[ArcSin[a*x]]*(-4*Sqrt[2]*Sqrt[I*ArcSin[a*x]]*Gamma[3/2, (-2*I)*ArcSin
[a*x]] - 4*Sqrt[2]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[3/2, (2*I)*ArcSin[a*x]] + S
qrt[I*ArcSin[a*x]]*Gamma[3/2, (-4*I)*ArcSin[a*x]] + Sqrt[(-I)*ArcSin[a*x]]*
Gamma[3/2, (4*I)*ArcSin[a*x]]))/(128*a^4*Sqrt[ArcSin[a*x]^2])
```

Maple [A] time = 0.049, size = 91, normalized size = 1.

$$\frac{1}{128\,a^4}\Bigg(-\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\text{FresnelC}\left(2\,\frac{\sqrt{2}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+4\,\arcsin(ax)\cos(4\,\arcsin(ax))-16\,\arcsin(ax)\cos(2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*arcsin(a*x)^(1/2),x)
```

```
[Out] 1/128/a^4/arcsin(a*x)^(1/2)*(-2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelC(2
*2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))+4*arcsin(a*x)*cos(4*arcsin(a*x))-16*ar
csin(a*x)*cos(2*arcsin(a*x))+8*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelC(2*arcsin
(a*x)^(1/2)/Pi^(1/2)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^3\sqrt{\operatorname{asin}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*asin(a*x)**(1/2),x)
```

```
[Out] Integral(x**3*sqrt(asin(a*x)), x)
```

Giac [C] time = 1.43165, size = 207, normalized size = 2.18

$$\frac{(i+1)\sqrt{2}\sqrt{\pi}\,\mathrm{erf}\left((i-1)\sqrt{2}\sqrt{\arcsin(ax)}\right)}{512\,a^4} - \frac{(i-1)\sqrt{2}\sqrt{\pi}\,\mathrm{erf}\left(-(i+1)\sqrt{2}\sqrt{\arcsin(ax)}\right)}{512\,a^4} - \frac{(i+1)\sqrt{\pi}\,\mathrm{erf}\left((i-1)\sqrt{\mathrm{arc}}\right.}{64\,a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] (1/512*I + 1/512)*sqrt(2)*sqrt(pi)*erf((I - 1)*sqrt(2)*sqrt(arcsin(a*x)))/a
^4 - (1/512*I - 1/512)*sqrt(2)*sqrt(pi)*erf(-(I + 1)*sqrt(2)*sqrt(arcsin(a*
x)))/a^4 - (1/64*I + 1/64)*sqrt(pi)*erf((I - 1)*sqrt(arcsin(a*x)))/a^4 + (1
/64*I - 1/64)*sqrt(pi)*erf(-(I + 1)*sqrt(arcsin(a*x)))/a^4 + 1/64*sqrt(arcs
in(a*x))*e^(4*I*arcsin(a*x))/a^4 - 1/16*sqrt(arcsin(a*x))*e^(2*I*arcsin(a*x
))/a^4 - 1/16*sqrt(arcsin(a*x))*e^(-2*I*arcsin(a*x))/a^4 + 1/64*sqrt(arcsin
(a*x))*e^(-4*I*arcsin(a*x))/a^4
```

3.76 $\int x^2\sqrt{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=86

$$-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a^3}+\frac{\sqrt{\frac{\pi}{6}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{12a^3}+\frac{1}{3}x^3\sqrt{\sin^{-1}(ax)}$$

```
[Out] (x^3*Sqrt[ArcSin[a*x]])/3 - (Sqrt[Pi/2]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x
]]])/(4*a^3) + (Sqrt[Pi/6]*FresnelS[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(12*a^3)
```

Rubi [A] time = 0.180875, antiderivative size = 86, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 5, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.417, Rules used = {4629, 4723, 3312, 3305, 3351}

$$-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a^3}+\frac{\sqrt{\frac{\pi}{6}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{12a^3}+\frac{1}{3}x^3\sqrt{\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sqrt[ArcSin[a*x]],x]
```

```
[Out] (x^3*Sqrt[ArcSin[a*x]])/3 - (Sqrt[Pi/2]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x
]]])/(4*a^3) + (Sqrt[Pi/6]*FresnelS[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(12*a^3)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3312

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

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int x^2\sqrt{\sin^{-1}(ax)}\,dx &= \frac{1}{3}x^3\sqrt{\sin^{-1}(ax)}-\frac{1}{6}a\int \frac{x^3}{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}\,dx\\
&= \frac{1}{3}x^3\sqrt{\sin^{-1}(ax)}-\frac{\text{Subst}\left(\int \frac{\sin^3(x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{6a^3}\\
&= \frac{1}{3}x^3\sqrt{\sin^{-1}(ax)}-\frac{\text{Subst}\left(\int \left(\frac{3\sin(x)}{4\sqrt{x}}-\frac{\sin(3x)}{4\sqrt{x}}\right)dx,x,\sin^{-1}(ax)\right)}{6a^3}\\
&= \frac{1}{3}x^3\sqrt{\sin^{-1}(ax)}+\frac{\text{Subst}\left(\int \frac{\sin(3x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{24a^3}-\frac{\text{Subst}\left(\int \frac{\sin(x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{8a^3}\\
&= \frac{1}{3}x^3\sqrt{\sin^{-1}(ax)}+\frac{\text{Subst}\left(\int \sin\left(3x^2\right)dx,x,\sqrt{\sin^{-1}(ax)}\right)}{12a^3}-\frac{\text{Subst}\left(\int \sin\left(x^2\right)dx,x,\sqrt{\sin^{-1}(ax)}\right)}{4a^3}\\
&= \frac{1}{3}x^3\sqrt{\sin^{-1}(ax)}-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a^3}+\frac{\sqrt{\frac{\pi}{6}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{12a^3}
\end{aligned}
$$

Mathematica [C] time = 0.0495305, size = 126, normalized size = 1.47

$$
\frac{9\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{3}{2},-i\sin^{-1}(ax)\right)+9\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{3}{2},i\sin^{-1}(ax)\right)-\sqrt{3}\left(\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{3}{2},-3i\right.\right.}{72a^3\sqrt{\sin^{-1}(ax)}}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2*Sqrt[ArcSin[a*x]],x]
```

```
[Out] (9*Sqrt[(-I)*ArcSin[a*x]]*Gamma[3/2, (-I)*ArcSin[a*x]] + 9*Sqrt[I*ArcSin[a*
x]]*Gamma[3/2, I*ArcSin[a*x]] - Sqrt[3]*(Sqrt[(-I)*ArcSin[a*x]]*Gamma[3/2,
(-3*I)*ArcSin[a*x]] + Sqrt[I*ArcSin[a*x]]*Gamma[3/2, (3*I)*ArcSin[a*x]]))/(
72*a^3*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.044, size = 96, normalized size = 1.1

$$-\frac{1}{72\,a^{3}}\left(-\sqrt{3}\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\,\mathrm{FresnelS}\left(\frac{\sqrt{3}\sqrt{2}}{\sqrt{\pi}}\sqrt{\arcsin(ax)}\right)+9\,\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\,\mathrm{FresnelS}\left(\frac{\sqrt{2}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*arcsin(a*x)^(1/2),x)
```

```
[Out] -1/72/a^3/arcsin(a*x)^(1/2)*(-3^(1/2)*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*Fr
esnelS(2^(1/2)/Pi^(1/2)*3^(1/2)*arcsin(a*x)^(1/2))+9*2^(1/2)*arcsin(a*x)^(1
/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))-18*a*x*arcsin(a*x
)+6*arcsin(a*x)*sin(3*arcsin(a*x)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^2\sqrt{\operatorname{asin}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*asin(a*x)**(1/2),x)
```

```
[Out] Integral(x**2*sqrt(asin(a*x)), x)
```

Giac [C] time = 1.48785, size = 223, normalized size = 2.59

$$\frac{(i-1)\sqrt{6}\sqrt{\pi}\,\mathrm{erf}\left(\left(\frac{1}{2}i-\frac{1}{2}\right)\sqrt{6}\sqrt{\arcsin(ax)}\right)}{288\,a^3}-\frac{(i+1)\sqrt{6}\sqrt{\pi}\,\mathrm{erf}\left(-\left(\frac{1}{2}i+\frac{1}{2}\right)\sqrt{6}\sqrt{\arcsin(ax)}\right)}{288\,a^3}-\frac{(i-1)\sqrt{2}\sqrt{\pi}\,\mathrm{erf}\left(\left(\frac{1}{2}i\right.\right.}{32}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] (1/288*I - 1/288)*sqrt(6)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(6)*sqrt(arcsin(a*
x)))/a^3 - (1/288*I + 1/288)*sqrt(6)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(6)*sq
rt(arcsin(a*x)))/a^3 - (1/32*I - 1/32)*sqrt(2)*sqrt(pi)*erf((1/2*I - 1/2)*s
qrt(2)*sqrt(arcsin(a*x)))/a^3 + (1/32*I + 1/32)*sqrt(2)*sqrt(pi)*erf(-(1/2*
I + 1/2)*sqrt(2)*sqrt(arcsin(a*x)))/a^3 + 1/24*I*sqrt(arcsin(a*x))*e^(3*I*a
rcsin(a*x))/a^3 - 1/8*I*sqrt(arcsin(a*x))*e^(I*arcsin(a*x))/a^3 + 1/8*I*sqr
t(arcsin(a*x))*e^(-I*arcsin(a*x))/a^3 - 1/24*I*sqrt(arcsin(a*x))*e^(-3*I*ar
csin(a*x))/a^3
```

3.77 $\int x\sqrt{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=59

$$\frac{\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{8a^2}-\frac{\sqrt{\sin^{-1}(ax)}}{4a^2}+\frac{1}{2}x^2\sqrt{\sin^{-1}(ax)}$$

```
[Out] -Sqrt[ArcSin[a*x]]/(4*a^2) + (x^2*Sqrt[ArcSin[a*x]])/2 + (Sqrt[Pi]*FresnelC
[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(8*a^2)
```

Rubi [A] time = 0.150785, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4629, 4723, 3312, 3304, 3352}

$$\frac{\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{8a^2}-\frac{\sqrt{\sin^{-1}(ax)}}{4a^2}+\frac{1}{2}x^2\sqrt{\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sqrt[ArcSin[a*x]],x]
```

```
[Out] -Sqrt[ArcSin[a*x]]/(4*a^2) + (x^2*Sqrt[ArcSin[a*x]])/2 + (Sqrt[Pi]*FresnelC
[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(8*a^2)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3312

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

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int x\sqrt{\sin^{-1}(ax)}\,dx &= \frac{1}{2}x^2\sqrt{\sin^{-1}(ax)}-\frac{1}{4}a\int\frac{x^2}{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}\,dx\\
&= \frac{1}{2}x^2\sqrt{\sin^{-1}(ax)}-\frac{\text{Subst}\left(\int\frac{\sin^2(x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{4a^2}\\
&= \frac{1}{2}x^2\sqrt{\sin^{-1}(ax)}-\frac{\text{Subst}\left(\int\left(\frac{1}{2\sqrt{x}}-\frac{\cos(2x)}{2\sqrt{x}}\right)dx,x,\sin^{-1}(ax)\right)}{4a^2}\\
&= -\frac{\sqrt{\sin^{-1}(ax)}}{4a^2}+\frac{1}{2}x^2\sqrt{\sin^{-1}(ax)}+\frac{\text{Subst}\left(\int\frac{\cos(2x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{8a^2}\\
&= -\frac{\sqrt{\sin^{-1}(ax)}}{4a^2}+\frac{1}{2}x^2\sqrt{\sin^{-1}(ax)}+\frac{\text{Subst}\left(\int\cos\left(2x^2\right)dx,x,\sqrt{\sin^{-1}(ax)}\right)}{4a^2}\\
&= -\frac{\sqrt{\sin^{-1}(ax)}}{4a^2}+\frac{1}{2}x^2\sqrt{\sin^{-1}(ax)}+\frac{\sqrt{\pi}C\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{8a^2}
\end{aligned}
$$

Mathematica [C] time = 0.021174, size = 81, normalized size = 1.37

$$
-\frac{\sqrt{\sin^{-1}(ax)}\left(\sqrt{i\sin^{-1}(ax)}\,\text{Gamma}\left(\frac{3}{2},-2i\sin^{-1}(ax)\right)+\sqrt{-i\sin^{-1}(ax)}\,\text{Gamma}\left(\frac{3}{2},2i\sin^{-1}(ax)\right)\right)}{8\sqrt{2}a^2\sqrt{\sin^{-1}(ax)^2}}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*Sqrt[ArcSin[a*x]],x]
```

```
[Out] -(Sqrt[ArcSin[a*x]]*(Sqrt[I*ArcSin[a*x]]*Gamma[3/2, (-2*I)*ArcSin[a*x]] + S
qrt[(-I)*ArcSin[a*x]]*Gamma[3/2, (2*I)*ArcSin[a*x]]))/(8*Sqrt[2]*a^2*Sqrt[A
rcSin[a*x]^2])
```

Maple [A] time = 0.033, size = 42, normalized size = 0.7

$$\frac{1}{8a^2\sqrt{\pi}}\left(-2\sqrt{\arcsin(ax)}\sqrt{\pi}\cos(2\arcsin(ax))+\pi\,\mathrm{FresnelC}\left(2\frac{\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*arcsin(a*x)^(1/2),x)
```

```
[Out] 1/8/a^2/Pi^(1/2)*(-2*arcsin(a*x)^(1/2)*Pi^(1/2)*cos(2*arcsin(a*x))+Pi*Fresn
elC(2*arcsin(a*x)^(1/2)/Pi^(1/2)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\sqrt{\operatorname{asin}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*asin(a*x)**(1/2),x)
```

```
[Out] Integral(x*sqrt(asin(a*x)), x)
```

Giac [C] time = 1.37763, size = 96, normalized size = 1.63

$$-\frac{(i+1)\sqrt{\pi}\operatorname{erf}\left((i-1)\sqrt{\arcsin(ax)}\right)}{32a^2}+\frac{(i-1)\sqrt{\pi}\operatorname{erf}\left(-(i+1)\sqrt{\arcsin(ax)}\right)}{32a^2}-\frac{\sqrt{\arcsin(ax)}e^{(2i\arcsin(ax))}}{8a^2}-\sqrt{\arcsin}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] -(1/32*I + 1/32)*sqrt(pi)*erf((I - 1)*sqrt(arcsin(a*x)))/a^2 + (1/32*I - 1/
32)*sqrt(pi)*erf(-(I + 1)*sqrt(arcsin(a*x)))/a^2 - 1/8*sqrt(arcsin(a*x))*e^
(2*I*arcsin(a*x))/a^2 - 1/8*sqrt(arcsin(a*x))*e^(-2*I*arcsin(a*x))/a^2
```

3.78 $\int \sqrt{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=44

$$x\sqrt{\sin^{-1}(ax)}-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a}$$

```
[Out] x*Sqrt[ArcSin[a*x]] - (Sqrt[Pi/2]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/a
```

Rubi [A] time = 0.0896557, antiderivative size = 44, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4619, 4723, 3305, 3351}

$$x\sqrt{\sin^{-1}(ax)}-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[ArcSin[a*x]],x]
```

```
[Out] x*Sqrt[ArcSin[a*x]] - (Sqrt[Pi/2]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/a
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\begin{aligned}
\int \sqrt{\sin^{-1}(ax)}\,dx &= x\sqrt{\sin^{-1}(ax)} - \frac{1}{2}a\int \frac{x}{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}\,dx \\
&= x\sqrt{\sin^{-1}(ax)} - \frac{\text{Subst}\left(\int \frac{\sin(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{2a} \\
&= x\sqrt{\sin^{-1}(ax)} - \frac{\text{Subst}\left(\int \sin\left(x^2\right)\,dx, x, \sqrt{\sin^{-1}(ax)}\right)}{a} \\
&= x\sqrt{\sin^{-1}(ax)} - \frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a}
\end{aligned}$$

Mathematica [C] time = 0.0308365, size = 66, normalized size = 1.5

$$\frac{\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{3}{2}, -i\sin^{-1}(ax)\right) + \sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{3}{2}, i\sin^{-1}(ax)\right)}{2a\sqrt{\sin^{-1}(ax)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sqrt[ArcSin[a*x]],x]
```

```
[Out] (Sqrt[(-I)*ArcSin[a*x]]*Gamma[3/2, (-I)*ArcSin[a*x]] + Sqrt[I*ArcSin[a*x]]*
Gamma[3/2, I*ArcSin[a*x]])/(2*a*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.032, size = 49, normalized size = 1.1

$$\frac{1}{2\,a}\left(-\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\text{FresnelS}\left(\frac{\sqrt{2}}{\sqrt{\pi}}\sqrt{\arcsin(ax)}\right) + 2\,ax\arcsin(ax)\right)\frac{1}{\sqrt{\arcsin(ax)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^(1/2),x)
```

```
[Out] 1/2/a/arcsin(a*x)^(1/2)*(-2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2^(1/
2)/Pi^(1/2)*arcsin(a*x)^(1/2))+2*a*x*arcsin(a*x))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{\operatorname{asin}{\left(ax \right)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**(1/2),x)
```

```
[Out] Integral(sqrt(asin(a*x)), x)
```

Giac [C] time = 1.3613, size = 112, normalized size = 2.55

$$-\frac{(i-1)\sqrt{2}\sqrt{\pi}\operatorname{erf}\left(\left(\frac{1}{2}i-\frac{1}{2}\right)\sqrt{2}\sqrt{\arcsin(ax)}\right)}{8a}+\frac{(i+1)\sqrt{2}\sqrt{\pi}\operatorname{erf}\left(-\left(\frac{1}{2}i+\frac{1}{2}\right)\sqrt{2}\sqrt{\arcsin(ax)}\right)}{8a}-\frac{i\sqrt{\arcsin(ax)}e^{(i\,\mathrm{arcs}}}{2a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] -(1/8*I - 1/8)*sqrt(2)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(2)*sqrt(arcsin(a*x))
)/a + (1/8*I + 1/8)*sqrt(2)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(2)*sqrt(arcsin
(a*x)))/a - 1/2*I*sqrt(arcsin(a*x))*e^(I*arcsin(a*x))/a + 1/2*I*sqrt(arcsin
(a*x))*e^(-I*arcsin(a*x))/a
```

3.79 $\int \frac{\sqrt{\sin^{-1}(ax)}}{x} \, dx$

Optimal. Leaf size=14

$$\text{Unintegrable}\left(\frac{\sqrt{\sin^{-1}(ax)}}{x},x\right)$$

```
[Out] Unintegrable[Sqrt[ArcSin[a*x]]/x, x]
```

Rubi [A] time = 0.0127665, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int \frac{\sqrt{\sin^{-1}(ax)}}{x} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[Sqrt[ArcSin[a*x]]/x,x]
```

```
[Out] Defer[Int][Sqrt[ArcSin[a*x]]/x, x]
```

Rubi steps

$$\int \frac{\sqrt{\sin^{-1}(ax)}}{x} \, dx = \int \frac{\sqrt{\sin^{-1}(ax)}}{x} \, dx$$

Mathematica [A] time = 0.398712, size = 0, normalized size = 0.

$$\int \frac{\sqrt{\sin^{-1}(ax)}}{x} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sqrt[ArcSin[a*x]]/x,x]
```

```
[Out] Integrate[Sqrt[ArcSin[a*x]]/x, x]
```

Maple [A] time = 0.078, size = 0, normalized size = 0.

$$\int \frac{1}{x}\sqrt{\arcsin\left(ax\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^(1/2)/x,x)
```

```
[Out] int(arcsin(a*x)^(1/2)/x,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(1/2)/x,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(1/2)/x,x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{\operatorname{asin}\left(ax\right)}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**(1/2)/x,x)
```

```
[Out] Integral(sqrt(asin(a*x))/x, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{\arcsin{(ax)}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(1/2)/x,x, algorithm="giac")
```

```
[Out] integrate(sqrt(arcsin(a*x))/x, x)
```

3.80 $\int x^4 \sin^{-1}(ax)^{3/2}\,dx$

Optimal. Leaf size=214

$$-\frac{3\sqrt{\frac{\pi}{2}}\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^5}+\frac{\sqrt{\frac{\pi}{6}}\text{FresnelC}\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{32a^5}-\frac{3\sqrt{\frac{\pi}{10}}\text{FresnelC}\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{800a^5}+3x^4\sqrt{1-}$$

```
[Out] (4*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/(25*a^5) + (2*x^2*Sqrt[1 - a^2*x^2]
*Sqrt[ArcSin[a*x]])/(25*a^3) + (3*x^4*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/
(50*a) + (x^5*ArcSin[a*x]^(3/2))/5 - (3*Sqrt[Pi/2]*FresnelC[Sqrt[2/Pi]*Sqrt
[ArcSin[a*x]]])/(16*a^5) + (Sqrt[Pi/6]*FresnelC[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]
]])/(32*a^5) - (3*Sqrt[Pi/10]*FresnelC[Sqrt[10/Pi]*Sqrt[ArcSin[a*x]]])/(800
*a^5)
```

Rubi [A] time = 0.532559, antiderivative size = 282, normalized size of antiderivative = 1.32, number of steps used = 23, number of rules used = 8, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.667, Rules used = {4629, 4707, 4677, 4623, 3304, 3352, 4635, 4406}

$$-\frac{2\sqrt{2\pi}\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{25a^5}-\frac{11\sqrt{\frac{\pi}{2}}\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{400a^5}+\frac{3\sqrt{\frac{3\pi}{2}}\text{FresnelC}\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{800a^5}+\sqrt{\frac{\pi}{6}}\text{Fre}$$

Antiderivative was successfully verified.

```
[In] Int[x^4*ArcSin[a*x]^(3/2),x]
```

```
[Out] (4*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/(25*a^5) + (2*x^2*Sqrt[1 - a^2*x^2]
*Sqrt[ArcSin[a*x]])/(25*a^3) + (3*x^4*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/
(50*a) + (x^5*ArcSin[a*x]^(3/2))/5 - (11*Sqrt[Pi/2]*FresnelC[Sqrt[2/Pi]*Sqr
t[ArcSin[a*x]]])/(400*a^5) - (2*Sqrt[2*Pi]*FresnelC[Sqrt[2/Pi]*Sqrt[ArcSin[
a*x]]])/(25*a^5) + (Sqrt[Pi/6]*FresnelC[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(50*
a^5) + (3*Sqrt[(3*Pi)/2]*FresnelC[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(800*a^5)
- (3*Sqrt[Pi/10]*FresnelC[Sqrt[10/Pi]*Sqrt[ArcSin[a*x]]])/(800*a^5)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rubi steps

$$\int x^4 \sin^{-1}(ax)^{3/2}\,dx = \frac{1}{5}x^5\sin^{-1}(ax)^{3/2} - \frac{1}{10}(3a)\int \frac{x^5\sqrt{\sin^{-1}(ax)}}{\sqrt{1-a^2x^2}}\,dx$$

$$= \frac{3x^4\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{50a} + \frac{1}{5}x^5\sin^{-1}(ax)^{3/2} - \frac{3}{100}\int \frac{x^4}{\sqrt{\sin^{-1}(ax)}}\,dx - \frac{6\int \frac{x^3\sqrt{\sin^{-1}(ax)}}{\sqrt{1-a^2x^2}}\,dx}{25a}$$

$$= \frac{2x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{25a^3} + \frac{3x^4\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{50a} + \frac{1}{5}x^5\sin^{-1}(ax)^{3/2} - \frac{3\,\text{Subst}\left(\int \frac{\cos(x)\sin^4(}{\sqrt{x}}\right.}{100a}$$

$$= \frac{4\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{25a^5} + \frac{2x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{25a^3} + \frac{3x^4\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{50a} + \frac{1}{5}x^5\sin^{-1}(ax)^{3}$$

$$= \frac{4\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{25a^5} + \frac{2x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{25a^3} + \frac{3x^4\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{50a} + \frac{1}{5}x^5\sin^{-1}(ax)^{3}$$

$$= \frac{4\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{25a^5} + \frac{2x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{25a^3} + \frac{3x^4\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{50a} + \frac{1}{5}x^5\sin^{-1}(ax)^{3}$$

$$= \frac{4\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{25a^5} + \frac{2x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{25a^3} + \frac{3x^4\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{50a} + \frac{1}{5}x^5\sin^{-1}(ax)^{3}$$

$$= \frac{4\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{25a^5} + \frac{2x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{25a^3} + \frac{3x^4\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{50a} + \frac{1}{5}x^5\sin^{-1}(ax)^{3}$$

Mathematica [C] time = 0.0647914, size = 202, normalized size = 0.94

$$\sqrt{\sin^{-1}(ax)}\left(2250\sqrt{i\sin^{-1}(ax)}\,\text{Gamma}\left(\frac{5}{2},-i\sin^{-1}(ax)\right) + 2250\sqrt{-i\sin^{-1}(ax)}\,\text{Gamma}\left(\frac{5}{2},i\sin^{-1}(ax)\right) - 125\sqrt{3}\sqrt{i\sin^{-1}}\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^4*ArcSin[a*x]^(3/2),x]
```

```
[Out] (Sqrt[ArcSin[a*x]]*(2250*Sqrt[I*ArcSin[a*x]]*Gamma[5/2, (-I)*ArcSin[a*x]] +
 2250*Sqrt[(-I)*ArcSin[a*x]]*Gamma[5/2, I*ArcSin[a*x]] - 125*Sqrt[3]*Sqrt[I
*ArcSin[a*x]]*Gamma[5/2, (-3*I)*ArcSin[a*x]] - 125*Sqrt[3]*Sqrt[(-I)*ArcSin
[a*x]]*Gamma[5/2, (3*I)*ArcSin[a*x]] + 9*Sqrt[5]*Sqrt[I*ArcSin[a*x]]*Gamma[
5/2, (-5*I)*ArcSin[a*x]] + 9*Sqrt[5]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[5/2, (5*I
)*ArcSin[a*x]]))/(36000*a^5*Sqrt[ArcSin[a*x]^2])
```

Maple [A] time = 0.079, size = 193, normalized size = 0.9

$$-\frac{1}{24000\,a^{5}}\Bigg(-3000\,ax\left(\arcsin\left(ax\right)\right)^{2}+9\,\sqrt{5}\sqrt{2}\sqrt{\arcsin\left(ax\right)}\sqrt{\pi}\mathrm{FresnelC}\left(\frac{\sqrt{5}\sqrt{2}\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)-125\,\sqrt{3}\sqrt{2}\sqrt{\arcsin(}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*arcsin(a*x)^(3/2),x)
```

```
[Out] -1/24000/a^5/arcsin(a*x)^(1/2)*(-3000*a*x*arcsin(a*x)^2+9*5^(1/2)*2^(1/2)*a
rcsin(a*x)^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*5^(1/2)*arcsin(a*x)^(1/
2))-125*3^(1/2)*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1/2
)*3^(1/2)*arcsin(a*x)^(1/2))+1500*arcsin(a*x)^2*sin(3*arcsin(a*x))-300*arcs
in(a*x)^2*sin(5*arcsin(a*x))+2250*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*Fresne
lC(2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))-4500*arcsin(a*x)*(-a^2*x^2+1)^(1/2)+
750*arcsin(a*x)*cos(3*arcsin(a*x))-90*arcsin(a*x)*cos(5*arcsin(a*x)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*asin(a*x)**(3/2),x)
```

```
[Out] Timed out
```

Giac [C] time = 1.40054, size = 479, normalized size = 2.24

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] -1/160*I*arcsin(a*x)^(3/2)*e^(5*I*arcsin(a*x))/a^5 + 1/32*I*arcsin(a*x)^(3/
2)*e^(3*I*arcsin(a*x))/a^5 - 1/16*I*arcsin(a*x)^(3/2)*e^(I*arcsin(a*x))/a^5
 + 1/16*I*arcsin(a*x)^(3/2)*e^(-I*arcsin(a*x))/a^5 - 1/32*I*arcsin(a*x)^(3/
2)*e^(-3*I*arcsin(a*x))/a^5 + 1/160*I*arcsin(a*x)^(3/2)*e^(-5*I*arcsin(a*x)
)/a^5 + (3/32000*I + 3/32000)*sqrt(10)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(10)*
sqrt(arcsin(a*x)))/a^5 - (3/32000*I - 3/32000)*sqrt(10)*sqrt(pi)*erf(-(1/2*
I + 1/2)*sqrt(10)*sqrt(arcsin(a*x)))/a^5 - (1/768*I + 1/768)*sqrt(6)*sqrt(p
i)*erf((1/2*I - 1/2)*sqrt(6)*sqrt(arcsin(a*x)))/a^5 + (1/768*I - 1/768)*sqr
t(6)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(6)*sqrt(arcsin(a*x)))/a^5 + (3/128*I
+ 3/128)*sqrt(2)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(2)*sqrt(arcsin(a*x)))/a^5
- (3/128*I - 3/128)*sqrt(2)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(2)*sqrt(arcsin
(a*x)))/a^5 + 3/1600*sqrt(arcsin(a*x))*e^(5*I*arcsin(a*x))/a^5 - 1/64*sqrt(
arcsin(a*x))*e^(3*I*arcsin(a*x))/a^5 + 3/32*sqrt(arcsin(a*x))*e^(I*arcsin(a
*x))/a^5 + 3/32*sqrt(arcsin(a*x))*e^(-I*arcsin(a*x))/a^5 - 1/64*sqrt(arcsin
(a*x))*e^(-3*I*arcsin(a*x))/a^5 + 3/1600*sqrt(arcsin(a*x))*e^(-5*I*arcsin(a
*x))/a^5
```

3.81 $\int x^3 \sin^{-1}(ax)^{3/2}\,dx$

Optimal. Leaf size=157

$$\frac{3\sqrt{\frac{\pi}{2}}S\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{512a^4}-\frac{3\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{64a^4}+\frac{3x^3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{32a}+\frac{9x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{64a^3}-\frac{3\sin^{-1}(ax)^{3/2}}{32a^4}$$

```
[Out] (9*x*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/(64*a^3) + (3*x^3*Sqrt[1 - a^2*x^
2]*Sqrt[ArcSin[a*x]])/(32*a) - (3*ArcSin[a*x]^(3/2))/(32*a^4) + (x^4*ArcSin
[a*x]^(3/2))/4 + (3*Sqrt[Pi/2]*FresnelS[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(5
12*a^4) - (3*Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(64*a^4)
```

Rubi [A] time = 0.378891, antiderivative size = 157, normalized size of antiderivative = 1., number of steps used = 16, number of rules used = 8, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.667, Rules used = {4629, 4707, 4641, 4635, 4406, 12, 3305, 3351}

$$\frac{3\sqrt{\frac{\pi}{2}}S\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{512a^4}-\frac{3\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{64a^4}+\frac{3x^3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{32a}+\frac{9x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{64a^3}-\frac{3\sin^{-1}(ax)^{3/2}}{32a^4}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*ArcSin[a*x]^(3/2),x]
```

```
[Out] (9*x*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/(64*a^3) + (3*x^3*Sqrt[1 - a^2*x^
2]*Sqrt[ArcSin[a*x]])/(32*a) - (3*ArcSin[a*x]^(3/2))/(32*a^4) + (x^4*ArcSin
[a*x]^(3/2))/4 + (3*Sqrt[Pi/2]*FresnelS[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(5
12*a^4) - (3*Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(64*a^4)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int x^3 \sin^{-1}(ax)^{3/2}\,dx = \frac{1}{4}x^4\sin^{-1}(ax)^{3/2} - \frac{1}{8}(3a)\int \frac{x^4\sqrt{\sin^{-1}(ax)}}{\sqrt{1-a^2x^2}}\,dx$$

$$= \frac{3x^3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{32a} + \frac{1}{4}x^4\sin^{-1}(ax)^{3/2} - \frac{3}{64}\int \frac{x^3}{\sqrt{\sin^{-1}(ax)}}\,dx - \frac{9\int \frac{x^2\sqrt{\sin^{-1}(ax)}}{\sqrt{1-a^2x^2}}\,dx}{32a}$$

$$= \frac{9x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{64a^3} + \frac{3x^3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{32a} + \frac{1}{4}x^4\sin^{-1}(ax)^{3/2} - \frac{3\,\mathrm{Subst}\left(\int \frac{\cos(x)\sin^3(x)}{\sqrt{x}}\right.}{64a^4}$$

$$= \frac{9x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{64a^3} + \frac{3x^3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{32a} - \frac{3\sin^{-1}(ax)^{3/2}}{32a^4} + \frac{1}{4}x^4\sin^{-1}(ax)^{3/2} - \frac{3\,\mathrm{Sub}}{\;}$$

$$= \frac{9x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{64a^3} + \frac{3x^3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{32a} - \frac{3\sin^{-1}(ax)^{3/2}}{32a^4} + \frac{1}{4}x^4\sin^{-1}(ax)^{3/2} + \frac{3\,\mathrm{Sub}}{\;}$$

$$= \frac{9x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{64a^3} + \frac{3x^3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{32a} - \frac{3\sin^{-1}(ax)^{3/2}}{32a^4} + \frac{1}{4}x^4\sin^{-1}(ax)^{3/2} + \frac{3\,\mathrm{Sub}}{\;}$$

$$= \frac{9x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{64a^3} + \frac{3x^3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{32a} - \frac{3\sin^{-1}(ax)^{3/2}}{32a^4} + \frac{1}{4}x^4\sin^{-1}(ax)^{3/2} + \frac{3\sqrt{\frac{\pi}{2}}}{\;}$$

$$= \frac{9x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{64a^3} + \frac{3x^3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{32a} - \frac{3\sin^{-1}(ax)^{3/2}}{32a^4} + \frac{1}{4}x^4\sin^{-1}(ax)^{3/2} + \frac{3\sqrt{\frac{\pi}{2}}}{\;}$$

Mathematica [C] time = 0.0327046, size = 130, normalized size = 0.83

$$\frac{8\sqrt{2}\sqrt{-i\sin^{-1}(ax)}\,\mathrm{Gamma}\left(\frac{5}{2},-2i\sin^{-1}(ax)\right) + 8\sqrt{2}\sqrt{i\sin^{-1}(ax)}\,\mathrm{Gamma}\left(\frac{5}{2},2i\sin^{-1}(ax)\right) - \sqrt{-i\sin^{-1}(ax)}\,\mathrm{Gamma}\left(\frac{5}{2}\right.}{512a^4\sqrt{\sin^{-1}(ax)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^3*ArcSin[a*x]^(3/2),x]
```

```
[Out] (8*Sqrt[2]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[5/2, (-2*I)*ArcSin[a*x]] + 8*Sqrt[2
]*Sqrt[I*ArcSin[a*x]]*Gamma[5/2, (2*I)*ArcSin[a*x]] - Sqrt[(-I)*ArcSin[a*x]
]*Gamma[5/2, (-4*I)*ArcSin[a*x]] - Sqrt[I*ArcSin[a*x]]*Gamma[5/2, (4*I)*Arc
Sin[a*x]])/(512*a^4*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.053, size = 121, normalized size = 0.8

$$-\frac{1}{1024\,a^{4}}\left(-3\,\sqrt{2}\sqrt{\arcsin\left(ax\right)}\sqrt{\pi}\,\mathrm{FresnelS}\left(2\,\frac{\sqrt{2}\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)+128\,\left(\arcsin\left(ax\right)\right)^{2}\cos\left(2\,\arcsin\left(ax\right)\right)-32\,\left(\arcsin\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*arcsin(a*x)^(3/2),x)
```

```
[Out] -1/1024/a^4*(-3*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2*2^(1/2)/Pi^(1
/2)*arcsin(a*x)^(1/2))+128*arcsin(a*x)^2*cos(2*arcsin(a*x))-32*arcsin(a*x)^
2*cos(4*arcsin(a*x))+48*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2*arcsin(a*x)^(
1/2)/Pi^(1/2))-96*arcsin(a*x)*sin(2*arcsin(a*x))+12*arcsin(a*x)*sin(4*arcsi
n(a*x)))/arcsin(a*x)^(1/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^3 \operatorname{asin}^{\frac{3}{2}}(ax)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*asin(a*x)**(3/2),x)
```

```
[Out] Integral(x**3*asin(a*x)**(3/2), x)
```

Giac [C] time = 1.39818, size = 304, normalized size = 1.94

$$\frac{\arcsin(ax)^{\frac{3}{2}} e^{(4i \arcsin(ax))}}{64\, a^4} - \frac{\arcsin(ax)^{\frac{3}{2}} e^{(2i \arcsin(ax))}}{16\, a^4} - \frac{\arcsin(ax)^{\frac{3}{2}} e^{(-2i \arcsin(ax))}}{16\, a^4} + \frac{\arcsin(ax)^{\frac{3}{2}} e^{(-4i \arcsin(ax))}}{64\, a^4} + (3i$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] 1/64*arcsin(a*x)^(3/2)*e^(4*I*arcsin(a*x))/a^4 - 1/16*arcsin(a*x)^(3/2)*e^(
2*I*arcsin(a*x))/a^4 - 1/16*arcsin(a*x)^(3/2)*e^(-2*I*arcsin(a*x))/a^4 + 1/
64*arcsin(a*x)^(3/2)*e^(-4*I*arcsin(a*x))/a^4 + (3/4096*I - 3/4096)*sqrt(2)
*sqrt(pi)*erf((I - 1)*sqrt(2)*sqrt(arcsin(a*x)))/a^4 - (3/4096*I + 3/4096)*
sqrt(2)*sqrt(pi)*erf(-(I + 1)*sqrt(2)*sqrt(arcsin(a*x)))/a^4 - (3/256*I - 3
/256)*sqrt(pi)*erf((I - 1)*sqrt(arcsin(a*x)))/a^4 + (3/256*I + 3/256)*sqrt(
pi)*erf(-(I + 1)*sqrt(arcsin(a*x)))/a^4 + 3/512*I*sqrt(arcsin(a*x))*e^(4*I*
arcsin(a*x))/a^4 - 3/64*I*sqrt(arcsin(a*x))*e^(2*I*arcsin(a*x))/a^4 + 3/64*
I*sqrt(arcsin(a*x))*e^(-2*I*arcsin(a*x))/a^4 - 3/512*I*sqrt(arcsin(a*x))*e^
(-4*I*arcsin(a*x))/a^4
```

3.82 $\int x^2 \sin^{-1}(ax)^{3/2}\, dx$

Optimal. Leaf size=147

$$-\frac{3\sqrt{\frac{\pi}{2}}\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^3}+\frac{\sqrt{\frac{\pi}{6}}\text{FresnelC}\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{24a^3}+\frac{x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{6a}+\frac{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(}{3a^3}$$

```
[Out] (Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/(3*a^3) + (x^2*Sqrt[1 - a^2*x^2]*Sqrt
[ArcSin[a*x]])/(6*a) + (x^3*ArcSin[a*x]^(3/2))/3 - (3*Sqrt[Pi/2]*FresnelC[S
qrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(8*a^3) + (Sqrt[Pi/6]*FresnelC[Sqrt[6/Pi]*Sqr
t[ArcSin[a*x]]])/(24*a^3)
```

Rubi [A] time = 0.302717, antiderivative size = 147, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 8, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.667, Rules used = {4629, 4707, 4677, 4623, 3304, 3352, 4635, 4406}

$$-\frac{3\sqrt{\frac{\pi}{2}}\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^3}+\frac{\sqrt{\frac{\pi}{6}}\text{FresnelC}\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{24a^3}+\frac{x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{6a}+\frac{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(}{3a^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*ArcSin[a*x]^(3/2),x]
```

```
[Out] (Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/(3*a^3) + (x^2*Sqrt[1 - a^2*x^2]*Sqrt
[ArcSin[a*x]])/(6*a) + (x^3*ArcSin[a*x]^(3/2))/3 - (3*Sqrt[Pi/2]*FresnelC[S
qrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(8*a^3) + (Sqrt[Pi/6]*FresnelC[Sqrt[6/Pi]*Sqr
t[ArcSin[a*x]]])/(24*a^3)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rubi steps

$$\int x^2\sin^{-1}(ax)^{3/2}\,dx = \frac{1}{3}x^3\sin^{-1}(ax)^{3/2} - \frac{1}{2}a\int \frac{x^3\sqrt{\sin^{-1}(ax)}}{\sqrt{1-a^2x^2}}\,dx$$

$$= \frac{x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{6a} + \frac{1}{3}x^3\sin^{-1}(ax)^{3/2} - \frac{1}{12}\int \frac{x^2}{\sqrt{\sin^{-1}(ax)}}\,dx - \frac{\int \frac{x\sqrt{\sin^{-1}(ax)}}{\sqrt{1-a^2x^2}}\,dx}{3a}$$

$$= \frac{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{3a^3} + \frac{x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{6a} + \frac{1}{3}x^3\sin^{-1}(ax)^{3/2} - \frac{\text{Subst}\left(\int \frac{\cos(x)\sin^2(x)}{\sqrt{x}}\,dx,\right.}{12a^3}$$

$$= \frac{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{3a^3} + \frac{x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{6a} + \frac{1}{3}x^3\sin^{-1}(ax)^{3/2} - \frac{\text{Subst}\left(\int\left(\frac{\cos(x)}{4\sqrt{x}} - \frac{\cos(3x}{4\sqrt{x}}\right.\right.}{12a^3}$$

$$= \frac{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{3a^3} + \frac{x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{6a} + \frac{1}{3}x^3\sin^{-1}(ax)^{3/2} - \frac{\text{Subst}\left(\int \frac{\cos(x)}{\sqrt{x}}\,dx, x, \sin\right.}{48a^3}$$

$$= \frac{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{3a^3} + \frac{x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{6a} + \frac{1}{3}x^3\sin^{-1}(ax)^{3/2} - \frac{\sqrt{\frac{\pi}{2}}C\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^3}$$

$$= \frac{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{3a^3} + \frac{x^2\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{6a} + \frac{1}{3}x^3\sin^{-1}(ax)^{3/2} - \frac{3\sqrt{\frac{\pi}{2}}C\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^3}$$

Mathematica [C] time = 0.0591148, size = 136, normalized size = 0.93

$$\frac{\sqrt{\sin^{-1}(ax)}\left(27\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{5}{2},-i\sin^{-1}(ax)\right)+27\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{5}{2},i\sin^{-1}(ax)\right)-\sqrt{3}\left(\sqrt{i\sin^{-1}(ax)}\right.\right.}{216a^3\sqrt{\sin^{-1}(ax)^2}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2*ArcSin[a*x]^(3/2),x]
```

```
[Out] (Sqrt[ArcSin[a*x]]*(27*Sqrt[I*ArcSin[a*x]]*Gamma[5/2, (-I)*ArcSin[a*x]] + 2
7*Sqrt[(-I)*ArcSin[a*x]]*Gamma[5/2, I*ArcSin[a*x]] - Sqrt[3]*(Sqrt[I*ArcSin
[a*x]]*Gamma[5/2, (-3*I)*ArcSin[a*x]] + Sqrt[(-I)*ArcSin[a*x]]*Gamma[5/2, (
3*I)*ArcSin[a*x]])))/(216*a^3*Sqrt[ArcSin[a*x]^2])
```

Maple [A] time = 0.05, size = 131, normalized size = 0.9

$$-\frac{1}{144\,a^{3}}\left(-36\,ax\left(\arcsin\left(ax\right)\right)^{2}-\sqrt{3}\sqrt{2}\sqrt{\arcsin\left(ax\right)}\sqrt{\pi}\mathrm{FresnelC}\left(\frac{\sqrt{3}\sqrt{2}}{\sqrt{\pi}}\sqrt{\arcsin\left(ax\right)}\right)+12\,\left(\arcsin\left(ax\right)\right)^{2}\sin\left(3\,\mathrm{arcsi}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*arcsin(a*x)^(3/2),x)
```

```
[Out] -1/144/a^3/arcsin(a*x)^(1/2)*(-36*a*x*arcsin(a*x)^2-3^(1/2)*2^(1/2)*arcsin(
a*x)^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*3^(1/2)*arcsin(a*x)^(1/2))+12
*arcsin(a*x)^2*sin(3*arcsin(a*x))+27*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*Fre
snelC(2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))-54*arcsin(a*x)*(-a^2*x^2+1)^(1/2)
+6*arcsin(a*x)*cos(3*arcsin(a*x)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^2 \operatorname{asin}^{\frac{3}{2}}(ax)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*asin(a*x)**(3/2),x)
```

```
[Out] Integral(x**2*asin(a*x)**(3/2), x)
```

Giac [C] time = 1.39175, size = 320, normalized size = 2.18

$$\frac{i \arcsin(ax)^{\frac{3}{2}} e^{(3i \arcsin(ax))}}{24\,a^3} - \frac{i \arcsin(ax)^{\frac{3}{2}} e^{(i \arcsin(ax))}}{8\,a^3} + \frac{i \arcsin(ax)^{\frac{3}{2}} e^{(-i \arcsin(ax))}}{8\,a^3} - \frac{i \arcsin(ax)^{\frac{3}{2}} e^{(-3i \arcsin(ax))}}{24\,a^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] 1/24*I*arcsin(a*x)^(3/2)*e^(3*I*arcsin(a*x))/a^3 - 1/8*I*arcsin(a*x)^(3/2)*
e^(I*arcsin(a*x))/a^3 + 1/8*I*arcsin(a*x)^(3/2)*e^(-I*arcsin(a*x))/a^3 - 1/
24*I*arcsin(a*x)^(3/2)*e^(-3*I*arcsin(a*x))/a^3 - (1/576*I + 1/576)*sqrt(6)
*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(6)*sqrt(arcsin(a*x)))/a^3 + (1/576*I - 1/5
76)*sqrt(6)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(6)*sqrt(arcsin(a*x)))/a^3 + (3
/64*I + 3/64)*sqrt(2)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(2)*sqrt(arcsin(a*x)))
/a^3 - (3/64*I - 3/64)*sqrt(2)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(2)*sqrt(arc
sin(a*x)))/a^3 - 1/48*sqrt(arcsin(a*x))*e^(3*I*arcsin(a*x))/a^3 + 3/16*sqrt
(arcsin(a*x))*e^(I*arcsin(a*x))/a^3 + 3/16*sqrt(arcsin(a*x))*e^(-I*arcsin(a
*x))/a^3 - 1/48*sqrt(arcsin(a*x))*e^(-3*I*arcsin(a*x))/a^3
```

3.83 $\int x \sin^{-1}(ax)^{3/2}\,dx$

Optimal. Leaf size=89

$$-\frac{3\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{32a^2}+\frac{3x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{8a}-\frac{\sin^{-1}(ax)^{3/2}}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^{3/2}$$

```
[Out] (3*x*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/(8*a) - ArcSin[a*x]^(3/2)/(4*a^2)
 + (x^2*ArcSin[a*x]^(3/2))/2 - (3*Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a*x]])/S
qrt[Pi]])/(32*a^2)
```

Rubi [A] time = 0.182785, antiderivative size = 89, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.8, Rules used = {4629, 4707, 4641, 4635, 4406, 12, 3305, 3351}

$$-\frac{3\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{32a^2}+\frac{3x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{8a}-\frac{\sin^{-1}(ax)^{3/2}}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^{3/2}$$

Antiderivative was successfully verified.

```
[In] Int[x*ArcSin[a*x]^(3/2),x]
```

```
[Out] (3*x*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/(8*a) - ArcSin[a*x]^(3/2)/(4*a^2)
 + (x^2*ArcSin[a*x]^(3/2))/2 - (3*Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a*x]])/S
qrt[Pi]])/(32*a^2)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int x\sin^{-1}(ax)^{3/2}\,dx=\frac{1}{2}x^2\sin^{-1}(ax)^{3/2}-\frac{1}{4}(3a)\int\frac{x^2\sqrt{\sin^{-1}(ax)}}{\sqrt{1-a^2x^2}}\,dx$$

$$=\frac{3x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{8a}+\frac{1}{2}x^2\sin^{-1}(ax)^{3/2}-\frac{3}{16}\int\frac{x}{\sqrt{\sin^{-1}(ax)}}\,dx-\frac{3\int\frac{\sqrt{\sin^{-1}(ax)}}{\sqrt{1-a^2x^2}}\,dx}{8a}$$

$$=\frac{3x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{8a}-\frac{\sin^{-1}(ax)^{3/2}}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^{3/2}-\frac{3\,\mathrm{Subst}\left(\int\frac{\cos(x)\sin(x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax\right.}{16a^2}$$

$$=\frac{3x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{8a}-\frac{\sin^{-1}(ax)^{3/2}}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^{3/2}-\frac{3\,\mathrm{Subst}\left(\int\frac{\sin(2x)}{2\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{16a^2}$$

$$=\frac{3x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{8a}-\frac{\sin^{-1}(ax)^{3/2}}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^{3/2}-\frac{3\,\mathrm{Subst}\left(\int\frac{\sin(2x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{32a^2}$$

$$=\frac{3x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{8a}-\frac{\sin^{-1}(ax)^{3/2}}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^{3/2}-\frac{3\,\mathrm{Subst}\left(\int\sin\left(2x^2\right)\,dx,x,\sqrt{\sin^{-1}(a}\right.}{16a^2}$$

$$=\frac{3x\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{8a}-\frac{\sin^{-1}(ax)^{3/2}}{4a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^{3/2}-\frac{3\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{32a^2}$$

Mathematica [C] time = 0.0151286, size = 71, normalized size = 0.8

$$\frac{\sqrt{-i\sin^{-1}(ax)}\mathrm{Gamma}\left(\frac{5}{2},-2i\sin^{-1}(ax)\right)+\sqrt{i\sin^{-1}(ax)}\mathrm{Gamma}\left(\frac{5}{2},2i\sin^{-1}(ax)\right)}{16\sqrt{2}a^2\sqrt{\sin^{-1}(ax)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*ArcSin[a*x]^(3/2),x]
```

```
[Out] (Sqrt[(-I)*ArcSin[a*x]]*Gamma[5/2, (-2*I)*ArcSin[a*x]] + Sqrt[I*ArcSin[a*x]
]*Gamma[5/2, (2*I)*ArcSin[a*x]])/(16*Sqrt[2]*a^2*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.036, size = 64, normalized size = 0.7

$$-\frac{1}{32\,a^2}\left(8\,(\arcsin(ax))^2\cos(2\,\arcsin(ax))+3\sqrt{\arcsin(ax)}\sqrt{\pi}\mathrm{FresnelS}\left(2\frac{\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)-6\,\arcsin(ax)\sin(2\,\mathrm{arcsi}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*arcsin(a*x)^(3/2),x)
```

```
[Out] -1/32/a^2*(8*arcsin(a*x)^2*cos(2*arcsin(a*x))+3*arcsin(a*x)^(1/2)*Pi^(1/2)*
FresnelS(2*arcsin(a*x)^(1/2)/Pi^(1/2))-6*arcsin(a*x)*sin(2*arcsin(a*x)))/ar
csin(a*x)^(1/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x \operatorname{asin}^{\frac{3}{2}}{\left(ax\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*asin(a*x)**(3/2),x)
```

```
[Out] Integral(x*asin(a*x)**(3/2), x)
```

Giac [C] time = 1.34236, size = 144, normalized size = 1.62

$$-\frac{\arcsin(ax)^{\frac{3}{2}}e^{(2i\arcsin(ax))}}{8a^2}-\frac{\arcsin(ax)^{\frac{3}{2}}e^{(-2i\arcsin(ax))}}{8a^2}-\frac{(3i-3)\sqrt{\pi}\operatorname{erf}\left((i-1)\sqrt{\arcsin(ax)}\right)}{128a^2}+\frac{(3i+3)\sqrt{\pi}\operatorname{erf}\left(-(\right.}{128}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] -1/8*arcsin(a*x)^(3/2)*e^(2*I*arcsin(a*x))/a^2 - 1/8*arcsin(a*x)^(3/2)*e^(-
2*I*arcsin(a*x))/a^2 - (3/128*I - 3/128)*sqrt(pi)*erf((I - 1)*sqrt(arcsin(a
*x)))/a^2 + (3/128*I + 3/128)*sqrt(pi)*erf(-(I + 1)*sqrt(arcsin(a*x)))/a^2
- 3/32*I*sqrt(arcsin(a*x))*e^(2*I*arcsin(a*x))/a^2 + 3/32*I*sqrt(arcsin(a*x
))*e^(-2*I*arcsin(a*x))/a^2
```

3.84 $\int \sin^{-1}(ax)^{3/2}\,dx$

Optimal. Leaf size=75

$$\frac{3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{2a}-\frac{3\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a}+x\sin^{-1}(ax)^{3/2}$$

```
[Out] (3*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/(2*a) + x*ArcSin[a*x]^(3/2) - (3*Sq
rt[Pi/2]*FresnelC[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(2*a)
```

Rubi [A] time = 0.0991487, antiderivative size = 75, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {4619, 4677, 4623, 3304, 3352}

$$\frac{3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{2a}-\frac{3\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a}+x\sin^{-1}(ax)^{3/2}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^(3/2),x]
```

```
[Out] (3*Sqrt[1 - a^2*x^2]*Sqrt[ArcSin[a*x]])/(2*a) + x*ArcSin[a*x]^(3/2) - (3*Sq
rt[Pi/2]*FresnelC[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(2*a)
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int \sin^{-1}(ax)^{3/2}\,dx &= x\sin^{-1}(ax)^{3/2} - \frac{1}{2}(3a)\int \frac{x\sqrt{\sin^{-1}(ax)}}{\sqrt{1-a^2x^2}}\,dx \\
&= \frac{3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{2a} + x\sin^{-1}(ax)^{3/2} - \frac{3}{4}\int \frac{1}{\sqrt{\sin^{-1}(ax)}}\,dx \\
&= \frac{3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{2a} + x\sin^{-1}(ax)^{3/2} - \frac{3\,\mathrm{Subst}\left(\int \frac{\cos(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{4a} \\
&= \frac{3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{2a} + x\sin^{-1}(ax)^{3/2} - \frac{3\,\mathrm{Subst}\left(\int \cos\left(x^2\right)\,dx, x, \sqrt{\sin^{-1}(ax)}\right)}{2a} \\
&= \frac{3\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}{2a} + x\sin^{-1}(ax)^{3/2} - \frac{3\sqrt{\frac{\pi}{2}}C\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a}
\end{aligned}
$$

Mathematica [C] time = 0.0433252, size = 76, normalized size = 1.01

$$
\frac{\sqrt{\sin^{-1}(ax)}\left(\sqrt{i\sin^{-1}(ax)}\,\mathrm{Gamma}\left(\frac{5}{2}, -i\sin^{-1}(ax)\right) + \sqrt{-i\sin^{-1}(ax)}\,\mathrm{Gamma}\left(\frac{5}{2}, i\sin^{-1}(ax)\right)\right)}{2a\sqrt{\sin^{-1}(ax)^2}}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^(3/2),x]
```

```
[Out] (Sqrt[ArcSin[a*x]]*(Sqrt[I*ArcSin[a*x]]*Gamma[5/2, (-I)*ArcSin[a*x]] + Sqrt
[(-I)*ArcSin[a*x]]*Gamma[5/2, I*ArcSin[a*x]]))/(2*a*Sqrt[ArcSin[a*x]^2])
```

Maple [A] time = 0.036, size = 72, normalized size = 1.

$$\frac{\sqrt{2}}{4\,a\sqrt{\pi}}\left(2\,(\arcsin(ax))^{3/2}\sqrt{2}\sqrt{\pi}xa+3\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\sqrt{-a^2x^2+1}-3\,\pi\,\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^(3/2),x)
```

```
[Out] 1/4/a*2^(1/2)*(2*arcsin(a*x)^(3/2)*2^(1/2)*Pi^(1/2)*x*a+3*2^(1/2)*arcsin(a*
x)^(1/2)*Pi^(1/2)*(-a^2*x^2+1)^(1/2)-3*Pi*FresnelC(2^(1/2)/Pi^(1/2)*arcsin(
a*x)^(1/2)))/Pi^(1/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \operatorname{asin}^{\frac{3}{2}}(ax)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**(3/2),x)
```

```
[Out] Integral(asin(a*x)**(3/2), x)
```

Giac [C] time = 1.46949, size = 161, normalized size = 2.15

$$-\frac{i\arcsin(ax)^{\frac{3}{2}}e^{(i\arcsin(ax))}}{2a}+\frac{i\arcsin(ax)^{\frac{3}{2}}e^{(-i\arcsin(ax))}}{2a}+\frac{(3i+3)\ \sqrt{2}\sqrt{\pi}\operatorname{erf}\left(\left(\frac{1}{2}i-\frac{1}{2}\right)\ \sqrt{2}\sqrt{\arcsin(ax)}\right)}{16a}-\frac{(3i-3)\ \sqrt{}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] -1/2*I*arcsin(a*x)^(3/2)*e^(I*arcsin(a*x))/a + 1/2*I*arcsin(a*x)^(3/2)*e^(-
I*arcsin(a*x))/a + (3/16*I + 3/16)*sqrt(2)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(
2)*sqrt(arcsin(a*x)))/a - (3/16*I - 3/16)*sqrt(2)*sqrt(pi)*erf(-(1/2*I + 1/
2)*sqrt(2)*sqrt(arcsin(a*x)))/a + 3/4*sqrt(arcsin(a*x))*e^(I*arcsin(a*x))/a
 + 3/4*sqrt(arcsin(a*x))*e^(-I*arcsin(a*x))/a
```

3.85 $\int \frac{\sin^{-1}(ax)^{3/2}}{x}\,dx$

Optimal. Leaf size=14

$$\text{Unintegrable}\left(\frac{\sin^{-1}(ax)^{3/2}}{x},x\right)$$

```
[Out] Unintegrable[ArcSin[a*x]^(3/2)/x, x]
```

Rubi [A] time = 0.0131838, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\sin^{-1}(ax)^{3/2}}{x}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[ArcSin[a*x]^(3/2)/x,x]
```

```
[Out] Defer[Int][ArcSin[a*x]^(3/2)/x, x]
```

Rubi steps

$$\int \frac{\sin^{-1}(ax)^{3/2}}{x}\,dx=\int \frac{\sin^{-1}(ax)^{3/2}}{x}\,dx$$

Mathematica [A] time = 0.371563, size = 0, normalized size = 0.

$$\int \frac{\sin^{-1}(ax)^{3/2}}{x}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[ArcSin[a*x]^(3/2)/x,x]
```

```
[Out] Integrate[ArcSin[a*x]^(3/2)/x, x]
```

Maple [A] time = 0.063, size = 0, normalized size = 0.

$$\int \frac{1}{x} \left(\arcsin \left(ax\right)\right)^{\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^(3/2)/x,x)
```

```
[Out] int(arcsin(a*x)^(3/2)/x,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(3/2)/x,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(3/2)/x,x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^{\frac{3}{2}}\left(ax\right)}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**(3/2)/x,x)
```

```
[Out] Integral(asin(a*x)**(3/2)/x, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin{(ax)}^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(3/2)/x,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^(3/2)/x, x)
```

3.86 $\int x^4 \sin^{-1}(ax)^{5/2}\,dx$

Optimal. Leaf size=263

$$\frac{15\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{32a^5}-\frac{5\sqrt{\frac{\pi}{6}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{192a^5}+\frac{3\sqrt{\frac{\pi}{10}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{1600a^5}+\frac{x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{10a}-\frac{x^3\sqrt{\mathrm{sir}}}{15}$$

```
[Out] (-2*x*Sqrt[ArcSin[a*x]])/(5*a^4) - (x^3*Sqrt[ArcSin[a*x]])/(15*a^2) - (3*x^
5*Sqrt[ArcSin[a*x]])/100 + (4*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2))/(15*a^5)
 + (2*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2))/(15*a^3) + (x^4*Sqrt[1 - a^2
*x^2]*ArcSin[a*x]^(3/2))/(10*a) + (x^5*ArcSin[a*x]^(5/2))/5 + (15*Sqrt[Pi/2
]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(32*a^5) - (5*Sqrt[Pi/6]*FresnelS
[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(192*a^5) + (3*Sqrt[Pi/10]*FresnelS[Sqrt[10
/Pi]*Sqrt[ArcSin[a*x]]])/(1600*a^5)
```

Rubi [A] time = 0.803417, antiderivative size = 298, normalized size of antiderivative = 1.13, number of steps used = 26, number of rules used = 8, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.667, Rules used = {4629, 4707, 4677, 4619, 4723, 3305, 3351, 3312}

$$\frac{15\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{32a^5}-\frac{\sqrt{\frac{3\pi}{2}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{320a^5}-\frac{\sqrt{\frac{\pi}{6}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{60a^5}+\frac{3\sqrt{\frac{\pi}{10}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{1600a^5}+\frac{x^4\sqrt{1-a}}{}$$

Antiderivative was successfully verified.

```
[In] Int[x^4*ArcSin[a*x]^(5/2),x]
```

```
[Out] (-2*x*Sqrt[ArcSin[a*x]])/(5*a^4) - (x^3*Sqrt[ArcSin[a*x]])/(15*a^2) - (3*x^
5*Sqrt[ArcSin[a*x]])/100 + (4*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2))/(15*a^5)
 + (2*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2))/(15*a^3) + (x^4*Sqrt[1 - a^2
*x^2]*ArcSin[a*x]^(3/2))/(10*a) + (x^5*ArcSin[a*x]^(5/2))/5 + (15*Sqrt[Pi/2
]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(32*a^5) - (Sqrt[Pi/6]*FresnelS[S
qrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(60*a^5) - (Sqrt[(3*Pi)/2]*FresnelS[Sqrt[6/Pi
]*Sqrt[ArcSin[a*x]]])/(320*a^5) + (3*Sqrt[Pi/10]*FresnelS[Sqrt[10/Pi]*Sqrt[
ArcSin[a*x]]])/(1600*a^5)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3312

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

Rubi steps

$$\int x^4\sin^{-1}(ax)^{5/2}\,dx = \frac{1}{5}x^5\sin^{-1}(ax)^{5/2} - \frac{1}{2}a\int\frac{x^5\sin^{-1}(ax)^{3/2}}{\sqrt{1-a^2x^2}}\,dx$$

$$= \frac{x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{10a} + \frac{1}{5}x^5\sin^{-1}(ax)^{5/2} - \frac{3}{20}\int x^4\sqrt{\sin^{-1}(ax)}\,dx - \frac{2\int\frac{x^3\sin^{-1}(ax)^{3/2}}{\sqrt{1-a^2x^2}}\,dx}{5a}$$

$$= -\frac{3}{100}x^5\sqrt{\sin^{-1}(ax)} + \frac{2x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{15a^3} + \frac{x^4\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{10a} + \frac{1}{5}x^5\sin^{-1}(ax)^{5/2} -$$

$$= -\frac{x^3\sqrt{\sin^{-1}(ax)}}{15a^2} - \frac{3}{100}x^5\sqrt{\sin^{-1}(ax)} + \frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{15a^5} + \frac{2x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{15a^3} + \frac{x^4}{}$$

$$= -\frac{2x\sqrt{\sin^{-1}(ax)}}{5a^4} - \frac{x^3\sqrt{\sin^{-1}(ax)}}{15a^2} - \frac{3}{100}x^5\sqrt{\sin^{-1}(ax)} + \frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{15a^5} + \frac{2x^2\sqrt{1-a^2x^2}}{15a}$$

$$= -\frac{2x\sqrt{\sin^{-1}(ax)}}{5a^4} - \frac{x^3\sqrt{\sin^{-1}(ax)}}{15a^2} - \frac{3}{100}x^5\sqrt{\sin^{-1}(ax)} + \frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{15a^5} + \frac{2x^2\sqrt{1-a^2x^2}}{15a}$$

$$= -\frac{2x\sqrt{\sin^{-1}(ax)}}{5a^4} - \frac{x^3\sqrt{\sin^{-1}(ax)}}{15a^2} - \frac{3}{100}x^5\sqrt{\sin^{-1}(ax)} + \frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{15a^5} + \frac{2x^2\sqrt{1-a^2x^2}}{15a}$$

$$= -\frac{2x\sqrt{\sin^{-1}(ax)}}{5a^4} - \frac{x^3\sqrt{\sin^{-1}(ax)}}{15a^2} - \frac{3}{100}x^5\sqrt{\sin^{-1}(ax)} + \frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{15a^5} + \frac{2x^2\sqrt{1-a^2x^2}}{15a}$$

$$= -\frac{2x\sqrt{\sin^{-1}(ax)}}{5a^4} - \frac{x^3\sqrt{\sin^{-1}(ax)}}{15a^2} - \frac{3}{100}x^5\sqrt{\sin^{-1}(ax)} + \frac{4\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{15a^5} + \frac{2x^2\sqrt{1-a^2x^2}}{15a}$$

Mathematica [C] time = 0.0706802, size = 204, normalized size = 0.78

$$\frac{i\sqrt{\sin^{-1}(ax)}\left(33750\sqrt{i\sin^{-1}(ax)}\,\mathrm{Gamma}\left(\frac{7}{2},-i\sin^{-1}(ax)\right) - 33750\sqrt{-i\sin^{-1}(ax)}\,\mathrm{Gamma}\left(\frac{7}{2},i\sin^{-1}(ax)\right) - 625\sqrt{3}\sqrt{i\,\mathrm{si}}\right.}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^4*ArcSin[a*x]^(5/2),x]
```

```
[Out] ((I/540000)*Sqrt[ArcSin[a*x]]*(33750*Sqrt[I*ArcSin[a*x]]*Gamma[7/2, (-I)*Ar
cSin[a*x]] - 33750*Sqrt[(-I)*ArcSin[a*x]]*Gamma[7/2, I*ArcSin[a*x]] - 625*S
qrt[3]*Sqrt[I*ArcSin[a*x]]*Gamma[7/2, (-3*I)*ArcSin[a*x]] + 625*Sqrt[3]*Sqr
t[(-I)*ArcSin[a*x]]*Gamma[7/2, (3*I)*ArcSin[a*x]] + 27*Sqrt[5]*Sqrt[I*ArcSi
n[a*x]]*Gamma[7/2, (-5*I)*ArcSin[a*x]] - 27*Sqrt[5]*Sqrt[(-I)*ArcSin[a*x]]*
Gamma[7/2, (5*I)*ArcSin[a*x]]))/(a^5*Sqrt[ArcSin[a*x]^2])
```

Maple [A] time = 0.077, size = 233, normalized size = 0.9

$$-\frac{1}{144000\,a^{5}}\Bigg(-18000\,ax\,(\arcsin(ax))^{3}+9000\,(\arcsin(ax))^{3}\sin(3\arcsin(ax))-1800\,(\arcsin(ax))^{3}\sin(5\arcsin(ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4*arcsin(a*x)^(5/2),x)
```

```
[Out] -1/144000/a^5/arcsin(a*x)^(1/2)*(-18000*a*x*arcsin(a*x)^3+9000*arcsin(a*x)^
3*sin(3*arcsin(a*x))-1800*arcsin(a*x)^3*sin(5*arcsin(a*x))-27*5^(1/2)*2^(1/
2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*5^(1/2)*arcsin(a*x)
^(1/2))+625*3^(1/2)*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^
(1/2)*3^(1/2)*arcsin(a*x)^(1/2))-45000*arcsin(a*x)^2*(-a^2*x^2+1)^(1/2)+750
0*arcsin(a*x)^2*cos(3*arcsin(a*x))-900*arcsin(a*x)^2*cos(5*arcsin(a*x))-337
50*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*arcsin(a*x)
^(1/2))+67500*a*x*arcsin(a*x)-3750*arcsin(a*x)*sin(3*arcsin(a*x))+270*arcsi
n(a*x)*sin(5*arcsin(a*x)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4*asin(a*x)**(5/2),x)
```

```
[Out] Timed out
```

Giac [C] time = 1.47479, size = 625, normalized size = 2.38

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4*arcsin(a*x)^(5/2),x, algorithm="giac")
```

```
[Out] -1/160*I*arcsin(a*x)^(5/2)*e^(5*I*arcsin(a*x))/a^5 + 1/32*I*arcsin(a*x)^(5/
2)*e^(3*I*arcsin(a*x))/a^5 - 1/16*I*arcsin(a*x)^(5/2)*e^(I*arcsin(a*x))/a^5
 + 1/16*I*arcsin(a*x)^(5/2)*e^(-I*arcsin(a*x))/a^5 - 1/32*I*arcsin(a*x)^(5/
2)*e^(-3*I*arcsin(a*x))/a^5 + 1/160*I*arcsin(a*x)^(5/2)*e^(-5*I*arcsin(a*x)
)/a^5 + 1/320*arcsin(a*x)^(3/2)*e^(5*I*arcsin(a*x))/a^5 - 5/192*arcsin(a*x)
^(3/2)*e^(3*I*arcsin(a*x))/a^5 + 5/32*arcsin(a*x)^(3/2)*e^(I*arcsin(a*x))/a
^5 + 5/32*arcsin(a*x)^(3/2)*e^(-I*arcsin(a*x))/a^5 - 5/192*arcsin(a*x)^(3/2
)*e^(-3*I*arcsin(a*x))/a^5 + 1/320*arcsin(a*x)^(3/2)*e^(-5*I*arcsin(a*x))/a
^5 + (3/64000*I - 3/64000)*sqrt(10)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(10)*sqr
t(arcsin(a*x)))/a^5 - (3/64000*I + 3/64000)*sqrt(10)*sqrt(pi)*erf(-(1/2*I +
 1/2)*sqrt(10)*sqrt(arcsin(a*x)))/a^5 - (5/4608*I - 5/4608)*sqrt(6)*sqrt(pi
)*erf((1/2*I - 1/2)*sqrt(6)*sqrt(arcsin(a*x)))/a^5 + (5/4608*I + 5/4608)*sq
rt(6)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(6)*sqrt(arcsin(a*x)))/a^5 + (15/256*
I - 15/256)*sqrt(2)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(2)*sqrt(arcsin(a*x)))/a
^5 - (15/256*I + 15/256)*sqrt(2)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(2)*sqrt(a
rcsin(a*x)))/a^5 + 3/3200*I*sqrt(arcsin(a*x))*e^(5*I*arcsin(a*x))/a^5 - 5/3
84*I*sqrt(arcsin(a*x))*e^(3*I*arcsin(a*x))/a^5 + 15/64*I*sqrt(arcsin(a*x))*
e^(I*arcsin(a*x))/a^5 - 15/64*I*sqrt(arcsin(a*x))*e^(-I*arcsin(a*x))/a^5 +
5/384*I*sqrt(arcsin(a*x))*e^(-3*I*arcsin(a*x))/a^5 - 3/3200*I*sqrt(arcsin(a
*x))*e^(-5*I*arcsin(a*x))/a^5
```

3.87 $\int x^3 \sin^{-1}(ax)^{5/2}\,dx$

Optimal. Leaf size=205

$$\frac{15\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4096a^4}-\frac{15\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{256a^4}+\frac{5x^3\sqrt{1-a^2x^2}\,\sin^{-1}(ax)^{3/2}}{32a}-\frac{45x^2\sqrt{\sin^{-1}(ax)}}{256a^2}+$$

```
[Out] (225*Sqrt[ArcSin[a*x]])/(2048*a^4) - (45*x^2*Sqrt[ArcSin[a*x]])/(256*a^2) -
 (15*x^4*Sqrt[ArcSin[a*x]])/256 + (15*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2)
)/(64*a^3) + (5*x^3*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2))/(32*a) - (3*ArcSin
[a*x]^(5/2))/(32*a^4) + (x^4*ArcSin[a*x]^(5/2))/4 + (15*Sqrt[Pi/2]*FresnelC
[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(4096*a^4) - (15*Sqrt[Pi]*FresnelC[(2*Sqr
t[ArcSin[a*x]])/Sqrt[Pi]])/(256*a^4)
```

Rubi [A] time = 0.600391, antiderivative size = 205, normalized size of antiderivative = 1., number of steps used = 18, number of rules used = 7, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.583, Rules used = {4629, 4707, 4641, 4723, 3312, 3304, 3352}

$$\frac{15\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4096a^4}-\frac{15\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{256a^4}+\frac{5x^3\sqrt{1-a^2x^2}\,\sin^{-1}(ax)^{3/2}}{32a}-\frac{45x^2\sqrt{\sin^{-1}(ax)}}{256a^2}+$$

Antiderivative was successfully verified.

```
[In] Int[x^3*ArcSin[a*x]^(5/2),x]
```

```
[Out] (225*Sqrt[ArcSin[a*x]])/(2048*a^4) - (45*x^2*Sqrt[ArcSin[a*x]])/(256*a^2) -
 (15*x^4*Sqrt[ArcSin[a*x]])/256 + (15*x*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2)
)/(64*a^3) + (5*x^3*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2))/(32*a) - (3*ArcSin
[a*x]^(5/2))/(32*a^4) + (x^4*ArcSin[a*x]^(5/2))/4 + (15*Sqrt[Pi/2]*FresnelC
[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(4096*a^4) - (15*Sqrt[Pi]*FresnelC[(2*Sqr
t[ArcSin[a*x]])/Sqrt[Pi]])/(256*a^4)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3312

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

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int x^3 \sin^{-1}(ax)^{5/2}\,dx = \frac{1}{4}x^4\sin^{-1}(ax)^{5/2} - \frac{1}{8}(5a)\int \frac{x^4\sin^{-1}(ax)^{3/2}}{\sqrt{1-a^2x^2}}\,dx$$

$$= \frac{5x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{32a} + \frac{1}{4}x^4\sin^{-1}(ax)^{5/2} - \frac{15}{64}\int x^3\sqrt{\sin^{-1}(ax)}\,dx - \frac{15\int \frac{x^2\sin^{-1}(ax)^{3/2}}{\sqrt{1-a^2x^2}}\,dx}{32a}$$

$$= -\frac{15}{256}x^4\sqrt{\sin^{-1}(ax)} + \frac{15x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{64a^3} + \frac{5x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{32a} + \frac{1}{4}x^4\sin^{-1}(ax)^{5/2}$$

$$= -\frac{45x^2\sqrt{\sin^{-1}(ax)}}{256a^2} - \frac{15}{256}x^4\sqrt{\sin^{-1}(ax)} + \frac{15x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{64a^3} + \frac{5x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{32a}$$

$$= -\frac{45x^2\sqrt{\sin^{-1}(ax)}}{256a^2} - \frac{15}{256}x^4\sqrt{\sin^{-1}(ax)} + \frac{15x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{64a^3} + \frac{5x^3\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{32a}$$

$$= \frac{45\sqrt{\sin^{-1}(ax)}}{2048a^4} - \frac{45x^2\sqrt{\sin^{-1}(ax)}}{256a^2} - \frac{15}{256}x^4\sqrt{\sin^{-1}(ax)} + \frac{15x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{64a^3} + \frac{5x^3\sqrt{1-a}}{}$$

$$= \frac{225\sqrt{\sin^{-1}(ax)}}{2048a^4} - \frac{45x^2\sqrt{\sin^{-1}(ax)}}{256a^2} - \frac{15}{256}x^4\sqrt{\sin^{-1}(ax)} + \frac{15x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{64a^3} + \frac{5x^3\sqrt{1-}}{}$$

$$= \frac{225\sqrt{\sin^{-1}(ax)}}{2048a^4} - \frac{45x^2\sqrt{\sin^{-1}(ax)}}{256a^2} - \frac{15}{256}x^4\sqrt{\sin^{-1}(ax)} + \frac{15x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{64a^3} + \frac{5x^3\sqrt{1-}}{}$$

$$= \frac{225\sqrt{\sin^{-1}(ax)}}{2048a^4} - \frac{45x^2\sqrt{\sin^{-1}(ax)}}{256a^2} - \frac{15}{256}x^4\sqrt{\sin^{-1}(ax)} + \frac{15x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{64a^3} + \frac{5x^3\sqrt{1-}}{}$$

Mathematica [C] time = 0.0413394, size = 140, normalized size = 0.68

$$\frac{\sqrt{\sin^{-1}(ax)}\left(16\sqrt{2}\sqrt{i\sin^{-1}(ax)}\,\text{Gamma}\left(\frac{7}{2},-2i\sin^{-1}(ax)\right)+16\sqrt{2}\sqrt{-i\sin^{-1}(ax)}\,\text{Gamma}\left(\frac{7}{2},2i\sin^{-1}(ax)\right)-\sqrt{i\sin^{-1}(a}\right.}{2048a^4\sqrt{\sin^{-1}(ax)^2}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^3*ArcSin[a*x]^(5/2),x]
```

```
[Out] (Sqrt[ArcSin[a*x]]*(16*Sqrt[2]*Sqrt[I*ArcSin[a*x]]*Gamma[7/2, (-2*I)*ArcSin
[a*x]] + 16*Sqrt[2]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[7/2, (2*I)*ArcSin[a*x]] -
Sqrt[I*ArcSin[a*x]]*Gamma[7/2, (-4*I)*ArcSin[a*x]] - Sqrt[(-I)*ArcSin[a*x]]
*Gamma[7/2, (4*I)*ArcSin[a*x]]))/(2048*a^4*Sqrt[ArcSin[a*x]^2])
```

Maple [A] time = 0.056, size = 154, normalized size = 0.8

$$-\frac{1}{8192\,a^{4}\sqrt{\pi}}\Big(1024\,(\arcsin(ax))^{5/2}\sqrt{\pi}\cos(2\arcsin(ax)) - 256\,(\arcsin(ax))^{5/2}\sqrt{\pi}\cos(4\arcsin(ax)) - 1280\,(\mathrm{arcsi}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*arcsin(a*x)^(5/2),x)
```

```
[Out] -1/8192/a^4/Pi^(1/2)*(1024*arcsin(a*x)^(5/2)*Pi^(1/2)*cos(2*arcsin(a*x))-25
6*arcsin(a*x)^(5/2)*Pi^(1/2)*cos(4*arcsin(a*x))-1280*arcsin(a*x)^(3/2)*Pi^(
1/2)*sin(2*arcsin(a*x))+160*arcsin(a*x)^(3/2)*Pi^(1/2)*sin(4*arcsin(a*x))-1
5*Pi*2^(1/2)*FresnelC(2*2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))-960*arcsin(a*x)
^(1/2)*Pi^(1/2)*cos(2*arcsin(a*x))+60*arcsin(a*x)^(1/2)*Pi^(1/2)*cos(4*arcs
in(a*x))+480*Pi*FresnelC(2*arcsin(a*x)^(1/2)/Pi^(1/2)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*asin(a*x)**(5/2),x)
```

```
[Out] Timed out
```

Giac [C] time = 1.49425, size = 401, normalized size = 1.96

$$\frac{\arcsin\left(ax\right)^{\frac{5}{2}} e^{\left(4i \arcsin\left(ax\right)\right)}}{64\, a^{4}} - \frac{\arcsin\left(ax\right)^{\frac{5}{2}} e^{\left(2i \arcsin\left(ax\right)\right)}}{16\, a^{4}} - \frac{\arcsin\left(ax\right)^{\frac{5}{2}} e^{\left(-2i \arcsin\left(ax\right)\right)}}{16\, a^{4}} + \frac{\arcsin\left(ax\right)^{\frac{5}{2}} e^{\left(-4i \arcsin\left(ax\right)\right)}}{64\, a^{4}} + 5i$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^(5/2),x, algorithm="giac")
```

```
[Out] 1/64*arcsin(a*x)^(5/2)*e^(4*I*arcsin(a*x))/a^4 - 1/16*arcsin(a*x)^(5/2)*e^(
2*I*arcsin(a*x))/a^4 - 1/16*arcsin(a*x)^(5/2)*e^(-2*I*arcsin(a*x))/a^4 + 1/
64*arcsin(a*x)^(5/2)*e^(-4*I*arcsin(a*x))/a^4 + 5/512*I*arcsin(a*x)^(3/2)*e
^(4*I*arcsin(a*x))/a^4 - 5/64*I*arcsin(a*x)^(3/2)*e^(2*I*arcsin(a*x))/a^4 +
 5/64*I*arcsin(a*x)^(3/2)*e^(-2*I*arcsin(a*x))/a^4 - 5/512*I*arcsin(a*x)^(3
/2)*e^(-4*I*arcsin(a*x))/a^4 - (15/32768*I + 15/32768)*sqrt(2)*sqrt(pi)*erf
((I - 1)*sqrt(2)*sqrt(arcsin(a*x)))/a^4 + (15/32768*I - 15/32768)*sqrt(2)*s
qrt(pi)*erf(-(I + 1)*sqrt(2)*sqrt(arcsin(a*x)))/a^4 + (15/1024*I + 15/1024)
*sqrt(pi)*erf((I - 1)*sqrt(arcsin(a*x)))/a^4 - (15/1024*I - 15/1024)*sqrt(p
i)*erf(-(I + 1)*sqrt(arcsin(a*x)))/a^4 - 15/4096*sqrt(arcsin(a*x))*e^(4*I*a
rcsin(a*x))/a^4 + 15/256*sqrt(arcsin(a*x))*e^(2*I*arcsin(a*x))/a^4 + 15/256
*sqrt(arcsin(a*x))*e^(-2*I*arcsin(a*x))/a^4 - 15/4096*sqrt(arcsin(a*x))*e^(
-4*I*arcsin(a*x))/a^4
```

3.88 $\int x^2 \sin^{-1}(ax)^{5/2}\,dx$

Optimal. Leaf size=178

$$\frac{15\sqrt{\frac{\pi}{2}}\,S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^3}-\frac{5\sqrt{\frac{\pi}{6}}\,S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{144a^3}+\frac{5x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{18a}+\frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{9a^3}-\frac{5x\sqrt{\mathrm{si}}}{6}$$

```
[Out] (-5*x*Sqrt[ArcSin[a*x]])/(6*a^2) - (5*x^3*Sqrt[ArcSin[a*x]])/36 + (5*Sqrt[1
 - a^2*x^2]*ArcSin[a*x]^(3/2))/(9*a^3) + (5*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*
x]^(3/2))/(18*a) + (x^3*ArcSin[a*x]^(5/2))/3 + (15*Sqrt[Pi/2]*FresnelS[Sqrt
[2/Pi]*Sqrt[ArcSin[a*x]]])/(16*a^3) - (5*Sqrt[Pi/6]*FresnelS[Sqrt[6/Pi]*Sqr
t[ArcSin[a*x]]])/(144*a^3)
```

Rubi [A] time = 0.4692, antiderivative size = 178, normalized size of antiderivative = 1., number of steps used = 15, number of rules used = 8, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.667, Rules used = {4629, 4707, 4677, 4619, 4723, 3305, 3351, 3312}

$$\frac{15\sqrt{\frac{\pi}{2}}\,S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^3}-\frac{5\sqrt{\frac{\pi}{6}}\,S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{144a^3}+\frac{5x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{18a}+\frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{9a^3}-\frac{5x\sqrt{\mathrm{si}}}{6}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*ArcSin[a*x]^(5/2),x]
```

```
[Out] (-5*x*Sqrt[ArcSin[a*x]])/(6*a^2) - (5*x^3*Sqrt[ArcSin[a*x]])/36 + (5*Sqrt[1
 - a^2*x^2]*ArcSin[a*x]^(3/2))/(9*a^3) + (5*x^2*Sqrt[1 - a^2*x^2]*ArcSin[a*
x]^(3/2))/(18*a) + (x^3*ArcSin[a*x]^(5/2))/3 + (15*Sqrt[Pi/2]*FresnelS[Sqrt
[2/Pi]*Sqrt[ArcSin[a*x]]])/(16*a^3) - (5*Sqrt[Pi/6]*FresnelS[Sqrt[6/Pi]*Sqr
t[ArcSin[a*x]]])/(144*a^3)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3312

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

Rubi steps

$$\int x^2 \sin^{-1}(ax)^{5/2}\,dx = \frac{1}{3}x^3 \sin^{-1}(ax)^{5/2} - \frac{1}{6}(5a)\int \frac{x^3 \sin^{-1}(ax)^{3/2}}{\sqrt{1-a^2x^2}}\,dx$$

$$= \frac{5x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{18a} + \frac{1}{3}x^3 \sin^{-1}(ax)^{5/2} - \frac{5}{12}\int x^2\sqrt{\sin^{-1}(ax)}\,dx - \frac{5\int \frac{x\sin^{-1}(ax)^{3/2}}{\sqrt{1-a^2x^2}}\,dx}{9a}$$

$$= -\frac{5}{36}x^3\sqrt{\sin^{-1}(ax)} + \frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{9a^3} + \frac{5x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{18a} + \frac{1}{3}x^3 \sin^{-1}(ax)^{5/2} -$$

$$= -\frac{5x\sqrt{\sin^{-1}(ax)}}{6a^2} - \frac{5}{36}x^3\sqrt{\sin^{-1}(ax)} + \frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{9a^3} + \frac{5x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{18a} + \frac{1}{3}$$

$$= -\frac{5x\sqrt{\sin^{-1}(ax)}}{6a^2} - \frac{5}{36}x^3\sqrt{\sin^{-1}(ax)} + \frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{9a^3} + \frac{5x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{18a} + \frac{1}{3}$$

$$= -\frac{5x\sqrt{\sin^{-1}(ax)}}{6a^2} - \frac{5}{36}x^3\sqrt{\sin^{-1}(ax)} + \frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{9a^3} + \frac{5x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{18a} + \frac{1}{3}$$

$$= -\frac{5x\sqrt{\sin^{-1}(ax)}}{6a^2} - \frac{5}{36}x^3\sqrt{\sin^{-1}(ax)} + \frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{9a^3} + \frac{5x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{18a} + \frac{1}{3}$$

$$= -\frac{5x\sqrt{\sin^{-1}(ax)}}{6a^2} - \frac{5}{36}x^3\sqrt{\sin^{-1}(ax)} + \frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{9a^3} + \frac{5x^2\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{18a} + \frac{1}{3}$$

Mathematica [C] time = 0.0465538, size = 125, normalized size = 0.7

$$\frac{-81\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{7}{2},-i\sin^{-1}(ax)\right) - 81\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{7}{2},i\sin^{-1}(ax)\right) + \sqrt{3}\Bigg(\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\Bigg(}{648a^3\sqrt{\sin^{-1}(ax)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2*ArcSin[a*x]^(5/2),x]
```

```
[Out] (-81*Sqrt[(-I)*ArcSin[a*x]]*Gamma[7/2, (-I)*ArcSin[a*x]] - 81*Sqrt[I*ArcSin
[a*x]]*Gamma[7/2, I*ArcSin[a*x]] + Sqrt[3]*(Sqrt[(-I)*ArcSin[a*x]]*Gamma[7/
2, (-3*I)*ArcSin[a*x]] + Sqrt[I*ArcSin[a*x]]*Gamma[7/2, (3*I)*ArcSin[a*x]])
)/(648*a^3*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.055, size = 156, normalized size = 0.9

$$-\frac{1}{864\,a^3}\left(-216\,ax\,(\arcsin(ax))^3+72\,(\arcsin(ax))^3\sin(3\,\arcsin(ax))+5\,\sqrt{3}\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\mathrm{FresnelS}\left(\frac{\sqrt{3}\sqrt{2}\sqrt{\mathrm{ar}}}{\sqrt{}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*arcsin(a*x)^(5/2),x)
```

```
[Out] -1/864/a^3/arcsin(a*x)^(1/2)*(-216*a*x*arcsin(a*x)^3+72*arcsin(a*x)^3*sin(3
*arcsin(a*x))+5*3^(1/2)*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)
/Pi^(1/2)*3^(1/2)*arcsin(a*x)^(1/2))-540*arcsin(a*x)^2*(-a^2*x^2+1)^(1/2)+6
0*arcsin(a*x)^2*cos(3*arcsin(a*x))-405*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*F
resnelS(2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))+810*a*x*arcsin(a*x)-30*arcsin(a
*x)*sin(3*arcsin(a*x)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*asin(a*x)**(5/2),x)
```

```
[Out] Timed out
```

Giac [C] time = 1.43601, size = 417, normalized size = 2.34

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^(5/2),x, algorithm="giac")
```

```
[Out] 1/24*I*arcsin(a*x)^(5/2)*e^(3*I*arcsin(a*x))/a^3 - 1/8*I*arcsin(a*x)^(5/2)*
e^(I*arcsin(a*x))/a^3 + 1/8*I*arcsin(a*x)^(5/2)*e^(-I*arcsin(a*x))/a^3 - 1/
24*I*arcsin(a*x)^(5/2)*e^(-3*I*arcsin(a*x))/a^3 - 5/144*arcsin(a*x)^(3/2)*e
^(3*I*arcsin(a*x))/a^3 + 5/16*arcsin(a*x)^(3/2)*e^(I*arcsin(a*x))/a^3 + 5/1
6*arcsin(a*x)^(3/2)*e^(-I*arcsin(a*x))/a^3 - 5/144*arcsin(a*x)^(3/2)*e^(-3*
I*arcsin(a*x))/a^3 - (5/3456*I - 5/3456)*sqrt(6)*sqrt(pi)*erf((1/2*I - 1/2)
*sqrt(6)*sqrt(arcsin(a*x)))/a^3 + (5/3456*I + 5/3456)*sqrt(6)*sqrt(pi)*erf(
-(1/2*I + 1/2)*sqrt(6)*sqrt(arcsin(a*x)))/a^3 + (15/128*I - 15/128)*sqrt(2)
*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(2)*sqrt(arcsin(a*x)))/a^3 - (15/128*I + 15
/128)*sqrt(2)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(2)*sqrt(arcsin(a*x)))/a^3 -
5/288*I*sqrt(arcsin(a*x))*e^(3*I*arcsin(a*x))/a^3 + 15/32*I*sqrt(arcsin(a*x
))*e^(I*arcsin(a*x))/a^3 - 15/32*I*sqrt(arcsin(a*x))*e^(-I*arcsin(a*x))/a^3
 + 5/288*I*sqrt(arcsin(a*x))*e^(-3*I*arcsin(a*x))/a^3
```

3.89 $\int x\sin^{-1}(ax)^{5/2}\,dx$

Optimal. Leaf size=119

$$-\frac{15\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{128a^2}+\frac{5x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{8a}-\frac{\sin^{-1}(ax)^{5/2}}{4a^2}+\frac{15\sqrt{\sin^{-1}(ax)}}{64a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^{5/2}-\frac{15}{32}x^2\sqrt{\text{s}}$$

```
[Out] (15*Sqrt[ArcSin[a*x]])/(64*a^2) - (15*x^2*Sqrt[ArcSin[a*x]])/32 + (5*x*Sqrt
[1 - a^2*x^2]*ArcSin[a*x]^(3/2))/(8*a) - ArcSin[a*x]^(5/2)/(4*a^2) + (x^2*A
rcSin[a*x]^(5/2))/2 - (15*Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]]
)/(128*a^2)
```

Rubi [A] time = 0.312713, antiderivative size = 119, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.7, Rules used = {4629, 4707, 4641, 4723, 3312, 3304, 3352}

$$-\frac{15\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{128a^2}+\frac{5x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{8a}-\frac{\sin^{-1}(ax)^{5/2}}{4a^2}+\frac{15\sqrt{\sin^{-1}(ax)}}{64a^2}+\frac{1}{2}x^2\sin^{-1}(ax)^{5/2}-\frac{15}{32}x^2\sqrt{\text{s}}$$

Antiderivative was successfully verified.

```
[In] Int[x*ArcSin[a*x]^(5/2),x]
```

```
[Out] (15*Sqrt[ArcSin[a*x]])/(64*a^2) - (15*x^2*Sqrt[ArcSin[a*x]])/32 + (5*x*Sqrt
[1 - a^2*x^2]*ArcSin[a*x]^(3/2))/(8*a) - ArcSin[a*x]^(5/2)/(4*a^2) + (x^2*A
rcSin[a*x]^(5/2))/2 - (15*Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]]
)/(128*a^2)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3312

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

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int x\sin^{-1}(ax)^{5/2}\,dx = \frac{1}{2}x^2\sin^{-1}(ax)^{5/2} - \frac{1}{4}(5a)\int \frac{x^2\sin^{-1}(ax)^{3/2}}{\sqrt{1-a^2x^2}}\,dx$$

$$= \frac{5x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{8a} + \frac{1}{2}x^2\sin^{-1}(ax)^{5/2} - \frac{15}{16}\int x\sqrt{\sin^{-1}(ax)}\,dx - \frac{5\int \frac{\sin^{-1}(ax)^{3/2}}{\sqrt{1-a^2x^2}}\,dx}{8a}$$

$$= -\frac{15}{32}x^2\sqrt{\sin^{-1}(ax)} + \frac{5x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{8a} - \frac{\sin^{-1}(ax)^{5/2}}{4a^2} + \frac{1}{2}x^2\sin^{-1}(ax)^{5/2} + \frac{1}{64}(15a)\int$$

$$= -\frac{15}{32}x^2\sqrt{\sin^{-1}(ax)} + \frac{5x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{8a} - \frac{\sin^{-1}(ax)^{5/2}}{4a^2} + \frac{1}{2}x^2\sin^{-1}(ax)^{5/2} +$$

$$= -\frac{15}{32}x^2\sqrt{\sin^{-1}(ax)} + \frac{5x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{8a} - \frac{\sin^{-1}(ax)^{5/2}}{4a^2} + \frac{1}{2}x^2\sin^{-1}(ax)^{5/2} +$$

$$= \frac{15\sqrt{\sin^{-1}(ax)}}{64a^2} - \frac{15}{32}x^2\sqrt{\sin^{-1}(ax)} + \frac{5x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{8a} - \frac{\sin^{-1}(ax)^{5/2}}{4a^2} + \frac{1}{2}x^2\sin^{-1}(ax)^{5/2} -$$

$$= \frac{15\sqrt{\sin^{-1}(ax)}}{64a^2} - \frac{15}{32}x^2\sqrt{\sin^{-1}(ax)} + \frac{5x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{8a} - \frac{\sin^{-1}(ax)^{5/2}}{4a^2} + \frac{1}{2}x^2\sin^{-1}(ax)^{5/2} -$$

$$= \frac{15\sqrt{\sin^{-1}(ax)}}{64a^2} - \frac{15}{32}x^2\sqrt{\sin^{-1}(ax)} + \frac{5x\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{8a} - \frac{\sin^{-1}(ax)^{5/2}}{4a^2} + \frac{1}{2}x^2\sin^{-1}(ax)^{5/2} -$$

Mathematica [C] time = 0.0195838, size = 81, normalized size = 0.68

$$\frac{\sqrt{\sin^{-1}(ax)}\left(\sqrt{i\sin^{-1}(ax)}\,\text{Gamma}\left(\frac{7}{2},-2i\sin^{-1}(ax)\right)+\sqrt{-i\sin^{-1}(ax)}\,\text{Gamma}\left(\frac{7}{2},2i\sin^{-1}(ax)\right)\right)}{32\sqrt{2}a^2\sqrt{\sin^{-1}(ax)^2}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*ArcSin[a*x]^(5/2),x]
```

```
[Out] (Sqrt[ArcSin[a*x]]*(Sqrt[I*ArcSin[a*x]]*Gamma[7/2, (-2*I)*ArcSin[a*x]] + Sq
rt[(-I)*ArcSin[a*x]]*Gamma[7/2, (2*I)*ArcSin[a*x]]))/(32*Sqrt[2]*a^2*Sqrt[A
rcSin[a*x]^2])
```

Maple [A] time = 0.036, size = 79, normalized size = 0.7

$$-\frac{1}{128\,a^{2}\sqrt{\pi}}\Bigg(32\,(\arcsin(ax))^{5/2}\sqrt{\pi}\cos(2\arcsin(ax))-40\,(\arcsin(ax))^{3/2}\sqrt{\pi}\sin(2\arcsin(ax))-30\sqrt{\arcsin(ax)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*arcsin(a*x)^(5/2),x)
```

```
[Out] -1/128/a^2/Pi^(1/2)*(32*arcsin(a*x)^(5/2)*Pi^(1/2)*cos(2*arcsin(a*x))-40*ar
csin(a*x)^(3/2)*Pi^(1/2)*sin(2*arcsin(a*x))-30*arcsin(a*x)^(1/2)*Pi^(1/2)*c
os(2*arcsin(a*x))+15*Pi*FresnelC(2*arcsin(a*x)^(1/2)/Pi^(1/2)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*asin(a*x)**(5/2),x)
```

```
[Out] Timed out
```

Giac [C] time = 1.46285, size = 193, normalized size = 1.62

$$-\frac{\arcsin\left(ax\right)^{\frac{5}{2}} e^{\left(2i \arcsin\left(ax\right)\right)}}{8 a^2}-\frac{\arcsin\left(ax\right)^{\frac{5}{2}} e^{\left(-2i \arcsin\left(ax\right)\right)}}{8 a^2}-\frac{5i \arcsin\left(ax\right)^{\frac{3}{2}} e^{\left(2i \arcsin\left(ax\right)\right)}}{32 a^2}+\frac{5i \arcsin\left(ax\right)^{\frac{3}{2}} e^{\left(-2i \arcsin\left(ax\right)\right)}}{32 a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^(5/2),x, algorithm="giac")
```

```
[Out] -1/8*arcsin(a*x)^(5/2)*e^(2*I*arcsin(a*x))/a^2 - 1/8*arcsin(a*x)^(5/2)*e^(-
2*I*arcsin(a*x))/a^2 - 5/32*I*arcsin(a*x)^(3/2)*e^(2*I*arcsin(a*x))/a^2 + 5
/32*I*arcsin(a*x)^(3/2)*e^(-2*I*arcsin(a*x))/a^2 + (15/512*I + 15/512)*sqrt
(pi)*erf((I - 1)*sqrt(arcsin(a*x)))/a^2 - (15/512*I - 15/512)*sqrt(pi)*erf(
-(I + 1)*sqrt(arcsin(a*x)))/a^2 + 15/128*sqrt(arcsin(a*x))*e^(2*I*arcsin(a*
x))/a^2 + 15/128*sqrt(arcsin(a*x))*e^(-2*I*arcsin(a*x))/a^2
```

3.90 $\int \sin^{-1}(ax)^{5/2}\,dx$

Optimal. Leaf size=88

$$\frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{2a}+\frac{15\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a}+x\sin^{-1}(ax)^{5/2}-\frac{15}{4}x\sqrt{\sin^{-1}(ax)}$$

```
[Out] (-15*x*Sqrt[ArcSin[a*x]])/4 + (5*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2))/(2*a)
 + x*ArcSin[a*x]^(5/2) + (15*Sqrt[Pi/2]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x
]]])/(4*a)
```

Rubi [A] time = 0.164965, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {4619, 4677, 4723, 3305, 3351}

$$\frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{2a}+\frac{15\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a}+x\sin^{-1}(ax)^{5/2}-\frac{15}{4}x\sqrt{\sin^{-1}(ax)}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^(5/2),x]
```

```
[Out] (-15*x*Sqrt[ArcSin[a*x]])/4 + (5*Sqrt[1 - a^2*x^2]*ArcSin[a*x]^(3/2))/(2*a)
 + x*ArcSin[a*x]^(5/2) + (15*Sqrt[Pi/2]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x
]]])/(4*a)
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int \sin^{-1}(ax)^{5/2}\,dx &= x\sin^{-1}(ax)^{5/2}-\frac{1}{2}(5a)\int \frac{x\sin^{-1}(ax)^{3/2}}{\sqrt{1-a^2x^2}}\,dx\\
&= \frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{2a}+x\sin^{-1}(ax)^{5/2}-\frac{15}{4}\int \sqrt{\sin^{-1}(ax)}\,dx\\
&= -\frac{15}{4}x\sqrt{\sin^{-1}(ax)}+\frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{2a}+x\sin^{-1}(ax)^{5/2}+\frac{1}{8}(15a)\int \frac{x}{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}\,dx\\
&= -\frac{15}{4}x\sqrt{\sin^{-1}(ax)}+\frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{2a}+x\sin^{-1}(ax)^{5/2}+\frac{15\,\text{Subst}\left(\int \frac{\sin(x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{8a}\\
&= -\frac{15}{4}x\sqrt{\sin^{-1}(ax)}+\frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{2a}+x\sin^{-1}(ax)^{5/2}+\frac{15\,\text{Subst}\left(\int \sin\left(x^2\right)\,dx,x,\sqrt{\sin^{-1}(a}\right.}{4a}\\
&= -\frac{15}{4}x\sqrt{\sin^{-1}(ax)}+\frac{5\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}{2a}+x\sin^{-1}(ax)^{5/2}+\frac{15\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a}
\end{aligned}
$$

Mathematica [C] time = 0.0354744, size = 68, normalized size = 0.77

$$\frac{-\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{7}{2},-i\sin^{-1}(ax)\right)-\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{7}{2},i\sin^{-1}(ax)\right)}{2a\sqrt{\sin^{-1}(ax)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^(5/2),x]
```

```
[Out] (-(Sqrt[(-I)*ArcSin[a*x]]*Gamma[7/2, (-I)*ArcSin[a*x]]) - Sqrt[I*ArcSin[a*x
]]*Gamma[7/2, I*ArcSin[a*x]])/(2*a*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.037, size = 88, normalized size = 1.

$$\frac{\sqrt{2}}{8\,a\sqrt{\pi}}\left(4\,\left(\arcsin\left(ax\right)\right)^{5/2}\sqrt{2}\sqrt{\pi}xa+10\,\left(\arcsin\left(ax\right)\right)^{3/2}\sqrt{2}\sqrt{\pi}\sqrt{-a^{2}x^{2}+1}-15\,\sqrt{2}\sqrt{\arcsin\left(ax\right)}\sqrt{\pi}xa+15\,\pi\,\mathrm{Fresnel}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^(5/2),x)
```

```
[Out] 1/8/a*2^(1/2)/Pi^(1/2)*(4*arcsin(a*x)^(5/2)*2^(1/2)*Pi^(1/2)*x*a+10*arcsin(
a*x)^(3/2)*2^(1/2)*Pi^(1/2)*(-a^2*x^2+1)^(1/2)-15*2^(1/2)*arcsin(a*x)^(1/2)
*Pi^(1/2)*x*a+15*Pi*FresnelS(2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**(5/2),x)
```

```
[Out] Timed out
```

Giac [C] time = 1.51359, size = 209, normalized size = 2.38

$$-\frac{i\arcsin\left(ax\right)^{\frac{5}{2}}e^{\left(i\arcsin\left(ax\right)\right)}}{2\,a}+\frac{i\arcsin\left(ax\right)^{\frac{5}{2}}e^{\left(-i\arcsin\left(ax\right)\right)}}{2\,a}+\frac{5\arcsin\left(ax\right)^{\frac{3}{2}}e^{\left(i\arcsin\left(ax\right)\right)}}{4\,a}+\frac{5\arcsin\left(ax\right)^{\frac{3}{2}}e^{\left(-i\arcsin\left(ax\right)\right)}}{4\,a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(5/2),x, algorithm="giac")
```

```
[Out] -1/2*I*arcsin(a*x)^(5/2)*e^(I*arcsin(a*x))/a + 1/2*I*arcsin(a*x)^(5/2)*e^(-
I*arcsin(a*x))/a + 5/4*arcsin(a*x)^(3/2)*e^(I*arcsin(a*x))/a + 5/4*arcsin(a
*x)^(3/2)*e^(-I*arcsin(a*x))/a + (15/32*I - 15/32)*sqrt(2)*sqrt(pi)*erf((1/
2*I - 1/2)*sqrt(2)*sqrt(arcsin(a*x)))/a - (15/32*I + 15/32)*sqrt(2)*sqrt(pi
)*erf(-(1/2*I + 1/2)*sqrt(2)*sqrt(arcsin(a*x)))/a + 15/8*I*sqrt(arcsin(a*x)
)*e^(I*arcsin(a*x))/a - 15/8*I*sqrt(arcsin(a*x))*e^(-I*arcsin(a*x))/a
```

3.91 $\int \frac{\sin^{-1}(ax)^{5/2}}{x} \, dx$

Optimal. Leaf size=14

$$\text{Unintegrable}\left(\frac{\sin^{-1}(ax)^{5/2}}{x},x\right)$$

```
[Out] Unintegrable[ArcSin[a*x]^(5/2)/x, x]
```

Rubi [A] time = 0.0125499, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\sin^{-1}(ax)^{5/2}}{x} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[ArcSin[a*x]^(5/2)/x,x]
```

```
[Out] Defer[Int][ArcSin[a*x]^(5/2)/x, x]
```

Rubi steps

$$\int \frac{\sin^{-1}(ax)^{5/2}}{x} \, dx = \int \frac{\sin^{-1}(ax)^{5/2}}{x} \, dx$$

Mathematica [A] time = 0.373316, size = 0, normalized size = 0.

$$\int \frac{\sin^{-1}(ax)^{5/2}}{x} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[ArcSin[a*x]^(5/2)/x,x]
```

```
[Out] Integrate[ArcSin[a*x]^(5/2)/x, x]
```

Maple [A] time = 0.063, size = 0, normalized size = 0.

$$\int \frac{1}{x} (\arcsin (ax))^{\frac{5}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^(5/2)/x,x)
```

```
[Out] int(arcsin(a*x)^(5/2)/x,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(5/2)/x,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(5/2)/x,x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**(5/2)/x,x)
```

```
[Out] Timed out
```

<u>Giac</u> [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin{(ax)}^{\frac{5}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^(5/2)/x,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^(5/2)/x, x)
```

3.92 $\int \frac{x^4}{\sqrt{\sin^{-1}(ax)}}\,dx$

Optimal. Leaf size=106

$$\frac{\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a^5}-\frac{\sqrt{\frac{3\pi}{2}}\,\text{FresnelC}\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^5}+\frac{\sqrt{\frac{\pi}{10}}\,\text{FresnelC}\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^5}$$

```
[Out] (Sqrt[Pi/2]*FresnelC[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(4*a^5) - (Sqrt[(3*Pi)/
2]*FresnelC[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(8*a^5) + (Sqrt[Pi/10]*FresnelC[
Sqrt[10/Pi]*Sqrt[ArcSin[a*x]]])/(8*a^5)
```

Rubi [A] time = 0.111608, antiderivative size = 106, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 4, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {4635, 4406, 3304, 3352}

$$\frac{\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a^5}-\frac{\sqrt{\frac{3\pi}{2}}\,\text{FresnelC}\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^5}+\frac{\sqrt{\frac{\pi}{10}}\,\text{FresnelC}\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^5}$$

Antiderivative was successfully verified.

```
[In] Int[x^4/Sqrt[ArcSin[a*x]],x]
```

```
[Out] (Sqrt[Pi/2]*FresnelC[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(4*a^5) - (Sqrt[(3*Pi)/
2]*FresnelC[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(8*a^5) + (Sqrt[Pi/10]*FresnelC[
Sqrt[10/Pi]*Sqrt[ArcSin[a*x]]])/(8*a^5)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{x^4}{\sqrt{\sin^{-1}(ax)}}\,dx &= \frac{\text{Subst}\left(\int \frac{\cos(x)\sin^4(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{a^5}\\
&= \frac{\text{Subst}\left(\int \left(\frac{\cos(x)}{8\sqrt{x}} - \frac{3\cos(3x)}{16\sqrt{x}} + \frac{\cos(5x)}{16\sqrt{x}}\right)dx, x, \sin^{-1}(ax)\right)}{a^5}\\
&= \frac{\text{Subst}\left(\int \frac{\cos(5x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{16a^5} + \frac{\text{Subst}\left(\int \frac{\cos(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{8a^5} - \frac{3\,\text{Subst}\left(\int \frac{\cos(3x)}{\sqrt{x}}\,dx, x, \text{si}\right.}{16a^5}\\
&= \frac{\text{Subst}\left(\int \cos\left(5x^2\right)dx, x, \sqrt{\sin^{-1}(ax)}\right)}{8a^5} + \frac{\text{Subst}\left(\int \cos\left(x^2\right)dx, x, \sqrt{\sin^{-1}(ax)}\right)}{4a^5} - \frac{3\,\text{Subst}\left(\int \text{cos}\right.}{}\\
&= \frac{\sqrt{\frac{\pi}{2}}C\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a^5} - \frac{\sqrt{\frac{3\pi}{2}}C\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^5} + \frac{\sqrt{\frac{\pi}{10}}C\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^5}
\end{aligned}
$$

Mathematica [C] time = 0.0565194, size = 193, normalized size = 1.82

$$
-\frac{i\left(10\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2}, -i\sin^{-1}(ax)\right) - 10\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2}, i\sin^{-1}(ax)\right) - 5\sqrt{3}\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\right.}{}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^4/Sqrt[ArcSin[a*x]],x]
```

```
[Out] ((-I/160)*(10*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-I)*ArcSin[a*x]] - 10*Sqrt
[I*ArcSin[a*x]]*Gamma[1/2, I*ArcSin[a*x]] - 5*Sqrt[3]*Sqrt[(-I)*ArcSin[a*x]
]*Gamma[1/2, (-3*I)*ArcSin[a*x]] + 5*Sqrt[3]*Sqrt[I*ArcSin[a*x]]*Gamma[1/2,
 (3*I)*ArcSin[a*x]] + Sqrt[5]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-5*I)*ArcS
in[a*x]] - Sqrt[5]*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (5*I)*ArcSin[a*x]]))/(a^5
*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.055, size = 72, normalized size = 0.7

$$\frac{\sqrt{2}\sqrt{\pi}}{80\,a^5}\left(\sqrt{5}\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{5}}{\sqrt{\pi}}\sqrt{\arcsin(ax)}\right)-5\,\sqrt{3}\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{3}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+10\,\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4/arcsin(a*x)^(1/2),x)
```

```
[Out] 1/80/a^5*2^(1/2)*Pi^(1/2)*(5^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*5^(1/2)*arcsin
(a*x)^(1/2))-5*3^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*3^(1/2)*arcsin(a*x)^(1/2))
+10*FresnelC(2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\sqrt{\operatorname{asin}(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4/asin(a*x)**(1/2),x)
```

```
[Out] Integral(x**4/sqrt(asin(a*x)), x)
```

Giac [C] time = 1.45233, size = 188, normalized size = 1.77

$$-\frac{(i+1)\,\sqrt{10}\sqrt{\pi}\operatorname{erf}\left(\left(\frac{1}{2}i-\frac{1}{2}\right)\sqrt{10}\sqrt{\arcsin(ax)}\right)}{320\,a^5}+\frac{(i-1)\,\sqrt{10}\sqrt{\pi}\operatorname{erf}\left(-\left(\frac{1}{2}i+\frac{1}{2}\right)\sqrt{10}\sqrt{\arcsin(ax)}\right)}{320\,a^5}+\frac{(i+1)\,\sqrt{6}\sqrt{\pi}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] -(1/320*I + 1/320)*sqrt(10)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(10)*sqrt(arcsin
(a*x)))/a^5 + (1/320*I - 1/320)*sqrt(10)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(1
0)*sqrt(arcsin(a*x)))/a^5 + (1/64*I + 1/64)*sqrt(6)*sqrt(pi)*erf((1/2*I - 1
/2)*sqrt(6)*sqrt(arcsin(a*x)))/a^5 - (1/64*I - 1/64)*sqrt(6)*sqrt(pi)*erf(-
(1/2*I + 1/2)*sqrt(6)*sqrt(arcsin(a*x)))/a^5 - (1/32*I + 1/32)*sqrt(2)*sqrt
(pi)*erf((1/2*I - 1/2)*sqrt(2)*sqrt(arcsin(a*x)))/a^5 + (1/32*I - 1/32)*sqr
t(2)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(2)*sqrt(arcsin(a*x)))/a^5
```

3.93 $\int \frac{x^3}{\sqrt{\sin^{-1}(ax)}}\,dx$

Optimal. Leaf size=65

$$\frac{\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{4a^4}-\frac{\sqrt{\frac{\pi}{2}}S\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^4}$$

```
[Out] -(Sqrt[Pi/2]*FresnelS[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(8*a^4) + (Sqrt[Pi]*
FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(4*a^4)
```

Rubi [A] time = 0.0826256, antiderivative size = 65, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 4, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {4635, 4406, 3305, 3351}

$$\frac{\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{4a^4}-\frac{\sqrt{\frac{\pi}{2}}S\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^4}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/Sqrt[ArcSin[a*x]],x]
```

```
[Out] -(Sqrt[Pi/2]*FresnelS[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(8*a^4) + (Sqrt[Pi]*
FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(4*a^4)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{x^3}{\sqrt{\sin^{-1}(ax)}}\,dx &= \frac{\text{Subst}\left(\int \frac{\cos(x)\sin^3(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{a^4}\\
&= \frac{\text{Subst}\left(\int \left(\frac{\sin(2x)}{4\sqrt{x}} - \frac{\sin(4x)}{8\sqrt{x}}\right)dx, x, \sin^{-1}(ax)\right)}{a^4}\\
&= -\frac{\text{Subst}\left(\int \frac{\sin(4x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{8a^4} + \frac{\text{Subst}\left(\int \frac{\sin(2x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{4a^4}\\
&= -\frac{\text{Subst}\left(\int \sin\left(4x^2\right)dx, x, \sqrt{\sin^{-1}(ax)}\right)}{4a^4} + \frac{\text{Subst}\left(\int \sin\left(2x^2\right)dx, x, \sqrt{\sin^{-1}(ax)}\right)}{2a^4}\\
&= -\frac{\sqrt{\frac{\pi}{2}}S\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^4} + \frac{\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{4a^4}
\end{aligned}
$$

Mathematica [C] time = 0.0323625, size = 128, normalized size = 1.97

$$
\frac{-2\sqrt{2}\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2}, -2i\sin^{-1}(ax)\right) - 2\sqrt{2}\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2}, 2i\sin^{-1}(ax)\right) + \sqrt{-i\sin^{-1}(ax)}\text{Gamma}}{32a^4\sqrt{\sin^{-1}(ax)}}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^3/Sqrt[ArcSin[a*x]],x]
```

```
[Out] (-2*Sqrt[2]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-2*I)*ArcSin[a*x]] - 2*Sqrt[
2]*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (2*I)*ArcSin[a*x]] + Sqrt[(-I)*ArcSin[a*x
]]*Gamma[1/2, (-4*I)*ArcSin[a*x]] + Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (4*I)*Ar
cSin[a*x]])/(32*a^4*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.039, size = 44, normalized size = 0.7

$$\frac{\sqrt{\pi}}{16\,a^4}\left(-\sqrt{2}\mathrm{FresnelS}\left(2\,\frac{\sqrt{2}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+4\,\mathrm{FresnelS}\left(2\,\frac{\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/arcsin(a*x)^(1/2),x)
```

```
[Out] 1/16/a^4*Pi^(1/2)*(-2^(1/2)*FresnelS(2*2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))+
4*FresnelS(2*arcsin(a*x)^(1/2)/Pi^(1/2)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\sqrt{\operatorname{asin}(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/asin(a*x)**(1/2),x)
```

```
[Out] Integral(x**3/sqrt(asin(a*x)), x)
```

Giac [C] time = 1.47587, size = 109, normalized size = 1.68

$$-\frac{(i-1)\sqrt{2}\sqrt{\pi}\operatorname{erf}\left((i-1)\sqrt{2}\sqrt{\arcsin(ax)}\right)}{64\,a^4}+\frac{(i+1)\sqrt{2}\sqrt{\pi}\operatorname{erf}\left(-(i+1)\sqrt{2}\sqrt{\arcsin(ax)}\right)}{64\,a^4}+\frac{(i-1)\sqrt{\pi}\operatorname{erf}\left((i-1)\right.}{16\,a^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] -(1/64*I - 1/64)*sqrt(2)*sqrt(pi)*erf((I - 1)*sqrt(2)*sqrt(arcsin(a*x)))/a^
4 + (1/64*I + 1/64)*sqrt(2)*sqrt(pi)*erf(-(I + 1)*sqrt(2)*sqrt(arcsin(a*x))
)/a^4 + (1/16*I - 1/16)*sqrt(pi)*erf((I - 1)*sqrt(arcsin(a*x)))/a^4 - (1/16
*I + 1/16)*sqrt(pi)*erf(-(I + 1)*sqrt(arcsin(a*x)))/a^4
```

3.94 $\int \frac{x^2}{\sqrt{\sin^{-1}(ax)}}\,dx$

Optimal. Leaf size=71

$$\frac{\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a^3}-\frac{\sqrt{\frac{\pi}{6}}\,\text{FresnelC}\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a^3}$$

```
[Out] (Sqrt[Pi/2]*FresnelC[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(2*a^3) - (Sqrt[Pi/6]*F
resnelC[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(2*a^3)
```

Rubi [A] time = 0.0892158, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 4, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {4635, 4406, 3304, 3352}

$$\frac{\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a^3}-\frac{\sqrt{\frac{\pi}{6}}\,\text{FresnelC}\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/Sqrt[ArcSin[a*x]],x]
```

```
[Out] (Sqrt[Pi/2]*FresnelC[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(2*a^3) - (Sqrt[Pi/6]*F
resnelC[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(2*a^3)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{x^2}{\sqrt{\sin^{-1}(ax)}}\,dx &= \frac{\text{Subst}\left(\int \frac{\cos(x)\sin^2(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{a^3}\\
&= \frac{\text{Subst}\left(\int \left(\frac{\cos(x)}{4\sqrt{x}} - \frac{\cos(3x)}{4\sqrt{x}}\right)dx, x, \sin^{-1}(ax)\right)}{a^3}\\
&= \frac{\text{Subst}\left(\int \frac{\cos(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{4a^3} - \frac{\text{Subst}\left(\int \frac{\cos(3x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{4a^3}\\
&= \frac{\text{Subst}\left(\int \cos\left(x^2\right)dx, x, \sqrt{\sin^{-1}(ax)}\right)}{2a^3} - \frac{\text{Subst}\left(\int \cos\left(3x^2\right)dx, x, \sqrt{\sin^{-1}(ax)}\right)}{2a^3}\\
&= \frac{\sqrt{\frac{\pi}{2}}\,C\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a^3} - \frac{\sqrt{\frac{\pi}{6}}\,C\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a^3}
\end{aligned}
$$

Mathematica [C] time = 0.0508396, size = 128, normalized size = 1.8

$$
-\frac{i(3\sqrt{-i\sin^{-1}(ax)}\,\text{Gamma}(\tfrac{1}{2}, -i\sin^{-1}(ax)) - 3\sqrt{i\sin^{-1}(ax)}\,\text{Gamma}(\tfrac{1}{2}, i\sin^{-1}(ax)) + \sqrt{3}(\sqrt{i\sin^{-1}(ax)}\,\text{Gamma}(\tfrac{1}{2},}{24a^3\sqrt{\sin^{-1}(ax)}}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2/Sqrt[ArcSin[a*x]],x]
```

```
[Out] ((-I/24)*(3*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-I)*ArcSin[a*x]] - 3*Sqrt[I*
ArcSin[a*x]]*Gamma[1/2, I*ArcSin[a*x]] + Sqrt[3]*(-(Sqrt[(-I)*ArcSin[a*x]]*
Gamma[1/2, (-3*I)*ArcSin[a*x]]) + Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (3*I)*ArcS
in[a*x]])))/(a^3*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.039, size = 51, normalized size = 0.7

$$\frac{\sqrt{2}\sqrt{\pi}}{12\,a^{3}}\left(-\sqrt{3}\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{3}}{\sqrt{\pi}}\sqrt{\arcsin\left(ax\right)}\right)+3\,\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/arcsin(a*x)^(1/2),x)
```

```
[Out] 1/12/a^3*2^(1/2)*Pi^(1/2)*(-3^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*3^(1/2)*arcsi
n(a*x)^(1/2))+3*FresnelC(2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{\operatorname{asin}(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/asin(a*x)**(1/2),x)
```

```
[Out] Integral(x**2/sqrt(asin(a*x)), x)
```

Giac [C] time = 1.4345, size = 126, normalized size = 1.77

$$\frac{(i+1)\ \sqrt{6}\sqrt{\pi}\,\mathrm{erf}\left(\left(\frac{1}{2}i-\frac{1}{2}\right)\ \sqrt{6}\sqrt{\arcsin(ax)}\right)}{48\,a^3}-\frac{(i-1)\ \sqrt{6}\sqrt{\pi}\,\mathrm{erf}\left(-\left(\frac{1}{2}i+\frac{1}{2}\right)\ \sqrt{6}\sqrt{\arcsin(ax)}\right)}{48\,a^3}-\frac{(i+1)\ \sqrt{2}\sqrt{\pi}\,\mathrm{erf}\left(\left(\frac{1}{2}\right.\right.}{1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] (1/48*I + 1/48)*sqrt(6)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(6)*sqrt(arcsin(a*x)
))/a^3 - (1/48*I - 1/48)*sqrt(6)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(6)*sqrt(a
rcsin(a*x)))/a^3 - (1/16*I + 1/16)*sqrt(2)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(
2)*sqrt(arcsin(a*x)))/a^3 + (1/16*I - 1/16)*sqrt(2)*sqrt(pi)*erf(-(1/2*I +
1/2)*sqrt(2)*sqrt(arcsin(a*x)))/a^3
```

3.95 $\int \frac{x}{\sqrt{\sin^{-1}(ax)}} \, dx$

Optimal. Leaf size=28

$$\frac{\sqrt{\pi} S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{2a^2}$$

```
[Out] (Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(2*a^2)
```

Rubi [A] time = 0.0447623, antiderivative size = 28, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4635, 4406, 12, 3305, 3351}

$$\frac{\sqrt{\pi} S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{2a^2}$$

Antiderivative was successfully verified.

```
[In] Int[x/Sqrt[ArcSin[a*x]],x]
```

```
[Out] (Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(2*a^2)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{x}{\sqrt{\sin^{-1}(ax)}}\,dx &= \frac{\text{Subst}\left(\int \frac{\cos(x)\sin(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{a^2}\\
&= \frac{\text{Subst}\left(\int \frac{\sin(2x)}{2\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{a^2}\\
&= \frac{\text{Subst}\left(\int \frac{\sin(2x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{2a^2}\\
&= \frac{\text{Subst}\left(\int \sin\left(2x^2\right)\,dx, x, \sqrt{\sin^{-1}(ax)}\right)}{a^2}\\
&= \frac{\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{2a^2}
\end{aligned}$$

Mathematica [C] time = 0.0173538, size = 71, normalized size = 2.54

$$-\frac{\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2}, -2i\sin^{-1}(ax)\right)+\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2}, 2i\sin^{-1}(ax)\right)}{4\sqrt{2}a^2\sqrt{\sin^{-1}(ax)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x/Sqrt[ArcSin[a*x]],x]
```

```
[Out] -(Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-2*I)*ArcSin[a*x]] + Sqrt[I*ArcSin[a*x
]]*Gamma[1/2, (2*I)*ArcSin[a*x]])/(4*Sqrt[2]*a^2*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.029, size = 21, normalized size = 0.8

$$\frac{\sqrt{\pi}}{2\,a^{2}}\mathrm{FresnelS}\left(2\,\frac{\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/arcsin(a*x)^(1/2),x)
```

```
[Out] 1/2*FresnelS(2*arcsin(a*x)^(1/2)/Pi^(1/2))*Pi^(1/2)/a^2
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{\operatorname{asin}(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/asin(a*x)**(1/2),x)
```

```
[Out] Integral(x/sqrt(asin(a*x)), x)
```

Giac [C] time = 1.47883, size = 47, normalized size = 1.68

$$\frac{(i-1)\sqrt{\pi}\operatorname{erf}\left((i-1)\sqrt{\arcsin(ax)}\right)}{8\,a^2}-\frac{(i+1)\sqrt{\pi}\operatorname{erf}\left(-(i+1)\sqrt{\arcsin(ax)}\right)}{8\,a^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] (1/8*I - 1/8)*sqrt(pi)*erf((I - 1)*sqrt(arcsin(a*x)))/a^2 - (1/8*I + 1/8)*s
qrt(pi)*erf(-(I + 1)*sqrt(arcsin(a*x)))/a^2
```

3.96 $\int \frac{1}{\sqrt{\sin^{-1}(ax)}}\,dx$

Optimal. Leaf size=30

$$\frac{\sqrt{2\pi}\,\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a}$$

```
[Out] (Sqrt[2*Pi]*FresnelC[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/a
```

Rubi [A] time = 0.0244487, antiderivative size = 30, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.375, Rules used = {4623, 3304, 3352}

$$\frac{\sqrt{2\pi}\,\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a}$$

Antiderivative was successfully verified.

```
[In] Int[1/Sqrt[ArcSin[a*x]],x]
```

```
[Out] (Sqrt[2*Pi]*FresnelC[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/a
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{1}{\sqrt{\sin^{-1}(ax)}}\,dx &= \frac{\text{Subst}\left(\int \frac{\cos(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{a}\\
&= \frac{2\,\text{Subst}\left(\int \cos\left(x^2\right)\,dx, x, \sqrt{\sin^{-1}(ax)}\right)}{a}\\
&= \frac{\sqrt{2\pi}C\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a}
\end{aligned}
$$

Mathematica [C] time = 0.0256741, size = 69, normalized size = 2.3

$$
-\frac{i\left(\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},-i\sin^{-1}(ax)\right)-\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},i\sin^{-1}(ax)\right)\right)}{2a\sqrt{\sin^{-1}(ax)}}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[1/Sqrt[ArcSin[a*x]],x]
```

```
[Out] ((-I/2)*(Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-I)*ArcSin[a*x]] - Sqrt[I*ArcSi
n[a*x]]*Gamma[1/2, I*ArcSin[a*x]]))/(a*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.028, size = 25, normalized size = 0.8

$$
\frac{\sqrt{2}\sqrt{\pi}}{a}\text{FresnelC}\left(\frac{\sqrt{2}}{\sqrt{\pi}}\sqrt{\arcsin(ax)}\right)
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/arcsin(a*x)^(1/2),x)
```

```
[Out] FresnelC(2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))*2^(1/2)*Pi^(1/2)/a
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{\operatorname{asin}(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/asin(a*x)**(1/2),x)
```

```
[Out] Integral(1/sqrt(asin(a*x)), x)
```

Giac [C] time = 1.36933, size = 63, normalized size = 2.1

$$-\frac{(i+1)\sqrt{2}\sqrt{\pi}\,\mathrm{erf}\left(\left(\frac{1}{2}i-\frac{1}{2}\right)\sqrt{2}\sqrt{\arcsin(ax)}\right)}{4a}+\frac{(i-1)\sqrt{2}\sqrt{\pi}\,\mathrm{erf}\left(-\left(\frac{1}{2}i+\frac{1}{2}\right)\sqrt{2}\sqrt{\arcsin(ax)}\right)}{4a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] -(1/4*I + 1/4)*sqrt(2)*sqrt(pi)*erf((1/2*I - 1/2)*sqrt(2)*sqrt(arcsin(a*x))
)/a + (1/4*I - 1/4)*sqrt(2)*sqrt(pi)*erf(-(1/2*I + 1/2)*sqrt(2)*sqrt(arcsin
(a*x)))/a
```

3.97 $\int \frac{1}{x\sqrt{\sin^{-1}(ax)}}\,dx$

Optimal. Leaf size=14

$$\text{Unintegrable}\left(\frac{1}{x\sqrt{\sin^{-1}(ax)}},x\right)$$

```
[Out] Unintegrable[1/(x*Sqrt[ArcSin[a*x]]), x]
```

Rubi [A] time = 0.0141105, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x\sqrt{\sin^{-1}(ax)}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*Sqrt[ArcSin[a*x]]),x]
```

```
[Out] Defer[Int][1/(x*Sqrt[ArcSin[a*x]]), x]
```

Rubi steps

$$\int \frac{1}{x\sqrt{\sin^{-1}(ax)}}\,dx=\int \frac{1}{x\sqrt{\sin^{-1}(ax)}}\,dx$$

Mathematica [A] time = 0.356249, size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{\sin^{-1}(ax)}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*Sqrt[ArcSin[a*x]]),x]
```

```
[Out] Integrate[1/(x*Sqrt[ArcSin[a*x]]), x]
```

Maple [A] time = 0.069, size = 0, normalized size = 0.

$$\int \frac{1}{x}\frac{1}{\sqrt{\arcsin\left(ax\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/arcsin(a*x)^(1/2),x)
```

```
[Out] int(1/x/arcsin(a*x)^(1/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{\operatorname{asin}\left(ax\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/asin(a*x)**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(asin(a*x))), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{\arcsin{(ax)}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x*sqrt(arcsin(a*x))), x)
```

3.98 $\int \frac{1}{x^2 \sqrt{\sin^{-1}(ax)}} \, dx$

Optimal. Leaf size=14

$$\text{Unintegrable}\left(\frac{1}{x^2 \sqrt{\sin^{-1}(ax)}}, x\right)$$

```
[Out] Unintegrable[1/(x^2*Sqrt[ArcSin[a*x]]), x]
```

Rubi [A] time = 0.0131443, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x^2 \sqrt{\sin^{-1}(ax)}} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x^2*Sqrt[ArcSin[a*x]]),x]
```

```
[Out] Defer[Int][1/(x^2*Sqrt[ArcSin[a*x]]), x]
```

Rubi steps

$$\int \frac{1}{x^2 \sqrt{\sin^{-1}(ax)}} \, dx = \int \frac{1}{x^2 \sqrt{\sin^{-1}(ax)}} \, dx$$

Mathematica [A] time = 2.99319, size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \sqrt{\sin^{-1}(ax)}} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x^2*Sqrt[ArcSin[a*x]]),x]
```

```
[Out] Integrate[1/(x^2*Sqrt[ArcSin[a*x]]), x]
```

Maple [A] time = 0.122, size = 0, normalized size = 0.

$$\int \frac{1}{x^2}\frac{1}{\sqrt{\arcsin(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/arcsin(a*x)^(1/2),x)
```

```
[Out] int(1/x^2/arcsin(a*x)^(1/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\sqrt{\operatorname{asin}(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/asin(a*x)**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(asin(a*x))), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\sqrt{\arcsin{(ax)}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x^2*sqrt(arcsin(a*x))), x)
```

3.99 $\int \frac{x^6}{\sin^{-1}(ax)^{3/2}}\,dx$

Optimal. Leaf size=171

$$-\frac{5\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^7}+\frac{9\sqrt{\frac{3\pi}{2}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^7}-\frac{5\sqrt{\frac{5\pi}{2}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^7}+\frac{\sqrt{\frac{7\pi}{2}}S\left(\sqrt{\frac{14}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^7}-\frac{2x^6\sqrt{}}{a\sqrt{\mathrm{s}}}$$

```
[Out] (-2*x^6*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) - (5*Sqrt[Pi/2]*FresnelS[S
qrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(16*a^7) + (9*Sqrt[(3*Pi)/2]*FresnelS[Sqrt[6/
Pi]*Sqrt[ArcSin[a*x]]])/(16*a^7) - (5*Sqrt[(5*Pi)/2]*FresnelS[Sqrt[10/Pi]*S
qrt[ArcSin[a*x]]])/(16*a^7) + (Sqrt[(7*Pi)/2]*FresnelS[Sqrt[14/Pi]*Sqrt[Arc
Sin[a*x]]])/(16*a^7)
```

Rubi [A] time = 0.14418, antiderivative size = 171, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 3, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25, Rules used = {4631, 3305, 3351}

$$-\frac{5\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^7}+\frac{9\sqrt{\frac{3\pi}{2}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^7}-\frac{5\sqrt{\frac{5\pi}{2}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^7}+\frac{\sqrt{\frac{7\pi}{2}}S\left(\sqrt{\frac{14}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^7}-\frac{2x^6\sqrt{}}{a\sqrt{\mathrm{s}}}$$

Antiderivative was successfully verified.

```
[In] Int[x^6/ArcSin[a*x]^(3/2),x]
```

```
[Out] (-2*x^6*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) - (5*Sqrt[Pi/2]*FresnelS[S
qrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(16*a^7) + (9*Sqrt[(3*Pi)/2]*FresnelS[Sqrt[6/
Pi]*Sqrt[ArcSin[a*x]]])/(16*a^7) - (5*Sqrt[(5*Pi)/2]*FresnelS[Sqrt[10/Pi]*S
qrt[ArcSin[a*x]]])/(16*a^7) + (Sqrt[(7*Pi)/2]*FresnelS[Sqrt[14/Pi]*Sqrt[Arc
Sin[a*x]]])/(16*a^7)
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{x^6}{\sin^{-1}(ax)^{3/2}}\,dx &= -\frac{2x^6\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}+\frac{2\,\mathrm{Subst}\left(\int\left(-\frac{5\sin(x)}{64\sqrt{x}}+\frac{27\sin(3x)}{64\sqrt{x}}-\frac{25\sin(5x)}{64\sqrt{x}}+\frac{7\sin(7x)}{64\sqrt{x}}\right)dx,x,\sin^{-1}(ax)\right)}{a^7}\\ &= -\frac{2x^6\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-\frac{5\,\mathrm{Subst}\left(\int\frac{\sin(x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{32a^7}+\frac{7\,\mathrm{Subst}\left(\int\frac{\sin(7x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{32a^7}-25\,\mathrm{Su}\\ &= -\frac{2x^6\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-\frac{5\,\mathrm{Subst}\left(\int\sin\left(x^2\right)dx,x,\sqrt{\sin^{-1}(ax)}\right)}{16a^7}+\frac{7\,\mathrm{Subst}\left(\int\sin\left(7x^2\right)dx,x,\sqrt{\sin^{-1}(a}\right.}{16a^7}\\ &= -\frac{2x^6\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-\frac{5\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^7}+\frac{9\sqrt{\frac{3\pi}{2}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{16a^7}-\frac{5\sqrt{\frac{5\pi}{2}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(a}\right.}{16a^7}\end{aligned}$$

Mathematica [C] time = 0.233579, size = 427, normalized size = 2.5

$$-\frac{5\left(e^{i\sin^{-1}(ax)}-\sqrt{-i\sin^{-1}(ax)}\mathrm{Gamma}\left(\frac{1}{2},-i\sin^{-1}(ax)\right)\right)}{64\sqrt{\sin^{-1}(ax)}}-\frac{5\left(e^{-i\sin^{-1}(ax)}-\sqrt{i\sin^{-1}(ax)}\mathrm{Gamma}\left(\frac{1}{2},i\sin^{-1}(ax)\right)\right)}{64\sqrt{\sin^{-1}(ax)}}+\frac{9\left(e^{3i\sin^{-1}(ax)}-\sqrt{3}\sqrt{-i\sin^{-1}(ax)}\mathrm{Gamm}\right.}{64\sqrt{\sin^{-1}(ax)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^6/ArcSin[a*x]^(3/2),x]
```

```
[Out] ((-5*(E^(I*ArcSin[a*x]) - Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-I)*ArcSin[a*x
]]))/(64*Sqrt[ArcSin[a*x]]) - (5*(E^((-I)*ArcSin[a*x]) - Sqrt[I*ArcSin[a*x]
]*Gamma[1/2, I*ArcSin[a*x]]))/(64*Sqrt[ArcSin[a*x]]) + (9*(E^((3*I)*ArcSin[
a*x]) - Sqrt[3]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-3*I)*ArcSin[a*x]]))/(64
*Sqrt[ArcSin[a*x]]) + (9*(E^((-3*I)*ArcSin[a*x]) - Sqrt[3]*Sqrt[I*ArcSin[a*
x]]*Gamma[1/2, (3*I)*ArcSin[a*x]]))/(64*Sqrt[ArcSin[a*x]]) - (5*(E^((5*I)*A
rcSin[a*x]) - Sqrt[5]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-5*I)*ArcSin[a*x]]
))/(64*Sqrt[ArcSin[a*x]]) - (5*(E^((-5*I)*ArcSin[a*x]) - Sqrt[5]*Sqrt[I*Arc
Sin[a*x]]*Gamma[1/2, (5*I)*ArcSin[a*x]]))/(64*Sqrt[ArcSin[a*x]]) + (E^((7*I
)*ArcSin[a*x]) - Sqrt[7]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-7*I)*ArcSin[a*
x]])/(64*Sqrt[ArcSin[a*x]]) + (E^((-7*I)*ArcSin[a*x]) - Sqrt[7]*Sqrt[I*ArcS
in[a*x]]*Gamma[1/2, (7*I)*ArcSin[a*x]])/(64*Sqrt[ArcSin[a*x]]))/a^7
```

Maple [A] time = 0.077, size = 184, normalized size = 1.1

$$-\frac{1}{32\,a^{7}}\left(-\sqrt{2}\sqrt{\pi}\sqrt{7}\mathrm{FresnelS}\left(\frac{\sqrt{2}\sqrt{7}}{\sqrt{\pi}}\sqrt{\arcsin(ax)}\right)\sqrt{\arcsin(ax)}+5\sqrt{5}\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\mathrm{FresnelS}\left(\frac{\sqrt{5}\sqrt{2}\sqrt{\arcsin(}}{\sqrt{\pi}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^6/arcsin(a*x)^(3/2),x)
```

```
[Out] -1/32/a^7*(-2^(1/2)*Pi^(1/2)*7^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*7^(1/2)*arcs
in(a*x)^(1/2))*arcsin(a*x)^(1/2)+5*5^(1/2)*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/
2)*FresnelS(2^(1/2)/Pi^(1/2)*5^(1/2)*arcsin(a*x)^(1/2))-9*3^(1/2)*2^(1/2)*a
rcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*3^(1/2)*arcsin(a*x)^(1/
2))+5*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*arcsin(a
*x)^(1/2))+5*(-a^2*x^2+1)^(1/2)-9*cos(3*arcsin(a*x))+5*cos(5*arcsin(a*x))-c
os(7*arcsin(a*x)))/arcsin(a*x)^(1/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{\operatorname{asin}^{\frac{3}{2}}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**6/asin(a*x)**(3/2),x)
```

```
[Out] Integral(x**6/asin(a*x)**(3/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^6}{\arcsin(ax)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^6/arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^6/arcsin(a*x)^(3/2), x)
```

3.100 $\int \frac{x^5}{\sin^{-1}(ax)^{3/2}}\,dx$

Optimal. Leaf size=127

$$-\frac{\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^6}+\frac{\sqrt{3\pi}\,\text{FresnelC}\left(2\sqrt{\frac{3}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^6}+\frac{5\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{8a^6}-\frac{2x^5\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}$$

```
[Out] (-2*x^5*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) - (Sqrt[Pi/2]*FresnelC[2*S
qrt[2/Pi]*Sqrt[ArcSin[a*x]]])/a^6 + (Sqrt[3*Pi]*FresnelC[2*Sqrt[3/Pi]*Sqrt[
ArcSin[a*x]]])/(8*a^6) + (5*Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi
]])/(8*a^6)
```

Rubi [A] time = 0.106607, antiderivative size = 127, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 3, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25, Rules used = {4631, 3304, 3352}

$$-\frac{\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^6}+\frac{\sqrt{3\pi}\,\text{FresnelC}\left(2\sqrt{\frac{3}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^6}+\frac{5\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{8a^6}-\frac{2x^5\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}$$

Antiderivative was successfully verified.

```
[In] Int[x^5/ArcSin[a*x]^(3/2),x]
```

```
[Out] (-2*x^5*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) - (Sqrt[Pi/2]*FresnelC[2*S
qrt[2/Pi]*Sqrt[ArcSin[a*x]]])/a^6 + (Sqrt[3*Pi]*FresnelC[2*Sqrt[3/Pi]*Sqrt[
ArcSin[a*x]]])/(8*a^6) + (5*Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi
]])/(8*a^6)
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int \frac{x^5}{\sin^{-1}(ax)^{3/2}}\,dx = -\frac{2x^5\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}} + \frac{2\,\text{Subst}\left(\int \left(\frac{5\cos(2x)}{16\sqrt{x}} - \frac{\cos(4x)}{2\sqrt{x}} + \frac{3\cos(6x)}{16\sqrt{x}}\right)dx, x, \sin^{-1}(ax)\right)}{a^6}$$

$$= -\frac{2x^5\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}} + \frac{3\,\text{Subst}\left(\int \frac{\cos(6x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{8a^6} + \frac{5\,\text{Subst}\left(\int \frac{\cos(2x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{8a^6} - \text{Sub}$$

$$= -\frac{2x^5\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}} + \frac{3\,\text{Subst}\left(\int \cos\left(6x^2\right)dx, x, \sqrt{\sin^{-1}(ax)}\right)}{4a^6} + \frac{5\,\text{Subst}\left(\int \cos\left(2x^2\right)dx, x, \sqrt{\sin^{-1}}\right.}{4a^6}$$

$$= -\frac{2x^5\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}} - \frac{\sqrt{\frac{\pi}{2}}C\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^6} + \frac{\sqrt{3\pi}C\left(2\sqrt{\frac{3}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{8a^6} + \frac{5\sqrt{\pi}C\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{8a^6}$$

Mathematica [C] time = 0.135244, size = 231, normalized size = 1.82

$$-\frac{5i\sqrt{2}\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2}, -2i\sin^{-1}(ax)\right) - 5i\sqrt{2}\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2}, 2i\sin^{-1}(ax)\right) - 8i\sqrt{-i\sin^{-1}(ax)}\text{Gam}}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^5/ArcSin[a*x]^(3/2),x]
```

```
[Out] -((5*I)*Sqrt[2]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-2*I)*ArcSin[a*x]] - (5*
I)*Sqrt[2]*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (2*I)*ArcSin[a*x]] - (8*I)*Sqrt[(
-I)*ArcSin[a*x]]*Gamma[1/2, (-4*I)*ArcSin[a*x]] + (8*I)*Sqrt[I*ArcSin[a*x]]
*Gamma[1/2, (4*I)*ArcSin[a*x]] + I*Sqrt[6]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2
, (-6*I)*ArcSin[a*x]] - I*Sqrt[6]*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (6*I)*ArcS
in[a*x]] + 10*Sin[2*ArcSin[a*x]] - 8*Sin[4*ArcSin[a*x]] + 2*Sin[6*ArcSin[a*
x]])/(32*a^6*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.067, size = 121, normalized size = 1.

$$-\frac{1}{16\,a^{6}}\left(-2\,\sqrt{\pi}\sqrt{3}\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{6}\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)\sqrt{\arcsin\left(ax\right)}+8\,\sqrt{2}\sqrt{\arcsin\left(ax\right)}\sqrt{\pi}\mathrm{FresnelC}\left(2\,\frac{\sqrt{2}\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^5/arcsin(a*x)^(3/2),x)
```

```
[Out] -1/16/a^6/arcsin(a*x)^(1/2)*(-2*Pi^(1/2)*3^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*
6^(1/2)*arcsin(a*x)^(1/2))*arcsin(a*x)^(1/2)+8*2^(1/2)*arcsin(a*x)^(1/2)*Pi
^(1/2)*FresnelC(2*2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))-10*arcsin(a*x)^(1/2)*
Pi^(1/2)*FresnelC(2*arcsin(a*x)^(1/2)/Pi^(1/2))+5*sin(2*arcsin(a*x))-4*sin(
4*arcsin(a*x))+sin(6*arcsin(a*x)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\operatorname{asin}^{\frac{3}{2}}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**5/asin(a*x)**(3/2),x)
```

```
[Out] Integral(x**5/asin(a*x)**(3/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^5}{\arcsin(ax)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^5/arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^5/arcsin(a*x)^(3/2), x)
```

3.101 $\int \frac{x^4}{\sin^{-1}(ax)^{3/2}}\,dx$

Optimal. Leaf size=136

$$-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a^5}+\frac{3\sqrt{\frac{3\pi}{2}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a^5}-\frac{\sqrt{\frac{5\pi}{2}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a^5}-\frac{2x^4\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}$$

```
[Out] (-2*x^4*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) - (Sqrt[Pi/2]*FresnelS[Sqr
t[2/Pi]*Sqrt[ArcSin[a*x]]])/(2*a^5) + (3*Sqrt[(3*Pi)/2]*FresnelS[Sqrt[6/Pi]
*Sqrt[ArcSin[a*x]]])/(4*a^5) - (Sqrt[(5*Pi)/2]*FresnelS[Sqrt[10/Pi]*Sqrt[Ar
cSin[a*x]]])/(4*a^5)
```

Rubi [A] time = 0.098155, antiderivative size = 136, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 3, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25, Rules used = {4631, 3305, 3351}

$$-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a^5}+\frac{3\sqrt{\frac{3\pi}{2}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a^5}-\frac{\sqrt{\frac{5\pi}{2}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a^5}-\frac{2x^4\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}$$

Antiderivative was successfully verified.

```
[In] Int[x^4/ArcSin[a*x]^(3/2),x]
```

```
[Out] (-2*x^4*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) - (Sqrt[Pi/2]*FresnelS[Sqr
t[2/Pi]*Sqrt[ArcSin[a*x]]])/(2*a^5) + (3*Sqrt[(3*Pi)/2]*FresnelS[Sqrt[6/Pi]
*Sqrt[ArcSin[a*x]]])/(4*a^5) - (Sqrt[(5*Pi)/2]*FresnelS[Sqrt[10/Pi]*Sqrt[Ar
cSin[a*x]]])/(4*a^5)
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{x^4}{\sin^{-1}(ax)^{3/2}}\,dx &= -\frac{2x^4\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}} + \frac{2\,\text{Subst}\left(\int\left(-\frac{\sin(x)}{8\sqrt{x}}+\frac{9\sin(3x)}{16\sqrt{x}}-\frac{5\sin(5x)}{16\sqrt{x}}\right)dx, x, \sin^{-1}(ax)\right)}{a^5}\\
&= -\frac{2x^4\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}} - \frac{\text{Subst}\left(\int\frac{\sin(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{4a^5} - \frac{5\,\text{Subst}\left(\int\frac{\sin(5x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{8a^5} + \frac{9\,\text{Subs}}{}\\
&= -\frac{2x^4\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}} - \frac{\text{Subst}\left(\int\sin\left(x^2\right)dx, x, \sqrt{\sin^{-1}(ax)}\right)}{2a^5} - \frac{5\,\text{Subst}\left(\int\sin\left(5x^2\right)dx, x, \sqrt{\sin^{-1}(ax}\right.}{4a^5}\\
&= -\frac{2x^4\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}} - \frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a^5} + \frac{3\sqrt{\frac{3\pi}{2}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{4a^5} - \frac{\sqrt{\frac{5\pi}{2}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax}\right.}{4a^5}\end{aligned}$$

Mathematica [C] time = 0.151671, size = 319, normalized size = 2.35

$$\frac{-\frac{e^{i\sin^{-1}(ax)}-\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},-i\sin^{-1}(ax)\right)}{8\sqrt{\sin^{-1}(ax)}} - \frac{e^{-i\sin^{-1}(ax)}-\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},i\sin^{-1}(ax)\right)}{8\sqrt{\sin^{-1}(ax)}} + \frac{3\left(e^{3i\sin^{-1}(ax)}-\sqrt{3}\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},-\right.\right.}{16\sqrt{\sin^{-1}(ax)}}}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^4/ArcSin[a*x]^(3/2),x]
```

```
[Out] (-(E^(I*ArcSin[a*x]) - Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-I)*ArcSin[a*x]])
/(8*Sqrt[ArcSin[a*x]]) - (E^((-I)*ArcSin[a*x]) - Sqrt[I*ArcSin[a*x]]*Gamma[
1/2, I*ArcSin[a*x]])/(8*Sqrt[ArcSin[a*x]]) + (3*(E^((3*I)*ArcSin[a*x]) - Sq
rt[3]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-3*I)*ArcSin[a*x]]))/(16*Sqrt[ArcS
in[a*x]]) + (3*(E^((-3*I)*ArcSin[a*x]) - Sqrt[3]*Sqrt[I*ArcSin[a*x]]*Gamma[
1/2, (3*I)*ArcSin[a*x]]))/(16*Sqrt[ArcSin[a*x]]) - (E^((5*I)*ArcSin[a*x]) -
 Sqrt[5]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-5*I)*ArcSin[a*x]])/(16*Sqrt[Ar
cSin[a*x]]) - (E^((-5*I)*ArcSin[a*x]) - Sqrt[5]*Sqrt[I*ArcSin[a*x]]*Gamma[1
/2, (5*I)*ArcSin[a*x]])/(16*Sqrt[ArcSin[a*x]]))/a^5
```

Maple [A] time = 0.051, size = 138, normalized size = 1.

$$-\frac{1}{8\,a^{5}}\left(\sqrt{5}\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\,\mathrm{FresnelS}\left(\frac{\sqrt{5}\sqrt{2}}{\sqrt{\pi}}\sqrt{\arcsin(ax)}\right)-3\sqrt{3}\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\,\mathrm{FresnelS}\left(\frac{\sqrt{3}\sqrt{2}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4/arcsin(a*x)^(3/2),x)
```

```
[Out] -1/8/a^5*(5^(1/2)*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1
/2)*5^(1/2)*arcsin(a*x)^(1/2))-3*3^(1/2)*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)
*FresnelS(2^(1/2)/Pi^(1/2)*3^(1/2)*arcsin(a*x)^(1/2))+2*2^(1/2)*arcsin(a*x)
^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))+2*(-a^2*x^2+1)
^(1/2)-3*cos(3*arcsin(a*x))+cos(5*arcsin(a*x)))/arcsin(a*x)^(1/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\operatorname{asin}^{\frac{3}{2}}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4/asin(a*x)**(3/2),x)
```

```
[Out] Integral(x**4/asin(a*x)**(3/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\arcsin(ax)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^4/arcsin(a*x)^(3/2), x)
```

3.102 $\int \frac{x^3}{\sin^{-1}(ax)^{3/2}}\,dx$

Optimal. Leaf size=90

$$-\frac{\sqrt{\frac{\pi}{2}}\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^4}+\frac{\sqrt{\pi}\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{a^4}-\frac{2x^3\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}$$

```
[Out] (-2*x^3*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) - (Sqrt[Pi/2]*FresnelC[2*S
qrt[2/Pi]*Sqrt[ArcSin[a*x]]])/a^4 + (Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]]
)/Sqrt[Pi]])/a^4
```

Rubi [A] time = 0.0696889, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 3, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25, Rules used = {4631, 3304, 3352}

$$-\frac{\sqrt{\frac{\pi}{2}}\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^4}+\frac{\sqrt{\pi}\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{a^4}-\frac{2x^3\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/ArcSin[a*x]^(3/2),x]
```

```
[Out] (-2*x^3*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) - (Sqrt[Pi/2]*FresnelC[2*S
qrt[2/Pi]*Sqrt[ArcSin[a*x]]])/a^4 + (Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]]
)/Sqrt[Pi]])/a^4
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{x^3}{\sin^{-1}(ax)^{3/2}}\,dx &= -\frac{2x^3\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}+\frac{2\,\text{Subst}\left(\int\left(\frac{\cos(2x)}{2\sqrt{x}}-\frac{\cos(4x)}{2\sqrt{x}}\right)dx,x,\sin^{-1}(ax)\right)}{a^4}\\
&= -\frac{2x^3\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}+\frac{\text{Subst}\left(\int\frac{\cos(2x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{a^4}-\frac{\text{Subst}\left(\int\frac{\cos(4x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{a^4}\\
&= -\frac{2x^3\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}+\frac{2\,\text{Subst}\left(\int\cos\left(2x^2\right)dx,x,\sqrt{\sin^{-1}(ax)}\right)}{a^4}-\frac{2\,\text{Subst}\left(\int\cos\left(4x^2\right)dx,x,\sqrt{\sin^{-1}\right.}{a^4}\\
&= -\frac{2x^3\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-\frac{\sqrt{\frac{\pi}{2}}C\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^4}+\frac{\sqrt{\pi}C\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{a^4}
\end{aligned}$$

Mathematica [C] time = 0.0458816, size = 154, normalized size = 1.71

$$\frac{-i\sqrt{2}\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},-2i\sin^{-1}(ax)\right)+i\sqrt{2}\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},2i\sin^{-1}(ax)\right)+i\sqrt{-i\sin^{-1}(ax)}\text{Gamma}}{4a^4\sqrt{\sin^{-1}(ax)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^3/ArcSin[a*x]^(3/2),x]
```

```
[Out] ((-I)*Sqrt[2]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-2*I)*ArcSin[a*x]] + I*Sqr
t[2]*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (2*I)*ArcSin[a*x]] + I*Sqrt[(-I)*ArcSin
[a*x]]*Gamma[1/2, (-4*I)*ArcSin[a*x]] - I*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (4
*I)*ArcSin[a*x]] - 2*Sin[2*ArcSin[a*x]] + Sin[4*ArcSin[a*x]])/(4*a^4*Sqrt[A
rcSin[a*x]])
```

Maple [A] time = 0.042, size = 83, normalized size = 0.9

$$-\frac{1}{4\,a^4}\Bigg(2\,\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\mathrm{FresnelC}\Bigg(2\,\frac{\sqrt{2}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\Bigg)-4\,\sqrt{\arcsin(ax)}\sqrt{\pi}\mathrm{FresnelC}\Bigg(2\,\frac{\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\Bigg)+2\,\sin(2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/arcsin(a*x)^(3/2),x)
```

```
[Out] -1/4/a^4*(2*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelC(2*2^(1/2)/Pi^(1/2)*
arcsin(a*x)^(1/2))-4*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelC(2*arcsin(a*x)^(1/2
)/Pi^(1/2))+2*sin(2*arcsin(a*x))-sin(4*arcsin(a*x)))/arcsin(a*x)^(1/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\operatorname{asin}^{\frac{3}{2}}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/asin(a*x)**(3/2),x)
```

```
[Out] Integral(x**3/asin(a*x)**(3/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\arcsin(ax)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^3/arcsin(a*x)^(3/2), x)
```

3.103 $\int \frac{x^2}{\sin^{-1}(ax)^{3/2}}\,dx$

Optimal. Leaf size=96

$$-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^3}+\frac{\sqrt{\frac{3\pi}{2}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^3}-\frac{2x^2\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}$$

```
[Out] (-2*x^2*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) - (Sqrt[Pi/2]*FresnelS[Sqr
t[2/Pi]*Sqrt[ArcSin[a*x]]])/a^3 + (Sqrt[(3*Pi)/2]*FresnelS[Sqrt[6/Pi]*Sqrt[
ArcSin[a*x]]])/a^3
```

Rubi [A] time = 0.0692069, antiderivative size = 96, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 3, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25, Rules used = {4631, 3305, 3351}

$$-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^3}+\frac{\sqrt{\frac{3\pi}{2}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^3}-\frac{2x^2\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/ArcSin[a*x]^(3/2),x]
```

```
[Out] (-2*x^2*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) - (Sqrt[Pi/2]*FresnelS[Sqr
t[2/Pi]*Sqrt[ArcSin[a*x]]])/a^3 + (Sqrt[(3*Pi)/2]*FresnelS[Sqrt[6/Pi]*Sqrt[
ArcSin[a*x]]])/a^3
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\begin{aligned}
\int \frac{x^2}{\sin^{-1}(ax)^{3/2}}\,dx &= -\frac{2x^2\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}+\frac{2\,\text{Subst}\left(\int\left(-\frac{\sin(x)}{4\sqrt{x}}+\frac{3\sin(3x)}{4\sqrt{x}}\right)dx,x,\sin^{-1}(ax)\right)}{a^3}\\
&= -\frac{2x^2\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-\frac{\text{Subst}\left(\int\frac{\sin(x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{2a^3}+\frac{3\,\text{Subst}\left(\int\frac{\sin(3x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{2a^3}\\
&= -\frac{2x^2\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-\frac{\text{Subst}\left(\int\sin\left(x^2\right)dx,x,\sqrt{\sin^{-1}(ax)}\right)}{a^3}+\frac{3\,\text{Subst}\left(\int\sin\left(3x^2\right)dx,x,\sqrt{\sin^{-1}(ax}\right.}{a^3}\\
&= -\frac{2x^2\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-\frac{\sqrt{\frac{\pi}{2}}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^3}+\frac{\sqrt{\frac{3\pi}{2}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^3}
\end{aligned}$$

Mathematica [C] time = 0.0720673, size = 211, normalized size = 2.2

$$\frac{-\frac{e^{i\sin^{-1}(ax)}-\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},-i\sin^{-1}(ax)\right)}{4\sqrt{\sin^{-1}(ax)}}-\frac{e^{-i\sin^{-1}(ax)}-\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},i\sin^{-1}(ax)\right)}{4\sqrt{\sin^{-1}(ax)}}+\frac{e^{3i\sin^{-1}(ax)}-\sqrt{3}\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},-3i\right.}{4\sqrt{\sin^{-1}(ax)}}}{a^3}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2/ArcSin[a*x]^(3/2),x]
```

```
[Out] (-(E^(I*ArcSin[a*x]) - Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-I)*ArcSin[a*x]])
/(4*Sqrt[ArcSin[a*x]]) - (E^((-I)*ArcSin[a*x]) - Sqrt[I*ArcSin[a*x]]*Gamma[
1/2, I*ArcSin[a*x]])/(4*Sqrt[ArcSin[a*x]]) + (E^((3*I)*ArcSin[a*x]) - Sqrt[
3]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-3*I)*ArcSin[a*x]])/(4*Sqrt[ArcSin[a*
x]]) + (E^((-3*I)*ArcSin[a*x]) - Sqrt[3]*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (3*
I)*ArcSin[a*x]])/(4*Sqrt[ArcSin[a*x]]))/a^3
```

Maple [A] time = 0.046, size = 95, normalized size = 1.

$$\frac{1}{2\,a^{3}}\Bigg(\sqrt{3}\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\mathrm{FresnelS}\left(\frac{\sqrt{3}\sqrt{2}}{\sqrt{\pi}}\sqrt{\arcsin(ax)}\right)-\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\mathrm{FresnelS}\left(\frac{\sqrt{2}}{\sqrt{\pi}}\sqrt{\arcsin(ax)}\right)-\sqrt{-a^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/arcsin(a*x)^(3/2),x)
```

```
[Out] 1/2/a^3*(3^(1/2)*2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(1/
2)*3^(1/2)*arcsin(a*x)^(1/2))-2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelS(2
^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))-(-a^2*x^2+1)^(1/2)+cos(3*arcsin(a*x)))/a
rcsin(a*x)^(1/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\operatorname{asin}^{\frac{3}{2}}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/asin(a*x)**(3/2),x)
```

```
[Out] Integral(x**2/asin(a*x)**(3/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\arcsin(ax)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^2/arcsin(a*x)^(3/2), x)
```

3.104 $\int \frac{x}{\sin^{-1}(ax)^{3/2}}\,dx$

Optimal. Leaf size=55

$$\frac{2\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{a^2}-\frac{2x\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}$$

```
[Out] (-2*x*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) + (2*Sqrt[Pi]*FresnelC[(2*Sq
rt[ArcSin[a*x]])/Sqrt[Pi]])/a^2
```

Rubi [A] time = 0.031562, antiderivative size = 55, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3, Rules used = {4631, 3304, 3352}

$$\frac{2\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{a^2}-\frac{2x\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}$$

Antiderivative was successfully verified.

```
[In] Int[x/ArcSin[a*x]^(3/2),x]
```

```
[Out] (-2*x*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) + (2*Sqrt[Pi]*FresnelC[(2*Sq
rt[ArcSin[a*x]])/Sqrt[Pi]])/a^2
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{x}{\sin^{-1}(ax)^{3/2}}\,dx &= -\frac{2x\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}+\frac{2\,\text{Subst}\left(\int \frac{\cos(2x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{a^2}\\ &= -\frac{2x\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}+\frac{4\,\text{Subst}\left(\int \cos\left(2x^2\right)\,dx,x,\sqrt{\sin^{-1}(ax)}\right)}{a^2}\\ &= -\frac{2x\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}+\frac{2\sqrt{\pi}C\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{a^2}\end{aligned}$$

Mathematica [C] time = 0.0326046, size = 91, normalized size = 1.65

$$-\frac{i\sqrt{2}\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},-2i\sin^{-1}(ax)\right)-i\sqrt{2}\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},2i\sin^{-1}(ax)\right)+2\sin\left(2\sin^{-1}(ax)\right)}{2a^2\sqrt{\sin^{-1}(ax)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x/ArcSin[a*x]^(3/2),x]
```

```
[Out] -(I*Sqrt[2]*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-2*I)*ArcSin[a*x]] - I*Sqrt[
2]*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (2*I)*ArcSin[a*x]] + 2*Sin[2*ArcSin[a*x]]
)/(2*a^2*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.031, size = 43, normalized size = 0.8

$$-\frac{1}{a^2}\left(-2\sqrt{\arcsin(ax)}\sqrt{\pi}\text{FresnelC}\left(2\frac{\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+\sin(2\arcsin(ax))\right)\frac{1}{\sqrt{\arcsin(ax)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/arcsin(a*x)^(3/2),x)
```

```
[Out] -1/a^2/arcsin(a*x)^(1/2)*(-2*arcsin(a*x)^(1/2)*Pi^(1/2)*FresnelC(2*arcsin(a
*x)^(1/2)/Pi^(1/2))+sin(2*arcsin(a*x)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\operatorname{asin}^{\frac{3}{2}}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/asin(a*x)**(3/2),x)
```

```
[Out] Integral(x/asin(a*x)**(3/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\arcsin{(ax)}^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x/arcsin(a*x)^(3/2), x)
```

3.105 $\int \frac{1}{\sin^{-1}(ax)^{3/2}}\,dx$

Optimal. Leaf size=59

$$-\frac{2\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-\frac{2\sqrt{2\pi}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a}$$

```
[Out] (-2*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) - (2*Sqrt[2*Pi]*FresnelS[Sqrt[
2/Pi]*Sqrt[ArcSin[a*x]]])/a
```

Rubi [A] time = 0.0904898, antiderivative size = 59, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4621, 4723, 3305, 3351}

$$-\frac{2\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-\frac{2\sqrt{2\pi}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^(-3/2),x]
```

```
[Out] (-2*Sqrt[1 - a^2*x^2])/(a*Sqrt[ArcSin[a*x]]) - (2*Sqrt[2*Pi]*FresnelS[Sqrt[
2/Pi]*Sqrt[ArcSin[a*x]]])/a
```

Rule 4621

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Sqrt[1 - c^
2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + Dist[c/(b*(n + 1)),
 Int[(x*(a + b*ArcSin[c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a,
 b, c}, x] && LtQ[n, -1]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{1}{\sin^{-1}(ax)^{3/2}}\,dx &= -\frac{2\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-(2a)\int \frac{x}{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}\,dx\\
&= -\frac{2\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-\frac{2\,\mathrm{Subst}\left(\int \frac{\sin(x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{a}\\
&= -\frac{2\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-\frac{4\,\mathrm{Subst}\left(\int \sin\left(x^2\right)\,dx,x,\sqrt{\sin^{-1}(ax)}\right)}{a}\\
&= -\frac{2\sqrt{1-a^2x^2}}{a\sqrt{\sin^{-1}(ax)}}-\frac{2\sqrt{2\pi}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a}
\end{aligned}
$$

Mathematica [C] time = 0.0951994, size = 87, normalized size = 1.47

$$
\frac{\sqrt{-i\sin^{-1}(ax)}\mathrm{Gamma}\left(\frac{1}{2},-i\sin^{-1}(ax)\right)+\sqrt{i\sin^{-1}(ax)}\mathrm{Gamma}\left(\frac{1}{2},i\sin^{-1}(ax)\right)-e^{-i\sin^{-1}(ax)}\left(1+e^{2i\sin^{-1}(ax)}\right)}{a\sqrt{\sin^{-1}(ax)}}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^(-3/2),x]
```

```
[Out] (-((1 + E^((2*I)*ArcSin[a*x]))/E^(I*ArcSin[a*x])) + Sqrt[(-I)*ArcSin[a*x]]*
Gamma[1/2, (-I)*ArcSin[a*x]] + Sqrt[I*ArcSin[a*x]]*Gamma[1/2, I*ArcSin[a*x]
])/(a*Sqrt[ArcSin[a*x]])
```

Maple [A] time = 0.035, size = 65, normalized size = 1.1

$$-\frac{\sqrt{2}}{a\sqrt{\pi}\arcsin(ax)}\left(2\arcsin(ax)\,\pi\,\mathrm{FresnelS}\left(\frac{\sqrt{2}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)+\sqrt{2}\sqrt{\arcsin(ax)}\sqrt{\pi}\sqrt{-a^{2}x^{2}+1}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/arcsin(a*x)^(3/2),x)
```

```
[Out] -1/a*2^(1/2)/Pi^(1/2)*(2*arcsin(a*x)*Pi*FresnelS(2^(1/2)/Pi^(1/2)*arcsin(a*
x)^(1/2))+2^(1/2)*arcsin(a*x)^(1/2)*Pi^(1/2)*(-a^2*x^2+1)^(1/2))/arcsin(a*x
)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\operatorname{asin}^{\frac{3}{2}}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/asin(a*x)**(3/2),x)
```

```
[Out] Integral(asin(a*x)**(-3/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\arcsin(ax)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^(-3/2), x)
```

3.106 $\int \frac{1}{x \sin^{-1}(ax)^{3/2}} \, dx$

Optimal. Leaf size=14

$$\text{Unintegrable}\left(\frac{1}{x \sin^{-1}(ax)^{3/2}}, x\right)$$

```
[Out] Unintegrable[1/(x*ArcSin[a*x]^(3/2)), x]
```

Rubi [A] time = 0.0136693, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int \frac{1}{x \sin^{-1}(ax)^{3/2}} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*ArcSin[a*x]^(3/2)),x]
```

```
[Out] Defer[Int][1/(x*ArcSin[a*x]^(3/2)), x]
```

Rubi steps

$$\int \frac{1}{x \sin^{-1}(ax)^{3/2}} \, dx = \int \frac{1}{x \sin^{-1}(ax)^{3/2}} \, dx$$

Mathematica [A] time = 0.455303, size = 0, normalized size = 0.

$$\int \frac{1}{x \sin^{-1}(ax)^{3/2}} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*ArcSin[a*x]^(3/2)),x]
```

```
[Out] Integrate[1/(x*ArcSin[a*x]^(3/2)), x]
```

Maple [A] time = 0.063, size = 0, normalized size = 0.

$$\int \frac{1}{x}\left(\arcsin\left(ax\right)\right)^{-\frac{3}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/arcsin(a*x)^(3/2),x)
```

```
[Out] int(1/x/arcsin(a*x)^(3/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\operatorname{asin}^{\frac{3}{2}}\left(ax\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/asin(a*x)**(3/2),x)
```

```
[Out] Integral(1/(x*asin(a*x)**(3/2)), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\arcsin{(ax)}^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x*arcsin(a*x)^(3/2)), x)
```

3.107 $\int \frac{x^4}{\sin^{-1}(ax)^{5/2}}\, dx$

Optimal. Leaf size=171

$$-\frac{\sqrt{\frac{\pi}{2}}\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^5}+\frac{3\sqrt{\frac{3\pi}{2}}\text{FresnelC}\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{2a^5}-\frac{5\sqrt{\frac{5\pi}{2}}\text{FresnelC}\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{6a^5}-\frac{2x^4\sqrt{1}}{3a\sin^{-}}$$

```
[Out] (-2*x^4*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^(3/2)) - (16*x^3)/(3*a^2*Sqrt[A
rcSin[a*x]]) + (20*x^5)/(3*Sqrt[ArcSin[a*x]]) - (Sqrt[Pi/2]*FresnelC[Sqrt[2
/Pi]*Sqrt[ArcSin[a*x]]])/(3*a^5) + (3*Sqrt[(3*Pi)/2]*FresnelC[Sqrt[6/Pi]*Sq
rt[ArcSin[a*x]]])/(2*a^5) - (5*Sqrt[(5*Pi)/2]*FresnelC[Sqrt[10/Pi]*Sqrt[Arc
Sin[a*x]]])/(6*a^5)
```

Rubi [A] time = 0.434386, antiderivative size = 235, normalized size of antiderivative = 1.37, number of steps used = 19, number of rules used = 6, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4633, 4719, 4635, 4406, 3304, 3352}

$$\frac{4\sqrt{2\pi}\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^5}-\frac{25\sqrt{\frac{\pi}{2}}\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^5}-\frac{4\sqrt{\frac{2\pi}{3}}\text{FresnelC}\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^5}+\frac{25\sqrt{\frac{\pi}{6}}}{}$$

Antiderivative was successfully verified.

```
[In] Int[x^4/ArcSin[a*x]^(5/2),x]
```

```
[Out] (-2*x^4*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^(3/2)) - (16*x^3)/(3*a^2*Sqrt[A
rcSin[a*x]]) + (20*x^5)/(3*Sqrt[ArcSin[a*x]]) - (25*Sqrt[Pi/2]*FresnelC[Sqr
t[2/Pi]*Sqrt[ArcSin[a*x]]])/(3*a^5) + (4*Sqrt[2*Pi]*FresnelC[Sqrt[2/Pi]*Sqr
t[ArcSin[a*x]]])/a^5 + (25*Sqrt[Pi/6]*FresnelC[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]
])/(2*a^5) - (4*Sqrt[(2*Pi)/3]*FresnelC[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/a^5
 - (5*Sqrt[(5*Pi)/2]*FresnelC[Sqrt[10/Pi]*Sqrt[ArcSin[a*x]]])/(6*a^5)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int \frac{x^4}{\sin^{-1}(ax)^{5/2}}\,dx = -\frac{2x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} + \frac{8\int \frac{x^3}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}\,dx}{3a} - \frac{1}{3}(10a)\int \frac{x^5}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}\,dx$$

$$= -\frac{2x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{16x^3}{3a^2\sqrt{\sin^{-1}(ax)}} + \frac{20x^5}{3\sqrt{\sin^{-1}(ax)}} - \frac{100}{3}\int \frac{x^4}{\sqrt{\sin^{-1}(ax)}}\,dx + \frac{16\int \frac{x^2}{\sqrt{\sin^{-1}(ax)}}\,dx}{a^2}$$

$$= -\frac{2x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{16x^3}{3a^2\sqrt{\sin^{-1}(ax)}} + \frac{20x^5}{3\sqrt{\sin^{-1}(ax)}} + \frac{16\,\mathrm{Subst}\left(\int \frac{\cos(x)\sin^2(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{a^5} -$$

$$= -\frac{2x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{16x^3}{3a^2\sqrt{\sin^{-1}(ax)}} + \frac{20x^5}{3\sqrt{\sin^{-1}(ax)}} + \frac{16\,\mathrm{Subst}\left(\int \left(\frac{\cos(x)}{4\sqrt{x}} - \frac{\cos(3x)}{4\sqrt{x}}\right) dx, x, \sin^{-1}(a\right.}{a^5}$$

$$= -\frac{2x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{16x^3}{3a^2\sqrt{\sin^{-1}(ax)}} + \frac{20x^5}{3\sqrt{\sin^{-1}(ax)}} - \frac{25\,\mathrm{Subst}\left(\int \frac{\cos(5x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{12a^5} + \frac{4\,\mathrm{Su}}{}$$

$$= -\frac{2x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{16x^3}{3a^2\sqrt{\sin^{-1}(ax)}} + \frac{20x^5}{3\sqrt{\sin^{-1}(ax)}} - \frac{25\,\mathrm{Subst}\left(\int \cos\left(5x^2\right) dx, x, \sqrt{\sin^{-1}(ax)}\right)}{6a^5} +$$

$$= -\frac{2x^4\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{16x^3}{3a^2\sqrt{\sin^{-1}(ax)}} + \frac{20x^5}{3\sqrt{\sin^{-1}(ax)}} - \frac{25\sqrt{\frac{\pi}{2}}C\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^5} + \frac{4\sqrt{2\pi}C\left(\sqrt{\frac{2}{\pi}}\right.}{a^5}$$

Mathematica [C] time = 0.328869, size = 418, normalized size = 2.44

$$\frac{ie^{i\sin^{-1}(ax)}\left(-2\sin^{-1}(ax)+i\right)-2\left(-i\sin^{-1}(ax)\right)^{3/2}\mathrm{Gamma}\left(\frac{1}{2},-i\sin^{-1}(ax)\right)}{24\sin^{-1}(ax)^{3/2}} - \frac{e^{-i\sin^{-1}(ax)}\left(2e^{i\sin^{-1}(ax)}\left(i\sin^{-1}(ax)\right)^{3/2}\mathrm{Gamma}\left(\frac{1}{2},i\sin^{-1}(ax)\right)-2i\sin^{-1}(ax)+1\right)}{24\sin^{-1}(ax)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^4/ArcSin[a*x]^(5/2),x]
```

```
[Out] ((I*E^(I*ArcSin[a*x])*(I - 2*ArcSin[a*x]) - 2*((-I)*ArcSin[a*x])^(3/2)*Gamm
a[1/2, (-I)*ArcSin[a*x]])/(24*ArcSin[a*x]^(3/2)) - (1 - (2*I)*ArcSin[a*x] +
 2*E^(I*ArcSin[a*x])*(I*ArcSin[a*x])^(3/2)*Gamma[1/2, I*ArcSin[a*x]])/(24*E
^(I*ArcSin[a*x])*ArcSin[a*x]^(3/2)) - (I*E^((3*I)*ArcSin[a*x])*(I - 6*ArcSi
n[a*x]) - 6*Sqrt[3]*((-I)*ArcSin[a*x])^(3/2)*Gamma[1/2, (-3*I)*ArcSin[a*x]]
)/(16*ArcSin[a*x]^(3/2)) + (1 - (6*I)*ArcSin[a*x] + 6*Sqrt[3]*E^((3*I)*ArcS
in[a*x])*(I*ArcSin[a*x])^(3/2)*Gamma[1/2, (3*I)*ArcSin[a*x]])/(16*E^((3*I)*
ArcSin[a*x])*ArcSin[a*x]^(3/2)) + (I*E^((5*I)*ArcSin[a*x])*(I - 10*ArcSin[a
*x]) - 10*Sqrt[5]*((-I)*ArcSin[a*x])^(3/2)*Gamma[1/2, (-5*I)*ArcSin[a*x]])/
(48*ArcSin[a*x]^(3/2)) - (1 - (10*I)*ArcSin[a*x] + 10*Sqrt[5]*E^((5*I)*ArcS
in[a*x])*(I*ArcSin[a*x])^(3/2)*Gamma[1/2, (5*I)*ArcSin[a*x]])/(48*E^((5*I)*
ArcSin[a*x])*ArcSin[a*x]^(3/2)))/a^5
```

Maple [A] time = 0.07, size = 175, normalized size = 1.

$$\frac{1}{24\,a^{5}}\left(18\,\sqrt{2}\sqrt{\pi}\sqrt{3}\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{3}\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)\left(\arcsin\left(ax\right)\right)^{3/2}-10\,\sqrt{2}\sqrt{\pi}\sqrt{5}\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{5}\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)(\mathrm{arcs}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4/arcsin(a*x)^(5/2),x)
```

```
[Out] 1/24/a^5*(18*2^(1/2)*Pi^(1/2)*3^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*3^(1/2)*arc
sin(a*x)^(1/2))*arcsin(a*x)^(3/2)-10*2^(1/2)*Pi^(1/2)*5^(1/2)*FresnelC(2^(1
/2)/Pi^(1/2)*5^(1/2)*arcsin(a*x)^(1/2))*arcsin(a*x)^(3/2)-4*2^(1/2)*Pi^(1/2
)*FresnelC(2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))*arcsin(a*x)^(3/2)+4*a*x*arcs
in(a*x)+10*arcsin(a*x)*sin(5*arcsin(a*x))-18*arcsin(a*x)*sin(3*arcsin(a*x))
-2*(-a^2*x^2+1)^(1/2)-cos(5*arcsin(a*x))+3*cos(3*arcsin(a*x)))/arcsin(a*x)^
(3/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\operatorname{asin}^{\frac{5}{2}}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4/asin(a*x)**(5/2),x)
```

```
[Out] Integral(x**4/asin(a*x)**(5/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\arcsin(ax)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(x^4/arcsin(a*x)^(5/2), x)
```

3.108 $\int \frac{x^3}{\sin^{-1}(ax)^{5/2}}\,dx$

Optimal. Leaf size=126

$$\frac{4\sqrt{2\pi}S\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^4}-\frac{4\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{3a^4}-\frac{2x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{4x^2}{a^2\sqrt{\sin^{-1}(ax)}}+\frac{16x^4}{3\sqrt{\sin^{-1}(ax)}}$$

```
[Out] (-2*x^3*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^(3/2)) - (4*x^2)/(a^2*Sqrt[ArcS
in[a*x]]) + (16*x^4)/(3*Sqrt[ArcSin[a*x]]) + (4*Sqrt[2*Pi]*FresnelS[2*Sqrt[
2/Pi]*Sqrt[ArcSin[a*x]]])/(3*a^4) - (4*Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a*x
]])/Sqrt[Pi]])/(3*a^4)
```

Rubi [A] time = 0.338175, antiderivative size = 126, normalized size of antiderivative = 1., number of steps used = 15, number of rules used = 7, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.583, Rules used = {4633, 4719, 4635, 4406, 3305, 3351, 12}

$$\frac{4\sqrt{2\pi}S\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^4}-\frac{4\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{3a^4}-\frac{2x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{4x^2}{a^2\sqrt{\sin^{-1}(ax)}}+\frac{16x^4}{3\sqrt{\sin^{-1}(ax)}}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/ArcSin[a*x]^(5/2),x]
```

```
[Out] (-2*x^3*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^(3/2)) - (4*x^2)/(a^2*Sqrt[ArcS
in[a*x]]) + (16*x^4)/(3*Sqrt[ArcSin[a*x]]) + (4*Sqrt[2*Pi]*FresnelS[2*Sqrt[
2/Pi]*Sqrt[ArcSin[a*x]]])/(3*a^4) - (4*Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a*x
]])/Sqrt[Pi]])/(3*a^4)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rubi steps

$$\begin{aligned}
\int \frac{x^3}{\sin^{-1}(ax)^{5/2}}\,dx &= -\frac{2x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} + \frac{2\int \frac{x^2}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}\,dx}{a} - \frac{1}{3}(8a)\int \frac{x^4}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}\,dx \\
&= -\frac{2x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{4x^2}{a^2\sqrt{\sin^{-1}(ax)}} + \frac{16x^4}{3\sqrt{\sin^{-1}(ax)}} - \frac{64}{3}\int \frac{x^3}{\sqrt{\sin^{-1}(ax)}}\,dx + \frac{8\int \frac{x}{\sqrt{\sin^{-1}(ax)}}\,dx}{a^2} \\
&= -\frac{2x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{4x^2}{a^2\sqrt{\sin^{-1}(ax)}} + \frac{16x^4}{3\sqrt{\sin^{-1}(ax)}} + \frac{8\,\mathrm{Subst}\left(\int \frac{\cos(x)\sin(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{a^4} - 64\,\mathrm{Su} \\
&= -\frac{2x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{4x^2}{a^2\sqrt{\sin^{-1}(ax)}} + \frac{16x^4}{3\sqrt{\sin^{-1}(ax)}} + \frac{8\,\mathrm{Subst}\left(\int \frac{\sin(2x)}{2\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{a^4} - 64\,\mathrm{Subst} \\
&= -\frac{2x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{4x^2}{a^2\sqrt{\sin^{-1}(ax)}} + \frac{16x^4}{3\sqrt{\sin^{-1}(ax)}} + \frac{8\,\mathrm{Subst}\left(\int \frac{\sin(4x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{3a^4} + 4\,\mathrm{Subst}\big(\\
&= -\frac{2x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{4x^2}{a^2\sqrt{\sin^{-1}(ax)}} + \frac{16x^4}{3\sqrt{\sin^{-1}(ax)}} + \frac{16\,\mathrm{Subst}\left(\int \sin\left(4x^2\right)\,dx, x, \sqrt{\sin^{-1}(ax)}\right)}{3a^4} + 8 \\
&= -\frac{2x^3\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{4x^2}{a^2\sqrt{\sin^{-1}(ax)}} + \frac{16x^4}{3\sqrt{\sin^{-1}(ax)}} + \frac{4\sqrt{2\pi}S\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^4} - \frac{4\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax}}{\sqrt{\pi}}\right.}{3a^4}
\end{aligned}$$

Mathematica [C] time = 0.393931, size = 200, normalized size = 1.59

$$\frac{-4\sin^{-1}(ax)\left(-\sqrt{2}\sqrt{-i\sin^{-1}(ax)}\mathrm{Gamma}\left(\frac{1}{2}, -2i\sin^{-1}(ax)\right) - \sqrt{2}\sqrt{i\sin^{-1}(ax)}\mathrm{Gamma}\left(\frac{1}{2}, 2i\sin^{-1}(ax)\right) + e^{-2i\sin^{-1}(ax)} +\right.}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^3/ArcSin[a*x]^(5/2),x]
```

```
[Out] (-4*ArcSin[a*x]*(E^((-2*I)*ArcSin[a*x]) + E^((2*I)*ArcSin[a*x]) - Sqrt[2]*S
qrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-2*I)*ArcSin[a*x]] - Sqrt[2]*Sqrt[I*ArcSi
n[a*x]]*Gamma[1/2, (2*I)*ArcSin[a*x]]) + 4*ArcSin[a*x]*(E^((-4*I)*ArcSin[a*
x]) + E^((4*I)*ArcSin[a*x]) - 2*Sqrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-4*I)*Ar
cSin[a*x]] - 2*Sqrt[I*ArcSin[a*x]]*Gamma[1/2, (4*I)*ArcSin[a*x]]) - 2*Sin[2
*ArcSin[a*x]] + Sin[4*ArcSin[a*x]])/(12*a^4*ArcSin[a*x]^(3/2))
```

Maple [A] time = 0.057, size = 109, normalized size = 0.9

$$-\frac{1}{12\,a^{4}}\left(-16\,\sqrt{2}\sqrt{\pi}\mathrm{FresnelS}\left(2\,\frac{\sqrt{2}\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)\left(\arcsin\left(ax\right)\right)^{3/2}+16\,\sqrt{\pi}\mathrm{FresnelS}\left(2\,\frac{\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)\left(\arcsin\left(ax\right)\right)^{3/2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/arcsin(a*x)^(5/2),x)
```

```
[Out] -1/12/a^4*(-16*2^(1/2)*Pi^(1/2)*FresnelS(2*2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/
2))*arcsin(a*x)^(3/2)+16*Pi^(1/2)*FresnelS(2*arcsin(a*x)^(1/2)/Pi^(1/2))*ar
csin(a*x)^(3/2)+8*arcsin(a*x)*cos(2*arcsin(a*x))-8*arcsin(a*x)*cos(4*arcsin
(a*x))+2*sin(2*arcsin(a*x))-sin(4*arcsin(a*x)))/arcsin(a*x)^(3/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\operatorname{asin}^{\frac{5}{2}}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/asin(a*x)**(5/2),x)
```

```
[Out] Integral(x**3/asin(a*x)**(5/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\arcsin(ax)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(x^3/arcsin(a*x)^(5/2), x)
```

3.109 $\int \frac{x^2}{\sin^{-1}(ax)^{5/2}}\,dx$

Optimal. Leaf size=125

$$-\frac{\sqrt{2\pi}\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^3}+\frac{\sqrt{6\pi}\text{FresnelC}\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^3}-\frac{2x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{8x}{3a^2\sqrt{\sin^{-1}(ax)}}+\frac{4x^3}{\sqrt{\sin^{-1}(a}}$$

```
[Out] (-2*x^2*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^(3/2)) - (8*x)/(3*a^2*Sqrt[ArcS
in[a*x]]) + (4*x^3)/Sqrt[ArcSin[a*x]] - (Sqrt[2*Pi]*FresnelC[Sqrt[2/Pi]*Sqr
t[ArcSin[a*x]]])/(3*a^3) + (Sqrt[6*Pi]*FresnelC[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]
]])/a^3
```

Rubi [A] time = 0.301204, antiderivative size = 125, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 7, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.583, Rules used = {4633, 4719, 4635, 4406, 3304, 3352, 4623}

$$-\frac{\sqrt{2\pi}\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^3}+\frac{\sqrt{6\pi}\text{FresnelC}\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^3}-\frac{2x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{8x}{3a^2\sqrt{\sin^{-1}(ax)}}+\frac{4x^3}{\sqrt{\sin^{-1}(a}}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/ArcSin[a*x]^(5/2),x]
```

```
[Out] (-2*x^2*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^(3/2)) - (8*x)/(3*a^2*Sqrt[ArcS
in[a*x]]) + (4*x^3)/Sqrt[ArcSin[a*x]] - (Sqrt[2*Pi]*FresnelC[Sqrt[2/Pi]*Sqr
t[ArcSin[a*x]]])/(3*a^3) + (Sqrt[6*Pi]*FresnelC[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]
]])/a^3
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rubi steps

$$\int \frac{x^2}{\sin^{-1}(ax)^{5/2}}\,dx = -\frac{2x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} + \frac{4\int \frac{x}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}\,dx}{3a} - (2a)\int \frac{x^3}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}\,dx$$

$$= -\frac{2x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{8x}{3a^2\sqrt{\sin^{-1}(ax)}} + \frac{4x^3}{\sqrt{\sin^{-1}(ax)}} - 12\int \frac{x^2}{\sqrt{\sin^{-1}(ax)}}\,dx + \frac{8\int \frac{1}{\sqrt{\sin^{-1}(ax)}}\,dx}{3a^2}$$

$$= -\frac{2x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{8x}{3a^2\sqrt{\sin^{-1}(ax)}} + \frac{4x^3}{\sqrt{\sin^{-1}(ax)}} + \frac{8\,\mathrm{Subst}\left(\int \frac{\cos(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{3a^3} - 12\,\mathrm{Subs}$$

$$= -\frac{2x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{8x}{3a^2\sqrt{\sin^{-1}(ax)}} + \frac{4x^3}{\sqrt{\sin^{-1}(ax)}} + \frac{16\,\mathrm{Subst}\left(\int \cos\left(x^2\right)\,dx, x, \sqrt{\sin^{-1}(ax)}\right)}{3a^3} - 12$$

$$= -\frac{2x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{8x}{3a^2\sqrt{\sin^{-1}(ax)}} + \frac{4x^3}{\sqrt{\sin^{-1}(ax)}} + \frac{8\sqrt{2\pi}C\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^3} - 3\,\mathrm{Subst}\left(\int \frac{\cos(x}{\sqrt{x}}\right.$$

$$= -\frac{2x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{8x}{3a^2\sqrt{\sin^{-1}(ax)}} + \frac{4x^3}{\sqrt{\sin^{-1}(ax)}} + \frac{8\sqrt{2\pi}C\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^3} - 6\,\mathrm{Subst}\left(\int \cos\right.$$

$$= -\frac{2x^2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{8x}{3a^2\sqrt{\sin^{-1}(ax)}} + \frac{4x^3}{\sqrt{\sin^{-1}(ax)}} - \frac{\sqrt{2\pi}C\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^3} + \frac{\sqrt{6\pi}C\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin\right.}{a^3}$$

Mathematica [C] time = 0.207792, size = 277, normalized size = 2.22

$$\frac{ie^{i\sin^{-1}(ax)}\left(-2\sin^{-1}(ax)+i\right)-2\left(-i\sin^{-1}(ax)\right)^{3/2}\mathrm{Gamma}\left(\frac{1}{2},-i\sin^{-1}(ax)\right)}{12\sin^{-1}(ax)^{3/2}} - \frac{e^{-i\sin^{-1}(ax)}\left(2e^{i\sin^{-1}(ax)}\left(i\sin^{-1}(ax)\right)^{3/2}\mathrm{Gamma}\left(\frac{1}{2},i\sin^{-1}(ax)\right)-2i\sin^{-1}(ax)+1\right)}{12\sin^{-1}(ax)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2/ArcSin[a*x]^(5/2),x]
```

```
[Out] ((I*E^(I*ArcSin[a*x])*(I - 2*ArcSin[a*x]) - 2*((-I)*ArcSin[a*x])^(3/2)*Gamm
a[1/2, (-I)*ArcSin[a*x]])/(12*ArcSin[a*x]^(3/2)) - (1 - (2*I)*ArcSin[a*x] +
 2*E^(I*ArcSin[a*x])*(I*ArcSin[a*x])^(3/2)*Gamma[1/2, I*ArcSin[a*x]])/(12*E
^(I*ArcSin[a*x])*ArcSin[a*x]^(3/2)) - (I*E^((3*I)*ArcSin[a*x])*(I - 6*ArcSi
n[a*x]) - 6*Sqrt[3]*((-I)*ArcSin[a*x])^(3/2)*Gamma[1/2, (-3*I)*ArcSin[a*x]]
)/(12*ArcSin[a*x]^(3/2)) + (1 - (6*I)*ArcSin[a*x] + 6*Sqrt[3]*E^((3*I)*ArcS
in[a*x])*(I*ArcSin[a*x])^(3/2)*Gamma[1/2, (3*I)*ArcSin[a*x]])/(12*E^((3*I)*
ArcSin[a*x])*ArcSin[a*x]^(3/2)))/a^3
```

Maple [A] time = 0.055, size = 117, normalized size = 0.9

$$-\frac{1}{6\,a^3}\left(-6\sqrt{2}\sqrt{\pi}\sqrt{3}\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{3}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)(\arcsin(ax))^{3/2}+2\sqrt{2}\sqrt{\pi}\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)(\arcsin(ax\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/arcsin(a*x)^(5/2),x)
```

```
[Out] -1/6/a^3*(-6*2^(1/2)*Pi^(1/2)*3^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*3^(1/2)*arc
sin(a*x)^(1/2))*arcsin(a*x)^(3/2)+2*2^(1/2)*Pi^(1/2)*FresnelC(2^(1/2)/Pi^(1
/2)*arcsin(a*x)^(1/2))*arcsin(a*x)^(3/2)-2*a*x*arcsin(a*x)+6*arcsin(a*x)*si
n(3*arcsin(a*x))+(-a^2*x^2+1)^(1/2)-cos(3*arcsin(a*x)))/arcsin(a*x)^(3/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\operatorname{asin}^{\frac{5}{2}}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/asin(a*x)**(5/2),x)
```

```
[Out] Integral(x**2/asin(a*x)**(5/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\arcsin(ax)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(x^2/arcsin(a*x)^(5/2), x)
```

3.110 $\int \frac{x}{\sin^{-1}(ax)^{5/2}}\,dx$

Optimal. Leaf size=89

$$-\frac{8\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{3a^2}-\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{4}{3a^2\sqrt{\sin^{-1}(ax)}}+\frac{8x^2}{3\sqrt{\sin^{-1}(ax)}}$$

```
[Out] (-2*x*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^(3/2)) - 4/(3*a^2*Sqrt[ArcSin[a*x
]]) + (8*x^2)/(3*Sqrt[ArcSin[a*x]]) - (8*Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a
*x]])/Sqrt[Pi]])/(3*a^2)
```

Rubi [A] time = 0.179532, antiderivative size = 89, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.8, Rules used = {4633, 4719, 4635, 4406, 12, 3305, 3351, 4641}

$$-\frac{8\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{3a^2}-\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{4}{3a^2\sqrt{\sin^{-1}(ax)}}+\frac{8x^2}{3\sqrt{\sin^{-1}(ax)}}$$

Antiderivative was successfully verified.

```
[In] Int[x/ArcSin[a*x]^(5/2),x]
```

```
[Out] (-2*x*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^(3/2)) - 4/(3*a^2*Sqrt[ArcSin[a*x
]]) + (8*x^2)/(3*Sqrt[ArcSin[a*x]]) - (8*Sqrt[Pi]*FresnelS[(2*Sqrt[ArcSin[a
*x]])/Sqrt[Pi]])/(3*a^2)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rubi steps

$$\begin{aligned}
\int \frac{x}{\sin^{-1}(ax)^{5/2}}\,dx &= -\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}+\frac{2\int \frac{1}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}\,dx}{3a}-\frac{1}{3}(4a)\int \frac{x^2}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{3/2}}\,dx\\
&= -\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{4}{3a^2\sqrt{\sin^{-1}(ax)}}+\frac{8x^2}{3\sqrt{\sin^{-1}(ax)}}-\frac{16}{3}\int \frac{x}{\sqrt{\sin^{-1}(ax)}}\,dx\\
&= -\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{4}{3a^2\sqrt{\sin^{-1}(ax)}}+\frac{8x^2}{3\sqrt{\sin^{-1}(ax)}}-\frac{16\,\text{Subst}\left(\int \frac{\cos(x)\sin(x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{3a^2}\\
&= -\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{4}{3a^2\sqrt{\sin^{-1}(ax)}}+\frac{8x^2}{3\sqrt{\sin^{-1}(ax)}}-\frac{16\,\text{Subst}\left(\int \frac{\sin(2x)}{2\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{3a^2}\\
&= -\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{4}{3a^2\sqrt{\sin^{-1}(ax)}}+\frac{8x^2}{3\sqrt{\sin^{-1}(ax)}}-\frac{8\,\text{Subst}\left(\int \frac{\sin(2x)}{\sqrt{x}}\,dx,x,\sin^{-1}(ax)\right)}{3a^2}\\
&= -\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{4}{3a^2\sqrt{\sin^{-1}(ax)}}+\frac{8x^2}{3\sqrt{\sin^{-1}(ax)}}-\frac{16\,\text{Subst}\left(\int \sin\left(2x^2\right)\,dx,x,\sqrt{\sin^{-1}(ax)}\right)}{3a^2}\\
&= -\frac{2x\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{4}{3a^2\sqrt{\sin^{-1}(ax)}}+\frac{8x^2}{3\sqrt{\sin^{-1}(ax)}}-\frac{8\sqrt{\pi}S\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{3a^2}
\end{aligned}$$

<u>Mathematica</u> [C] time = 0.225307, size = 112, normalized size = 1.26

$$-\frac{\sin\left(2\sin^{-1}(ax)\right)+2\sin^{-1}(ax)\left(-\sqrt{2}\sqrt{-i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},-2i\sin^{-1}(ax)\right)-\sqrt{2}\sqrt{i\sin^{-1}(ax)}\text{Gamma}\left(\frac{1}{2},2i\sin^{-1}(a\right.\right.}{3a^2\sin^{-1}(ax)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x/ArcSin[a*x]^(5/2),x]
```

```
[Out] -(2*ArcSin[a*x]*(E^((-2*I)*ArcSin[a*x]) + E^((2*I)*ArcSin[a*x]) - Sqrt[2]*S
qrt[(-I)*ArcSin[a*x]]*Gamma[1/2, (-2*I)*ArcSin[a*x]] - Sqrt[2]*Sqrt[I*ArcSi
n[a*x]]*Gamma[1/2, (2*I)*ArcSin[a*x]]) + Sin[2*ArcSin[a*x]])/(3*a^2*ArcSin[
a*x]^(3/2))
```

Maple [A] time = 0.039, size = 56, normalized size = 0.6

$$-\frac{1}{3\,a^{2}}\left(8\,\sqrt{\pi}\mathrm{FresnelS}\left(2\,\frac{\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)\left(\arcsin\left(ax\right)\right)^{3/2}+4\,\arcsin\left(ax\right)\cos\left(2\,\arcsin\left(ax\right)\right)+\sin\left(2\,\arcsin\left(ax\right)\right)\right)(\mathrm{arcs}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/arcsin(a*x)^(5/2),x)
```

```
[Out] -1/3/a^2*(8*Pi^(1/2)*FresnelS(2*arcsin(a*x)^(1/2)/Pi^(1/2))*arcsin(a*x)^(3/
2)+4*arcsin(a*x)*cos(2*arcsin(a*x))+sin(2*arcsin(a*x)))/arcsin(a*x)^(3/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\operatorname{asin}^{\frac{5}{2}}{\left(ax \right)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/asin(a*x)**(5/2),x)
```

```
[Out] Integral(x/asin(a*x)**(5/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\arcsin{(ax)}^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(x/arcsin(a*x)^(5/2), x)
```

3.111 $\int \frac{1}{\sin^{-1}(ax)^{5/2}}\,dx$

Optimal. Leaf size=76

$$-\frac{2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{4\sqrt{2\pi}\,\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a}+\frac{4x}{3\sqrt{\sin^{-1}(ax)}}$$

```
[Out] (-2*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^(3/2)) + (4*x)/(3*Sqrt[ArcSin[a*x]]
) - (4*Sqrt[2*Pi]*FresnelC[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(3*a)
```

Rubi [A] time = 0.0989886, antiderivative size = 76, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {4621, 4719, 4623, 3304, 3352}

$$-\frac{2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}}-\frac{4\sqrt{2\pi}\,\text{FresnelC}\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a}+\frac{4x}{3\sqrt{\sin^{-1}(ax)}}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^(-5/2),x]
```

```
[Out] (-2*Sqrt[1 - a^2*x^2])/(3*a*ArcSin[a*x]^(3/2)) + (4*x)/(3*Sqrt[ArcSin[a*x]]
) - (4*Sqrt[2*Pi]*FresnelC[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(3*a)
```

Rule 4621

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Sqrt[1 - c^
2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + Dist[c/(b*(n + 1)),
 Int[(x*(a + b*ArcSin[c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a,
 b, c}, x] && LtQ[n, -1]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
```

```
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{1}{\sin^{-1}(ax)^{5/2}}\,dx &= -\frac{2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} - \frac{1}{3}(2a)\int \frac{x}{\sqrt{1-a^2x^2}\,\sin^{-1}(ax)^{3/2}}\,dx \\
&= -\frac{2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} + \frac{4x}{3\sqrt{\sin^{-1}(ax)}} - \frac{4}{3}\int \frac{1}{\sqrt{\sin^{-1}(ax)}}\,dx \\
&= -\frac{2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} + \frac{4x}{3\sqrt{\sin^{-1}(ax)}} - \frac{4\,\mathrm{Subst}\left(\int \frac{\cos(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{3a} \\
&= -\frac{2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} + \frac{4x}{3\sqrt{\sin^{-1}(ax)}} - \frac{8\,\mathrm{Subst}\left(\int \cos\left(x^2\right)\,dx, x, \sqrt{\sin^{-1}(ax)}\right)}{3a} \\
&= -\frac{2\sqrt{1-a^2x^2}}{3a\sin^{-1}(ax)^{3/2}} + \frac{4x}{3\sqrt{\sin^{-1}(ax)}} - \frac{4\sqrt{2\pi}\,C\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a}
\end{aligned}
$$

Mathematica [C] time = 0.127191, size = 138, normalized size = 1.82

$$\frac{-4\left(-i\sin^{-1}(ax)\right)^{3/2}\text{Gamma}\left(\frac{1}{2},-i\sin^{-1}(ax)\right)-2ie^{i\sin^{-1}(ax)}\left(2\sin^{-1}(ax)-i\right)}{6a\sin^{-1}(ax)^{3/2}}+\frac{e^{-i\sin^{-1}(ax)}\left(-4e^{i\sin^{-1}(ax)}\left(i\sin^{-1}(ax)\right)^{3/2}\right.}{6a\,\mathrm{si}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^(-5/2),x]
```

```
[Out] ((-2*I)*E^(I*ArcSin[a*x])*(-I + 2*ArcSin[a*x]) - 4*((-I)*ArcSin[a*x])^(3/2)
*Gamma[1/2, (-I)*ArcSin[a*x]])/(6*a*ArcSin[a*x]^(3/2)) + (-2 + (4*I)*ArcSin
[a*x] - 4*E^(I*ArcSin[a*x])*(I*ArcSin[a*x])^(3/2)*Gamma[1/2, I*ArcSin[a*x]]
)/(6*a*E^(I*ArcSin[a*x])*ArcSin[a*x]^(3/2))
```

Maple [A] time = 0.042, size = 83, normalized size = 1.1

$$-\frac{\sqrt{2}}{3\,a\sqrt{\pi}\,(\arcsin(ax))^2}\left(4\,(\arcsin(ax))^2\,\pi\,\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)-2\,(\arcsin(ax))^{3/2}\sqrt{2}\sqrt{\pi}xa+\sqrt{2}\sqrt{\arcsin(a}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/arcsin(a*x)^(5/2),x)
```

```
[Out] -1/3/a*2^(1/2)/Pi^(1/2)*(4*arcsin(a*x)^2*Pi*FresnelC(2^(1/2)/Pi^(1/2)*arcsi
n(a*x)^(1/2))-2*arcsin(a*x)^(3/2)*2^(1/2)*Pi^(1/2)*x*a+2^(1/2)*arcsin(a*x)^
(1/2)*Pi^(1/2)*(-a^2*x^2+1)^(1/2))/arcsin(a*x)^2
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\operatorname{asin}^{\frac{5}{2}}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/asin(a*x)**(5/2),x)
```

```
[Out] Integral(asin(a*x)**(-5/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\arcsin(ax)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^(-5/2), x)
```

3.112 $\int \frac{1}{x \sin^{-1}(ax)^{5/2}} \, dx$

Optimal. Leaf size=14

$$\text{Unintegrable}\left(\frac{1}{x \sin^{-1}(ax)^{5/2}}, x\right)$$

```
[Out] Unintegrable[1/(x*ArcSin[a*x]^(5/2)), x]
```

Rubi [A] time = 0.0133551, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int \frac{1}{x \sin^{-1}(ax)^{5/2}} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*ArcSin[a*x]^(5/2)),x]
```

```
[Out] Defer[Int][1/(x*ArcSin[a*x]^(5/2)), x]
```

Rubi steps

$$\int \frac{1}{x \sin^{-1}(ax)^{5/2}} \, dx = \int \frac{1}{x \sin^{-1}(ax)^{5/2}} \, dx$$

Mathematica [A] time = 0.462145, size = 0, normalized size = 0.

$$\int \frac{1}{x \sin^{-1}(ax)^{5/2}} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*ArcSin[a*x]^(5/2)),x]
```

```
[Out] Integrate[1/(x*ArcSin[a*x]^(5/2)), x]
```

Maple [A] time = 0.069, size = 0, normalized size = 0.

$$\int \frac{1}{x}\left(\arcsin\left(ax\right)\right)^{-\frac{5}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/arcsin(a*x)^(5/2),x)
```

```
[Out] int(1/x/arcsin(a*x)^(5/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\operatorname{asin}^{\frac{5}{2}}\left(ax\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/asin(a*x)**(5/2),x)
```

```
[Out] Integral(1/(x*asin(a*x)**(5/2)), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x \arcsin{(ax)}^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x*arcsin(a*x)^(5/2)), x)
```

3.113 $\int \frac{x^4}{\sin^{-1}(ax)^{7/2}}\,dx$

Optimal. Leaf size=264

$$\frac{\sqrt{2\pi}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{15a^5}+\frac{8\sqrt{6\pi}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{5a^5}-\frac{5\sqrt{\frac{3\pi}{2}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^5}+\frac{5\sqrt{\frac{5\pi}{2}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^5}+\frac{40x^4\sqrt{}}{3a\sqrt{\mathrm{s}}}$$

```
[Out] (-2*x^4*Sqrt[1 - a^2*x^2])/(5*a*ArcSin[a*x]^(5/2)) - (16*x^3)/(15*a^2*ArcSi
n[a*x]^(3/2)) + (4*x^5)/(3*ArcSin[a*x]^(3/2)) - (32*x^2*Sqrt[1 - a^2*x^2])/
(5*a^3*Sqrt[ArcSin[a*x]]) + (40*x^4*Sqrt[1 - a^2*x^2])/(3*a*Sqrt[ArcSin[a*x
]]) + (Sqrt[2*Pi]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(15*a^5) - (5*Sqr
t[(3*Pi)/2]*FresnelS[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/a^5 + (8*Sqrt[6*Pi]*Fre
snelS[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(5*a^5) + (5*Sqrt[(5*Pi)/2]*FresnelS[S
qrt[10/Pi]*Sqrt[ArcSin[a*x]]])/(3*a^5)
```

Rubi [A] time = 0.39587, antiderivative size = 264, normalized size of antiderivative = 1., number of steps used = 17, number of rules used = 5, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.417, Rules used = {4633, 4719, 4631, 3305, 3351}

$$\frac{\sqrt{2\pi}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{15a^5}+\frac{8\sqrt{6\pi}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{5a^5}-\frac{5\sqrt{\frac{3\pi}{2}}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{a^5}+\frac{5\sqrt{\frac{5\pi}{2}}S\left(\sqrt{\frac{10}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{3a^5}+\frac{40x^4\sqrt{}}{3a\sqrt{\mathrm{s}}}$$

Antiderivative was successfully verified.

```
[In] Int[x^4/ArcSin[a*x]^(7/2),x]
```

```
[Out] (-2*x^4*Sqrt[1 - a^2*x^2])/(5*a*ArcSin[a*x]^(5/2)) - (16*x^3)/(15*a^2*ArcSi
n[a*x]^(3/2)) + (4*x^5)/(3*ArcSin[a*x]^(3/2)) - (32*x^2*Sqrt[1 - a^2*x^2])/
(5*a^3*Sqrt[ArcSin[a*x]]) + (40*x^4*Sqrt[1 - a^2*x^2])/(3*a*Sqrt[ArcSin[a*x
]]) + (Sqrt[2*Pi]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(15*a^5) - (5*Sqr
t[(3*Pi)/2]*FresnelS[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/a^5 + (8*Sqrt[6*Pi]*Fre
snelS[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(5*a^5) + (5*Sqrt[(5*Pi)/2]*FresnelS[S
qrt[10/Pi]*Sqrt[ArcSin[a*x]]])/(3*a^5)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int \frac{x^4}{\sin^{-1}(ax)^{7/2}}\,dx = -\frac{2x^4\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} + \frac{8\int \frac{x^3}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{5/2}}\,dx}{5a} - (2a)\int \frac{x^5}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{5/2}}\,dx$$

$$= -\frac{2x^4\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{16x^3}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{4x^5}{3\sin^{-1}(ax)^{3/2}} - \frac{20}{3}\int \frac{x^4}{\sin^{-1}(ax)^{3/2}}\,dx + \frac{16\int \frac{x^2}{\sin^{-1}(ax)^{3/2}}\,dx}{5a^2}$$

$$= -\frac{2x^4\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{16x^3}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{4x^5}{3\sin^{-1}(ax)^{3/2}} - \frac{32x^2\sqrt{1-a^2x^2}}{5a^3\sqrt{\sin^{-1}(ax)}} + \frac{40x^4\sqrt{1-a^2x^2}}{3a\sqrt{\sin^{-1}(ax)}} + \frac{32\,\mathrm{Sub}}{}$$

$$= -\frac{2x^4\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{16x^3}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{4x^5}{3\sin^{-1}(ax)^{3/2}} - \frac{32x^2\sqrt{1-a^2x^2}}{5a^3\sqrt{\sin^{-1}(ax)}} + \frac{40x^4\sqrt{1-a^2x^2}}{3a\sqrt{\sin^{-1}(ax)}} - \frac{8\,\mathrm{Subs}}{}$$

$$= -\frac{2x^4\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{16x^3}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{4x^5}{3\sin^{-1}(ax)^{3/2}} - \frac{32x^2\sqrt{1-a^2x^2}}{5a^3\sqrt{\sin^{-1}(ax)}} + \frac{40x^4\sqrt{1-a^2x^2}}{3a\sqrt{\sin^{-1}(ax)}} - \frac{16\,\mathrm{Sub}}{}$$

$$= -\frac{2x^4\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{16x^3}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{4x^5}{3\sin^{-1}(ax)^{3/2}} - \frac{32x^2\sqrt{1-a^2x^2}}{5a^3\sqrt{\sin^{-1}(ax)}} + \frac{40x^4\sqrt{1-a^2x^2}}{3a\sqrt{\sin^{-1}(ax)}} + \frac{\sqrt{2\pi}S}{}$$

Mathematica [C] time = 0.772494, size = 417, normalized size = 1.58

$$\frac{-8\sqrt{-i\sin^{-1}(ax)}\sin^{-1}(ax)^2\mathrm{Gamma}\left(\frac{1}{2},-i\sin^{-1}(ax)\right)+108\sqrt{3}\sqrt{-i\sin^{-1}(ax)}\sin^{-1}(ax)^2\mathrm{Gamma}\left(\frac{1}{2},-3i\sin^{-1}(ax)\right)-10}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^4/ArcSin[a*x]^(7/2),x]
```

```
[Out] (9*E^((3*I)*ArcSin[a*x])*(1 + (2*I)*ArcSin[a*x] - 12*ArcSin[a*x]^2) + 2*E^(
I*ArcSin[a*x])*(-3 - (2*I)*ArcSin[a*x] + 4*ArcSin[a*x]^2) + E^((5*I)*ArcSin
[a*x])*(-3 - (10*I)*ArcSin[a*x] + 100*ArcSin[a*x]^2) - 8*Sqrt[(-I)*ArcSin[a
*x]]*ArcSin[a*x]^2*Gamma[1/2, (-I)*ArcSin[a*x]] + (-6 + (4*I)*ArcSin[a*x] +
 8*ArcSin[a*x]^2 + 8*E^(I*ArcSin[a*x])*(I*ArcSin[a*x])^(5/2)*Gamma[1/2, I*A
rcSin[a*x]])/E^(I*ArcSin[a*x]) + 108*Sqrt[3]*Sqrt[(-I)*ArcSin[a*x]]*ArcSin[
a*x]^2*Gamma[1/2, (-3*I)*ArcSin[a*x]] - (9*(-1 + (2*I)*ArcSin[a*x] + 12*Arc
Sin[a*x]^2 + 12*Sqrt[3]*E^((3*I)*ArcSin[a*x])*(I*ArcSin[a*x])^(5/2)*Gamma[1
/2, (3*I)*ArcSin[a*x]]))/E^((3*I)*ArcSin[a*x]) - 100*Sqrt[5]*Sqrt[(-I)*ArcS
in[a*x]]*ArcSin[a*x]^2*Gamma[1/2, (-5*I)*ArcSin[a*x]] + (-3 + (10*I)*ArcSin
[a*x] + 100*ArcSin[a*x]^2 + 100*Sqrt[5]*E^((5*I)*ArcSin[a*x])*(I*ArcSin[a*x
])^(5/2)*Gamma[1/2, (5*I)*ArcSin[a*x]])/E^((5*I)*ArcSin[a*x]))/(240*a^5*Arc
Sin[a*x]^(5/2))
```

Maple [A] time = 0.083, size = 225, normalized size = 0.9

$$-\frac{1}{120\,a^{5}}\left(-100\,\sqrt{2}\sqrt{\pi}\sqrt{5}\mathrm{FresnelS}\left(\frac{\sqrt{2}\sqrt{5}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)(\arcsin(ax))^{5/2}+108\,\sqrt{2}\sqrt{\pi}\sqrt{3}\mathrm{FresnelS}\left(\frac{\sqrt{2}\sqrt{3}\sqrt{\arcsin(ax}}{\sqrt{\pi}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^4/arcsin(a*x)^(7/2),x)
```

```
[Out] -1/120/a^5*(-100*2^(1/2)*Pi^(1/2)*5^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*5^(1/2)
*arcsin(a*x)^(1/2))*arcsin(a*x)^(5/2)+108*2^(1/2)*Pi^(1/2)*3^(1/2)*FresnelS
(2^(1/2)/Pi^(1/2)*3^(1/2)*arcsin(a*x)^(1/2))*arcsin(a*x)^(5/2)-8*2^(1/2)*Pi
^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2))*arcsin(a*x)^(5/2)+108*a
rcsin(a*x)^2*cos(3*arcsin(a*x))-100*arcsin(a*x)^2*cos(5*arcsin(a*x))-8*arcs
in(a*x)^2*(-a^2*x^2+1)^(1/2)-4*a*x*arcsin(a*x)+18*arcsin(a*x)*sin(3*arcsin(
a*x))-10*arcsin(a*x)*sin(5*arcsin(a*x))-9*cos(3*arcsin(a*x))+3*cos(5*arcsin
(a*x))+6*(-a^2*x^2+1)^(1/2))/arcsin(a*x)^(5/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^(7/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^(7/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**4/asin(a*x)**(7/2),x)
```

```
[Out] Timed out
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^4}{\arcsin{(ax)}^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^4/arcsin(a*x)^(7/2),x, algorithm="giac")
```

```
[Out] integrate(x^4/arcsin(a*x)^(7/2), x)
```

3.114 $\int \frac{x^3}{\sin^{-1}(ax)^{7/2}}\,dx$

Optimal. Leaf size=190

$$\frac{32\sqrt{2\pi}\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{15a^4}-\frac{16\sqrt{\pi}\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{15a^4}+\frac{128x^3\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}}-\frac{2x^3\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}}-\frac{4x^2}{5a^2\sin^{-1}(}$$

```
[Out] (-2*x^3*Sqrt[1 - a^2*x^2])/(5*a*ArcSin[a*x]^(5/2)) - (4*x^2)/(5*a^2*ArcSin[
a*x]^(3/2)) + (16*x^4)/(15*ArcSin[a*x]^(3/2)) - (16*x*Sqrt[1 - a^2*x^2])/(5
*a^3*Sqrt[ArcSin[a*x]]) + (128*x^3*Sqrt[1 - a^2*x^2])/(15*a*Sqrt[ArcSin[a*x
]]) + (32*Sqrt[2*Pi]*FresnelC[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(15*a^4) - (
16*Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(15*a^4)
```

Rubi [A] time = 0.318782, antiderivative size = 190, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 5, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.417, Rules used = {4633, 4719, 4631, 3304, 3352}

$$\frac{32\sqrt{2\pi}\text{FresnelC}\left(2\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{15a^4}-\frac{16\sqrt{\pi}\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{15a^4}+\frac{128x^3\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}}-\frac{2x^3\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}}-\frac{4x^2}{5a^2\sin^{-1}(}$$

Antiderivative was successfully verified.

```
[In] Int[x^3/ArcSin[a*x]^(7/2),x]
```

```
[Out] (-2*x^3*Sqrt[1 - a^2*x^2])/(5*a*ArcSin[a*x]^(5/2)) - (4*x^2)/(5*a^2*ArcSin[
a*x]^(3/2)) + (16*x^4)/(15*ArcSin[a*x]^(3/2)) - (16*x*Sqrt[1 - a^2*x^2])/(5
*a^3*Sqrt[ArcSin[a*x]]) + (128*x^3*Sqrt[1 - a^2*x^2])/(15*a*Sqrt[ArcSin[a*x
]]) + (32*Sqrt[2*Pi]*FresnelC[2*Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(15*a^4) - (
16*Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(15*a^4)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int \frac{x^3}{\sin^{-1}(ax)^{7/2}}\,dx = -\frac{2x^3\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} + \frac{6\int \frac{x^2}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{5/2}}\,dx}{5a} - \frac{1}{5}(8a)\int \frac{x^4}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{5/2}}\,dx$$

$$= -\frac{2x^3\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{4x^2}{5a^2\sin^{-1}(ax)^{3/2}} + \frac{16x^4}{15\sin^{-1}(ax)^{3/2}} - \frac{64}{15}\int \frac{x^3}{\sin^{-1}(ax)^{3/2}}\,dx + \frac{8\int \frac{x}{\sin^{-1}(ax)^{3/2}}\,dx}{5a^2}$$

$$= -\frac{2x^3\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{4x^2}{5a^2\sin^{-1}(ax)^{3/2}} + \frac{16x^4}{15\sin^{-1}(ax)^{3/2}} - \frac{16x\sqrt{1-a^2x^2}}{5a^3\sqrt{\sin^{-1}(ax)}} + \frac{128x^3\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}} + \frac{16\,\mathrm{S}}{\ }$$

$$= -\frac{2x^3\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{4x^2}{5a^2\sin^{-1}(ax)^{3/2}} + \frac{16x^4}{15\sin^{-1}(ax)^{3/2}} - \frac{16x\sqrt{1-a^2x^2}}{5a^3\sqrt{\sin^{-1}(ax)}} + \frac{128x^3\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}} - \frac{64\,\mathrm{S}}{\ }$$

$$= -\frac{2x^3\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{4x^2}{5a^2\sin^{-1}(ax)^{3/2}} + \frac{16x^4}{15\sin^{-1}(ax)^{3/2}} - \frac{16x\sqrt{1-a^2x^2}}{5a^3\sqrt{\sin^{-1}(ax)}} + \frac{128x^3\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}} + \frac{16\surd}{\ }$$

$$= -\frac{2x^3\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{4x^2}{5a^2\sin^{-1}(ax)^{3/2}} + \frac{16x^4}{15\sin^{-1}(ax)^{3/2}} - \frac{16x\sqrt{1-a^2x^2}}{5a^3\sqrt{\sin^{-1}(ax)}} + \frac{128x^3\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}} + \frac{32\surd}{\ }$$

Mathematica [C] time = 1.18683, size = 272, normalized size = 1.43

$$\frac{4\sin^{-1}(ax)\Big(-4\sqrt{2}\left(-i\sin^{-1}(ax)\right)^{3/2}\text{Gamma}\left(\frac{1}{2},-2i\sin^{-1}(ax)\right)+e^{-2i\sin^{-1}(ax)}\Big(-4\sqrt{2}e^{2i\sin^{-1}(ax)}\left(i\sin^{-1}(ax)\right)^{3/2}\text{Gamma}}{\ }$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^3/ArcSin[a*x]^(7/2),x]
```

```
[Out] (4*ArcSin[a*x]*(I*E^((2*I)*ArcSin[a*x])*(I - 4*ArcSin[a*x]) - 4*Sqrt[2]*((-
I)*ArcSin[a*x])^(3/2)*Gamma[1/2, (-2*I)*ArcSin[a*x]] + (-1 + (4*I)*ArcSin[a
*x] - 4*Sqrt[2]*E^((2*I)*ArcSin[a*x])*(I*ArcSin[a*x])^(3/2)*Gamma[1/2, (2*I
)*ArcSin[a*x]])/E^((2*I)*ArcSin[a*x])) - 4*ArcSin[a*x]*(I*E^((4*I)*ArcSin[a
*x])*(I - 8*ArcSin[a*x]) - 16*((-I)*ArcSin[a*x])^(3/2)*Gamma[1/2, (-4*I)*Ar
cSin[a*x]] + (-1 + (8*I)*ArcSin[a*x] - 16*E^((4*I)*ArcSin[a*x])*(I*ArcSin[a
*x])^(3/2)*Gamma[1/2, (4*I)*ArcSin[a*x]])/E^((4*I)*ArcSin[a*x])) - 6*Sin[2*
ArcSin[a*x]] + 3*Sin[4*ArcSin[a*x]])/(60*a^4*ArcSin[a*x]^(5/2))
```

Maple [A] time = 0.055, size = 139, normalized size = 0.7

$$\frac{1}{60\,a^{4}}\left(128\,\sqrt{2}\sqrt{\pi}\,\mathrm{FresnelC}\left(2\,\frac{\sqrt{2}\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)\left(\arcsin\left(ax\right)\right)^{5/2}-64\,\sqrt{\pi}\,\mathrm{FresnelC}\left(2\,\frac{\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)\left(\arcsin\left(ax\right)\right)^{5/2}+3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3/arcsin(a*x)^(7/2),x)
```

```
[Out] 1/60/a^4*(128*2^(1/2)*Pi^(1/2)*FresnelC(2*2^(1/2)/Pi^(1/2)*arcsin(a*x)^(1/2
))*arcsin(a*x)^(5/2)-64*Pi^(1/2)*FresnelC(2*arcsin(a*x)^(1/2)/Pi^(1/2))*arc
sin(a*x)^(5/2)+32*sin(2*arcsin(a*x))*arcsin(a*x)^2-64*sin(4*arcsin(a*x))*ar
csin(a*x)^2-8*arcsin(a*x)*cos(2*arcsin(a*x))+8*arcsin(a*x)*cos(4*arcsin(a*x
))-6*sin(2*arcsin(a*x))+3*sin(4*arcsin(a*x)))/arcsin(a*x)^(5/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^(7/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^(7/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3/asin(a*x)**(7/2),x)
```

```
[Out] Timed out
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^3}{\arcsin{(ax)}^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3/arcsin(a*x)^(7/2),x, algorithm="giac")
```

```
[Out] integrate(x^3/arcsin(a*x)^(7/2), x)
```

3.115 $\int \frac{x^2}{\sin^{-1}(ax)^{7/2}}\,dx$

Optimal. Leaf size=191

$$\frac{2\sqrt{2\pi}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{15a^3}-\frac{6\sqrt{6\pi}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{5a^3}+\frac{24x^2\sqrt{1-a^2x^2}}{5a\sqrt{\sin^{-1}(ax)}}-\frac{2x^2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}}-\frac{16\sqrt{1-a^2x^2}}{15a^3\sqrt{\sin^{-1}(ax)}}-\frac{8}{15a^2\sin}$$

```
[Out] (-2*x^2*Sqrt[1 - a^2*x^2])/(5*a*ArcSin[a*x]^(5/2)) - (8*x)/(15*a^2*ArcSin[a
*x]^(3/2)) + (4*x^3)/(5*ArcSin[a*x]^(3/2)) - (16*Sqrt[1 - a^2*x^2])/(15*a^3
*Sqrt[ArcSin[a*x]]) + (24*x^2*Sqrt[1 - a^2*x^2])/(5*a*Sqrt[ArcSin[a*x]]) +
(2*Sqrt[2*Pi]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(15*a^3) - (6*Sqrt[6*
Pi]*FresnelS[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(5*a^3)
```

Rubi [A] time = 0.347694, antiderivative size = 191, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 7, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.583, Rules used = {4633, 4719, 4631, 3305, 3351, 4621, 4723}

$$\frac{2\sqrt{2\pi}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{15a^3}-\frac{6\sqrt{6\pi}S\left(\sqrt{\frac{6}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{5a^3}+\frac{24x^2\sqrt{1-a^2x^2}}{5a\sqrt{\sin^{-1}(ax)}}-\frac{2x^2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}}-\frac{16\sqrt{1-a^2x^2}}{15a^3\sqrt{\sin^{-1}(ax)}}-\frac{8}{15a^2\sin}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/ArcSin[a*x]^(7/2),x]
```

```
[Out] (-2*x^2*Sqrt[1 - a^2*x^2])/(5*a*ArcSin[a*x]^(5/2)) - (8*x)/(15*a^2*ArcSin[a
*x]^(3/2)) + (4*x^3)/(5*ArcSin[a*x]^(3/2)) - (16*Sqrt[1 - a^2*x^2])/(15*a^3
*Sqrt[ArcSin[a*x]]) + (24*x^2*Sqrt[1 - a^2*x^2])/(5*a*Sqrt[ArcSin[a*x]]) +
(2*Sqrt[2*Pi]*FresnelS[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(15*a^3) - (6*Sqrt[6*
Pi]*FresnelS[Sqrt[6/Pi]*Sqrt[ArcSin[a*x]]])/(5*a^3)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 4621

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Sqrt[1 - c^
2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + Dist[c/(b*(n + 1)),
 Int[(x*(a + b*ArcSin[c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a,
 b, c}, x] && LtQ[n, -1]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rubi steps

$$\int \frac{x^2}{\sin^{-1}(ax)^{7/2}}\,dx = -\frac{2x^2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} + \frac{4\int \frac{x}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{5/2}}\,dx}{5a} - \frac{1}{5}(6a)\int \frac{x^3}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{5/2}}\,dx$$

$$= -\frac{2x^2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{8x}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{4x^3}{5\sin^{-1}(ax)^{3/2}} - \frac{12}{5}\int \frac{x^2}{\sin^{-1}(ax)^{3/2}}\,dx + \frac{8\int \frac{1}{\sin^{-1}(ax)^{3/2}}\,dx}{15a^2}$$

$$= -\frac{2x^2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{8x}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{4x^3}{5\sin^{-1}(ax)^{3/2}} - \frac{16\sqrt{1-a^2x^2}}{15a^3\sqrt{\sin^{-1}(ax)}} + \frac{24x^2\sqrt{1-a^2x^2}}{5a\sqrt{\sin^{-1}(ax)}} - \frac{24\,\mathrm{Su}}{}$$

$$= -\frac{2x^2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{8x}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{4x^3}{5\sin^{-1}(ax)^{3/2}} - \frac{16\sqrt{1-a^2x^2}}{15a^3\sqrt{\sin^{-1}(ax)}} + \frac{24x^2\sqrt{1-a^2x^2}}{5a\sqrt{\sin^{-1}(ax)}} - \frac{16\,\mathrm{Su}}{}$$

$$= -\frac{2x^2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{8x}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{4x^3}{5\sin^{-1}(ax)^{3/2}} - \frac{16\sqrt{1-a^2x^2}}{15a^3\sqrt{\sin^{-1}(ax)}} + \frac{24x^2\sqrt{1-a^2x^2}}{5a\sqrt{\sin^{-1}(ax)}} - \frac{32\,\mathrm{Su}}{}$$

$$= -\frac{2x^2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{8x}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{4x^3}{5\sin^{-1}(ax)^{3/2}} - \frac{16\sqrt{1-a^2x^2}}{15a^3\sqrt{\sin^{-1}(ax)}} + \frac{24x^2\sqrt{1-a^2x^2}}{5a\sqrt{\sin^{-1}(ax)}} + \frac{2\sqrt{2\pi}}{}$$

Mathematica [C] time = 0.47627, size = 280, normalized size = 1.47

$$\frac{-4\sqrt{-i\sin^{-1}(ax)}\sin^{-1}(ax)^2\text{Gamma}\left(\frac{1}{2}, -i\sin^{-1}(ax)\right) + 36\sqrt{3}\sqrt{-i\sin^{-1}(ax)}\sin^{-1}(ax)^2\text{Gamma}\left(\frac{1}{2}, -3i\sin^{-1}(ax)\right) + e^{-i}}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2/ArcSin[a*x]^(7/2),x]
```

```
[Out] (3*E^((3*I)*ArcSin[a*x])*(1 + (2*I)*ArcSin[a*x] - 12*ArcSin[a*x]^2) + E^(I*
ArcSin[a*x])*(-3 - (2*I)*ArcSin[a*x] + 4*ArcSin[a*x]^2) - 4*Sqrt[(-I)*ArcSi
n[a*x]]*ArcSin[a*x]^2*Gamma[1/2, (-I)*ArcSin[a*x]] + (-3 + (2*I)*ArcSin[a*x
] + 4*ArcSin[a*x]^2 + 4*E^(I*ArcSin[a*x])*(I*ArcSin[a*x])^(5/2)*Gamma[1/2,
I*ArcSin[a*x]])/E^(I*ArcSin[a*x]) + 36*Sqrt[3]*Sqrt[(-I)*ArcSin[a*x]]*ArcSi
n[a*x]^2*Gamma[1/2, (-3*I)*ArcSin[a*x]] - (3*(-1 + (2*I)*ArcSin[a*x] + 12*A
rcSin[a*x]^2 + 12*Sqrt[3]*E^((3*I)*ArcSin[a*x])*(I*ArcSin[a*x])^(5/2)*Gamma
[1/2, (3*I)*ArcSin[a*x]]))/E^((3*I)*ArcSin[a*x]))/(60*a^3*ArcSin[a*x]^(5/2)
```

)

Maple [A] time = 0.055, size = 154, normalized size = 0.8

$$-\frac{1}{30\,a^3}\Bigg(36\sqrt{2}\sqrt{\pi}\sqrt{3}\mathrm{FresnelS}\left(\frac{\sqrt{2}\sqrt{3}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)(\arcsin(ax))^{5/2}-4\sqrt{2}\sqrt{\pi}\mathrm{FresnelS}\left(\frac{\sqrt{2}\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)(\arcsin($$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/arcsin(a*x)^(7/2),x)
```

```
[Out] -1/30/a^3*(36*2^(1/2)*Pi^(1/2)*3^(1/2)*FresnelS(2^(1/2)/Pi^(1/2)*3^(1/2)*ar
csin(a*x)^(1/2))*arcsin(a*x)^(5/2)-4*2^(1/2)*Pi^(1/2)*FresnelS(2^(1/2)/Pi^(
1/2)*arcsin(a*x)^(1/2))*arcsin(a*x)^(5/2)-4*arcsin(a*x)^2*(-a^2*x^2+1)^(1/2
)+36*arcsin(a*x)^2*cos(3*arcsin(a*x))-2*a*x*arcsin(a*x)+6*arcsin(a*x)*sin(3
*arcsin(a*x))+3*(-a^2*x^2+1)^(1/2)-3*cos(3*arcsin(a*x)))/arcsin(a*x)^(5/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^(7/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^(7/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/asin(a*x)**(7/2),x)
```

```
[Out] Timed out
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\arcsin (ax)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/arcsin(a*x)^(7/2),x, algorithm="giac")
```

```
[Out] integrate(x^2/arcsin(a*x)^(7/2), x)
```

3.116 $\int \frac{x}{\sin^{-1}(ax)^{7/2}}\,dx$

Optimal. Leaf size=119

$$-\frac{32\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{15a^2}+\frac{32x\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}}-\frac{2x\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}}-\frac{4}{15a^2\sin^{-1}(ax)^{3/2}}+\frac{8x^2}{15\sin^{-1}(ax)^{3/2}}$$

```
[Out] (-2*x*Sqrt[1 - a^2*x^2])/(5*a*ArcSin[a*x]^(5/2)) - 4/(15*a^2*ArcSin[a*x]^(3
/2)) + (8*x^2)/(15*ArcSin[a*x]^(3/2)) + (32*x*Sqrt[1 - a^2*x^2])/(15*a*Sqrt
[ArcSin[a*x]]) - (32*Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(15
*a^2)
```

Rubi [A] time = 0.171635, antiderivative size = 119, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.6, Rules used = {4633, 4719, 4631, 3304, 3352, 4641}

$$-\frac{32\sqrt{\pi}\,\text{FresnelC}\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{15a^2}+\frac{32x\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}}-\frac{2x\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}}-\frac{4}{15a^2\sin^{-1}(ax)^{3/2}}+\frac{8x^2}{15\sin^{-1}(ax)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[x/ArcSin[a*x]^(7/2),x]
```

```
[Out] (-2*x*Sqrt[1 - a^2*x^2])/(5*a*ArcSin[a*x]^(5/2)) - 4/(15*a^2*ArcSin[a*x]^(3
/2)) + (8*x^2)/(15*ArcSin[a*x]^(3/2)) + (32*x*Sqrt[1 - a^2*x^2])/(15*a*Sqrt
[ArcSin[a*x]]) - (32*Sqrt[Pi]*FresnelC[(2*Sqrt[ArcSin[a*x]])/Sqrt[Pi]])/(15
*a^2)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rubi steps

$$\int \frac{x}{\sin^{-1}(ax)^{7/2}}\,dx = -\frac{2x\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} + \frac{2\int \frac{1}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{5/2}}\,dx}{5a} - \frac{1}{5}(4a)\int \frac{x^2}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{5/2}}\,dx$$

$$= -\frac{2x\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{4}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{8x^2}{15\sin^{-1}(ax)^{3/2}} - \frac{16}{15}\int \frac{x}{\sin^{-1}(ax)^{3/2}}\,dx$$

$$= -\frac{2x\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{4}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{8x^2}{15\sin^{-1}(ax)^{3/2}} + \frac{32x\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}} - \frac{32\,\mathrm{Subst}\left(\int \frac{\cos(2x)}{\sqrt{x}}\,dx\right.}{15a^2}$$

$$= -\frac{2x\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{4}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{8x^2}{15\sin^{-1}(ax)^{3/2}} + \frac{32x\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}} - \frac{64\,\mathrm{Subst}\left(\int \cos\left(2x^2\right.\right.}{15a}$$

$$= -\frac{2x\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{4}{15a^2\sin^{-1}(ax)^{3/2}} + \frac{8x^2}{15\sin^{-1}(ax)^{3/2}} + \frac{32x\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}} - \frac{32\sqrt{\pi}C\left(\frac{2\sqrt{\sin^{-1}(ax)}}{\sqrt{\pi}}\right)}{15a^2}$$

Mathematica [C] time = 0.411848, size = 146, normalized size = 1.23

$$-\frac{3\sin\left(2\sin^{-1}(ax)\right) + \sin^{-1}(ax)\left(8\sqrt{2}\left(-i\sin^{-1}(ax)\right)^{3/2}\,\mathrm{Gamma}\left(\frac{1}{2},-2i\sin^{-1}(ax)\right) + e^{-2i\sin^{-1}(ax)}\left(8\sqrt{2}e^{2i\sin^{-1}(ax)}\left(i\sin^{-}\right.\right.\right.}{15a^2\sin^{-1}(ax)^{5/2}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x/ArcSin[a*x]^(7/2),x]
```

```
[Out] -(ArcSin[a*x]*(2*E^((2*I)*ArcSin[a*x])*(1 + (4*I)*ArcSin[a*x]) + 8*Sqrt[2]*
((-I)*ArcSin[a*x])^(3/2)*Gamma[1/2, (-2*I)*ArcSin[a*x]] + (2 - (8*I)*ArcSin
[a*x] + 8*Sqrt[2]*E^((2*I)*ArcSin[a*x])*(I*ArcSin[a*x])^(3/2)*Gamma[1/2, (2
*I)*ArcSin[a*x]])/E^((2*I)*ArcSin[a*x])) + 3*Sin[2*ArcSin[a*x]])/(15*a^2*Ar
cSin[a*x]^(5/2))
```

Maple [A] time = 0.038, size = 73, normalized size = 0.6

$$\frac{1}{15\,a^2}\left(-32\,\sqrt{\pi}\mathrm{FresnelC}\left(2\,\frac{\sqrt{\arcsin(ax)}}{\sqrt{\pi}}\right)(\arcsin(ax))^{5/2} + 16\,\sin(2\,\arcsin(ax))\,(\arcsin(ax))^2 - 4\,\arcsin(ax)\cos(2\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/arcsin(a*x)^(7/2),x)
```

```
[Out] 1/15/a^2*(-32*Pi^(1/2)*FresnelC(2*arcsin(a*x)^(1/2)/Pi^(1/2))*arcsin(a*x)^(
5/2)+16*sin(2*arcsin(a*x))*arcsin(a*x)^2-4*arcsin(a*x)*cos(2*arcsin(a*x))-3
*sin(2*arcsin(a*x)))/arcsin(a*x)^(5/2)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^(7/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^(7/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/asin(a*x)**(7/2),x)
```

```
[Out] Timed out
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\arcsin\left(ax\right)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/arcsin(a*x)^(7/2),x, algorithm="giac")
```

```
[Out] integrate(x/arcsin(a*x)^(7/2), x)
```

3.117 $\int \frac{1}{\sin^{-1}(ax)^{7/2}}\,dx$

Optimal. Leaf size=105

$$\frac{8\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}}-\frac{2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}}+\frac{8\sqrt{2\pi}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{15a}+\frac{4x}{15\sin^{-1}(ax)^{3/2}}$$

```
[Out] (-2*Sqrt[1 - a^2*x^2])/(5*a*ArcSin[a*x]^(5/2)) + (4*x)/(15*ArcSin[a*x]^(3/2
)) + (8*Sqrt[1 - a^2*x^2])/(15*a*Sqrt[ArcSin[a*x]]) + (8*Sqrt[2*Pi]*Fresnel
S[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(15*a)
```

Rubi [A] time = 0.165702, antiderivative size = 105, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {4621, 4719, 4723, 3305, 3351}

$$\frac{8\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}}-\frac{2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}}+\frac{8\sqrt{2\pi}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{15a}+\frac{4x}{15\sin^{-1}(ax)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^(-7/2),x]
```

```
[Out] (-2*Sqrt[1 - a^2*x^2])/(5*a*ArcSin[a*x]^(5/2)) + (4*x)/(15*ArcSin[a*x]^(3/2
)) + (8*Sqrt[1 - a^2*x^2])/(15*a*Sqrt[ArcSin[a*x]]) + (8*Sqrt[2*Pi]*Fresnel
S[Sqrt[2/Pi]*Sqrt[ArcSin[a*x]]])/(15*a)
```

Rule 4621

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Sqrt[1 - c^
2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + Dist[c/(b*(n + 1)),
 Int[(x*(a + b*ArcSin[c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a,
 b, c}, x] && LtQ[n, -1]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{1}{\sin^{-1}(ax)^{7/2}}\,dx &= -\frac{2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} - \frac{1}{5}(2a)\int \frac{x}{\sqrt{1-a^2x^2}\sin^{-1}(ax)^{5/2}}\,dx \\
&= -\frac{2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} + \frac{4x}{15\sin^{-1}(ax)^{3/2}} - \frac{4}{15}\int \frac{1}{\sin^{-1}(ax)^{3/2}}\,dx \\
&= -\frac{2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} + \frac{4x}{15\sin^{-1}(ax)^{3/2}} + \frac{8\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}} + \frac{1}{15}(8a)\int \frac{x}{\sqrt{1-a^2x^2}\sqrt{\sin^{-1}(ax)}}\,dx \\
&= -\frac{2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} + \frac{4x}{15\sin^{-1}(ax)^{3/2}} + \frac{8\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}} + \frac{8\,\mathrm{Subst}\left(\int \frac{\sin(x)}{\sqrt{x}}\,dx, x, \sin^{-1}(ax)\right)}{15a} \\
&= -\frac{2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} + \frac{4x}{15\sin^{-1}(ax)^{3/2}} + \frac{8\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}} + \frac{16\,\mathrm{Subst}\left(\int \sin\left(x^2\right)\,dx, x, \sqrt{\sin^{-1}(ax)}\right)}{15a} \\
&= -\frac{2\sqrt{1-a^2x^2}}{5a\sin^{-1}(ax)^{5/2}} + \frac{4x}{15\sin^{-1}(ax)^{3/2}} + \frac{8\sqrt{1-a^2x^2}}{15a\sqrt{\sin^{-1}(ax)}} + \frac{8\sqrt{2\pi}S\left(\sqrt{\frac{2}{\pi}}\sqrt{\sin^{-1}(ax)}\right)}{15a}
\end{aligned}
$$

Mathematica [C] time = 0.259962, size = 143, normalized size = 1.36

$$
\frac{-8\sqrt{-i\sin^{-1}(ax)}\sin^{-1}(ax)^2\mathrm{Gamma}\left(\frac{1}{2},-i\sin^{-1}(ax)\right)+e^{-i\sin^{-1}(ax)}\left(8e^{i\sin^{-1}(ax)}\left(i\sin^{-1}(ax)\right)^{5/2}\mathrm{Gamma}\left(\frac{1}{2},i\sin^{-1}(ax)\right)+\right.}{30a\sin^{-1}(ax)^{5/2}}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[ArcSin[a*x]^(-7/2),x]
```

```
[Out] (2*E^(I*ArcSin[a*x])*(-3 - (2*I)*ArcSin[a*x] + 4*ArcSin[a*x]^2) - 8*Sqrt[(-
I)*ArcSin[a*x]]*ArcSin[a*x]^2*Gamma[1/2, (-I)*ArcSin[a*x]] + (-6 + (4*I)*Ar
cSin[a*x] + 8*ArcSin[a*x]^2 + 8*E^(I*ArcSin[a*x])*(I*ArcSin[a*x])^(5/2)*Gam
ma[1/2, I*ArcSin[a*x]])/E^(I*ArcSin[a*x]))/(30*a*ArcSin[a*x]^(5/2))
```

Maple [A] time = 0.04, size = 110, normalized size = 1.1

$$
\frac{\sqrt{2}}{15\,a\sqrt{\pi}\left(\arcsin\left(ax\right)\right)^{3}}\left(8\,\left(\arcsin\left(ax\right)\right)^{3}\pi\,\mathrm{FresnelS}\left(\frac{\sqrt{2}\sqrt{\arcsin\left(ax\right)}}{\sqrt{\pi}}\right)+4\,\left(\arcsin\left(ax\right)\right)^{5/2}\sqrt{2}\sqrt{\pi}\sqrt{-a^2x^2+1}+2\,\left(\mathrm{arcsi}\right.\right.
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/arcsin(a*x)^(7/2),x)
```

```
[Out] 1/15/a*2^(1/2)/Pi^(1/2)/arcsin(a*x)^3*(8*arcsin(a*x)^3*Pi*FresnelS(2^(1/2)/
Pi^(1/2)*arcsin(a*x)^(1/2))+4*arcsin(a*x)^(5/2)*2^(1/2)*Pi^(1/2)*(-a^2*x^2+
1)^(1/2)+2*arcsin(a*x)^(3/2)*2^(1/2)*Pi^(1/2)*x*a-3*2^(1/2)*arcsin(a*x)^(1/
2)*Pi^(1/2)*(-a^2*x^2+1)^(1/2))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^(7/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^(7/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/asin(a*x)**(7/2),x)
```

```
[Out] Timed out
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\arcsin{(ax)}^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/arcsin(a*x)^(7/2),x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^(-7/2), x)
```

3.118 $\int \frac{1}{x \sin^{-1}(ax)^{7/2}} \, dx$

Optimal. Leaf size=14

$$\text{Unintegrable}\left(\frac{1}{x \sin^{-1}(ax)^{7/2}}, x\right)$$

```
[Out] Unintegrable[1/(x*ArcSin[a*x]^(7/2)), x]
```

Rubi [A] time = 0.0127218, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x \sin^{-1}(ax)^{7/2}} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*ArcSin[a*x]^(7/2)),x]
```

```
[Out] Defer[Int][1/(x*ArcSin[a*x]^(7/2)), x]
```

Rubi steps

$$\int \frac{1}{x \sin^{-1}(ax)^{7/2}} \, dx = \int \frac{1}{x \sin^{-1}(ax)^{7/2}} \, dx$$

Mathematica [A] time = 0.46164, size = 0, normalized size = 0.

$$\int \frac{1}{x \sin^{-1}(ax)^{7/2}} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*ArcSin[a*x]^(7/2)),x]
```

```
[Out] Integrate[1/(x*ArcSin[a*x]^(7/2)), x]
```

Maple [A] time = 0.066, size = 0, normalized size = 0.

$$\int \frac{1}{x}\left(\arcsin\left(ax\right)\right)^{-\frac{7}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/arcsin(a*x)^(7/2),x)
```

```
[Out] int(1/x/arcsin(a*x)^(7/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^(7/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^(7/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/asin(a*x)**(7/2),x)
```

```
[Out] Timed out
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x \arcsin{(ax)}^{\frac{7}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/arcsin(a*x)^(7/2),x, algorithm="giac")
```

```
[Out] integrate(1/(x*arcsin(a*x)^(7/2)), x)
```

3.119 $\int (bx)^m \sin^{-1}(ax)^4 \, dx$

Optimal. Leaf size=64

$$\frac{\sin^{-1}(ax)^4(bx)^{m+1}}{b(m+1)}-\frac{4a\text{Unintegrable}\left(\frac{\sin^{-1}(ax)^3(bx)^{m+1}}{\sqrt{1-a^2x^2}},x\right)}{b(m+1)}$$

```
[Out] ((b*x)^(1 + m)*ArcSin[a*x]^4)/(b*(1 + m)) - (4*a*Unintegrable[((b*x)^(1 + m
)*ArcSin[a*x]^3)/Sqrt[1 - a^2*x^2], x])/(b*(1 + m))
```

Rubi [A] time = 0.121914, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int (bx)^m \sin^{-1}(ax)^4 \, dx$$

Verification is Not applicable to the result.

```
[In] Int[(b*x)^m*ArcSin[a*x]^4,x]
```

```
[Out] ((b*x)^(1 + m)*ArcSin[a*x]^4)/(b*(1 + m)) - (4*a*Defer[Int][((b*x)^(1 + m)*
ArcSin[a*x]^3)/Sqrt[1 - a^2*x^2], x])/(b*(1 + m))
```

Rubi steps

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

Mathematica [A] time = 1.06375, size = 0, normalized size = 0.

$$\int (bx)^m \sin^{-1}(ax)^4 \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(b*x)^m*ArcSin[a*x]^4,x]
```

```
[Out] Integrate[(b*x)^m*ArcSin[a*x]^4, x]
```

Maple [A] time = 0.828, size = 0, normalized size = 0.

$$\int (bx)^{m} \left(\arcsin \left(ax\right)\right)^{4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^m*arcsin(a*x)^4,x)
```

```
[Out] int((b*x)^m*arcsin(a*x)^4,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x)^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(bx\right)^{m} \arcsin\left(ax\right)^{4}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x)^4,x, algorithm="fricas")
```

```
[Out] integral((b*x)^m*arcsin(a*x)^4, x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int (bx)^{m} \operatorname{asin}^{4}{\left(ax \right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**m*asin(a*x)**4,x)
```

```
[Out] Integral((b*x)**m*asin(a*x)**4, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int (bx)^m \arcsin (ax)^4 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x)^4,x, algorithm="giac")
```

```
[Out] integrate((b*x)^m*arcsin(a*x)^4, x)
```

3.120 $\int (bx)^m \sin^{-1}(ax)^3 \, dx$

Optimal. Leaf size=64

$$\frac{\sin^{-1}(ax)^3 (bx)^{m+1}}{b(m+1)} - \frac{3a\text{Unintegrable}\left(\frac{\sin^{-1}(ax)^2 (bx)^{m+1}}{\sqrt{1-a^2x^2}}, x\right)}{b(m+1)}$$

```
[Out] ((b*x)^(1 + m)*ArcSin[a*x]^3)/(b*(1 + m)) - (3*a*Unintegrable[((b*x)^(1 + m
)*ArcSin[a*x]^2)/Sqrt[1 - a^2*x^2], x])/(b*(1 + m))
```

Rubi [A] time = 0.118226, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int (bx)^m \sin^{-1}(ax)^3 \, dx$$

Verification is Not applicable to the result.

```
[In] Int[(b*x)^m*ArcSin[a*x]^3,x]
```

```
[Out] ((b*x)^(1 + m)*ArcSin[a*x]^3)/(b*(1 + m)) - (3*a*Defer[Int][((b*x)^(1 + m)*
ArcSin[a*x]^2)/Sqrt[1 - a^2*x^2], x])/(b*(1 + m))
```

Rubi steps

$$\int (bx)^m \sin^{-1}(ax)^3 \, dx = \frac{(bx)^{1+m} \sin^{-1}(ax)^3}{b(1+m)} - \frac{(3a) \int \frac{(bx)^{1+m} \sin^{-1}(ax)^2}{\sqrt{1-a^2x^2}} \, dx}{b(1+m)}$$

Mathematica [A] time = 0.941219, size = 0, normalized size = 0.

$$\int (bx)^m \sin^{-1}(ax)^3 \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(b*x)^m*ArcSin[a*x]^3,x]
```

```
[Out] Integrate[(b*x)^m*ArcSin[a*x]^3, x]
```

Maple [A] time = 0.548, size = 0, normalized size = 0.

$$\int (bx)^m (\arcsin (ax))^3 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^m*arcsin(a*x)^3,x)
```

```
[Out] int((b*x)^m*arcsin(a*x)^3,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left((bx)^m \arcsin (ax)^3 , x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b*x)^m*arcsin(a*x)^3, x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int (bx)^m \operatorname{asin}^3 (ax) \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**m*asin(a*x)**3,x)
```

```
[Out] Integral((b*x)**m*asin(a*x)**3, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int (bx)^m \arcsin{(ax)}^3 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((b*x)^m*arcsin(a*x)^3, x)
```

3.121 $\int (bx)^m \sin^{-1}(ax)^2 \, dx$

Optimal. Leaf size=150

$$\frac{2a^2(bx)^{m+3}\text{HypergeometricPFQ}\left(\left\{1,\frac{m}{2}+\frac{3}{2},\frac{m}{2}+\frac{3}{2}\right\},\left\{\frac{m}{2}+2,\frac{m}{2}+\frac{5}{2}\right\},a^2x^2\right)}{b^3(m+1)(m+2)(m+3)}-\frac{2a\sin^{-1}(ax)(bx)^{m+2}\text{Hypergeometric2}}{b^2(m+1)(m+2}$$

```
[Out] ((b*x)^(1 + m)*ArcSin[a*x]^2)/(b*(1 + m)) - (2*a*(b*x)^(2 + m)*ArcSin[a*x]*
Hypergeometric2F1[1/2, (2 + m)/2, (4 + m)/2, a^2*x^2])/(b^2*(1 + m)*(2 + m)
) + (2*a^2*(b*x)^(3 + m)*HypergeometricPFQ[{1, 3/2 + m/2, 3/2 + m/2}, {2 +
m/2, 5/2 + m/2}, a^2*x^2])/(b^3*(1 + m)*(2 + m)*(3 + m))
```

Rubi [A] time = 0.114086, antiderivative size = 150, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {4627, 4711}

$$\frac{2a^2(bx)^{m+3}\,{}_3F_2\left(1,\frac{m}{2}+\frac{3}{2},\frac{m}{2}+\frac{3}{2};\frac{m}{2}+2,\frac{m}{2}+\frac{5}{2};a^2x^2\right)}{b^3(m+1)(m+2)(m+3)}-\frac{2a\sin^{-1}(ax)(bx)^{m+2}\,{}_2F_1\left(\frac{1}{2},\frac{m+2}{2};\frac{m+4}{2};a^2x^2\right)}{b^2(m+1)(m+2)}+\frac{\sin^{-1}(ax)^2(bx)^{m+1}}{b(m+1)}$$

Antiderivative was successfully verified.

```
[In] Int[(b*x)^m*ArcSin[a*x]^2,x]
```

```
[Out] ((b*x)^(1 + m)*ArcSin[a*x]^2)/(b*(1 + m)) - (2*a*(b*x)^(2 + m)*ArcSin[a*x]*
Hypergeometric2F1[1/2, (2 + m)/2, (4 + m)/2, a^2*x^2])/(b^2*(1 + m)*(2 + m)
) + (2*a^2*(b*x)^(3 + m)*HypergeometricPFQ[{1, 3/2 + m/2, 3/2 + m/2}, {2 +
m/2, 5/2 + m/2}, a^2*x^2])/(b^3*(1 + m)*(2 + m)*(3 + m))
```

Rule 4627

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

Rule 4711

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((f_.)*(x_))^(m_))/Sqrt[(d_) + (e_.
)*(x_)^2], x_Symbol] :> Simp[((f*x)^(m + 1)*(a + b*ArcSin[c*x])*Hypergeomet
ric2F1[1/2, (1 + m)/2, (3 + m)/2, c^2*x^2])/(Sqrt[d]*f*(m + 1)), x] - Simp[
(b*c*(f*x)^(m + 2)*HypergeometricPFQ[{1, 1 + m/2, 1 + m/2}, {3/2 + m/2, 2 +
m/2}, c^2*x^2])/(Sqrt[d]*f^2*(m + 1)*(m + 2)), x] /; FreeQ[{a, b, c, d, e,
f, m}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] &&  !IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int (bx)^m \sin^{-1}(ax)^2\,dx &= \frac{(bx)^{1+m}\sin^{-1}(ax)^2}{b(1+m)} - \frac{(2a)\int \frac{(bx)^{1+m}\sin^{-1}(ax)}{\sqrt{1-a^2x^2}}\,dx}{b(1+m)}\\ &= \frac{(bx)^{1+m}\sin^{-1}(ax)^2}{b(1+m)} - \frac{2a(bx)^{2+m}\sin^{-1}(ax)\,{}_2F_1\left(\frac{1}{2},\frac{2+m}{2};\frac{4+m}{2};a^2x^2\right)}{b^2(1+m)(2+m)} + \frac{2a^2(bx)^{3+m}\,{}_3F_2\left(1,\frac{3}{2}+\frac{m}{2},\right.}{b^3(1+m)(2}\end{aligned}$$

Mathematica [A] time = 0.0431142, size = 122, normalized size = 0.81

$$\frac{x(bx)^m\left(2a^2x^2\text{HypergeometricPFQ}\left(\left\{1,\frac{m}{2}+\frac{3}{2},\frac{m}{2}+\frac{3}{2}\right\},\left\{\frac{m}{2}+2,\frac{m}{2}+\frac{5}{2}\right\},a^2x^2\right)+(m+3)\sin^{-1}(ax)\left((m+2)\sin^{-1}(ax\right.\right.}{(m+1)(m+2)(m+3)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(b*x)^m*ArcSin[a*x]^2,x]
```

```
[Out] (x*(b*x)^m*((3 + m)*ArcSin[a*x]*((2 + m)*ArcSin[a*x] - 2*a*x*Hypergeometric
2F1[1/2, (2 + m)/2, (4 + m)/2, a^2*x^2]) + 2*a^2*x^2*HypergeometricPFQ[{1,
3/2 + m/2, 3/2 + m/2}, {2 + m/2, 5/2 + m/2}, a^2*x^2]))/((1 + m)*(2 + m)*(3
 + m))
```

Maple [F] time = 0.525, size = 0, normalized size = 0.

$$\int (bx)^m (\arcsin(ax))^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^m*arcsin(a*x)^2,x)
```

```
[Out] int((b*x)^m*arcsin(a*x)^2,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left((bx)^{m}\arcsin\left(ax\right)^{2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b*x)^m*arcsin(a*x)^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int (bx)^{m}\operatorname{asin}^{2}\left(ax\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**m*asin(a*x)**2,x)
```

```
[Out] Integral((b*x)**m*asin(a*x)**2, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int (bx)^{m}\arcsin\left(ax\right)^{2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((b*x)^m*arcsin(a*x)^2, x)
```

3.122 $\int (bx)^m \sin^{-1}(ax)\,dx$

Optimal. Leaf size=69

$$\frac{\sin^{-1}(ax)(bx)^{m+1}}{b(m+1)}-\frac{a(bx)^{m+2}\text{Hypergeometric2F1}\left(\frac{1}{2},\frac{m+2}{2},\frac{m+4}{2},a^2x^2\right)}{b^2(m+1)(m+2)}$$

```
[Out] ((b*x)^(1 + m)*ArcSin[a*x])/(b*(1 + m)) - (a*(b*x)^(2 + m)*Hypergeometric2F
1[1/2, (2 + m)/2, (4 + m)/2, a^2*x^2])/(b^2*(1 + m)*(2 + m))
```

Rubi [A] time = 0.0252512, antiderivative size = 69, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2, Rules used = {4627, 364}

$$\frac{\sin^{-1}(ax)(bx)^{m+1}}{b(m+1)}-\frac{a(bx)^{m+2}\,{}_2F_1\left(\frac{1}{2},\frac{m+2}{2};\frac{m+4}{2};a^2x^2\right)}{b^2(m+1)(m+2)}$$

Antiderivative was successfully verified.

```
[In] Int[(b*x)^m*ArcSin[a*x],x]
```

```
[Out] ((b*x)^(1 + m)*ArcSin[a*x])/(b*(1 + m)) - (a*(b*x)^(2 + m)*Hypergeometric2F
1[1/2, (2 + m)/2, (4 + m)/2, a^2*x^2])/(b^2*(1 + m)*(2 + m))
```

Rule 4627

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

Rule 364

```
Int[((c_.)*(x_))^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Simp[(a^
p*(c*x)^(m + 1)*Hypergeometric2F1[-p, (m + 1)/n, (m + 1)/n + 1, -((b*x^n)/a
)])/(c*(m + 1)), x] /; FreeQ[{a, b, c, m, n, p}, x] &&  !IGtQ[p, 0] && (ILt
Q[p, 0] || GtQ[a, 0])
```

Rubi steps

$$\int (bx)^m \sin^{-1}(ax)\,dx = \frac{(bx)^{1+m}\sin^{-1}(ax)}{b(1+m)} - \frac{a\int \frac{(bx)^{1+m}}{\sqrt{1-a^2x^2}}\,dx}{b(1+m)}$$
$$= \frac{(bx)^{1+m}\sin^{-1}(ax)}{b(1+m)} - \frac{a(bx)^{2+m}\,{}_2F_1\left(\frac{1}{2},\frac{2+m}{2};\frac{4+m}{2};a^2x^2\right)}{b^2(1+m)(2+m)}$$

Mathematica [A] time = 0.0203494, size = 56, normalized size = 0.81

$$-\frac{x(bx)^m\left(ax\text{Hypergeometric2F1}\left(\frac{1}{2},\frac{m+2}{2},\frac{m+4}{2},a^2x^2\right)-(m+2)\sin^{-1}(ax)\right)}{(m+1)(m+2)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(b*x)^m*ArcSin[a*x],x]
```

```
[Out] -((x*(b*x)^m*(-((2 + m)*ArcSin[a*x]) + a*x*Hypergeometric2F1[1/2, (2 + m)/2
, (4 + m)/2, a^2*x^2]))/((1 + m)*(2 + m)))
```

Maple [F] time = 0.531, size = 0, normalized size = 0.

$$\int (bx)^m \arcsin(ax)\ dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^m*arcsin(a*x),x)
```

```
[Out] int((b*x)^m*arcsin(a*x),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left((bx)^m \arcsin(ax), x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x),x, algorithm="fricas")
```

```
[Out] integral((b*x)^m*arcsin(a*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int (bx)^m \operatorname{asin}(ax)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**m*asin(a*x),x)
```

```
[Out] Integral((b*x)**m*asin(a*x), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int (bx)^m \arcsin(ax)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((b*x)^m*arcsin(a*x), x)
```

3.123 $\int \frac{(bx)^m}{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=14

$$\text{Unintegrable}\left(\frac{(bx)^m}{\sin^{-1}(ax)},x\right)$$

```
[Out] Unintegrable[(b*x)^m/ArcSin[a*x], x]
```

Rubi [A] time = 0.0165568, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{(bx)^m}{\sin^{-1}(ax)}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(b*x)^m/ArcSin[a*x],x]
```

```
[Out] Defer[Int][(b*x)^m/ArcSin[a*x], x]
```

Rubi steps

$$\int \frac{(bx)^m}{\sin^{-1}(ax)}\,dx = \int \frac{(bx)^m}{\sin^{-1}(ax)}\,dx$$

Mathematica [A] time = 0.561421, size = 0, normalized size = 0.

$$\int \frac{(bx)^m}{\sin^{-1}(ax)}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(b*x)^m/ArcSin[a*x],x]
```

```
[Out] Integrate[(b*x)^m/ArcSin[a*x], x]
```

Maple [A] time = 0.434, size = 0, normalized size = 0.

$$\int \frac{(bx)^m}{\arcsin(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^m/arcsin(a*x),x)
```

```
[Out] int((b*x)^m/arcsin(a*x),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx)^m}{\arcsin(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m/arcsin(a*x),x, algorithm="maxima")
```

```
[Out] integrate((b*x)^m/arcsin(a*x), x)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(bx)^m}{\arcsin(ax)}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m/arcsin(a*x),x, algorithm="fricas")
```

```
[Out] integral((b*x)^m/arcsin(a*x), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx)^m}{\operatorname{asin}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**m/asin(a*x),x)
```

```
[Out] Integral((b*x)**m/asin(a*x), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx)^m}{\arcsin{(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m/arcsin(a*x),x, algorithm="giac")
```

```
[Out] integrate((b*x)^m/arcsin(a*x), x)
```

3.124 $\int \frac{(bx)^m}{\sin^{-1}(ax)^2}\,dx$

Optimal. Leaf size=14

$$\text{Unintegrable}\left(\frac{(bx)^m}{\sin^{-1}(ax)^2},x\right)$$

```
[Out] Unintegrable[(b*x)^m/ArcSin[a*x]^2, x]
```

Rubi [A] time = 0.0153909, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{(bx)^m}{\sin^{-1}(ax)^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(b*x)^m/ArcSin[a*x]^2,x]

[Out] Defer[Int][(b*x)^m/ArcSin[a*x]^2, x]
```

Rubi steps

$$\int \frac{(bx)^m}{\sin^{-1}(ax)^2}\,dx=\int \frac{(bx)^m}{\sin^{-1}(ax)^2}\,dx$$

Mathematica [A] time = 0.575555, size = 0, normalized size = 0.

$$\int \frac{(bx)^m}{\sin^{-1}(ax)^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(b*x)^m/ArcSin[a*x]^2,x]

[Out] Integrate[(b*x)^m/ArcSin[a*x]^2, x]
```

Maple [A] time = 0.434, size = 0, normalized size = 0.

$$\int \frac{(bx)^{m}}{(\arcsin(ax))^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^m/arcsin(a*x)^2,x)
```

```
[Out] int((b*x)^m/arcsin(a*x)^2,x)
```

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m/arcsin(a*x)^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(bx)^{m}}{\arcsin(ax)^{2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m/arcsin(a*x)^2,x, algorithm="fricas")
```

```
[Out] integral((b*x)^m/arcsin(a*x)^2, x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx)^{m}}{\operatorname{asin}^{2}(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**m/asin(a*x)**2,x)
```

```
[Out] Integral((b*x)**m/asin(a*x)**2, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx)^m}{\arcsin{(ax)}^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m/arcsin(a*x)^2,x, algorithm="giac")
```

```
[Out] integrate((b*x)^m/arcsin(a*x)^2, x)
```

3.125 $\int (bx)^m \sin^{-1}(ax)^{3/2}\,dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\sin^{-1}(ax)^{3/2}(bx)^m, x\right)$$

```
[Out] Unintegrable[(b*x)^m*ArcSin[a*x]^(3/2), x]
```

Rubi [A] time = 0.016084, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int (bx)^m \sin^{-1}(ax)^{3/2}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(b*x)^m*ArcSin[a*x]^(3/2),x]
```

```
[Out] Defer[Int][(b*x)^m*ArcSin[a*x]^(3/2), x]
```

Rubi steps

$$\int (bx)^m \sin^{-1}(ax)^{3/2}\,dx = \int (bx)^m \sin^{-1}(ax)^{3/2}\,dx$$

Mathematica [A] time = 2.62588, size = 0, normalized size = 0.

$$\int (bx)^m \sin^{-1}(ax)^{3/2}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(b*x)^m*ArcSin[a*x]^(3/2),x]
```

```
[Out] Integrate[(b*x)^m*ArcSin[a*x]^(3/2), x]
```

Maple [A] time = 0.07, size = 0, normalized size = 0.

$$\int (bx)^{m} (\arcsin (ax))^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^m*arcsin(a*x)^(3/2),x)
```

```
[Out] int((b*x)^m*arcsin(a*x)^(3/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**m*asin(a*x)**(3/2),x)
```

```
[Out] Timed out
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int (bx)^m \arcsin{(ax)}^{\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*x)^m*arcsin(a*x)^(3/2), x)
```

3.126 $\int (bx)^m \sqrt{\sin^{-1}(ax)}\,dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\sqrt{\sin^{-1}(ax)}(bx)^m, x\right)$$

```
[Out] Unintegrable[(b*x)^m*Sqrt[ArcSin[a*x]], x]
```

Rubi [A] time = 0.0152887, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int (bx)^m \sqrt{\sin^{-1}(ax)}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(b*x)^m*Sqrt[ArcSin[a*x]],x]

[Out] Defer[Int][(b*x)^m*Sqrt[ArcSin[a*x]], x]
```

Rubi steps

$$\int (bx)^m \sqrt{\sin^{-1}(ax)}\,dx = \int (bx)^m \sqrt{\sin^{-1}(ax)}\,dx$$

Mathematica [A] time = 2.9291, size = 0, normalized size = 0.

$$\int (bx)^m \sqrt{\sin^{-1}(ax)}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(b*x)^m*Sqrt[ArcSin[a*x]],x]

[Out] Integrate[(b*x)^m*Sqrt[ArcSin[a*x]], x]
```

Maple [A] time = 0.062, size = 0, normalized size = 0.

$$\int (bx)^m \sqrt{\arcsin (ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^m*arcsin(a*x)^(1/2),x)
```

```
[Out] int((b*x)^m*arcsin(a*x)^(1/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int (bx)^m \sqrt{\operatorname{asin} (ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**m*asin(a*x)**(1/2),x)
```

```
[Out] Integral((b*x)**m*sqrt(asin(a*x)), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int (bx)^m \sqrt{\arcsin(ax)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*x)^m*sqrt(arcsin(a*x)), x)
```

3.127 $\int \frac{(bx)^m}{\sqrt{\sin^{-1}(ax)}}\,dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\frac{(bx)^m}{\sqrt{\sin^{-1}(ax)}},x\right)$$

```
[Out] Unintegrable[(b*x)^m/Sqrt[ArcSin[a*x]], x]
```

Rubi [A] time = 0.0153915, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{(bx)^m}{\sqrt{\sin^{-1}(ax)}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(b*x)^m/Sqrt[ArcSin[a*x]],x]

[Out] Defer[Int][(b*x)^m/Sqrt[ArcSin[a*x]], x]
```

Rubi steps

$$\int \frac{(bx)^m}{\sqrt{\sin^{-1}(ax)}}\,dx = \int \frac{(bx)^m}{\sqrt{\sin^{-1}(ax)}}\,dx$$

Mathematica [A] time = 2.20408, size = 0, normalized size = 0.

$$\int \frac{(bx)^m}{\sqrt{\sin^{-1}(ax)}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(b*x)^m/Sqrt[ArcSin[a*x]],x]
```

```
[Out] Integrate[(b*x)^m/Sqrt[ArcSin[a*x]], x]
```

Maple [A] time = 0.066, size = 0, normalized size = 0.

$$\int (bx)^m \frac{1}{\sqrt{\arcsin(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^m/arcsin(a*x)^(1/2),x)
```

```
[Out] int((b*x)^m/arcsin(a*x)^(1/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m/arcsin(a*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m/arcsin(a*x)^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx)^m}{\sqrt{\operatorname{asin}(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**m/asin(a*x)**(1/2),x)
```

```
[Out] Integral((b*x)**m/sqrt(asin(a*x)), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx)^m}{\sqrt{\arcsin(ax)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m/arcsin(a*x)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*x)^m/sqrt(arcsin(a*x)), x)
```

3.128 $\int \frac{(bx)^m}{\sin^{-1}(ax)^{3/2}}\,dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\frac{(bx)^m}{\sin^{-1}(ax)^{3/2}},x\right)$$

```
[Out] Unintegrable[(b*x)^m/ArcSin[a*x]^(3/2), x]
```

Rubi [A] time = 0.0151034, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{(bx)^m}{\sin^{-1}(ax)^{3/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(b*x)^m/ArcSin[a*x]^(3/2),x]
```

```
[Out] Defer[Int][(b*x)^m/ArcSin[a*x]^(3/2), x]
```

Rubi steps

$$\int \frac{(bx)^m}{\sin^{-1}(ax)^{3/2}}\,dx = \int \frac{(bx)^m}{\sin^{-1}(ax)^{3/2}}\,dx$$

Mathematica [A] time = 2.19188, size = 0, normalized size = 0.

$$\int \frac{(bx)^m}{\sin^{-1}(ax)^{3/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(b*x)^m/ArcSin[a*x]^(3/2),x]
```

```
[Out] Integrate[(b*x)^m/ArcSin[a*x]^(3/2), x]
```

Maple [A] time = 0.059, size = 0, normalized size = 0.

$$\int (bx)^{m} (\arcsin (ax))^{-\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^m/arcsin(a*x)^(3/2),x)
```

```
[Out] int((b*x)^m/arcsin(a*x)^(3/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m/arcsin(a*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m/arcsin(a*x)^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx)^{m}}{\operatorname{asin}^{\frac{3}{2}}{(ax)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**m/asin(a*x)**(3/2),x)
```

```
[Out] Integral((b*x)**m/asin(a*x)**(3/2), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(bx)^m}{\arcsin(ax)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m/arcsin(a*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*x)^m/arcsin(a*x)^(3/2), x)
```

3.129 $\int (bx)^m \sin^{-1}(ax)^n \, dx$

Optimal. Leaf size=14

$$\text{Unintegrable}\left((bx)^m \sin^{-1}(ax)^n, x\right)$$

```
[Out] Unintegrable[(b*x)^m*ArcSin[a*x]^n, x]
```

Rubi [A] time = 0.0156084, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int (bx)^m \sin^{-1}(ax)^n \, dx$$

Verification is Not applicable to the result.

```
[In] Int[(b*x)^m*ArcSin[a*x]^n,x]

[Out] Defer[Int][(b*x)^m*ArcSin[a*x]^n, x]
```

Rubi steps

$$\int (bx)^m \sin^{-1}(ax)^n \, dx = \int (bx)^m \sin^{-1}(ax)^n \, dx$$

Mathematica [A] time = 0.797716, size = 0, normalized size = 0.

$$\int (bx)^m \sin^{-1}(ax)^n \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(b*x)^m*ArcSin[a*x]^n,x]

[Out] Integrate[(b*x)^m*ArcSin[a*x]^n, x]
```

Maple [A] time = 0.758, size = 0, normalized size = 0.

$$\int (bx)^{m} (\arcsin (ax))^{n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^m*arcsin(a*x)^n,x)
```

```
[Out] int((b*x)^m*arcsin(a*x)^n,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x)^n,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left((bx)^{m} \arcsin (ax)^{n}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x)^n,x, algorithm="fricas")
```

```
[Out] integral((b*x)^m*arcsin(a*x)^n, x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int (bx)^{m} \operatorname{asin}^{n} (ax)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**m*asin(a*x)**n,x)
```

```
[Out] Integral((b*x)**m*asin(a*x)**n, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int (bx)^m \arcsin{(ax)}^n \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^m*arcsin(a*x)^n,x, algorithm="giac")
```

```
[Out] integrate((b*x)^m*arcsin(a*x)^n, x)
```

3.130 $\int x^3 \sin^{-1}(ax)^n\,dx$

Optimal. Leaf size=167

$$-\frac{2^{-n-4}\sin^{-1}(ax)^n\left(-i\sin^{-1}(ax)\right)^{-n}\text{Gamma}\left(n+1,-2i\sin^{-1}(ax)\right)}{a^4}+\frac{2^{-2(n+3)}\sin^{-1}(ax)^n\left(-i\sin^{-1}(ax)\right)^{-n}\text{Gamma}(n+1}{a^4}$$

```
[Out] -((2^(-4 - n)*ArcSin[a*x]^n*Gamma[1 + n, (-2*I)*ArcSin[a*x]])/(a^4*((-I)*Ar
cSin[a*x])^n)) - (2^(-4 - n)*ArcSin[a*x]^n*Gamma[1 + n, (2*I)*ArcSin[a*x]])
/(a^4*(I*ArcSin[a*x])^n) + (ArcSin[a*x]^n*Gamma[1 + n, (-4*I)*ArcSin[a*x]])
/(2^(2*(3 + n))*a^4*((-I)*ArcSin[a*x])^n) + (ArcSin[a*x]^n*Gamma[1 + n, (4*
I)*ArcSin[a*x]])/(2^(2*(3 + n))*a^4*(I*ArcSin[a*x])^n)
```

Rubi [A] time = 0.176853, antiderivative size = 167, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4, Rules used = {4635, 4406, 3308, 2181}

$$-\frac{2^{-n-4}\sin^{-1}(ax)^n\left(-i\sin^{-1}(ax)\right)^{-n}\text{Gamma}\left(n+1,-2i\sin^{-1}(ax)\right)}{a^4}+\frac{2^{-2(n+3)}\sin^{-1}(ax)^n\left(-i\sin^{-1}(ax)\right)^{-n}\text{Gamma}(n+1}{a^4}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*ArcSin[a*x]^n,x]
```

```
[Out] -((2^(-4 - n)*ArcSin[a*x]^n*Gamma[1 + n, (-2*I)*ArcSin[a*x]])/(a^4*((-I)*Ar
cSin[a*x])^n)) - (2^(-4 - n)*ArcSin[a*x]^n*Gamma[1 + n, (2*I)*ArcSin[a*x]])
/(a^4*(I*ArcSin[a*x])^n) + (ArcSin[a*x]^n*Gamma[1 + n, (-4*I)*ArcSin[a*x]])
/(2^(2*(3 + n))*a^4*((-I)*ArcSin[a*x])^n) + (ArcSin[a*x]^n*Gamma[1 + n, (4*
I)*ArcSin[a*x]])/(2^(2*(3 + n))*a^4*(I*ArcSin[a*x])^n)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

```
tQ[p, 0]
```

Rule 3308

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

Rule 2181

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> -Simp[(F^(g*(e - (c*f)/d))*(c + d*x)^FracPart[m]*Gamma[m + 1, (-((f*g*Lo
g[F])/d))*(c + d*x)])/(d*(-((f*g*Log[F])/d))^(IntPart[m] + 1)*(-((f*g*Log[F
]*(c + d*x))/d))^FracPart[m]), x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&  !I
ntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int x^3\sin^{-1}(ax)^n\,dx &= \frac{\text{Subst}\left(\int x^n\cos(x)\sin^3(x)\,dx,x,\sin^{-1}(ax)\right)}{a^4}\\ &= \frac{\text{Subst}\left(\int\left(\frac{1}{4}x^n\sin(2x)-\frac{1}{8}x^n\sin(4x)\right)dx,x,\sin^{-1}(ax)\right)}{a^4}\\ &= -\frac{\text{Subst}\left(\int x^n\sin(4x)\,dx,x,\sin^{-1}(ax)\right)}{8a^4}+\frac{\text{Subst}\left(\int x^n\sin(2x)\,dx,x,\sin^{-1}(ax)\right)}{4a^4}\\ &= -\frac{i\,\text{Subst}\left(\int e^{-4ix}x^n\,dx,x,\sin^{-1}(ax)\right)}{16a^4}+\frac{i\,\text{Subst}\left(\int e^{4ix}x^n\,dx,x,\sin^{-1}(ax)\right)}{16a^4}+\frac{i\,\text{Subst}\left(\int e^{-2ix}x^n\,dx\right.}{8a^4}\\ &= -\frac{2^{-4-n}\left(-i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\Gamma\left(1+n,-2i\sin^{-1}(ax)\right)}{a^4}-\frac{2^{-4-n}\left(i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\Gamma\left(1\right.}{a^4}\end{aligned}$$

Mathematica [A] time = 0.0876354, size = 132, normalized size = 0.79

$$\frac{4^{-n-3}\sin^{-1}(ax)^n\left(\sin^{-1}(ax)^2\right)^{-n}\left(-2^{n+2}\left(-i\sin^{-1}(ax)\right)^n\text{Gamma}\left(n+1,2i\sin^{-1}(ax)\right)+\left(-i\sin^{-1}(ax)\right)^n\text{Gamma}\left(n+1,\right.\right.}{a^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*ArcSin[a*x]^n,x]
```

```
[Out] (4^(-3 - n)*ArcSin[a*x]^n*(-(2^(2 + n)*(I*ArcSin[a*x])^n*Gamma[1 + n, (-2*I
)*ArcSin[a*x]]) - 2^(2 + n)*((-I)*ArcSin[a*x])^n*Gamma[1 + n, (2*I)*ArcSin[
a*x]] + (I*ArcSin[a*x])^n*Gamma[1 + n, (-4*I)*ArcSin[a*x]] + ((-I)*ArcSin[a
*x])^n*Gamma[1 + n, (4*I)*ArcSin[a*x]]))/(a^4*(ArcSin[a*x]^2)^n)
```

Maple [F] time = 0.144, size = 0, normalized size = 0.

$$\int x^3 (\arcsin (ax))^n \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*arcsin(a*x)^n,x)
```

```
[Out] int(x^3*arcsin(a*x)^n,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^n,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(x^3 \arcsin (ax)^n , x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^n,x, algorithm="fricas")
```

```
[Out] integral(x^3*arcsin(a*x)^n, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^3 \operatorname{asin}^n(ax)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*asin(a*x)**n,x)
```

```
[Out] Integral(x**3*asin(a*x)**n, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int x^3 \arcsin(ax)^n\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^3*arcsin(a*x)^n,x, algorithm="giac")
```

```
[Out] integrate(x^3*arcsin(a*x)^n, x)
```

3.131 $\int x^2 \sin^{-1}(ax)^n \, dx$

Optimal. Leaf size=171

$$-\frac{i\sin^{-1}(ax)^n\left(-i\sin^{-1}(ax)\right)^{-n}\text{Gamma}\left(n+1,-i\sin^{-1}(ax)\right)}{8a^3}+\frac{i3^{-n-1}\sin^{-1}(ax)^n\left(-i\sin^{-1}(ax)\right)^{-n}\text{Gamma}\left(n+1,-3i\sin\right.}{8a^3}$$

```
[Out] ((-I/8)*ArcSin[a*x]^n*Gamma[1 + n, (-I)*ArcSin[a*x]])/(a^3*((-I)*ArcSin[a*x
])^n) + ((I/8)*ArcSin[a*x]^n*Gamma[1 + n, I*ArcSin[a*x]])/(a^3*(I*ArcSin[a*
x])^n) + ((I/8)*3^(-1 - n)*ArcSin[a*x]^n*Gamma[1 + n, (-3*I)*ArcSin[a*x]])/
(a^3*((-I)*ArcSin[a*x])^n) - ((I/8)*3^(-1 - n)*ArcSin[a*x]^n*Gamma[1 + n, (
3*I)*ArcSin[a*x]])/(a^3*(I*ArcSin[a*x])^n)
```

Rubi [A] time = 0.166141, antiderivative size = 171, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4, Rules used = {4635, 4406, 3307, 2181}

$$-\frac{i\sin^{-1}(ax)^n\left(-i\sin^{-1}(ax)\right)^{-n}\text{Gamma}\left(n+1,-i\sin^{-1}(ax)\right)}{8a^3}+\frac{i3^{-n-1}\sin^{-1}(ax)^n\left(-i\sin^{-1}(ax)\right)^{-n}\text{Gamma}\left(n+1,-3i\sin\right.}{8a^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*ArcSin[a*x]^n,x]
```

```
[Out] ((-I/8)*ArcSin[a*x]^n*Gamma[1 + n, (-I)*ArcSin[a*x]])/(a^3*((-I)*ArcSin[a*x
])^n) + ((I/8)*ArcSin[a*x]^n*Gamma[1 + n, I*ArcSin[a*x]])/(a^3*(I*ArcSin[a*
x])^n) + ((I/8)*3^(-1 - n)*ArcSin[a*x]^n*Gamma[1 + n, (-3*I)*ArcSin[a*x]])/
(a^3*((-I)*ArcSin[a*x])^n) - ((I/8)*3^(-1 - n)*ArcSin[a*x]^n*Gamma[1 + n, (
3*I)*ArcSin[a*x]])/(a^3*(I*ArcSin[a*x])^n)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

```
tQ[p, 0]
```

Rule 3307

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

Rule 2181

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> -Simp[(F^(g*(e - (c*f)/d))*(c + d*x)^FracPart[m]*Gamma[m + 1, (-((f*g*Lo
g[F])/d))*(c + d*x)])/(d*(-((f*g*Log[F])/d))^(IntPart[m] + 1)*(-((f*g*Log[F
]*(c + d*x))/d))^FracPart[m]), x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&  !I
ntegerQ[m]
```

Rubi steps

$$\begin{aligned}
\int x^2 \sin^{-1}(ax)^n\,dx &= \frac{\text{Subst}\left(\int x^n \cos(x)\sin^2(x)\,dx, x, \sin^{-1}(ax)\right)}{a^3}\\
&= \frac{\text{Subst}\left(\int \left(\frac{1}{4}x^n\cos(x) - \frac{1}{4}x^n\cos(3x)\right)dx, x, \sin^{-1}(ax)\right)}{a^3}\\
&= \frac{\text{Subst}\left(\int x^n\cos(x)\,dx, x, \sin^{-1}(ax)\right)}{4a^3} - \frac{\text{Subst}\left(\int x^n\cos(3x)\,dx, x, \sin^{-1}(ax)\right)}{4a^3}\\
&= \frac{\text{Subst}\left(\int e^{-ix}x^n\,dx, x, \sin^{-1}(ax)\right)}{8a^3} + \frac{\text{Subst}\left(\int e^{ix}x^n\,dx, x, \sin^{-1}(ax)\right)}{8a^3} - \frac{\text{Subst}\left(\int e^{-3ix}x^n\,dx, x, \sin\right.}{8a^3}\\
&= -\frac{i\left(-i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\Gamma\left(1+n, -i\sin^{-1}(ax)\right)}{8a^3} + \frac{i\left(i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\Gamma\left(1+n, i\sin^{-\right.}{8a^3}
\end{aligned}$$

Mathematica [A] time = 0.0723912, size = 137, normalized size = 0.8

$$\frac{i3^{-n-1}\sin^{-1}(ax)^n\left(\sin^{-1}(ax)^2\right)^{-n}\left(3^{n+1}\left(-i\sin^{-1}(ax)\right)^n \text{Gamma}\left(n+1, i\sin^{-1}(ax)\right) - \left(-i\sin^{-1}(ax)\right)^n \text{Gamma}\left(n+1, 3\right.\right.}{8a^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*ArcSin[a*x]^n,x]
```

```
[Out] ((I/8)*3^(-1 - n)*ArcSin[a*x]^n*(-(3^(1 + n)*(I*ArcSin[a*x])^n*Gamma[1 + n,
 (-I)*ArcSin[a*x]]) + 3^(1 + n)*((-I)*ArcSin[a*x])^n*Gamma[1 + n, I*ArcSin[
a*x]] + (I*ArcSin[a*x])^n*Gamma[1 + n, (-3*I)*ArcSin[a*x]] - ((-I)*ArcSin[a
*x])^n*Gamma[1 + n, (3*I)*ArcSin[a*x]]))/(a^3*(ArcSin[a*x]^2)^n)
```

Maple [F] time = 0.154, size = 0, normalized size = 0.

$$\int x^{2} \left(\arcsin \left(a x \right)\right)^{n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*arcsin(a*x)^n,x)
```

```
[Out] int(x^2*arcsin(a*x)^n,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^n,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$${\rm integral}\left(x^{2} \arcsin \left(a x\right)^{n}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^n,x, algorithm="fricas")
```

```
[Out] integral(x^2*arcsin(a*x)^n, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^2 \operatorname{asin}^n(ax)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*asin(a*x)**n,x)
```

```
[Out] Integral(x**2*asin(a*x)**n, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int x^2 \arcsin(ax)^n\ dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*arcsin(a*x)^n,x, algorithm="giac")
```

```
[Out] integrate(x^2*arcsin(a*x)^n, x)
```

3.132 $\int x\sin^{-1}(ax)^n\,dx$

Optimal. Leaf size=85

$$-\frac{2^{-n-3}\sin^{-1}(ax)^n\left(-i\sin^{-1}(ax)\right)^{-n}\text{Gamma}\left(n+1,-2i\sin^{-1}(ax)\right)}{a^2}-\frac{2^{-n-3}\left(i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\text{Gamma}\left(n+1,2i\right.}{a^2}$$

```
[Out] -((2^(-3 - n)*ArcSin[a*x]^n*Gamma[1 + n, (-2*I)*ArcSin[a*x]])/(a^2*((-I)*Ar
cSin[a*x])^n)) - (2^(-3 - n)*ArcSin[a*x]^n*Gamma[1 + n, (2*I)*ArcSin[a*x]])
/(a^2*(I*ArcSin[a*x])^n)
```

Rubi [A] time = 0.0819761, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {4635, 4406, 12, 3308, 2181}

$$-\frac{2^{-n-3}\sin^{-1}(ax)^n\left(-i\sin^{-1}(ax)\right)^{-n}\text{Gamma}\left(n+1,-2i\sin^{-1}(ax)\right)}{a^2}-\frac{2^{-n-3}\left(i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\text{Gamma}\left(n+1,2i\right.}{a^2}$$

Antiderivative was successfully verified.

```
[In] Int[x*ArcSin[a*x]^n,x]
```

```
[Out] -((2^(-3 - n)*ArcSin[a*x]^n*Gamma[1 + n, (-2*I)*ArcSin[a*x]])/(a^2*((-I)*Ar
cSin[a*x])^n)) - (2^(-3 - n)*ArcSin[a*x]^n*Gamma[1 + n, (2*I)*ArcSin[a*x]])
/(a^2*(I*ArcSin[a*x])^n)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 3308

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

Rule 2181

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> -Simp[(F^(g*(e - (c*f)/d))*(c + d*x)^FracPart[m]*Gamma[m + 1, (-((f*g*Lo
g[F])/d))*(c + d*x)])/(d*(-((f*g*Log[F])/d))^(IntPart[m] + 1)*(-((f*g*Log[F
]*(c + d*x))/d))^FracPart[m]), x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&  !I
ntegerQ[m]
```

Rubi steps

$$
\begin{aligned}
\int x\sin^{-1}(ax)^n\,dx &= \frac{\mathrm{Subst}\left(\int x^n\cos(x)\sin(x)\,dx,x,\sin^{-1}(ax)\right)}{a^2}\\
&= \frac{\mathrm{Subst}\left(\int \frac{1}{2}x^n\sin(2x)\,dx,x,\sin^{-1}(ax)\right)}{a^2}\\
&= \frac{\mathrm{Subst}\left(\int x^n\sin(2x)\,dx,x,\sin^{-1}(ax)\right)}{2a^2}\\
&= \frac{i\,\mathrm{Subst}\left(\int e^{-2ix}x^n\,dx,x,\sin^{-1}(ax)\right)}{4a^2}-\frac{i\,\mathrm{Subst}\left(\int e^{2ix}x^n\,dx,x,\sin^{-1}(ax)\right)}{4a^2}\\
&= -\frac{2^{-3-n}\left(-i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\Gamma\left(1+n,-2i\sin^{-1}(ax)\right)}{a^2}-\frac{2^{-3-n}\left(i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\Gamma\left(1-\right.}{a^2}
\end{aligned}
$$

Mathematica [A] time = 0.019394, size = 75, normalized size = 0.88

$$
-\frac{2^{-n-3}\sin^{-1}(ax)^n\left(\sin^{-1}(ax)^2\right)^{-n}\left(\left(-i\sin^{-1}(ax)\right)^n\mathrm{Gamma}\left(n+1,2i\sin^{-1}(ax)\right)+\left(i\sin^{-1}(ax)\right)^n\mathrm{Gamma}\left(n+1,-2i\,\mathrm{si}\right.\right.}{a^2}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x*ArcSin[a*x]^n,x]
```

```
[Out] -((2^(-3 - n)*ArcSin[a*x]^n*((I*ArcSin[a*x])^n*Gamma[1 + n, (-2*I)*ArcSin[a
*x]] + ((-I)*ArcSin[a*x])^n*Gamma[1 + n, (2*I)*ArcSin[a*x]]))/(a^2*(ArcSin[
a*x]^2)^n))
```

Maple [C] time = 0.117, size = 138, normalized size = 1.6

$$\frac{\sqrt{\pi}}{4\,a^{2}}\left(2\,\frac{(\arcsin(ax))^{1+n}\sin(2\,\arcsin(ax))}{\sqrt{\pi}\,(2+n)}-\frac{\sin(2\,\arcsin(ax))}{\sqrt{\pi}\,(2+n)}2^{\frac{1}{2}-n}\sqrt{\arcsin(ax)}\mathrm{LommelS1}\left(n+\frac{3}{2},\frac{3}{2},2\,\arcsin(ax)\right)\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*arcsin(a*x)^n,x)
```

```
[Out] 1/4*Pi^(1/2)/a^2*(2/Pi^(1/2)/(2+n)*arcsin(a*x)^(1+n)*sin(2*arcsin(a*x))-2^(
1/2-n)/Pi^(1/2)/(2+n)*arcsin(a*x)^(1/2)*LommelS1(n+3/2,3/2,2*arcsin(a*x))*s
in(2*arcsin(a*x))-3*2^(-3/2-n)/Pi^(1/2)/(2+n)/arcsin(a*x)^(1/2)*(4/3+2/3*n)
*(2*arcsin(a*x)*cos(2*arcsin(a*x))-sin(2*arcsin(a*x)))*LommelS1(n+1/2,1/2,2
*arcsin(a*x)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^n,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(x\arcsin(ax)^{n},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^n,x, algorithm="fricas")
```

```
[Out] integral(x*arcsin(a*x)^n, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x \operatorname{asin}^{n}(ax)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*asin(a*x)**n,x)
```

```
[Out] Integral(x*asin(a*x)**n, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int x \arcsin(ax)^{n}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*arcsin(a*x)^n,x, algorithm="giac")
```

```
[Out] integrate(x*arcsin(a*x)^n, x)
```

3.133 $\int \sin^{-1}(ax)^n\,dx$

Optimal. Leaf size=79

$$\frac{i\left(i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\text{Gamma}\left(n+1,i\sin^{-1}(ax)\right)}{2a}-\frac{i\left(-i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\text{Gamma}\left(n+1,-i\sin^{-1}(ax)\right)}{2a}$$

```
[Out] ((-I/2)*ArcSin[a*x]^n*Gamma[1 + n, (-I)*ArcSin[a*x]])/(a*((-I)*ArcSin[a*x])
^n) + ((I/2)*ArcSin[a*x]^n*Gamma[1 + n, I*ArcSin[a*x]])/(a*(I*ArcSin[a*x])^
n)
```

Rubi [A] time = 0.0546235, antiderivative size = 79, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 6, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4623, 3307, 2181}

$$\frac{i\left(i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\text{Gamma}\left(n+1,i\sin^{-1}(ax)\right)}{2a}-\frac{i\left(-i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\text{Gamma}\left(n+1,-i\sin^{-1}(ax)\right)}{2a}$$

Antiderivative was successfully verified.

```
[In] Int[ArcSin[a*x]^n,x]
```

```
[Out] ((-I/2)*ArcSin[a*x]^n*Gamma[1 + n, (-I)*ArcSin[a*x]])/(a*((-I)*ArcSin[a*x])
^n) + ((I/2)*ArcSin[a*x]^n*Gamma[1 + n, I*ArcSin[a*x]])/(a*(I*ArcSin[a*x])^
n)
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3307

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

Rule 2181

```
Int[(F_)^((g_.)*((e_.) + (f_.)*(x_)))*((c_.) + (d_.)*(x_))^(m_), x_Symbol]
:> -Simp[(F^(g*(e - (c*f)/d))*(c + d*x)^FracPart[m]*Gamma[m + 1, (-((f*g*Lo
g[F])/d))*(c + d*x)])/(d*(-((f*g*Log[F])/d))^(IntPart[m] + 1)*(-((f*g*Log[F
]*(c + d*x))/d))^FracPart[m]), x] /; FreeQ[{F, c, d, e, f, g, m}, x] &&  !I
ntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int \sin^{-1}(ax)^n\,dx &= \frac{\text{Subst}\left(\int x^n\cos(x)\,dx, x, \sin^{-1}(ax)\right)}{a}\\ &= \frac{\text{Subst}\left(\int e^{-ix}x^n\,dx, x, \sin^{-1}(ax)\right)}{2a} + \frac{\text{Subst}\left(\int e^{ix}x^n\,dx, x, \sin^{-1}(ax)\right)}{2a}\\ &= -\frac{i\left(-i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\Gamma\left(1+n,-i\sin^{-1}(ax)\right)}{2a} + \frac{i\left(i\sin^{-1}(ax)\right)^{-n}\sin^{-1}(ax)^n\Gamma\left(1+n,i\sin^{-1}(a\right.}{2a}\end{aligned}$$

Mathematica [A] time = 0.035468, size = 73, normalized size = 0.92

$$\frac{i\sin^{-1}(ax)^n\left(\sin^{-1}(ax)^2\right)^{-n}\left(\left(-i\sin^{-1}(ax)\right)^n\text{Gamma}\left(n+1,i\sin^{-1}(ax)\right)-\left(i\sin^{-1}(ax)\right)^n\text{Gamma}\left(n+1,-i\sin^{-1}(ax)\right)\right.}{2a}$$

Antiderivative was successfully verified.

```
[In] Integrate[ArcSin[a*x]^n,x]
```

```
[Out] ((I/2)*ArcSin[a*x]^n*(-((I*ArcSin[a*x])^n*Gamma[1 + n, (-I)*ArcSin[a*x]]) +
 ((-I)*ArcSin[a*x])^n*Gamma[1 + n, I*ArcSin[a*x]]))/(a*(ArcSin[a*x]^2)^n)
```

Maple [C] time = 0.082, size = 240, normalized size = 3.

$$\frac{2^n\sqrt{\pi}}{a}\left(\frac{2^{-1-n}\left(\arcsin\left(ax\right)\right)^n\left(6+2\,n\right)ax}{\sqrt{\pi}\left(1+n\right)\left(3+n\right)} + \frac{\left(\arcsin\left(ax\right)\right)^n 2^{-n}}{\sqrt{\pi}\left(1+n\right)\left(a^2x^2-1\right)}\sqrt{-a^2x^2+1}\left(a^2x^2\arcsin\left(ax\right)-\arcsin\left(ax\right)+ax\sqrt{-a^2}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^n,x)
```

```
[Out] 2^n*Pi^(1/2)/a*(2^(-1-n)/Pi^(1/2)/(1+n)*arcsin(a*x)^n*(6+2*n)/(3+n)*a*x+1/P
i^(1/2)/(1+n)*arcsin(a*x)^n*2^(-n)*(-a^2*x^2+1)^(1/2)/(a^2*x^2-1)*(a^2*x^2*
arcsin(a*x)-arcsin(a*x)+a*x*(-a^2*x^2+1)^(1/2))+2^(-n)/Pi^(1/2)/(1+n)*arcsi
n(a*x)^(1/2)*n*LommelS1(n+1/2,3/2,arcsin(a*x))*a*x-2^(-n)/Pi^(1/2)/(1+n)/ar
csin(a*x)^(1/2)*(-a^2*x^2+1)^(1/2)/(a^2*x^2-1)*(a^2*x^2*arcsin(a*x)-arcsin(
a*x)+a*x*(-a^2*x^2+1)^(1/2))*LommelS1(n+3/2,1/2,arcsin(a*x)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\arcsin\left(ax\right)^{n},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^n, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \operatorname{asin}^{n}\left(ax\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**n,x)
```

```
[Out] Integral(asin(a*x)**n, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \arcsin{(ax)}^n \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^n, x)
```

3.134 $\int \frac{\sin^{-1}(ax)^n}{x}\,dx$

Optimal. Leaf size=12

$$\text{Unintegrable}\left(\frac{\sin^{-1}(ax)^n}{x},x\right)$$

```
[Out] Unintegrable[ArcSin[a*x]^n/x, x]
```

Rubi [A] time = 0.0147082, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\sin^{-1}(ax)^n}{x}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[ArcSin[a*x]^n/x,x]
```

```
[Out] Defer[Int][ArcSin[a*x]^n/x, x]
```

Rubi steps

$$\int \frac{\sin^{-1}(ax)^n}{x}\,dx=\int \frac{\sin^{-1}(ax)^n}{x}\,dx$$

Mathematica [A] time = 0.278058, size = 0, normalized size = 0.

$$\int \frac{\sin^{-1}(ax)^n}{x}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[ArcSin[a*x]^n/x,x]
```

```
[Out] Integrate[ArcSin[a*x]^n/x, x]
```

Maple [A] time = 0.102, size = 0, normalized size = 0.

$$\int \frac{(\arcsin (ax))^{n}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^n/x,x)
```

```
[Out] int(arcsin(a*x)^n/x,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n/x,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\arcsin (ax)^{n}}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n/x,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^n/x, x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^{n}(ax)}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**n/x,x)
```

```
[Out] Integral(asin(a*x)**n/x, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin{(ax)}^n}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n/x,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^n/x, x)
```

3.135 $\int \frac{\sin^{-1}(ax)^n}{x^2} \, dx$

Optimal. Leaf size=12

$$\text{Unintegrable}\left(\frac{\sin^{-1}(ax)^n}{x^2},x\right)$$

```
[Out] Unintegrable[ArcSin[a*x]^n/x^2, x]
```

Rubi [A] time = 0.0159331, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\sin^{-1}(ax)^n}{x^2} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[ArcSin[a*x]^n/x^2,x]
```

```
[Out] Defer[Int][ArcSin[a*x]^n/x^2, x]
```

Rubi steps

$$\int \frac{\sin^{-1}(ax)^n}{x^2} \, dx = \int \frac{\sin^{-1}(ax)^n}{x^2} \, dx$$

Mathematica [A] time = 0.525123, size = 0, normalized size = 0.

$$\int \frac{\sin^{-1}(ax)^n}{x^2} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[ArcSin[a*x]^n/x^2,x]
```

```
[Out] Integrate[ArcSin[a*x]^n/x^2, x]
```

Maple [A] time = 0.072, size = 0, normalized size = 0.

$$\int \frac{(\arcsin (ax))^n}{x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^n/x^2,x)
```

```
[Out] int(arcsin(a*x)^n/x^2,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n/x^2,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\arcsin (ax)^n}{x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n/x^2,x, algorithm="fricas")
```

```
[Out] integral(arcsin(a*x)^n/x^2, x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^n (ax)}{x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**n/x**2,x)
```

```
[Out] Integral(asin(a*x)**n/x**2, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin{(ax)}^n}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n/x^2,x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^n/x^2, x)
```

3.136 $\int (bx)^{3/2} \sin^{-1}(ax)^n \, dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left((bx)^{3/2}\sin^{-1}(ax)^n, x\right)$$

```
[Out] Unintegrable[(b*x)^(3/2)*ArcSin[a*x]^n, x]
```

Rubi [A] time = 0.0214075, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int (bx)^{3/2}\sin^{-1}(ax)^n\, dx$$

Verification is Not applicable to the result.

```
[In] Int[(b*x)^(3/2)*ArcSin[a*x]^n,x]
```

```
[Out] Defer[Int][(b*x)^(3/2)*ArcSin[a*x]^n, x]
```

Rubi steps

$$\int (bx)^{3/2}\sin^{-1}(ax)^n\, dx = \int (bx)^{3/2}\sin^{-1}(ax)^n\, dx$$

Mathematica [A] time = 3.57054, size = 0, normalized size = 0.

$$\int (bx)^{3/2}\sin^{-1}(ax)^n\, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(b*x)^(3/2)*ArcSin[a*x]^n,x]
```

```
[Out] Integrate[(b*x)^(3/2)*ArcSin[a*x]^n, x]
```

Maple [A] time = 0.089, size = 0, normalized size = 0.

$$\int (bx)^{\frac{3}{2}} (\arcsin (ax))^{n} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^(3/2)*arcsin(a*x)^n,x)
```

```
[Out] int((b*x)^(3/2)*arcsin(a*x)^n,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^(3/2)*arcsin(a*x)^n,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\sqrt{bx}bx \arcsin (ax)^{n}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^(3/2)*arcsin(a*x)^n,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x)*b*x*arcsin(a*x)^n, x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**(3/2)*asin(a*x)**n,x)
```

```
[Out] Timed out
```

<u>Giac</u> [A] time = 0., size = 0, normalized size = 0.

$$\int (bx)^{\frac{3}{2}} \arcsin{(ax)}^n \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^(3/2)*arcsin(a*x)^n,x, algorithm="giac")
```

```
[Out] integrate((b*x)^(3/2)*arcsin(a*x)^n, x)
```

3.137 $\int \sqrt{bx} \sin^{-1}(ax)^n \, dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\sqrt{bx} \sin^{-1}(ax)^n, x\right)$$

```
[Out] Unintegrable[Sqrt[b*x]*ArcSin[a*x]^n, x]
```

Rubi [A] time = 0.0174957, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int \sqrt{bx} \sin^{-1}(ax)^n \, dx$$

Verification is Not applicable to the result.

```
[In] Int[Sqrt[b*x]*ArcSin[a*x]^n,x]
```

```
[Out] Defer[Int][Sqrt[b*x]*ArcSin[a*x]^n, x]
```

Rubi steps

$$\int \sqrt{bx} \sin^{-1}(ax)^n \, dx = \int \sqrt{bx} \sin^{-1}(ax)^n \, dx$$

Mathematica [A] time = 4.26913, size = 0, normalized size = 0.

$$\int \sqrt{bx} \sin^{-1}(ax)^n \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sqrt[b*x]*ArcSin[a*x]^n,x]
```

```
[Out] Integrate[Sqrt[b*x]*ArcSin[a*x]^n, x]
```

Maple [A] time = 0.07, size = 0, normalized size = 0.

$$\int \sqrt{bx}\,(\arcsin(ax))^{n}\;dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x)^(1/2)*arcsin(a*x)^n,x)
```

```
[Out] int((b*x)^(1/2)*arcsin(a*x)^n,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^(1/2)*arcsin(a*x)^n,x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\sqrt{bx}\arcsin(ax)^{n}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^(1/2)*arcsin(a*x)^n,x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x)*arcsin(a*x)^n, x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{bx}\,\mathrm{asin}^{n}(ax)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)**(1/2)*asin(a*x)**n,x)
```

```
[Out] Integral(sqrt(b*x)*asin(a*x)**n, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{bx} \arcsin{(ax)}^n \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x)^(1/2)*arcsin(a*x)^n,x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*x)*arcsin(a*x)^n, x)
```

3.138 $\int \frac{\sin^{-1}(ax)^n}{\sqrt{bx}}\,dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\frac{\sin^{-1}(ax)^n}{\sqrt{bx}},x\right)$$

```
[Out] Unintegrable[ArcSin[a*x]^n/Sqrt[b*x], x]
```

Rubi [A] time = 0.0183719, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\sin^{-1}(ax)^n}{\sqrt{bx}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[ArcSin[a*x]^n/Sqrt[b*x],x]
```

```
[Out] Defer[Int][ArcSin[a*x]^n/Sqrt[b*x], x]
```

Rubi steps

$$\int \frac{\sin^{-1}(ax)^n}{\sqrt{bx}}\,dx = \int \frac{\sin^{-1}(ax)^n}{\sqrt{bx}}\,dx$$

Mathematica [A] time = 1.5516, size = 0, normalized size = 0.

$$\int \frac{\sin^{-1}(ax)^n}{\sqrt{bx}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[ArcSin[a*x]^n/Sqrt[b*x],x]
```

```
[Out] Integrate[ArcSin[a*x]^n/Sqrt[b*x], x]
```

Maple [A] time = 0.069, size = 0, normalized size = 0.

$$\int (\arcsin (ax))^n \frac{1}{\sqrt{bx}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^n/(b*x)^(1/2),x)
```

```
[Out] int(arcsin(a*x)^n/(b*x)^(1/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n/(b*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{bx}\arcsin (ax)^n}{bx}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n/(b*x)^(1/2),x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x)*arcsin(a*x)^n/(b*x), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\operatorname{asin}^{n}(ax)}{\sqrt{bx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**n/(b*x)**(1/2),x)
```

```
[Out] Integral(asin(a*x)**n/sqrt(b*x), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin(ax)^{n}}{\sqrt{bx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n/(b*x)^(1/2),x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^n/sqrt(b*x), x)
```

3.139 $\int \frac{\sin^{-1}(ax)^n}{(bx)^{3/2}} \, dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\frac{\sin^{-1}(ax)^n}{(bx)^{3/2}},x\right)$$

```
[Out] Unintegrable[ArcSin[a*x]^n/(b*x)^(3/2), x]
```

Rubi [A] time = 0.0207741, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int \frac{\sin^{-1}(ax)^n}{(bx)^{3/2}} \, dx$$

Verification is Not applicable to the result.

```
[In] Int[ArcSin[a*x]^n/(b*x)^(3/2),x]
```

```
[Out] Defer[Int][ArcSin[a*x]^n/(b*x)^(3/2), x]
```

Rubi steps

$$\int \frac{\sin^{-1}(ax)^n}{(bx)^{3/2}} \, dx = \int \frac{\sin^{-1}(ax)^n}{(bx)^{3/2}} \, dx$$

Mathematica [A] time = 1.90002, size = 0, normalized size = 0.

$$\int \frac{\sin^{-1}(ax)^n}{(bx)^{3/2}} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[ArcSin[a*x]^n/(b*x)^(3/2),x]
```

```
[Out] Integrate[ArcSin[a*x]^n/(b*x)^(3/2), x]
```

Maple [A] time = 0.069, size = 0, normalized size = 0.

$$\int (\arcsin (ax))^{n} (bx)^{-\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(arcsin(a*x)^n/(b*x)^(3/2),x)
```

```
[Out] int(arcsin(a*x)^n/(b*x)^(3/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: RuntimeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n/(b*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: RuntimeError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\sqrt{bx}\arcsin (ax)^{n}}{b^{2}x^{2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n/(b*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral(sqrt(b*x)*arcsin(a*x)^n/(b^2*x^2), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(asin(a*x)**n/(b*x)**(3/2),x)
```

```
[Out] Timed out
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\arcsin{(ax)}^n}{(bx)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(arcsin(a*x)^n/(b*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate(arcsin(a*x)^n/(b*x)^(3/2), x)
```

3.140 $\int x^3 \left(a+b\sin^{-1}(cx)\right)\,dx$

Optimal. Leaf size=76

$$\frac{1}{4}x^4\left(a+b\sin^{-1}(cx)\right)+\frac{bx^3\sqrt{1-c^2x^2}}{16c}+\frac{3bx\sqrt{1-c^2x^2}}{32c^3}-\frac{3b\sin^{-1}(cx)}{32c^4}$$

```
[Out] (3*b*x*Sqrt[1 - c^2*x^2])/(32*c^3) + (b*x^3*Sqrt[1 - c^2*x^2])/(16*c) - (3*
b*ArcSin[c*x])/(32*c^4) + (x^4*(a + b*ArcSin[c*x]))/4
```

Rubi [A] time = 0.0345858, antiderivative size = 76, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25, Rules used = {4627, 321, 216}

$$\frac{1}{4}x^4\left(a+b\sin^{-1}(cx)\right)+\frac{bx^3\sqrt{1-c^2x^2}}{16c}+\frac{3bx\sqrt{1-c^2x^2}}{32c^3}-\frac{3b\sin^{-1}(cx)}{32c^4}$$

Antiderivative was successfully verified.

```
[In] Int[x^3*(a + b*ArcSin[c*x]),x]
```

```
[Out] (3*b*x*Sqrt[1 - c^2*x^2])/(32*c^3) + (b*x^3*Sqrt[1 - c^2*x^2])/(16*c) - (3*
b*ArcSin[c*x])/(32*c^4) + (x^4*(a + b*ArcSin[c*x]))/4
```

Rule 4627

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

Rule 321

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

Rule 216

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

Rubi steps

$$
\begin{aligned}
\int x^3\left(a+b\sin^{-1}(cx)\right)\,dx &= \frac{1}{4}x^4\left(a+b\sin^{-1}(cx)\right)-\frac{1}{4}(bc)\int\frac{x^4}{\sqrt{1-c^2x^2}}\,dx\\
&= \frac{bx^3\sqrt{1-c^2x^2}}{16c}+\frac{1}{4}x^4\left(a+b\sin^{-1}(cx)\right)-\frac{(3b)\int\frac{x^2}{\sqrt{1-c^2x^2}}\,dx}{16c}\\
&= \frac{3bx\sqrt{1-c^2x^2}}{32c^3}+\frac{bx^3\sqrt{1-c^2x^2}}{16c}+\frac{1}{4}x^4\left(a+b\sin^{-1}(cx)\right)-\frac{(3b)\int\frac{1}{\sqrt{1-c^2x^2}}\,dx}{32c^3}\\
&= \frac{3bx\sqrt{1-c^2x^2}}{32c^3}+\frac{bx^3\sqrt{1-c^2x^2}}{16c}-\frac{3b\sin^{-1}(cx)}{32c^4}+\frac{1}{4}x^4\left(a+b\sin^{-1}(cx)\right)
\end{aligned}
$$

Mathematica [A] time = 0.029848, size = 81, normalized size = 1.07

$$
\frac{ax^4}{4}+\frac{bx^3\sqrt{1-c^2x^2}}{16c}+\frac{3bx\sqrt{1-c^2x^2}}{32c^3}-\frac{3b\sin^{-1}(cx)}{32c^4}+\frac{1}{4}bx^4\sin^{-1}(cx)
$$

Antiderivative was successfully verified.

```
[In] Integrate[x^3*(a + b*ArcSin[c*x]),x]
```

```
[Out] (a*x^4)/4 + (3*b*x*Sqrt[1 - c^2*x^2])/(32*c^3) + (b*x^3*Sqrt[1 - c^2*x^2])/
(16*c) - (3*b*ArcSin[c*x])/(32*c^4) + (b*x^4*ArcSin[c*x])/4
```

Maple [A] time = 0.005, size = 72, normalized size = 1.

$$
\frac{1}{c^4}\left(\frac{c^4x^4a}{4}+b\left(\frac{c^4x^4\arcsin(cx)}{4}+\frac{c^3x^3}{16}\sqrt{-c^2x^2+1}+\frac{3\,cx}{32}\sqrt{-c^2x^2+1}-\frac{3\,\arcsin(cx)}{32}\right)\right)
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^3*(a+b*arcsin(c*x)),x)
```

```
[Out] 1/c^4*(1/4*c^4*x^4*a+b*(1/4*c^4*x^4*arcsin(c*x)+1/16*c^3*x^3*(-c^2*x^2+1)^(
1/2)+3/32*c*x*(-c^2*x^2+1)^(1/2)-3/32*arcsin(c*x)))
```

Maxima [A] time = 1.59075, size = 111, normalized size = 1.46

$$\frac{1}{4}\,ax^4+\frac{1}{32}\left(8\,x^4\arcsin\left(cx\right)+\left(\frac{2\,\sqrt{-c^2x^2+1}x^3}{c^2}+\frac{3\,\sqrt{-c^2x^2+1}x}{c^4}-\frac{3\,\arcsin\left(\frac{c^2x}{\sqrt{c^2}}\right)}{\sqrt{c^2}c^4}\right)c\right)b$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*a*x^4 + 1/32*(8*x^4*arcsin(c*x) + (2*sqrt(-c^2*x^2 + 1)*x^3/c^2 + 3*sqr
t(-c^2*x^2 + 1)*x/c^4 - 3*arcsin(c^2*x/sqrt(c^2))/(sqrt(c^2)*c^4))*c)*b
```

Fricas [A] time = 1.43564, size = 139, normalized size = 1.83

$$\frac{8\,ac^4x^4+\left(8\,bc^4x^4-3\,b\right)\arcsin\left(cx\right)+\left(2\,bc^3x^3+3\,bcx\right)\sqrt{-c^2x^2+1}}{32\,c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/32*(8*a*c^4*x^4 + (8*b*c^4*x^4 - 3*b)*arcsin(c*x) + (2*b*c^3*x^3 + 3*b*c*
x)*sqrt(-c^2*x^2 + 1))/c^4
```

Sympy [A] time = 2.3713, size = 80, normalized size = 1.05

$$\begin{cases}\frac{ax^4}{4}+\frac{bx^4\operatorname{asin}\left(cx\right)}{4}+\frac{bx^3\sqrt{-c^2x^2+1}}{16c}+\frac{3bx\sqrt{-c^2x^2+1}}{32c^3}-\frac{3b\operatorname{asin}\left(cx\right)}{32c^4} & \text{for}\ c\neq 0\\ \frac{ax^4}{4} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**3*(a+b*asin(c*x)),x)
```

```
[Out] Piecewise((a*x**4/4 + b*x**4*asin(c*x)/4 + b*x**3*sqrt(-c**2*x**2 + 1)/(16*
c) + 3*b*x*sqrt(-c**2*x**2 + 1)/(32*c**3) - 3*b*asin(c*x)/(32*c**4), Ne(c,
0)), (a*x**4/4, True))
```

Giac [A] time = 1.37045, size = 163, normalized size = 2.14

$$-\frac{\left(-c^2x^2+1\right)^{\frac{3}{2}}bx}{16\,c^3}+\frac{\left(c^2x^2-1\right)^2b\arcsin\left(cx\right)}{4\,c^4}+\frac{5\,\sqrt{-c^2x^2+1}bx}{32\,c^3}+\frac{\left(c^2x^2-1\right)^2a}{4\,c^4}+\frac{\left(c^2x^2-1\right)b\arcsin\left(cx\right)}{2\,c^4}+\frac{\left(c^2x^2-1\right)a}{2\,c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/16*(-c^2*x^2 + 1)^(3/2)*b*x/c^3 + 1/4*(c^2*x^2 - 1)^2*b*arcsin(c*x)/c^4
+ 5/32*sqrt(-c^2*x^2 + 1)*b*x/c^3 + 1/4*(c^2*x^2 - 1)^2*a/c^4 + 1/2*(c^2*x^
2 - 1)*b*arcsin(c*x)/c^4 + 1/2*(c^2*x^2 - 1)*a/c^4 + 5/32*b*arcsin(c*x)/c^4
```

3.141 $\int x^2 \left(a+b\sin^{-1}(cx)\right)\,dx$

Optimal. Leaf size=60

$$\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)-\frac{b\left(1-c^2x^2\right)^{3/2}}{9c^3}+\frac{b\sqrt{1-c^2x^2}}{3c^3}$$

```
[Out] (b*Sqrt[1 - c^2*x^2])/(3*c^3) - (b*(1 - c^2*x^2)^(3/2))/(9*c^3) + (x^3*(a +
 b*ArcSin[c*x]))/3
```

Rubi [A] time = 0.0391678, antiderivative size = 60, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25, Rules used = {4627, 266, 43}

$$\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)-\frac{b\left(1-c^2x^2\right)^{3/2}}{9c^3}+\frac{b\sqrt{1-c^2x^2}}{3c^3}$$

Antiderivative was successfully verified.

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

```
[Out] (b*Sqrt[1 - c^2*x^2])/(3*c^3) - (b*(1 - c^2*x^2)^(3/2))/(9*c^3) + (x^3*(a +
 b*ArcSin[c*x]))/3
```

Rule 4627

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

Rule 266

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rubi steps

$$\begin{aligned}\int x^2\left(a+b\sin^{-1}(cx)\right)\,dx &= \frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)-\frac{1}{3}(bc)\int\frac{x^3}{\sqrt{1-c^2x^2}}\,dx\\
&= \frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)-\frac{1}{6}(bc)\,\mathrm{Subst}\left(\int\frac{x}{\sqrt{1-c^2x}}\,dx,x,x^2\right)\\
&= \frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)-\frac{1}{6}(bc)\,\mathrm{Subst}\left(\int\left(\frac{1}{c^2\sqrt{1-c^2x}}-\frac{\sqrt{1-c^2x}}{c^2}\right)dx,x,x^2\right)\\
&= \frac{b\sqrt{1-c^2x^2}}{3c^3}-\frac{b\left(1-c^2x^2\right)^{3/2}}{9c^3}+\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)\end{aligned}$$

Mathematica [A] time = 0.0391751, size = 49, normalized size = 0.82

$$\frac{1}{9}\left(3ax^3+\frac{b\sqrt{1-c^2x^2}\left(c^2x^2+2\right)}{c^3}+3bx^3\sin^{-1}(cx)\right)$$

Antiderivative was successfully verified.

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

```
[Out] (3*a*x^3 + (b*Sqrt[1 - c^2*x^2]*(2 + c^2*x^2))/c^3 + 3*b*x^3*ArcSin[c*x])/9
```

Maple [A] time = 0.003, size = 64, normalized size = 1.1

$$\frac{1}{c^3}\left(\frac{c^3x^3a}{3}+b\left(\frac{c^3x^3\arcsin(cx)}{3}+\frac{c^2x^2}{9}\sqrt{-c^2x^2+1}+\frac{2}{9}\sqrt{-c^2x^2+1}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/c^3*(1/3*c^3*x^3*a+b*(1/3*c^3*x^3*arcsin(c*x)+1/9*c^2*x^2*(-c^2*x^2+1)^(1
/2)+2/9*(-c^2*x^2+1)^(1/2)))
```

Maxima [A] time = 1.6864, size = 80, normalized size = 1.33

$$\frac{1}{3}\,ax^3+\frac{1}{9}\left(3\,x^3\arcsin\left(cx\right)+c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2}+\frac{2\,\sqrt{-c^2x^2+1}}{c^4}\right)\right)b$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*a*x^3 + 1/9*(3*x^3*arcsin(c*x) + c*(sqrt(-c^2*x^2 + 1)*x^2/c^2 + 2*sqrt
(-c^2*x^2 + 1)/c^4))*b
```

Fricas [A] time = 1.52999, size = 119, normalized size = 1.98

$$\frac{3\,bc^3x^3\arcsin\left(cx\right)+3\,ac^3x^3+\left(bc^2x^2+2\,b\right)\sqrt{-c^2x^2+1}}{9\,c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/9*(3*b*c^3*x^3*arcsin(c*x) + 3*a*c^3*x^3 + (b*c^2*x^2 + 2*b)*sqrt(-c^2*x^
2 + 1))/c^3
```

Sympy [A] time = 0.921519, size = 65, normalized size = 1.08

$$\begin{cases}\frac{ax^3}{3}+\frac{bx^3\operatorname{asin}\left(cx\right)}{3}+\frac{bx^2\sqrt{-c^2x^2+1}}{9c}+\frac{2b\sqrt{-c^2x^2+1}}{9c^3} & \text{for}\; c\neq 0\\ \frac{ax^3}{3} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*asin(c*x)),x)
```

```
[Out] Piecewise((a*x**3/3 + b*x**3*asin(c*x)/3 + b*x**2*sqrt(-c**2*x**2 + 1)/(9*c
) + 2*b*sqrt(-c**2*x**2 + 1)/(9*c**3), Ne(c, 0)), (a*x**3/3, True))
```

Giac [A] time = 1.34687, size = 100, normalized size = 1.67

$$\frac{1}{3}\,ax^3+\frac{\left(c^2x^2-1\right)bx\arcsin\left(cx\right)}{3\,c^2}+\frac{bx\arcsin\left(cx\right)}{3\,c^2}-\frac{\left(-c^2x^2+1\right)^{\frac{3}{2}}b}{9\,c^3}+\frac{\sqrt{-c^2x^2+1}b}{3\,c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*a*x^3 + 1/3*(c^2*x^2 - 1)*b*x*arcsin(c*x)/c^2 + 1/3*b*x*arcsin(c*x)/c^2
 - 1/9*(-c^2*x^2 + 1)^(3/2)*b/c^3 + 1/3*sqrt(-c^2*x^2 + 1)*b/c^3
```

3.142 $\int x\left(a+b\sin^{-1}(cx)\right)\,dx$

Optimal. Leaf size=51

$$\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)+\frac{bx\sqrt{1-c^2x^2}}{4c}-\frac{b\sin^{-1}(cx)}{4c^2}$$

```
[Out] (b*x*Sqrt[1 - c^2*x^2])/(4*c) - (b*ArcSin[c*x])/(4*c^2) + (x^2*(a + b*ArcSi
n[c*x]))/2
```

Rubi [A] time = 0.0189604, antiderivative size = 51, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3, Rules used = {4627, 321, 216}

$$\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)+\frac{bx\sqrt{1-c^2x^2}}{4c}-\frac{b\sin^{-1}(cx)}{4c^2}$$

Antiderivative was successfully verified.

```
[In] Int[x*(a + b*ArcSin[c*x]),x]
```

```
[Out] (b*x*Sqrt[1 - c^2*x^2])/(4*c) - (b*ArcSin[c*x])/(4*c^2) + (x^2*(a + b*ArcSi
n[c*x]))/2
```

Rule 4627

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

Rule 321

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

Rule 216

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

Rubi steps

$$\begin{aligned}\int x\left(a+b\sin^{-1}(cx)\right)dx &= \frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)-\frac{1}{2}(bc)\int\frac{x^2}{\sqrt{1-c^2x^2}}\,dx\\ &= \frac{bx\sqrt{1-c^2x^2}}{4c}+\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)-\frac{b\int\frac{1}{\sqrt{1-c^2x^2}}\,dx}{4c}\\ &= \frac{bx\sqrt{1-c^2x^2}}{4c}-\frac{b\sin^{-1}(cx)}{4c^2}+\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)\end{aligned}$$

Mathematica [A] time = 0.0193532, size = 56, normalized size = 1.1

$$\frac{ax^2}{2}+\frac{bx\sqrt{1-c^2x^2}}{4c}-\frac{b\sin^{-1}(cx)}{4c^2}+\frac{1}{2}bx^2\sin^{-1}(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(a + b*ArcSin[c*x]),x]
```

```
[Out] (a*x^2)/2 + (b*x*Sqrt[1 - c^2*x^2])/(4*c) - (b*ArcSin[c*x])/(4*c^2) + (b*x^
2*ArcSin[c*x])/2
```

Maple [A] time = 0.003, size = 52, normalized size = 1.

$$\frac{1}{c^2}\left(\frac{c^2x^2a}{2}+b\left(\frac{c^2x^2\arcsin(cx)}{2}+\frac{cx}{4}\sqrt{-c^2x^2+1}-\frac{\arcsin(cx)}{4}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*arcsin(c*x)),x)
```

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

Maxima [A] time = 1.59805, size = 82, normalized size = 1.61

$$\frac{1}{2}\,ax^2+\frac{1}{4}\left(2\,x^2\arcsin\left(cx\right)+c\left(\frac{\sqrt{-c^2x^2+1}x}{c^2}-\frac{\arcsin\left(\frac{c^2x}{\sqrt{c^2}}\right)}{\sqrt{c^2}c^2}\right)\right)b$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

```
[Out] 1/2*a*x^2 + 1/4*(2*x^2*arcsin(c*x) + c*(sqrt(-c^2*x^2 + 1)*x/c^2 - arcsin(c
^2*x/sqrt(c^2))/(sqrt(c^2)*c^2)))*b
```

Fricas [A] time = 1.48371, size = 111, normalized size = 2.18

$$\frac{2\,ac^2x^2+\sqrt{-c^2x^2+1}bcx+\left(2\,bc^2x^2-b\right)\arcsin\left(cx\right)}{4\,c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

```
[Out] 1/4*(2*a*c^2*x^2 + sqrt(-c^2*x^2 + 1)*b*c*x + (2*b*c^2*x^2 - b)*arcsin(c*x)
)/c^2
```

Sympy [A] time = 0.435322, size = 54, normalized size = 1.06

$$\begin{cases} \frac{ax^2}{2}+\frac{bx^2\operatorname{asin}\left(cx\right)}{2}+\frac{bx\sqrt{-c^2x^2+1}}{4c}-\frac{b\operatorname{asin}\left(cx\right)}{4c^2} & \text{for}\ c\neq 0\\ \frac{ax^2}{2} & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*asin(c*x)),x)
```

```
[Out] Piecewise((a*x**2/2 + b*x**2*asin(c*x)/2 + b*x*sqrt(-c**2*x**2 + 1)/(4*c) -
 b*asin(c*x)/(4*c**2), Ne(c, 0)), (a*x**2/2, True))
```

Giac [A] time = 1.31596, size = 86, normalized size = 1.69

$$\frac{\sqrt{-c^2x^2+1}bx}{4\,c}+\frac{\left(c^2x^2-1\right)b\arcsin\left(cx\right)}{2\,c^2}+\frac{\left(c^2x^2-1\right)a}{2\,c^2}+\frac{b\arcsin\left(cx\right)}{4\,c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*arcsin(c*x)),x, algorithm="giac")
```

```
[Out] 1/4*sqrt(-c^2*x^2 + 1)*b*x/c + 1/2*(c^2*x^2 - 1)*b*arcsin(c*x)/c^2 + 1/2*(c
^2*x^2 - 1)*a/c^2 + 1/4*b*arcsin(c*x)/c^2
```

3.143 $\int \left(a+b\sin^{-1}(cx)\right)\,dx$

Optimal. Leaf size=30

$$ax+\frac{b\sqrt{1-c^2x^2}}{c}+bx\sin^{-1}(cx)$$

```
[Out] a*x + (b*Sqrt[1 - c^2*x^2])/c + b*x*ArcSin[c*x]
```

Rubi [A] time = 0.0137527, antiderivative size = 30, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 8, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25, Rules used = {4619, 261}

$$ax+\frac{b\sqrt{1-c^2x^2}}{c}+bx\sin^{-1}(cx)$$

Antiderivative was successfully verified.

```
[In] Int[a + b*ArcSin[c*x],x]
```

```
[Out] a*x + (b*Sqrt[1 - c^2*x^2])/c + b*x*ArcSin[c*x]
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 261

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

Rubi steps

$$\begin{aligned}\int \left(a+b\sin^{-1}(cx)\right)\,dx &= ax+b\int \sin^{-1}(cx)\,dx\\ &= ax+bx\sin^{-1}(cx)-(bc)\int \frac{x}{\sqrt{1-c^2x^2}}\,dx\\ &= ax+\frac{b\sqrt{1-c^2x^2}}{c}+bx\sin^{-1}(cx)\end{aligned}$$

Mathematica [A] time = 0.0123389, size = 30, normalized size = 1.

$$ax+\frac{b\sqrt{1-c^2x^2}}{c}+bx\sin^{-1}(cx)$$

Antiderivative was successfully verified.

```
[In] Integrate[a + b*ArcSin[c*x],x]
```

```
[Out] a*x + (b*Sqrt[1 - c^2*x^2])/c + b*x*ArcSin[c*x]
```

Maple [A] time = 0.003, size = 30, normalized size = 1.

$$ax+\frac{b}{c}\left(cx\arcsin(cx)+\sqrt{-c^2x^2+1}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(a+b*arcsin(c*x),x)
```

```
[Out] a*x+b/c*(c*x*arcsin(c*x)+(-c^2*x^2+1)^(1/2))
```

Maxima [A] time = 1.51728, size = 39, normalized size = 1.3

$$ax+\frac{\left(cx\arcsin(cx)+\sqrt{-c^2x^2+1}\right)b}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(a+b*arcsin(c*x),x, algorithm="maxima")
```

```
[Out] a*x + (c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))*b/c
```

Fricas [A] time = 1.45936, size = 73, normalized size = 2.43

$$\frac{bcx\arcsin(cx) + acx + \sqrt{-c^2x^2 + 1}b}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(a+b*arcsin(c*x),x, algorithm="fricas")
```

```
[Out] (b*c*x*arcsin(c*x) + a*c*x + sqrt(-c^2*x^2 + 1)*b)/c
```

Sympy [A] time = 0.170436, size = 26, normalized size = 0.87

$$ax + b\left(\begin{cases} x\operatorname{asin}(cx) + \frac{\sqrt{-c^2x^2+1}}{c} & \text{for } c \neq 0 \\ 0 & \text{otherwise} \end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(a+b*asin(c*x),x)
```

```
[Out] a*x + b*Piecewise((x*asin(c*x) + sqrt(-c**2*x**2 + 1)/c, Ne(c, 0)), (0, Tru
e))
```

Giac [A] time = 1.28599, size = 39, normalized size = 1.3

$$ax + \frac{\left(cx\arcsin(cx) + \sqrt{-c^2x^2 + 1}\right)b}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(a+b*arcsin(c*x),x, algorithm="giac")
```

```
[Out] a*x + (c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))*b/c
```

3.144 $\int \frac{a+b\sin^{-1}(cx)}{x}\,dx$

Optimal. Leaf size=63

$$-\frac{1}{2}ib\text{PolyLog}\left(2,e^{2i\sin^{-1}(cx)}\right)-\frac{i\left(a+b\sin^{-1}(cx)\right)^2}{2b}+\log\left(1-e^{2i\sin^{-1}(cx)}\right)\left(a+b\sin^{-1}(cx)\right)$$

```
[Out] ((-I/2)*(a + b*ArcSin[c*x])^2)/b + (a + b*ArcSin[c*x])*Log[1 - E^((2*I)*Arc
Sin[c*x])] - (I/2)*b*PolyLog[2, E^((2*I)*ArcSin[c*x])]
```

Rubi [A] time = 0.069963, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.417, Rules used = {4625, 3717, 2190, 2279, 2391}

$$-\frac{1}{2}ib\text{PolyLog}\left(2,e^{2i\sin^{-1}(cx)}\right)-\frac{i\left(a+b\sin^{-1}(cx)\right)^2}{2b}+\log\left(1-e^{2i\sin^{-1}(cx)}\right)\left(a+b\sin^{-1}(cx)\right)$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])/x,x]
```

```
[Out] ((-I/2)*(a + b*ArcSin[c*x])^2)/b + (a + b*ArcSin[c*x])*Log[1 - E^((2*I)*Arc
Sin[c*x])] - (I/2)*b*PolyLog[2, E^((2*I)*ArcSin[c*x])]
```

Rule 4625

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n/Tan[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Rule 3717

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[(I*(c + d*x)^(m + 1))/(d*(m + 1)), x] - Dist[2*I, Int[((c + d*x)^
m*E^(2*I*k*Pi)*E^(2*I*(e + f*x)))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x))), x],
 x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

Rule 2190

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m*Log[1 + (b*(F^(g*(e + f*x)))^n)/a])/(b*f*g*n*Log[F]), x] - Di
```

```
st[(d*m)/(b*f*g*n*Log[F]), Int[(c + d*x)^(m - 1)*Log[1 + (b*(F^(g*(e + f*x)
))^n)/a], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2279

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2391

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> -Simp[PolyLog[2
, -(c*e*x^n)]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$
\begin{aligned}
\int \frac{a+b\sin^{-1}(cx)}{x}\,dx &= \operatorname{Subst}\left(\int (a+bx)\cot(x)\,dx, x, \sin^{-1}(cx)\right)\\
&= -\frac{i\left(a+b\sin^{-1}(cx)\right)^2}{2b} - 2i\operatorname{Subst}\left(\int \frac{e^{2ix}(a+bx)}{1-e^{2ix}}\,dx, x, \sin^{-1}(cx)\right)\\
&= -\frac{i\left(a+b\sin^{-1}(cx)\right)^2}{2b} + \left(a+b\sin^{-1}(cx)\right)\log\left(1-e^{2i\sin^{-1}(cx)}\right) - b\operatorname{Subst}\Bigl(\int \log\left(1-e^{2ix}\right)\,dx, x, \mathrm{si}\\
&= -\frac{i\left(a+b\sin^{-1}(cx)\right)^2}{2b} + \left(a+b\sin^{-1}(cx)\right)\log\left(1-e^{2i\sin^{-1}(cx)}\right) + \frac{1}{2}(ib)\operatorname{Subst}\Bigl(\int \frac{\log(1-x)}{x}\,dx, x,\\
&= -\frac{i\left(a+b\sin^{-1}(cx)\right)^2}{2b} + \left(a+b\sin^{-1}(cx)\right)\log\left(1-e^{2i\sin^{-1}(cx)}\right) - \frac{1}{2}ib\operatorname{Li}_2\left(e^{2i\sin^{-1}(cx)}\right)
\end{aligned}
$$

Mathematica [A] time = 0.0321451, size = 52, normalized size = 0.83

$$
-\frac{1}{2}ib\left(\sin^{-1}(cx)^2+\operatorname{PolyLog}\left(2,e^{2i\sin^{-1}(cx)}\right)\right)+a\log(x)+b\sin^{-1}(cx)\log\left(1-e^{2i\sin^{-1}(cx)}\right)
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*ArcSin[c*x])/x,x]
```

```
[Out] b*ArcSin[c*x]*Log[1 - E^((2*I)*ArcSin[c*x])] + a*Log[x] - (I/2)*b*(ArcSin[c
*x]^2 + PolyLog[2, E^((2*I)*ArcSin[c*x])])
```

Maple [A] time = 0.03, size = 122, normalized size = 1.9

$$a\ln\left(cx\right)-\frac{i}{2}b\left(\arcsin\left(cx\right)\right)^{2}+b\arcsin\left(cx\right)\ln\left(1+icx+\sqrt{-c^{2}x^{2}+1}\right)+b\arcsin\left(cx\right)\ln\left(1-icx-\sqrt{-c^{2}x^{2}+1}\right)-ib\mathrm{pol}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))/x,x)
```

```
[Out] a*ln(c*x)-1/2*I*b*arcsin(c*x)^2+b*arcsin(c*x)*ln(1+I*c*x+(-c^2*x^2+1)^(1/2)
)+b*arcsin(c*x)*ln(1-I*c*x-(-c^2*x^2+1)^(1/2))-I*b*polylog(2,I*c*x+(-c^2*x^
2+1)^(1/2))-I*b*polylog(2,-I*c*x-(-c^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$b\int\frac{\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)}{x}\,dx+a\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))/x,x, algorithm="maxima")
```

```
[Out] b*integrate(arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))/x, x) + a*log(x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{b\arcsin\left(cx\right)+a}{x},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))/x,x, algorithm="fricas")
```

```
[Out] integral((b*arcsin(c*x) + a)/x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{a + b\,\mathrm{asin}\,(cx)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))/x,x)
```

```
[Out] Integral((a + b*asin(c*x))/x, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{b \arcsin\,(cx) + a}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))/x,x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)/x, x)
```

3.145 $\int \frac{a+b\sin^{-1}(cx)}{x^2}\,dx$

Optimal. Leaf size=33

$$-\frac{a+b\sin^{-1}(cx)}{x}-bc\tanh^{-1}\left(\sqrt{1-c^2x^2}\right)$$

```
[Out] -((a + b*ArcSin[c*x])/x) - b*c*ArcTanh[Sqrt[1 - c^2*x^2]]
```

Rubi [A] time = 0.0265272, antiderivative size = 33, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {4627, 266, 63, 208}

$$-\frac{a+b\sin^{-1}(cx)}{x}-bc\tanh^{-1}\left(\sqrt{1-c^2x^2}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])/x^2,x]
```

```
[Out] -((a + b*ArcSin[c*x])/x) - b*c*ArcTanh[Sqrt[1 - c^2*x^2]]
```

Rule 4627

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

Rule 266

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 63

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - (a*d)/b +
(d*x^p)/b)^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 208

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

Rubi steps

$$\begin{aligned}\int \frac{a+b\sin^{-1}(cx)}{x^2}\,dx &= -\frac{a+b\sin^{-1}(cx)}{x}+(bc)\int \frac{1}{x\sqrt{1-c^2x^2}}\,dx\\ &= -\frac{a+b\sin^{-1}(cx)}{x}+\frac{1}{2}(bc)\,\mathrm{Subst}\left(\int \frac{1}{x\sqrt{1-c^2x}}\,dx,x,x^2\right)\\ &= -\frac{a+b\sin^{-1}(cx)}{x}-\frac{b\,\mathrm{Subst}\left(\int \frac{1}{\frac{1}{c^2}-\frac{x^2}{c^2}}\,dx,x,\sqrt{1-c^2x^2}\right)}{c}\\ &= -\frac{a+b\sin^{-1}(cx)}{x}-bc\tanh^{-1}\left(\sqrt{1-c^2x^2}\right)\end{aligned}$$

Mathematica [A] time = 0.0027337, size = 36, normalized size = 1.09

$$-\frac{a}{x}-bc\tanh^{-1}\left(\sqrt{1-c^2x^2}\right)-\frac{b\sin^{-1}(cx)}{x}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])/x^2,x]
```

```
[Out] -(a/x) - (b*ArcSin[c*x])/x - b*c*ArcTanh[Sqrt[1 - c^2*x^2]]
```

Maple [A] time = 0.004, size = 43, normalized size = 1.3

$$c\left(-\frac{a}{cx}+b\left(-\frac{\arcsin(cx)}{cx}-\mathrm{Artanh}\left(\frac{1}{\sqrt{-c^2x^2+1}}\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] c*(-a/c/x+b*(-1/c/x*arcsin(c*x)-arctanh(1/(-c^2*x^2+1)^(1/2))))
```

Maxima [A] time = 1.50488, size = 63, normalized size = 1.91

$$-\left(c\log\left(\frac{2\sqrt{-c^2x^2+1}}{|x|}+\frac{2}{|x|}\right)+\frac{\arcsin(cx)}{x}\right)b-\frac{a}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(c*log(2*sqrt(-c^2*x^2 + 1)/abs(x) + 2/abs(x)) + arcsin(c*x)/x)*b - a/x
```

Fricas [A] time = 1.55218, size = 140, normalized size = 4.24

$$-\frac{bcx\log\left(\sqrt{-c^2x^2+1}+1\right)-bcx\log\left(\sqrt{-c^2x^2+1}-1\right)+2\,b\arcsin(cx)+2\,a}{2\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(b*c*x*log(sqrt(-c^2*x^2 + 1) + 1) - b*c*x*log(sqrt(-c^2*x^2 + 1) - 1)
 + 2*b*arcsin(c*x) + 2*a)/x
```

Sympy [A] time = 3.3225, size = 39, normalized size = 1.18

$$-\frac{a}{x}+bc\left(\begin{cases}-\operatorname{acosh}\left(\frac{1}{cx}\right) & \text{for}\ \frac{1}{|c^2x^2|}>1\\ i\operatorname{asin}\left(\frac{1}{cx}\right) & \text{otherwise}\end{cases}\right)-\frac{b\operatorname{asin}(cx)}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -a/x + b*c*Piecewise((-acosh(1/(c*x)), 1/Abs(c**2*x**2) > 1), (I*asin(1/(c*
x)), True)) - b*asin(c*x)/x
```

<u>Giac</u> [B] time = 1.58261, size = 439, normalized size = 13.3

$$-\frac{\sqrt{-c^2x^2+1}bc^2x\arcsin\left(cx\right)}{2\left(\sqrt{-c^2x^2+1}+1\right)^2}-\frac{bc^2x\arcsin\left(cx\right)}{2\left(\sqrt{-c^2x^2+1}+1\right)^2}-\frac{\sqrt{-c^2x^2+1}ac^2x}{2\left(\sqrt{-c^2x^2+1}+1\right)^2}+\frac{\sqrt{-c^2x^2+1}bc\log\left(|c||x|\right)}{\sqrt{-c^2x^2+1}+1}-$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*sqrt(-c^2*x^2 + 1)*b*c^2*x*arcsin(c*x)/(sqrt(-c^2*x^2 + 1) + 1)^2 - 1/
2*b*c^2*x*arcsin(c*x)/(sqrt(-c^2*x^2 + 1) + 1)^2 - 1/2*sqrt(-c^2*x^2 + 1)*a
*c^2*x/(sqrt(-c^2*x^2 + 1) + 1)^2 + sqrt(-c^2*x^2 + 1)*b*c*log(abs(c)*abs(x
))/(sqrt(-c^2*x^2 + 1) + 1) - sqrt(-c^2*x^2 + 1)*b*c*log(sqrt(-c^2*x^2 + 1)
 + 1)/(sqrt(-c^2*x^2 + 1) + 1) - 1/2*a*c^2*x/(sqrt(-c^2*x^2 + 1) + 1)^2 + b
*c*log(abs(c)*abs(x))/(sqrt(-c^2*x^2 + 1) + 1) - b*c*log(sqrt(-c^2*x^2 + 1)
 + 1)/(sqrt(-c^2*x^2 + 1) + 1) - 1/2*sqrt(-c^2*x^2 + 1)*b*arcsin(c*x)/x - 1
/2*b*arcsin(c*x)/x - 1/2*sqrt(-c^2*x^2 + 1)*a/x - 1/2*a/x
```

3.146 $\int \frac{a+b\sin^{-1}(cx)}{x^3}\,dx$

Optimal. Leaf size=39

$$-\frac{a+b\sin^{-1}(cx)}{2x^2}-\frac{bc\sqrt{1-c^2x^2}}{2x}$$

```
[Out] -(b*c*Sqrt[1 - c^2*x^2])/(2*x) - (a + b*ArcSin[c*x])/(2*x^2)
```

Rubi [A] time = 0.0189224, antiderivative size = 39, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167, Rules used = {4627, 264}

$$-\frac{a+b\sin^{-1}(cx)}{2x^2}-\frac{bc\sqrt{1-c^2x^2}}{2x}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])/x^3,x]
```

```
[Out] -(b*c*Sqrt[1 - c^2*x^2])/(2*x) - (a + b*ArcSin[c*x])/(2*x^2)
```

Rule 4627

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

Rule 264

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

Rubi steps

$$\int \frac{a+b\sin^{-1}(cx)}{x^3}\,dx = -\frac{a+b\sin^{-1}(cx)}{2x^2}+\frac{1}{2}(bc)\int \frac{1}{x^2\sqrt{1-c^2x^2}}\,dx$$
$$= -\frac{bc\sqrt{1-c^2x^2}}{2x}-\frac{a+b\sin^{-1}(cx)}{2x^2}$$

Mathematica [A] time = 0.013428, size = 44, normalized size = 1.13

$$-\frac{a}{2x^2}-\frac{bc\sqrt{1-c^2x^2}}{2x}-\frac{b\sin^{-1}(cx)}{2x^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])/x^3,x]
```

```
[Out] -a/(2*x^2) - (b*c*Sqrt[1 - c^2*x^2])/(2*x) - (b*ArcSin[c*x])/(2*x^2)
```

Maple [A] time = 0.004, size = 50, normalized size = 1.3

$$c^2\left(-\frac{a}{2\,c^2x^2}+b\left(-\frac{\arcsin\left(cx\right)}{2\,c^2x^2}-\frac{1}{2\,cx}\sqrt{-c^2x^2+1}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] c^2*(-1/2*a/c^2/x^2+b*(-1/2/c^2/x^2*arcsin(c*x)-1/2/c/x*(-c^2*x^2+1)^(1/2))
)
```

Maxima [A] time = 1.53808, size = 49, normalized size = 1.26

$$-\frac{1}{2}b\left(\frac{\sqrt{-c^2x^2+1}c}{x}+\frac{\arcsin\left(cx\right)}{x^2}\right)-\frac{a}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*b*(sqrt(-c^2*x^2 + 1)*c/x + arcsin(c*x)/x^2) - 1/2*a/x^2
```

Fricas [A] time = 1.48941, size = 88, normalized size = 2.26

$$-\frac{\sqrt{-c^2x^2+1}bcx - ax^2 + b\arcsin(cx) + a}{2\,x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/2*(sqrt(-c^2*x^2 + 1)*b*c*x - a*x^2 + b*arcsin(c*x) + a)/x^2
```

Sympy [A] time = 2.89605, size = 61, normalized size = 1.56

$$-\frac{a}{2x^2} + \frac{bc\left(\begin{cases} -\frac{i\sqrt{c^2x^2-1}}{x} & \text{for } \left|c^2x^2\right| > 1 \\ -\frac{\sqrt{-c^2x^2+1}}{x} & \text{otherwise} \end{cases}\right)}{2} - \frac{b\,\mathrm{asin}(cx)}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -a/(2*x**2) + b*c*Piecewise((-I*sqrt(c**2*x**2 - 1)/x, Abs(c**2*x**2) > 1),
 (-sqrt(-c**2*x**2 + 1)/x, True))/2 - b*asin(c*x)/(2*x**2)
```

Giac [B] time = 1.40209, size = 220, normalized size = 5.64

$$-\frac{bc^4x^2\arcsin(cx)}{8\left(\sqrt{-c^2x^2+1}+1\right)^2} - \frac{ac^4x^2}{8\left(\sqrt{-c^2x^2+1}+1\right)^2} + \frac{bc^3x}{4\left(\sqrt{-c^2x^2+1}+1\right)} - \frac{1}{4}bc^2\arcsin(cx) - \frac{1}{4}ac^2 - \frac{bc\left(\sqrt{-c^2x^2+1}+1\right)}{4\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/8*b*c^4*x^2*arcsin(c*x)/(sqrt(-c^2*x^2 + 1) + 1)^2 - 1/8*a*c^4*x^2/(sqrt
(-c^2*x^2 + 1) + 1)^2 + 1/4*b*c^3*x/(sqrt(-c^2*x^2 + 1) + 1) - 1/4*b*c^2*ar
csin(c*x) - 1/4*a*c^2 - 1/4*b*c*(sqrt(-c^2*x^2 + 1) + 1)/x - 1/8*b*(sqrt(-c
^2*x^2 + 1) + 1)^2*arcsin(c*x)/x^2 - 1/8*a*(sqrt(-c^2*x^2 + 1) + 1)^2/x^2
```

3.147 $\int \frac{a+b\sin^{-1}(cx)}{x^4}\,dx$

Optimal. Leaf size=62

$$-\frac{a+b\sin^{-1}(cx)}{3x^3}-\frac{bc\sqrt{1-c^2x^2}}{6x^2}-\frac{1}{6}bc^3\tanh^{-1}\left(\sqrt{1-c^2x^2}\right)$$

```
[Out] -(b*c*Sqrt[1 - c^2*x^2])/(6*x^2) - (a + b*ArcSin[c*x])/(3*x^3) - (b*c^3*Arc
Tanh[Sqrt[1 - c^2*x^2]])/6
```

Rubi [A] time = 0.0382465, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.417, Rules used = {4627, 266, 51, 63, 208}

$$-\frac{a+b\sin^{-1}(cx)}{3x^3}-\frac{bc\sqrt{1-c^2x^2}}{6x^2}-\frac{1}{6}bc^3\tanh^{-1}\left(\sqrt{1-c^2x^2}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])/x^4,x]
```

```
[Out] -(b*c*Sqrt[1 - c^2*x^2])/(6*x^2) - (a + b*ArcSin[c*x])/(3*x^3) - (b*c^3*Arc
Tanh[Sqrt[1 - c^2*x^2]])/6
```

Rule 4627

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

Rule 266

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 51

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> Simp[
((a + b*x)^(m + 1)*(c + d*x)^(n + 1))/((b*c - a*d)*(m + 1)), x] - Dist[(d*(
m + n + 2))/((b*c - a*d)*(m + 1)), Int[(a + b*x)^(m + 1)*(c + d*x)^n, x], x
] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && LtQ[m, -1] &&  !(LtQ
[n, -1] && (EqQ[a, 0] || (NeQ[c, 0] && LtQ[m - n, 0] && IntegerQ[n]))) && I
ntLinearQ[a, b, c, d, m, n, x]
```

Rule 63

```
Int[((a_.) + (b_.)*(x_))^(m_)*((c_.) + (d_.)*(x_))^(n_), x_Symbol] :> With[
{p = Denominator[m]}, Dist[p/b, Subst[Int[x^(p*(m + 1) - 1)*(c - (a*d)/b +
(d*x^p)/b)^n, x], x, (a + b*x)^(1/p)], x]] /; FreeQ[{a, b, c, d}, x] && NeQ
[b*c - a*d, 0] && LtQ[-1, m, 0] && LeQ[-1, n, 0] && LeQ[Denominator[n], Den
ominator[m]] && IntLinearQ[a, b, c, d, m, n, x]
```

Rule 208

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

Rubi steps

$$\begin{aligned}
\int \frac{a+b\sin^{-1}(cx)}{x^4}\,dx &= -\frac{a+b\sin^{-1}(cx)}{3x^3}+\frac{1}{3}(bc)\int \frac{1}{x^3\sqrt{1-c^2x^2}}\,dx\\
&= -\frac{a+b\sin^{-1}(cx)}{3x^3}+\frac{1}{6}(bc)\,\mathrm{Subst}\left(\int \frac{1}{x^2\sqrt{1-c^2x}}\,dx,x,x^2\right)\\
&= -\frac{bc\sqrt{1-c^2x^2}}{6x^2}-\frac{a+b\sin^{-1}(cx)}{3x^3}+\frac{1}{12}\left(bc^3\right)\mathrm{Subst}\left(\int \frac{1}{x\sqrt{1-c^2x}}\,dx,x,x^2\right)\\
&= -\frac{bc\sqrt{1-c^2x^2}}{6x^2}-\frac{a+b\sin^{-1}(cx)}{3x^3}-\frac{1}{6}(bc)\,\mathrm{Subst}\left(\int \frac{1}{\frac{1}{c^2}-\frac{x^2}{c^2}}\,dx,x,\sqrt{1-c^2x^2}\right)\\
&= -\frac{bc\sqrt{1-c^2x^2}}{6x^2}-\frac{a+b\sin^{-1}(cx)}{3x^3}-\frac{1}{6}bc^3\tanh^{-1}\left(\sqrt{1-c^2x^2}\right)
\end{aligned}$$

Mathematica [A] time = 0.0183823, size = 67, normalized size = 1.08

$$-\frac{a}{3x^3}-\frac{bc\sqrt{1-c^2x^2}}{6x^2}-\frac{1}{6}bc^3\tanh^{-1}\left(\sqrt{1-c^2x^2}\right)-\frac{b\sin^{-1}(cx)}{3x^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])/x^4,x]
```

```
[Out] -a/(3*x^3) - (b*c*Sqrt[1 - c^2*x^2])/(6*x^2) - (b*ArcSin[c*x])/(3*x^3) - (b
*c^3*ArcTanh[Sqrt[1 - c^2*x^2]])/6
```

Maple [A] time = 0.003, size = 65, normalized size = 1.1

$$c^{3}\left(-\frac{a}{3\,c^{3}x^{3}}+b\left(-\frac{\arcsin(cx)}{3\,c^{3}x^{3}}-\frac{1}{6\,c^{2}x^{2}}\sqrt{-c^{2}x^{2}+1}-\frac{1}{6}\mathrm{Artanh}\left(\frac{1}{\sqrt{-c^{2}x^{2}+1}}\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))/x^4,x)
```

```
[Out] c^3*(-1/3*a/c^3/x^3+b*(-1/3/c^3/x^3*arcsin(c*x)-1/6/c^2/x^2*(-c^2*x^2+1)^(1
/2)-1/6*arctanh(1/(-c^2*x^2+1)^(1/2))))
```

Maxima [A] time = 1.54952, size = 93, normalized size = 1.5

$$-\frac{1}{6}\left(\left(c^{2}\log\left(\frac{2\sqrt{-c^{2}x^{2}+1}}{|x|}+\frac{2}{|x|}\right)+\frac{\sqrt{-c^{2}x^{2}+1}}{x^{2}}\right)c+\frac{2\arcsin(cx)}{x^{3}}\right)b-\frac{a}{3\,x^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/6*((c^2*log(2*sqrt(-c^2*x^2 + 1)/abs(x) + 2/abs(x)) + sqrt(-c^2*x^2 + 1)
/x^2)*c + 2*arcsin(c*x)/x^3)*b - 1/3*a/x^3
```

Fricas [A] time = 1.66349, size = 194, normalized size = 3.13

$$-\frac{bc^{3}x^{3}\log\left(\sqrt{-c^{2}x^{2}+1}+1\right)-bc^{3}x^{3}\log\left(\sqrt{-c^{2}x^{2}+1}-1\right)+2\sqrt{-c^{2}x^{2}+1}bcx+4\,b\arcsin(cx)+4\,a}{12\,x^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/12*(b*c^3*x^3*log(sqrt(-c^2*x^2 + 1) + 1) - b*c^3*x^3*log(sqrt(-c^2*x^2
+ 1) - 1) + 2*sqrt(-c^2*x^2 + 1)*b*c*x + 4*b*arcsin(c*x) + 4*a)/x^3
```

Sympy [A] time = 5.74433, size = 119, normalized size = 1.92

$$-\frac{a}{3x^3}+\frac{bc\left(\begin{cases}-\frac{c^2\operatorname{acosh}\left(\frac{1}{cx}\right)}{2}-\frac{c\sqrt{-1+\frac{1}{c^2x^2}}}{2x} & \text{for } \frac{1}{|c^2x^2|}>1\\ \frac{ic^2\operatorname{asin}\left(\frac{1}{cx}\right)}{2}-\frac{ic}{2x\sqrt{1-\frac{1}{c^2x^2}}}+\frac{i}{2cx^3\sqrt{1-\frac{1}{c^2x^2}}} & \text{otherwise}\end{cases}\right)}{3}-\frac{b\operatorname{asin}(cx)}{3x^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))/x**4,x)
```

```
[Out] -a/(3*x**3) + b*c*Piecewise((-c**2*acosh(1/(c*x))/2 - c*sqrt(-1 + 1/(c**2*x
**2))/(2*x), 1/Abs(c**2*x**2) > 1), (I*c**2*asin(1/(c*x))/2 - I*c/(2*x*sqrt
(1 - 1/(c**2*x**2))) + I/(2*c*x**3*sqrt(1 - 1/(c**2*x**2))), True))/3 - b*a
sin(c*x)/(3*x**3)
```

Giac [B] time = 2.03371, size = 383, normalized size = 6.18

$$-\frac{bc^6x^3\arcsin(cx)}{24\left(\sqrt{-c^2x^2+1}+1\right)^3}-\frac{ac^6x^3}{24\left(\sqrt{-c^2x^2+1}+1\right)^3}+\frac{bc^5x^2}{24\left(\sqrt{-c^2x^2+1}+1\right)^2}-\frac{bc^4x\arcsin(cx)}{8\left(\sqrt{-c^2x^2+1}+1\right)}-\frac{ac^4x}{8\left(\sqrt{-c^2x^2+1}+1\right)}+$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -1/24*b*c^6*x^3*arcsin(c*x)/(sqrt(-c^2*x^2 + 1) + 1)^3 - 1/24*a*c^6*x^3/(sq
rt(-c^2*x^2 + 1) + 1)^3 + 1/24*b*c^5*x^2/(sqrt(-c^2*x^2 + 1) + 1)^2 - 1/8*b
*c^4*x*arcsin(c*x)/(sqrt(-c^2*x^2 + 1) + 1) - 1/8*a*c^4*x/(sqrt(-c^2*x^2 +
1) + 1) + 1/6*b*c^3*log(abs(c)*abs(x)) - 1/6*b*c^3*log(sqrt(-c^2*x^2 + 1) +
 1) - 1/8*b*c^2*(sqrt(-c^2*x^2 + 1) + 1)*arcsin(c*x)/x - 1/8*a*c^2*(sqrt(-c
^2*x^2 + 1) + 1)/x - 1/24*b*c*(sqrt(-c^2*x^2 + 1) + 1)^2/x^2 - 1/24*b*(sqrt
(-c^2*x^2 + 1) + 1)^3*arcsin(c*x)/x^3 - 1/24*a*(sqrt(-c^2*x^2 + 1) + 1)^3/x
^3
```

3.148 $\int x^2 \left(a+b\sin^{-1}(cx)\right)^2 \, dx$

Optimal. Leaf size=102

$$\frac{2bx^2\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{9c}+\frac{4b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{9c^3}+\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^2-\frac{4b^2x}{9c^2}-\frac{2}{27}b^2x^3$$

```
[Out] (-4*b^2*x)/(9*c^2) - (2*b^2*x^3)/27 + (4*b*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[
c*x]))/(9*c^3) + (2*b*x^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(9*c) + (x
^3*(a + b*ArcSin[c*x])^2)/3
```

Rubi [A] time = 0.153869, antiderivative size = 102, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.357, Rules used = {4627, 4707, 4677, 8, 30}

$$\frac{2bx^2\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{9c}+\frac{4b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{9c^3}+\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^2-\frac{4b^2x}{9c^2}-\frac{2}{27}b^2x^3$$

Antiderivative was successfully verified.

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

```
[Out] (-4*b^2*x)/(9*c^2) - (2*b^2*x^3)/27 + (4*b*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[
c*x]))/(9*c^3) + (2*b*x^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(9*c) + (x
^3*(a + b*ArcSin[c*x])^2)/3
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

```
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 8

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

Rule 30

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

Rubi steps

$$
\begin{aligned}
\int x^2\left(a+b\sin^{-1}(cx)\right)^2\,dx &= \frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^2-\frac{1}{3}(2bc)\int\frac{x^3\left(a+b\sin^{-1}(cx)\right)}{\sqrt{1-c^2x^2}}\,dx\\
&= \frac{2bx^2\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{9c}+\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^2-\frac{1}{9}\left(2b^2\right)\int x^2\,dx-\frac{(4b)\int\frac{x(a+b}{\sqrt{1}}}{9c}\\
&= -\frac{2}{27}b^2x^3+\frac{4b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{9c^3}+\frac{2bx^2\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{9c}+\frac{1}{3}x^3\left(a+b\right.\\
&= -\frac{4b^2x}{9c^2}-\frac{2b^2x^3}{27}+\frac{4b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{9c^3}+\frac{2bx^2\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{9c}+\frac{1}{3}x^3
\end{aligned}
$$

Mathematica [A] time = 0.188787, size = 95, normalized size = 0.93

$$
\frac{1}{3}\left(x^3\left(a+b\sin^{-1}(cx)\right)^2-\frac{2b\left(-3c^2x^2\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)-6\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)+bc^3x^3+6bcx\right)}{9c^3}\right)
$$

Antiderivative was successfully verified.

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

```
[Out] (x^3*(a + b*ArcSin[c*x])^2 - (2*b*(6*b*c*x + b*c^3*x^3 - 6*Sqrt[1 - c^2*x^2
]*(a + b*ArcSin[c*x]) - 3*c^2*x^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])))/(
9*c^3))/3
```

Maple [A] time = 0.025, size = 126, normalized size = 1.2

$$\frac{1}{c^3}\left(\frac{a^2c^3x^3}{3}+b^2\left(\frac{c^3x^3(\arcsin(cx))^2}{3}+\frac{2\arcsin(cx)\left(c^2x^2+2\right)}{9}\sqrt{-c^2x^2+1}-\frac{2c^3x^3}{27}-\frac{4cx}{9}\right)+2ab\left(1/3c^3x^3\arcsin(cx\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/c^3*(1/3*a^2*c^3*x^3+b^2*(1/3*c^3*x^3*arcsin(c*x)^2+2/9*arcsin(c*x)*(c^2*
x^2+2)*(-c^2*x^2+1)^(1/2)-2/27*c^3*x^3-4/9*c*x)+2*a*b*(1/3*c^3*x^3*arcsin(c
*x)+1/9*c^2*x^2*(-c^2*x^2+1)^(1/2)+2/9*(-c^2*x^2+1)^(1/2)))
```

Maxima [A] time = 1.54948, size = 192, normalized size = 1.88

$$\frac{1}{3}b^2x^3\arcsin(cx)^2+\frac{1}{3}a^2x^3+\frac{2}{9}\left(3x^3\arcsin(cx)+c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2}+\frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right)ab+\frac{2}{27}\left(3c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2}+\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*b^2*x^3*arcsin(c*x)^2 + 1/3*a^2*x^3 + 2/9*(3*x^3*arcsin(c*x) + c*(sqrt(
-c^2*x^2 + 1)*x^2/c^2 + 2*sqrt(-c^2*x^2 + 1)/c^4))*a*b + 2/27*(3*c*(sqrt(-c
^2*x^2 + 1)*x^2/c^2 + 2*sqrt(-c^2*x^2 + 1)/c^4)*arcsin(c*x) - (c^2*x^3 + 6*
x)/c^2)*b^2
```

Fricas [A] time = 1.43564, size = 255, normalized size = 2.5

$$\frac{9b^2c^3x^3\arcsin(cx)^2+18abc^3x^3\arcsin(cx)+\left(9a^2-2b^2\right)c^3x^3-12b^2cx+6\left(abc^2x^2+2ab+\left(b^2c^2x^2+2b^2\right)\arcsin(\right.}{27c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/27*(9*b^2*c^3*x^3*arcsin(c*x)^2 + 18*a*b*c^3*x^3*arcsin(c*x) + (9*a^2 - 2
*b^2)*c^3*x^3 - 12*b^2*c*x + 6*(a*b*c^2*x^2 + 2*a*b + (b^2*c^2*x^2 + 2*b^2)
*arcsin(c*x))*sqrt(-c^2*x^2 + 1))/c^3
```

Sympy [A] time = 2.05873, size = 170, normalized size = 1.67

$$\begin{cases} \frac{a^2x^3}{3} + \frac{2abx^3\operatorname{asin}(cx)}{3} + \frac{2abx^2\sqrt{-c^2x^2+1}}{9c} + \frac{4ab\sqrt{-c^2x^2+1}}{9c^3} + \frac{b^2x^3\operatorname{asin}^2(cx)}{3} - \frac{2b^2x^3}{27} + \frac{2b^2x^2\sqrt{-c^2x^2+1}\operatorname{asin}(cx)}{9c} - \frac{4b^2x}{9c^2} + \frac{4b^2\sqrt{-c^2x^2+1}\operatorname{asin}(cx)}{9c^3} \\ \frac{a^2x^3}{3} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*asin(c*x))**2,x)
```

```
[Out] Piecewise((a**2*x**3/3 + 2*a*b*x**3*asin(c*x)/3 + 2*a*b*x**2*sqrt(-c**2*x**
2 + 1)/(9*c) + 4*a*b*sqrt(-c**2*x**2 + 1)/(9*c**3) + b**2*x**3*asin(c*x)**2
/3 - 2*b**2*x**3/27 + 2*b**2*x**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/(9*c) - 4*
b**2*x/(9*c**2) + 4*b**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/(9*c**3), Ne(c, 0))
, (a**2*x**3/3, True))
```

Giac [B] time = 1.34679, size = 262, normalized size = 2.57

$$\frac{1}{3}\,a^2x^3 + \frac{\left(c^2x^2-1\right)b^2x\arcsin\left(cx\right)^2}{3\,c^2} + \frac{2\left(c^2x^2-1\right)abx\arcsin\left(cx\right)}{3\,c^2} + \frac{b^2x\arcsin\left(cx\right)^2}{3\,c^2} - \frac{2\left(c^2x^2-1\right)b^2x}{27\,c^2} + \frac{2\,abx\arcsin(c}{3\,c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/3*a^2*x^3 + 1/3*(c^2*x^2 - 1)*b^2*x*arcsin(c*x)^2/c^2 + 2/3*(c^2*x^2 - 1)
*a*b*x*arcsin(c*x)/c^2 + 1/3*b^2*x*arcsin(c*x)^2/c^2 - 2/27*(c^2*x^2 - 1)*b
^2*x/c^2 + 2/3*a*b*x*arcsin(c*x)/c^2 - 2/9*(-c^2*x^2 + 1)^(3/2)*b^2*arcsin(
c*x)/c^3 - 14/27*b^2*x/c^2 - 2/9*(-c^2*x^2 + 1)^(3/2)*a*b/c^3 + 2/3*sqrt(-c
^2*x^2 + 1)*b^2*arcsin(c*x)/c^3 + 2/3*sqrt(-c^2*x^2 + 1)*a*b/c^3
```

3.149 $\int x\left(a+b\sin^{-1}(cx)\right)^2\,dx$

Optimal. Leaf size=76

$$\frac{bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{2c}-\frac{\left(a+b\sin^{-1}(cx)\right)^2}{4c^2}+\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^2-\frac{1}{4}b^2x^2$$

```
[Out] -(b^2*x^2)/4 + (b*x*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(2*c) - (a + b*A
rcSin[c*x])^2/(4*c^2) + (x^2*(a + b*ArcSin[c*x])^2)/2
```

Rubi [A] time = 0.118784, antiderivative size = 76, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {4627, 4707, 4641, 30}

$$\frac{bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{2c}-\frac{\left(a+b\sin^{-1}(cx)\right)^2}{4c^2}+\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^2-\frac{1}{4}b^2x^2$$

Antiderivative was successfully verified.

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

```
[Out] -(b^2*x^2)/4 + (b*x*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/(2*c) - (a + b*A
rcSin[c*x])^2/(4*c^2) + (x^2*(a + b*ArcSin[c*x])^2)/2
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 30

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

Rubi steps

$$
\begin{aligned}
\int x\left(a+b\sin^{-1}(cx)\right)^2\,dx &= \frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^2-(bc)\int\frac{x^2\left(a+b\sin^{-1}(cx)\right)}{\sqrt{1-c^2x^2}}\,dx\\
&= \frac{bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{2c}+\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^2-\frac{1}{2}b^2\int x\,dx-\frac{b\int\frac{a+b\sin^{-1}(cx)}{\sqrt{1-c^2x^2}}\,dx}{2c}\\
&= -\frac{1}{4}b^2x^2+\frac{bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{2c}-\frac{\left(a+b\sin^{-1}(cx)\right)^2}{4c^2}+\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^2
\end{aligned}
$$

Mathematica [A] time = 0.0734169, size = 73, normalized size = 0.96

$$
-\frac{-2c^2x^2\left(a+b\sin^{-1}(cx)\right)^2-2bcx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)+\left(a+b\sin^{-1}(cx)\right)^2+b^2c^2x^2}{4c^2}
$$

Antiderivative was successfully verified.

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

```
[Out] -(b^2*c^2*x^2 - 2*b*c*x*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]) + (a + b*ArcS
in[c*x])^2 - 2*c^2*x^2*(a + b*ArcSin[c*x])^2)/(4*c^2)
```

Maple [A] time = 0.023, size = 120, normalized size = 1.6

$$
\frac{1}{c^2}\Bigg(\frac{a^2c^2x^2}{2}+b^2\left(\frac{\left(c^2x^2-1\right)\left(\arcsin(cx)\right)^2}{2}+\frac{\arcsin(cx)}{2}\left(cx\sqrt{-c^2x^2+1}+\arcsin(cx)\right)-\frac{\left(\arcsin(cx)\right)^2}{4}-\frac{c^2x^2}{4}\right)+2ab\Bigg(1
$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{1}{2}a^2x^2 + \frac{1}{2}\left(2x^2\arcsin(cx) + c\left(\frac{\sqrt{-c^2x^2+1}x}{c^2} - \frac{\arcsin\left(\frac{c^2x}{\sqrt{c^2}}\right)}{\sqrt{c^2}c^2}\right)\right)ab + \frac{1}{2}\left(x^2\arctan\left(cx, \sqrt{cx+1}\sqrt{-cx+1}\right)^2 + 2c\int$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*a^2*x^2 + 1/2*(2*x^2*arcsin(c*x) + c*(sqrt(-c^2*x^2 + 1)*x/c^2 - arcsin
(c^2*x/sqrt(c^2))/(sqrt(c^2)*c^2)))*a*b + 1/2*(x^2*arctan2(c*x, sqrt(c*x +
1)*sqrt(-c*x + 1))^2 + 2*c*integrate(sqrt(c*x + 1)*sqrt(-c*x + 1)*x^2*arcta
n2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))/(c^2*x^2 - 1), x))*b^2
```

Fricas [A] time = 1.48231, size = 221, normalized size = 2.91

$$\frac{\left(2a^2-b^2\right)c^2x^2 + \left(2b^2c^2x^2-b^2\right)\arcsin(cx)^2 + 2\left(2abc^2x^2-ab\right)\arcsin(cx) + 2\left(b^2cx\arcsin(cx)+abcx\right)\sqrt{-c^2x^2+1}}{4c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*((2*a^2 - b^2)*c^2*x^2 + (2*b^2*c^2*x^2 - b^2)*arcsin(c*x)^2 + 2*(2*a*b
*c^2*x^2 - a*b)*arcsin(c*x) + 2*(b^2*c*x*arcsin(c*x) + a*b*c*x)*sqrt(-c^2*x
^2 + 1))/c^2
```

Sympy [A] time = 1.17421, size = 126, normalized size = 1.66

$$\begin{cases} \frac{a^2x^2}{2} + abx^2\operatorname{asin}(cx) + \frac{abx\sqrt{-c^2x^2+1}}{2c} - \frac{ab\operatorname{asin}(cx)}{2c^2} + \frac{b^2x^2\operatorname{asin}^2(cx)}{2} - \frac{b^2x^2}{4} + \frac{b^2x\sqrt{-c^2x^2+1}\operatorname{asin}(cx)}{2c} - \frac{b^2\operatorname{asin}^2(cx)}{4c^2} & \text{for } c \neq 0 \\ \frac{a^2x^2}{2} & \text{otherwise} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*asin(c*x))**2,x)
```

```
[Out] Piecewise((a**2*x**2/2 + a*b*x**2*asin(c*x) + a*b*x*sqrt(-c**2*x**2 + 1)/(2
*c) - a*b*asin(c*x)/(2*c**2) + b**2*x**2*asin(c*x)**2/2 - b**2*x**2/4 + b**
2*x*sqrt(-c**2*x**2 + 1)*asin(c*x)/(2*c) - b**2*asin(c*x)**2/(4*c**2), Ne(c
, 0)), (a**2*x**2/2, True))
```

Giac [B] time = 1.29979, size = 209, normalized size = 2.75

$$\frac{\sqrt{-c^2x^2+1}b^2x\arcsin\left(cx\right)}{2\,c}+\frac{\left(c^2x^2-1\right)b^2\arcsin\left(cx\right)^2}{2\,c^2}+\frac{\sqrt{-c^2x^2+1}abx}{2\,c}+\frac{\left(c^2x^2-1\right)ab\arcsin\left(cx\right)}{c^2}+\frac{b^2\arcsin\left(cx\right)^2}{4\,c^2}+$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*sqrt(-c^2*x^2 + 1)*b^2*x*arcsin(c*x)/c + 1/2*(c^2*x^2 - 1)*b^2*arcsin(c
*x)^2/c^2 + 1/2*sqrt(-c^2*x^2 + 1)*a*b*x/c + (c^2*x^2 - 1)*a*b*arcsin(c*x)/
c^2 + 1/4*b^2*arcsin(c*x)^2/c^2 + 1/2*(c^2*x^2 - 1)*a^2/c^2 - 1/4*(c^2*x^2
- 1)*b^2/c^2 + 1/2*a*b*arcsin(c*x)/c^2 - 1/8*b^2/c^2
```

3.150 $\int \left(a+b\sin^{-1}(cx)\right)^2\,dx$

Optimal. Leaf size=47

$$\frac{2b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{c}+x\left(a+b\sin^{-1}(cx)\right)^2-2b^2x$$

```
[Out] -2*b^2*x + (2*b*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/c + x*(a + b*ArcSin[
c*x])^2
```

Rubi [A] time = 0.0602799, antiderivative size = 47, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3, Rules used = {4619, 4677, 8}

$$\frac{2b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{c}+x\left(a+b\sin^{-1}(cx)\right)^2-2b^2x$$

Antiderivative was successfully verified.

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

```
[Out] -2*b^2*x + (2*b*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/c + x*(a + b*ArcSin[
c*x])^2
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 8

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

Rubi steps

$$
\begin{aligned}
\int \left(a+b\sin^{-1}(cx)\right)^2 dx &= x\left(a+b\sin^{-1}(cx)\right)^2-(2bc)\int \frac{x\left(a+b\sin^{-1}(cx)\right)}{\sqrt{1-c^2x^2}}\,dx\\
&= \frac{2b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{c}+x\left(a+b\sin^{-1}(cx)\right)^2-\left(2b^2\right)\int 1\,dx\\
&= -2b^2x+\frac{2b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{c}+x\left(a+b\sin^{-1}(cx)\right)^2
\end{aligned}
$$

Mathematica [A] time = 0.0401299, size = 47, normalized size = 1.

$$\frac{2b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}{c}+x\left(a+b\sin^{-1}(cx)\right)^2-2b^2x$$

Antiderivative was successfully verified.

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

```
[Out] -2*b^2*x + (2*b*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x]))/c + x*(a + b*ArcSin[
c*x])^2
```

Maple [A] time = 0.023, size = 72, normalized size = 1.5

$$\frac{1}{c}\left(cxa^2+b^2\left(cx\left(\arcsin(cx)\right)^2-2\,cx+2\,\arcsin(cx)\sqrt{-c^2x^2+1}\right)+2\,ab\left(cx\arcsin(cx)+\sqrt{-c^2x^2+1}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/c*(c*x*a^2+b^2*(c*x*arcsin(c*x)^2-2*c*x+2*arcsin(c*x)*(-c^2*x^2+1)^(1/2))
+2*a*b*(c*x*arcsin(c*x)+(-c^2*x^2+1)^(1/2)))
```

Maxima [A] time = 1.56612, size = 97, normalized size = 2.06

$$b^2x\arcsin(cx)^2-2\,b^2\left(x-\frac{\sqrt{-c^2x^2+1}\arcsin(cx)}{c}\right)+a^2x+\frac{2\left(cx\arcsin(cx)+\sqrt{-c^2x^2+1}\right)ab}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] b^2*x*arcsin(c*x)^2 - 2*b^2*(x - sqrt(-c^2*x^2 + 1)*arcsin(c*x)/c) + a^2*x
+ 2*(c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))*a*b/c
```

Fricas [A] time = 1.55504, size = 159, normalized size = 3.38

$$\frac{b^2cx\arcsin(cx)^2+2\,abcx\arcsin(cx)+\left(a^2-2\,b^2\right)cx+2\sqrt{-c^2x^2+1}\left(b^2\arcsin(cx)+ab\right)}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (b^2*c*x*arcsin(c*x)^2 + 2*a*b*c*x*arcsin(c*x) + (a^2 - 2*b^2)*c*x + 2*sqrt
(-c^2*x^2 + 1)*(b^2*arcsin(c*x) + a*b))/c
```

Sympy [A] time = 0.528404, size = 82, normalized size = 1.74

$$\begin{cases} a^2x+2abx\operatorname{asin}(cx)+\frac{2ab\sqrt{-c^2x^2+1}}{c}+b^2x\operatorname{asin}^2(cx)-2b^2x+\frac{2b^2\sqrt{-c^2x^2+1}\operatorname{asin}(cx)}{c} & \text{for } c\neq 0\\ a^2x & \text{otherwise}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**2,x)
```

```
[Out] Piecewise((a**2*x + 2*a*b*x*asin(c*x) + 2*a*b*sqrt(-c**2*x**2 + 1)/c + b**2
*x*asin(c*x)**2 - 2*b**2*x + 2*b**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/c, Ne(c,
 0)), (a**2*x, True))
```

Giac [A] time = 1.35122, size = 101, normalized size = 2.15

$$b^2x\arcsin(cx)^2 + 2\,abx\arcsin(cx) + a^2x - 2\,b^2x + \frac{2\,\sqrt{-c^2x^2+1}b^2\arcsin(cx)}{c} + \frac{2\,\sqrt{-c^2x^2+1}ab}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] b^2*x*arcsin(c*x)^2 + 2*a*b*x*arcsin(c*x) + a^2*x - 2*b^2*x + 2*sqrt(-c^2*x
^2 + 1)*b^2*arcsin(c*x)/c + 2*sqrt(-c^2*x^2 + 1)*a*b/c
```

3.151 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{x}\,dx$

Optimal. Leaf size=90

$$-ib\text{PolyLog}\left(2,e^{2i\sin^{-1}(cx)}\right)\left(a+b\sin^{-1}(cx)\right)+\frac{1}{2}b^2\text{PolyLog}\left(3,e^{2i\sin^{-1}(cx)}\right)-\frac{i\left(a+b\sin^{-1}(cx)\right)^3}{3b}+\log\left(1-e^{2i\sin^{-1}(cx)}\right)$$

```
[Out] ((-I/3)*(a + b*ArcSin[c*x])^3)/b + (a + b*ArcSin[c*x])^2*Log[1 - E^((2*I)*A
rcSin[c*x])] - I*b*(a + b*ArcSin[c*x])*PolyLog[2, E^((2*I)*ArcSin[c*x])] +
(b^2*PolyLog[3, E^((2*I)*ArcSin[c*x])])/2
```

Rubi [A] time = 0.122593, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.429, Rules used = {4625, 3717, 2190, 2531, 2282, 6589}

$$-ib\text{PolyLog}\left(2,e^{2i\sin^{-1}(cx)}\right)\left(a+b\sin^{-1}(cx)\right)+\frac{1}{2}b^2\text{PolyLog}\left(3,e^{2i\sin^{-1}(cx)}\right)-\frac{i\left(a+b\sin^{-1}(cx)\right)^3}{3b}+\log\left(1-e^{2i\sin^{-1}(cx)}\right)$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^2/x,x]
```

```
[Out] ((-I/3)*(a + b*ArcSin[c*x])^3)/b + (a + b*ArcSin[c*x])^2*Log[1 - E^((2*I)*A
rcSin[c*x])] - I*b*(a + b*ArcSin[c*x])*PolyLog[2, E^((2*I)*ArcSin[c*x])] +
(b^2*PolyLog[3, E^((2*I)*ArcSin[c*x])])/2
```

Rule 4625

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n/Tan[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Rule 3717

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[(I*(c + d*x)^(m + 1))/(d*(m + 1)), x] - Dist[2*I, Int[((c + d*x)^
m*E^(2*I*k*Pi)*E^(2*I*(e + f*x)))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x))), x],
 x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

Rule 2190

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m*Log[1 + (b*(F^(g*(e + f*x)))^n)/a])/(b*f*g*n*Log[F]), x] - Di
st[(d*m)/(b*f*g*n*Log[F]), Int[(c + d*x)^(m - 1)*Log[1 + (b*(F^(g*(e + f*x)
))^n)/a], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2531

```
Int[Log[1 + (e_.)*((F_)^((c_.)*((a_.) + (b_.)*(x_))))^(n_.)]*((f_.) + (g_.)
*(x_))^(m_.), x_Symbol] :> -Simp[((f + g*x)^m*PolyLog[2, -(e*(F^(c*(a + b*x
)))^n)])/(b*c*n*Log[F]), x] + Dist[(g*m)/(b*c*n*Log[F]), Int[(f + g*x)^(m -
 1)*PolyLog[2, -(e*(F^(c*(a + b*x)))^n)], x], x] /; FreeQ[{F, a, b, c, e, f
, g, n}, x] && GtQ[m, 0]
```

Rule 2282

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Dist[v/D[v, x]
, Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Functi
onOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ[
{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))*
(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

Rule 6589

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\begin{aligned}
\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{x}\,dx &= \text{Subst}\left(\int (a+bx)^2\cot(x)\,dx, x, \sin^{-1}(cx)\right)\\
&= -\frac{i\left(a+b\sin^{-1}(cx)\right)^3}{3b} - 2i\,\text{Subst}\left(\int \frac{e^{2ix}(a+bx)^2}{1-e^{2ix}}\,dx, x, \sin^{-1}(cx)\right)\\
&= -\frac{i\left(a+b\sin^{-1}(cx)\right)^3}{3b} + \left(a+b\sin^{-1}(cx)\right)^2\log\left(1-e^{2i\sin^{-1}(cx)}\right) - (2b)\,\text{Subst}\Big(\int(a+bx)\log\Big(\\
&= -\frac{i\left(a+b\sin^{-1}(cx)\right)^3}{3b} + \left(a+b\sin^{-1}(cx)\right)^2\log\left(1-e^{2i\sin^{-1}(cx)}\right) - ib\left(a+b\sin^{-1}(cx)\right)\text{Li}_2\Big(e^{2i\,\mathrm{si}}\\
&= -\frac{i\left(a+b\sin^{-1}(cx)\right)^3}{3b} + \left(a+b\sin^{-1}(cx)\right)^2\log\left(1-e^{2i\sin^{-1}(cx)}\right) - ib\left(a+b\sin^{-1}(cx)\right)\text{Li}_2\Big(e^{2i\,\mathrm{si}}\\
&= -\frac{i\left(a+b\sin^{-1}(cx)\right)^3}{3b} + \left(a+b\sin^{-1}(cx)\right)^2\log\left(1-e^{2i\sin^{-1}(cx)}\right) - ib\left(a+b\sin^{-1}(cx)\right)\text{Li}_2\Big(e^{2i\,\mathrm{si}}
\end{aligned}$$

Mathematica [A] time = 0.155712, size = 143, normalized size = 1.59

$$2ab\left(\sin^{-1}(cx)\log\left(1-e^{2i\sin^{-1}(cx)}\right) - \frac{1}{2}i\left(\sin^{-1}(cx)^2 + \text{PolyLog}\left(2, e^{2i\sin^{-1}(cx)}\right)\right)\right) + b^2\Big(i\sin^{-1}(cx)\text{PolyLog}\Big(2, e^{-2i\sin^{-1}(c}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*ArcSin[c*x])^2/x,x]
```

```
[Out] a^2*Log[c*x] + 2*a*b*(ArcSin[c*x]*Log[1 - E^((2*I)*ArcSin[c*x])] - (I/2)*(A
rcSin[c*x]^2 + PolyLog[2, E^((2*I)*ArcSin[c*x])])) + b^2*((-I/24)*Pi^3 + (I
/3)*ArcSin[c*x]^3 + ArcSin[c*x]^2*Log[1 - E^((-2*I)*ArcSin[c*x])] + I*ArcSi
n[c*x]*PolyLog[2, E^((-2*I)*ArcSin[c*x])] + PolyLog[3, E^((-2*I)*ArcSin[c*x
])]/2)
```

Maple [B] time = 0.03, size = 319, normalized size = 3.5

$$a^2\ln(cx) - \frac{i}{3}b^2(\arcsin(cx))^3 + b^2(\arcsin(cx))^2\ln\left(1+icx+\sqrt{-c^2x^2+1}\right) - 2\,ib^2\arcsin(cx)\,\text{polylog}\Big(2, -icx - \sqrt{-c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] a^2*ln(c*x)-1/3*I*b^2*arcsin(c*x)^3+b^2*arcsin(c*x)^2*ln(1+I*c*x+(-c^2*x^2+
1)^(1/2))-2*I*b^2*arcsin(c*x)*polylog(2,-I*c*x-(-c^2*x^2+1)^(1/2))+2*b^2*po
lylog(3,-I*c*x-(-c^2*x^2+1)^(1/2))+b^2*arcsin(c*x)^2*ln(1-I*c*x-(-c^2*x^2+1
)^(1/2))-2*I*b^2*arcsin(c*x)*polylog(2,I*c*x+(-c^2*x^2+1)^(1/2))+2*b^2*poly
log(3,I*c*x+(-c^2*x^2+1)^(1/2))-I*a*b*arcsin(c*x)^2-2*I*a*b*polylog(2,I*c*x
+(-c^2*x^2+1)^(1/2))-2*I*a*b*polylog(2,-I*c*x-(-c^2*x^2+1)^(1/2))+2*a*b*arc
sin(c*x)*ln(1-I*c*x-(-c^2*x^2+1)^(1/2))+2*a*b*arcsin(c*x)*ln(1+I*c*x+(-c^2*
x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$a^2 \log(x) + \int \frac{b^2 \arctan\left(cx, \sqrt{cx+1}\sqrt{-cx+1}\right)^2 + 2\,ab \arctan\left(cx, \sqrt{cx+1}\sqrt{-cx+1}\right)}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] a^2*log(x) + integrate((b^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 +
2*a*b*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)))/x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{b^2 \arcsin(cx)^2 + 2\,ab \arcsin(cx) + a^2}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)/x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(a + b\,\mathrm{asin}(cx))^2}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((a + b*asin(c*x))**2/x, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(b \arcsin{(cx)} + a)^2}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.152 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{x^2}\,dx$

Optimal. Leaf size=81

$$2ib^2c\text{PolyLog}\left(2,-e^{i\sin^{-1}(cx)}\right)-2ib^2c\text{PolyLog}\left(2,e^{i\sin^{-1}(cx)}\right)-\frac{\left(a+b\sin^{-1}(cx)\right)^2}{x}-4bc\tanh^{-1}\left(e^{i\sin^{-1}(cx)}\right)\left(a+b\sin^{-1}(c\right.$$

```
[Out] -((a + b*ArcSin[c*x])^2/x) - 4*b*c*(a + b*ArcSin[c*x])*ArcTanh[E^(I*ArcSin[
c*x])] + (2*I)*b^2*c*PolyLog[2, -E^(I*ArcSin[c*x])] - (2*I)*b^2*c*PolyLog[2
, E^(I*ArcSin[c*x])]
```

Rubi [A] time = 0.128171, antiderivative size = 81, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.357, Rules used = {4627, 4709, 4183, 2279, 2391}

$$2ib^2c\text{PolyLog}\left(2,-e^{i\sin^{-1}(cx)}\right)-2ib^2c\text{PolyLog}\left(2,e^{i\sin^{-1}(cx)}\right)-\frac{\left(a+b\sin^{-1}(cx)\right)^2}{x}-4bc\tanh^{-1}\left(e^{i\sin^{-1}(cx)}\right)\left(a+b\sin^{-1}(c\right.$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^2/x^2,x]
```

```
[Out] -((a + b*ArcSin[c*x])^2/x) - 4*b*c*(a + b*ArcSin[c*x])*ArcTanh[E^(I*ArcSin[
c*x])] + (2*I)*b^2*c*PolyLog[2, -E^(I*ArcSin[c*x])] - (2*I)*b^2*c*PolyLog[2
, E^(I*ArcSin[c*x])]
```

Rule 4627

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

Rule 4709

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_))/Sqrt[(d_) + (e_.)*
(x_)^2], x_Symbol] :> Dist[1/(c^(m + 1)*Sqrt[d]), Subst[Int[(a + b*x)^n*Sin
[x]^m, x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d +
e, 0] && GtQ[d, 0] && IGtQ[n, 0] && IntegerQ[m]
```

Rule 4183

```
Int[csc[(e_.) + (f_.)*(x_)]*((c_.) + (d_.)*(x_))^(m_.), x_Symbol] :> Simp[(
-2*(c + d*x)^m*ArcTanh[E^(I*(e + f*x))])/f, x] + (-Dist[(d*m)/f, Int[(c + d
*x)^(m - 1)*Log[1 - E^(I*(e + f*x))], x], x] + Dist[(d*m)/f, Int[(c + d*x)^
(m - 1)*Log[1 + E^(I*(e + f*x))], x], x]) /; FreeQ[{c, d, e, f}, x] && IGtQ
[m, 0]
```

Rule 2279

```
Int[Log[(a_) + (b_.)*((F_)^((e_.)*((c_.) + (d_.)*(x_))))^(n_.)], x_Symbol]
:> Dist[1/(d*e*n*Log[F]), Subst[Int[Log[a + b*x]/x, x], x, (F^(e*(c + d*x))
)^n], x] /; FreeQ[{F, a, b, c, d, e, n}, x] && GtQ[a, 0]
```

Rule 2391

```
Int[Log[(c_.)*((d_) + (e_.)*(x_)^(n_.))]/(x_), x_Symbol] :> -Simp[PolyLog[2
, -(c*e*x^n)]/n, x] /; FreeQ[{c, d, e, n}, x] && EqQ[c*d, 1]
```

Rubi steps

$$
\begin{aligned}
\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{x^2}\,dx &= -\frac{\left(a+b\sin^{-1}(cx)\right)^2}{x}+(2bc)\int \frac{a+b\sin^{-1}(cx)}{x\sqrt{1-c^2x^2}}\,dx\\
&= -\frac{\left(a+b\sin^{-1}(cx)\right)^2}{x}+(2bc)\,\text{Subst}\left(\int (a+bx)\csc(x)\,dx,x,\sin^{-1}(cx)\right)\\
&= -\frac{\left(a+b\sin^{-1}(cx)\right)^2}{x}-4bc\left(a+b\sin^{-1}(cx)\right)\tanh^{-1}\left(e^{i\sin^{-1}(cx)}\right)-\left(2b^2c\right)\text{Subst}\Bigl(\int \log\bigl(1-e\\
&= -\frac{\left(a+b\sin^{-1}(cx)\right)^2}{x}-4bc\left(a+b\sin^{-1}(cx)\right)\tanh^{-1}\left(e^{i\sin^{-1}(cx)}\right)+\left(2ib^2c\right)\text{Subst}\Bigl(\int \frac{\log(1-}{x}\\
&= -\frac{\left(a+b\sin^{-1}(cx)\right)^2}{x}-4bc\left(a+b\sin^{-1}(cx)\right)\tanh^{-1}\left(e^{i\sin^{-1}(cx)}\right)+2ib^2c\,\text{Li}_2\left(-e^{i\sin^{-1}(cx)}\right)-2ib
\end{aligned}
$$

Mathematica [A] time = 0.225321, size = 126, normalized size = 1.56

$$
-\frac{-ib^2\Bigl(2cx\text{PolyLog}\left(2,-e^{i\sin^{-1}(cx)}\right)-2cx\text{PolyLog}\left(2,e^{i\sin^{-1}(cx)}\right)+i\sin^{-1}(cx)\Bigl(\sin^{-1}(cx)+2cx\Bigl(\log\left(1+e^{i\sin^{-1}(cx)}\right)-\text{lo}}{x}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*ArcSin[c*x])^2/x^2,x]
```

```
[Out] -((a^2 + 2*a*b*(ArcSin[c*x] + c*x*ArcTanh[Sqrt[1 - c^2*x^2]]) - I*b^2*(I*Ar
cSin[c*x]*(ArcSin[c*x] + 2*c*x*(-Log[1 - E^(I*ArcSin[c*x])] + Log[1 + E^(I*
ArcSin[c*x])])) + 2*c*x*PolyLog[2, -E^(I*ArcSin[c*x])] - 2*c*x*PolyLog[2, E
^(I*ArcSin[c*x])]))/x)
```

Maple [A] time = 0.056, size = 171, normalized size = 2.1

$$-\frac{a^2}{x}-\frac{b^2\left(\arcsin\left(cx\right)\right)^2}{x}+2\,cb^2\arcsin\left(cx\right)\ln\left(1-icx-\sqrt{-c^2x^2+1}\right)-2\,cb^2\arcsin\left(cx\right)\ln\left(1+icx+\sqrt{-c^2x^2+1}\right)-2\,ib^2$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -a^2/x-b^2/x*arcsin(c*x)^2+2*c*b^2*arcsin(c*x)*ln(1-I*c*x-(-c^2*x^2+1)^(1/2
))-2*c*b^2*arcsin(c*x)*ln(1+I*c*x+(-c^2*x^2+1)^(1/2))-2*I*b^2*c*polylog(2,I
*c*x+(-c^2*x^2+1)^(1/2))+2*I*b^2*c*polylog(2,-I*c*x-(-c^2*x^2+1)^(1/2))-2*a
*b/x*arcsin(c*x)-2*c*a*b*arctanh(1/(-c^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-2\left(c\log\left(\frac{2\sqrt{-c^2x^2+1}}{|x|}+\frac{2}{|x|}\right)+\frac{\arcsin\left(cx\right)}{x}\right)ab-\frac{\Bigg(2\,cx\int\frac{\sqrt{-cx+1}\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)}{\sqrt{cx+1}(cx-1)x}\,dx+\arctan\Big(cx,\sqrt{cx+1}\sqrt{-cx+}}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2*(c*log(2*sqrt(-c^2*x^2 + 1)/abs(x) + 2/abs(x)) + arcsin(c*x)/x)*a*b - (2
*c*x*integrate(sqrt(c*x + 1)*sqrt(-c*x + 1)*arctan2(c*x, sqrt(c*x + 1)*sqrt
(-c*x + 1))/(c^2*x^3 - x), x) + arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^
2)*b^2/x - a^2/x
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{b^2\arcsin(cx)^2 + 2\,ab\arcsin(cx) + a^2}{x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)/x^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{(a + b\,\text{asin}(cx))^2}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((a + b*asin(c*x))**2/x**2, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{(b\arcsin(cx) + a)^2}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.153 $\int x^2\left(a+b\sin^{-1}(cx)\right)^3\,dx$

Optimal. Leaf size=178

$$-\frac{4ab^2x}{3c^2}-\frac{2}{9}b^2x^3\left(a+b\sin^{-1}(cx)\right)+\frac{bx^2\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{3c}+\frac{2b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{3c^3}+\frac{1}{3}x^3\left(a+b\sin^{-}\right.$$

```
[Out] (-4*a*b^2*x)/(3*c^2) - (14*b^3*Sqrt[1 - c^2*x^2])/(9*c^3) + (2*b^3*(1 - c^2
*x^2)^(3/2))/(27*c^3) - (4*b^3*x*ArcSin[c*x])/(3*c^2) - (2*b^2*x^3*(a + b*A
rcSin[c*x]))/9 + (2*b*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^2)/(3*c^3) + (b
*x^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^2)/(3*c) + (x^3*(a + b*ArcSin[c*
x])^3)/3
```

Rubi [A] time = 0.296877, antiderivative size = 178, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 7, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4627, 4707, 4677, 4619, 261, 266, 43}

$$-\frac{4ab^2x}{3c^2}-\frac{2}{9}b^2x^3\left(a+b\sin^{-1}(cx)\right)+\frac{bx^2\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{3c}+\frac{2b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{3c^3}+\frac{1}{3}x^3\left(a+b\sin^{-}\right.$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(a + b*ArcSin[c*x])^3,x]
```

```
[Out] (-4*a*b^2*x)/(3*c^2) - (14*b^3*Sqrt[1 - c^2*x^2])/(9*c^3) + (2*b^3*(1 - c^2
*x^2)^(3/2))/(27*c^3) - (4*b^3*x*ArcSin[c*x])/(3*c^2) - (2*b^2*x^3*(a + b*A
rcSin[c*x]))/9 + (2*b*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^2)/(3*c^3) + (b
*x^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^2)/(3*c) + (x^3*(a + b*ArcSin[c*
x])^3)/3
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 261

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

Rule 266

```
Int[(x_)^(m_.)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> Dist[1/n, Subst[
Int[x^(Simplify[(m + 1)/n] - 1)*(a + b*x)^p, x], x, x^n], x] /; FreeQ[{a, b
, m, n, p}, x] && IntegerQ[Simplify[(m + 1)/n]]
```

Rule 43

```
Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] :> Int
[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x], x] /; FreeQ[{a, b, c, d, n},
x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && ( !IntegerQ[n] || (EqQ[c, 0] && Le
Q[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])
```

Rubi steps

$$\int x^2 \left(a+b\sin^{-1}(cx)\right)^3 dx = \frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^3 - (bc)\int \frac{x^3\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{1-c^2x^2}}\,dx$$

$$= \frac{bx^2\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{3c} + \frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^3 - \frac{1}{3}\left(2b^2\right)\int x^2\left(a+b\sin^{-1}(cx)\right)$$

$$= -\frac{2}{9}b^2x^3\left(a+b\sin^{-1}(cx)\right) + \frac{2b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{3c^3} + \frac{bx^2\sqrt{1-c^2x^2}\,(a+b\sin^{-1}(cx)}{3c}$$

$$= -\frac{4ab^2x}{3c^2} - \frac{2}{9}b^2x^3\left(a+b\sin^{-1}(cx)\right) + \frac{2b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{3c^3} + \frac{bx^2\sqrt{1-c^2x^2}\,(a+b}{3c}$$

$$= -\frac{4ab^2x}{3c^2} - \frac{4b^3x\sin^{-1}(cx)}{3c^2} - \frac{2}{9}b^2x^3\left(a+b\sin^{-1}(cx)\right) + \frac{2b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{3c^3} + bx^2$$

$$= -\frac{4ab^2x}{3c^2} - \frac{14b^3\sqrt{1-c^2x^2}}{9c^3} + \frac{2b^3\left(1-c^2x^2\right)^{3/2}}{27c^3} - \frac{4b^3x\sin^{-1}(cx)}{3c^2} - \frac{2}{9}b^2x^3\left(a+b\sin^{-1}(cx)\right) +$$

Mathematica [A] time = 0.40945, size = 163, normalized size = 0.92

$$\frac{1}{27}\left(\frac{b\left(9c^2x^2\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2 - 2b\left(3c^3x^3\left(a+b\sin^{-1}(cx)\right) + b\sqrt{1-c^2x^2}\left(c^2x^2+2\right)\right) + 18\,(\sqrt{1-c^2x^2}\,(a+b\,\mathrm{si}}{c^3}\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2*(a + b*ArcSin[c*x])^3,x]
```

```
[Out] (9*x^3*(a + b*ArcSin[c*x])^3 + (b*(9*c^2*x^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSi
n[c*x])^2 - 2*b*(b*Sqrt[1 - c^2*x^2]*(2 + c^2*x^2) + 3*c^3*x^3*(a + b*ArcSi
n[c*x])) + 18*(Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^2 - 2*b*(a*c*x + b*Sqr
t[1 - c^2*x^2] + b*c*x*ArcSin[c*x]))))/c^3)/27
```

Maple [A] time = 0.029, size = 235, normalized size = 1.3

$$\frac{1}{c^3}\left(\frac{a^3c^3x^3}{3} + b^3\left(\frac{c^3x^3(\arcsin(cx))^3}{3} + \frac{(\arcsin(cx))^2\left(c^2x^2+2\right)}{3}\sqrt{-c^2x^2+1} - \frac{4}{3}\sqrt{-c^2x^2+1} - \frac{4cx\arcsin(cx)}{3} - \frac{2c^3x^3\,\mathrm{a}}{}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*arcsin(c*x))^3,x)
```

```
[Out] 1/c^3*(1/3*a^3*c^3*x^3+b^3*(1/3*c^3*x^3*arcsin(c*x)^3+1/3*arcsin(c*x)^2*(c^
2*x^2+2)*(-c^2*x^2+1)^(1/2)-4/3*(-c^2*x^2+1)^(1/2)-4/3*c*x*arcsin(c*x)-2/9*
c^3*x^3*arcsin(c*x)-2/27*(c^2*x^2+2)*(-c^2*x^2+1)^(1/2))+3*a*b^2*(1/3*c^3*x
^3*arcsin(c*x)^2+2/9*arcsin(c*x)*(c^2*x^2+2)*(-c^2*x^2+1)^(1/2)-2/27*c^3*x^
3-4/9*c*x)+3*a^2*b*(1/3*c^3*x^3*arcsin(c*x)+1/9*c^2*x^2*(-c^2*x^2+1)^(1/2)+
2/9*(-c^2*x^2+1)^(1/2)))
```

Maxima [A] time = 1.88801, size = 369, normalized size = 2.07

$$\frac{1}{3}b^3x^3\arcsin(cx)^3+ab^2x^3\arcsin(cx)^2+\frac{1}{3}a^3x^3+\frac{1}{3}\left(3x^3\arcsin(cx)+c\left(\frac{\sqrt{-c^2x^2+1}x^2}{c^2}+\frac{2\sqrt{-c^2x^2+1}}{c^4}\right)\right)a^2b+\frac{2}{9}\left(3\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*arcsin(c*x))^3,x, algorithm="maxima")
```

```
[Out] 1/3*b^3*x^3*arcsin(c*x)^3 + a*b^2*x^3*arcsin(c*x)^2 + 1/3*a^3*x^3 + 1/3*(3*
x^3*arcsin(c*x) + c*(sqrt(-c^2*x^2 + 1)*x^2/c^2 + 2*sqrt(-c^2*x^2 + 1)/c^4)
)*a^2*b + 2/9*(3*c*(sqrt(-c^2*x^2 + 1)*x^2/c^2 + 2*sqrt(-c^2*x^2 + 1)/c^4)*
arcsin(c*x) - (c^2*x^3 + 6*x)/c^2)*a*b^2 + 1/27*(9*c*(sqrt(-c^2*x^2 + 1)*x^
2/c^2 + 2*sqrt(-c^2*x^2 + 1)/c^4)*arcsin(c*x)^2 - 2*c*((sqrt(-c^2*x^2 + 1)*
x^2 + 20*sqrt(-c^2*x^2 + 1)/c^2)/c^2 + 3*(c^2*x^3 + 6*x)*arcsin(c*x)/c^3))*
b^3
```

Fricas [A] time = 1.80444, size = 441, normalized size = 2.48

$$\frac{9b^3c^3x^3\arcsin(cx)^3+27ab^2c^3x^3\arcsin(cx)^2+3\left(3a^3-2ab^2\right)c^3x^3-36ab^2cx+3\left(\left(9a^2b-2b^3\right)c^3x^3-12b^3cx\right)\mathrm{arcsi}}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*arcsin(c*x))^3,x, algorithm="fricas")
```

```
[Out] 1/27*(9*b^3*c^3*x^3*arcsin(c*x)^3 + 27*a*b^2*c^3*x^3*arcsin(c*x)^2 + 3*(3*a
^3 - 2*a*b^2)*c^3*x^3 - 36*a*b^2*c*x + 3*((9*a^2*b - 2*b^3)*c^3*x^3 - 12*b^
3*c*x)*arcsin(c*x) + ((9*a^2*b - 2*b^3)*c^2*x^2 + 18*a^2*b - 40*b^3 + 9*(b^
3*c^2*x^2 + 2*b^3)*arcsin(c*x)^2 + 18*(a*b^2*c^2*x^2 + 2*a*b^2)*arcsin(c*x)
)*sqrt(-c^2*x^2 + 1))/c^3
```

Sympy [A] time = 3.74468, size = 328, normalized size = 1.84

$$\begin{cases} \frac{a^3x^3}{3} + a^2bx^3 \operatorname{asin}(cx) + \frac{a^2bx^2\sqrt{-c^2x^2+1}}{3c} + \frac{2a^2b\sqrt{-c^2x^2+1}}{3c^3} + ab^2x^3 \operatorname{asin}^2(cx) - \frac{2ab^2x^3}{9} + \frac{2ab^2x^2\sqrt{-c^2x^2+1}\operatorname{asin}(cx)}{3c} - \frac{4ab^2x}{3c^2} + \\ \frac{a^3x^3}{3} \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*asin(c*x))**3,x)
```

```
[Out] Piecewise((a**3*x**3/3 + a**2*b*x**3*asin(c*x) + a**2*b*x**2*sqrt(-c**2*x**
2 + 1)/(3*c) + 2*a**2*b*sqrt(-c**2*x**2 + 1)/(3*c**3) + a*b**2*x**3*asin(c*
x)**2 - 2*a*b**2*x**3/9 + 2*a*b**2*x**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/(3*c
) - 4*a*b**2*x/(3*c**2) + 4*a*b**2*sqrt(-c**2*x**2 + 1)*asin(c*x)/(3*c**3)
+ b**3*x**3*asin(c*x)**3/3 - 2*b**3*x**3*asin(c*x)/9 + b**3*x**2*sqrt(-c**2
*x**2 + 1)*asin(c*x)**2/(3*c) - 2*b**3*x**2*sqrt(-c**2*x**2 + 1)/(27*c) - 4
*b**3*x*asin(c*x)/(3*c**2) + 2*b**3*sqrt(-c**2*x**2 + 1)*asin(c*x)**2/(3*c*
*3) - 40*b**3*sqrt(-c**2*x**2 + 1)/(27*c**3), Ne(c, 0)), (a**3*x**3/3, True
))
```

Giac [B] time = 1.45838, size = 497, normalized size = 2.79

$$\frac{1}{3}a^3x^3 + \frac{(c^2x^2-1)b^3x\arcsin(cx)^3}{3c^2} + \frac{(c^2x^2-1)ab^2x\arcsin(cx)^2}{c^2} + \frac{b^3x\arcsin(cx)^3}{3c^2} + \frac{(c^2x^2-1)a^2bx\arcsin(cx)}{c^2} -$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*arcsin(c*x))^3,x, algorithm="giac")
```

```
[Out] 1/3*a^3*x^3 + 1/3*(c^2*x^2 - 1)*b^3*x*arcsin(c*x)^3/c^2 + (c^2*x^2 - 1)*a*b
^2*x*arcsin(c*x)^2/c^2 + 1/3*b^3*x*arcsin(c*x)^3/c^2 + (c^2*x^2 - 1)*a^2*b*
x*arcsin(c*x)/c^2 - 2/9*(c^2*x^2 - 1)*b^3*x*arcsin(c*x)/c^2 + a*b^2*x*arcsi
n(c*x)^2/c^2 - 1/3*(-c^2*x^2 + 1)^(3/2)*b^3*arcsin(c*x)^2/c^3 - 2/9*(c^2*x^
2 - 1)*a*b^2*x/c^2 + a^2*b*x*arcsin(c*x)/c^2 - 14/9*b^3*x*arcsin(c*x)/c^2 -
 2/3*(-c^2*x^2 + 1)^(3/2)*a*b^2*arcsin(c*x)/c^3 + sqrt(-c^2*x^2 + 1)*b^3*ar
csin(c*x)^2/c^3 - 14/9*a*b^2*x/c^2 - 1/3*(-c^2*x^2 + 1)^(3/2)*a^2*b/c^3 + 2
```

```
/27*(-c^2*x^2 + 1)^(3/2)*b^3/c^3 + 2*sqrt(-c^2*x^2 + 1)*a*b^2*arcsin(c*x)/c
^3 + sqrt(-c^2*x^2 + 1)*a^2*b/c^3 - 14/9*sqrt(-c^2*x^2 + 1)*b^3/c^3
```

3.154 $\int x\left(a+b\sin^{-1}(cx)\right)^3\,dx$

Optimal. Leaf size=125

$$-\frac{3}{4}b^2x^2\left(a+b\sin^{-1}(cx)\right)+\frac{3bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{4c}-\frac{\left(a+b\sin^{-1}(cx)\right)^3}{4c^2}+\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^3-\frac{3b^3x\sqrt{1-c^2}}{8c}$$

```
[Out] (-3*b^3*x*Sqrt[1 - c^2*x^2])/(8*c) + (3*b^3*ArcSin[c*x])/(8*c^2) - (3*b^2*x
^2*(a + b*ArcSin[c*x]))/4 + (3*b*x*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^2)
/(4*c) - (a + b*ArcSin[c*x])^3/(4*c^2) + (x^2*(a + b*ArcSin[c*x])^3)/2
```

Rubi [A] time = 0.204622, antiderivative size = 125, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.417, Rules used = {4627, 4707, 4641, 321, 216}

$$-\frac{3}{4}b^2x^2\left(a+b\sin^{-1}(cx)\right)+\frac{3bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{4c}-\frac{\left(a+b\sin^{-1}(cx)\right)^3}{4c^2}+\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^3-\frac{3b^3x\sqrt{1-c^2}}{8c}$$

Antiderivative was successfully verified.

```
[In] Int[x*(a + b*ArcSin[c*x])^3,x]
```

```
[Out] (-3*b^3*x*Sqrt[1 - c^2*x^2])/(8*c) + (3*b^3*ArcSin[c*x])/(8*c^2) - (3*b^2*x
^2*(a + b*ArcSin[c*x]))/4 + (3*b*x*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^2)
/(4*c) - (a + b*ArcSin[c*x])^3/(4*c^2) + (x^2*(a + b*ArcSin[c*x])^3)/2
```

Rule 4627

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

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
```

```
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 321

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

Rule 216

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

Rubi steps

$$
\begin{aligned}
\int x\left(a+b\sin^{-1}(cx)\right)^3\,dx &= \frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^3-\frac{1}{2}(3bc)\int\frac{x^2\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{1-c^2x^2}}\,dx\\
&= \frac{3bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{4c}+\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^3-\frac{1}{2}\left(3b^2\right)\int x\left(a+b\sin^{-1}(cx)\right)\,d\\
&= -\frac{3}{4}b^2x^2\left(a+b\sin^{-1}(cx)\right)+\frac{3bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{4c}-\frac{\left(a+b\sin^{-1}(cx)\right)^3}{4c^2}+\frac{1}{2}x^2(a\\
&= -\frac{3b^3x\sqrt{1-c^2x^2}}{8c}-\frac{3}{4}b^2x^2\left(a+b\sin^{-1}(cx)\right)+\frac{3bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{4c}-\frac{(a+b\sin}{4c^2}\\
&= -\frac{3b^3x\sqrt{1-c^2x^2}}{8c}+\frac{3b^3\sin^{-1}(cx)}{8c^2}-\frac{3}{4}b^2x^2\left(a+b\sin^{-1}(cx)\right)+\frac{3bx\sqrt{1-c^2x^2}\,(a+b\sin^{-1}(cx}{4c}
\end{aligned}
$$

Mathematica [A] time = 0.14751, size = 114, normalized size = 0.91

$$
\frac{-3b^2\left(cx\left(2acx+b\sqrt{1-c^2x^2}\right)+b\left(2c^2x^2-1\right)\sin^{-1}(cx)\right)+4c^2x^2\left(a+b\sin^{-1}(cx)\right)^3+6bcx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{8c^2}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x*(a + b*ArcSin[c*x])^3,x]
```

```
[Out] (6*b*c*x*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^2 - 2*(a + b*ArcSin[c*x])^3
+ 4*c^2*x^2*(a + b*ArcSin[c*x])^3 - 3*b^2*(c*x*(2*a*c*x + b*Sqrt[1 - c^2*x^
2]) + b*(-1 + 2*c^2*x^2)*ArcSin[c*x]))/(8*c^2)
```

Maple [A] time = 0.027, size = 219, normalized size = 1.8

$$\frac{1}{c^2}\Bigg(\frac{c^2x^2a^3}{2}+b^3\Bigg(\frac{\left(c^2x^2-1\right)(\arcsin(cx))^3}{2}+\frac{3\,(\arcsin(cx))^2}{4}\left(cx\sqrt{-c^2x^2+1}+\arcsin(cx)\right)-\frac{\left(3\,c^2x^2-3\right)\arcsin(cx)}{4}-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*arcsin(c*x))^3,x)
```

```
[Out] 1/c^2*(1/2*c^2*x^2*a^3+b^3*(1/2*(c^2*x^2-1)*arcsin(c*x)^3+3/4*arcsin(c*x)^2
*(c*x*(-c^2*x^2+1)^(1/2)+arcsin(c*x))-3/4*(c^2*x^2-1)*arcsin(c*x)-3/8*c*x*(
-c^2*x^2+1)^(1/2)-3/8*arcsin(c*x)-1/2*arcsin(c*x)^3)+3*a*b^2*(1/2*(c^2*x^2-
1)*arcsin(c*x)^2+1/2*arcsin(c*x)*(c*x*(-c^2*x^2+1)^(1/2)+arcsin(c*x))-1/4*a
rcsin(c*x)^2-1/4*c^2*x^2)+3*a^2*b*(1/2*c^2*x^2*arcsin(c*x)+1/4*c*x*(-c^2*x^
2+1)^(1/2)-1/4*arcsin(c*x)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{1}{2}\,b^3x^2\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)^3+\frac{1}{2}\,a^3x^2+\frac{3}{4}\left(2\,x^2\arcsin(cx)+c\left(\frac{\sqrt{-c^2x^2+1}x}{c^2}-\frac{\arcsin\left(\frac{c^2x}{\sqrt{c^2}}\right)}{\sqrt{c^2}c^2}\right)\right)a^2b+\int$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*b^3*x^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^3 + 1/2*a^3*x^2 + 3/
4*(2*x^2*arcsin(c*x) + c*(sqrt(-c^2*x^2 + 1)*x/c^2 - arcsin(c^2*x/sqrt(c^2)
)/(sqrt(c^2)*c^2)))*a^2*b + integrate(3/2*(sqrt(c*x + 1)*sqrt(-c*x + 1)*b^3
*c*x^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 + 2*(a*b^2*c^2*x^3 - a*
b^2*x)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2)/(c^2*x^2 - 1), x)
```

Fricas [A] time = 1.68147, size = 378, normalized size = 3.02

$$\frac{2\left(2a^3-3ab^2\right)c^2x^2+2\left(2b^3c^2x^2-b^3\right)\arcsin(cx)^3+6\left(2ab^2c^2x^2-ab^2\right)\arcsin(cx)^2+3\left(2\left(2a^2b-b^3\right)c^2x^2-2a^2b+\right.}{8c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*(2*(2*a^3 - 3*a*b^2)*c^2*x^2 + 2*(2*b^3*c^2*x^2 - b^3)*arcsin(c*x)^3 +
6*(2*a*b^2*c^2*x^2 - a*b^2)*arcsin(c*x)^2 + 3*(2*(2*a^2*b - b^3)*c^2*x^2 -
2*a^2*b + b^3)*arcsin(c*x) + 3*(2*b^3*c*x*arcsin(c*x)^2 + 4*a*b^2*c*x*arcsi
n(c*x) + (2*a^2*b - b^3)*c*x)*sqrt(-c^2*x^2 + 1))/c^2
```

Sympy [A] time = 1.89282, size = 264, normalized size = 2.11

$$\begin{cases}\frac{a^3x^2}{2}+\frac{3a^2bx^2\operatorname{asin}(cx)}{2}+\frac{3a^2bx\sqrt{-c^2x^2+1}}{4c}-\frac{3a^2b\operatorname{asin}(cx)}{4c^2}+\frac{3ab^2x^2\operatorname{asin}^2(cx)}{2}-\frac{3ab^2x^2}{4}+\frac{3ab^2x\sqrt{-c^2x^2+1}\operatorname{asin}(cx)}{2c}-\frac{3ab^2\operatorname{asin}^2(cx)}{4c^2}+ \\ \frac{a^3x^2}{2}\end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*asin(c*x))**3,x)
```

```
[Out] Piecewise((a**3*x**2/2 + 3*a**2*b*x**2*asin(c*x)/2 + 3*a**2*b*x*sqrt(-c**2*
x**2 + 1)/(4*c) - 3*a**2*b*asin(c*x)/(4*c**2) + 3*a*b**2*x**2*asin(c*x)**2/
2 - 3*a*b**2*x**2/4 + 3*a*b**2*x*sqrt(-c**2*x**2 + 1)*asin(c*x)/(2*c) - 3*a
*b**2*asin(c*x)**2/(4*c**2) + b**3*x**2*asin(c*x)**3/2 - 3*b**3*x**2*asin(c
*x)/4 + 3*b**3*x*sqrt(-c**2*x**2 + 1)*asin(c*x)**2/(4*c) - 3*b**3*x*sqrt(-c
**2*x**2 + 1)/(8*c) - b**3*asin(c*x)**3/(4*c**2) + 3*b**3*asin(c*x)/(8*c**2
), Ne(c, 0)), (a**3*x**2/2, True))
```

Giac [B] time = 1.47751, size = 385, normalized size = 3.08

$$\frac{3\sqrt{-c^2x^2+1}b^3x\arcsin(cx)^2}{4c}+\frac{\left(c^2x^2-1\right)b^3\arcsin(cx)^3}{2c^2}+\frac{3\sqrt{-c^2x^2+1}ab^2x\arcsin(cx)}{2c}+\frac{3\left(c^2x^2-1\right)ab^2\arcsin(cx}{2c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 3/4*sqrt(-c^2*x^2 + 1)*b^3*x*arcsin(c*x)^2/c + 1/2*(c^2*x^2 - 1)*b^3*arcsin
(c*x)^3/c^2 + 3/2*sqrt(-c^2*x^2 + 1)*a*b^2*x*arcsin(c*x)/c + 3/2*(c^2*x^2 -
 1)*a*b^2*arcsin(c*x)^2/c^2 + 1/4*b^3*arcsin(c*x)^3/c^2 + 3/4*sqrt(-c^2*x^2
 + 1)*a^2*b*x/c - 3/8*sqrt(-c^2*x^2 + 1)*b^3*x/c + 3/2*(c^2*x^2 - 1)*a^2*b*
arcsin(c*x)/c^2 - 3/4*(c^2*x^2 - 1)*b^3*arcsin(c*x)/c^2 + 3/4*a*b^2*arcsin(
c*x)^2/c^2 + 1/2*(c^2*x^2 - 1)*a^3/c^2 - 3/4*(c^2*x^2 - 1)*a*b^2/c^2 + 3/4*
a^2*b*arcsin(c*x)/c^2 - 3/8*b^3*arcsin(c*x)/c^2 - 3/8*a*b^2/c^2
```

3.155 $\int \left(a+b\sin^{-1}(cx)\right)^3\,dx$

Optimal. Leaf size=82

$$-6ab^2x+\frac{3b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{c}+x\left(a+b\sin^{-1}(cx)\right)^3-\frac{6b^3\sqrt{1-c^2x^2}}{c}-6b^3x\sin^{-1}(cx)$$

```
[Out] -6*a*b^2*x - (6*b^3*Sqrt[1 - c^2*x^2])/c - 6*b^3*x*ArcSin[c*x] + (3*b*Sqrt[
1 - c^2*x^2]*(a + b*ArcSin[c*x])^2)/c + x*(a + b*ArcSin[c*x])^3
```

Rubi [A] time = 0.108703, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3, Rules used = {4619, 4677, 261}

$$-6ab^2x+\frac{3b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{c}+x\left(a+b\sin^{-1}(cx)\right)^3-\frac{6b^3\sqrt{1-c^2x^2}}{c}-6b^3x\sin^{-1}(cx)$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^3,x]
```

```
[Out] -6*a*b^2*x - (6*b^3*Sqrt[1 - c^2*x^2])/c - 6*b^3*x*ArcSin[c*x] + (3*b*Sqrt[
1 - c^2*x^2]*(a + b*ArcSin[c*x])^2)/c + x*(a + b*ArcSin[c*x])^3
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 261

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

Rubi steps

$$\begin{aligned}
\int \left(a+b\sin^{-1}(cx)\right)^3\,dx &= x\left(a+b\sin^{-1}(cx)\right)^3-(3bc)\int \frac{x\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{1-c^2x^2}}\,dx\\
&= \frac{3b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{c}+x\left(a+b\sin^{-1}(cx)\right)^3-\left(6b^2\right)\int \left(a+b\sin^{-1}(cx)\right)\,dx\\
&= -6ab^2x+\frac{3b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{c}+x\left(a+b\sin^{-1}(cx)\right)^3-\left(6b^3\right)\int \sin^{-1}(cx)\,dx\\
&= -6ab^2x-6b^3x\sin^{-1}(cx)+\frac{3b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{c}+x\left(a+b\sin^{-1}(cx)\right)^3+\left(6b^3c\right)\int\\
&= -6ab^2x-\frac{6b^3\sqrt{1-c^2x^2}}{c}-6b^3x\sin^{-1}(cx)+\frac{3b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}{c}+x\left(a+b\sin^{-1}(cx
\end{aligned}$$

Mathematica [A] time = 0.0881327, size = 77, normalized size = 0.94

$$\frac{3b\left(\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2-2b\left(acx+b\sqrt{1-c^2x^2}+bcx\sin^{-1}(cx)\right)\right)}{c}+x\left(a+b\sin^{-1}(cx)\right)^3$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])^3,x]
```

```
[Out] x*(a + b*ArcSin[c*x])^3 + (3*b*(Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^2 - 2
*b*(a*c*x + b*Sqrt[1 - c^2*x^2] + b*c*x*ArcSin[c*x])))/c
```

Maple [A] time = 0.024, size = 132, normalized size = 1.6

$$\frac{1}{c}\left(cxa^3+b^3\left(cx\left(\arcsin(cx)\right)^3+3\left(\arcsin(cx)\right)^2\sqrt{-c^2x^2+1}-6\sqrt{-c^2x^2+1}-6cx\arcsin(cx)\right)+3ab^2\left(cx\left(\arcsin(cx)\right)^2\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^3,x)
```

```
[Out] 1/c*(c*x*a^3+b^3*(c*x*arcsin(c*x)^3+3*arcsin(c*x)^2*(-c^2*x^2+1)^(1/2)-6*(-
c^2*x^2+1)^(1/2)-6*c*x*arcsin(c*x))+3*a*b^2*(c*x*arcsin(c*x)^2-2*c*x+2*arcs
in(c*x)*(-c^2*x^2+1)^(1/2))+3*a^2*b*(c*x*arcsin(c*x)+(-c^2*x^2+1)^(1/2)))
```

Maxima [A] time = 1.86907, size = 190, normalized size = 2.32

$$b^3x\arcsin(cx)^3 + 3\,ab^2x\arcsin(cx)^2 + 3\left(\frac{\sqrt{-c^2x^2+1}\arcsin(cx)^2}{c} - \frac{2\left(cx\arcsin(cx) + \sqrt{-c^2x^2+1}\right)}{c}\right)b^3 - 6\,ab^2\Bigl(x -$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] b^3*x*arcsin(c*x)^3 + 3*a*b^2*x*arcsin(c*x)^2 + 3*(sqrt(-c^2*x^2 + 1)*arcsi
n(c*x)^2/c - 2*(c*x*arcsin(c*x) + sqrt(-c^2*x^2 + 1))/c)*b^3 - 6*a*b^2*(x -
 sqrt(-c^2*x^2 + 1)*arcsin(c*x)/c) + a^3*x + 3*(c*x*arcsin(c*x) + sqrt(-c^2
*x^2 + 1))*a^2*b/c
```

Fricas [A] time = 1.79325, size = 262, normalized size = 3.2

$$\frac{b^3cx\arcsin(cx)^3 + 3\,ab^2cx\arcsin(cx)^2 + 3\left(a^2b - 2\,b^3\right)cx\arcsin(cx) + \left(a^3 - 6\,ab^2\right)cx + 3\left(b^3\arcsin(cx)^2 + 2\,ab^2\,\mathrm{arcs}\right.}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (b^3*c*x*arcsin(c*x)^3 + 3*a*b^2*c*x*arcsin(c*x)^2 + 3*(a^2*b - 2*b^3)*c*x*
arcsin(c*x) + (a^3 - 6*a*b^2)*c*x + 3*(b^3*arcsin(c*x)^2 + 2*a*b^2*arcsin(c
*x) + a^2*b - 2*b^3)*sqrt(-c^2*x^2 + 1))/c
```

Sympy [A] time = 1.2092, size = 160, normalized size = 1.95

$$\begin{cases} a^3x + 3a^2bx\operatorname{asin}(cx) + \frac{3a^2b\sqrt{-c^2x^2+1}}{c} + 3ab^2x\operatorname{asin}^2(cx) - 6ab^2x + \frac{6ab^2\sqrt{-c^2x^2+1}\operatorname{asin}(cx)}{c} + b^3x\operatorname{asin}^3(cx) - 6b^3x\operatorname{asin}(cx) \\ a^3x \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**3,x)
```

```
[Out] Piecewise((a**3*x + 3*a**2*b*x*asin(c*x) + 3*a**2*b*sqrt(-c**2*x**2 + 1)/c
+ 3*a*b**2*x*asin(c*x)**2 - 6*a*b**2*x + 6*a*b**2*sqrt(-c**2*x**2 + 1)*asin
(c*x)/c + b**3*x*asin(c*x)**3 - 6*b**3*x*asin(c*x) + 3*b**3*sqrt(-c**2*x**2
 + 1)*asin(c*x)**2/c - 6*b**3*sqrt(-c**2*x**2 + 1)/c, Ne(c, 0)), (a**3*x, T
rue))
```

Giac [A] time = 1.37369, size = 203, normalized size = 2.48

$$b^3x\arcsin\left(cx\right)^3+3\,ab^2x\arcsin\left(cx\right)^2+3\,a^2bx\arcsin\left(cx\right)-6\,b^3x\arcsin\left(cx\right)+\frac{3\,\sqrt{-c^2x^2+1}b^3\arcsin\left(cx\right)^2}{c}+a^3x-6\,ab$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] b^3*x*arcsin(c*x)^3 + 3*a*b^2*x*arcsin(c*x)^2 + 3*a^2*b*x*arcsin(c*x) - 6*b
^3*x*arcsin(c*x) + 3*sqrt(-c^2*x^2 + 1)*b^3*arcsin(c*x)^2/c + a^3*x - 6*a*b
^2*x + 6*sqrt(-c^2*x^2 + 1)*a*b^2*arcsin(c*x)/c + 3*sqrt(-c^2*x^2 + 1)*a^2*
b/c - 6*sqrt(-c^2*x^2 + 1)*b^3/c
```

3.156 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{x}\,dx$

Optimal. Leaf size=123

$$\frac{3}{2}b^2\text{PolyLog}\Big(3,e^{2i\sin^{-1}(cx)}\Big)\Big(a+b\sin^{-1}(cx)\Big)-\frac{3}{2}ib\text{PolyLog}\Big(2,e^{2i\sin^{-1}(cx)}\Big)\Big(a+b\sin^{-1}(cx)\Big)^2+\frac{3}{4}ib^3\text{PolyLog}\Big(4,e^{2i\sin}$$

```
[Out] ((-I/4)*(a + b*ArcSin[c*x])^4)/b + (a + b*ArcSin[c*x])^3*Log[1 - E^((2*I)*A
rcSin[c*x])] - ((3*I)/2)*b*(a + b*ArcSin[c*x])^2*PolyLog[2, E^((2*I)*ArcSin
[c*x])] + (3*b^2*(a + b*ArcSin[c*x])*PolyLog[3, E^((2*I)*ArcSin[c*x])])/2 +
 ((3*I)/4)*b^3*PolyLog[4, E^((2*I)*ArcSin[c*x])]
```

Rubi [A] time = 0.146619, antiderivative size = 123, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4625, 3717, 2190, 2531, 6609, 2282, 6589}

$$\frac{3}{2}b^2\text{PolyLog}\Big(3,e^{2i\sin^{-1}(cx)}\Big)\Big(a+b\sin^{-1}(cx)\Big)-\frac{3}{2}ib\text{PolyLog}\Big(2,e^{2i\sin^{-1}(cx)}\Big)\Big(a+b\sin^{-1}(cx)\Big)^2+\frac{3}{4}ib^3\text{PolyLog}\Big(4,e^{2i\sin}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^3/x,x]
```

```
[Out] ((-I/4)*(a + b*ArcSin[c*x])^4)/b + (a + b*ArcSin[c*x])^3*Log[1 - E^((2*I)*A
rcSin[c*x])] - ((3*I)/2)*b*(a + b*ArcSin[c*x])^2*PolyLog[2, E^((2*I)*ArcSin
[c*x])] + (3*b^2*(a + b*ArcSin[c*x])*PolyLog[3, E^((2*I)*ArcSin[c*x])])/2 +
 ((3*I)/4)*b^3*PolyLog[4, E^((2*I)*ArcSin[c*x])]
```

Rule 4625

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/(x_), x_Symbol] :> Subst[Int[(
a + b*x)^n/Tan[x], x], x, ArcSin[c*x]] /; FreeQ[{a, b, c}, x] && IGtQ[n, 0]
```

Rule 3717

```
Int[((c_.) + (d_.)*(x_))^(m_.)*tan[(e_.) + Pi*(k_.) + (f_.)*(x_)], x_Symbol
] :> Simp[(I*(c + d*x)^(m + 1))/(d*(m + 1)), x] - Dist[2*I, Int[((c + d*x)^
m*E^(2*I*k*Pi)*E^(2*I*(e + f*x)))/(1 + E^(2*I*k*Pi)*E^(2*I*(e + f*x))), x],
 x] /; FreeQ[{c, d, e, f}, x] && IntegerQ[4*k] && IGtQ[m, 0]
```

Rule 2190

```
Int[(((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)*((c_.) + (d_.)*(x_))^(m_.))/
((a_) + (b_.)*((F_)^((g_.)*((e_.) + (f_.)*(x_))))^(n_.)), x_Symbol] :> Simp
[((c + d*x)^m*Log[1 + (b*(F^(g*(e + f*x)))^n)/a])/(b*f*g*n*Log[F]), x] - Di
st[(d*m)/(b*f*g*n*Log[F]), Int[(c + d*x)^(m - 1)*Log[1 + (b*(F^(g*(e + f*x)
))^n)/a], x], x] /; FreeQ[{F, a, b, c, d, e, f, g, n}, x] && IGtQ[m, 0]
```

Rule 2531

```
Int[Log[1 + (e_.)*((F_)^((c_.)*((a_.) + (b_.)*(x_))))^(n_.)]*((f_.) + (g_.)
*(x_))^(m_.), x_Symbol] :> -Simp[((f + g*x)^m*PolyLog[2, -(e*(F^(c*(a + b*x
)))^n)])/(b*c*n*Log[F]), x] + Dist[(g*m)/(b*c*n*Log[F]), Int[(f + g*x)^(m -
 1)*PolyLog[2, -(e*(F^(c*(a + b*x)))^n)], x], x] /; FreeQ[{F, a, b, c, e, f
, g, n}, x] && GtQ[m, 0]
```

Rule 6609

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

Rule 2282

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Dist[v/D[v, x]
, Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Functi
onOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ[
{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))*
(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

Rule 6589

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{x}\,dx = \text{Subst}\left(\int (a+bx)^3\cot(x)\,dx, x, \sin^{-1}(cx)\right)$$

$$= -\frac{i\left(a+b\sin^{-1}(cx)\right)^4}{4b} - 2i\,\text{Subst}\left(\int \frac{e^{2ix}(a+bx)^3}{1-e^{2ix}}\,dx, x, \sin^{-1}(cx)\right)$$

$$= -\frac{i\left(a+b\sin^{-1}(cx)\right)^4}{4b} + \left(a+b\sin^{-1}(cx)\right)^3\log\left(1-e^{2i\sin^{-1}(cx)}\right) - (3b)\,\text{Subst}\Big(\int (a+bx)^2\log$$

$$= -\frac{i\left(a+b\sin^{-1}(cx)\right)^4}{4b} + \left(a+b\sin^{-1}(cx)\right)^3\log\left(1-e^{2i\sin^{-1}(cx)}\right) - \frac{3}{2}ib\left(a+b\sin^{-1}(cx)\right)^2\textbf{Li}_2\Big(e$$

$$= -\frac{i\left(a+b\sin^{-1}(cx)\right)^4}{4b} + \left(a+b\sin^{-1}(cx)\right)^3\log\left(1-e^{2i\sin^{-1}(cx)}\right) - \frac{3}{2}ib\left(a+b\sin^{-1}(cx)\right)^2\textbf{Li}_2\Big(e$$

$$= -\frac{i\left(a+b\sin^{-1}(cx)\right)^4}{4b} + \left(a+b\sin^{-1}(cx)\right)^3\log\left(1-e^{2i\sin^{-1}(cx)}\right) - \frac{3}{2}ib\left(a+b\sin^{-1}(cx)\right)^2\textbf{Li}_2\Big(e$$

$$= -\frac{i\left(a+b\sin^{-1}(cx)\right)^4}{4b} + \left(a+b\sin^{-1}(cx)\right)^3\log\left(1-e^{2i\sin^{-1}(cx)}\right) - \frac{3}{2}ib\left(a+b\sin^{-1}(cx)\right)^2\textbf{Li}_2\Big(e$$

Mathematica [A] time = 0.238776, size = 244, normalized size = 1.98

$$3a^2b\left(\sin^{-1}(cx)\log\left(1-e^{2i\sin^{-1}(cx)}\right) - \frac{1}{2}i\left(\sin^{-1}(cx)^2 + \textbf{PolyLog}\left(2, e^{2i\sin^{-1}(cx)}\right)\right)\right) + \frac{1}{8}ab^2\Big(24i\sin^{-1}(cx)\textbf{PolyLog}\Big(2, e^{-2}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*ArcSin[c*x])^3/x,x]
```

```
[Out] a^3*Log[c*x] + 3*a^2*b*(ArcSin[c*x]*Log[1 - E^((2*I)*ArcSin[c*x])] - (I/2)*
(ArcSin[c*x]^2 + PolyLog[2, E^((2*I)*ArcSin[c*x])])) + (a*b^2*((-I)*Pi^3 +
(8*I)*ArcSin[c*x]^3 + 24*ArcSin[c*x]^2*Log[1 - E^((-2*I)*ArcSin[c*x])] + (2
4*I)*ArcSin[c*x]*PolyLog[2, E^((-2*I)*ArcSin[c*x])] + 12*PolyLog[3, E^((-2*
I)*ArcSin[c*x])]))/8 - (I/64)*b^3*(Pi^4 - 16*ArcSin[c*x]^4 + (64*I)*ArcSin[
c*x]^3*Log[1 - E^((-2*I)*ArcSin[c*x])] - 96*ArcSin[c*x]^2*PolyLog[2, E^((-2
*I)*ArcSin[c*x])] + (96*I)*ArcSin[c*x]*PolyLog[3, E^((-2*I)*ArcSin[c*x])] +
 48*PolyLog[4, E^((-2*I)*ArcSin[c*x])])
```

Maple [B] time = 0.026, size = 592, normalized size = 4.8

$$a^3\ln(cx) - 3\,ia^2b\text{polylog}\left(2, -icx - \sqrt{-c^2x^2+1}\right) + b^3\left(\arcsin(cx)\right)^3\ln\left(1+icx+\sqrt{-c^2x^2+1}\right) + 6\,ib^3\text{polylog}\Big(4, icx +$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] a^3*ln(c*x)-3*I*a^2*b*polylog(2,-I*c*x-(-c^2*x^2+1)^(1/2))+b^3*arcsin(c*x)^
3*ln(1+I*c*x+(-c^2*x^2+1)^(1/2))+6*I*b^3*polylog(4,I*c*x+(-c^2*x^2+1)^(1/2)
)+6*b^3*arcsin(c*x)*polylog(3,-I*c*x-(-c^2*x^2+1)^(1/2))+6*I*b^3*polylog(4,
-I*c*x-(-c^2*x^2+1)^(1/2))+b^3*arcsin(c*x)^3*ln(1-I*c*x-(-c^2*x^2+1)^(1/2))
-6*I*a*b^2*arcsin(c*x)*polylog(2,-I*c*x-(-c^2*x^2+1)^(1/2))+6*b^3*arcsin(c*
x)*polylog(3,I*c*x+(-c^2*x^2+1)^(1/2))-6*I*a*b^2*arcsin(c*x)*polylog(2,I*c*
x+(-c^2*x^2+1)^(1/2))-1/4*I*b^3*arcsin(c*x)^4-3*I*b^3*arcsin(c*x)^2*polylog
(2,-I*c*x-(-c^2*x^2+1)^(1/2))-3/2*I*a^2*b*arcsin(c*x)^2+3*a*b^2*arcsin(c*x)
^2*ln(1+I*c*x+(-c^2*x^2+1)^(1/2))+3*a*b^2*arcsin(c*x)^2*ln(1-I*c*x-(-c^2*x^
2+1)^(1/2))+6*a*b^2*polylog(3,-I*c*x-(-c^2*x^2+1)^(1/2))+6*a*b^2*polylog(3,
I*c*x+(-c^2*x^2+1)^(1/2))-3*I*a^2*b*polylog(2,I*c*x+(-c^2*x^2+1)^(1/2))+3*a
^2*b*arcsin(c*x)*ln(1+I*c*x+(-c^2*x^2+1)^(1/2))+3*a^2*b*arcsin(c*x)*ln(1-I*
c*x-(-c^2*x^2+1)^(1/2))-3*I*b^3*arcsin(c*x)^2*polylog(2,I*c*x+(-c^2*x^2+1)^
(1/2))-I*a*b^2*arcsin(c*x)^3
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$a^{3} \log\left(x\right) + \int \frac{b^{3} \arctan\left(cx, \sqrt{cx+1}\sqrt{-cx+1}\right)^{3} + 3\,ab^{2} \arctan\left(cx, \sqrt{cx+1}\sqrt{-cx+1}\right)^{2} + 3\,a^{2}b \arctan\left(cx, \sqrt{cx+1}\sqrt{-}\right.}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] a^3*log(x) + integrate((b^3*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^3 +
3*a*b^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 + 3*a^2*b*arctan2(c*x,
 sqrt(c*x + 1)*sqrt(-c*x + 1)))/x, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{b^{3} \arcsin\left(cx\right)^{3} + 3\,ab^{2} \arcsin\left(cx\right)^{2} + 3\,a^{2}b \arcsin\left(cx\right) + a^{3}}{x}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b^3*arcsin(c*x)^3 + 3*a*b^2*arcsin(c*x)^2 + 3*a^2*b*arcsin(c*x) +
 a^3)/x, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(a + b\operatorname{asin}(cx))^3}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((a + b*asin(c*x))**3/x, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(b\arcsin(cx) + a)^3}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.157 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{x^2}\,dx$

Optimal. Leaf size=137

$$6ib^2c\mathrm{PolyLog}\left(2,-e^{i\sin^{-1}(cx)}\right)\left(a+b\sin^{-1}(cx)\right)-6ib^2c\mathrm{PolyLog}\left(2,e^{i\sin^{-1}(cx)}\right)\left(a+b\sin^{-1}(cx)\right)-6b^3c\mathrm{PolyLog}\left(3,-e^{i\sin}\right.$$

```
[Out] -((a + b*ArcSin[c*x])^3/x) - 6*b*c*(a + b*ArcSin[c*x])^2*ArcTanh[E^(I*ArcSi
n[c*x])] + (6*I)*b^2*c*(a + b*ArcSin[c*x])*PolyLog[2, -E^(I*ArcSin[c*x])] -
 (6*I)*b^2*c*(a + b*ArcSin[c*x])*PolyLog[2, E^(I*ArcSin[c*x])] - 6*b^3*c*Po
lyLog[3, -E^(I*ArcSin[c*x])] + 6*b^3*c*PolyLog[3, E^(I*ArcSin[c*x])]
```

Rubi [A] time = 0.212895, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 6, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.429, Rules used = {4627, 4709, 4183, 2531, 2282, 6589}

$$6ib^2c\mathrm{PolyLog}\left(2,-e^{i\sin^{-1}(cx)}\right)\left(a+b\sin^{-1}(cx)\right)-6ib^2c\mathrm{PolyLog}\left(2,e^{i\sin^{-1}(cx)}\right)\left(a+b\sin^{-1}(cx)\right)-6b^3c\mathrm{PolyLog}\left(3,-e^{i\sin}\right.$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^3/x^2,x]
```

```
[Out] -((a + b*ArcSin[c*x])^3/x) - 6*b*c*(a + b*ArcSin[c*x])^2*ArcTanh[E^(I*ArcSi
n[c*x])] + (6*I)*b^2*c*(a + b*ArcSin[c*x])*PolyLog[2, -E^(I*ArcSin[c*x])] -
 (6*I)*b^2*c*(a + b*ArcSin[c*x])*PolyLog[2, E^(I*ArcSin[c*x])] - 6*b^3*c*Po
lyLog[3, -E^(I*ArcSin[c*x])] + 6*b^3*c*PolyLog[3, E^(I*ArcSin[c*x])]
```

Rule 4627

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

Rule 4709

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_))/Sqrt[(d_) + (e_.)*
(x_)^2], x_Symbol] :> Dist[1/(c^(m + 1)*Sqrt[d]), Subst[Int[(a + b*x)^n*Sin
[x]^m, x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[c^2*d +
e, 0] && GtQ[d, 0] && IGtQ[n, 0] && IntegerQ[m]
```

Rule 4183

```
Int[csc[(e_.) + (f_.)*(x_)]*((c_.) + (d_.)*(x_))^(m_.), x_Symbol] :> Simp[(
-2*(c + d*x)^m*ArcTanh[E^(I*(e + f*x))])/f, x] + (-Dist[(d*m)/f, Int[(c + d
*x)^(m - 1)*Log[1 - E^(I*(e + f*x))], x], x] + Dist[(d*m)/f, Int[(c + d*x)^
(m - 1)*Log[1 + E^(I*(e + f*x))], x], x]) /; FreeQ[{c, d, e, f}, x] && IGtQ
[m, 0]
```

Rule 2531

```
Int[Log[1 + (e_.)*((F_)^((c_.)*((a_.) + (b_.)*(x_))))^(n_.)]*((f_.) + (g_.)
*(x_))^(m_.), x_Symbol] :> -Simp[((f + g*x)^m*PolyLog[2, -(e*(F^(c*(a + b*x
)))^n)])/(b*c*n*Log[F]), x] + Dist[(g*m)/(b*c*n*Log[F]), Int[(f + g*x)^(m -
 1)*PolyLog[2, -(e*(F^(c*(a + b*x)))^n)], x], x] /; FreeQ[{F, a, b, c, e, f
, g, n}, x] && GtQ[m, 0]
```

Rule 2282

```
Int[u_, x_Symbol] :> With[{v = FunctionOfExponential[u, x]}, Dist[v/D[v, x]
, Subst[Int[FunctionOfExponentialFunction[u, x]/x, x], x, v], x]] /; Functi
onOfExponentialQ[u, x] &&  !MatchQ[u, (w_)*((a_.)*(v_)^(n_))^(m_) /; FreeQ[
{a, m, n}, x] && IntegerQ[m*n]] &&  !MatchQ[u, E^((c_.)*((a_.) + (b_.)*x))*
(F_)[v_] /; FreeQ[{a, b, c}, x] && InverseFunctionQ[F[x]]]
```

Rule 6589

```
Int[PolyLog[n_, (c_.)*((a_.) + (b_.)*(x_))^(p_.)]/((d_.) + (e_.)*(x_)), x_S
ymbol] :> Simp[PolyLog[n + 1, c*(a + b*x)^p]/(e*p), x] /; FreeQ[{a, b, c, d
, e, n, p}, x] && EqQ[b*d, a*e]
```

Rubi steps

$$\begin{aligned}
\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{x^2}\,dx &= -\frac{\left(a+b\sin^{-1}(cx)\right)^3}{x} + (3bc)\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{x\sqrt{1-c^2x^2}}\,dx \\
&= -\frac{\left(a+b\sin^{-1}(cx)\right)^3}{x} + (3bc)\,\mathrm{Subst}\left(\int (a+bx)^2\csc(x)\,dx, x, \sin^{-1}(cx)\right) \\
&= -\frac{\left(a+b\sin^{-1}(cx)\right)^3}{x} - 6bc\left(a+b\sin^{-1}(cx)\right)^2\tanh^{-1}\left(e^{i\sin^{-1}(cx)}\right) - \left(6b^2c\right)\mathrm{Subst}\Big(\int (a+bx)\,\mathrm{lo} \\
&= -\frac{\left(a+b\sin^{-1}(cx)\right)^3}{x} - 6bc\left(a+b\sin^{-1}(cx)\right)^2\tanh^{-1}\left(e^{i\sin^{-1}(cx)}\right) + 6ib^2c\left(a+b\sin^{-1}(cx)\right)\mathrm{Li}_2\Big(\\
&= -\frac{\left(a+b\sin^{-1}(cx)\right)^3}{x} - 6bc\left(a+b\sin^{-1}(cx)\right)^2\tanh^{-1}\left(e^{i\sin^{-1}(cx)}\right) + 6ib^2c\left(a+b\sin^{-1}(cx)\right)\mathrm{Li}_2\Big(\\
&= -\frac{\left(a+b\sin^{-1}(cx)\right)^3}{x} - 6bc\left(a+b\sin^{-1}(cx)\right)^2\tanh^{-1}\left(e^{i\sin^{-1}(cx)}\right) + 6ib^2c\left(a+b\sin^{-1}(cx)\right)\mathrm{Li}_2\Big(
\end{aligned}$$

Mathematica [B] time = 0.314443, size = 283, normalized size = 2.07

$$3ab^2c\Big(2i\mathrm{PolyLog}\left(2,-e^{i\sin^{-1}(cx)}\right) - 2i\mathrm{PolyLog}\left(2,e^{i\sin^{-1}(cx)}\right) - \sin^{-1}(cx)\Big(\frac{\sin^{-1}(cx)}{cx} - 2\log\left(1-e^{i\sin^{-1}(cx)}\right) + 2\log\Big(1+e$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*ArcSin[c*x])^3/x^2,x]
```

```
[Out] -(a^3/x) - (3*a^2*b*ArcSin[c*x])/x + 3*a^2*b*c*Log[x] - 3*a^2*b*c*Log[1 + S
qrt[1 - c^2*x^2]] + 3*a*b^2*c*(-(ArcSin[c*x]*(ArcSin[c*x]/(c*x) - 2*Log[1 -
 E^(I*ArcSin[c*x])] + 2*Log[1 + E^(I*ArcSin[c*x])])) + (2*I)*PolyLog[2, -E^
(I*ArcSin[c*x])] - (2*I)*PolyLog[2, E^(I*ArcSin[c*x])]) + b^3*c*(-(ArcSin[c
*x]^3/(c*x)) + 3*ArcSin[c*x]^2*Log[1 - E^(I*ArcSin[c*x])] - 3*ArcSin[c*x]^2
*Log[1 + E^(I*ArcSin[c*x])] + (6*I)*ArcSin[c*x]*PolyLog[2, -E^(I*ArcSin[c*x
])] - (6*I)*ArcSin[c*x]*PolyLog[2, E^(I*ArcSin[c*x])] - 6*PolyLog[3, -E^(I*
ArcSin[c*x])] + 6*PolyLog[3, E^(I*ArcSin[c*x])])
```

Maple [B] time = 0.042, size = 378, normalized size = 2.8

$$-\frac{a^3}{x} - \frac{b^3\left(\arcsin(cx)\right)^3}{x} - 3\,cb^3\left(\arcsin(cx)\right)^2\ln\left(1+icx+\sqrt{-c^2x^2+1}\right) + 6\,icb^3\arcsin(cx)\,\mathrm{polylog}\Big(2,-icx-\sqrt{-c^2x^2+}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^3/x^2,x)
```

```
[Out] -a^3/x-b^3/x*arcsin(c*x)^3-3*c*b^3*arcsin(c*x)^2*ln(1+I*c*x+(-c^2*x^2+1)^(1
/2))+6*I*c*b^3*arcsin(c*x)*polylog(2,-I*c*x-(-c^2*x^2+1)^(1/2))-6*b^3*c*pol
ylog(3,-I*c*x-(-c^2*x^2+1)^(1/2))+3*c*b^3*arcsin(c*x)^2*ln(1-I*c*x-(-c^2*x^
2+1)^(1/2))-6*I*c*b^3*arcsin(c*x)*polylog(2,I*c*x+(-c^2*x^2+1)^(1/2))+6*b^3
*c*polylog(3,I*c*x+(-c^2*x^2+1)^(1/2))-3*a*b^2/x*arcsin(c*x)^2+6*c*a*b^2*ar
csin(c*x)*ln(1-I*c*x-(-c^2*x^2+1)^(1/2))-6*c*a*b^2*arcsin(c*x)*ln(1+I*c*x+(
-c^2*x^2+1)^(1/2))-6*I*c*a*b^2*polylog(2,I*c*x+(-c^2*x^2+1)^(1/2))+6*I*c*a*
b^2*polylog(2,-I*c*x-(-c^2*x^2+1)^(1/2))-3*a^2*b/x*arcsin(c*x)-3*c*a^2*b*ar
ctanh(1/(-c^2*x^2+1)^(1/2))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-3\left(c\log\left(\frac{2\sqrt{-c^2x^2+1}}{|x|}+\frac{2}{|x|}\right)+\frac{\arcsin(cx)}{x}\right)a^2b-\frac{a^3}{x}-\frac{b^3\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)^3+\frac{3}{2}\left(ab^2c^2\left(\frac{\log(cx+1)}{c}-\frac{\log(c}{c}\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^3/x^2,x, algorithm="maxima")
```

```
[Out] -3*(c*log(2*sqrt(-c^2*x^2 + 1)/abs(x) + 2/abs(x)) + arcsin(c*x)/x)*a^2*b -
a^3/x - (b^3*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^3 + x*integrate(3*(
sqrt(c*x + 1)*sqrt(-c*x + 1)*b^3*c*x*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x +
 1))^2 - (a*b^2*c^2*x^2 - a*b^2)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))
^2)/(c^2*x^4 - x^2), x))/x
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{b^3\arcsin(cx)^3+3\,ab^2\arcsin(cx)^2+3\,a^2b\arcsin(cx)+a^3}{x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^3/x^2,x, algorithm="fricas")
```

```
[Out] integral((b^3*arcsin(c*x)^3 + 3*a*b^2*arcsin(c*x)^2 + 3*a^2*b*arcsin(c*x) +
 a^3)/x^2, x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(a + b\operatorname{asin}(cx))^3}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**3/x**2,x)
```

```
[Out] Integral((a + b*asin(c*x))**3/x**2, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(b\arcsin(cx) + a)^3}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^3/x^2,x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)^3/x^2, x)
```

3.158 $\int \frac{x^2}{a+b\sin^{-1}(cx)}\,dx$

Optimal. Leaf size=121

$$\frac{\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{4bc^3}-\frac{\cos\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3\left(a+b\sin^{-1}(cx)\right)}{b}\right)}{4bc^3}+\frac{\sin\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{4bc^3}-\frac{\sin\left(\frac{3a}{b}\right)\text{Si}\left(3(\right.}{4bc}$$

```
[Out] (Cos[a/b]*CosIntegral[(a + b*ArcSin[c*x])/b])/(4*b*c^3) - (Cos[(3*a)/b]*Cos
Integral[(3*(a + b*ArcSin[c*x]))/b])/(4*b*c^3) + (Sin[a/b]*SinIntegral[(a +
 b*ArcSin[c*x])/b])/(4*b*c^3) - (Sin[(3*a)/b]*SinIntegral[(3*(a + b*ArcSin[
c*x]))/b])/(4*b*c^3)
```

Rubi [A] time = 0.253727, antiderivative size = 117, normalized size of antiderivative = 0.97, number of steps used = 9, number of rules used = 5, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.357, Rules used = {4635, 4406, 3303, 3299, 3302}

$$\frac{\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{4bc^3}-\frac{\cos\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3a}{b}+3\sin^{-1}(cx)\right)}{4bc^3}+\frac{\sin\left(\frac{a}{b}\right)\text{Si}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{4bc^3}-\frac{\sin\left(\frac{3a}{b}\right.}{}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/(a + b*ArcSin[c*x]),x]
```

```
[Out] (Cos[a/b]*CosIntegral[a/b + ArcSin[c*x]])/(4*b*c^3) - (Cos[(3*a)/b]*CosInte
gral[(3*a)/b + 3*ArcSin[c*x]])/(4*b*c^3) + (Sin[a/b]*SinIntegral[a/b + ArcS
in[c*x]])/(4*b*c^3) - (Sin[(3*a)/b]*SinIntegral[(3*a)/b + 3*ArcSin[c*x]])/(
4*b*c^3)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

```
tQ[p, 0]
```

Rule 3303

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

Rule 3299

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

Rule 3302

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

Rubi steps

$$
\begin{aligned}
\int \frac{x^2}{a+b\sin^{-1}(cx)}\,dx &= \frac{\mathrm{Subst}\left(\int \frac{\cos(x)\sin^2(x)}{a+bx}\,dx, x, \sin^{-1}(cx)\right)}{c^3}\\
&= \frac{\mathrm{Subst}\left(\int \left(\frac{\cos(x)}{4(a+bx)}-\frac{\cos(3x)}{4(a+bx)}\right)dx, x, \sin^{-1}(cx)\right)}{c^3}\\
&= \frac{\mathrm{Subst}\left(\int \frac{\cos(x)}{a+bx}\,dx, x, \sin^{-1}(cx)\right)}{4c^3}-\frac{\mathrm{Subst}\left(\int \frac{\cos(3x)}{a+bx}\,dx, x, \sin^{-1}(cx)\right)}{4c^3}\\
&= \frac{\cos\left(\frac{a}{b}\right)\mathrm{Subst}\left(\int \frac{\cos\left(\frac{a}{b}+x\right)}{a+bx}\,dx, x, \sin^{-1}(cx)\right)}{4c^3}-\frac{\cos\left(\frac{3a}{b}\right)\mathrm{Subst}\left(\int \frac{\cos\left(\frac{3a}{b}+3x\right)}{a+bx}\,dx, x, \sin^{-1}(cx)\right)}{4c^3}+\\
&= \frac{\cos\left(\frac{a}{b}\right)\mathrm{Ci}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{4bc^3}-\frac{\cos\left(\frac{3a}{b}\right)\mathrm{Ci}\left(\frac{3a}{b}+3\sin^{-1}(cx)\right)}{4bc^3}+\frac{\sin\left(\frac{a}{b}\right)\mathrm{Si}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{4bc^3}-
\end{aligned}
$$

Mathematica [A] time = 0.19952, size = 91, normalized size = 0.75

$$
\frac{\cos\left(\frac{a}{b}\right)\mathrm{CosIntegral}\left(\frac{a}{b}+\sin^{-1}(cx)\right)-\cos\left(\frac{3a}{b}\right)\mathrm{CosIntegral}\left(3\left(\frac{a}{b}+\sin^{-1}(cx)\right)\right)+\sin\left(\frac{a}{b}\right)\mathrm{Si}\left(\frac{a}{b}+\sin^{-1}(cx)\right)-\sin\left(\frac{3a}{b}\right)}{4bc^3}
$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/(a + b*ArcSin[c*x]),x]
```

```
[Out] (Cos[a/b]*CosIntegral[a/b + ArcSin[c*x]] - Cos[(3*a)/b]*CosIntegral[3*(a/b
+ ArcSin[c*x])] + Sin[a/b]*SinIntegral[a/b + ArcSin[c*x]] - Sin[(3*a)/b]*Si
nIntegral[3*(a/b + ArcSin[c*x])])/(4*b*c^3)
```

Maple [A] time = 0.025, size = 102, normalized size = 0.8

$$\frac{1}{c^3}\biggl(\frac{1}{4b}\mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)+\frac{1}{4b}\mathrm{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)-\frac{1}{4b}\mathrm{Si}\left(3\arcsin(cx)+3\frac{a}{b}\right)\sin\left(3\frac{a}{b}\right)-\frac{1}{4b}\mathrm{Ci}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{b\arcsin(cx)+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x^2}{b\arcsin(cx)+a},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x^2/(b*arcsin(c*x) + a), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{a + b\,\mathrm{asin}\,(cx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x**2/(a + b*asin(c*x)), x)
```

Giac [A] time = 1.30241, size = 234, normalized size = 1.93

$$-\frac{\cos\left(\frac{a}{b}\right)^3 \mathrm{Ci}\left(\frac{3\,a}{b} + 3\,\arcsin\,(cx)\right)}{bc^3} - \frac{\cos\left(\frac{a}{b}\right)^2 \sin\left(\frac{a}{b}\right) \mathrm{Si}\left(\frac{3\,a}{b} + 3\,\arcsin\,(cx)\right)}{bc^3} + \frac{3\,\cos\left(\frac{a}{b}\right) \mathrm{Ci}\left(\frac{3\,a}{b} + 3\,\arcsin\,(cx)\right)}{4\,bc^3} + \frac{\cos}{}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

3.159 $\int \frac{x}{a+b\sin^{-1}(cx)}\,dx$

Optimal. Leaf size=63

$$\frac{\cos\left(\frac{2a}{b}\right)\text{Si}\left(\frac{2\left(a+b\sin^{-1}(cx)\right)}{b}\right)}{2bc^2}-\frac{\sin\left(\frac{2a}{b}\right)\text{CosIntegral}\left(\frac{2\left(a+b\sin^{-1}(cx)\right)}{b}\right)}{2bc^2}$$

```
[Out] -(CosIntegral[(2*(a + b*ArcSin[c*x]))/b]*Sin[(2*a)/b])/(2*b*c^2) + (Cos[(2*
a)/b]*SinIntegral[(2*(a + b*ArcSin[c*x]))/b])/(2*b*c^2)
```

Rubi [A] time = 0.131864, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4635, 4406, 12, 3303, 3299, 3302}

$$\frac{\cos\left(\frac{2a}{b}\right)\text{Si}\left(\frac{2a}{b}+2\sin^{-1}(cx)\right)}{2bc^2}-\frac{\sin\left(\frac{2a}{b}\right)\text{CosIntegral}\left(\frac{2a}{b}+2\sin^{-1}(cx)\right)}{2bc^2}$$

Antiderivative was successfully verified.

```
[In] Int[x/(a + b*ArcSin[c*x]),x]
```

```
[Out] -(CosIntegral[(2*a)/b + 2*ArcSin[c*x]]*Sin[(2*a)/b])/(2*b*c^2) + (Cos[(2*a)
/b]*SinIntegral[(2*a)/b + 2*ArcSin[c*x]])/(2*b*c^2)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 3303

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

Rule 3299

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

Rule 3302

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

Rubi steps

$$\begin{aligned}
\int \frac{x}{a+b\sin^{-1}(cx)}\,dx &= \frac{\mathrm{Subst}\left(\int \frac{\cos(x)\sin(x)}{a+bx}\,dx, x, \sin^{-1}(cx)\right)}{c^2}\\
&= \frac{\mathrm{Subst}\left(\int \frac{\sin(2x)}{2(a+bx)}\,dx, x, \sin^{-1}(cx)\right)}{c^2}\\
&= \frac{\mathrm{Subst}\left(\int \frac{\sin(2x)}{a+bx}\,dx, x, \sin^{-1}(cx)\right)}{2c^2}\\
&= \frac{\cos\left(\frac{2a}{b}\right)\mathrm{Subst}\left(\int \frac{\sin\left(\frac{2a}{b}+2x\right)}{a+bx}\,dx, x, \sin^{-1}(cx)\right)}{2c^2} - \frac{\sin\left(\frac{2a}{b}\right)\mathrm{Subst}\left(\int \frac{\cos\left(\frac{2a}{b}+2x\right)}{a+bx}\,dx, x, \sin^{-1}(cx)\right)}{2c^2}\\
&= -\frac{\mathrm{Ci}\left(\frac{2a}{b}+2\sin^{-1}(cx)\right)\sin\left(\frac{2a}{b}\right)}{2bc^2} + \frac{\cos\left(\frac{2a}{b}\right)\mathrm{Si}\left(\frac{2a}{b}+2\sin^{-1}(cx)\right)}{2bc^2}
\end{aligned}$$

Mathematica [A] time = 0.079123, size = 56, normalized size = 0.89

$$\frac{\cos\left(\frac{2a}{b}\right)\mathrm{Si}\left(\frac{2a}{b}+2\sin^{-1}(cx)\right)-\sin\left(\frac{2a}{b}\right)\mathrm{CosIntegral}\left(\frac{2a}{b}+2\sin^{-1}(cx)\right)}{2bc^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/(a + b*ArcSin[c*x]),x]
```

```
[Out] (-(CosIntegral[(2*a)/b + 2*ArcSin[c*x]]*Sin[(2*a)/b]) + Cos[(2*a)/b]*SinInt
egral[(2*a)/b + 2*ArcSin[c*x]])/(2*b*c^2)
```

Maple [A] time = 0.023, size = 58, normalized size = 0.9

$$\frac{1}{c^2}\left(\frac{1}{2b}\mathrm{Si}\left(2\arcsin(cx)+2\frac{a}{b}\right)\cos\left(2\frac{a}{b}\right)-\frac{1}{2b}\mathrm{Ci}\left(2\arcsin(cx)+2\frac{a}{b}\right)\sin\left(2\frac{a}{b}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/(a+b*arcsin(c*x)),x)
```

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

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x}{b\arcsin(cx)+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

```
[Out] integrate(x/(b*arcsin(c*x) + a), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x}{b\arcsin(cx)+a},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

```
[Out] integral(x/(b*arcsin(c*x) + a), x)
```

Sympy [F]   time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{a + b\operatorname{asin}{(cx)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*asin(c*x)),x)
```

```
[Out] Integral(x/(a + b*asin(c*x)), x)
```

Giac [A]   time = 1.28797, size = 116, normalized size = 1.84

$$-\frac{\cos\left(\frac{a}{b}\right)\operatorname{Ci}\left(\frac{2\,a}{b} + 2\,\arcsin\left(cx\right)\right)\sin\left(\frac{a}{b}\right)}{bc^{2}} + \frac{\cos\left(\frac{a}{b}\right)^{2}\operatorname{Si}\left(\frac{2\,a}{b} + 2\,\arcsin\left(cx\right)\right)}{bc^{2}} - \frac{\operatorname{Si}\left(\frac{2\,a}{b} + 2\,\arcsin\left(cx\right)\right)}{2\,bc^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*arcsin(c*x)),x, algorithm="giac")
```

```
[Out] -cos(a/b)*cos_integral(2*a/b + 2*arcsin(c*x))*sin(a/b)/(b*c^2) + cos(a/b)^2
*sin_integral(2*a/b + 2*arcsin(c*x))/(b*c^2) - 1/2*sin_integral(2*a/b + 2*a
rcsin(c*x))/(b*c^2)
```

3.160 $\int \frac{1}{a+b\sin^{-1}(cx)}\,dx$

Optimal. Leaf size=53

$$\frac{\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{bc}+\frac{\sin\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{bc}$$

```
[Out] (Cos[a/b]*CosIntegral[(a + b*ArcSin[c*x])/b])/(b*c) + (Sin[a/b]*SinIntegral
[(a + b*ArcSin[c*x])/b])/(b*c)
```

Rubi [A] time = 0.066952, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.4, Rules used = {4623, 3303, 3299, 3302}

$$\frac{\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{bc}+\frac{\sin\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{bc}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^(-1),x]
```

```
[Out] (Cos[a/b]*CosIntegral[(a + b*ArcSin[c*x])/b])/(b*c) + (Sin[a/b]*SinIntegral
[(a + b*ArcSin[c*x])/b])/(b*c)
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3303

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

Rule 3299

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

Rule 3302

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

Rubi steps

$$\begin{aligned}\int \frac{1}{a+b\sin^{-1}(cx)}\,dx &= \frac{\operatorname{Subst}\left(\int \frac{\cos\left(\frac{a}{b}-\frac{x}{b}\right)}{x}\,dx, x, a+b\sin^{-1}(cx)\right)}{bc}\\ &= \frac{\cos\left(\frac{a}{b}\right)\operatorname{Subst}\left(\int \frac{\cos\left(\frac{x}{b}\right)}{x}\,dx, x, a+b\sin^{-1}(cx)\right)}{bc}+\frac{\sin\left(\frac{a}{b}\right)\operatorname{Subst}\left(\int \frac{\sin\left(\frac{x}{b}\right)}{x}\,dx, x, a+b\sin^{-1}(cx)\right)}{bc}\\ &= \frac{\cos\left(\frac{a}{b}\right)\operatorname{Ci}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{bc}+\frac{\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{bc}\end{aligned}$$

Mathematica [A] time = 0.0648763, size = 44, normalized size = 0.83

$$\frac{\cos\left(\frac{a}{b}\right)\operatorname{CosIntegral}\left(\frac{a}{b}+\sin^{-1}(cx)\right)+\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{bc}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])^(-1),x]
```

```
[Out] (Cos[a/b]*CosIntegral[a/b + ArcSin[c*x]] + Sin[a/b]*SinIntegral[a/b + ArcSi
n[c*x]])/(b*c)
```

Maple [A] time = 0.023, size = 48, normalized size = 0.9

$$\frac{1}{c}\left(\frac{1}{b}\operatorname{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)+\frac{1}{b}\operatorname{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(a+b*arcsin(c*x)),x)
```

```
[Out] 1/c*(Si(arcsin(c*x)+a/b)*sin(a/b)/b+Ci(arcsin(c*x)+a/b)*cos(a/b)/b)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{b \arcsin{(cx)} + a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

```
[Out] integrate(1/(b*arcsin(c*x) + a), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{b \arcsin{(cx)} + a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

```
[Out] integral(1/(b*arcsin(c*x) + a), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{a + b \operatorname{asin}{(cx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*asin(c*x)),x)
```

```
[Out] Integral(1/(a + b*asin(c*x)), x)
```

Giac [A] time = 1.41228, size = 66, normalized size = 1.25

$$\frac{\cos\left(\frac{a}{b}\right)\operatorname{Ci}\left(\frac{a}{b}+\arcsin\left(cx\right)\right)}{bc}+\frac{\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a}{b}+\arcsin\left(cx\right)\right)}{bc}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x)),x, algorithm="giac")
```

```
[Out] cos(a/b)*cos_integral(a/b + arcsin(c*x))/(b*c) + sin(a/b)*sin_integral(a/b
+ arcsin(c*x))/(b*c)
```

3.161 $\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)}\,dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\frac{1}{x\left(a+b\sin^{-1}(cx)\right)},x\right)$$

```
[Out] Unintegrable[1/(x*(a + b*ArcSin[c*x])), x]
```

Rubi [A] time = 0.0237117, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*(a + b*ArcSin[c*x])),x]
```

```
[Out] Defer[Int][1/(x*(a + b*ArcSin[c*x])), x]
```

Rubi steps

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

Mathematica [A] time = 0.245207, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*(a + b*ArcSin[c*x])),x]
```

```
[Out] Integrate[1/(x*(a + b*ArcSin[c*x])), x]
```

Maple [A] time = 0.145, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+b\arcsin\left(cx\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(a+b*arcsin(c*x)),x)
```

```
[Out] int(1/x/(a+b*arcsin(c*x)),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b\arcsin\left(cx\right)+a)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)*x), x)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{bx\arcsin\left(cx\right)+ax},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

```
[Out] integral(1/(b*x*arcsin(c*x) + a*x), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\,(a+b\operatorname{asin}{(cx)})}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*asin(c*x)),x)
```

```
[Out] Integral(1/(x*(a + b*asin(c*x))), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b\arcsin{(cx)}+a)x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)*x), x)
```

3.162 $\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)}\,dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)},x\right)$$

```
[Out] Unintegrable[1/(x^2*(a + b*ArcSin[c*x])), x]
```

Rubi [A] time = 0.0245967, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

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

Verification is Not applicable to the result.

```
[In] Int[1/(x^2*(a + b*ArcSin[c*x])),x]
```

```
[Out] Defer[Int][1/(x^2*(a + b*ArcSin[c*x])), x]
```

Rubi steps

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

Mathematica [A] time = 2.16653, size = 0, normalized size = 0.

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

Verification is Not applicable to the result.

```
[In] Integrate[1/(x^2*(a + b*ArcSin[c*x])),x]
```

```
[Out] Integrate[1/(x^2*(a + b*ArcSin[c*x])), x]
```

Maple [A] time = 0.243, size = 0, normalized size = 0.

$$\int \frac{1}{x^{2} \left(a + b \arcsin \left(c x\right)\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/(a+b*arcsin(c*x)),x)
```

```
[Out] int(1/x^2/(a+b*arcsin(c*x)),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{{\left(b \arcsin \left(c x\right) + a\right)} x^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)*x^2), x)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$${\rm integral}\left(\frac{1}{b x^{2} \arcsin \left(c x\right) + a x^{2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

```
[Out] integral(1/(b*x^2*arcsin(c*x) + a*x^2), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\left(a+b\operatorname{asin}\left(cx\right)\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(a+b*asin(c*x)),x)
```

```
[Out] Integral(1/(x**2*(a + b*asin(c*x))), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b\arcsin\left(cx\right)+a)x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x)),x, algorithm="giac")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)*x^2), x)
```

3.163 $\int \frac{x^2}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx$

Optimal. Leaf size=156

$$\frac{\sin\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{4b^2c^3}-\frac{3\sin\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3\left(a+b\sin^{-1}(cx)\right)}{b}\right)}{4b^2c^3}-\frac{\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{4b^2c^3}+\frac{3\cos\left(\frac{3a}{b}\right)\text{Si}}{4}$$

```
[Out] -((x^2*Sqrt[1 - c^2*x^2])/(b*c*(a + b*ArcSin[c*x]))) + (CosIntegral[(a + b*
ArcSin[c*x])/b]*Sin[a/b])/(4*b^2*c^3) - (3*CosIntegral[(3*(a + b*ArcSin[c*x
]))/b]*Sin[(3*a)/b])/(4*b^2*c^3) - (Cos[a/b]*SinIntegral[(a + b*ArcSin[c*x]
)/b])/(4*b^2*c^3) + (3*Cos[(3*a)/b]*SinIntegral[(3*(a + b*ArcSin[c*x]))/b])
/(4*b^2*c^3)
```

Rubi [A] time = 0.18189, antiderivative size = 152, normalized size of antiderivative = 0.97, number of steps used = 8, number of rules used = 4, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.286, Rules used = {4631, 3303, 3299, 3302}

$$\frac{\sin\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{4b^2c^3}-\frac{3\sin\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3a}{b}+3\sin^{-1}(cx)\right)}{4b^2c^3}-\frac{\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{4b^2c^3}+\frac{3\cos}{}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/(a + b*ArcSin[c*x])^2,x]
```

```
[Out] -((x^2*Sqrt[1 - c^2*x^2])/(b*c*(a + b*ArcSin[c*x]))) + (CosIntegral[a/b + A
rcSin[c*x]]*Sin[a/b])/(4*b^2*c^3) - (3*CosIntegral[(3*a)/b + 3*ArcSin[c*x]]
*Sin[(3*a)/b])/(4*b^2*c^3) - (Cos[a/b]*SinIntegral[a/b + ArcSin[c*x]])/(4*b
^2*c^3) + (3*Cos[(3*a)/b]*SinIntegral[(3*a)/b + 3*ArcSin[c*x]])/(4*b^2*c^3)
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3303

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

Rule 3299

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

Rule 3302

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

Rubi steps

$$\begin{aligned}
\int \frac{x^2}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx &= -\frac{x^2\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}+\frac{\text{Subst}\left(\int\left(-\frac{\sin(x)}{4(a+bx)}+\frac{3\sin(3x)}{4(a+bx)}\right)dx,x,\sin^{-1}(cx)\right)}{bc^3}\\
&= -\frac{x^2\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}-\frac{\text{Subst}\left(\int\frac{\sin(x)}{a+bx}\,dx,x,\sin^{-1}(cx)\right)}{4bc^3}+\frac{3\,\text{Subst}\left(\int\frac{\sin(3x)}{a+bx}\,dx,x,\sin^{-1}(cx)\right)}{4bc^3}\\
&= -\frac{x^2\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}-\frac{\cos\left(\frac{a}{b}\right)\text{Subst}\left(\int\frac{\sin\left(\frac{a}{b}+x\right)}{a+bx}\,dx,x,\sin^{-1}(cx)\right)}{4bc^3}+\frac{\left(3\cos\left(\frac{3a}{b}\right)\right)\text{Subst}\left(\int\right.}{4b}\\
&= -\frac{x^2\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}+\frac{\text{Ci}\left(\frac{a}{b}+\sin^{-1}(cx)\right)\sin\left(\frac{a}{b}\right)}{4b^2c^3}-\frac{3\text{Ci}\left(\frac{3a}{b}+3\sin^{-1}(cx)\right)\sin\left(\frac{3a}{b}\right)}{4b^2c^3}-\frac{\cos\left(\frac{a}{b}\right.}{}
\end{aligned}$$

Mathematica [A] time = 0.531093, size = 125, normalized size = 0.8

$$\frac{-\frac{4bc^2x^2\sqrt{1-c^2x^2}}{a+b\sin^{-1}(cx)}+\sin\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a}{b}+\sin^{-1}(cx)\right)-3\sin\left(\frac{3a}{b}\right)\text{CosIntegral}\left(3\left(\frac{a}{b}+\sin^{-1}(cx)\right)\right)-\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a}{b}+\sin\right.}{4b^2c^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/(a + b*ArcSin[c*x])^2,x]
```

```
[Out] ((-4*b*c^2*x^2*Sqrt[1 - c^2*x^2])/(a + b*ArcSin[c*x]) + CosIntegral[a/b + A
rcSin[c*x]]*Sin[a/b] - 3*CosIntegral[3*(a/b + ArcSin[c*x])]*Sin[(3*a)/b] -
Cos[a/b]*SinIntegral[a/b + ArcSin[c*x]] + 3*Cos[(3*a)/b]*SinIntegral[3*(a/b
 + ArcSin[c*x])])/(4*b^2*c^3)
```

Maple [A] time = 0.037, size = 149, normalized size = 1.

$$\frac{1}{c^3}\Bigg(-\frac{1}{(4a+4b\arcsin(cx))b}\sqrt{-c^2x^2+1}-\frac{1}{4b^2}\bigg(\mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)-\mathrm{Ci}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)\bigg)+\frac{\cos}{(4a+}$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x^2}{b^2\arcsin(cx)^2+2ab\arcsin(cx)+a^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x^2/(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(a + b\operatorname{asin}(cx))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x**2/(a + b*asin(c*x))**2, x)
```

Giac [B] time = 1.40317, size = 872, normalized size = 5.59

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -3*b*arcsin(c*x)*cos(a/b)^2*cos_integral(3*a/b + 3*arcsin(c*x))*sin(a/b)/(b
^3*c^3*arcsin(c*x) + a*b^2*c^3) + 3*b*arcsin(c*x)*cos(a/b)^3*sin_integral(3
*a/b + 3*arcsin(c*x))/(b^3*c^3*arcsin(c*x) + a*b^2*c^3) - 3*a*cos(a/b)^2*co
s_integral(3*a/b + 3*arcsin(c*x))*sin(a/b)/(b^3*c^3*arcsin(c*x) + a*b^2*c^3
) + 3*a*cos(a/b)^3*sin_integral(3*a/b + 3*arcsin(c*x))/(b^3*c^3*arcsin(c*x)
 + a*b^2*c^3) + 3/4*b*arcsin(c*x)*cos_integral(3*a/b + 3*arcsin(c*x))*sin(a
/b)/(b^3*c^3*arcsin(c*x) + a*b^2*c^3) + 1/4*b*arcsin(c*x)*cos_integral(a/b
+ arcsin(c*x))*sin(a/b)/(b^3*c^3*arcsin(c*x) + a*b^2*c^3) - 9/4*b*arcsin(c*
x)*cos(a/b)*sin_integral(3*a/b + 3*arcsin(c*x))/(b^3*c^3*arcsin(c*x) + a*b^
2*c^3) - 1/4*b*arcsin(c*x)*cos(a/b)*sin_integral(a/b + arcsin(c*x))/(b^3*c^
3*arcsin(c*x) + a*b^2*c^3) + 3/4*a*cos_integral(3*a/b + 3*arcsin(c*x))*sin(
a/b)/(b^3*c^3*arcsin(c*x) + a*b^2*c^3) + 1/4*a*cos_integral(a/b + arcsin(c*
x))*sin(a/b)/(b^3*c^3*arcsin(c*x) + a*b^2*c^3) - 9/4*a*cos(a/b)*sin_integra
l(3*a/b + 3*arcsin(c*x))/(b^3*c^3*arcsin(c*x) + a*b^2*c^3) - 1/4*a*cos(a/b)
*sin_integral(a/b + arcsin(c*x))/(b^3*c^3*arcsin(c*x) + a*b^2*c^3) + (-c^2*
x^2 + 1)^(3/2)*b/(b^3*c^3*arcsin(c*x) + a*b^2*c^3) - sqrt(-c^2*x^2 + 1)*b/(
b^3*c^3*arcsin(c*x) + a*b^2*c^3)
```

3.164 $\int \frac{x}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx$

Optimal. Leaf size=90

$$\frac{\cos\left(\frac{2a}{b}\right)\text{CosIntegral}\left(\frac{2\left(a+b\sin^{-1}(cx)\right)}{b}\right)}{b^2c^2}+\frac{\sin\left(\frac{2a}{b}\right)\text{Si}\left(\frac{2\left(a+b\sin^{-1}(cx)\right)}{b}\right)}{b^2c^2}-\frac{x\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}$$

```
[Out] -((x*Sqrt[1 - c^2*x^2])/(b*c*(a + b*ArcSin[c*x]))) + (Cos[(2*a)/b]*CosInteg
ral[(2*(a + b*ArcSin[c*x]))/b])/(b^2*c^2) + (Sin[(2*a)/b]*SinIntegral[(2*(a
 + b*ArcSin[c*x]))/b])/(b^2*c^2)
```

Rubi [A] time = 0.10033, antiderivative size = 90, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.333, Rules used = {4631, 3303, 3299, 3302}

$$\frac{\cos\left(\frac{2a}{b}\right)\text{CosIntegral}\left(\frac{2a}{b}+2\sin^{-1}(cx)\right)}{b^2c^2}+\frac{\sin\left(\frac{2a}{b}\right)\text{Si}\left(\frac{2a}{b}+2\sin^{-1}(cx)\right)}{b^2c^2}-\frac{x\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[x/(a + b*ArcSin[c*x])^2,x]
```

```
[Out] -((x*Sqrt[1 - c^2*x^2])/(b*c*(a + b*ArcSin[c*x]))) + (Cos[(2*a)/b]*CosInteg
ral[(2*a)/b + 2*ArcSin[c*x]])/(b^2*c^2) + (Sin[(2*a)/b]*SinIntegral[(2*a)/b
 + 2*ArcSin[c*x]])/(b^2*c^2)
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3303

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

Rule 3299

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

Rule 3302

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

Rubi steps

$$\int \frac{x}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx = -\frac{x\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}+\frac{\text{Subst}\left(\int \frac{\cos(2x)}{a+bx}\,dx,x,\sin^{-1}(cx)\right)}{bc^2}$$

$$= -\frac{x\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}+\frac{\cos\left(\frac{2a}{b}\right)\text{Subst}\left(\int \frac{\cos\left(\frac{2a}{b}+2x\right)}{a+bx}\,dx,x,\sin^{-1}(cx)\right)}{bc^2}+\frac{\sin\left(\frac{2a}{b}\right)\text{Subst}\left(\int \right.}{}$$

$$= -\frac{x\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}+\frac{\cos\left(\frac{2a}{b}\right)\text{Ci}\left(\frac{2a}{b}+2\sin^{-1}(cx)\right)}{b^2c^2}+\frac{\sin\left(\frac{2a}{b}\right)\text{Si}\left(\frac{2a}{b}+2\sin^{-1}(cx)\right)}{b^2c^2}$$

Mathematica [A] time = 0.265858, size = 79, normalized size = 0.88

$$\frac{-\frac{bcx\sqrt{1-c^2x^2}}{a+b\sin^{-1}(cx)}+\cos\left(\frac{2a}{b}\right)\text{CosIntegral}\left(2\left(\frac{a}{b}+\sin^{-1}(cx)\right)\right)+\sin\left(\frac{2a}{b}\right)\text{Si}\left(2\left(\frac{a}{b}+\sin^{-1}(cx)\right)\right)}{b^2c^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/(a + b*ArcSin[c*x])^2,x]
```

```
[Out] (-((b*c*x*Sqrt[1 - c^2*x^2])/(a + b*ArcSin[c*x])) + Cos[(2*a)/b]*CosIntegra
l[2*(a/b + ArcSin[c*x])] + Sin[(2*a)/b]*SinIntegral[2*(a/b + ArcSin[c*x])])
/(b^2*c^2)
```

Maple [A] time = 0.027, size = 77, normalized size = 0.9

$$\frac{1}{c^2}\left(-\frac{\sin\left(2\arcsin\left(cx\right)\right)}{\left(2a+2b\arcsin\left(cx\right)\right)b}+\frac{1}{b^2}\left(\mathrm{Si}\left(2\arcsin\left(cx\right)+2\frac{a}{b}\right)\sin\left(2\frac{a}{b}\right)+\mathrm{Ci}\left(2\arcsin\left(cx\right)+2\frac{a}{b}\right)\cos\left(2\frac{a}{b}\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Timed out
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{x}{b^2\arcsin\left(cx\right)^2+2ab\arcsin\left(cx\right)+a^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x/(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{x}{\left(a+b\,\mathrm{asin}\left(cx\right)\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x/(a + b*asin(c*x))**2, x)
```

Giac [B] time = 1.41347, size = 440, normalized size = 4.89

$$\frac{2\,b\arcsin\left(cx\right)\cos\left(\frac{a}{b}\right)^{2}\operatorname{Ci}\left(\frac{2\,a}{b}+2\,\arcsin\left(cx\right)\right)}{b^{3}c^{2}\arcsin\left(cx\right)+ab^{2}c^{2}}+\frac{2\,b\arcsin\left(cx\right)\cos\left(\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{2\,a}{b}+2\,\arcsin\left(cx\right)\right)}{b^{3}c^{2}\arcsin\left(cx\right)+ab^{2}c^{2}}+\frac{2\,a\cos\left(\frac{a}{b}\right)^{2}\mathrm{C}}{b^{3}c^{2}\,\mathrm{arc}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2*b*arcsin(c*x)*cos(a/b)^2*cos_integral(2*a/b + 2*arcsin(c*x))/(b^3*c^2*arc
sin(c*x) + a*b^2*c^2) + 2*b*arcsin(c*x)*cos(a/b)*sin(a/b)*sin_integral(2*a/
b + 2*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) + 2*a*cos(a/b)^2*cos_i
ntegral(2*a/b + 2*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) + 2*a*cos(
a/b)*sin(a/b)*sin_integral(2*a/b + 2*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*
b^2*c^2) - sqrt(-c^2*x^2 + 1)*b*c*x/(b^3*c^2*arcsin(c*x) + a*b^2*c^2) - b*a
rcsin(c*x)*cos_integral(2*a/b + 2*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2
*c^2) - a*cos_integral(2*a/b + 2*arcsin(c*x))/(b^3*c^2*arcsin(c*x) + a*b^2*
c^2)
```

3.165 $\int \frac{1}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx$

Optimal. Leaf size=86

$$\frac{\sin\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{b^2c}-\frac{\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{b^2c}-\frac{\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}$$

```
[Out] -(Sqrt[1 - c^2*x^2]/(b*c*(a + b*ArcSin[c*x]))) + (CosIntegral[(a + b*ArcSin
[c*x])/b]*Sin[a/b])/(b^2*c) - (Cos[a/b]*SinIntegral[(a + b*ArcSin[c*x])/b])
/(b^2*c)
```

Rubi [A] time = 0.168647, antiderivative size = 82, normalized size of antiderivative = 0.95, number of steps used = 5, number of rules used = 5, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4621, 4723, 3303, 3299, 3302}

$$\frac{\sin\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{b^2c}-\frac{\cos\left(\frac{a}{b}\right)\text{Si}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{b^2c}-\frac{\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^(-2),x]
```

```
[Out] -(Sqrt[1 - c^2*x^2]/(b*c*(a + b*ArcSin[c*x]))) + (CosIntegral[a/b + ArcSin[
c*x]]*Sin[a/b])/(b^2*c) - (Cos[a/b]*SinIntegral[a/b + ArcSin[c*x]])/(b^2*c)
```

Rule 4621

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Sqrt[1 - c^
2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + Dist[c/(b*(n + 1)),
 Int[(x*(a + b*ArcSin[c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a,
 b, c}, x] && LtQ[n, -1]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3303

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

Rule 3299

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

Rule 3302

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

Rubi steps

$$
\begin{aligned}
\int \frac{1}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx &= -\frac{\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}-\frac{c\int\frac{x}{\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)}\,dx}{b}\\
&= -\frac{\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}-\frac{\text{Subst}\left(\int\frac{\sin(x)}{a+bx}\,dx,x,\sin^{-1}(cx)\right)}{bc}\\
&= -\frac{\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}-\frac{\cos\left(\frac{a}{b}\right)\text{Subst}\left(\int\frac{\sin\left(\frac{a}{b}+x\right)}{a+bx}\,dx,x,\sin^{-1}(cx)\right)}{bc}+\frac{\sin\left(\frac{a}{b}\right)\text{Subst}\left(\int\frac{\cos\left(\frac{a}{b}+\right.}{a+bx}\right.}{bc}\\
&= -\frac{\sqrt{1-c^2x^2}}{bc\left(a+b\sin^{-1}(cx)\right)}+\frac{\mathbf{Ci}\left(\frac{a}{b}+\sin^{-1}(cx)\right)\sin\left(\frac{a}{b}\right)}{b^2c}-\frac{\cos\left(\frac{a}{b}\right)\mathbf{Si}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{b^2c}
\end{aligned}
$$

Mathematica [A] time = 0.155814, size = 72, normalized size = 0.84

$$
\frac{-\frac{b\sqrt{1-c^2x^2}}{a+b\sin^{-1}(cx)}+\sin\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a}{b}+\sin^{-1}(cx)\right)-\cos\left(\frac{a}{b}\right)\mathbf{Si}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{b^2c}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])^(-2),x]
```

```
[Out] (-((b*Sqrt[1 - c^2*x^2])/(a + b*ArcSin[c*x])) + CosIntegral[a/b + ArcSin[c*
x]]*Sin[a/b] - Cos[a/b]*SinIntegral[a/b + ArcSin[c*x]])/(b^2*c)
```

Maple [A] time = 0.03, size = 76, normalized size = 0.9

$$\frac{1}{c}\left(-\frac{1}{\left(a+b\arcsin\left(cx\right)\right)b}\sqrt{-c^{2}x^{2}+1}-\frac{1}{b^{2}}\left(\mathrm{Si}\left(\arcsin\left(cx\right)+\frac{a}{b}\right)\cos\left(\frac{a}{b}\right)-\mathrm{Ci}\left(\arcsin\left(cx\right)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(a+b*arcsin(c*x))^2,x)
```

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

Maple [F (-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{b^{2}\arcsin\left(cx\right)^{2}+2\,ab\arcsin\left(cx\right)+a^{2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

```
[Out] integral(1/(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(a + b \operatorname{asin}{\left(cx \right)}\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*asin(c*x))**2,x)
```

```
[Out] Integral((a + b*asin(c*x))**(-2), x)
```

Giac [B] time = 1.35946, size = 259, normalized size = 3.01

$$\frac{b \arcsin\left(cx\right) \operatorname{Ci}\left(\frac{a}{b} + \arcsin\left(cx\right)\right) \sin\left(\frac{a}{b}\right)}{b^{3} c \arcsin\left(cx\right) + a b^{2} c} - \frac{b \arcsin\left(cx\right) \cos\left(\frac{a}{b}\right) \operatorname{Si}\left(\frac{a}{b} + \arcsin\left(cx\right)\right)}{b^{3} c \arcsin\left(cx\right) + a b^{2} c} + \frac{a \operatorname{Ci}\left(\frac{a}{b} + \arcsin\left(cx\right)\right) \sin\left(\frac{a}{b}\right)}{b^{3} c \arcsin\left(cx\right) + a b^{2} c} -$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

```
[Out] b*arcsin(c*x)*cos_integral(a/b + arcsin(c*x))*sin(a/b)/(b^3*c*arcsin(c*x) +
 a*b^2*c) - b*arcsin(c*x)*cos(a/b)*sin_integral(a/b + arcsin(c*x))/(b^3*c*a
rcsin(c*x) + a*b^2*c) + a*cos_integral(a/b + arcsin(c*x))*sin(a/b)/(b^3*c*a
rcsin(c*x) + a*b^2*c) - a*cos(a/b)*sin_integral(a/b + arcsin(c*x))/(b^3*c*a
rcsin(c*x) + a*b^2*c) - sqrt(-c^2*x^2 + 1)*b/(b^3*c*arcsin(c*x) + a*b^2*c)
```

3.166 $\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^2}\,dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\frac{1}{x\left(a+b\sin^{-1}(cx)\right)^2},x\right)$$

```
[Out] Unintegrable[1/(x*(a + b*ArcSin[c*x])^2), x]
```

Rubi [A] time = 0.0226791, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

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

Verification is Not applicable to the result.

```
[In] Int[1/(x*(a + b*ArcSin[c*x])^2),x]
```

```
[Out] Defer[Int][1/(x*(a + b*ArcSin[c*x])^2), x]
```

Rubi steps

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

Mathematica [A] time = 3.98478, size = 0, normalized size = 0.

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

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*(a + b*ArcSin[c*x])^2),x]
```

```
[Out] Integrate[1/(x*(a + b*ArcSin[c*x])^2), x]
```

Maple [A] time = 0.184, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+b\arcsin\left(cx\right)\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(a+b*arcsin(c*x))^2,x)
```

```
[Out] int(1/x/(a+b*arcsin(c*x))^2,x)
```

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{b^{2}x\arcsin\left(cx\right)^{2}+2\,abx\arcsin\left(cx\right)+a^{2}x},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

```
[Out] integral(1/(b^2*x*arcsin(c*x)^2 + 2*a*b*x*arcsin(c*x) + a^2*x), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+b\operatorname{asin}\left(cx\right)\right)^{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*asin(c*x))**2,x)
```

```
[Out] Integral(1/(x*(a + b*asin(c*x))**2), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b\arcsin\left(cx\right)+a\right)^{2}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)^2*x), x)
```

3.167 $\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^2}\,dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^2},x\right)$$

```
[Out] Unintegrable[1/(x^2*(a + b*ArcSin[c*x])^2), x]
```

Rubi [A] time = 0.0228626, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

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

Verification is Not applicable to the result.

```
[In] Int[1/(x^2*(a + b*ArcSin[c*x])^2),x]
```

```
[Out] Defer[Int][1/(x^2*(a + b*ArcSin[c*x])^2), x]
```

Rubi steps

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

Mathematica [A] time = 33.3234, size = 0, normalized size = 0.

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

Verification is Not applicable to the result.

```
[In] Integrate[1/(x^2*(a + b*ArcSin[c*x])^2),x]
```

```
[Out] Integrate[1/(x^2*(a + b*ArcSin[c*x])^2), x]
```

Maple [A] time = 0.339, size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \left(a+b \arcsin \left(c x\right)\right)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/(a+b*arcsin(c*x))^2,x)
```

```
[Out] int(1/x^2/(a+b*arcsin(c*x))^2,x)
```

Maxima [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

```
[Out] Timed out
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{b^2 x^2 \arcsin \left(c x\right)^2+2 \, a b x^2 \arcsin \left(c x\right)+a^2 x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

```
[Out] integral(1/(b^2*x^2*arcsin(c*x)^2 + 2*a*b*x^2*arcsin(c*x) + a^2*x^2), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \left(a + b \operatorname{asin}\left(cx\right)\right)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(a+b*asin(c*x))**2,x)
```

```
[Out] Integral(1/(x**2*(a + b*asin(c*x))**2), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b \arcsin\left(cx\right) + a\right)^2 x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)^2*x^2), x)
```

3.168 $\int \frac{x^2}{\left(a+b\sin^{-1}(cx)\right)^3}\,dx$

Optimal. Leaf size=197

$$-\frac{\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{8b^3c^3}+\frac{9\cos\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3\left(a+b\sin^{-1}(cx)\right)}{b}\right)}{8b^3c^3}-\frac{\sin\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{8b^3c^3}+9\sin\left(\frac{3a}{b}\right)$$

```
[Out] -(x^2*Sqrt[1 - c^2*x^2])/(2*b*c*(a + b*ArcSin[c*x])^2) - x/(b^2*c^2*(a + b*
ArcSin[c*x])) + (3*x^3)/(2*b^2*(a + b*ArcSin[c*x])) - (Cos[a/b]*CosIntegral
[(a + b*ArcSin[c*x])/b])/(8*b^3*c^3) + (9*Cos[(3*a)/b]*CosIntegral[(3*(a +
b*ArcSin[c*x]))/b])/(8*b^3*c^3) - (Sin[a/b]*SinIntegral[(a + b*ArcSin[c*x])
/b])/(8*b^3*c^3) + (9*Sin[(3*a)/b]*SinIntegral[(3*(a + b*ArcSin[c*x]))/b])/
(8*b^3*c^3)
```

Rubi [A] time = 0.542489, antiderivative size = 245, normalized size of antiderivative = 1.24, number of steps used = 16, number of rules used = 8, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.571, Rules used = {4633, 4719, 4635, 4406, 3303, 3299, 3302, 4623}

$$-\frac{9\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{8b^3c^3}+\frac{9\cos\left(\frac{3a}{b}\right)\text{CosIntegral}\left(\frac{3a}{b}+3\sin^{-1}(cx)\right)}{8b^3c^3}+\frac{\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\sin^{-1}}{b}\right.}{b^3c^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/(a + b*ArcSin[c*x])^3,x]
```

```
[Out] -(x^2*Sqrt[1 - c^2*x^2])/(2*b*c*(a + b*ArcSin[c*x])^2) - x/(b^2*c^2*(a + b*
ArcSin[c*x])) + (3*x^3)/(2*b^2*(a + b*ArcSin[c*x])) - (9*Cos[a/b]*CosIntegr
al[a/b + ArcSin[c*x]])/(8*b^3*c^3) + (9*Cos[(3*a)/b]*CosIntegral[(3*a)/b +
3*ArcSin[c*x]])/(8*b^3*c^3) + (Cos[a/b]*CosIntegral[(a + b*ArcSin[c*x])/b])
/(b^3*c^3) - (9*Sin[a/b]*SinIntegral[a/b + ArcSin[c*x]])/(8*b^3*c^3) + (9*S
in[(3*a)/b]*SinIntegral[(3*a)/b + 3*ArcSin[c*x]])/(8*b^3*c^3) + (Sin[a/b]*S
inIntegral[(a + b*ArcSin[c*x])/b])/(b^3*c^3)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3303

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

Rule 3299

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

Rule 3302

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

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rubi steps

$$\int \frac{x^2}{\left(a+b\sin^{-1}(cx)\right)^3}\,dx = -\frac{x^2\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2}+\frac{\int \frac{x}{\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}\,dx}{bc}-\frac{(3c)\int \frac{x^3}{\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}\,dx}{2b}$$

$$= -\frac{x^2\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2}-\frac{x}{b^2c^2\left(a+b\sin^{-1}(cx)\right)}+\frac{3x^3}{2b^2\left(a+b\sin^{-1}(cx)\right)}-\frac{9\int \frac{x^2}{a+b\sin^{-1}(cx)}\,dx}{2b^2}$$

$$= -\frac{x^2\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2}-\frac{x}{b^2c^2\left(a+b\sin^{-1}(cx)\right)}+\frac{3x^3}{2b^2\left(a+b\sin^{-1}(cx)\right)}+\frac{\text{Subst}\left(\int \frac{\cos\left(\frac{a}{b}-\frac{x}{b}\right.}{x}\right.}{}$$

$$= -\frac{x^2\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2}-\frac{x}{b^2c^2\left(a+b\sin^{-1}(cx)\right)}+\frac{3x^3}{2b^2\left(a+b\sin^{-1}(cx)\right)}-\frac{9\,\text{Subst}\left(\int\left(\frac{\cos(}{4(a+b}\right.\right.}{}$$

$$= -\frac{x^2\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2}-\frac{x}{b^2c^2\left(a+b\sin^{-1}(cx)\right)}+\frac{3x^3}{2b^2\left(a+b\sin^{-1}(cx)\right)}+\frac{\cos\left(\frac{a}{b}\right)\text{Ci}\left(\frac{a+b\sin}{}\right.}{b^3c^3}$$

$$= -\frac{x^2\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2}-\frac{x}{b^2c^2\left(a+b\sin^{-1}(cx)\right)}+\frac{3x^3}{2b^2\left(a+b\sin^{-1}(cx)\right)}+\frac{\cos\left(\frac{a}{b}\right)\text{Ci}\left(\frac{a+b\sin}{}\right.}{b^3c^3}$$

$$= -\frac{x^2\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2}-\frac{x}{b^2c^2\left(a+b\sin^{-1}(cx)\right)}+\frac{3x^3}{2b^2\left(a+b\sin^{-1}(cx)\right)}-\frac{9\cos\left(\frac{a}{b}\right)\text{Ci}\left(\frac{a}{b}+\right.}{8b^3c^3}$$

Mathematica [A] time = 0.861159, size = 168, normalized size = 0.85

$$-\frac{\frac{4b^2x^2\sqrt{1-c^2x^2}}{c\left(a+b\sin^{-1}(cx)\right)^2}+\frac{\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{c^3}-\frac{9\cos\left(\frac{3a}{b}\right)\text{CosIntegral}\left(3\left(\frac{a}{b}+\sin^{-1}(cx)\right)\right)}{c^3}+\frac{\sin\left(\frac{a}{b}\right)\text{Si}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{c^3}-\frac{9\sin\left(\frac{3a}{b}\right)\text{Si}\left(3\left(\frac{a}{b}+\sin\right.\right.}{c^3}}{8b^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[x^2/(a + b*ArcSin[c*x])^3,x]
```

```
[Out] -((4*b^2*x^2*Sqrt[1 - c^2*x^2])/(c*(a + b*ArcSin[c*x])^2) + (8*b*x)/(c^2*(a
 + b*ArcSin[c*x])) - (12*b*x^3)/(a + b*ArcSin[c*x]) + (Cos[a/b]*CosIntegral
[a/b + ArcSin[c*x]])/c^3 - (9*Cos[(3*a)/b]*CosIntegral[3*(a/b + ArcSin[c*x]
)])/c^3 + (Sin[a/b]*SinIntegral[a/b + ArcSin[c*x]])/c^3 - (9*Sin[(3*a)/b]*S
inIntegral[3*(a/b + ArcSin[c*x])])/c^3)/(8*b^3)
```

Maple [A] time = 0.034, size = 290, normalized size = 1.5

$$\frac{1}{c^3}\Bigg(-\frac{1}{8\,(a+b\arcsin(cx))^2\,b}\sqrt{-c^2x^2+1}-\frac{1}{(8\,a+8\,b\arcsin(cx))\,b^3}\Bigg(\arcsin(cx)\,\mathrm{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)b+\arcsin($$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/(a+b*arcsin(c*x))^3,x)
```

```
[Out] 1/c^3*(-1/8*(-c^2*x^2+1)^(1/2)/(a+b*arcsin(c*x))^2/b-1/8*(arcsin(c*x)*Si(ar
csin(c*x)+a/b)*sin(a/b)*b+arcsin(c*x)*Ci(arcsin(c*x)+a/b)*cos(a/b)*b+Si(arc
sin(c*x)+a/b)*sin(a/b)*a+Ci(arcsin(c*x)+a/b)*cos(a/b)*a-x*b*c)/(a+b*arcsin(
c*x))/b^3+1/8*cos(3*arcsin(c*x))/(a+b*arcsin(c*x))^2/b+3/8*(3*arcsin(c*x)*S
i(3*arcsin(c*x)+3*a/b)*sin(3*a/b)*b+3*arcsin(c*x)*Ci(3*arcsin(c*x)+3*a/b)*c
os(3*a/b)*b+3*Si(3*arcsin(c*x)+3*a/b)*sin(3*a/b)*a+3*Ci(3*arcsin(c*x)+3*a/b
)*cos(3*a/b)*a-sin(3*arcsin(c*x))*b)/(a+b*arcsin(c*x))/b^3)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{3\,ac^2x^3-\sqrt{cx+1}\sqrt{-cx+1}bcx^2-2\,ax+\left(3\,bc^2x^3-2\,bx\right)\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)-\Big(b^4c^2\arctan\Big(cx,\sqrt{cx+1}\sqrt{-c}}{2\Big(b^4c^2\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)^2+2\,ab^3c^2\arctan\Big(c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*arcsin(c*x))^3,x, algorithm="maxima")
```

```
[Out] 1/2*(3*a*c^2*x^3 - sqrt(c*x + 1)*sqrt(-c*x + 1)*b*c*x^2 - 2*a*x + (3*b*c^2*
x^3 - 2*b*x)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) - 2*(b^4*c^2*arctan
2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 + 2*a*b^3*c^2*arctan2(c*x, sqrt(c*x
+ 1)*sqrt(-c*x + 1)) + a^2*b^2*c^2)*integrate(1/2*(9*c^2*x^2 - 2)/(b^3*c^2*
arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b^2*c^2), x))/(b^4*c^2*arcta
n2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 + 2*a*b^3*c^2*arctan2(c*x, sqrt(c*x
 + 1)*sqrt(-c*x + 1)) + a^2*b^2*c^2)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x^2}{b^3\arcsin(cx)^3 + 3\,ab^2\arcsin(cx)^2 + 3\,a^2b\arcsin(cx) + a^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*arcsin(c*x))^3,x, algorithm="fricas")
```

```
[Out] integral(x^2/(b^3*arcsin(c*x)^3 + 3*a*b^2*arcsin(c*x)^2 + 3*a^2*b*arcsin(c*
x) + a^3), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(a+b\,\text{asin}(cx))^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/(a+b*asin(c*x))**3,x)
```

```
[Out] Integral(x**2/(a + b*asin(c*x))**3, x)
```

Giac [B] time = 1.7048, size = 2078, normalized size = 10.55

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*arcsin(c*x))^3,x, algorithm="giac")
```

```
[Out] 9/2*b^2*arcsin(c*x)^2*cos(a/b)^3*cos_integral(3*a/b + 3*arcsin(c*x))/(b^5*c
^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*b^3*c^3) + 9/2*b^2*arcsin(
c*x)^2*cos(a/b)^2*sin(a/b)*sin_integral(3*a/b + 3*arcsin(c*x))/(b^5*c^3*arc
sin(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*b^3*c^3) + 9*a*b*arcsin(c*x)*cos
```

```
(a/b)^3*cos_integral(3*a/b + 3*arcsin(c*x))/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^
4*c^3*arcsin(c*x) + a^2*b^3*c^3) + 9*a*b*arcsin(c*x)*cos(a/b)^2*sin(a/b)*si
n_integral(3*a/b + 3*arcsin(c*x))/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arcs
in(c*x) + a^2*b^3*c^3) + 3/2*(c^2*x^2 - 1)*b^2*c*x*arcsin(c*x)/(b^5*c^3*arc
sin(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*b^3*c^3) - 27/8*b^2*arcsin(c*x)^
2*cos(a/b)*cos_integral(3*a/b + 3*arcsin(c*x))/(b^5*c^3*arcsin(c*x)^2 + 2*a
*b^4*c^3*arcsin(c*x) + a^2*b^3*c^3) + 9/2*a^2*cos(a/b)^3*cos_integral(3*a/b
 + 3*arcsin(c*x))/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*b^
3*c^3) - 1/8*b^2*arcsin(c*x)^2*cos(a/b)*cos_integral(a/b + arcsin(c*x))/(b^
5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*b^3*c^3) - 9/8*b^2*arcs
in(c*x)^2*sin(a/b)*sin_integral(3*a/b + 3*arcsin(c*x))/(b^5*c^3*arcsin(c*x)
^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*b^3*c^3) + 9/2*a^2*cos(a/b)^2*sin(a/b)*s
in_integral(3*a/b + 3*arcsin(c*x))/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arc
sin(c*x) + a^2*b^3*c^3) - 1/8*b^2*arcsin(c*x)^2*sin(a/b)*sin_integral(a/b +
 arcsin(c*x))/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*b^3*c^
3) + 3/2*(c^2*x^2 - 1)*a*b*c*x/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arcsin(
c*x) + a^2*b^3*c^3) + 1/2*b^2*c*x*arcsin(c*x)/(b^5*c^3*arcsin(c*x)^2 + 2*a*
b^4*c^3*arcsin(c*x) + a^2*b^3*c^3) - 27/4*a*b*arcsin(c*x)*cos(a/b)*cos_inte
gral(3*a/b + 3*arcsin(c*x))/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x
) + a^2*b^3*c^3) - 1/4*a*b*arcsin(c*x)*cos(a/b)*cos_integral(a/b + arcsin(c
*x))/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*b^3*c^3) - 9/4*
a*b*arcsin(c*x)*sin(a/b)*sin_integral(3*a/b + 3*arcsin(c*x))/(b^5*c^3*arcsi
n(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*b^3*c^3) - 1/4*a*b*arcsin(c*x)*sin
(a/b)*sin_integral(a/b + arcsin(c*x))/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*
arcsin(c*x) + a^2*b^3*c^3) + 1/2*a*b*c*x/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c
^3*arcsin(c*x) + a^2*b^3*c^3) - 27/8*a^2*cos(a/b)*cos_integral(3*a/b + 3*ar
csin(c*x))/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*b^3*c^3)
- 1/8*a^2*cos(a/b)*cos_integral(a/b + arcsin(c*x))/(b^5*c^3*arcsin(c*x)^2 +
 2*a*b^4*c^3*arcsin(c*x) + a^2*b^3*c^3) - 9/8*a^2*sin(a/b)*sin_integral(3*a
/b + 3*arcsin(c*x))/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*
b^3*c^3) - 1/8*a^2*sin(a/b)*sin_integral(a/b + arcsin(c*x))/(b^5*c^3*arcsin
(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*b^3*c^3) + 1/2*(-c^2*x^2 + 1)^(3/2)
*b^2/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a^2*b^3*c^3) - 1/2*
sqrt(-c^2*x^2 + 1)*b^2/(b^5*c^3*arcsin(c*x)^2 + 2*a*b^4*c^3*arcsin(c*x) + a
^2*b^3*c^3)
```

3.169 $\int \frac{x}{\left(a+b\sin^{-1}(cx)\right)^3}\,dx$

Optimal. Leaf size=130

$$\frac{\sin\left(\frac{2a}{b}\right)\text{CosIntegral}\left(\frac{2\left(a+b\sin^{-1}(cx)\right)}{b}\right)}{b^3c^2}-\frac{\cos\left(\frac{2a}{b}\right)\text{Si}\left(\frac{2\left(a+b\sin^{-1}(cx)\right)}{b}\right)}{b^3c^2}-\frac{1}{2b^2c^2\left(a+b\sin^{-1}(cx)\right)}+\frac{x^2}{b^2\left(a+b\sin^{-1}(cx)\right)}-$$

```
[Out] -(x*Sqrt[1 - c^2*x^2])/(2*b*c*(a + b*ArcSin[c*x])^2) - 1/(2*b^2*c^2*(a + b*
ArcSin[c*x])) + x^2/(b^2*(a + b*ArcSin[c*x])) + (CosIntegral[(2*(a + b*ArcS
in[c*x]))/b]*Sin[(2*a)/b])/(b^3*c^2) - (Cos[(2*a)/b]*SinIntegral[(2*(a + b*
ArcSin[c*x]))/b])/(b^3*c^2)
```

Rubi [A] time = 0.322832, antiderivative size = 130, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 9, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.75, Rules used = {4633, 4719, 4635, 4406, 12, 3303, 3299, 3302, 4641}

$$\frac{\sin\left(\frac{2a}{b}\right)\text{CosIntegral}\left(\frac{2a}{b}+2\sin^{-1}(cx)\right)}{b^3c^2}-\frac{\cos\left(\frac{2a}{b}\right)\text{Si}\left(\frac{2a}{b}+2\sin^{-1}(cx)\right)}{b^3c^2}-\frac{1}{2b^2c^2\left(a+b\sin^{-1}(cx)\right)}+\frac{x^2}{b^2\left(a+b\sin^{-1}(c\right.}$$

Antiderivative was successfully verified.

```
[In] Int[x/(a + b*ArcSin[c*x])^3,x]
```

```
[Out] -(x*Sqrt[1 - c^2*x^2])/(2*b*c*(a + b*ArcSin[c*x])^2) - 1/(2*b^2*c^2*(a + b*
ArcSin[c*x])) + x^2/(b^2*(a + b*ArcSin[c*x])) + (CosIntegral[(2*a)/b + 2*Ar
cSin[c*x]]*Sin[(2*a)/b])/(b^3*c^2) - (Cos[(2*a)/b]*SinIntegral[(2*a)/b + 2*
ArcSin[c*x]])/(b^3*c^2)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 3303

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

Rule 3299

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

Rule 3302

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

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rubi steps

$$\int \frac{x}{\left(a+b\sin^{-1}(cx)\right)^3}\,dx = -\frac{x\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2} + \frac{\int \frac{1}{\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}\,dx}{2bc} - \frac{c\int \frac{x^2}{\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}\,dx}{b}$$

$$= -\frac{x\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2} - \frac{1}{2b^2c^2\left(a+b\sin^{-1}(cx)\right)} + \frac{x^2}{b^2\left(a+b\sin^{-1}(cx)\right)} - \frac{2\int \frac{x}{a+b\sin^{-1}(cx)}\,dx}{b^2}$$

$$= -\frac{x\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2} - \frac{1}{2b^2c^2\left(a+b\sin^{-1}(cx)\right)} + \frac{x^2}{b^2\left(a+b\sin^{-1}(cx)\right)} - \frac{2\,\text{Subst}\left(\int \frac{\cos(x)}{a+}\right.}{}$$

$$= -\frac{x\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2} - \frac{1}{2b^2c^2\left(a+b\sin^{-1}(cx)\right)} + \frac{x^2}{b^2\left(a+b\sin^{-1}(cx)\right)} - \frac{2\,\text{Subst}\left(\int \frac{\sin(2x}{2(a+bx}\right.}{b^2}$$

$$= -\frac{x\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2} - \frac{1}{2b^2c^2\left(a+b\sin^{-1}(cx)\right)} + \frac{x^2}{b^2\left(a+b\sin^{-1}(cx)\right)} - \frac{\text{Subst}\left(\int \frac{\sin(2x)}{a+bx}\right.}{b^2c}$$

$$= -\frac{x\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2} - \frac{1}{2b^2c^2\left(a+b\sin^{-1}(cx)\right)} + \frac{x^2}{b^2\left(a+b\sin^{-1}(cx)\right)} - \frac{\cos\left(\frac{2a}{b}\right)\text{Subst}\left(\right.}{}$$

$$= -\frac{x\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2} - \frac{1}{2b^2c^2\left(a+b\sin^{-1}(cx)\right)} + \frac{x^2}{b^2\left(a+b\sin^{-1}(cx)\right)} + \frac{\text{Ci}\left(\frac{2a}{b}+2\sin^{-1}(\right.}{b^3c^2}$$

Mathematica [A] time = 0.330467, size = 108, normalized size = 0.83

$$\frac{-\frac{b^2cx\sqrt{1-c^2x^2}}{\left(a+b\sin^{-1}(cx)\right)^2} + \frac{b\left(2c^2x^2-1\right)}{a+b\sin^{-1}(cx)} + 2\sin\left(\frac{2a}{b}\right)\text{CosIntegral}\left(2\left(\frac{a}{b}+\sin^{-1}(cx)\right)\right) - 2\cos\left(\frac{2a}{b}\right)\text{Si}\left(2\left(\frac{a}{b}+\sin^{-1}(cx)\right)\right)}{2b^3c^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[x/(a + b*ArcSin[c*x])^3,x]
```

```
[Out] (-((b^2*c*x*Sqrt[1 - c^2*x^2])/(a + b*ArcSin[c*x])^2) + (b*(-1 + 2*c^2*x^2)
)/(a + b*ArcSin[c*x]) + 2*CosIntegral[2*(a/b + ArcSin[c*x])]*Sin[(2*a)/b] -
 2*Cos[(2*a)/b]*SinIntegral[2*(a/b + ArcSin[c*x])])/(2*b^3*c^2)
```

Maple [A] time = 0.027, size = 157, normalized size = 1.2

$$\frac{1}{c^2}\Biggl(-\frac{\sin(2\arcsin(cx))}{4(a+b\arcsin(cx))^2 b}-\frac{1}{(2a+2b\arcsin(cx))b^3}\Bigl(2\arcsin(cx)\operatorname{Si}\Bigl(2\arcsin(cx)+2\frac{a}{b}\Bigr)\cos\Bigl(2\frac{a}{b}\Bigr)b-2\arcsin(c$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{2ac^2x^2-\sqrt{cx+1}\sqrt{-cx+1}bcx+\left(2bc^2x^2-b\right)\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)-a-\frac{4\left(b^4c^2\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)^2+2ab^3c^2\operatorname{arc}}{}}{2\left(b^4c^2\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)^2+2ab^3c^2\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*(2*a*c^2*x^2 - sqrt(c*x + 1)*sqrt(-c*x + 1)*b*c*x + (2*b*c^2*x^2 - b)*a
rctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) - 4*(b^4*c^2*arctan2(c*x, sqrt(c*
x + 1)*sqrt(-c*x + 1))^2 + 2*a*b^3*c^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x
 + 1)) + a^2*b^2*c^2)*integrate(x/(b^3*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x
 + 1)) + a*b^2), x) - a)/(b^4*c^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)
)^2 + 2*a*b^3*c^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a^2*b^2*c^2)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{x}{b^3 \arcsin\left(cx\right)^3 + 3\,ab^2 \arcsin\left(cx\right)^2 + 3\,a^2 b \arcsin\left(cx\right) + a^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(x/(b^3*arcsin(c*x)^3 + 3*a*b^2*arcsin(c*x)^2 + 3*a^2*b*arcsin(c*x)
 + a^3), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(a + b \operatorname{asin}\left(cx\right)\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral(x/(a + b*asin(c*x))**3, x)
```

Giac [B] time = 1.68654, size = 1166, normalized size = 8.97

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2*b^2*arcsin(c*x)^2*cos(a/b)*cos_integral(2*a/b + 2*arcsin(c*x))*sin(a/b)/(
b^5*c^2*arcsin(c*x)^2 + 2*a*b^4*c^2*arcsin(c*x) + a^2*b^3*c^2) - 2*b^2*arcs
in(c*x)^2*cos(a/b)^2*sin_integral(2*a/b + 2*arcsin(c*x))/(b^5*c^2*arcsin(c*
x)^2 + 2*a*b^4*c^2*arcsin(c*x) + a^2*b^3*c^2) + 4*a*b*arcsin(c*x)*cos(a/b)*
cos_integral(2*a/b + 2*arcsin(c*x))*sin(a/b)/(b^5*c^2*arcsin(c*x)^2 + 2*a*b
^4*c^2*arcsin(c*x) + a^2*b^3*c^2) - 4*a*b*arcsin(c*x)*cos(a/b)^2*sin_integr
al(2*a/b + 2*arcsin(c*x))/(b^5*c^2*arcsin(c*x)^2 + 2*a*b^4*c^2*arcsin(c*x)
+ a^2*b^3*c^2) + 2*a^2*cos(a/b)*cos_integral(2*a/b + 2*arcsin(c*x))*sin(a/b
)/(b^5*c^2*arcsin(c*x)^2 + 2*a*b^4*c^2*arcsin(c*x) + a^2*b^3*c^2) + b^2*arc
sin(c*x)^2*sin_integral(2*a/b + 2*arcsin(c*x))/(b^5*c^2*arcsin(c*x)^2 + 2*a
*b^4*c^2*arcsin(c*x) + a^2*b^3*c^2) - 2*a^2*cos(a/b)^2*sin_integral(2*a/b +
 2*arcsin(c*x))/(b^5*c^2*arcsin(c*x)^2 + 2*a*b^4*c^2*arcsin(c*x) + a^2*b^3*
c^2) - 1/2*sqrt(-c^2*x^2 + 1)*b^2*c*x/(b^5*c^2*arcsin(c*x)^2 + 2*a*b^4*c^2*
arcsin(c*x) + a^2*b^3*c^2) + (c^2*x^2 - 1)*b^2*arcsin(c*x)/(b^5*c^2*arcsin(
c*x)^2 + 2*a*b^4*c^2*arcsin(c*x) + a^2*b^3*c^2) + 2*a*b*arcsin(c*x)*sin_int
egral(2*a/b + 2*arcsin(c*x))/(b^5*c^2*arcsin(c*x)^2 + 2*a*b^4*c^2*arcsin(c*
x) + a^2*b^3*c^2) + (c^2*x^2 - 1)*a*b/(b^5*c^2*arcsin(c*x)^2 + 2*a*b^4*c^2*
arcsin(c*x) + a^2*b^3*c^2) + 1/2*b^2*arcsin(c*x)/(b^5*c^2*arcsin(c*x)^2 + 2
*a*b^4*c^2*arcsin(c*x) + a^2*b^3*c^2) + a^2*sin_integral(2*a/b + 2*arcsin(c
*x))/(b^5*c^2*arcsin(c*x)^2 + 2*a*b^4*c^2*arcsin(c*x) + a^2*b^3*c^2) + 1/2*
a*b/(b^5*c^2*arcsin(c*x)^2 + 2*a*b^4*c^2*arcsin(c*x) + a^2*b^3*c^2)
```

3.170 $\int \frac{1}{\left(a+b\sin^{-1}(cx)\right)^3}\,dx$

Optimal. Leaf size=111

$$-\frac{\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{2b^3c}-\frac{\sin\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{2b^3c}+\frac{x}{2b^2\left(a+b\sin^{-1}(cx)\right)}-\frac{\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2}$$

```
[Out] -Sqrt[1 - c^2*x^2]/(2*b*c*(a + b*ArcSin[c*x])^2) + x/(2*b^2*(a + b*ArcSin[c
*x])) - (Cos[a/b]*CosIntegral[(a + b*ArcSin[c*x])/b])/(2*b^3*c) - (Sin[a/b]
*SinIntegral[(a + b*ArcSin[c*x])/b])/(2*b^3*c)
```

Rubi [A] time = 0.172366, antiderivative size = 111, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 10, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.6, Rules used = {4621, 4719, 4623, 3303, 3299, 3302}

$$-\frac{\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{2b^3c}-\frac{\sin\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{2b^3c}+\frac{x}{2b^2\left(a+b\sin^{-1}(cx)\right)}-\frac{\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^(-3),x]
```

```
[Out] -Sqrt[1 - c^2*x^2]/(2*b*c*(a + b*ArcSin[c*x])^2) + x/(2*b^2*(a + b*ArcSin[c
*x])) - (Cos[a/b]*CosIntegral[(a + b*ArcSin[c*x])/b])/(2*b^3*c) - (Sin[a/b]
*SinIntegral[(a + b*ArcSin[c*x])/b])/(2*b^3*c)
```

Rule 4621

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Sqrt[1 - c^
2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + Dist[c/(b*(n + 1)),
 Int[(x*(a + b*ArcSin[c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a,
 b, c}, x] && LtQ[n, -1]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3303

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

Rule 3299

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

Rule 3302

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

Rubi steps

$$\int \frac{1}{\left(a+b\sin^{-1}(cx)\right)^3}\,dx = -\frac{\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2} - \frac{c\int \frac{x}{\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^2}\,dx}{2b}$$

$$= -\frac{\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2} + \frac{x}{2b^2\left(a+b\sin^{-1}(cx)\right)} - \frac{\int \frac{1}{a+b\sin^{-1}(cx)}\,dx}{2b^2}$$

$$= -\frac{\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2} + \frac{x}{2b^2\left(a+b\sin^{-1}(cx)\right)} - \frac{\text{Subst}\left(\int \frac{\cos\left(\frac{a}{b}-\frac{x}{b}\right)}{x}\,dx, x, a+b\sin^{-1}(cx)\right)}{2b^3c}$$

$$= -\frac{\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2} + \frac{x}{2b^2\left(a+b\sin^{-1}(cx)\right)} - \frac{\cos\left(\frac{a}{b}\right)\text{Subst}\left(\int \frac{\cos\left(\frac{x}{b}\right)}{x}\,dx, x, a+b\sin^{-1}(\right.}{2b^3c}$$

$$= -\frac{\sqrt{1-c^2x^2}}{2bc\left(a+b\sin^{-1}(cx)\right)^2} + \frac{x}{2b^2\left(a+b\sin^{-1}(cx)\right)} - \frac{\cos\left(\frac{a}{b}\right)\text{Ci}\left(\frac{a+b\sin^{-1}(cx)}{b}\right)}{2b^3c} - \frac{\sin\left(\frac{a}{b}\right)\text{Si}\left(\frac{a+b}{}\right.}{2b^3c}$$

Mathematica [A] time = 0.417795, size = 93, normalized size = 0.84

$$-\frac{\frac{b\left(\frac{b\sqrt{1-c^2x^2}}{c}-x\left(a+b\sin^{-1}(cx)\right)\right)}{\left(a+b\sin^{-1}(cx)\right)^2}+\frac{\cos\left(\frac{a}{b}\right)\text{CosIntegral}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{c}+\frac{\sin\left(\frac{a}{b}\right)\text{Si}\left(\frac{a}{b}+\sin^{-1}(cx)\right)}{c}}{2b^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])^(-3),x]
```

```
[Out] -((b*((b*Sqrt[1 - c^2*x^2])/c - x*(a + b*ArcSin[c*x])))/(a + b*ArcSin[c*x])
^2 + (Cos[a/b]*CosIntegral[a/b + ArcSin[c*x]])/c + (Sin[a/b]*SinIntegral[a/
b + ArcSin[c*x]])/c)/(2*b^3)
```

Maple [A] time = 0.03, size = 138, normalized size = 1.2

$$\frac{1}{c}\left(-\frac{1}{2\left(a+b\arcsin(cx)\right)^2 b}\sqrt{-c^2x^2+1}-\frac{1}{\left(2a+2b\arcsin(cx)\right)b^3}\left(\arcsin(cx)\,\text{Si}\left(\arcsin(cx)+\frac{a}{b}\right)\sin\left(\frac{a}{b}\right)b+\arcsin\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(a+b*arcsin(c*x))^3,x)
```

```
[Out] 1/c*(-1/2*(-c^2*x^2+1)^(1/2)/(a+b*arcsin(c*x))^2/b-1/2*(arcsin(c*x)*Si(arcs
in(c*x)+a/b)*sin(a/b)*b+arcsin(c*x)*Ci(arcsin(c*x)+a/b)*cos(a/b)*b+Si(arcsi
n(c*x)+a/b)*sin(a/b)*a+Ci(arcsin(c*x)+a/b)*cos(a/b)*a-x*b*c)/(a+b*arcsin(c*
x))/b^3)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\frac{bcx\arctan\big(cx, \sqrt{cx+1}\sqrt{-cx+1}\big) + acx - \sqrt{cx+1}\sqrt{-cx+1}b - \Big(b^4c\arctan\big(cx, \sqrt{cx+1}\sqrt{-cx+1}\big)^2 + 2\,ab^3c\arctan\big(c}{2\Big(b^4c\arctan\big(cx, \sqrt{cx+1}\sqrt{-cx+1}\big)^2 + 2\,ab^3c\arctan\big(cx, \sqrt{cx+1}\sqrt{-cx}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^3,x, algorithm="maxima")
```

```
[Out] 1/2*(b*c*x*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*c*x - sqrt(c*x +
1)*sqrt(-c*x + 1)*b - 2*(b^4*c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2
 + 2*a*b^3*c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a^2*b^2*c)*integr
ate(1/2/(b^3*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b^2), x))/(b^4*
c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 + 2*a*b^3*c*arctan2(c*x, sqr
t(c*x + 1)*sqrt(-c*x + 1)) + a^2*b^2*c)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{1}{b^3\arcsin\left(cx\right)^3 + 3\,ab^2\arcsin\left(cx\right)^2 + 3\,a^2b\arcsin\left(cx\right) + a^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^3,x, algorithm="fricas")
```

```
[Out] integral(1/(b^3*arcsin(c*x)^3 + 3*a*b^2*arcsin(c*x)^2 + 3*a^2*b*arcsin(c*x)
 + a^3), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(a+b\operatorname{asin}(cx)\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*asin(c*x))**3,x)
```

```
[Out] Integral((a + b*asin(c*x))**(-3), x)
```

Giac [B] time = 1.42593, size = 651, normalized size = 5.86

$$-\frac{b^{2}\arcsin(cx)^{2}\cos\left(\frac{a}{b}\right)\operatorname{Ci}\left(\frac{a}{b}+\arcsin(cx)\right)}{2\left(b^{5}c\arcsin(cx)^{2}+2\,ab^{4}c\arcsin(cx)+a^{2}b^{3}c\right)}-\frac{b^{2}\arcsin(cx)^{2}\sin\left(\frac{a}{b}\right)\operatorname{Si}\left(\frac{a}{b}+\arcsin(cx)\right)}{2\left(b^{5}c\arcsin(cx)^{2}+2\,ab^{4}c\arcsin(cx)+a^{2}b^{3}c\right)}+\frac{}{2\left(b^{5}c\arcsin(c\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^3,x, algorithm="giac")
```

```
[Out] -1/2*b^2*arcsin(c*x)^2*cos(a/b)*cos_integral(a/b + arcsin(c*x))/(b^5*c*arcs
in(c*x)^2 + 2*a*b^4*c*arcsin(c*x) + a^2*b^3*c) - 1/2*b^2*arcsin(c*x)^2*sin(
a/b)*sin_integral(a/b + arcsin(c*x))/(b^5*c*arcsin(c*x)^2 + 2*a*b^4*c*arcsi
n(c*x) + a^2*b^3*c) + 1/2*b^2*c*x*arcsin(c*x)/(b^5*c*arcsin(c*x)^2 + 2*a*b^
4*c*arcsin(c*x) + a^2*b^3*c) - a*b*arcsin(c*x)*cos(a/b)*cos_integral(a/b +
arcsin(c*x))/(b^5*c*arcsin(c*x)^2 + 2*a*b^4*c*arcsin(c*x) + a^2*b^3*c) - a*
b*arcsin(c*x)*sin(a/b)*sin_integral(a/b + arcsin(c*x))/(b^5*c*arcsin(c*x)^2
 + 2*a*b^4*c*arcsin(c*x) + a^2*b^3*c) + 1/2*a*b*c*x/(b^5*c*arcsin(c*x)^2 +
2*a*b^4*c*arcsin(c*x) + a^2*b^3*c) - 1/2*a^2*cos(a/b)*cos_integral(a/b + ar
csin(c*x))/(b^5*c*arcsin(c*x)^2 + 2*a*b^4*c*arcsin(c*x) + a^2*b^3*c) - 1/2*
a^2*sin(a/b)*sin_integral(a/b + arcsin(c*x))/(b^5*c*arcsin(c*x)^2 + 2*a*b^4
*c*arcsin(c*x) + a^2*b^3*c) - 1/2*sqrt(-c^2*x^2 + 1)*b^2/(b^5*c*arcsin(c*x)
^2 + 2*a*b^4*c*arcsin(c*x) + a^2*b^3*c)
```

3.171 $\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^3}\,dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\frac{1}{x\left(a+b\sin^{-1}(cx)\right)^3},x\right)$$

```
[Out] Unintegrable[1/(x*(a + b*ArcSin[c*x])^3), x]
```

Rubi [A] time = 0.0229314, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^3}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*(a + b*ArcSin[c*x])^3),x]
```

```
[Out] Defer[Int][1/(x*(a + b*ArcSin[c*x])^3), x]
```

Rubi steps

$$\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^3}\,dx=\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^3}\,dx$$

Mathematica [A] time = 2.12791, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^3}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*(a + b*ArcSin[c*x])^3),x]
```

```
[Out] Integrate[1/(x*(a + b*ArcSin[c*x])^3), x]
```

Maple [A] time = 0.276, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+b\arcsin\left(cx\right)\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(a+b*arcsin(c*x))^3,x)
```

```
[Out] int(1/x/(a+b*arcsin(c*x))^3,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$-\frac{\sqrt{cx+1}\sqrt{-cx+1}bcx-b\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)-a-\frac{2\left(b^{4}c^{2}x^{2}\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)^{2}+2\,ab^{3}c^{2}x^{2}\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx\right.\right.}{b^{2}c^{2}}}{2\left(b^{4}c^{2}x^{2}\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)^{2}+2\,ab^{3}c^{2}x^{2}\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)+\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^3,x, algorithm="maxima")
```

```
[Out] -1/2*(sqrt(c*x + 1)*sqrt(-c*x + 1)*b*c*x - b*arctan2(c*x, sqrt(c*x + 1)*sqr
t(-c*x + 1)) - 2*(b^4*c^2*x^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2
+ 2*a*b^3*c^2*x^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a^2*b^2*c^2*
x^2)*integrate(1/(b^3*c^2*x^3*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) +
a*b^2*c^2*x^3), x) - a)/(b^4*c^2*x^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x +
 1))^2 + 2*a*b^3*c^2*x^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a^2*b
^2*c^2*x^2)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{1}{b^{3}x\arcsin\left(cx\right)^{3}+3\,ab^{2}x\arcsin\left(cx\right)^{2}+3\,a^{2}bx\arcsin\left(cx\right)+a^{3}x},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^3,x, algorithm="fricas")
```

```
[Out] integral(1/(b^3*x*arcsin(c*x)^3 + 3*a*b^2*x*arcsin(c*x)^2 + 3*a^2*b*x*arcsi
n(c*x) + a^3*x), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+b\operatorname{asin}\left(cx\right)\right)^{3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*asin(c*x))**3,x)
```

```
[Out] Integral(1/(x*(a + b*asin(c*x))**3), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b\arcsin\left(cx\right)+a\right)^{3}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^3,x, algorithm="giac")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)^3*x), x)
```

3.172 $\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^3}\,dx$

Optimal. Leaf size=16

$$\text{Unintegrable}\left(\frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^3},x\right)$$

```
[Out] Unintegrable[1/(x^2*(a + b*ArcSin[c*x])^3), x]
```

Rubi [A] time = 0.0229158, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^3}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x^2*(a + b*ArcSin[c*x])^3),x]
```

```
[Out] Defer[Int][1/(x^2*(a + b*ArcSin[c*x])^3), x]
```

Rubi steps

$$\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^3}\,dx=\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^3}\,dx$$

Mathematica [A] time = 17.8547, size = 0, normalized size = 0.

$$\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^3}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x^2*(a + b*ArcSin[c*x])^3),x]
```

```
[Out] Integrate[1/(x^2*(a + b*ArcSin[c*x])^3), x]
```

Maple [A] time = 0.5, size = 0, normalized size = 0.

$$\int \frac{1}{x^2 \left(a + b \arcsin\left(cx\right)\right)^3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/(a+b*arcsin(c*x))^3,x)
```

```
[Out] int(1/x^2/(a+b*arcsin(c*x))^3,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$-\frac{ac^2x^2 + \sqrt{cx+1}\sqrt{-cx+1}bcx + \big(bc^2x^2 - 2\,b\big)\arctan\big(cx, \sqrt{cx+1}\sqrt{-cx+1}\big) + \Big(b^4c^2x^3 \arctan\big(cx, \sqrt{cx+1}\sqrt{-cx+1}\big)^2 +}{2\Big(b^4c^2x^3 \arctan\big(cx, \sqrt{cx+1}\sqrt{-cx+1}\big)^2 + 2\,ab^3c^2x^3 \,\mathrm{arct}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^3,x, algorithm="maxima")
```

```
[Out] -1/2*(a*c^2*x^2 + sqrt(c*x + 1)*sqrt(-c*x + 1)*b*c*x + (b*c^2*x^2 - 2*b)*ar
ctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + 2*(b^4*c^2*x^3*arctan2(c*x, sqrt
(c*x + 1)*sqrt(-c*x + 1))^2 + 2*a*b^3*c^2*x^3*arctan2(c*x, sqrt(c*x + 1)*sq
rt(-c*x + 1)) + a^2*b^2*c^2*x^3)*integrate(1/2*(c^2*x^2 - 6)/(b^3*c^2*x^4*a
rctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b^2*c^2*x^4), x) - 2*a)/(b^4*
c^2*x^3*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))^2 + 2*a*b^3*c^2*x^3*arct
an2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a^2*b^2*c^2*x^3)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$${\rm integral}\left(\frac{1}{b^3x^2 \arcsin\left(cx\right)^3 + 3\,ab^2x^2 \arcsin\left(cx\right)^2 + 3\,a^2bx^2 \arcsin\left(cx\right) + a^3x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^3,x, algorithm="fricas")
```

```
[Out] integral(1/(b^3*x^2*arcsin(c*x)^3 + 3*a*b^2*x^2*arcsin(c*x)^2 + 3*a^2*b*x^2
*arcsin(c*x) + a^3*x^2), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2 (a + b \operatorname{asin}(cx))^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(a+b*asin(c*x))**3,x)
```

```
[Out] Integral(1/(x**2*(a + b*asin(c*x))**3), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b \arcsin(cx) + a)^3 x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^3,x, algorithm="giac")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)^3*x^2), x)
```

3.173 $\int x^2\sqrt{a+b\sin^{-1}(cx)}\,dx$

Optimal. Leaf size=242

$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{4c^3}-\frac{\sqrt{\frac{\pi}{6}}\sqrt{b}\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{12c^3}-\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\,\mathrm{si}}}{\sqrt{b}}\right.}{4c^3}$$

```
[Out] (x^3*Sqrt[a + b*ArcSin[c*x]])/3 - (Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sq
rt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(4*c^3) + (Sqrt[b]*Sqrt[Pi/6]*C
os[(3*a)/b]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(12*c^3
) + (Sqrt[b]*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[
b]]*Sin[a/b])/(4*c^3) - (Sqrt[b]*Sqrt[Pi/6]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b
*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(12*c^3)
```

Rubi [A] time = 0.755672, antiderivative size = 242, normalized size of antiderivative = 1., number of steps used = 14, number of rules used = 8, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4629, 4723, 3312, 3306, 3305, 3351, 3304, 3352}

$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{4c^3}-\frac{\sqrt{\frac{\pi}{6}}\sqrt{b}\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{12c^3}-\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\,\mathrm{si}}}{\sqrt{b}}\right.}{4c^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*Sqrt[a + b*ArcSin[c*x]],x]
```

```
[Out] (x^3*Sqrt[a + b*ArcSin[c*x]])/3 - (Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sq
rt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(4*c^3) + (Sqrt[b]*Sqrt[Pi/6]*C
os[(3*a)/b]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(12*c^3
) + (Sqrt[b]*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[
b]]*Sin[a/b])/(4*c^3) - (Sqrt[b]*Sqrt[Pi/6]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b
*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(12*c^3)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3312

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

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int x^2\sqrt{a+b\sin^{-1}(cx)}\,dx = \frac{1}{3}x^3\sqrt{a+b\sin^{-1}(cx)} - \frac{1}{6}(bc)\int \frac{x^3}{\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}\,dx$$

$$= \frac{1}{3}x^3\sqrt{a+b\sin^{-1}(cx)} - \frac{b\,\text{Subst}\left(\int \frac{\sin^3(x)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{6c^3}$$

$$= \frac{1}{3}x^3\sqrt{a+b\sin^{-1}(cx)} - \frac{b\,\text{Subst}\left(\int \left(\frac{3\sin(x)}{4\sqrt{a+bx}} - \frac{\sin(3x)}{4\sqrt{a+bx}}\right)dx, x, \sin^{-1}(cx)\right)}{6c^3}$$

$$= \frac{1}{3}x^3\sqrt{a+b\sin^{-1}(cx)} + \frac{b\,\text{Subst}\left(\int \frac{\sin(3x)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{24c^3} - \frac{b\,\text{Subst}\Big(\int \frac{\sin(x)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(c}{8c^3}$$

$$= \frac{1}{3}x^3\sqrt{a+b\sin^{-1}(cx)} - \frac{\left(b\cos\left(\frac{a}{b}\right)\right)\text{Subst}\left(\int \frac{\sin\left(\frac{a}{b}+x\right)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{8c^3} + \frac{\left(b\cos\left(\frac{3a}{b}\right)\right)\text{Subst}\Big(}{}$$

$$= \frac{1}{3}x^3\sqrt{a+b\sin^{-1}(cx)} - \frac{\cos\left(\frac{a}{b}\right)\text{Subst}\left(\int \sin\left(\frac{x^2}{b}\right)dx, x, \sqrt{a+b\sin^{-1}(cx)}\right)}{4c^3} + \frac{\cos\left(\frac{3a}{b}\right)\text{Subst}}{}$$

$$= \frac{1}{3}x^3\sqrt{a+b\sin^{-1}(cx)} - \frac{\sqrt{b}\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{4c^3} + \frac{\sqrt{b}\sqrt{\frac{\pi}{6}}\cos\left(\frac{3a}{b}\right)S\Big(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}}}{\sqrt{b}}}{12c^3}$$

Mathematica [C] time = 0.30403, size = 246, normalized size = 1.02

$$-\frac{ie^{-\frac{3ia}{b}}\sqrt{a+b\sin^{-1}(cx)}\left(9e^{\frac{2ia}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{3}{2}, -\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right) - 9e^{\frac{4ia}{b}}\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\Big(\frac{3}{2}, \frac{i\big(a+b\sin^{-1}(}{b}\right.}{72c^3\sqrt{\frac{\big(a+b\sin^{-1}}{b^2}}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2*Sqrt[a + b*ArcSin[c*x]],x]
```

```
[Out] ((-I/72)*Sqrt[a + b*ArcSin[c*x]]*(9*E^(((2*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c
*x]))/b]*Gamma[3/2, ((-I)*(a + b*ArcSin[c*x]))/b] - 9*E^(((4*I)*a)/b)*Sqrt[
((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, (I*(a + b*ArcSin[c*x]))/b] + Sqrt[
3]*(-(Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((-3*I)*(a + b*ArcSin[c*x]
))/b]) + E^(((6*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((3*
I)*(a + b*ArcSin[c*x]))/b])))/(c^3*E^(((3*I)*a)/b)*Sqrt[(a + b*ArcSin[c*x])
^2/b^2])
```

Maple [A] time = 0.083, size = 356, normalized size = 1.5

$$\frac{1}{72\,c^3}\left(-\sqrt{3}\sqrt{2}\sqrt{\pi}\sqrt{b^{-1}}\sqrt{a+b\arcsin\left(cx\right)}\mathrm{FresnelC}\left(\frac{\sqrt{3}\sqrt{2}}{\sqrt{\pi}b}\sqrt{a+b\arcsin\left(cx\right)}\frac{1}{\sqrt{b^{-1}}}\right)\sin\left(3\,\frac{a}{b}\right)b+\sqrt{3}\sqrt{2}\sqrt{\pi}\sqrt{b^{-1}}\sqrt{a+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*arcsin(c*x))^(1/2),x)
```

```
[Out] 1/72/c^3/(a+b*arcsin(c*x))^(1/2)*(-3^(1/2)*2^(1/2)*Pi^(1/2)*(1/b)^(1/2)*(a+
b*arcsin(c*x))^(1/2)*FresnelC(2^(1/2)/Pi^(1/2)*3^(1/2)/(1/b)^(1/2)*(a+b*arc
sin(c*x))^(1/2)/b)*sin(3*a/b)*b+3^(1/2)*2^(1/2)*Pi^(1/2)*(1/b)^(1/2)*(a+b*a
rcsin(c*x))^(1/2)*cos(3*a/b)*FresnelS(2^(1/2)/Pi^(1/2)*3^(1/2)/(1/b)^(1/2)*
(a+b*arcsin(c*x))^(1/2)/b)*b-9*2^(1/2)*Pi^(1/2)*(1/b)^(1/2)*(a+b*arcsin(c*x
))^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(
1/2)/b)*b+9*2^(1/2)*Pi^(1/2)*(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(a/b)*F
resnelC(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b+18*arcsin
(c*x)*sin((a+b*arcsin(c*x))/b-a/b)*b+18*sin((a+b*arcsin(c*x))/b-a/b)*a-6*ar
csin(c*x)*sin(3*(a+b*arcsin(c*x))/b-3*a/b)*b-6*sin(3*(a+b*arcsin(c*x))/b-3*
a/b)*a)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{b\arcsin\left(cx\right)+a}x^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*arcsin(c*x) + a)*x^2, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^2\sqrt{a+b\,\mathrm{asin}\,(cx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*asin(c*x))**(1/2),x)
```

```
[Out] Integral(x**2*sqrt(a + b*asin(c*x)), x)
```

Giac [C] time = 2.10463, size = 531, normalized size = 2.19

$$\frac{i\sqrt{2}\sqrt{\pi}b\,\mathrm{erf}\left(-\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}}-\frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(\frac{ia}{b}\right)}}{16\,c^3\left(\frac{ib}{\sqrt{|b|}}+\sqrt{|b|}\right)}-\frac{i\sqrt{2}\sqrt{\pi}b\,\mathrm{erf}\left(\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}}-\frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(-\frac{ia}{b}\right)}}{16\,c^3\left(-\frac{ib}{\sqrt{|b|}}+\sqrt{|b|}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

```
[Out] 1/16*I*sqrt(2)*sqrt(pi)*b*erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(a
bs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/(c^3
*(I*b/sqrt(abs(b)) + sqrt(abs(b)))) - 1/16*I*sqrt(2)*sqrt(pi)*b*erf(1/2*I*s
qrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x
) + a)*sqrt(abs(b))/b)*e^(-I*a/b)/(c^3*(-I*b/sqrt(abs(b)) + sqrt(abs(b))))
- 1/24*I*sqrt(pi)*sqrt(b)*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b)
- 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(3*I*a/b)/(c^3*(s
qrt(6) + I*sqrt(6)*b/abs(b))) + 1/24*I*sqrt(pi)*sqrt(b)*erf(-1/2*sqrt(6)*sq
rt(b*arcsin(c*x) + a)/sqrt(b) + 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(
b)/abs(b))*e^(-3*I*a/b)/(c^3*(sqrt(6) - I*sqrt(6)*b/abs(b))) + 1/24*I*sqrt(
b*arcsin(c*x) + a)*e^(3*I*arcsin(c*x))/c^3 - 1/8*I*sqrt(b*arcsin(c*x) + a)*
e^(I*arcsin(c*x))/c^3 + 1/8*I*sqrt(b*arcsin(c*x) + a)*e^(-I*arcsin(c*x))/c^
3 - 1/24*I*sqrt(b*arcsin(c*x) + a)*e^(-3*I*arcsin(c*x))/c^3
```

3.174 $\int x\sqrt{a+b\sin^{-1}(cx)}\,dx$

Optimal. Leaf size=137

$$\frac{\sqrt{\pi}\sqrt{b}\cos\left(\frac{2a}{b}\right)\text{FresnelC}\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{\pi}\sqrt{b}}\right)}{8c^2}+\frac{\sqrt{\pi}\sqrt{b}\sin\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{8c^2}-\frac{\sqrt{a+b\sin^{-1}(cx)}}{4c^2}+\frac{1}{2}x^2\sqrt{a+b\sin^{-1}(}$$

```
[Out] -Sqrt[a + b*ArcSin[c*x]]/(4*c^2) + (x^2*Sqrt[a + b*ArcSin[c*x]])/2 + (Sqrt[
b]*Sqrt[Pi]*Cos[(2*a)/b]*FresnelC[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sqrt
[Pi])])/(8*c^2) + (Sqrt[b]*Sqrt[Pi]*FresnelS[(2*Sqrt[a + b*ArcSin[c*x]])/(S
qrt[b]*Sqrt[Pi])]*Sin[(2*a)/b])/(8*c^2)
```

Rubi [A] time = 0.453424, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.571, Rules used = {4629, 4723, 3312, 3306, 3305, 3351, 3304, 3352}

$$\frac{\sqrt{\pi}\sqrt{b}\cos\left(\frac{2a}{b}\right)\text{FresnelC}\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{\pi}\sqrt{b}}\right)}{8c^2}+\frac{\sqrt{\pi}\sqrt{b}\sin\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{8c^2}-\frac{\sqrt{a+b\sin^{-1}(cx)}}{4c^2}+\frac{1}{2}x^2\sqrt{a+b\sin^{-1}(}$$

Antiderivative was successfully verified.

```
[In] Int[x*Sqrt[a + b*ArcSin[c*x]],x]
```

```
[Out] -Sqrt[a + b*ArcSin[c*x]]/(4*c^2) + (x^2*Sqrt[a + b*ArcSin[c*x]])/2 + (Sqrt[
b]*Sqrt[Pi]*Cos[(2*a)/b]*FresnelC[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sqrt
[Pi])])/(8*c^2) + (Sqrt[b]*Sqrt[Pi]*FresnelS[(2*Sqrt[a + b*ArcSin[c*x]])/(S
qrt[b]*Sqrt[Pi])]*Sin[(2*a)/b])/(8*c^2)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3312

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

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int x\sqrt{a+b\sin^{-1}(cx)}\,dx = \frac{1}{2}x^2\sqrt{a+b\sin^{-1}(cx)}-\frac{1}{4}(bc)\int\frac{x^2}{\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}\,dx$$

$$=\frac{1}{2}x^2\sqrt{a+b\sin^{-1}(cx)}-\frac{b\,\text{Subst}\left(\int\frac{\sin^2(x)}{\sqrt{a+bx}}\,dx,x,\sin^{-1}(cx)\right)}{4c^2}$$

$$=\frac{1}{2}x^2\sqrt{a+b\sin^{-1}(cx)}-\frac{b\,\text{Subst}\left(\int\left(\frac{1}{2\sqrt{a+bx}}-\frac{\cos(2x)}{2\sqrt{a+bx}}\right)dx,x,\sin^{-1}(cx)\right)}{4c^2}$$

$$=-\frac{\sqrt{a+b\sin^{-1}(cx)}}{4c^2}+\frac{1}{2}x^2\sqrt{a+b\sin^{-1}(cx)}+\frac{b\,\text{Subst}\left(\int\frac{\cos(2x)}{\sqrt{a+bx}}\,dx,x,\sin^{-1}(cx)\right)}{8c^2}$$

$$=-\frac{\sqrt{a+b\sin^{-1}(cx)}}{4c^2}+\frac{1}{2}x^2\sqrt{a+b\sin^{-1}(cx)}+\frac{\left(b\cos\left(\frac{2a}{b}\right)\right)\text{Subst}\left(\int\frac{\cos\left(\frac{2a}{b}+2x\right)}{\sqrt{a+bx}}\,dx,x,\sin^{-1}(c\right.}{8c^2}$$

$$=-\frac{\sqrt{a+b\sin^{-1}(cx)}}{4c^2}+\frac{1}{2}x^2\sqrt{a+b\sin^{-1}(cx)}+\frac{\cos\left(\frac{2a}{b}\right)\text{Subst}\left(\int\cos\left(\frac{2x^2}{b}\right)dx,x,\sqrt{a+b\sin^{-}}\right.}{4c^2}$$

$$=-\frac{\sqrt{a+b\sin^{-1}(cx)}}{4c^2}+\frac{1}{2}x^2\sqrt{a+b\sin^{-1}(cx)}+\frac{\sqrt{b}\sqrt{\pi}\cos\left(\frac{2a}{b}\right)C\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{8c^2}+\frac{\sqrt{b}\sqrt{\pi}S\left(\right.}{}$$

Mathematica [C] time = 0.0722514, size = 141, normalized size = 1.03

$$-\frac{e^{-\frac{2ia}{b}}\sqrt{a+b\sin^{-1}(cx)}\left(\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{3}{2},-\frac{2i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+e^{\frac{4ia}{b}}\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{3}{2},\frac{2i\left(a+b\sin^{-1}(cx)\right)}{b}\right.\right.}{8\sqrt{2}c^2\sqrt{\frac{\left(a+b\sin^{-1}(cx)\right)^2}{b^2}}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*Sqrt[a + b*ArcSin[c*x]],x]
```

```
[Out] -(Sqrt[a + b*ArcSin[c*x]]*(Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((-2*
I)*(a + b*ArcSin[c*x]))/b] + E^(((4*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x])
)/b]*Gamma[3/2, ((2*I)*(a + b*ArcSin[c*x]))/b]))/(8*Sqrt[2]*c^2*E^(((2*I)*a
)/b)*Sqrt[(a + b*ArcSin[c*x])^2/b^2])
```

Maple [A] time = 0.052, size = 173, normalized size = 1.3

$$-\frac{1}{8\,c^{2}}\left(-\sqrt{\pi}\sqrt{b^{-1}}\sqrt{a+b\arcsin(cx)}\sin\left(2\,\frac{a}{b}\right)\mathrm{FresnelS}\left(2\,\frac{\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{b^{-1}}b}\right)b-\sqrt{\pi}\sqrt{b^{-1}}\sqrt{a+b\arcsin(cx)}\mathrm{FresnelC}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*arcsin(c*x))^(1/2),x)
```

```
[Out] -1/8/c^2/(a+b*arcsin(c*x))^(1/2)*(-Pi^(1/2)*(1/b)^(1/2)*(a+b*arcsin(c*x))^(
1/2)*sin(2*a/b)*FresnelS(2/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*
b-Pi^(1/2)*(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)*FresnelC(2/Pi^(1/2)/(1/b)^(1
/2)*(a+b*arcsin(c*x))^(1/2)/b)*cos(2*a/b)*b+2*arcsin(c*x)*cos(2*(a+b*arcsin
(c*x))/b-2*a/b)*b+2*cos(2*(a+b*arcsin(c*x))/b-2*a/b)*a)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\sqrt{b\arcsin(cx)+a}\,x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*arcsin(c*x) + a)*x, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\sqrt{a+b\,\mathrm{asin}\,(cx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*asin(c*x))**(1/2),x)
```

```
[Out] Integral(x*sqrt(a + b*asin(c*x)), x)
```

Giac [C] time = 1.80531, size = 236, normalized size = 1.72

$$-\frac{\sqrt{\pi}\sqrt{b}\,\mathrm{erf}\left(-\frac{\sqrt{b\arcsin(cx)+a}}{\sqrt{b}}-\frac{i\sqrt{b\arcsin(cx)+a}\sqrt{b}}{|b|}\right)e^{\left(\frac{2ia}{b}\right)}}{16\,c^{2}\left(\frac{ib}{|b|}+1\right)}-\frac{\sqrt{\pi}\sqrt{b}\,\mathrm{erf}\left(-\frac{\sqrt{b\arcsin(cx)+a}}{\sqrt{b}}+\frac{i\sqrt{b\arcsin(cx)+a}\sqrt{b}}{|b|}\right)e^{\left(-\frac{2ia}{b}\right)}}{16\,c^{2}\left(-\frac{ib}{|b|}+1\right)}-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

```
[Out] -1/16*sqrt(pi)*sqrt(b)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) - I*sqrt(b*arcs
in(c*x) + a)*sqrt(b)/abs(b))*e^(2*I*a/b)/(c^2*(I*b/abs(b) + 1)) - 1/16*sqrt
(pi)*sqrt(b)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) + I*sqrt(b*arcsin(c*x) +
a)*sqrt(b)/abs(b))*e^(-2*I*a/b)/(c^2*(-I*b/abs(b) + 1)) - 1/8*sqrt(b*arcsin
(c*x) + a)*e^(2*I*arcsin(c*x))/c^2 - 1/8*sqrt(b*arcsin(c*x) + a)*e^(-2*I*ar
csin(c*x))/c^2
```

3.175 $\int \sqrt{a+b\sin^{-1}(cx)}\,dx$

Optimal. Leaf size=120

$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{c}-\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{c}+x\sqrt{a+b\sin^{-1}(cx)}$$

```
[Out] x*Sqrt[a + b*ArcSin[c*x]] - (Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sqrt[2/P
i]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/c + (Sqrt[b]*Sqrt[Pi/2]*FresnelC[(Sqr
t[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/c
```

Rubi [A] time = 0.331121, antiderivative size = 120, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.583, Rules used = {4619, 4723, 3306, 3305, 3351, 3304, 3352}

$$\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{c}-\frac{\sqrt{\frac{\pi}{2}}\sqrt{b}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{c}+x\sqrt{a+b\sin^{-1}(cx)}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[a + b*ArcSin[c*x]],x]
```

```
[Out] x*Sqrt[a + b*ArcSin[c*x]] - (Sqrt[b]*Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sqrt[2/P
i]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/c + (Sqrt[b]*Sqrt[Pi/2]*FresnelC[(Sqr
t[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/c
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int \sqrt{a+b\sin^{-1}(cx)}\,dx = x\sqrt{a+b\sin^{-1}(cx)}-\frac{1}{2}(bc)\int\frac{x}{\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}\,dx$$

$$= x\sqrt{a+b\sin^{-1}(cx)}-\frac{b\,\text{Subst}\left(\int\frac{\sin(x)}{\sqrt{a+bx}}\,dx,x,\sin^{-1}(cx)\right)}{2c}$$

$$= x\sqrt{a+b\sin^{-1}(cx)}-\frac{\left(b\cos\left(\frac{a}{b}\right)\right)\text{Subst}\left(\int\frac{\sin\left(\frac{a}{b}+x\right)}{\sqrt{a+bx}}\,dx,x,\sin^{-1}(cx)\right)}{2c}+\frac{\left(b\sin\left(\frac{a}{b}\right)\right)\text{Subst}\left(\int\frac{\cos(}{\sqrt{a}}\right.}{2c}$$

$$= x\sqrt{a+b\sin^{-1}(cx)}-\frac{\cos\left(\frac{a}{b}\right)\text{Subst}\left(\int\sin\left(\frac{x^2}{b}\right)\,dx,x,\sqrt{a+b\sin^{-1}(cx)}\right)}{c}+\frac{\sin\left(\frac{a}{b}\right)\text{Subst}\left(\int\text{co}\right.}{}$$

$$= x\sqrt{a+b\sin^{-1}(cx)}-\frac{\sqrt{b}\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{c}+\frac{\sqrt{b}\sqrt{\frac{\pi}{2}}C\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{c}$$

Mathematica [C] time = 0.0891791, size = 119, normalized size = 0.99

$$\frac{be^{-\frac{ia}{b}}\left(\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{3}{2},-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+e^{\frac{2ia}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{3}{2},\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)\right)}{2c\sqrt{a+b\sin^{-1}(cx)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sqrt[a + b*ArcSin[c*x]],x]
```

```
[Out] (b*(Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((-I)*(a + b*ArcSin[c*x])
)/b] + E^(((2*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, (I*(a + b
*ArcSin[c*x]))/b]))/(2*c*E^((I*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Maple [A] time = 0.043, size = 178, normalized size = 1.5

$$\frac{1}{2\,c}\left(-\sqrt{2}\sqrt{\pi}\sqrt{b^{-1}}\sqrt{a+b\arcsin(cx)}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{2}}{\sqrt{\pi}b}\sqrt{a+b\arcsin(cx)}\frac{1}{\sqrt{b^{-1}}}\right)b+\sqrt{2}\sqrt{\pi}\sqrt{b^{-1}}\sqrt{a+b\arcsin(cx\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^(1/2),x)
```

```
[Out] 1/2/c/(a+b*arcsin(c*x))^(1/2)*(-2^(1/2)*Pi^(1/2)*(1/b)^(1/2)*(a+b*arcsin(c*
x))^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^
(1/2)/b)*b+2^(1/2)*Pi^(1/2)*(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(a/b)*Fr
esnelC(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b+2*arcsin(c
*x)*sin((a+b*arcsin(c*x))/b-a/b)*b+2*sin((a+b*arcsin(c*x))/b-a/b)*a)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{b \arcsin(cx) + a}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*arcsin(c*x) + a), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{a + b \operatorname{asin}(cx)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**(1/2),x)
```

```
[Out] Integral(sqrt(a + b*asin(c*x)), x)
```

Giac [C] time = 1.6868, size = 266, normalized size = 2.22

$$\frac{i\sqrt{2}\sqrt{\pi}b\,\mathrm{erf}\left(-\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}}-\frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(\frac{ia}{b}\right)}}{4c\left(\frac{ib}{\sqrt{|b|}}+\sqrt{|b|}\right)}-\frac{i\sqrt{2}\sqrt{\pi}b\,\mathrm{erf}\left(\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}}-\frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(-\frac{ia}{b}\right)}}{4c\left(-\frac{ib}{\sqrt{|b|}}+\sqrt{|b|}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

```
[Out] 1/4*I*sqrt(2)*sqrt(pi)*b*erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(ab
s(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/(c*(I
*b/sqrt(abs(b)) + sqrt(abs(b)))) - 1/4*I*sqrt(2)*sqrt(pi)*b*erf(1/2*I*sqrt(
2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) +
a)*sqrt(abs(b))/b)*e^(-I*a/b)/(c*(-I*b/sqrt(abs(b)) + sqrt(abs(b)))) - 1/2*
I*sqrt(b*arcsin(c*x) + a)*e^(I*arcsin(c*x))/c + 1/2*I*sqrt(b*arcsin(c*x) +
a)*e^(-I*arcsin(c*x))/c
```

3.176 $\int \frac{\sqrt{a+b\sin^{-1}(cx)}}{x}\,dx$

Optimal. Leaf size=18

$$\text{Unintegrable}\left(\frac{\sqrt{a+b\sin^{-1}(cx)}}{x},x\right)$$

```
[Out] Unintegrable[Sqrt[a + b*ArcSin[c*x]]/x, x]
```

Rubi [A] time = 0.0463406, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\sqrt{a+b\sin^{-1}(cx)}}{x}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Sqrt[a + b*ArcSin[c*x]]/x,x]
```

```
[Out] Defer[Int][Sqrt[a + b*ArcSin[c*x]]/x, x]
```

Rubi steps

$$\int \frac{\sqrt{a+b\sin^{-1}(cx)}}{x}\,dx=\int \frac{\sqrt{a+b\sin^{-1}(cx)}}{x}\,dx$$

Mathematica [A] time = 3.25393, size = 0, normalized size = 0.

$$\int \frac{\sqrt{a+b\sin^{-1}(cx)}}{x}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sqrt[a + b*ArcSin[c*x]]/x,x]
```

```
[Out] Integrate[Sqrt[a + b*ArcSin[c*x]]/x, x]
```

Maple [A] time = 0.128, size = 0, normalized size = 0.

$$\int \frac{1}{x}\sqrt{a+b\arcsin\left(cx\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^(1/2)/x,x)
```

```
[Out] int((a+b*arcsin(c*x))^(1/2)/x,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{b\arcsin\left(cx\right)+a}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(1/2)/x,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*arcsin(c*x) + a)/x, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(1/2)/x,x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{a + b \operatorname{asin}(cx)}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**(1/2)/x,x)
```

```
[Out] Integral(sqrt(a + b*asin(c*x))/x, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{b \arcsin(cx) + a}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(1/2)/x,x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*arcsin(c*x) + a)/x, x)
```

3.177 $\int \frac{\sqrt{a+b\sin^{-1}(cx)}}{x^2}\,dx$

Optimal. Leaf size=18

$$\text{Unintegrable}\left(\frac{\sqrt{a+b\sin^{-1}(cx)}}{x^2},x\right)$$

```
[Out] Unintegrable[Sqrt[a + b*ArcSin[c*x]]/x^2, x]
```

Rubi [A] time = 0.0373746, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\sqrt{a+b\sin^{-1}(cx)}}{x^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Sqrt[a + b*ArcSin[c*x]]/x^2,x]
```

```
[Out] Defer[Int][Sqrt[a + b*ArcSin[c*x]]/x^2, x]
```

Rubi steps

$$\int \frac{\sqrt{a+b\sin^{-1}(cx)}}{x^2}\,dx=\int \frac{\sqrt{a+b\sin^{-1}(cx)}}{x^2}\,dx$$

Mathematica [A] time = 11.4003, size = 0, normalized size = 0.

$$\int \frac{\sqrt{a+b\sin^{-1}(cx)}}{x^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sqrt[a + b*ArcSin[c*x]]/x^2,x]
```

```
[Out] Integrate[Sqrt[a + b*ArcSin[c*x]]/x^2, x]
```

Maple [A] time = 0.165, size = 0, normalized size = 0.

$$\int \frac{1}{x^2}\sqrt{a+b\arcsin\left(cx\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^(1/2)/x^2,x)
```

```
[Out] int((a+b*arcsin(c*x))^(1/2)/x^2,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{b\arcsin\left(cx\right)+a}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(1/2)/x^2,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(b*arcsin(c*x) + a)/x^2, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(1/2)/x^2,x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{a+b\operatorname{asin}(cx)}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**(1/2)/x**2,x)
```

```
[Out] Integral(sqrt(a + b*asin(c*x))/x**2, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{b\arcsin(cx)+a}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(1/2)/x^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(b*arcsin(c*x) + a)/x^2, x)
```

3.178 $\int x^2 \left(a+b\sin^{-1}(cx)\right)^{3/2}\,dx$

Optimal. Leaf size=313

$$-\frac{3\sqrt{\frac{\pi}{2}}b^{3/2}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{8c^3}+\frac{\sqrt{\frac{\pi}{6}}b^{3/2}\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{24c^3}-\frac{3\sqrt{\frac{\pi}{2}}b^{3/2}\sin\left(\frac{a}{b}\right)S\left(\sqrt{}\right.}{8c^3}$$

```
[Out] (b*Sqrt[1 - c^2*x^2]*Sqrt[a + b*ArcSin[c*x]])/(3*c^3) + (b*x^2*Sqrt[1 - c^2
*x^2]*Sqrt[a + b*ArcSin[c*x]])/(6*c) + (x^3*(a + b*ArcSin[c*x])^(3/2))/3 -
(3*b^(3/2)*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]]
)/Sqrt[b]])/(8*c^3) + (b^(3/2)*Sqrt[Pi/6]*Cos[(3*a)/b]*FresnelC[(Sqrt[6/Pi]
*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(24*c^3) - (3*b^(3/2)*Sqrt[Pi/2]*Fresne
lS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(8*c^3) + (b^(3/
2)*Sqrt[Pi/6]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3
*a)/b])/(24*c^3)
```

Rubi [A] time = 1.04618, antiderivative size = 313, normalized size of antiderivative = 1., number of steps used = 22, number of rules used = 11, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.688, Rules used = {4629, 4707, 4677, 4623, 3306, 3305, 3351, 3304, 3352, 4635, 4406}

$$-\frac{3\sqrt{\frac{\pi}{2}}b^{3/2}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{8c^3}+\frac{\sqrt{\frac{\pi}{6}}b^{3/2}\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{24c^3}-\frac{3\sqrt{\frac{\pi}{2}}b^{3/2}\sin\left(\frac{a}{b}\right)S\left(\sqrt{}\right.}{8c^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(a + b*ArcSin[c*x])^(3/2),x]
```

```
[Out] (b*Sqrt[1 - c^2*x^2]*Sqrt[a + b*ArcSin[c*x]])/(3*c^3) + (b*x^2*Sqrt[1 - c^2
*x^2]*Sqrt[a + b*ArcSin[c*x]])/(6*c) + (x^3*(a + b*ArcSin[c*x])^(3/2))/3 -
(3*b^(3/2)*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]]
)/Sqrt[b]])/(8*c^3) + (b^(3/2)*Sqrt[Pi/6]*Cos[(3*a)/b]*FresnelC[(Sqrt[6/Pi]
*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(24*c^3) - (3*b^(3/2)*Sqrt[Pi/2]*Fresne
lS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(8*c^3) + (b^(3/
2)*Sqrt[Pi/6]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3
*a)/b])/(24*c^3)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rubi steps

$$\int x^2\left(a+b\sin^{-1}(cx)\right)^{3/2}\,dx=\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^{3/2}-\frac{1}{2}(bc)\int\frac{x^3\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{1-c^2x^2}}\,dx$$

$$=\frac{bx^2\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{6c}+\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^{3/2}-\frac{1}{12}b^2\int\frac{x^2}{\sqrt{a+b\sin^{-1}(cx)}}\,dx -$$

$$=\frac{b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{3c^3}+\frac{bx^2\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{6c}+\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^{3/2} -$$

$$=\frac{b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{3c^3}+\frac{bx^2\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{6c}+\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^{3/2} -$$

$$=\frac{b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{3c^3}+\frac{bx^2\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{6c}+\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^{3/2} -$$

$$=\frac{b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{3c^3}+\frac{bx^2\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{6c}+\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^{3/2} -$$

$$=\frac{b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{3c^3}+\frac{bx^2\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{6c}+\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^{3/2} -$$

$$=\frac{b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{3c^3}+\frac{bx^2\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{6c}+\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^{3/2} -$$

Mathematica [C] time = 0.285122, size = 245, normalized size = 0.78

$$\frac{be^{-\frac{3ia}{b}}\sqrt{a+b\sin^{-1}(cx)}\left(27e^{\frac{2ia}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{5}{2},-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+27e^{\frac{4ia}{b}}\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{5}{2},\frac{i\left(a+b\sin^{-}\right.}{b}\right.\right.}{216c^3\sqrt{\frac{\left(a+b\sin^{-}\right.}{b^2}}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2*(a + b*ArcSin[c*x])^(3/2),x]
```

```
[Out] (b*Sqrt[a + b*ArcSin[c*x]]*(27*E^(((2*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))
/b]*Gamma[5/2, ((-I)*(a + b*ArcSin[c*x]))/b] + 27*E^(((4*I)*a)/b)*Sqrt[((-I
)*(a + b*ArcSin[c*x]))/b]*Gamma[5/2, (I*(a + b*ArcSin[c*x]))/b] - Sqrt[3]*(
Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[5/2, ((-3*I)*(a + b*ArcSin[c*x]))/b]
+ E^(((6*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[5/2, ((3*I)*(a +
 b*ArcSin[c*x]))/b])))/(216*c^3*E^(((3*I)*a)/b)*Sqrt[(a + b*ArcSin[c*x])^2/
b^2])
```

Maple [B] time = 0.105, size = 540, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*arcsin(c*x))^(3/2),x)
```

```
[Out] 1/144/c^3/(a+b*arcsin(c*x))^(1/2)*(3^(1/2)*(1/b)^(1/2)*Pi^(1/2)*(a+b*arcsin
(c*x))^(1/2)*cos(3*a/b)*FresnelC(2^(1/2)/Pi^(1/2)*3^(1/2)/(1/b)^(1/2)*(a+b*
arcsin(c*x))^(1/2)/b)*2^(1/2)*b^2+3^(1/2)*(1/b)^(1/2)*Pi^(1/2)*(a+b*arcsin(
c*x))^(1/2)*sin(3*a/b)*FresnelS(2^(1/2)/Pi^(1/2)*3^(1/2)/(1/b)^(1/2)*(a+b*a
rcsin(c*x))^(1/2)/b)*2^(1/2)*b^2-27*(1/b)^(1/2)*Pi^(1/2)*(a+b*arcsin(c*x))^
(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2
)/b)*2^(1/2)*b^2-27*(1/b)^(1/2)*Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(a/b)*F
resnelS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*2^(1/2)*b^2
+36*arcsin(c*x)^2*sin((a+b*arcsin(c*x))/b-a/b)*b^2-12*arcsin(c*x)^2*sin(3*(
a+b*arcsin(c*x))/b-3*a/b)*b^2+72*arcsin(c*x)*sin((a+b*arcsin(c*x))/b-a/b)*a
*b+54*arcsin(c*x)*cos((a+b*arcsin(c*x))/b-a/b)*b^2-24*arcsin(c*x)*sin(3*(a+
b*arcsin(c*x))/b-3*a/b)*a*b-6*arcsin(c*x)*cos(3*(a+b*arcsin(c*x))/b-3*a/b)*
b^2+36*sin((a+b*arcsin(c*x))/b-a/b)*a^2+54*cos((a+b*arcsin(c*x))/b-a/b)*a*b
-12*sin(3*(a+b*arcsin(c*x))/b-3*a/b)*a^2-6*cos(3*(a+b*arcsin(c*x))/b-3*a/b)
*a*b)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (b \arcsin(cx) + a)^{\frac{3}{2}} x^2 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(3/2)*x^2, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x^2\left(a+b\operatorname{asin}(cx)\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*asin(c*x))**(3/2),x)
```

```
[Out] Integral(x**2*(a + b*asin(c*x))**(3/2), x)
```

Giac [C] time = 3.49969, size = 1740, normalized size = 5.56

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

```
[Out] -1/16*I*sqrt(2)*sqrt(pi)*a*b^3*erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/s
qrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)
/((I*b^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c^3) + 3/32*sqrt(2)*sqrt(pi)*b^4*
erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(
b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/((I*b^3/sqrt(abs(b)) + b^2*sqr
t(abs(b)))*c^3) + 1/16*I*sqrt(2)*sqrt(pi)*a*b^3*erf(1/2*I*sqrt(2)*sqrt(b*ar
csin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(
b))/b)*e^(-I*a/b)/((-I*b^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c^3) + 3/32*sqr
t(2)*sqrt(pi)*b^4*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) -
1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(-I*a/b)/((-I*b^3/sqr
t(abs(b)) + b^2*sqrt(abs(b)))*c^3) + 1/24*I*sqrt(pi)*a*b^(5/2)*erf(-1/2*sqr
t(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a
)*sqrt(b)/abs(b))*e^(3*I*a/b)/((sqrt(6)*b^2 + I*sqrt(6)*b^3/abs(b))*c^3) -
1/48*sqrt(pi)*b^(7/2)*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/
2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(3*I*a/b)/((sqrt(6)*b
^2 + I*sqrt(6)*b^3/abs(b))*c^3) + 1/16*I*sqrt(2)*sqrt(pi)*a*b^2*erf(-1/2*I*
sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*
x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/((I*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c^
3) - 1/16*I*sqrt(2)*sqrt(pi)*a*b^2*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a
)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(-I*
a/b)/((-I*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c^3) - 1/24*I*sqrt(pi)*a*b^(5/
2)*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b) + 1/2*I*sqrt(6)*sqrt(b*
arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(-3*I*a/b)/((sqrt(6)*b^2 - I*sqrt(6)*b^3
/abs(b))*c^3) - 1/48*sqrt(pi)*b^(7/2)*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) +
 a)/sqrt(b) + 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(-3*I
*a/b)/((sqrt(6)*b^2 - I*sqrt(6)*b^3/abs(b))*c^3) - 1/24*I*sqrt(pi)*a*b^(3/2
)*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I*sqrt(6)*sqrt(b*a
rcsin(c*x) + a)*sqrt(b)/abs(b))*e^(3*I*a/b)/((sqrt(6)*b + I*sqrt(6)*b^2/abs
(b))*c^3) + 1/24*I*sqrt(pi)*a*b^(3/2)*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) +
 a)/sqrt(b) + 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(-3*I
*a/b)/((sqrt(6)*b - I*sqrt(6)*b^2/abs(b))*c^3) + 1/24*I*sqrt(b*arcsin(c*x)
+ a)*b*arcsin(c*x)*e^(3*I*arcsin(c*x))/c^3 - 1/8*I*sqrt(b*arcsin(c*x) + a)*
b*arcsin(c*x)*e^(I*arcsin(c*x))/c^3 + 1/8*I*sqrt(b*arcsin(c*x) + a)*b*arcsi
n(c*x)*e^(-I*arcsin(c*x))/c^3 - 1/24*I*sqrt(b*arcsin(c*x) + a)*b*arcsin(c*x
)*e^(-3*I*arcsin(c*x))/c^3 + 1/24*I*sqrt(b*arcsin(c*x) + a)*a*e^(3*I*arcsin
(c*x))/c^3 - 1/48*sqrt(b*arcsin(c*x) + a)*b*e^(3*I*arcsin(c*x))/c^3 - 1/8*I
*sqrt(b*arcsin(c*x) + a)*a*e^(I*arcsin(c*x))/c^3 + 3/16*sqrt(b*arcsin(c*x)
+ a)*b*e^(I*arcsin(c*x))/c^3 + 1/8*I*sqrt(b*arcsin(c*x) + a)*a*e^(-I*arcsin
(c*x))/c^3 + 3/16*sqrt(b*arcsin(c*x) + a)*b*e^(-I*arcsin(c*x))/c^3 - 1/24*I
*sqrt(b*arcsin(c*x) + a)*a*e^(-3*I*arcsin(c*x))/c^3 - 1/48*sqrt(b*arcsin(c*
x) + a)*b*e^(-3*I*arcsin(c*x))/c^3
```

3.179 $\int x\left(a+b\sin^{-1}(cx)\right)^{3/2}\,dx$

Optimal. Leaf size=172

$$\frac{3\sqrt{\pi}b^{3/2}\sin\left(\frac{2a}{b}\right)\text{FresnelC}\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{\pi}\sqrt{b}}\right)}{32c^2}-\frac{3\sqrt{\pi}b^{3/2}\cos\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{32c^2}+\frac{3bx\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{8c}-\big(a$$

```
[Out] (3*b*x*Sqrt[1 - c^2*x^2]*Sqrt[a + b*ArcSin[c*x]])/(8*c) - (a + b*ArcSin[c*x
])^(3/2)/(4*c^2) + (x^2*(a + b*ArcSin[c*x])^(3/2))/2 - (3*b^(3/2)*Sqrt[Pi]*
Cos[(2*a)/b]*FresnelS[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sqrt[Pi])])/(32*
c^2) + (3*b^(3/2)*Sqrt[Pi]*FresnelC[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sq
rt[Pi])]*Sin[(2*a)/b])/(32*c^2)
```

Rubi [A] time = 0.524971, antiderivative size = 172, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 11, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.786, Rules used = {4629, 4707, 4641, 4635, 4406, 12, 3306, 3305, 3351, 3304, 3352}

$$\frac{3\sqrt{\pi}b^{3/2}\sin\left(\frac{2a}{b}\right)\text{FresnelC}\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{\pi}\sqrt{b}}\right)}{32c^2}-\frac{3\sqrt{\pi}b^{3/2}\cos\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{32c^2}+\frac{3bx\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{8c}-\big(a$$

Antiderivative was successfully verified.

```
[In] Int[x*(a + b*ArcSin[c*x])^(3/2),x]
```

```
[Out] (3*b*x*Sqrt[1 - c^2*x^2]*Sqrt[a + b*ArcSin[c*x]])/(8*c) - (a + b*ArcSin[c*x
])^(3/2)/(4*c^2) + (x^2*(a + b*ArcSin[c*x])^(3/2))/2 - (3*b^(3/2)*Sqrt[Pi]*
Cos[(2*a)/b]*FresnelS[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sqrt[Pi])])/(32*
c^2) + (3*b^(3/2)*Sqrt[Pi]*FresnelC[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sq
rt[Pi])]*Sin[(2*a)/b])/(32*c^2)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int x\left(a+b\sin^{-1}(cx)\right)^{3/2}dx = \frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^{3/2} - \frac{1}{4}(3bc)\int \frac{x^2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{1-c^2x^2}}\,dx$$

$$= \frac{3bx\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{8c} + \frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^{3/2} - \frac{1}{16}\left(3b^2\right)\int \frac{x}{\sqrt{a+b\sin^{-1}(cx}}$$

$$= \frac{3bx\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{8c} - \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{4c^2} + \frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^{3/2} - \frac{\left(3b^2\right)S}{}$$

$$= \frac{3bx\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{8c} - \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{4c^2} + \frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^{3/2} - \frac{\left(3b^2\right)S}{}$$

$$= \frac{3bx\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{8c} - \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{4c^2} + \frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^{3/2} - \frac{\left(3b^2\right)S}{}$$

$$= \frac{3bx\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{8c} - \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{4c^2} + \frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^{3/2} - \frac{\left(3b^2 c\right.}{}$$

$$= \frac{3bx\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{8c} - \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{4c^2} + \frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^{3/2} - \frac{\left(3b\,\mathrm{co}\right.}{}$$

$$= \frac{3bx\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{8c} - \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{4c^2} + \frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^{3/2} - \frac{3b^{3/2}\sqrt{}}{}$$

Mathematica [C] time = 0.0585441, size = 126, normalized size = 0.73

$$\frac{b^2e^{-\frac{2ia}{b}}\left(\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\mathrm{Gamma}\left(\frac{5}{2},-\frac{2i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+e^{\frac{4ia}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\mathrm{Gamma}\left(\frac{5}{2},\frac{2i\left(a+b\sin^{-1}(cx)\right)}{b}\right)\right)}{16\sqrt{2}c^2\sqrt{a+b\sin^{-1}(cx)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*(a + b*ArcSin[c*x])^(3/2),x]
```

```
[Out] (b^2*(Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[5/2, ((-2*I)*(a + b*ArcSin[c
*x]))/b] + E^(((4*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[5/2, ((2*I
)*(a + b*ArcSin[c*x]))/b]))/(16*Sqrt[2]*c^2*E^(((2*I)*a)/b)*Sqrt[a + b*ArcS
in[c*x]])
```

Maple [A] time = 0.092, size = 267, normalized size = 1.6

$$-\frac{1}{32\,c^{2}}\Bigl(3\,\sqrt{b^{-1}}\sqrt{\pi}\sqrt{a+b\arcsin\left(cx\right)}\cos\left(2\,\frac{a}{b}\right)\mathrm{FresnelS}\Bigl(2\,\frac{\sqrt{a+b\arcsin\left(cx\right)}}{\sqrt{b^{-1}}\sqrt{\pi}b}\Bigr)b^{2}-3\,\sqrt{b^{-1}}\sqrt{\pi}\sqrt{a+b\arcsin\left(cx\right)}\sin\Bigl(2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*arcsin(c*x))^(3/2),x)
```

```
[Out] -1/32/c^2*(3*(1/b)^(1/2)*Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)*cos(2*a/b)*Fresne
lS(2/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b^2-3*(1/b)^(1/2)*Pi^(
1/2)*(a+b*arcsin(c*x))^(1/2)*sin(2*a/b)*FresnelC(2/Pi^(1/2)/(1/b)^(1/2)*(a+
b*arcsin(c*x))^(1/2)/b)*b^2+8*arcsin(c*x)^2*cos(2*(a+b*arcsin(c*x))/b-2*a/b
)*b^2+16*arcsin(c*x)*cos(2*(a+b*arcsin(c*x))/b-2*a/b)*a*b-6*arcsin(c*x)*sin
(2*(a+b*arcsin(c*x))/b-2*a/b)*b^2+8*cos(2*(a+b*arcsin(c*x))/b-2*a/b)*a^2-6*
sin(2*(a+b*arcsin(c*x))/b-2*a/b)*a*b)/(a+b*arcsin(c*x))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (b\arcsin\left(cx\right)+a)^{\frac{3}{2}}x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(3/2)*x, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int x\left(a+b\operatorname{asin}\left(cx\right)\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*asin(c*x))**(3/2),x)
```

```
[Out] Integral(x*(a + b*asin(c*x))**(3/2), x)
```

Giac [C] time = 2.22962, size = 757, normalized size = 4.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

```
[Out] 1/16*sqrt(pi)*a*b^(5/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) - I*sqrt(b*arc
sin(c*x) + a)*sqrt(b)/abs(b))*e^(2*I*a/b)/((b^2 + I*b^3/abs(b))*c^2) + 3/64
*I*sqrt(pi)*b^(7/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) - I*sqrt(b*arcsin(
c*x) + a)*sqrt(b)/abs(b))*e^(2*I*a/b)/((b^2 + I*b^3/abs(b))*c^2) + 1/16*sqr
t(pi)*a*b^(5/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) + I*sqrt(b*arcsin(c*x)
 + a)*sqrt(b)/abs(b))*e^(-2*I*a/b)/((b^2 - I*b^3/abs(b))*c^2) - 3/64*I*sqrt
(pi)*b^(7/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) + I*sqrt(b*arcsin(c*x) +
a)*sqrt(b)/abs(b))*e^(-2*I*a/b)/((b^2 - I*b^3/abs(b))*c^2) - 1/16*sqrt(pi)*
a*b^(3/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) - I*sqrt(b*arcsin(c*x) + a)*
sqrt(b)/abs(b))*e^(2*I*a/b)/((b + I*b^2/abs(b))*c^2) - 1/16*sqrt(pi)*a*b^(3
/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) + I*sqrt(b*arcsin(c*x) + a)*sqrt(b
)/abs(b))*e^(-2*I*a/b)/((b - I*b^2/abs(b))*c^2) - 1/8*sqrt(b*arcsin(c*x) +
a)*b*arcsin(c*x)*e^(2*I*arcsin(c*x))/c^2 - 1/8*sqrt(b*arcsin(c*x) + a)*b*ar
csin(c*x)*e^(-2*I*arcsin(c*x))/c^2 - 1/8*sqrt(b*arcsin(c*x) + a)*a*e^(2*I*a
rcsin(c*x))/c^2 - 3/32*I*sqrt(b*arcsin(c*x) + a)*b*e^(2*I*arcsin(c*x))/c^2
- 1/8*sqrt(b*arcsin(c*x) + a)*a*e^(-2*I*arcsin(c*x))/c^2 + 3/32*I*sqrt(b*ar
csin(c*x) + a)*b*e^(-2*I*arcsin(c*x))/c^2
```

3.180 $\int \left(a+b\sin^{-1}(cx)\right)^{3/2}\,dx$

Optimal. Leaf size=159

$$-\frac{3\sqrt{\frac{\pi}{2}}b^{3/2}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2c}-\frac{3\sqrt{\frac{\pi}{2}}b^{3/2}\sin\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2c}+\frac{3b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{2c}+$$

```
[Out] (3*b*Sqrt[1 - c^2*x^2]*Sqrt[a + b*ArcSin[c*x]])/(2*c) + x*(a + b*ArcSin[c*x
])^(3/2) - (3*b^(3/2)*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*A
rcSin[c*x]])/Sqrt[b]])/(2*c) - (3*b^(3/2)*Sqrt[Pi/2]*FresnelS[(Sqrt[2/Pi]*S
qrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(2*c)
```

Rubi [A] time = 0.280982, antiderivative size = 159, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.667, Rules used = {4619, 4677, 4623, 3306, 3305, 3351, 3304, 3352}

$$-\frac{3\sqrt{\frac{\pi}{2}}b^{3/2}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2c}-\frac{3\sqrt{\frac{\pi}{2}}b^{3/2}\sin\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2c}+\frac{3b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{2c}+$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^(3/2),x]
```

```
[Out] (3*b*Sqrt[1 - c^2*x^2]*Sqrt[a + b*ArcSin[c*x]])/(2*c) + x*(a + b*ArcSin[c*x
])^(3/2) - (3*b^(3/2)*Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*A
rcSin[c*x]])/Sqrt[b]])/(2*c) - (3*b^(3/2)*Sqrt[Pi/2]*FresnelS[(Sqrt[2/Pi]*S
qrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(2*c)
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\begin{aligned}
\int \left(a+b\sin^{-1}(cx)\right)^{3/2}dx &= x\left(a+b\sin^{-1}(cx)\right)^{3/2}-\frac{1}{2}(3bc)\int \frac{x\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{1-c^2x^2}}\,dx\\
&= \frac{3b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{2c}+x\left(a+b\sin^{-1}(cx)\right)^{3/2}-\frac{1}{4}\left(3b^2\right)\int \frac{1}{\sqrt{a+b\sin^{-1}(cx)}}\,dx\\
&= \frac{3b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{2c}+x\left(a+b\sin^{-1}(cx)\right)^{3/2}-\frac{(3b)\,\mathrm{Subst}\left(\int \frac{\cos\left(\frac{a}{b}-\frac{x}{b}\right)}{\sqrt{x}}\,dx,x,a+b\,\mathrm{si}\right.}{4c}\\
&= \frac{3b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{2c}+x\left(a+b\sin^{-1}(cx)\right)^{3/2}-\frac{\left(3b\cos\left(\frac{a}{b}\right)\right)\mathrm{Subst}\left(\int \frac{\cos\left(\frac{x}{b}\right)}{\sqrt{x}}\,dx,x,a\right.}{4c}\\
&= \frac{3b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{2c}+x\left(a+b\sin^{-1}(cx)\right)^{3/2}-\frac{\left(3b\cos\left(\frac{a}{b}\right)\right)\mathrm{Subst}\left(\int \cos\left(\frac{x^2}{b}\right)dx,x\right.}{2c}\\
&= \frac{3b\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}{2c}+x\left(a+b\sin^{-1}(cx)\right)^{3/2}-\frac{3b^{3/2}\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)C\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2c}
\end{aligned}$$

Mathematica [C] time = 2.79561, size = 291, normalized size = 1.83

$$b\left(\frac{2ae^{-\frac{ia}{b}}\left(\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\mathrm{Gamma}\left(\frac{3}{2},-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+e^{\frac{2ia}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\mathrm{Gamma}\left(\frac{3}{2},\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)\right)}{\sqrt{a+b\sin^{-1}(cx)}}+2\left(3\sqrt{1-c^2x^2}+2cx\sin^{-1}(cx)\right)\sqrt{}\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*ArcSin[c*x])^(3/2),x]
```

```
[Out] (b*(2*Sqrt[a + b*ArcSin[c*x]]*(3*Sqrt[1 - c^2*x^2] + 2*c*x*ArcSin[c*x]) + (
2*a*(Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((-I)*(a + b*ArcSin[c*x]
))/b] + E^(((2*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, (I*(a +
b*ArcSin[c*x]))/b]))/(E^((I*a)/b)*Sqrt[a + b*ArcSin[c*x]]) - Sqrt[b^(-1)]*S
qrt[2*Pi]*FresnelC[Sqrt[b^(-1)]*Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]]]*(3*b*Co
s[a/b] + 2*a*Sin[a/b]) + Sqrt[b^(-1)]*Sqrt[2*Pi]*FresnelS[Sqrt[b^(-1)]*Sqrt
[2/Pi]*Sqrt[a + b*ArcSin[c*x]]]*(2*a*Cos[a/b] - 3*b*Sin[a/b])))/(4*c)
```

Maple [B] time = 0.056, size = 270, normalized size = 1.7

$$\frac{1}{4\,c}\left(-3\,\sqrt{b^{-1}}\sqrt{\pi}\sqrt{a+b\arcsin\left(cx\right)}\cos\left(\frac{a}{b}\right)\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin\left(cx\right)}}{\sqrt{b^{-1}}\sqrt{\pi}b}\right)\sqrt{2}b^{2}-3\,\sqrt{b^{-1}}\sqrt{\pi}\sqrt{a+b\arcsin\left(cx\right)}\sin\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^(3/2),x)
```

```
[Out] 1/4/c/(a+b*arcsin(c*x))^(1/2)*(-3*(1/b)^(1/2)*Pi^(1/2)*(a+b*arcsin(c*x))^(1
/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/
b)*2^(1/2)*b^2-3*(1/b)^(1/2)*Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(a/b)*Fres
nelS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*2^(1/2)*b^2+4*
arcsin(c*x)^2*sin((a+b*arcsin(c*x))/b-a/b)*b^2+8*arcsin(c*x)*sin((a+b*arcsi
n(c*x))/b-a/b)*a*b+6*arcsin(c*x)*cos((a+b*arcsin(c*x))/b-a/b)*b^2+4*sin((a+
b*arcsin(c*x))/b-a/b)*a^2+6*cos((a+b*arcsin(c*x))/b-a/b)*a*b)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\left(b\arcsin\left(cx\right)+a\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(3/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int (a+b\operatorname{asin}(cx))^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**(3/2),x)
```

```
[Out] Integral((a + b*asin(c*x))**(3/2), x)
```

Giac [C] time = 2.46893, size = 879, normalized size = 5.53

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

```
[Out] -1/4*I*sqrt(2)*sqrt(pi)*a*b^3*erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sq
rt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/
((I*b^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c) + 3/8*sqrt(2)*sqrt(pi)*b^4*erf(
-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*ar
csin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/((I*b^3/sqrt(abs(b)) + b^2*sqrt(ab
s(b)))*c) + 1/4*I*sqrt(2)*sqrt(pi)*a*b^3*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*
x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*
e^(-I*a/b)/((-I*b^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c) + 3/8*sqrt(2)*sqrt(
pi)*b^4*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2
)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(-I*a/b)/((-I*b^3/sqrt(abs(b))
 + b^2*sqrt(abs(b)))*c) + 1/4*I*sqrt(2)*sqrt(pi)*a*b^2*erf(-1/2*I*sqrt(2)*sq
rt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sq
rt(abs(b))/b)*e^(I*a/b)/((I*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c) - 1/4*I*s
qrt(2)*sqrt(pi)*a*b^2*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)
) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(-I*a/b)/((-I*b^2
/sqrt(abs(b)) + b*sqrt(abs(b)))*c) - 1/2*I*sqrt(b*arcsin(c*x) + a)*b*arcsin
(c*x)*e^(I*arcsin(c*x))/c + 1/2*I*sqrt(b*arcsin(c*x) + a)*b*arcsin(c*x)*e^(
-I*arcsin(c*x))/c - 1/2*I*sqrt(b*arcsin(c*x) + a)*a*e^(I*arcsin(c*x))/c + 3
/4*sqrt(b*arcsin(c*x) + a)*b*e^(I*arcsin(c*x))/c + 1/2*I*sqrt(b*arcsin(c*x)
 + a)*a*e^(-I*arcsin(c*x))/c + 3/4*sqrt(b*arcsin(c*x) + a)*b*e^(-I*arcsin(c
*x))/c
```

3.181 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x}\,dx$

Optimal. Leaf size=18

$$\text{Unintegrable}\left(\frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x},x\right)$$

```
[Out] Unintegrable[(a + b*ArcSin[c*x])^(3/2)/x, x]
```

Rubi [A] time = 0.0451535, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(a + b*ArcSin[c*x])^(3/2)/x,x]
```

```
[Out] Defer[Int][(a + b*ArcSin[c*x])^(3/2)/x, x]
```

Rubi steps

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x}\,dx=\int \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x}\,dx$$

Mathematica [A] time = 2.90078, size = 0, normalized size = 0.

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(a + b*ArcSin[c*x])^(3/2)/x,x]
```

```
[Out] Integrate[(a + b*ArcSin[c*x])^(3/2)/x, x]
```

Maple [A] time = 0.11, size = 0, normalized size = 0.

$$\int \frac{1}{x} (a + b \arcsin (cx))^{\frac{3}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^(3/2)/x,x)
```

```
[Out] int((a+b*arcsin(c*x))^(3/2)/x,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(b \arcsin (cx) + a)^{\frac{3}{2}}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(3/2)/x,x, algorithm="maxima")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(3/2)/x, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(3/2)/x,x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(a+b\,\mathrm{asin}\,(cx))^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**(3/2)/x,x)
```

```
[Out] Integral((a + b*asin(c*x))**(3/2)/x, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(b\arcsin\,(cx)+a)^{\frac{3}{2}}}{x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(3/2)/x,x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(3/2)/x, x)
```

3.182 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x^2}\,dx$

Optimal. Leaf size=18

$$\text{Unintegrable}\left(\frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x^2},x\right)$$

```
[Out] Unintegrable[(a + b*ArcSin[c*x])^(3/2)/x^2, x]
```

Rubi [A] time = 0.0420042, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(a + b*ArcSin[c*x])^(3/2)/x^2,x]
```

```
[Out] Defer[Int][(a + b*ArcSin[c*x])^(3/2)/x^2, x]
```

Rubi steps

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x^2}\,dx=\int \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x^2}\,dx$$

Mathematica [A] time = 10.1427, size = 0, normalized size = 0.

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^{3/2}}{x^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(a + b*ArcSin[c*x])^(3/2)/x^2,x]
```

```
[Out] Integrate[(a + b*ArcSin[c*x])^(3/2)/x^2, x]
```

Maple [A] time = 0.169, size = 0, normalized size = 0.

$$\int \frac{1}{x^2}\left(a+b\arcsin\left(cx\right)\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^(3/2)/x^2,x)
```

```
[Out] int((a+b*arcsin(c*x))^(3/2)/x^2,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(b\arcsin\left(cx\right)+a\right)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(3/2)/x^2,x, algorithm="maxima")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(3/2)/x^2, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(3/2)/x^2,x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(a+b\,\mathrm{asin}\,(cx))^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**(3/2)/x**2,x)
```

```
[Out] Integral((a + b*asin(c*x))**(3/2)/x**2, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(b\arcsin\,(cx)+a)^{\frac{3}{2}}}{x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(3/2)/x^2,x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(3/2)/x^2, x)
```

3.183 $\int x^2\left(a+b\sin^{-1}(cx)\right)^{5/2}\,dx$

Optimal. Leaf size=358

$$-\frac{15\sqrt{\frac{\pi}{2}}b^{5/2}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{16c^3}+\frac{5\sqrt{\frac{\pi}{6}}b^{5/2}\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{144c^3}+\frac{15\sqrt{\frac{\pi}{2}}b^{5/2}\cos\left(\frac{a}{b}\right)S}{16c}$$

```
[Out] (-5*b^2*x*Sqrt[a + b*ArcSin[c*x]])/(6*c^2) - (5*b^2*x^3*Sqrt[a + b*ArcSin[c
*x]])/36 + (5*b*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(3/2))/(9*c^3) + (5*b
*x^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(3/2))/(18*c) + (x^3*(a + b*ArcS
in[c*x])^(5/2))/3 + (15*b^(5/2)*Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sq
rt[a + b*ArcSin[c*x]])/Sqrt[b]])/(16*c^3) - (5*b^(5/2)*Sqrt[Pi/6]*Cos[(3*a)
/b]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(144*c^3) - (15
*b^(5/2)*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*
Sin[a/b])/(16*c^3) + (5*b^(5/2)*Sqrt[Pi/6]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b*
ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(144*c^3)
```

Rubi [A] time = 1.40912, antiderivative size = 358, normalized size of antiderivative = 1., number of steps used = 24, number of rules used = 11, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.688, Rules used = {4629, 4707, 4677, 4619, 4723, 3306, 3305, 3351, 3304, 3352, 3312}

$$-\frac{15\sqrt{\frac{\pi}{2}}b^{5/2}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{16c^3}+\frac{5\sqrt{\frac{\pi}{6}}b^{5/2}\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{144c^3}+\frac{15\sqrt{\frac{\pi}{2}}b^{5/2}\cos\left(\frac{a}{b}\right)S}{16c}$$

Antiderivative was successfully verified.

```
[In] Int[x^2*(a + b*ArcSin[c*x])^(5/2),x]
```

```
[Out] (-5*b^2*x*Sqrt[a + b*ArcSin[c*x]])/(6*c^2) - (5*b^2*x^3*Sqrt[a + b*ArcSin[c
*x]])/36 + (5*b*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(3/2))/(9*c^3) + (5*b
*x^2*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(3/2))/(18*c) + (x^3*(a + b*ArcS
in[c*x])^(5/2))/3 + (15*b^(5/2)*Sqrt[Pi/2]*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sq
rt[a + b*ArcSin[c*x]])/Sqrt[b]])/(16*c^3) - (5*b^(5/2)*Sqrt[Pi/6]*Cos[(3*a)
/b]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(144*c^3) - (15
*b^(5/2)*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*
Sin[a/b])/(16*c^3) + (5*b^(5/2)*Sqrt[Pi/6]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b*
ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(144*c^3)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3312

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

Rubi steps

$$\int x^2\left(a+b\sin^{-1}(cx)\right)^{5/2}\,dx=\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^{5/2}-\frac{1}{6}(5bc)\int\frac{x^3\left(a+b\sin^{-1}(cx)\right)^{3/2}}{\sqrt{1-c^2x^2}}\,dx$$

$$=\frac{5bx^2\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{18c}+\frac{1}{3}x^3\left(a+b\sin^{-1}(cx)\right)^{5/2}-\frac{1}{12}\left(5b^2\right)\int x^2\sqrt{a+b\sin}$$

$$=-\frac{5}{36}b^2x^3\sqrt{a+b\sin^{-1}(cx)}+\frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{9c^3}+\frac{5bx^2\sqrt{1-c^2x^2}\left(a+b\sin\right.}{18c}$$

$$=-\frac{5b^2x\sqrt{a+b\sin^{-1}(cx)}}{6c^2}-\frac{5}{36}b^2x^3\sqrt{a+b\sin^{-1}(cx)}+\frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{9c^3}+$$

$$=-\frac{5b^2x\sqrt{a+b\sin^{-1}(cx)}}{6c^2}-\frac{5}{36}b^2x^3\sqrt{a+b\sin^{-1}(cx)}+\frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{9c^3}+$$

$$=-\frac{5b^2x\sqrt{a+b\sin^{-1}(cx)}}{6c^2}-\frac{5}{36}b^2x^3\sqrt{a+b\sin^{-1}(cx)}+\frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{9c^3}+$$

$$=-\frac{5b^2x\sqrt{a+b\sin^{-1}(cx)}}{6c^2}-\frac{5}{36}b^2x^3\sqrt{a+b\sin^{-1}(cx)}+\frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{9c^3}+$$

$$=-\frac{5b^2x\sqrt{a+b\sin^{-1}(cx)}}{6c^2}-\frac{5}{36}b^2x^3\sqrt{a+b\sin^{-1}(cx)}+\frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{9c^3}+$$

$$=-\frac{5b^2x\sqrt{a+b\sin^{-1}(cx)}}{6c^2}-\frac{5}{36}b^2x^3\sqrt{a+b\sin^{-1}(cx)}+\frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{9c^3}+$$

Mathematica [C] time = 0.273454, size = 228, normalized size = 0.64

$$\frac{b^3e^{-\frac{3ia}{b}}\left(-81e^{\frac{2ia}{b}}\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{7}{2},-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)-81e^{\frac{4ia}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{7}{2},\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+\sqrt{3}\left(\right.\right.}{648c^3\sqrt{a+b\sin^{-1}(cx)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2*(a + b*ArcSin[c*x])^(5/2),x]
```

```
[Out] (b^3*(-81*E^(((2*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[7/2, ((-
I)*(a + b*ArcSin[c*x]))/b] - 81*E^(((4*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x])
)/b]*Gamma[7/2, (I*(a + b*ArcSin[c*x]))/b] + Sqrt[3]*(Sqrt[((-I)*(a + b*Arc
Sin[c*x]))/b]*Gamma[7/2, ((-3*I)*(a + b*ArcSin[c*x]))/b] + E^(((6*I)*a)/b)*
Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[7/2, ((3*I)*(a + b*ArcSin[c*x]))/b]))
)/(648*c^3*E^(((3*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Maple [B] time = 0.118, size = 792, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2*(a+b*arcsin(c*x))^(5/2),x)
```

```
[Out] 1/864/c^3/(a+b*arcsin(c*x))^(1/2)*(-5*3^(1/2)*(1/b)^(1/2)*Pi^(1/2)*2^(1/2)*
(a+b*arcsin(c*x))^(1/2)*cos(3*a/b)*FresnelS(2^(1/2)/Pi^(1/2)*3^(1/2)/(1/b)^
(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b^3+5*3^(1/2)*(1/b)^(1/2)*Pi^(1/2)*2^(1/2)
*(a+b*arcsin(c*x))^(1/2)*sin(3*a/b)*FresnelC(2^(1/2)/Pi^(1/2)*3^(1/2)/(1/b)
^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b^3+405*(1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b
*arcsin(c*x))^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arc
sin(c*x))^(1/2)/b)*b^3-405*(1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(
1/2)*sin(a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)
/b)*b^3+216*arcsin(c*x)^3*sin((a+b*arcsin(c*x))/b-a/b)*b^3-72*arcsin(c*x)^3
*sin(3*(a+b*arcsin(c*x))/b-3*a/b)*b^3+648*arcsin(c*x)^2*sin((a+b*arcsin(c*x
))/b-a/b)*a*b^2+540*arcsin(c*x)^2*cos((a+b*arcsin(c*x))/b-a/b)*b^3-216*arcs
in(c*x)^2*sin(3*(a+b*arcsin(c*x))/b-3*a/b)*a*b^2-60*arcsin(c*x)^2*cos(3*(a+
b*arcsin(c*x))/b-3*a/b)*b^3+648*arcsin(c*x)*sin((a+b*arcsin(c*x))/b-a/b)*a^
2*b-810*arcsin(c*x)*sin((a+b*arcsin(c*x))/b-a/b)*b^3+1080*arcsin(c*x)*cos((
a+b*arcsin(c*x))/b-a/b)*a*b^2-216*arcsin(c*x)*sin(3*(a+b*arcsin(c*x))/b-3*a
/b)*a^2*b+30*arcsin(c*x)*sin(3*(a+b*arcsin(c*x))/b-3*a/b)*b^3-120*arcsin(c*
x)*cos(3*(a+b*arcsin(c*x))/b-3*a/b)*a*b^2+216*sin((a+b*arcsin(c*x))/b-a/b)*
a^3-810*sin((a+b*arcsin(c*x))/b-a/b)*a*b^2+540*cos((a+b*arcsin(c*x))/b-a/b)
*a^2*b-72*sin(3*(a+b*arcsin(c*x))/b-3*a/b)*a^3+30*sin(3*(a+b*arcsin(c*x))/b
-3*a/b)*a*b^2-60*cos(3*(a+b*arcsin(c*x))/b-3*a/b)*a^2*b)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (b \arcsin(cx) + a)^{\frac{5}{2}} x^2 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*arcsin(c*x))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(5/2)*x^2, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*arcsin(c*x))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2*(a+b*asin(c*x))**(5/2),x)
```

```
[Out] Timed out
```

Giac [C] time = 5.10383, size = 3357, normalized size = 9.38

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2*(a+b*arcsin(c*x))^(5/2),x, algorithm="giac")
```

```
[Out] -1/8*I*sqrt(2)*sqrt(pi)*a^2*b^3*erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/
sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b
```

```
)/((I*b^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c^3) + 3/16*sqrt(2)*sqrt(pi)*a*b
^4*erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sq
rt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/((I*b^3/sqrt(abs(b)) + b^2*
sqrt(abs(b)))*c^3) + 1/8*I*sqrt(2)*sqrt(pi)*a^2*b^3*erf(1/2*I*sqrt(2)*sqrt(
b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(
abs(b))/b)*e^(-I*a/b)/((-I*b^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c^3) + 3/16
*sqrt(2)*sqrt(pi)*a*b^4*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(
b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(-I*a/b)/((-I*b
^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c^3) + 1/12*I*sqrt(pi)*a^2*b^(5/2)*erf(
-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I*sqrt(6)*sqrt(b*arcsin(
c*x) + a)*sqrt(b)/abs(b))*e^(3*I*a/b)/((sqrt(6)*b^2 + I*sqrt(6)*b^3/abs(b))
*c^3) - 1/24*sqrt(pi)*a*b^(7/2)*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sq
rt(b) - 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(3*I*a/b)/(
(sqrt(6)*b^2 + I*sqrt(6)*b^3/abs(b))*c^3) + 1/8*I*sqrt(2)*sqrt(pi)*a^2*b^2*
erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(
b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/((I*b^2/sqrt(abs(b)) + b*sqrt(
abs(b)))*c^3) - 3/16*sqrt(2)*sqrt(pi)*a*b^3*erf(-1/2*I*sqrt(2)*sqrt(b*arcsi
n(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))
/b)*e^(I*a/b)/((I*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c^3) - 15/64*I*sqrt(2)
*sqrt(pi)*b^4*erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2
*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/((I*b^2/sqrt(abs
(b)) + b*sqrt(abs(b)))*c^3) - 1/8*I*sqrt(2)*sqrt(pi)*a^2*b^2*erf(1/2*I*sqrt
(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) +
 a)*sqrt(abs(b))/b)*e^(-I*a/b)/((-I*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c^3)
 - 3/16*sqrt(2)*sqrt(pi)*a*b^3*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sq
rt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(-I*a/b)
/((-I*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c^3) + 15/64*I*sqrt(2)*sqrt(pi)*b^
4*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt
(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(-I*a/b)/((-I*b^2/sqrt(abs(b)) + b*sq
rt(abs(b)))*c^3) - 1/12*I*sqrt(pi)*a^2*b^(5/2)*erf(-1/2*sqrt(6)*sqrt(b*arcs
in(c*x) + a)/sqrt(b) + 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b)
)*e^(-3*I*a/b)/((sqrt(6)*b^2 - I*sqrt(6)*b^3/abs(b))*c^3) - 1/24*sqrt(pi)*a
*b^(7/2)*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b) + 1/2*I*sqrt(6)*s
qrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(-3*I*a/b)/((sqrt(6)*b^2 - I*sqrt(
6)*b^3/abs(b))*c^3) + 1/24*I*sqrt(b*arcsin(c*x) + a)*b^2*arcsin(c*x)^2*e^(3
*I*arcsin(c*x))/c^3 - 1/8*I*sqrt(b*arcsin(c*x) + a)*b^2*arcsin(c*x)^2*e^(I*
arcsin(c*x))/c^3 + 1/8*I*sqrt(b*arcsin(c*x) + a)*b^2*arcsin(c*x)^2*e^(-I*ar
csin(c*x))/c^3 - 1/24*I*sqrt(b*arcsin(c*x) + a)*b^2*arcsin(c*x)^2*e^(-3*I*a
rcsin(c*x))/c^3 - 1/24*I*sqrt(pi)*a^2*b^2*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*
x) + a)/sqrt(b) - 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(
3*I*a/b)/((sqrt(6)*b^(3/2) + I*sqrt(6)*b^(5/2)/abs(b))*c^3) + 1/24*I*sqrt(p
i)*a^2*b^2*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b) + 1/2*I*sqrt(6)
*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(-3*I*a/b)/((sqrt(6)*b^(3/2) - I
*sqrt(6)*b^(5/2)/abs(b))*c^3) - 1/24*I*sqrt(pi)*a^2*b^(3/2)*erf(-1/2*sqrt(6
)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*s
```

```
qrt(b)/abs(b))*e^(3*I*a/b)/((sqrt(6)*b + I*sqrt(6)*b^2/abs(b))*c^3) + 1/24*
sqrt(pi)*a*b^(5/2)*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I
*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(3*I*a/b)/((sqrt(6)*b +
I*sqrt(6)*b^2/abs(b))*c^3) + 5/288*I*sqrt(pi)*b^(7/2)*erf(-1/2*sqrt(6)*sqrt
(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)
/abs(b))*e^(3*I*a/b)/((sqrt(6)*b + I*sqrt(6)*b^2/abs(b))*c^3) + 1/24*I*sqrt
(pi)*a^2*b^(3/2)*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b) + 1/2*I*s
qrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(-3*I*a/b)/((sqrt(6)*b - I
*sqrt(6)*b^2/abs(b))*c^3) + 1/24*sqrt(pi)*a*b^(5/2)*erf(-1/2*sqrt(6)*sqrt(b
*arcsin(c*x) + a)/sqrt(b) + 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/a
bs(b))*e^(-3*I*a/b)/((sqrt(6)*b - I*sqrt(6)*b^2/abs(b))*c^3) - 5/288*I*sqrt
(pi)*b^(7/2)*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b) + 1/2*I*sqrt(
6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(-3*I*a/b)/((sqrt(6)*b - I*sqr
t(6)*b^2/abs(b))*c^3) + 1/12*I*sqrt(b*arcsin(c*x) + a)*a*b*arcsin(c*x)*e^(3
*I*arcsin(c*x))/c^3 - 5/144*sqrt(b*arcsin(c*x) + a)*b^2*arcsin(c*x)*e^(3*I*
arcsin(c*x))/c^3 - 1/4*I*sqrt(b*arcsin(c*x) + a)*a*b*arcsin(c*x)*e^(I*arcsi
n(c*x))/c^3 + 5/16*sqrt(b*arcsin(c*x) + a)*b^2*arcsin(c*x)*e^(I*arcsin(c*x)
)/c^3 + 1/4*I*sqrt(b*arcsin(c*x) + a)*a*b*arcsin(c*x)*e^(-I*arcsin(c*x))/c^
3 + 5/16*sqrt(b*arcsin(c*x) + a)*b^2*arcsin(c*x)*e^(-I*arcsin(c*x))/c^3 - 1
/12*I*sqrt(b*arcsin(c*x) + a)*a*b*arcsin(c*x)*e^(-3*I*arcsin(c*x))/c^3 - 5/
144*sqrt(b*arcsin(c*x) + a)*b^2*arcsin(c*x)*e^(-3*I*arcsin(c*x))/c^3 + 1/24
*I*sqrt(b*arcsin(c*x) + a)*a^2*e^(3*I*arcsin(c*x))/c^3 - 5/144*sqrt(b*arcsi
n(c*x) + a)*a*b*e^(3*I*arcsin(c*x))/c^3 - 5/288*I*sqrt(b*arcsin(c*x) + a)*b
^2*e^(3*I*arcsin(c*x))/c^3 - 1/8*I*sqrt(b*arcsin(c*x) + a)*a^2*e^(I*arcsin(
c*x))/c^3 + 5/16*sqrt(b*arcsin(c*x) + a)*a*b*e^(I*arcsin(c*x))/c^3 + 15/32*
I*sqrt(b*arcsin(c*x) + a)*b^2*e^(I*arcsin(c*x))/c^3 + 1/8*I*sqrt(b*arcsin(c
*x) + a)*a^2*e^(-I*arcsin(c*x))/c^3 + 5/16*sqrt(b*arcsin(c*x) + a)*a*b*e^(-
I*arcsin(c*x))/c^3 - 15/32*I*sqrt(b*arcsin(c*x) + a)*b^2*e^(-I*arcsin(c*x))
/c^3 - 1/24*I*sqrt(b*arcsin(c*x) + a)*a^2*e^(-3*I*arcsin(c*x))/c^3 - 5/144*
sqrt(b*arcsin(c*x) + a)*a*b*e^(-3*I*arcsin(c*x))/c^3 + 5/288*I*sqrt(b*arcsi
n(c*x) + a)*b^2*e^(-3*I*arcsin(c*x))/c^3
```

3.184 $\int x\left(a+b\sin^{-1}(cx)\right)^{5/2}\,dx$

Optimal. Leaf size=216

$$-\frac{15\sqrt{\pi}b^{5/2}\cos\left(\frac{2a}{b}\right)\text{FresnelC}\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{\pi}\sqrt{b}}\right)}{128c^2}-\frac{15\sqrt{\pi}b^{5/2}\sin\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{128c^2}+\frac{15b^2\sqrt{a+b\sin^{-1}(cx)}}{64c^2}-\frac{15}{32}b^2x$$

```
[Out] (15*b^2*Sqrt[a + b*ArcSin[c*x]])/(64*c^2) - (15*b^2*x^2*Sqrt[a + b*ArcSin[c
*x]])/32 + (5*b*x*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(3/2))/(8*c) - (a +
 b*ArcSin[c*x])^(5/2)/(4*c^2) + (x^2*(a + b*ArcSin[c*x])^(5/2))/2 - (15*b^(
5/2)*Sqrt[Pi]*Cos[(2*a)/b]*FresnelC[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sq
rt[Pi])])/(128*c^2) - (15*b^(5/2)*Sqrt[Pi]*FresnelS[(2*Sqrt[a + b*ArcSin[c*
x]])/(Sqrt[b]*Sqrt[Pi])]*Sin[(2*a)/b])/(128*c^2)
```

Rubi [A] time = 0.742519, antiderivative size = 216, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 10, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.714, Rules used = {4629, 4707, 4641, 4723, 3312, 3306, 3305, 3351, 3304, 3352}

$$-\frac{15\sqrt{\pi}b^{5/2}\cos\left(\frac{2a}{b}\right)\text{FresnelC}\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{\pi}\sqrt{b}}\right)}{128c^2}-\frac{15\sqrt{\pi}b^{5/2}\sin\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{128c^2}+\frac{15b^2\sqrt{a+b\sin^{-1}(cx)}}{64c^2}-\frac{15}{32}b^2x$$

Antiderivative was successfully verified.

```
[In] Int[x*(a + b*ArcSin[c*x])^(5/2),x]
```

```
[Out] (15*b^2*Sqrt[a + b*ArcSin[c*x]])/(64*c^2) - (15*b^2*x^2*Sqrt[a + b*ArcSin[c
*x]])/32 + (5*b*x*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(3/2))/(8*c) - (a +
 b*ArcSin[c*x])^(5/2)/(4*c^2) + (x^2*(a + b*ArcSin[c*x])^(5/2))/2 - (15*b^(
5/2)*Sqrt[Pi]*Cos[(2*a)/b]*FresnelC[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sq
rt[Pi])])/(128*c^2) - (15*b^(5/2)*Sqrt[Pi]*FresnelS[(2*Sqrt[a + b*ArcSin[c*
x]])/(Sqrt[b]*Sqrt[Pi])]*Sin[(2*a)/b])/(128*c^2)
```

Rule 4629

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^(m + 1)*(a + b*ArcSin[c*x])^n)/(m + 1), x] - Dist[(b*c*n)/(m + 1), Int[(x
^(m + 1)*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GtQ[n, 0]
```

Rule 4707

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*((f_.)*(x_))^(m_))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[(f*(f*x)^(m - 1)*Sqrt[d + e*x^2]*(a + b*
ArcSin[c*x])^n)/(e*m), x] + (Dist[(f^2*(m - 1))/(c^2*m), Int[((f*x)^(m - 2)
*(a + b*ArcSin[c*x])^n)/Sqrt[d + e*x^2], x], x] + Dist[(b*f*n*Sqrt[1 - c^2*
x^2])/(c*m*Sqrt[d + e*x^2]), Int[(f*x)^(m - 1)*(a + b*ArcSin[c*x])^(n - 1),
 x], x]) /; FreeQ[{a, b, c, d, e, f}, x] && EqQ[c^2*d + e, 0] && GtQ[n, 0]
&& GtQ[m, 1] && IntegerQ[m]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3312

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

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int x\left(a+b\sin^{-1}(cx)\right)^{5/2}\,dx=\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^{5/2}-\frac{1}{4}(5bc)\int\frac{x^2\left(a+b\sin^{-1}(cx)\right)^{3/2}}{\sqrt{1-c^2x^2}}\,dx$$

$$=\frac{5bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{8c}+\frac{1}{2}x^2\left(a+b\sin^{-1}(cx)\right)^{5/2}-\frac{1}{16}\left(15b^2\right)\int x\sqrt{a+b\sin^{-1}}$$

$$=-\frac{15}{32}b^2x^2\sqrt{a+b\sin^{-1}(cx)}+\frac{5bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{8c}-\frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{4c^2}+\frac{1}{2}x$$

$$=-\frac{15}{32}b^2x^2\sqrt{a+b\sin^{-1}(cx)}+\frac{5bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{8c}-\frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{4c^2}+\frac{1}{2}x$$

$$=-\frac{15}{32}b^2x^2\sqrt{a+b\sin^{-1}(cx)}+\frac{5bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{8c}-\frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{4c^2}+\frac{1}{2}x$$

$$=\frac{15b^2\sqrt{a+b\sin^{-1}(cx)}}{64c^2}-\frac{15}{32}b^2x^2\sqrt{a+b\sin^{-1}(cx)}+\frac{5bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{8c}-(a$$

$$=\frac{15b^2\sqrt{a+b\sin^{-1}(cx)}}{64c^2}-\frac{15}{32}b^2x^2\sqrt{a+b\sin^{-1}(cx)}+\frac{5bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{8c}-(a$$

$$=\frac{15b^2\sqrt{a+b\sin^{-1}(cx)}}{64c^2}-\frac{15}{32}b^2x^2\sqrt{a+b\sin^{-1}(cx)}+\frac{5bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{8c}-(a$$

$$=\frac{15b^2\sqrt{a+b\sin^{-1}(cx)}}{64c^2}-\frac{15}{32}b^2x^2\sqrt{a+b\sin^{-1}(cx)}+\frac{5bx\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{8c}-(a$$

Mathematica [C] time = 0.0945766, size = 141, normalized size = 0.65

$$\frac{e^{-\frac{2ia}{b}}\left(a+b\sin^{-1}(cx)\right)^{5/2}\left(\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{7}{2},-\frac{2i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+e^{\frac{4ia}{b}}\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{7}{2},\frac{2i\left(a+b\sin^{-1}(cx)\right)}{b}\right)\right.}{32\sqrt{2}c^2\left(\frac{\left(a+b\sin^{-1}(cx)\right)^2}{b^2}\right)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x*(a + b*ArcSin[c*x])^(5/2),x]
```

```
[Out] ((a + b*ArcSin[c*x])^(5/2)*(Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[7/2, ((-2
*I)*(a + b*ArcSin[c*x]))/b] + E^(((4*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]
))/b]*Gamma[7/2, ((2*I)*(a + b*ArcSin[c*x]))/b]))/(32*Sqrt[2]*c^2*E^(((2*I)
*a)/b)*((a + b*ArcSin[c*x])^2/b^2)^(3/2))
```

Maple [B] time = 0.068, size = 394, normalized size = 1.8

$$-\frac{1}{128\,c^{2}}\left(15\,\sqrt{b^{-1}}\sqrt{\pi}\sqrt{a+b\arcsin(cx)}\cos\left(2\,\frac{a}{b}\right)\mathrm{FresnelC}\left(2\,\frac{\sqrt{a+b\arcsin(cx)}}{\sqrt{b^{-1}}\sqrt{\pi}b}\right)b^{3}+15\,\sqrt{b^{-1}}\sqrt{\pi}\sqrt{a+b\arcsin(cx)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x*(a+b*arcsin(c*x))^(5/2),x)
```

```
[Out] -1/128/c^2*(15*(1/b)^(1/2)*Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)*cos(2*a/b)*Fres
nelC(2/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b^3+15*(1/b)^(1/2)*P
i^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(2*a/b)*FresnelS(2/Pi^(1/2)/(1/b)^(1/2)*
(a+b*arcsin(c*x))^(1/2)/b)*b^3+32*arcsin(c*x)^3*cos(2*(a+b*arcsin(c*x))/b-2
*a/b)*b^3+96*arcsin(c*x)^2*cos(2*(a+b*arcsin(c*x))/b-2*a/b)*a*b^2-40*arcsin
(c*x)^2*sin(2*(a+b*arcsin(c*x))/b-2*a/b)*b^3+96*arcsin(c*x)*cos(2*(a+b*arcs
in(c*x))/b-2*a/b)*a^2*b-30*arcsin(c*x)*cos(2*(a+b*arcsin(c*x))/b-2*a/b)*b^3
-80*arcsin(c*x)*sin(2*(a+b*arcsin(c*x))/b-2*a/b)*a*b^2+32*cos(2*(a+b*arcsin
(c*x))/b-2*a/b)*a^3-30*cos(2*(a+b*arcsin(c*x))/b-2*a/b)*a*b^2-40*sin(2*(a+b
*arcsin(c*x))/b-2*a/b)*a^2*b)/(a+b*arcsin(c*x))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (b\arcsin(cx)+a)^{\frac{5}{2}}x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*arcsin(c*x))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(5/2)*x, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*arcsin(c*x))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*asin(c*x))**(5/2),x)
```

```
[Out] Timed out
```

Giac [C] time = 2.79751, size = 1570, normalized size = 7.27

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(a+b*arcsin(c*x))^(5/2),x, algorithm="giac")
```

```
[Out] 1/8*sqrt(pi)*a^2*b^(5/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) - I*sqrt(b*ar
csin(c*x) + a)*sqrt(b)/abs(b))*e^(2*I*a/b)/((b^2 + I*b^3/abs(b))*c^2) + 3/3
2*I*sqrt(pi)*a*b^(7/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) - I*sqrt(b*arcs
in(c*x) + a)*sqrt(b)/abs(b))*e^(2*I*a/b)/((b^2 + I*b^3/abs(b))*c^2) + 1/8*s
qrt(pi)*a^2*b^(5/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) + I*sqrt(b*arcsin(
c*x) + a)*sqrt(b)/abs(b))*e^(-2*I*a/b)/((b^2 - I*b^3/abs(b))*c^2) - 3/32*I*
sqrt(pi)*a*b^(7/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) + I*sqrt(b*arcsin(c
*x) + a)*sqrt(b)/abs(b))*e^(-2*I*a/b)/((b^2 - I*b^3/abs(b))*c^2) - 1/8*sqrt
(b*arcsin(c*x) + a)*b^2*arcsin(c*x)^2*e^(2*I*arcsin(c*x))/c^2 - 1/8*sqrt(b*
arcsin(c*x) + a)*b^2*arcsin(c*x)^2*e^(-2*I*arcsin(c*x))/c^2 - 1/16*sqrt(pi)
*a^2*b^2*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) - I*sqrt(b*arcsin(c*x) + a)*s
qrt(b)/abs(b))*e^(2*I*a/b)/((b^(3/2) + I*b^(5/2)/abs(b))*c^2) - 1/16*sqrt(p
i)*a^2*b^2*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) + I*sqrt(b*arcsin(c*x) + a)
*sqrt(b)/abs(b))*e^(-2*I*a/b)/((b^(3/2) - I*b^(5/2)/abs(b))*c^2) - 1/16*sqr
t(pi)*a^2*b^(3/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) - I*sqrt(b*arcsin(c*
x) + a)*sqrt(b)/abs(b))*e^(2*I*a/b)/((b + I*b^2/abs(b))*c^2) - 3/32*I*sqrt(
pi)*a*b^(5/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) - I*sqrt(b*arcsin(c*x) +
 a)*sqrt(b)/abs(b))*e^(2*I*a/b)/((b + I*b^2/abs(b))*c^2) + 15/256*sqrt(pi)*
b^(7/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) - I*sqrt(b*arcsin(c*x) + a)*sq
rt(b)/abs(b))*e^(2*I*a/b)/((b + I*b^2/abs(b))*c^2) - 1/16*sqrt(pi)*a^2*b^(3
/2)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) + I*sqrt(b*arcsin(c*x) + a)*sqrt(b
)/abs(b))*e^(-2*I*a/b)/((b - I*b^2/abs(b))*c^2) + 3/32*I*sqrt(pi)*a*b^(5/2)
*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) + I*sqrt(b*arcsin(c*x) + a)*sqrt(b)/a
bs(b))*e^(-2*I*a/b)/((b - I*b^2/abs(b))*c^2) + 15/256*sqrt(pi)*b^(7/2)*erf(
-sqrt(b*arcsin(c*x) + a)/sqrt(b) + I*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b)
)*e^(-2*I*a/b)/((b - I*b^2/abs(b))*c^2) - 1/4*sqrt(b*arcsin(c*x) + a)*a*b*a
rcsin(c*x)*e^(2*I*arcsin(c*x))/c^2 - 5/32*I*sqrt(b*arcsin(c*x) + a)*b^2*arc
sin(c*x)*e^(2*I*arcsin(c*x))/c^2 - 1/4*sqrt(b*arcsin(c*x) + a)*a*b*arcsin(c
*x)*e^(-2*I*arcsin(c*x))/c^2 + 5/32*I*sqrt(b*arcsin(c*x) + a)*b^2*arcsin(c*
x)*e^(-2*I*arcsin(c*x))/c^2 - 1/8*sqrt(b*arcsin(c*x) + a)*a^2*e^(2*I*arcsin
(c*x))/c^2 - 5/32*I*sqrt(b*arcsin(c*x) + a)*a*b*e^(2*I*arcsin(c*x))/c^2 + 1
5/128*sqrt(b*arcsin(c*x) + a)*b^2*e^(2*I*arcsin(c*x))/c^2 - 1/8*sqrt(b*arcs
in(c*x) + a)*a^2*e^(-2*I*arcsin(c*x))/c^2 + 5/32*I*sqrt(b*arcsin(c*x) + a)*
a*b*e^(-2*I*arcsin(c*x))/c^2 + 15/128*sqrt(b*arcsin(c*x) + a)*b^2*e^(-2*I*a
rcsin(c*x))/c^2
```

3.185 $\int \left(a+b\sin^{-1}(cx)\right)^{5/2}\,dx$

Optimal. Leaf size=179

$$-\frac{15\sqrt{\frac{\pi}{2}}b^{5/2}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{4c}+\frac{15\sqrt{\frac{\pi}{2}}b^{5/2}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{4c}-\frac{15}{4}b^2x\sqrt{a+b\sin^{-1}(cx)}+\frac{5b}{}$$

```
[Out] (-15*b^2*x*Sqrt[a + b*ArcSin[c*x]])/4 + (5*b*Sqrt[1 - c^2*x^2]*(a + b*ArcSi
n[c*x])^(3/2))/(2*c) + x*(a + b*ArcSin[c*x])^(5/2) + (15*b^(5/2)*Sqrt[Pi/2]
*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(4*c) - (
15*b^(5/2)*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]
]*Sin[a/b])/(4*c)
```

Rubi [A] time = 0.50197, antiderivative size = 179, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.667, Rules used = {4619, 4677, 4723, 3306, 3305, 3351, 3304, 3352}

$$-\frac{15\sqrt{\frac{\pi}{2}}b^{5/2}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{4c}+\frac{15\sqrt{\frac{\pi}{2}}b^{5/2}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{4c}-\frac{15}{4}b^2x\sqrt{a+b\sin^{-1}(cx)}+\frac{5b}{}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^(5/2),x]
```

```
[Out] (-15*b^2*x*Sqrt[a + b*ArcSin[c*x]])/4 + (5*b*Sqrt[1 - c^2*x^2]*(a + b*ArcSi
n[c*x])^(3/2))/(2*c) + x*(a + b*ArcSin[c*x])^(5/2) + (15*b^(5/2)*Sqrt[Pi/2]
*Cos[a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(4*c) - (
15*b^(5/2)*Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]
]*Sin[a/b])/(4*c)
```

Rule 4619

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.), x_Symbol] :> Simp[x*(a + b*Ar
cSin[c*x])^n, x] - Dist[b*c*n, Int[(x*(a + b*ArcSin[c*x])^(n - 1))/Sqrt[1 -
 c^2*x^2], x], x] /; FreeQ[{a, b, c}, x] && GtQ[n, 0]
```

Rule 4677

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)*((d_) + (e_.)*(x_)^2)^(p_
.), x_Symbol] :> Simp[((d + e*x^2)^(p + 1)*(a + b*ArcSin[c*x])^n)/(2*e*(p +
 1)), x] + Dist[(b*n*d^IntPart[p]*(d + e*x^2)^FracPart[p])/(2*c*(p + 1)*(1
- c^2*x^2)^FracPart[p]), Int[(1 - c^2*x^2)^(p + 1/2)*(a + b*ArcSin[c*x])^(n
 - 1), x], x] /; FreeQ[{a, b, c, d, e, p}, x] && EqQ[c^2*d + e, 0] && GtQ[n
, 0] && NeQ[p, -1]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int \left(a+b\sin^{-1}(cx)\right)^{5/2}\,dx = x\left(a+b\sin^{-1}(cx)\right)^{5/2} - \frac{1}{2}(5bc)\int \frac{x\left(a+b\sin^{-1}(cx)\right)^{3/2}}{\sqrt{1-c^2x^2}}\,dx$$

$$= \frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{2c} + x\left(a+b\sin^{-1}(cx)\right)^{5/2} - \frac{1}{4}\left(15b^2\right)\int \sqrt{a+b\sin^{-1}(cx)}\,dx$$

$$= -\frac{15}{4}b^2x\sqrt{a+b\sin^{-1}(cx)} + \frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{2c} + x\left(a+b\sin^{-1}(cx)\right)^{5/2} + \frac{1}{8}\,(15b$$

$$= -\frac{15}{4}b^2x\sqrt{a+b\sin^{-1}(cx)} + \frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{2c} + x\left(a+b\sin^{-1}(cx)\right)^{5/2} + \frac{(15b^3}{}$$

$$= -\frac{15}{4}b^2x\sqrt{a+b\sin^{-1}(cx)} + \frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{2c} + x\left(a+b\sin^{-1}(cx)\right)^{5/2} + \frac{(15b^3}{}$$

$$= -\frac{15}{4}b^2x\sqrt{a+b\sin^{-1}(cx)} + \frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{2c} + x\left(a+b\sin^{-1}(cx)\right)^{5/2} + \frac{(15b^2}{}$$

$$= -\frac{15}{4}b^2x\sqrt{a+b\sin^{-1}(cx)} + \frac{5b\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}{2c} + x\left(a+b\sin^{-1}(cx)\right)^{5/2} + \frac{15b^{5/2}}{}$$

Mathematica [C] time = 2.89902, size = 379, normalized size = 2.12

$$\frac{e^{-\frac{ia}{b}}\left(2b\left(2a^2\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\,\mathrm{Gamma}\left(\frac{3}{2},-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+2a^2e^{\frac{2ia}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\,\mathrm{Gamma}\left(\frac{3}{2},\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+e^{\frac{ia}{b}}\left(a+\right.\right.\right.}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*ArcSin[c*x])^(5/2),x]
```

```
[Out] ((I*(4*a^2 + 15*b^2)*(-1 + E^(((2*I)*a)/b))*Sqrt[Pi/2]*Sqrt[a + b*ArcSin[c*
x]]*FresnelC[Sqrt[b^(-1)]*Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]]])/Sqrt[b^(-1)]
 + ((4*a^2 + 15*b^2)*(1 + E^(((2*I)*a)/b))*Sqrt[Pi/2]*Sqrt[a + b*ArcSin[c*x
]]*FresnelS[Sqrt[b^(-1)]*Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]]])/Sqrt[b^(-1)]
+ 2*b*(E^((I*a)/b)*(a + b*ArcSin[c*x])*(-15*b*c*x + 10*a*Sqrt[1 - c^2*x^2]
+ 2*(4*a*c*x + 5*b*Sqrt[1 - c^2*x^2])*ArcSin[c*x] + 4*b*c*x*ArcSin[c*x]^2)
+ 2*a^2*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[3/2, ((-I)*(a + b*ArcSin[c
*x]))/b] + 2*a^2*E^(((2*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[3/2,
 (I*(a + b*ArcSin[c*x]))/b]))/(8*c*E^((I*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Maple [B] time = 0.067, size = 393, normalized size = 2.2

$$\frac{1}{8c}\left(15\sqrt{b^{-1}}\sqrt{\pi}\sqrt{2}\sqrt{a+b\arcsin(cx)}\cos\left(\frac{a}{b}\right)\mathrm{FresnelS}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{b^{-1}}\sqrt{\pi}b}\right)b^3-15\sqrt{b^{-1}}\sqrt{\pi}\sqrt{2}\sqrt{a+b\arcsin(cx)}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^(5/2),x)
```

```
[Out] 1/8/c/(a+b*arcsin(c*x))^(1/2)*(15*(1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(
c*x))^(1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x)
)^(1/2)/b)*b^3-15*(1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(
a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b^3+8
*arcsin(c*x)^3*sin((a+b*arcsin(c*x))/b-a/b)*b^3+24*arcsin(c*x)^2*sin((a+b*a
rcsin(c*x))/b-a/b)*a*b^2+20*arcsin(c*x)^2*cos((a+b*arcsin(c*x))/b-a/b)*b^3+
24*arcsin(c*x)*sin((a+b*arcsin(c*x))/b-a/b)*a^2*b-30*arcsin(c*x)*sin((a+b*a
rcsin(c*x))/b-a/b)*b^3+40*arcsin(c*x)*cos((a+b*arcsin(c*x))/b-a/b)*a*b^2+8*
sin((a+b*arcsin(c*x))/b-a/b)*a^3-30*sin((a+b*arcsin(c*x))/b-a/b)*a*b^2+20*c
os((a+b*arcsin(c*x))/b-a/b)*a^2*b)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (b\arcsin(cx)+a)^{\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(5/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**(5/2),x)
```

```
[Out] Timed out
```

Giac [C] time = 3.19333, size = 1578, normalized size = 8.82

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(5/2),x, algorithm="giac")
```

```
[Out] -1/2*I*sqrt(2)*sqrt(pi)*a^2*b^3*erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/
sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b
)/((I*b^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c) + 3/4*sqrt(2)*sqrt(pi)*a*b^4*
erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(
b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/((I*b^3/sqrt(abs(b)) + b^2*sqr
t(abs(b)))*c) + 1/2*I*sqrt(2)*sqrt(pi)*a^2*b^3*erf(1/2*I*sqrt(2)*sqrt(b*arc
sin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b
))/b)*e^(-I*a/b)/((-I*b^3/sqrt(abs(b)) + b^2*sqrt(abs(b)))*c) + 3/4*sqrt(2)
*sqrt(pi)*a*b^4*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/
2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(-I*a/b)/((-I*b^3/sqrt(
abs(b)) + b^2*sqrt(abs(b)))*c) + 1/2*I*sqrt(2)*sqrt(pi)*a^2*b^2*erf(-1/2*I*
sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*
x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/((I*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c)
 - 3/4*sqrt(2)*sqrt(pi)*a*b^3*erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sq
rt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/
```

```
((I*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c) - 15/16*I*sqrt(2)*sqrt(pi)*b^4*er
f(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*
arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/((I*b^2/sqrt(abs(b)) + b*sqrt(ab
s(b)))*c) - 1/2*I*sqrt(2)*sqrt(pi)*a^2*b^2*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(
c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b
)*e^(-I*a/b)/((-I*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c) - 3/4*sqrt(2)*sqrt(
pi)*a*b^3*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt
(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(-I*a/b)/((-I*b^2/sqrt(abs(b)
) + b*sqrt(abs(b)))*c) + 15/16*I*sqrt(2)*sqrt(pi)*b^4*erf(1/2*I*sqrt(2)*sqr
t(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqr
t(abs(b))/b)*e^(-I*a/b)/((-I*b^2/sqrt(abs(b)) + b*sqrt(abs(b)))*c) - 1/2*I*
sqrt(b*arcsin(c*x) + a)*b^2*arcsin(c*x)^2*e^(I*arcsin(c*x))/c + 1/2*I*sqrt(
b*arcsin(c*x) + a)*b^2*arcsin(c*x)^2*e^(-I*arcsin(c*x))/c - I*sqrt(b*arcsin
(c*x) + a)*a*b*arcsin(c*x)*e^(I*arcsin(c*x))/c + 5/4*sqrt(b*arcsin(c*x) + a
)*b^2*arcsin(c*x)*e^(I*arcsin(c*x))/c + I*sqrt(b*arcsin(c*x) + a)*a*b*arcsi
n(c*x)*e^(-I*arcsin(c*x))/c + 5/4*sqrt(b*arcsin(c*x) + a)*b^2*arcsin(c*x)*e
^(-I*arcsin(c*x))/c - 1/2*I*sqrt(b*arcsin(c*x) + a)*a^2*e^(I*arcsin(c*x))/c
 + 5/4*sqrt(b*arcsin(c*x) + a)*a*b*e^(I*arcsin(c*x))/c + 15/8*I*sqrt(b*arcs
in(c*x) + a)*b^2*e^(I*arcsin(c*x))/c + 1/2*I*sqrt(b*arcsin(c*x) + a)*a^2*e^
(-I*arcsin(c*x))/c + 5/4*sqrt(b*arcsin(c*x) + a)*a*b*e^(-I*arcsin(c*x))/c -
 15/8*I*sqrt(b*arcsin(c*x) + a)*b^2*e^(-I*arcsin(c*x))/c
```

3.186 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x}\,dx$

Optimal. Leaf size=18

$$\text{Unintegrable}\left(\frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x},x\right)$$

```
[Out] Unintegrable[(a + b*ArcSin[c*x])^(5/2)/x, x]
```

Rubi [A] time = 0.0441739, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(a + b*ArcSin[c*x])^(5/2)/x,x]

[Out] Defer[Int][(a + b*ArcSin[c*x])^(5/2)/x, x]
```

Rubi steps

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x}\,dx=\int \frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x}\,dx$$

Mathematica [A] time = 3.05952, size = 0, normalized size = 0.

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(a + b*ArcSin[c*x])^(5/2)/x,x]
```

```
[Out] Integrate[(a + b*ArcSin[c*x])^(5/2)/x, x]
```

Maple [A] time = 0.101, size = 0, normalized size = 0.

$$\int \frac{1}{x} \left(a + b \arcsin\left(cx\right)\right)^{\frac{5}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^(5/2)/x,x)
```

```
[Out] int((a+b*arcsin(c*x))^(5/2)/x,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(b \arcsin\left(cx\right) + a\right)^{\frac{5}{2}}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(5/2)/x,x, algorithm="maxima")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(5/2)/x, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(5/2)/x,x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**(5/2)/x,x)
```

```
[Out] Timed out
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(b \arcsin(cx) + a)^{\frac{5}{2}}}{x}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(5/2)/x,x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(5/2)/x, x)
```

3.187 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x^2}\,dx$

Optimal. Leaf size=18

$$\text{Unintegrable}\left(\frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x^2},x\right)$$

```
[Out] Unintegrable[(a + b*ArcSin[c*x])^(5/2)/x^2, x]
```

Rubi [A] time = 0.0433305, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(a + b*ArcSin[c*x])^(5/2)/x^2,x]
```

```
[Out] Defer[Int][(a + b*ArcSin[c*x])^(5/2)/x^2, x]
```

Rubi steps

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x^2}\,dx=\int \frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x^2}\,dx$$

Mathematica [A] time = 10.2156, size = 0, normalized size = 0.

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^{5/2}}{x^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(a + b*ArcSin[c*x])^(5/2)/x^2,x]
```

```
[Out] Integrate[(a + b*ArcSin[c*x])^(5/2)/x^2, x]
```

Maple [A] time = 0.161, size = 0, normalized size = 0.

$$\int \frac{1}{x^2} \left(a + b \arcsin\left(cx\right)\right)^{\frac{5}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^(5/2)/x^2,x)
```

```
[Out] int((a+b*arcsin(c*x))^(5/2)/x^2,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(b \arcsin\left(cx\right) + a\right)^{\frac{5}{2}}}{x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(5/2)/x^2,x, algorithm="maxima")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(5/2)/x^2, x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(5/2)/x^2,x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**(5/2)/x**2,x)
```

```
[Out] Timed out
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(b \arcsin(cx) + a)^{\frac{5}{2}}}{x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^(5/2)/x^2,x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(5/2)/x^2, x)
```

3.188 $\int \frac{x^2}{\sqrt{a+b\sin^{-1}(cx)}}\,dx$

Optimal. Leaf size=223

$$\frac{\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}-\frac{\sqrt{\frac{\pi}{6}}\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}+\frac{\sqrt{\frac{\pi}{2}}\sin\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}-$$

```
[Out] (Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]
)/(2*Sqrt[b]*c^3) - (Sqrt[Pi/6]*Cos[(3*a)/b]*FresnelC[(Sqrt[6/Pi]*Sqrt[a +
b*ArcSin[c*x]])/Sqrt[b]])/(2*Sqrt[b]*c^3) + (Sqrt[Pi/2]*FresnelS[(Sqrt[2/Pi
]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(2*Sqrt[b]*c^3) - (Sqrt[Pi/6]
*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(2*Sq
rt[b]*c^3)
```

Rubi [A] time = 0.420864, antiderivative size = 223, normalized size of antiderivative = 1., number of steps used = 13, number of rules used = 7, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.438, Rules used = {4635, 4406, 3306, 3305, 3351, 3304, 3352}

$$\frac{\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}-\frac{\sqrt{\frac{\pi}{6}}\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}+\frac{\sqrt{\frac{\pi}{2}}\sin\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}-$$

Antiderivative was successfully verified.

```
[In] Int[x^2/Sqrt[a + b*ArcSin[c*x]],x]
```

```
[Out] (Sqrt[Pi/2]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]
)/(2*Sqrt[b]*c^3) - (Sqrt[Pi/6]*Cos[(3*a)/b]*FresnelC[(Sqrt[6/Pi]*Sqrt[a +
b*ArcSin[c*x]])/Sqrt[b]])/(2*Sqrt[b]*c^3) + (Sqrt[Pi/2]*FresnelS[(Sqrt[2/Pi
]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(2*Sqrt[b]*c^3) - (Sqrt[Pi/6]
*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(2*Sq
rt[b]*c^3)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\begin{aligned}\int \frac{x^2}{\sqrt{a+b\sin^{-1}(cx)}}\,dx &= \frac{\text{Subst}\left(\int \frac{\cos(x)\sin^2(x)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{c^3}\\
&= \frac{\text{Subst}\left(\int \left(\frac{\cos(x)}{4\sqrt{a+bx}}-\frac{\cos(3x)}{4\sqrt{a+bx}}\right)dx, x, \sin^{-1}(cx)\right)}{c^3}\\
&= \frac{\text{Subst}\left(\int \frac{\cos(x)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{4c^3}-\frac{\text{Subst}\left(\int \frac{\cos(3x)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{4c^3}\\
&= \frac{\cos\left(\frac{a}{b}\right)\text{Subst}\left(\int \frac{\cos\left(\frac{a}{b}+x\right)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{4c^3}-\frac{\cos\left(\frac{3a}{b}\right)\text{Subst}\left(\int \frac{\cos\left(\frac{3a}{b}+3x\right)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{4c^3}+\\
&= \frac{\cos\left(\frac{a}{b}\right)\text{Subst}\left(\int \cos\left(\frac{x^2}{b}\right)dx, x, \sqrt{a+b\sin^{-1}(cx)}\right)}{2bc^3}-\frac{\cos\left(\frac{3a}{b}\right)\text{Subst}\left(\int \cos\left(\frac{3x^2}{b}\right)dx, x, \sqrt{a+}\right.}{2bc^3}\\
&= \frac{\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)C\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}-\frac{\sqrt{\frac{\pi}{6}}\cos\left(\frac{3a}{b}\right)C\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}+\frac{\sqrt{\frac{\pi}{2}}S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{2\sqrt{b}c^3}\end{aligned}$$

Mathematica [C] time = 0.266476, size = 228, normalized size = 1.02

$$-\frac{ie^{-\frac{3ia}{b}}\left(3e^{\frac{2ia}{b}}\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{1}{2},-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)-3e^{\frac{4ia}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{1}{2},\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+\sqrt{3}\left(e^{\frac{6ia}{b}}\sqrt{}\right.\right.}{24c^3\sqrt{a+b\sin^{-1}(cx)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2/Sqrt[a + b*ArcSin[c*x]],x]
```

```
[Out] ((-I/24)*(3*E^(((2*I)*a)/b)*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, (
(-I)*(a + b*ArcSin[c*x]))/b] - 3*E^(((4*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]
))/b]*Gamma[1/2, (I*(a + b*ArcSin[c*x]))/b] + Sqrt[3]*(-(Sqrt[((-I)*(a + b*
ArcSin[c*x]))/b]*Gamma[1/2, ((-3*I)*(a + b*ArcSin[c*x]))/b]) + E^(((6*I)*a)
/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((3*I)*(a + b*ArcSin[c*x]))/
b])))/(c^3*E^(((3*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Maple [A] time = 0.058, size = 168, normalized size = 0.8

$$\frac{\sqrt{2}\sqrt{\pi}}{12\,c^{3}}\sqrt{b^{-1}}\Bigg(-\cos\left(3\,\frac{a}{b}\right)\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{3}}{\sqrt{\pi}b}\sqrt{a+b\arcsin(cx)}\frac{1}{\sqrt{b^{-1}}}\right)\sqrt{3}-\sin\left(3\,\frac{a}{b}\right)\mathrm{FresnelS}\Bigg(\frac{\sqrt{2}\sqrt{3}}{\sqrt{\pi}b}\sqrt{a+b\arcsin(c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/(a+b*arcsin(c*x))^(1/2),x)
```

```
[Out] 1/12/c^3*(1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(-cos(3*a/b)*FresnelC(2^(1/2)/Pi^(1/2
)*3^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*3^(1/2)-sin(3*a/b)*Fresnel
S(2^(1/2)/Pi^(1/2)*3^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*3^(1/2)+3
*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)+
3*sin(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)
)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{2}}{\sqrt{b\arcsin(cx)+a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(x^2/sqrt(b*arcsin(c*x) + a), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{\sqrt{a + b \operatorname{asin}(cx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/(a+b*asin(c*x))**(1/2),x)
```

```
[Out] Integral(x**2/sqrt(a + b*asin(c*x)), x)
```

Giac [C] time = 2.27106, size = 428, normalized size = 1.92

$$\frac{\sqrt{\pi}\,\mathrm{erf}\left(-\frac{\sqrt{6}\sqrt{b\arcsin(cx)+a}}{2\sqrt{b}} - \frac{i\sqrt{6}\sqrt{b\arcsin(cx)+a}\sqrt{b}}{2|b|}\right)e^{\left(\frac{3ia}{b}\right)}}{4\left(\sqrt{6}\sqrt{b}+\frac{i\sqrt{6}b^{\frac{3}{2}}}{|b|}\right)c^3} - \frac{\sqrt{\pi}\,\mathrm{erf}\left(-\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}} - \frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(\frac{ia}{b}\right)}}{4c^3\left(\frac{i\sqrt{2}b}{\sqrt{|b|}}+\sqrt{2}\sqrt{|b|}\right)} - \sqrt{\pi}\,\mathrm{erf}($$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

```
[Out] 1/4*sqrt(pi)*erf(-1/2*sqrt(6)*sqrt(b*arcsin(c*x) + a)/sqrt(b) - 1/2*I*sqrt(
6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)/abs(b))*e^(3*I*a/b)/((sqrt(6)*sqrt(b) +
I*sqrt(6)*b^(3/2)/abs(b))*c^3) - 1/4*sqrt(pi)*erf(-1/2*I*sqrt(2)*sqrt(b*arc
sin(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b
))/b)*e^(I*a/b)/(c^3*(I*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b)))) - 1
/4*sqrt(pi)*erf(1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sq
rt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(-I*a/b)/(c^3*(-I*sqrt(2)*b
/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b)))) + 1/4*sqrt(pi)*erf(-1/2*sqrt(6)*sqrt
(b*arcsin(c*x) + a)/sqrt(b) + 1/2*I*sqrt(6)*sqrt(b*arcsin(c*x) + a)*sqrt(b)
/abs(b))*e^(-3*I*a/b)/((sqrt(6)*sqrt(b) - I*sqrt(6)*b^(3/2)/abs(b))*c^3)
```

3.189 $\int \frac{x}{\sqrt{a+b\sin^{-1}(cx)}}\,dx$

Optimal. Leaf size=99

$$\frac{\sqrt{\pi}\cos\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{2\sqrt{b}c^2}-\frac{\sqrt{\pi}\sin\left(\frac{2a}{b}\right)\text{FresnelC}\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{\pi}\sqrt{b}}\right)}{2\sqrt{b}c^2}$$

```
[Out] (Sqrt[Pi]*Cos[(2*a)/b]*FresnelS[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sqrt[P
i])])/(2*Sqrt[b]*c^2) - (Sqrt[Pi]*FresnelC[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqr
t[b]*Sqrt[Pi])]*Sin[(2*a)/b])/(2*Sqrt[b]*c^2)
```

Rubi [A] time = 0.17644, antiderivative size = 99, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.571, Rules used = {4635, 4406, 12, 3306, 3305, 3351, 3304, 3352}

$$\frac{\sqrt{\pi}\cos\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{2\sqrt{b}c^2}-\frac{\sqrt{\pi}\sin\left(\frac{2a}{b}\right)\text{FresnelC}\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{\pi}\sqrt{b}}\right)}{2\sqrt{b}c^2}$$

Antiderivative was successfully verified.

```
[In] Int[x/Sqrt[a + b*ArcSin[c*x]],x]
```

```
[Out] (Sqrt[Pi]*Cos[(2*a)/b]*FresnelS[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sqrt[P
i])])/(2*Sqrt[b]*c^2) - (Sqrt[Pi]*FresnelC[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqr
t[b]*Sqrt[Pi])]*Sin[(2*a)/b])/(2*Sqrt[b]*c^2)
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

```
tQ[p, 0]
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$
\begin{aligned}
\int \frac{x}{\sqrt{a+b\sin^{-1}(cx)}}\,dx &= \frac{\text{Subst}\left(\int \frac{\cos(x)\sin(x)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{c^2} \\
&= \frac{\text{Subst}\left(\int \frac{\sin(2x)}{2\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{c^2} \\
&= \frac{\text{Subst}\left(\int \frac{\sin(2x)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{2c^2} \\
&= \frac{\cos\left(\frac{2a}{b}\right)\text{Subst}\left(\int \frac{\sin\left(\frac{2a}{b}+2x\right)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{2c^2} - \frac{\sin\left(\frac{2a}{b}\right)\text{Subst}\left(\int \frac{\cos\left(\frac{2a}{b}+2x\right)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right.}{2c^2} \\
&= \frac{\cos\left(\frac{2a}{b}\right)\text{Subst}\left(\int \sin\left(\frac{2x^2}{b}\right)\,dx, x, \sqrt{a+b\sin^{-1}(cx)}\right)}{bc^2} - \frac{\sin\left(\frac{2a}{b}\right)\text{Subst}\left(\int \cos\left(\frac{2x^2}{b}\right)\,dx, x,\right.}{bc^2} \\
&= \frac{\sqrt{\pi}\cos\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{2\sqrt{b}c^2} - \frac{\sqrt{\pi}C\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)\sin\left(\frac{2a}{b}\right)}{2\sqrt{b}c^2}
\end{aligned}
$$

Mathematica [C] time = 0.0610222, size = 123, normalized size = 1.24

$$
-\frac{e^{-\frac{2ia}{b}}\left(\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{1}{2},-\frac{2i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+e^{\frac{4ia}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{1}{2},\frac{2i\left(a+b\sin^{-1}(cx)\right)}{b}\right)\right)}{4\sqrt{2}c^2\sqrt{a+b\sin^{-1}(cx)}}
$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x/Sqrt[a + b*ArcSin[c*x]],x]
```

```
[Out] -(Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-2*I)*(a + b*ArcSin[c*x])
)/b] + E^(((4*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((2*I)*(a
 + b*ArcSin[c*x]))/b])/(4*Sqrt[2]*c^2*E^(((2*I)*a)/b)*Sqrt[a + b*ArcSin[c*x
]])
```

Maple [A] time = 0.038, size = 80, normalized size = 0.8

$$
-\frac{\sqrt{\pi}}{2\,c^2}\sqrt{b^{-1}}\left(\sin\left(2\,\frac{a}{b}\right)\text{FresnelC}\left(2\,\frac{\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{b^{-1}}b}\right)-\cos\left(2\,\frac{a}{b}\right)\text{FresnelS}\left(2\,\frac{\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{b^{-1}}b}\right)\right)
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/(a+b*arcsin(c*x))^(1/2),x)
```

```
[Out] -1/2*Pi^(1/2)*(1/b)^(1/2)*(sin(2*a/b)*FresnelC(2/Pi^(1/2)/(1/b)^(1/2)*(a+b*
arcsin(c*x))^(1/2)/b)-cos(2*a/b)*FresnelS(2/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsi
n(c*x))^(1/2)/b))/c^2
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{b \arcsin(cx) + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(x/sqrt(b*arcsin(c*x) + a), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\sqrt{a + b \operatorname{asin}(cx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*asin(c*x))**(1/2),x)
```

```
[Out] Integral(x/sqrt(a + b*asin(c*x)), x)
```

Giac [C] time = 1.99215, size = 178, normalized size = 1.8

$$\frac{i\sqrt{\pi}\,\mathrm{erf}\left(-\frac{\sqrt{b\arcsin(cx)+a}}{\sqrt{b}}+\frac{i\sqrt{b\arcsin(cx)+a}\sqrt{b}}{|b|}\right)e^{\left(-\frac{2ia}{b}\right)}}{4c^2\left(\sqrt{b}-\frac{ib^{\frac{3}{2}}}{|b|}\right)}-\frac{i\sqrt{\pi}\,\mathrm{erf}\left(-\frac{\sqrt{b\arcsin(cx)+a}}{\sqrt{b}}-\frac{i\sqrt{b\arcsin(cx)+a}\sqrt{b}}{|b|}\right)e^{\left(\frac{2ia}{b}\right)}}{4\sqrt{b}c^2\left(\frac{ib}{|b|}+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

```
[Out] 1/4*I*sqrt(pi)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) + I*sqrt(b*arcsin(c*x)
+ a)*sqrt(b)/abs(b))*e^(-2*I*a/b)/(c^2*(sqrt(b) - I*b^(3/2)/abs(b))) - 1/4*
I*sqrt(pi)*erf(-sqrt(b*arcsin(c*x) + a)/sqrt(b) - I*sqrt(b*arcsin(c*x) + a)
*sqrt(b)/abs(b))*e^(2*I*a/b)/(sqrt(b)*c^2*(I*b/abs(b) + 1))
```

3.190 $\int \frac{1}{\sqrt{a+b\sin^{-1}(cx)}}\,dx$

Optimal. Leaf size=101

$$\frac{\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c}+\frac{\sqrt{2\pi}\sin\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c}$$

```
[Out] (Sqrt[2*Pi]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]
)/(Sqrt[b]*c) + (Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/S
qrt[b]]*Sin[a/b])/(Sqrt[b]*c)
```

Rubi [A] time = 0.0909293, antiderivative size = 101, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.5, Rules used = {4623, 3306, 3305, 3351, 3304, 3352}

$$\frac{\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c}+\frac{\sqrt{2\pi}\sin\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c}$$

Antiderivative was successfully verified.

```
[In] Int[1/Sqrt[a + b*ArcSin[c*x]],x]
```

```
[Out] (Sqrt[2*Pi]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]
)/(Sqrt[b]*c) + (Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/S
qrt[b]]*Sin[a/b])/(Sqrt[b]*c)
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int \frac{1}{\sqrt{a+b\sin^{-1}(cx)}}\,dx = \frac{\text{Subst}\left(\int \frac{\cos\left(\frac{a}{b}-\frac{x}{b}\right)}{\sqrt{x}}\,dx, x, a+b\sin^{-1}(cx)\right)}{bc}$$

$$= \frac{\cos\left(\frac{a}{b}\right)\text{Subst}\left(\int \frac{\cos\left(\frac{x}{b}\right)}{\sqrt{x}}\,dx, x, a+b\sin^{-1}(cx)\right)}{bc} + \frac{\sin\left(\frac{a}{b}\right)\text{Subst}\Big(\int \frac{\sin\left(\frac{x}{b}\right)}{\sqrt{x}}\,dx, x, a+b\sin^{-1}(cx}{bc}$$

$$= \frac{\left(2\cos\left(\frac{a}{b}\right)\right)\text{Subst}\left(\int \cos\left(\frac{x^2}{b}\right)\,dx, x, \sqrt{a+b\sin^{-1}(cx)}\right)}{bc} + \frac{\left(2\sin\left(\frac{a}{b}\right)\right)\text{Subst}\Big(\int \sin\left(\frac{x^2}{b}\right)\,dx, x}{bc}$$

$$= \frac{\sqrt{2\pi}\cos\left(\frac{a}{b}\right)C\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{\sqrt{b}c} + \frac{\sqrt{2\pi}S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)\sin\left(\frac{a}{b}\right)}{\sqrt{b}c}$$

Mathematica [C] time = 0.0873759, size = 121, normalized size = 1.2

$$\frac{ie^{-\frac{ia}{b}}\left(e^{\frac{2ia}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\,\text{Gamma}\left(\frac{1}{2},\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)-\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\,\text{Gamma}\left(\frac{1}{2},-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)\right)}{2c\sqrt{a+b\sin^{-1}(cx)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[1/Sqrt[a + b*ArcSin[c*x]],x]
```

```
[Out] ((I/2)*(-(Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-I)*(a + b*ArcSin
[c*x]))/b]) + E^(((2*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, (I
*(a + b*ArcSin[c*x]))/b]))/(c*E^((I*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Maple [A] time = 0.029, size = 83, normalized size = 0.8

$$\frac{\sqrt{2}\sqrt{\pi}}{c}\sqrt{b^{-1}}\left(\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{2}}{\sqrt{\pi}b}\sqrt{a+b\arcsin(cx)}\frac{1}{\sqrt{b^{-1}}}\right)+\sin\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{2}}{\sqrt{\pi}b}\sqrt{a+b\arcsin(cx)}\frac{1}{\sqrt{b^{-1}}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(a+b*arcsin(c*x))^(1/2),x)
```

```
[Out] 2^(1/2)*Pi^(1/2)*(1/b)^(1/2)*(cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(1/b)^(1/2
)*(a+b*arcsin(c*x))^(1/2)/b)+sin(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)
*(a+b*arcsin(c*x))^(1/2)/b))/c
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{\sqrt{b\arcsin(cx)+a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(1/sqrt(b*arcsin(c*x) + a), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{a + b \operatorname{asin}{(cx)}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*asin(c*x))**(1/2),x)
```

```
[Out] Integral(1/sqrt(a + b*asin(c*x)), x)
```

Giac [C] time = 1.9122, size = 215, normalized size = 2.13

$$-\frac{\sqrt{\pi}\operatorname{erf}\left(-\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}}-\frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(\frac{ia}{b}\right)}}{c\left(\frac{i\sqrt{2}b}{\sqrt{|b|}}+\sqrt{2}\sqrt{|b|}\right)}-\frac{\sqrt{\pi}\operatorname{erf}\left(\frac{i\sqrt{2}\sqrt{b\arcsin(cx)+a}}{2\sqrt{|b|}}-\frac{\sqrt{2}\sqrt{b\arcsin(cx)+a}\sqrt{|b|}}{2b}\right)e^{\left(-\frac{ia}{b}\right)}}{c\left(-\frac{i\sqrt{2}b}{\sqrt{|b|}}+\sqrt{2}\sqrt{|b|}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

```
[Out] -sqrt(pi)*erf(-1/2*I*sqrt(2)*sqrt(b*arcsin(c*x) + a)/sqrt(abs(b)) - 1/2*sqr
t(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))/b)*e^(I*a/b)/(c*(I*sqrt(2)*b/sqrt
(abs(b)) + sqrt(2)*sqrt(abs(b)))) - sqrt(pi)*erf(1/2*I*sqrt(2)*sqrt(b*arcsi
n(c*x) + a)/sqrt(abs(b)) - 1/2*sqrt(2)*sqrt(b*arcsin(c*x) + a)*sqrt(abs(b))
/b)*e^(-I*a/b)/(c*(-I*sqrt(2)*b/sqrt(abs(b)) + sqrt(2)*sqrt(abs(b))))
```

3.191 $\int \frac{1}{x\sqrt{a+b\sin^{-1}(cx)}}\,dx$

Optimal. Leaf size=18

$$\text{Unintegrable}\left(\frac{1}{x\sqrt{a+b\sin^{-1}(cx)}},x\right)$$

```
[Out] Unintegrable[1/(x*Sqrt[a + b*ArcSin[c*x]]), x]
```

Rubi [A] time = 0.0373151, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x\sqrt{a+b\sin^{-1}(cx)}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*Sqrt[a + b*ArcSin[c*x]]),x]
```

```
[Out] Defer[Int][1/(x*Sqrt[a + b*ArcSin[c*x]]), x]
```

Rubi steps

$$\int \frac{1}{x\sqrt{a+b\sin^{-1}(cx)}}\,dx = \int \frac{1}{x\sqrt{a+b\sin^{-1}(cx)}}\,dx$$

Mathematica [A] time = 2.86607, size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{a+b\sin^{-1}(cx)}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*Sqrt[a + b*ArcSin[c*x]]),x]
```

```
[Out] Integrate[1/(x*Sqrt[a + b*ArcSin[c*x]]), x]
```

Maple [A] time = 0.082, size = 0, normalized size = 0.

$$\int \frac{1}{x}\frac{1}{\sqrt{a+b\arcsin\left(cx\right)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(a+b*arcsin(c*x))^(1/2),x)
```

```
[Out] int(1/x/(a+b*arcsin(c*x))^(1/2),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{b\arcsin\left(cx\right)+a}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*arcsin(c*x) + a)*x), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\sqrt{a + b \operatorname{asin}{\left(cx \right)}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*asin(c*x))**(1/2),x)
```

```
[Out] Integral(1/(x*sqrt(a + b*asin(c*x))), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{b \arcsin\left(cx\right) + a}\,x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*arcsin(c*x) + a)*x), x)
```

3.192 $\int \frac{1}{x^2\sqrt{a+b\sin^{-1}(cx)}}\,dx$

Optimal. Leaf size=18

$$\text{Unintegrable}\left(\frac{1}{x^2\sqrt{a+b\sin^{-1}(cx)}},x\right)$$

```
[Out] Unintegrable[1/(x^2*Sqrt[a + b*ArcSin[c*x]]), x]
```

Rubi [A] time = 0.0368645, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x^2\sqrt{a+b\sin^{-1}(cx)}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x^2*Sqrt[a + b*ArcSin[c*x]]),x]
```

```
[Out] Defer[Int][1/(x^2*Sqrt[a + b*ArcSin[c*x]]), x]
```

Rubi steps

$$\int \frac{1}{x^2\sqrt{a+b\sin^{-1}(cx)}}\,dx=\int \frac{1}{x^2\sqrt{a+b\sin^{-1}(cx)}}\,dx$$

Mathematica [A] time = 11.6302, size = 0, normalized size = 0.

$$\int \frac{1}{x^2\sqrt{a+b\sin^{-1}(cx)}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x^2*Sqrt[a + b*ArcSin[c*x]]),x]
```

```
[Out] Integrate[1/(x^2*Sqrt[a + b*ArcSin[c*x]]), x]
```

Maple [A] time = 0.137, size = 0, normalized size = 0.

$$\int \frac{1}{x^2} \frac{1}{\sqrt{a + b \arcsin(cx)}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/(a+b*arcsin(c*x))^(1/2),x)
```

```
[Out] int(1/x^2/(a+b*arcsin(c*x))^(1/2),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{b \arcsin(cx) + a}\, x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(b*arcsin(c*x) + a)*x^2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\sqrt{a+b\,\mathrm{asin}\,(cx)}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(a+b*asin(c*x))**(1/2),x)
```

```
[Out] Integral(1/(x**2*sqrt(a + b*asin(c*x))), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{b\arcsin(cx)+a}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^(1/2),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(b*arcsin(c*x) + a)*x^2), x)
```

3.193 $\int \frac{x^2}{\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx$

Optimal. Leaf size=250

$$\frac{\sqrt{\frac{\pi}{2}}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3}-\frac{\sqrt{\frac{3\pi}{2}}\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3}-\frac{\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3}-$$

```
[Out] (-2*x^2*Sqrt[1 - c^2*x^2])/(b*c*Sqrt[a + b*ArcSin[c*x]]) - (Sqrt[Pi/2]*Cos[
a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(b^(3/2)*c^3)
+ (Sqrt[(3*Pi)/2]*Cos[(3*a)/b]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]]
)/Sqrt[b]])/(b^(3/2)*c^3) + (Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*Arc
Sin[c*x]])/Sqrt[b]]*Sin[a/b])/(b^(3/2)*c^3) - (Sqrt[(3*Pi)/2]*FresnelC[(Sqr
t[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(b^(3/2)*c^3)
```

Rubi [A] time = 0.418084, antiderivative size = 250, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 6, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.375, Rules used = {4631, 3306, 3305, 3351, 3304, 3352}

$$\frac{\sqrt{\frac{\pi}{2}}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3}-\frac{\sqrt{\frac{3\pi}{2}}\sin\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3}-\frac{\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3}-$$

Antiderivative was successfully verified.

```
[In] Int[x^2/(a + b*ArcSin[c*x])^(3/2),x]
```

```
[Out] (-2*x^2*Sqrt[1 - c^2*x^2])/(b*c*Sqrt[a + b*ArcSin[c*x]]) - (Sqrt[Pi/2]*Cos[
a/b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(b^(3/2)*c^3)
+ (Sqrt[(3*Pi)/2]*Cos[(3*a)/b]*FresnelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]]
)/Sqrt[b]])/(b^(3/2)*c^3) + (Sqrt[Pi/2]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*Arc
Sin[c*x]])/Sqrt[b]]*Sin[a/b])/(b^(3/2)*c^3) - (Sqrt[(3*Pi)/2]*FresnelC[(Sqr
t[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(b^(3/2)*c^3)
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
```

```
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int \frac{x^2}{\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx = -\frac{2x^2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} + \frac{2\,\text{Subst}\left(\int \left(-\frac{\sin(x)}{4\sqrt{a+bx}} + \frac{3\sin(3x)}{4\sqrt{a+bx}}\right)dx, x, \sin^{-1}(cx)\right)}{bc^3}$$

$$= -\frac{2x^2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} - \frac{\text{Subst}\left(\int \frac{\sin(x)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{2bc^3} + \frac{3\,\text{Subst}\left(\int \frac{\sin(3x)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx\right.}{2bc^3}$$

$$= -\frac{2x^2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} - \frac{\cos\left(\frac{a}{b}\right)\text{Subst}\left(\int \frac{\sin\left(\frac{a}{b}+x\right)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{2bc^3} + \left(3\cos\left(\frac{3a}{b}\right)\right)\text{Subst}\left(\int\right.$$

$$= -\frac{2x^2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} - \frac{\cos\left(\frac{a}{b}\right)\text{Subst}\left(\int \sin\left(\frac{x^2}{b}\right)dx, x, \sqrt{a+b\sin^{-1}(cx)}\right)}{b^2c^3} + \left(3\cos\left(\frac{3a}{b}\right)\right)\text{S}$$

$$= -\frac{2x^2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} - \frac{\sqrt{\frac{\pi}{2}}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3} + \frac{\sqrt{\frac{3\pi}{2}}\cos\left(\frac{3a}{b}\right)S\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c^3}$$

Mathematica [C] time = 0.443021, size = 343, normalized size = 1.37

$$e^{-\frac{3i\left(a+b\sin^{-1}(cx)\right)}{b}}\left(e^{\frac{2ia}{b}+3i\sin^{-1}(cx)}\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\,\text{Gamma}\left(\frac{1}{2},-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+e^{\frac{4ia}{b}+3i\sin^{-1}(cx)}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\,\text{Gamma}\left(\frac{1}{2},\frac{i(}{}\right.\right.$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2/(a + b*ArcSin[c*x])^(3/2),x]
```

```
[Out] (E^(((3*I)*a)/b) - E^(((3*I)*a)/b + (2*I)*ArcSin[c*x]) - E^(((3*I)*a)/b + (
4*I)*ArcSin[c*x]) + E^(((3*I)*(a + 2*b*ArcSin[c*x]))/b) + E^(((2*I)*a)/b +
(3*I)*ArcSin[c*x])*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-I)*(a +
 b*ArcSin[c*x]))/b] + E^(((4*I)*a)/b + (3*I)*ArcSin[c*x])*Sqrt[(I*(a + b*Ar
cSin[c*x]))/b]*Gamma[1/2, (I*(a + b*ArcSin[c*x]))/b] - Sqrt[3]*E^((3*I)*Arc
Sin[c*x])*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-3*I)*(a + b*ArcS
in[c*x]))/b] - Sqrt[3]*E^((3*I)*((2*a)/b + ArcSin[c*x]))*Sqrt[(I*(a + b*Arc
Sin[c*x]))/b]*Gamma[1/2, ((3*I)*(a + b*ArcSin[c*x]))/b])/(4*b*c^3*E^(((3*I)
*(a + b*ArcSin[c*x]))/b)*Sqrt[a + b*ArcSin[c*x]])
```

Maple [A] time = 0.066, size = 295, normalized size = 1.2

$$-\frac{1}{2\,bc^{3}}\left(-\sqrt{3}\sqrt{b^{-1}}\sqrt{\pi}\sqrt{2}\sqrt{a+b\arcsin(cx)}\cos\left(3\,\frac{a}{b}\right)\mathrm{FresnelS}\left(\frac{\sqrt{2}\sqrt{3}}{\sqrt{\pi}b}\sqrt{a+b\arcsin(cx)}\frac{1}{\sqrt{b^{-1}}}\right)+\sqrt{3}\sqrt{b^{-1}}\sqrt{\pi}\sqrt{2}\sqrt{a+}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/(a+b*arcsin(c*x))^(3/2),x)
```

```
[Out] -1/2/c^3/b/(a+b*arcsin(c*x))^(1/2)*(-3^(1/2)*(1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(
a+b*arcsin(c*x))^(1/2)*cos(3*a/b)*FresnelS(2^(1/2)/Pi^(1/2)*3^(1/2)/(1/b)^(
1/2)*(a+b*arcsin(c*x))^(1/2)/b)+3^(1/2)*(1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b*a
rcsin(c*x))^(1/2)*sin(3*a/b)*FresnelC(2^(1/2)/Pi^(1/2)*3^(1/2)/(1/b)^(1/2)*
(a+b*arcsin(c*x))^(1/2)/b)+(1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(
1/2)*cos(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)
/b)-(1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(a/b)*FresnelC(
2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)+cos((a+b*arcsin(c*x
))/b-a/b)-cos(3*(a+b*arcsin(c*x))/b-3*a/b))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^{2}}{\left(b\arcsin(cx)+a\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x^2/(b*arcsin(c*x) + a)^(3/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(a+b\,\mathrm{asin}\,(cx))^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/(a+b*asin(c*x))**(3/2),x)
```

```
[Out] Integral(x**2/(a + b*asin(c*x))**(3/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(b\arcsin\,(cx)+a)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x^2/(b*arcsin(c*x) + a)^(3/2), x)
```

3.194 $\int \frac{x}{\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx$

Optimal. Leaf size=130

$$\frac{2\sqrt{\pi}\cos\left(\frac{2a}{b}\right)\text{FresnelC}\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{\pi}\sqrt{b}}\right)}{b^{3/2}c^2}+\frac{2\sqrt{\pi}\sin\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{b^{3/2}c^2}-\frac{2x\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}}$$

```
[Out] (-2*x*Sqrt[1 - c^2*x^2])/(b*c*Sqrt[a + b*ArcSin[c*x]]) + (2*Sqrt[Pi]*Cos[(2
*a)/b]*FresnelC[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sqrt[Pi])])/(b^(3/2)*c
^2) + (2*Sqrt[Pi]*FresnelS[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sqrt[Pi])]*
Sin[(2*a)/b])/(b^(3/2)*c^2)
```

Rubi [A] time = 0.162871, antiderivative size = 130, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.429, Rules used = {4631, 3306, 3305, 3351, 3304, 3352}

$$\frac{2\sqrt{\pi}\cos\left(\frac{2a}{b}\right)\text{FresnelC}\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{\pi}\sqrt{b}}\right)}{b^{3/2}c^2}+\frac{2\sqrt{\pi}\sin\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{b^{3/2}c^2}-\frac{2x\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}}$$

Antiderivative was successfully verified.

```
[In] Int[x/(a + b*ArcSin[c*x])^(3/2),x]
```

```
[Out] (-2*x*Sqrt[1 - c^2*x^2])/(b*c*Sqrt[a + b*ArcSin[c*x]]) + (2*Sqrt[Pi]*Cos[(2
*a)/b]*FresnelC[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sqrt[Pi])])/(b^(3/2)*c
^2) + (2*Sqrt[Pi]*FresnelS[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sqrt[Pi])]*
Sin[(2*a)/b])/(b^(3/2)*c^2)
```

Rule 4631

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] - Dist
[1/(b*c^(m + 1)*(n + 1)), Subst[Int[ExpandTrigReduce[(a + b*x)^(n + 1), Sin
[x]^(m - 1)*(m - (m + 1)*Sin[x]^2), x], x], x, ArcSin[c*x]], x] /; FreeQ[{a
, b, c}, x] && IGtQ[m, 0] && GeQ[n, -2] && LtQ[n, -1]
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int \frac{x}{\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx = -\frac{2x\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} + \frac{2\,\mathrm{Subst}\left(\int \frac{\cos(2x)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{bc^2}$$

$$= -\frac{2x\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} + \frac{\left(2\cos\left(\frac{2a}{b}\right)\right)\mathrm{Subst}\left(\int \frac{\cos\left(\frac{2a}{b}+2x\right)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{bc^2} + \frac{\left(2\sin\left(\frac{2a}{b}\right)\right)\mathrm{Su}}{}$$

$$= -\frac{2x\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} + \frac{\left(4\cos\left(\frac{2a}{b}\right)\right)\mathrm{Subst}\left(\int \cos\left(\frac{2x^2}{b}\right)dx, x, \sqrt{a+b\sin^{-1}(cx)}\right)}{b^2c^2} + \frac{\left(4\sin\right.}{}$$

$$= -\frac{2x\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} + \frac{2\sqrt{\pi}\cos\left(\frac{2a}{b}\right)C\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{b^{3/2}c^2} + \frac{2\sqrt{\pi}S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)\sin\left(\frac{2a}{b}\right)}{b^{3/2}c^2}$$

Mathematica [C] time = 0.145312, size = 155, normalized size = 1.19

$$\frac{ie^{-\frac{2ia}{b}}\left(-\sqrt{2}\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\mathrm{Gamma}\left(\frac{1}{2}, -\frac{2i\left(a+b\sin^{-1}(cx)\right)}{b}\right) + \sqrt{2}e^{\frac{4ia}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\mathrm{Gamma}\left(\frac{1}{2}, \frac{2i\left(a+b\sin^{-1}(cx)\right)}{b}\right) + 2ie^{\frac{2ia}{b}}\mathrm{s}\right.}{2bc^2\sqrt{a+b\sin^{-1}(cx)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x/(a + b*ArcSin[c*x])^(3/2),x]
```

```
[Out] ((I/2)*(-(Sqrt[2]*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-2*I)*(a
+ b*ArcSin[c*x]))/b]) + Sqrt[2]*E^(((4*I)*a)/b)*Sqrt[(I*(a + b*ArcSin[c*x])
)/b]*Gamma[1/2, ((2*I)*(a + b*ArcSin[c*x]))/b] + (2*I)*E^(((2*I)*a)/b)*Sin[
2*ArcSin[c*x]]))/(b*c^2*E^(((2*I)*a)/b)*Sqrt[a + b*ArcSin[c*x]])
```

Maple [A] time = 0.045, size = 143, normalized size = 1.1

$$-\frac{1}{bc^2}\left(-2\sqrt{b^{-1}}\sqrt{\pi}\sqrt{a+b\arcsin(cx)}\cos\left(2\frac{a}{b}\right)\mathrm{FresnelC}\left(2\frac{\sqrt{a+b\arcsin(cx)}}{\sqrt{b^{-1}}\sqrt{\pi}b}\right) - 2\sqrt{b^{-1}}\sqrt{\pi}\sqrt{a+b\arcsin(cx)}\sin\left(2\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/(a+b*arcsin(c*x))^(3/2),x)
```

```
[Out] -1/c^2/b/(a+b*arcsin(c*x))^(1/2)*(-2*(1/b)^(1/2)*Pi^(1/2)*(a+b*arcsin(c*x))
^(1/2)*cos(2*a/b)*FresnelC(2/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b
)-2*(1/b)^(1/2)*Pi^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(2*a/b)*FresnelS(2/Pi^(
1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)+sin(2*(a+b*arcsin(c*x))/b-2*a/b
))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(b\arcsin(cx)+a)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(x/(b*arcsin(c*x) + a)^(3/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(a+b\operatorname{asin}(cx))^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*asin(c*x))**(3/2),x)
```

```
[Out] Integral(x/(a + b*asin(c*x))**(3/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(b\arcsin{(cx)} + a)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(x/(b*arcsin(c*x) + a)^(3/2), x)
```

3.195 $\int \frac{1}{\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx$

Optimal. Leaf size=137

$$\frac{2\sqrt{2\pi}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c}-\frac{2\sqrt{2\pi}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c}-\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}}$$

```
[Out] (-2*Sqrt[1 - c^2*x^2])/(b*c*Sqrt[a + b*ArcSin[c*x]]) - (2*Sqrt[2*Pi]*Cos[a/
b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(b^(3/2)*c) + (2
*Sqrt[2*Pi]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b]
)/(b^(3/2)*c)
```

Rubi [A] time = 0.29426, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.583, Rules used = {4621, 4723, 3306, 3305, 3351, 3304, 3352}

$$\frac{2\sqrt{2\pi}\sin\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c}-\frac{2\sqrt{2\pi}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c}-\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^(-3/2),x]
```

```
[Out] (-2*Sqrt[1 - c^2*x^2])/(b*c*Sqrt[a + b*ArcSin[c*x]]) - (2*Sqrt[2*Pi]*Cos[a/
b]*FresnelS[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(b^(3/2)*c) + (2
*Sqrt[2*Pi]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b]
)/(b^(3/2)*c)
```

Rule 4621

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Sqrt[1 - c^
2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + Dist[c/(b*(n + 1)),
 Int[(x*(a + b*ArcSin[c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a,
 b, c}, x] && LtQ[n, -1]
```

Rule 4723

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)*(x_)^(m_.)*((d_) + (e_.)*(x_)^
2)^(p_.), x_Symbol] :> Dist[d^p/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*C
os[x]^(2*p + 1), x], x, ArcSin[c*x]], x] /; FreeQ[{a, b, c, d, e, n}, x] &&
 EqQ[c^2*d + e, 0] && IntegerQ[2*p] && GtQ[p, -1] && IGtQ[m, 0] && (Integer
Q[p] || GtQ[d, 0])
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int \frac{1}{\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx = -\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} - \frac{(2c)\int \frac{x}{\sqrt{1-c^2x^2}\sqrt{a+b\sin^{-1}(cx)}}\,dx}{b}$$

$$= -\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} - \frac{2\,\text{Subst}\left(\int \frac{\sin(x)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{bc}$$

$$= -\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} - \frac{\left(2\cos\left(\frac{a}{b}\right)\right)\text{Subst}\left(\int \frac{\sin\left(\frac{a}{b}+x\right)}{\sqrt{a+bx}}\,dx, x, \sin^{-1}(cx)\right)}{bc} + \left(2\sin\left(\frac{a}{b}\right)\right)\text{Subst}\,($$

$$= -\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} - \frac{\left(4\cos\left(\frac{a}{b}\right)\right)\text{Subst}\left(\int \sin\left(\frac{x^2}{b}\right)\,dx, x, \sqrt{a+b\sin^{-1}(cx)}\right)}{b^2c} + \left(4\sin\left(\frac{a}{b}\right)\right)$$

$$= -\frac{2\sqrt{1-c^2x^2}}{bc\sqrt{a+b\sin^{-1}(cx)}} - \frac{2\sqrt{2\pi}\cos\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{3/2}c} + \frac{2\sqrt{2\pi}C\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)\sin\,(}{b^{3/2}c}$$

Mathematica [C] time = 0.297999, size = 167, normalized size = 1.22

$$\frac{e^{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\left(e^{i\sin^{-1}(cx)}\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{1}{2},-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+e^{\frac{ia}{b}}\left(e^{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\text{Gamma}\left(\frac{1}{2},\right.\right.\right.}{bc\sqrt{a+b\sin^{-1}(cx)}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*ArcSin[c*x])^(-3/2),x]
```

```
[Out] (E^(I*ArcSin[c*x])*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-I)*(a +
 b*ArcSin[c*x]))/b] + E^((I*a)/b)*(-1 - E^((2*I)*ArcSin[c*x]) + E^((I*(a +
b*ArcSin[c*x]))/b)*Sqrt[(I*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, (I*(a + b*Arc
Sin[c*x]))/b]))/(b*c*E^((I*(a + b*ArcSin[c*x]))/b)*Sqrt[a + b*ArcSin[c*x]])
```

Maple [A] time = 0.042, size = 149, normalized size = 1.1

$$-2\,\frac{1}{bc\sqrt{a+b\arcsin(cx)}}\left(\sqrt{b^{-1}}\sqrt{\pi}\sqrt{2}\sqrt{a+b\arcsin(cx)}\cos\left(\frac{a}{b}\right)\text{FresnelS}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{b^{-1}}\sqrt{\pi}b}\right)-\sqrt{b^{-1}}\sqrt{\pi}\sqrt{2}\sqrt{a+b}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(a+b*arcsin(c*x))^(3/2),x)
```

```
[Out] -2/c/b*((1/b)^(1/2)*Pi^(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*cos(a/b)*Fresn
elS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)-(1/b)^(1/2)*Pi^
(1/2)*2^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(1
/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)+cos((a+b*arcsin(c*x))/b-a/b))/(a+b*arc
sin(c*x))^(1/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b \arcsin\left(cx\right) + a\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(-3/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(a + b \operatorname{asin}\left(cx\right)\right)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*asin(c*x))**(3/2),x)
```

```
[Out] Integral((a + b*asin(c*x))**(-3/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b \arcsin(cx) + a)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(-3/2), x)
```

3.196 $\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx$

Optimal. Leaf size=18

$$\text{Unintegrable}\left(\frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{3/2}},x\right)$$

```
[Out] Unintegrable[1/(x*(a + b*ArcSin[c*x])^(3/2)), x]
```

Rubi [A] time = 0.0442315, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*(a + b*ArcSin[c*x])^(3/2)),x]
```

```
[Out] Defer[Int][1/(x*(a + b*ArcSin[c*x])^(3/2)), x]
```

Rubi steps

$$\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx=\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx$$

Mathematica [A] time = 3.4583, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*(a + b*ArcSin[c*x])^(3/2)),x]
```

```
[Out] Integrate[1/(x*(a + b*ArcSin[c*x])^(3/2)), x]
```

Maple [A] time = 0.079, size = 0, normalized size = 0.

$$\int \frac{1}{x} (a + b \arcsin(cx))^{-\frac{3}{2}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(a+b*arcsin(c*x))^(3/2),x)
```

```
[Out] int(1/x/(a+b*arcsin(c*x))^(3/2),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b \arcsin(cx) + a)^{\frac{3}{2}} x} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)^(3/2)*x), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\,(a+b\,\mathrm{asin}\,(cx))^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*asin(c*x))**(3/2),x)
```

```
[Out] Integral(1/(x*(a + b*asin(c*x))**(3/2)), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b\arcsin\,(cx)+a)^{\frac{3}{2}}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)^(3/2)*x), x)
```

3.197 $\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx$

Optimal. Leaf size=18

$$\text{Unintegrable}\left(\frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{3/2}},x\right)$$

```
[Out] Unintegrable[1/(x^2*(a + b*ArcSin[c*x])^(3/2)), x]
```

Rubi [A] time = 0.0428374, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x^2*(a + b*ArcSin[c*x])^(3/2)),x]
```

```
[Out] Defer[Int][1/(x^2*(a + b*ArcSin[c*x])^(3/2)), x]
```

Rubi steps

$$\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx=\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx$$

Mathematica [A] time = 11.4046, size = 0, normalized size = 0.

$$\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x^2*(a + b*ArcSin[c*x])^(3/2)),x]
```

```
[Out] Integrate[1/(x^2*(a + b*ArcSin[c*x])^(3/2)), x]
```

Maple [A] time = 0.158, size = 0, normalized size = 0.

$$\int \frac{1}{x^2} (a + b \arcsin(cx))^{-\frac{3}{2}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/(a+b*arcsin(c*x))^(3/2),x)
```

```
[Out] int(1/x^2/(a+b*arcsin(c*x))^(3/2),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b \arcsin(cx) + a)^{\frac{3}{2}} x^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)^(3/2)*x^2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x^2\,(a+b\,\mathrm{asin}\,(cx))^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(a+b*asin(c*x))**(3/2),x)
```

```
[Out] Integral(1/(x**2*(a + b*asin(c*x))**(3/2)), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(b\arcsin\,(cx)+a)^{\frac{3}{2}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^(3/2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)^(3/2)*x^2), x)
```

3.198 $\int \frac{x^2}{\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx$

Optimal. Leaf size=291

$$-\frac{\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{3b^{5/2}c^3}+\frac{\sqrt{6\pi}\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{5/2}c^3}-\frac{\sqrt{2\pi}\sin\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}}}{\sqrt{b}}\right.}{3b^{5/2}c^3}$$

```
[Out] (-2*x^2*Sqrt[1 - c^2*x^2])/(3*b*c*(a + b*ArcSin[c*x])^(3/2)) - (8*x)/(3*b^2
*c^2*Sqrt[a + b*ArcSin[c*x]]) + (4*x^3)/(b^2*Sqrt[a + b*ArcSin[c*x]]) - (Sq
rt[2*Pi]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(
3*b^(5/2)*c^3) + (Sqrt[6*Pi]*Cos[(3*a)/b]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b*A
rcSin[c*x]])/Sqrt[b]])/(b^(5/2)*c^3) - (Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqr
t[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(3*b^(5/2)*c^3) + (Sqrt[6*Pi]*Fres
nelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(b^(5/2)*c
^3)
```

Rubi [A] time = 1.00719, antiderivative size = 291, normalized size of antiderivative = 1., number of steps used = 22, number of rules used = 10, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.625, Rules used = {4633, 4719, 4635, 4406, 3306, 3305, 3351, 3304, 3352, 4623}

$$-\frac{\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{3b^{5/2}c^3}+\frac{\sqrt{6\pi}\cos\left(\frac{3a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{6}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{b^{5/2}c^3}-\frac{\sqrt{2\pi}\sin\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(}}{\sqrt{b}}\right.}{3b^{5/2}c^3}$$

Antiderivative was successfully verified.

```
[In] Int[x^2/(a + b*ArcSin[c*x])^(5/2),x]
```

```
[Out] (-2*x^2*Sqrt[1 - c^2*x^2])/(3*b*c*(a + b*ArcSin[c*x])^(3/2)) - (8*x)/(3*b^2
*c^2*Sqrt[a + b*ArcSin[c*x]]) + (4*x^3)/(b^2*Sqrt[a + b*ArcSin[c*x]]) - (Sq
rt[2*Pi]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]])/(
3*b^(5/2)*c^3) + (Sqrt[6*Pi]*Cos[(3*a)/b]*FresnelC[(Sqrt[6/Pi]*Sqrt[a + b*A
rcSin[c*x]])/Sqrt[b]])/(b^(5/2)*c^3) - (Sqrt[2*Pi]*FresnelS[(Sqrt[2/Pi]*Sqr
t[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(3*b^(5/2)*c^3) + (Sqrt[6*Pi]*Fres
nelS[(Sqrt[6/Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[(3*a)/b])/(b^(5/2)*c
^3)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rubi steps

$$\int \frac{x^2}{\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx = -\frac{2x^2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} + \frac{4\int \frac{x}{\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx}{3bc} - \frac{(2c)\int \frac{x^3}{\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx}{b}$$

$$= -\frac{2x^2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{8x}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{4x^3}{b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{12\int \frac{x^2}{\sqrt{a+b\sin^{-1}(cx}}}{b^2}$$

$$= -\frac{2x^2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{8x}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{4x^3}{b^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{8\,\mathrm{Subst}\left(\int \frac{\cos(}{\sqrt{}}\right.}{}$$

$$= -\frac{2x^2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{8x}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{4x^3}{b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{12\,\mathrm{Subst}\left(\int\left(\frac{\mathrm{c}}{4\sqrt{}}\right.\right.}{}$$

$$= -\frac{2x^2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{8x}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{4x^3}{b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{3\,\mathrm{Subst}\left(\int \frac{\cos(x}{\sqrt{a+b}}\right.}{b}$$

$$= -\frac{2x^2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{8x}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{4x^3}{b^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{8\sqrt{2\pi}\cos\left(\frac{a}{b}\right)C}{3b}$$

$$= -\frac{2x^2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{8x}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{4x^3}{b^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{8\sqrt{2\pi}\cos\left(\frac{a}{b}\right)C}{3b}$$

$$= -\frac{2x^2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{8x}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{4x^3}{b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{\sqrt{2\pi}\cos\left(\frac{a}{b}\right)C\left(\right.}{3b^{5}}$$

Mathematica [C] time = 1.85544, size = 370, normalized size = 1.27

$$-2be^{-\frac{ia}{b}}\left(-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)^{3/2}\mathrm{Gamma}\left(\frac{1}{2},-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+6\sqrt{3}be^{-\frac{3ia}{b}}\left(-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)^{3/2}\mathrm{Gamma}\left(\frac{1}{2},-\frac{3i\left(a+b\sin^{-1}(cx)\right)}{b}\right)+$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x^2/(a + b*ArcSin[c*x])^(5/2),x]
```

```
[Out] (((-6*I)*a)/E^((3*I)*ArcSin[c*x]) + (b*(1 - (6*I)*ArcSin[c*x]))/E^((3*I)*Ar
cSin[c*x]) + E^((3*I)*ArcSin[c*x])*((6*I)*a + b + (6*I)*b*ArcSin[c*x]) - I*
E^(I*ArcSin[c*x])*(2*a - I*b + 2*b*ArcSin[c*x]) - (2*b*(((-I)*(a + b*ArcSin
[c*x]))/b)^(3/2)*Gamma[1/2, ((-I)*(a + b*ArcSin[c*x]))/b])/E^((I*a)/b) + (I
*(2*a + I*b + 2*b*ArcSin[c*x] + (2*I)*b*E^((I*(a + b*ArcSin[c*x]))/b)*((I*(
a + b*ArcSin[c*x]))/b)^(3/2)*Gamma[1/2, (I*(a + b*ArcSin[c*x]))/b]))/E^(I*A
rcSin[c*x]) + (6*Sqrt[3]*b*(((-I)*(a + b*ArcSin[c*x]))/b)^(3/2)*Gamma[1/2,
((-3*I)*(a + b*ArcSin[c*x]))/b])/E^(((3*I)*a)/b) + 6*Sqrt[3]*b*E^(((3*I)*a)
/b)*((I*(a + b*ArcSin[c*x]))/b)^(3/2)*Gamma[1/2, ((3*I)*(a + b*ArcSin[c*x])
)/b])/(12*b^2*c^3*(a + b*ArcSin[c*x])^(3/2))
```

Maple [B] time = 0.088, size = 660, normalized size = 2.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x^2/(a+b*arcsin(c*x))^(5/2),x)
```

```
[Out] 1/6/c^3/b^2*(6*arcsin(c*x)*(a+b*arcsin(c*x))^(1/2)*cos(3*a/b)*FresnelC(2^(1
/2)/Pi^(1/2)*3^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*3^(1/2)*(1/b)^(
1/2)*2^(1/2)*Pi^(1/2)*b+6*arcsin(c*x)*(a+b*arcsin(c*x))^(1/2)*sin(3*a/b)*Fr
esnelS(2^(1/2)/Pi^(1/2)*3^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*3^(1
/2)*(1/b)^(1/2)*2^(1/2)*Pi^(1/2)*b-2*arcsin(c*x)*(a+b*arcsin(c*x))^(1/2)*co
s(a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(1/
b)^(1/2)*2^(1/2)*Pi^(1/2)*b-2*arcsin(c*x)*(a+b*arcsin(c*x))^(1/2)*sin(a/b)*
FresnelS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(1/b)^(1/2
)*2^(1/2)*Pi^(1/2)*b+6*(a+b*arcsin(c*x))^(1/2)*cos(3*a/b)*FresnelC(2^(1/2)/
Pi^(1/2)*3^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*3^(1/2)*(1/b)^(1/2)
*2^(1/2)*Pi^(1/2)*a+6*(a+b*arcsin(c*x))^(1/2)*sin(3*a/b)*FresnelS(2^(1/2)/P
i^(1/2)*3^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*3^(1/2)*(1/b)^(1/2)*
2^(1/2)*Pi^(1/2)*a-2*(a+b*arcsin(c*x))^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(
1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(1/b)^(1/2)*2^(1/2)*Pi^(1/2)*a-
2*(a+b*arcsin(c*x))^(1/2)*sin(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a
+b*arcsin(c*x))^(1/2)/b)*(1/b)^(1/2)*2^(1/2)*Pi^(1/2)*a+2*arcsin(c*x)*sin((
a+b*arcsin(c*x))/b-a/b)*b-6*arcsin(c*x)*sin(3*(a+b*arcsin(c*x))/b-3*a/b)*b-
cos((a+b*arcsin(c*x))/b-a/b)*b+2*sin((a+b*arcsin(c*x))/b-a/b)*a+cos(3*(a+b*
arcsin(c*x))/b-3*a/b)*b-6*sin(3*(a+b*arcsin(c*x))/b-3*a/b)*a)/(a+b*arcsin(c
*x))^(3/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(b\arcsin(cx)+a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*arcsin(c*x))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(x^2/(b*arcsin(c*x) + a)^(5/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*arcsin(c*x))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(a+b\,\mathrm{asin}(cx))^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x**2/(a+b*asin(c*x))**(5/2),x)
```

```
[Out] Integral(x**2/(a + b*asin(c*x))**(5/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2}{(b\arcsin(cx)+a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x^2/(a+b*arcsin(c*x))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(x^2/(b*arcsin(c*x) + a)^(5/2), x)
```

3.199 $\int \frac{x}{\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx$

Optimal. Leaf size=180

$$\frac{8\sqrt{\pi}\sin\left(\frac{2a}{b}\right)\text{FresnelC}\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{\pi}\sqrt{b}}\right)}{3b^{5/2}c^2}-\frac{8\sqrt{\pi}\cos\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{3b^{5/2}c^2}-\frac{4}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}}+\frac{8x^2}{3b^2\sqrt{a+b\sin^{-1}(c}}$$

```
[Out] (-2*x*Sqrt[1 - c^2*x^2])/(3*b*c*(a + b*ArcSin[c*x])^(3/2)) - 4/(3*b^2*c^2*S
qrt[a + b*ArcSin[c*x]]) + (8*x^2)/(3*b^2*Sqrt[a + b*ArcSin[c*x]]) - (8*Sqrt
[Pi]*Cos[(2*a)/b]*FresnelS[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sqrt[Pi])])
/(3*b^(5/2)*c^2) + (8*Sqrt[Pi]*FresnelC[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b
]*Sqrt[Pi])]*Sin[(2*a)/b])/(3*b^(5/2)*c^2)
```

Rubi [A] time = 0.506164, antiderivative size = 180, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 11, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.786, Rules used = {4633, 4719, 4635, 4406, 12, 3306, 3305, 3351, 3304, 3352, 4641}

$$\frac{8\sqrt{\pi}\sin\left(\frac{2a}{b}\right)\text{FresnelC}\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{\pi}\sqrt{b}}\right)}{3b^{5/2}c^2}-\frac{8\sqrt{\pi}\cos\left(\frac{2a}{b}\right)S\left(\frac{2\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}\sqrt{\pi}}\right)}{3b^{5/2}c^2}-\frac{4}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}}+\frac{8x^2}{3b^2\sqrt{a+b\sin^{-1}(c}}$$

Antiderivative was successfully verified.

```
[In] Int[x/(a + b*ArcSin[c*x])^(5/2),x]
```

```
[Out] (-2*x*Sqrt[1 - c^2*x^2])/(3*b*c*(a + b*ArcSin[c*x])^(3/2)) - 4/(3*b^2*c^2*S
qrt[a + b*ArcSin[c*x]]) + (8*x^2)/(3*b^2*Sqrt[a + b*ArcSin[c*x]]) - (8*Sqrt
[Pi]*Cos[(2*a)/b]*FresnelS[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b]*Sqrt[Pi])])
/(3*b^(5/2)*c^2) + (8*Sqrt[Pi]*FresnelC[(2*Sqrt[a + b*ArcSin[c*x]])/(Sqrt[b
]*Sqrt[Pi])]*Sin[(2*a)/b])/(3*b^(5/2)*c^2)
```

Rule 4633

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Simp[(
x^m*Sqrt[1 - c^2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + (Dis
t[(c*(m + 1))/(b*(n + 1)), Int[(x^(m + 1)*(a + b*ArcSin[c*x])^(n + 1))/Sqrt
[1 - c^2*x^2], x], x] - Dist[m/(b*c*(n + 1)), Int[(x^(m - 1)*(a + b*ArcSin[
c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x]) /; FreeQ[{a, b, c}, x] && IGtQ[m,
 0] && LtQ[n, -2]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4635

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*(x_)^(m_.), x_Symbol] :> Dist[1
/c^(m + 1), Subst[Int[(a + b*x)^n*Sin[x]^m*Cos[x], x], x, ArcSin[c*x]], x]
/; FreeQ[{a, b, c, n}, x] && IGtQ[m, 0]
```

Rule 4406

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

Rule 12

```
Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] &&  !Match
Q[u, (b_)*(v_) /; FreeQ[b, x]]
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 4641

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_.)/Sqrt[(d_) + (e_.)*(x_)^2], x_S
ymbol] :> Simp[(a + b*ArcSin[c*x])^(n + 1)/(b*c*Sqrt[d]*(n + 1)), x] /; Fre
eQ[{a, b, c, d, e, n}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] && NeQ[n, -1]
```

Rubi steps

$$\int \frac{x}{\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx = -\frac{2x\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} + \frac{2\int \frac{1}{\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx}{3bc} - \frac{(4c)\int \frac{x^2}{\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx}{3b}$$

$$= -\frac{2x\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{4}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{8x^2}{3b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{16\int \frac{x}{\sqrt{a+b\sin^{-}}}}{3b^2}$$

$$= -\frac{2x\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{4}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{8x^2}{3b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{16\,\mathrm{Subst}\Big(\int}{}$$

$$= -\frac{2x\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{4}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{8x^2}{3b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{16\,\mathrm{Subst}\Big(\int}{}$$

$$= -\frac{2x\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{4}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{8x^2}{3b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{8\,\mathrm{Subst}\Big(\int}{}$$

$$= -\frac{2x\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{4}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{8x^2}{3b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{\left(8\cos\left(\frac{2a}{b}\right)\right)}{}$$

$$= -\frac{2x\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{4}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{8x^2}{3b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{\left(16\cos\left(\frac{2a}{b}\right)\right)}{}$$

$$= -\frac{2x\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{4}{3b^2c^2\sqrt{a+b\sin^{-1}(cx)}} + \frac{8x^2}{3b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{8\sqrt{\pi}\cos\left(\frac{2a}{b}\right)}{3}$$

Mathematica [C] time = 1.23093, size = 173, normalized size = 0.96

$$-\frac{b\sin\left(2\sin^{-1}(cx)\right) + 2\left(a+b\sin^{-1}(cx)\right)\left(-\sqrt{2}e^{-\frac{2ia}{b}}\sqrt{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\mathrm{Gamma}\left(\frac{1}{2},-\frac{2i\left(a+b\sin^{-1}(cx)\right)}{b}\right) - \sqrt{2}e^{\frac{2ia}{b}}\sqrt{\frac{i\left(a+b\sin^{-1}\right.}{b}}\right.}{3b^2c^2\left(a+b\sin^{-1}(cx)\right)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[x/(a + b*ArcSin[c*x])^(5/2),x]
```

```
[Out] -(2*(a + b*ArcSin[c*x])*(E^((-2*I)*ArcSin[c*x]) + E^((2*I)*ArcSin[c*x]) - (
Sqrt[2]*Sqrt[((-I)*(a + b*ArcSin[c*x]))/b]*Gamma[1/2, ((-2*I)*(a + b*ArcSin
[c*x]))/b])/E^(((2*I)*a)/b) - Sqrt[2]*E^(((2*I)*a)/b)*Sqrt[(I*(a + b*ArcSin
[c*x]))/b]*Gamma[1/2, ((2*I)*(a + b*ArcSin[c*x]))/b]) + b*Sin[2*ArcSin[c*x]
])/(3*b^2*c^2*(a + b*ArcSin[c*x])^(3/2))
```

Maple [B] time = 0.059, size = 311, normalized size = 1.7

$$-\frac{1}{3\,b^{2}c^{2}}\left(8\,\arcsin(cx)\,\sqrt{\pi}\sqrt{b^{-1}}\sqrt{a+b\arcsin(cx)}\cos\left(2\,\frac{a}{b}\right)\mathrm{FresnelS}\left(2\,\frac{\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{b^{-1}}b}\right)b-8\,\arcsin(cx)\,\sqrt{\pi}\sqrt{b^{-1}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(x/(a+b*arcsin(c*x))^(5/2),x)
```

```
[Out] -1/3/c^2/b^2*(8*arcsin(c*x)*Pi^(1/2)*(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)*co
s(2*a/b)*FresnelS(2/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b-8*arc
sin(c*x)*Pi^(1/2)*(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(2*a/b)*FresnelC(2
/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*b+8*Pi^(1/2)*(1/b)^(1/2)*(
a+b*arcsin(c*x))^(1/2)*cos(2*a/b)*FresnelS(2/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcs
in(c*x))^(1/2)/b)*a-8*Pi^(1/2)*(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)*sin(2*a/
b)*FresnelC(2/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*a+4*arcsin(c*
x)*cos(2*(a+b*arcsin(c*x))/b-2*a/b)*b+sin(2*(a+b*arcsin(c*x))/b-2*a/b)*b+4*
cos(2*(a+b*arcsin(c*x))/b-2*a/b)*a)/(a+b*arcsin(c*x))^(3/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{\left(b\arcsin(cx)+a\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*arcsin(c*x))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(x/(b*arcsin(c*x) + a)^(5/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*arcsin(c*x))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(a + b\operatorname{asin}(cx))^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*asin(c*x))**(5/2),x)
```

```
[Out] Integral(x/(a + b*asin(c*x))**(5/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x}{(b\arcsin(cx) + a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x/(a+b*arcsin(c*x))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(x/(b*arcsin(c*x) + a)^(5/2), x)
```

3.200 $\int \frac{1}{\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx$

Optimal. Leaf size=163

$$-\frac{4\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{3b^{5/2}c}-\frac{4\sqrt{2\pi}\sin\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{3b^{5/2}c}+\frac{4x}{3b^2\sqrt{a+b\sin^{-1}(cx)}}-\frac{2\sqrt{1-c}}{3bc\left(a+b\sin\right.}$$

```
[Out] (-2*Sqrt[1 - c^2*x^2])/(3*b*c*(a + b*ArcSin[c*x])^(3/2)) + (4*x)/(3*b^2*Sqr
t[a + b*ArcSin[c*x]]) - (4*Sqrt[2*Pi]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a
+ b*ArcSin[c*x]])/Sqrt[b]])/(3*b^(5/2)*c) - (4*Sqrt[2*Pi]*FresnelS[(Sqrt[2/
Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(3*b^(5/2)*c)
```

Rubi [A] time = 0.275994, antiderivative size = 163, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 12, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.667, Rules used = {4621, 4719, 4623, 3306, 3305, 3351, 3304, 3352}

$$-\frac{4\sqrt{2\pi}\cos\left(\frac{a}{b}\right)\text{FresnelC}\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{3b^{5/2}c}-\frac{4\sqrt{2\pi}\sin\left(\frac{a}{b}\right)S\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{3b^{5/2}c}+\frac{4x}{3b^2\sqrt{a+b\sin^{-1}(cx)}}-\frac{2\sqrt{1-c}}{3bc\left(a+b\sin\right.}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^(-5/2),x]
```

```
[Out] (-2*Sqrt[1 - c^2*x^2])/(3*b*c*(a + b*ArcSin[c*x])^(3/2)) + (4*x)/(3*b^2*Sqr
t[a + b*ArcSin[c*x]]) - (4*Sqrt[2*Pi]*Cos[a/b]*FresnelC[(Sqrt[2/Pi]*Sqrt[a
+ b*ArcSin[c*x]])/Sqrt[b]])/(3*b^(5/2)*c) - (4*Sqrt[2*Pi]*FresnelS[(Sqrt[2/
Pi]*Sqrt[a + b*ArcSin[c*x]])/Sqrt[b]]*Sin[a/b])/(3*b^(5/2)*c)
```

Rule 4621

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Simp[(Sqrt[1 - c^
2*x^2]*(a + b*ArcSin[c*x])^(n + 1))/(b*c*(n + 1)), x] + Dist[c/(b*(n + 1)),
 Int[(x*(a + b*ArcSin[c*x])^(n + 1))/Sqrt[1 - c^2*x^2], x], x] /; FreeQ[{a,
 b, c}, x] && LtQ[n, -1]
```

Rule 4719

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_)*((f_.)*(x_))^(m_.))/Sqrt[(d_)
+ (e_.)*(x_)^2], x_Symbol] :> Simp[((f*x)^m*(a + b*ArcSin[c*x])^(n + 1))/(b
*c*Sqrt[d]*(n + 1)), x] - Dist[(f*m)/(b*c*Sqrt[d]*(n + 1)), Int[(f*x)^(m -
1)*(a + b*ArcSin[c*x])^(n + 1), x], x] /; FreeQ[{a, b, c, d, e, f, m}, x] &
& EqQ[c^2*d + e, 0] && LtQ[n, -1] && GtQ[d, 0]
```

Rule 4623

```
Int[((a_.) + ArcSin[(c_.)*(x_)]*(b_.))^(n_), x_Symbol] :> Dist[1/(b*c), Sub
st[Int[x^n*Cos[a/b - x/b], x], x, a + b*ArcSin[c*x]], x] /; FreeQ[{a, b, c,
 n}, x]
```

Rule 3306

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[Cos
[(d*e - c*f)/d], Int[Sin[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] + Dist[Sin[(d
*e - c*f)/d], Int[Cos[(c*f)/d + f*x]/Sqrt[c + d*x], x], x] /; FreeQ[{c, d,
e, f}, x] && ComplexFreeQ[f] && NeQ[d*e - c*f, 0]
```

Rule 3305

```
Int[sin[(e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> Dist[2/d
, Subst[Int[Sin[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d, e, f}
, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3351

```
Int[Sin[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lS[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rule 3304

```
Int[sin[Pi/2 + (e_.) + (f_.)*(x_)]/Sqrt[(c_.) + (d_.)*(x_)], x_Symbol] :> D
ist[2/d, Subst[Int[Cos[(f*x^2)/d], x], x, Sqrt[c + d*x]], x] /; FreeQ[{c, d
, e, f}, x] && ComplexFreeQ[f] && EqQ[d*e - c*f, 0]
```

Rule 3352

```
Int[Cos[(d_.)*((e_.) + (f_.)*(x_))^2], x_Symbol] :> Simp[(Sqrt[Pi/2]*Fresne
lC[Sqrt[2/Pi]*Rt[d, 2]*(e + f*x)])/(f*Rt[d, 2]), x] /; FreeQ[{d, e, f}, x]
```

Rubi steps

$$\int \frac{1}{\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx = -\frac{2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} - \frac{(2c)\int \frac{x}{\sqrt{1-c^2x^2}\left(a+b\sin^{-1}(cx)\right)^{3/2}}\,dx}{3b}$$

$$= -\frac{2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} + \frac{4x}{3b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{4\int \frac{1}{\sqrt{a+b\sin^{-1}(cx)}}\,dx}{3b^2}$$

$$= -\frac{2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} + \frac{4x}{3b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{4\,\text{Subst}\left(\int \frac{\cos\left(\frac{a}{b}-\frac{x}{b}\right)}{\sqrt{x}}\,dx, x, a+b\sin^{-1}(cx\right.}{3b^3c}$$

$$= -\frac{2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} + \frac{4x}{3b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{\left(4\cos\left(\frac{a}{b}\right)\right)\text{Subst}\left(\int \frac{\cos\left(\frac{x}{b}\right)}{\sqrt{x}}\,dx, x, a+b\,\mathrm{si}\right.}{3b^3c}$$

$$= -\frac{2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} + \frac{4x}{3b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{\left(8\cos\left(\frac{a}{b}\right)\right)\text{Subst}\left(\int \cos\left(\frac{x^2}{b}\right)dx, x, \sqrt{a}\right.}{3b^3c}$$

$$= -\frac{2\sqrt{1-c^2x^2}}{3bc\left(a+b\sin^{-1}(cx)\right)^{3/2}} + \frac{4x}{3b^2\sqrt{a+b\sin^{-1}(cx)}} - \frac{4\sqrt{2\pi}\cos\left(\frac{a}{b}\right)C\left(\frac{\sqrt{\frac{2}{\pi}}\sqrt{a+b\sin^{-1}(cx)}}{\sqrt{b}}\right)}{3b^{5/2}c} - 4\sqrt{2}$$

Mathematica [C] time = 0.851546, size = 214, normalized size = 1.31

$$\frac{e^{-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\left(-2be^{i\sin^{-1}(cx)}\left(-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)^{3/2}\text{Gamma}\left(\frac{1}{2},-\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)-ie^{\frac{ia}{b}}\left(-2ibe^{\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}}\left(\frac{i\left(a+b\sin^{-1}(cx)\right)}{b}\right)^{3/2}\text{G}\right.\right.}{3b^2c\left(a+b\sin^{-1}(cx)\right)}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(a + b*ArcSin[c*x])^(-5/2),x]
```

```
[Out] (-2*b*E^(I*ArcSin[c*x])*(((-I)*(a + b*ArcSin[c*x]))/b)^(3/2)*Gamma[1/2, ((-
I)*(a + b*ArcSin[c*x]))/b] - I*E^((I*a)/b)*(2*a*(-1 + E^((2*I)*ArcSin[c*x])
) + b*(-I - 2*ArcSin[c*x] + E^((2*I)*ArcSin[c*x])*(-I + 2*ArcSin[c*x])) - (
2*I)*b*E^((I*(a + b*ArcSin[c*x]))/b)*((I*(a + b*ArcSin[c*x]))/b)^(3/2)*Gamm
a[1/2, (I*(a + b*ArcSin[c*x]))/b]))/(3*b^2*c*E^((I*(a + b*ArcSin[c*x]))/b)*
(a + b*ArcSin[c*x])^(3/2))
```

Maple [B] time = 0.053, size = 325, normalized size = 2.

$$\frac{2}{3\,b^{2}c}\left(-2\arcsin(cx)\sqrt{a+b\arcsin(cx)}\cos\left(\frac{a}{b}\right)\mathrm{FresnelC}\left(\frac{\sqrt{2}\sqrt{a+b\arcsin(cx)}}{\sqrt{\pi}\sqrt{b^{-1}}b}\right)\sqrt{b^{-1}}\sqrt{2}\sqrt{\pi}b-2\arcsin(cx)\sqrt{a+ }\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(a+b*arcsin(c*x))^(5/2),x)
```

```
[Out] 2/3/c/b^2*(-2*arcsin(c*x)*(a+b*arcsin(c*x))^(1/2)*cos(a/b)*FresnelC(2^(1/2)
/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(1/b)^(1/2)*2^(1/2)*Pi^(1/
2)*b-2*arcsin(c*x)*(a+b*arcsin(c*x))^(1/2)*sin(a/b)*FresnelS(2^(1/2)/Pi^(1/
2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)/b)*(1/b)^(1/2)*2^(1/2)*Pi^(1/2)*b-2*
(a+b*arcsin(c*x))^(1/2)*cos(a/b)*FresnelC(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b
*arcsin(c*x))^(1/2)/b)*(1/b)^(1/2)*2^(1/2)*Pi^(1/2)*a-2*(a+b*arcsin(c*x))^(
1/2)*sin(a/b)*FresnelS(2^(1/2)/Pi^(1/2)/(1/b)^(1/2)*(a+b*arcsin(c*x))^(1/2)
/b)*(1/b)^(1/2)*2^(1/2)*Pi^(1/2)*a+2*arcsin(c*x)*sin((a+b*arcsin(c*x))/b-a/
b)*b-cos((a+b*arcsin(c*x))/b-a/b)*b+2*sin((a+b*arcsin(c*x))/b-a/b)*a)/(a+b*
arcsin(c*x))^(3/2)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int\frac{1}{(b\arcsin(cx)+a)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(-5/2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(a + b \operatorname{asin}{\left(cx \right)}\right)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*asin(c*x))**(5/2),x)
```

```
[Out] Integral((a + b*asin(c*x))**(-5/2), x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b \arcsin\left(cx\right) + a\right)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(a+b*arcsin(c*x))^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)^(-5/2), x)
```

3.201 $\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx$

Optimal. Leaf size=18

$$\text{Unintegrable}\left(\frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{5/2}},x\right)$$

```
[Out] Unintegrable[1/(x*(a + b*ArcSin[c*x])^(5/2)), x]
```

Rubi [A] time = 0.0452953, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x*(a + b*ArcSin[c*x])^(5/2)),x]
```

```
[Out] Defer[Int][1/(x*(a + b*ArcSin[c*x])^(5/2)), x]
```

Rubi steps

$$\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx=\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx$$

Mathematica [A] time = 3.61281, size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x*(a + b*ArcSin[c*x])^(5/2)),x]
```

```
[Out] Integrate[1/(x*(a + b*ArcSin[c*x])^(5/2)), x]
```

Maple [A] time = 0.073, size = 0, normalized size = 0.

$$\int \frac{1}{x}\left(a+b\arcsin\left(cx\right)\right)^{-\frac{5}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x/(a+b*arcsin(c*x))^(5/2),x)
```

```
[Out] int(1/x/(a+b*arcsin(c*x))^(5/2),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b\arcsin\left(cx\right)+a\right)^{\frac{5}{2}}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)^(5/2)*x), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{x\left(a+b\,\mathrm{asin}\,(cx)\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*asin(c*x))**(5/2),x)
```

```
[Out] Integral(1/(x*(a + b*asin(c*x))**(5/2)), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b\arcsin\left(cx\right)+a\right)^{\frac{5}{2}}x}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x/(a+b*arcsin(c*x))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)^(5/2)*x), x)
```

3.202 $\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx$

Optimal. Leaf size=18

$$\text{Unintegrable}\left(\frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{5/2}},x\right)$$

```
[Out] Unintegrable[1/(x^2*(a + b*ArcSin[c*x])^(5/2)), x]
```

Rubi [A] time = 0.0451862, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(x^2*(a + b*ArcSin[c*x])^(5/2)),x]
```

```
[Out] Defer[Int][1/(x^2*(a + b*ArcSin[c*x])^(5/2)), x]
```

Rubi steps

$$\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx=\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx$$

Mathematica [A] time = 11.4478, size = 0, normalized size = 0.

$$\int \frac{1}{x^2\left(a+b\sin^{-1}(cx)\right)^{5/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(x^2*(a + b*ArcSin[c*x])^(5/2)),x]
```

```
[Out] Integrate[1/(x^2*(a + b*ArcSin[c*x])^(5/2)), x]
```

Maple [A] time = 0.161, size = 0, normalized size = 0.

$$\int \frac{1}{x^2}\left(a+b\arcsin\left(cx\right)\right)^{-\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/x^2/(a+b*arcsin(c*x))^(5/2),x)
```

```
[Out] int(1/x^2/(a+b*arcsin(c*x))^(5/2),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b\arcsin\left(cx\right)+a\right)^{\frac{5}{2}}x^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^(5/2),x, algorithm="maxima")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)^(5/2)*x^2), x)
```

Fricas [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: UnboundLocalError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^(5/2),x, algorithm="fricas")
```

```
[Out] Exception raised: UnboundLocalError
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x**2/(a+b*asin(c*x))**(5/2),x)
```

```
[Out] Timed out
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(b \arcsin\left(cx\right) + a\right)^{\frac{5}{2}} x^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/x^2/(a+b*arcsin(c*x))^(5/2),x, algorithm="giac")
```

```
[Out] integrate(1/((b*arcsin(c*x) + a)^(5/2)*x^2), x)
```

3.203 $\int (dx)^{5/2} \left(a+b\sin^{-1}(cx)\right) dx$

Optimal. Leaf size=120

$$-\frac{20bd^{5/2}\text{EllipticF}\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right),-1\right)}{147c^{7/2}}+\frac{2(dx)^{7/2}\left(a+b\sin^{-1}(cx)\right)}{7d}+\frac{20bd^2\sqrt{1-c^2x^2}\sqrt{dx}}{147c^3}+\frac{4b\sqrt{1-c^2x^2}(dx)^{5/2}}{49c}$$

```
[Out] (20*b*d^2*Sqrt[d*x]*Sqrt[1 - c^2*x^2])/(147*c^3) + (4*b*(d*x)^(5/2)*Sqrt[1
- c^2*x^2])/(49*c) + (2*(d*x)^(7/2)*(a + b*ArcSin[c*x]))/(7*d) - (20*b*d^(5
/2)*EllipticF[ArcSin[(Sqrt[c]*Sqrt[d*x])/Sqrt[d]], -1])/(147*c^(7/2))
```

Rubi [A] time = 0.075921, antiderivative size = 120, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25, Rules used = {4627, 321, 329, 221}

$$\frac{2(dx)^{7/2}\left(a+b\sin^{-1}(cx)\right)}{7d}+\frac{20bd^2\sqrt{1-c^2x^2}\sqrt{dx}}{147c^3}-\frac{20bd^{5/2}F\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{147c^{7/2}}+\frac{4b\sqrt{1-c^2x^2}(dx)^{5/2}}{49c}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(5/2)*(a + b*ArcSin[c*x]),x]
```

```
[Out] (20*b*d^2*Sqrt[d*x]*Sqrt[1 - c^2*x^2])/(147*c^3) + (4*b*(d*x)^(5/2)*Sqrt[1
- c^2*x^2])/(49*c) + (2*(d*x)^(7/2)*(a + b*ArcSin[c*x]))/(7*d) - (20*b*d^(5
/2)*EllipticF[ArcSin[(Sqrt[c]*Sqrt[d*x])/Sqrt[d]], -1])/(147*c^(7/2))
```

Rule 4627

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

Rule 321

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

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^4], x_Symbol] :> Simp[EllipticF[ArcSin[(Rt[-b,
 4]*x)/Rt[a, 4]], -1]/(Rt[a, 4]*Rt[-b, 4]), x] /; FreeQ[{a, b}, x] && NegQ[
b/a] && GtQ[a, 0]
```

Rubi steps

$$\begin{aligned}
\int (dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)\,dx &= \frac{2(dx)^{7/2}\left(a+b\sin^{-1}(cx)\right)}{7d}-\frac{(2bc)\int\frac{(dx)^{7/2}}{\sqrt{1-c^2x^2}}\,dx}{7d}\\
&= \frac{4b(dx)^{5/2}\sqrt{1-c^2x^2}}{49c}+\frac{2(dx)^{7/2}\left(a+b\sin^{-1}(cx)\right)}{7d}-\frac{(10bd)\int\frac{(dx)^{3/2}}{\sqrt{1-c^2x^2}}\,dx}{49c}\\
&= \frac{20bd^2\sqrt{dx}\sqrt{1-c^2x^2}}{147c^3}+\frac{4b(dx)^{5/2}\sqrt{1-c^2x^2}}{49c}+\frac{2(dx)^{7/2}\left(a+b\sin^{-1}(cx)\right)}{7d}-\frac{\left(10bd^3\right)\int\frac{}{\sqrt{dx}}}{147c}\\
&= \frac{20bd^2\sqrt{dx}\sqrt{1-c^2x^2}}{147c^3}+\frac{4b(dx)^{5/2}\sqrt{1-c^2x^2}}{49c}+\frac{2(dx)^{7/2}\left(a+b\sin^{-1}(cx)\right)}{7d}-\frac{\left(20bd^2\right)\mathrm{Subs}}{}\\
&= \frac{20bd^2\sqrt{dx}\sqrt{1-c^2x^2}}{147c^3}+\frac{4b(dx)^{5/2}\sqrt{1-c^2x^2}}{49c}+\frac{2(dx)^{7/2}\left(a+b\sin^{-1}(cx)\right)}{7d}-\frac{20bd^{5/2}F\left(\sin\right.}{14}
\end{aligned}$$

Mathematica [C] time = 0.0394848, size = 100, normalized size = 0.83

$$\frac{2d^2\sqrt{dx}\left(-10b\text{Hypergeometric2F1}\left(\frac{1}{4},\frac{1}{2},\frac{5}{4},c^2x^2\right)+21ac^3x^3+6bc^2x^2\sqrt{1-c^2x^2}+10b\sqrt{1-c^2x^2}+21bc^3x^3\sin^{-1}(cx)\right)}{147c^3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(5/2)*(a + b*ArcSin[c*x]),x]
```

```
[Out] (2*d^2*Sqrt[d*x]*(21*a*c^3*x^3 + 10*b*Sqrt[1 - c^2*x^2] + 6*b*c^2*x^2*Sqrt[
1 - c^2*x^2] + 21*b*c^3*x^3*ArcSin[c*x] - 10*b*Hypergeometric2F1[1/4, 1/2,
5/4, c^2*x^2]))/(147*c^3)
```

Maple [A] time = 0.036, size = 144, normalized size = 1.2

$$2\frac{1}{d}\left(1/7\,(dx)^{7/2}a+b\left(1/7\,(dx)^{7/2}\arcsin(cx)-2/7\,\frac{c}{d}\left(-1/7\,\frac{d^2(dx)^{5/2}\sqrt{-c^2x^2+1}}{c^2}-\frac{5\,d^4\sqrt{dx}\sqrt{-c^2x^2+1}}{21\,c^4}+\frac{5\,d^4\sqrt{-cx+}}{21\,c^4\sqrt{-c^2}}\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(5/2)*(a+b*arcsin(c*x)),x)
```

```
[Out] 2/d*(1/7*(d*x)^(7/2)*a+b*(1/7*(d*x)^(7/2)*arcsin(c*x)-2/7*c/d*(-1/7/c^2*d^2
*(d*x)^(5/2)*(-c^2*x^2+1)^(1/2)-5/21/c^4*d^4*(d*x)^(1/2)*(-c^2*x^2+1)^(1/2)
+5/21/c^4*d^4/(c/d)^(1/2)*(-c*x+1)^(1/2)*(c*x+1)^(1/2)/(-c^2*x^2+1)^(1/2)*E
llipticF((d*x)^(1/2)*(c/d)^(1/2),I))))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(bd^2x^2\arcsin(cx)+ad^2x^2\right)\sqrt{dx},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

```
[Out] integral((b*d^2*x^2*arcsin(c*x) + a*d^2*x^2)*sqrt(d*x), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(5/2)*(a+b*asin(c*x)),x)
```

```
[Out] Timed out
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int (dx)^{\frac{5}{2}} (b \arcsin (cx) + a) \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)*(a+b*arcsin(c*x)),x, algorithm="giac")
```

```
[Out] integrate((d*x)^(5/2)*(b*arcsin(c*x) + a), x)
```

3.204 $\int (dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)\,dx$

Optimal. Leaf size=124

$$\frac{12bd^{3/2}\text{EllipticF}\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right),-1\right)}{25c^{5/2}}+\frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)}{5d}-\frac{12bd^{3/2}E\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{25c^{5/2}}+\frac{4b\sqrt{1-c^2x^2}(dx)^3}{25c}$$

```
[Out] (4*b*(d*x)^(3/2)*Sqrt[1 - c^2*x^2])/(25*c) + (2*(d*x)^(5/2)*(a + b*ArcSin[c
*x]))/(5*d) - (12*b*d^(3/2)*EllipticE[ArcSin[(Sqrt[c]*Sqrt[d*x])/Sqrt[d]],
-1])/(25*c^(5/2)) + (12*b*d^(3/2)*EllipticF[ArcSin[(Sqrt[c]*Sqrt[d*x])/Sqrt
[d]], -1])/(25*c^(5/2))
```

Rubi [A] time = 0.0984692, antiderivative size = 124, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.438, Rules used = {4627, 321, 329, 307, 221, 1199, 424}

$$\frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)}{5d}+\frac{12bd^{3/2}F\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{25c^{5/2}}-\frac{12bd^{3/2}E\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{25c^{5/2}}+\frac{4b\sqrt{1-c^2x^2}(dx)^{3/2}}{25c}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(3/2)*(a + b*ArcSin[c*x]),x]
```

```
[Out] (4*b*(d*x)^(3/2)*Sqrt[1 - c^2*x^2])/(25*c) + (2*(d*x)^(5/2)*(a + b*ArcSin[c
*x]))/(5*d) - (12*b*d^(3/2)*EllipticE[ArcSin[(Sqrt[c]*Sqrt[d*x])/Sqrt[d]],
-1])/(25*c^(5/2)) + (12*b*d^(3/2)*EllipticF[ArcSin[(Sqrt[c]*Sqrt[d*x])/Sqrt
[d]], -1])/(25*c^(5/2))
```

Rule 4627

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

Rule 321

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

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 307

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

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^4], x_Symbol] :> Simp[EllipticF[ArcSin[(Rt[-b,
 4]*x)/Rt[a, 4]], -1]/(Rt[a, 4]*Rt[-b, 4]), x] /; FreeQ[{a, b}, x] && NegQ[
b/a] && GtQ[a, 0]
```

Rule 1199

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (c_.)*(x_)^4], x_Symbol] :> Dist[d/Sq
rt[a], Int[Sqrt[1 + (e*x^2)/d]/Sqrt[1 - (e*x^2)/d], x], x] /; FreeQ[{a, c,
d, e}, x] && NegQ[c/a] && EqQ[c*d^2 + a*e^2, 0] && GtQ[a, 0]
```

Rule 424

```
Int[Sqrt[(a_) + (b_.)*(x_)^2]/Sqrt[(c_) + (d_.)*(x_)^2], x_Symbol] :> Simp[
(Sqrt[a]*EllipticE[ArcSin[Rt[-(d/c), 2]*x], (b*c)/(a*d)])/(Sqrt[c]*Rt[-(d/c
), 2]), x] /; FreeQ[{a, b, c, d}, x] && NegQ[d/c] && GtQ[c, 0] && GtQ[a, 0]
```

Rubi steps

$$\begin{aligned}\int (dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)\,dx &= \frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)}{5d}-\frac{(2bc)\int\frac{(dx)^{5/2}}{\sqrt{1-c^2x^2}}\,dx}{5d}\\ &= \frac{4b(dx)^{3/2}\sqrt{1-c^2x^2}}{25c}+\frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)}{5d}-\frac{(6bd)\int\frac{\sqrt{dx}}{\sqrt{1-c^2x^2}}\,dx}{25c}\\ &= \frac{4b(dx)^{3/2}\sqrt{1-c^2x^2}}{25c}+\frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)}{5d}-\frac{(12b)\,\mathrm{Subst}\left(\int\frac{x^2}{\sqrt{1-\frac{c^2x^4}{d^2}}}\,dx,x,\sqrt{dx}\right)}{25c}\\ &= \frac{4b(dx)^{3/2}\sqrt{1-c^2x^2}}{25c}+\frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)}{5d}+\frac{(12bd)\,\mathrm{Subst}\left(\int\frac{1}{\sqrt{1-\frac{c^2x^4}{d^2}}}\,dx,x,\sqrt{dx}\right.}{25c^2}\\ &= \frac{4b(dx)^{3/2}\sqrt{1-c^2x^2}}{25c}+\frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)}{5d}+\frac{12bd^{3/2}F\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{25c^{5/2}}-\frac{(12}{}\\ &= \frac{4b(dx)^{3/2}\sqrt{1-c^2x^2}}{25c}+\frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)}{5d}-\frac{12bd^{3/2}E\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{25c^{5/2}}+\frac{12b}{}\end{aligned}$$

Mathematica [C] time = 0.0248279, size = 66, normalized size = 0.53

$$\frac{2(dx)^{3/2}\left(-2b\text{Hypergeometric2F1}\left(\frac{1}{2},\frac{3}{4},\frac{7}{4},c^2x^2\right)+5acx+2b\sqrt{1-c^2x^2}+5bcx\sin^{-1}(cx)\right)}{25c}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(3/2)*(a + b*ArcSin[c*x]),x]
```

```
[Out] (2*(d*x)^(3/2)*(5*a*c*x + 2*b*Sqrt[1 - c^2*x^2] + 5*b*c*x*ArcSin[c*x] - 2*b
*Hypergeometric2F1[1/2, 3/4, 7/4, c^2*x^2]))/(25*c)
```

Maple [A] time = 0.01, size = 138, normalized size = 1.1

$$2\,\frac{1}{d}\left(1/5\,(dx)^{5/2}a+b\left(1/5\,(dx)^{5/2}\arcsin(cx)-2/5\,\frac{c}{d}\left(-1/5\,\frac{d^2\,(dx)^{3/2}\sqrt{-c^2x^2+1}}{c^2}-3/5\,\frac{d^3\sqrt{-cx+1}\sqrt{cx+1}}{c^3\sqrt{-c^2x^2+1}}\left(\mathrm{EllipticF}\right.\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)*(a+b*arcsin(c*x)),x)
```

```
[Out] 2/d*(1/5*(d*x)^(5/2)*a+b*(1/5*(d*x)^(5/2)*arcsin(c*x)-2/5*c/d*(-1/5/c^2*d^2
*(d*x)^(3/2)*(-c^2*x^2+1)^(1/2)-3/5/c^3*d^3/(c/d)^(1/2)*(-c*x+1)^(1/2)*(c*x
+1)^(1/2)/(-c^2*x^2+1)^(1/2)*(EllipticF((d*x)^(1/2)*(c/d)^(1/2),I)-Elliptic
E((d*x)^(1/2)*(c/d)^(1/2),I)))))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left((bdx\arcsin(cx) + adx)\sqrt{dx}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

```
[Out] integral((b*d*x*arcsin(c*x) + a*d*x)*sqrt(d*x), x)
```

Sympy [A] time = 163.098, size = 82, normalized size = 0.66

$$a\left(\begin{cases} 0 & \text{for}\: d = 0 \\ \frac{2(dx)^{\frac{5}{2}}}{5d} & \text{otherwise} \end{cases}\right) - bc\left(\begin{cases} 0 & \text{for}\: d = 0 \\ \frac{d^{\frac{3}{2}}x^{\frac{7}{2}}\Gamma\left(\frac{7}{4}\right){}_{2}F_{1}\left(\left.\begin{matrix} \frac{1}{2}, \frac{7}{4} \\ \frac{11}{4} \end{matrix}\right| c^{2}x^{2}e^{2i\pi}\right)}{5\Gamma\left(\frac{11}{4}\right)} & \text{otherwise} \end{cases}\right) + b\left(\begin{cases} 0 & \text{for}\: d = 0 \\ \frac{2(dx)^{\frac{5}{2}}}{5d} & \text{otherwise} \end{cases}\right)\operatorname{asin}(cx)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(3/2)*(a+b*asin(c*x)),x)
```

```
[Out] a*Piecewise((0, Eq(d, 0)), (2*(d*x)**(5/2)/(5*d), True)) - b*c*Piecewise((0
, Eq(d, 0)), (d**(3/2)*x**(7/2)*gamma(7/4)*hyper((1/2, 7/4), (11/4,), c**2*
x**2*exp_polar(2*I*pi))/(5*gamma(11/4)), True)) + b*Piecewise((0, Eq(d, 0))
, (2*(d*x)**(5/2)/(5*d), True))*asin(c*x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int (dx)^{\frac{3}{2}} (b \arcsin (cx) + a)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*arcsin(c*x)),x, algorithm="giac")
```

```
[Out] integrate((d*x)^(3/2)*(b*arcsin(c*x) + a), x)
```

3.205 $\int \sqrt{dx}\left(a+b\sin^{-1}(cx)\right)\,dx$

Optimal. Leaf size=88

$$-\frac{4b\sqrt{d}\,\text{EllipticF}\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right),-1\right)}{9c^{3/2}}+\frac{2(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)}{3d}+\frac{4b\sqrt{1-c^2x^2}\sqrt{dx}}{9c}$$

```
[Out] (4*b*Sqrt[d*x]*Sqrt[1 - c^2*x^2])/(9*c) + (2*(d*x)^(3/2)*(a + b*ArcSin[c*x]
))/(3*d) - (4*b*Sqrt[d]*EllipticF[ArcSin[(Sqrt[c]*Sqrt[d*x])/Sqrt[d]], -1])
/(9*c^(3/2))
```

Rubi [A] time = 0.044585, antiderivative size = 88, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25, Rules used = {4627, 321, 329, 221}

$$\frac{2(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)}{3d}+\frac{4b\sqrt{1-c^2x^2}\sqrt{dx}}{9c}-\frac{4b\sqrt{d}F\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{9c^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[Sqrt[d*x]*(a + b*ArcSin[c*x]),x]
```

```
[Out] (4*b*Sqrt[d*x]*Sqrt[1 - c^2*x^2])/(9*c) + (2*(d*x)^(3/2)*(a + b*ArcSin[c*x]
))/(3*d) - (4*b*Sqrt[d]*EllipticF[ArcSin[(Sqrt[c]*Sqrt[d*x])/Sqrt[d]], -1])
/(9*c^(3/2))
```

Rule 4627

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

Rule 321

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

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^4], x_Symbol] :> Simp[EllipticF[ArcSin[(Rt[-b,
 4]*x)/Rt[a, 4]], -1]/(Rt[a, 4]*Rt[-b, 4]), x] /; FreeQ[{a, b}, x] && NegQ[
b/a] && GtQ[a, 0]
```

Rubi steps

$$
\begin{aligned}
\int \sqrt{dx}\left(a+b\sin^{-1}(cx)\right)dx &= \frac{2(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)}{3d}-\frac{(2bc)\int \frac{(dx)^{3/2}}{\sqrt{1-c^2x^2}}\,dx}{3d}\\
&= \frac{4b\sqrt{dx}\sqrt{1-c^2x^2}}{9c}+\frac{2(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)}{3d}-\frac{(2bd)\int \frac{1}{\sqrt{dx}\sqrt{1-c^2x^2}}\,dx}{9c}\\
&= \frac{4b\sqrt{dx}\sqrt{1-c^2x^2}}{9c}+\frac{2(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)}{3d}-\frac{(4b)\,\mathrm{Subst}\left(\int \frac{1}{\sqrt{1-\frac{c^2x^4}{d^2}}}\,dx,x,\sqrt{dx}\right)}{9c}\\
&= \frac{4b\sqrt{dx}\sqrt{1-c^2x^2}}{9c}+\frac{2(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)}{3d}-\frac{4b\sqrt{d}F\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{9c^{3/2}}
\end{aligned}
$$

Mathematica [C] time = 0.0172088, size = 66, normalized size = 0.75

$$
\frac{2\sqrt{dx}\left(-2b\,\mathrm{Hypergeometric2F1}\left(\frac{1}{4},\frac{1}{2},\frac{5}{4},c^2x^2\right)+3acx+2b\sqrt{1-c^2x^2}+3bcx\sin^{-1}(cx)\right)}{9c}
$$

Antiderivative was successfully verified.

```
[In] Integrate[Sqrt[d*x]*(a + b*ArcSin[c*x]),x]
```

```
[Out] (2*Sqrt[d*x]*(3*a*c*x + 2*b*Sqrt[1 - c^2*x^2] + 3*b*c*x*ArcSin[c*x] - 2*b*H
ypergeometric2F1[1/4, 1/2, 5/4, c^2*x^2]))/(9*c)
```

Maple [A] time = 0.008, size = 119, normalized size = 1.4

$$2\,\frac{1}{d}\left(1/3\,(dx)^{3/2}a+b\left(1/3\,(dx)^{3/2}\arcsin(cx)-2/3\,\frac{c}{d}\left(-1/3\,\frac{d^2\sqrt{dx}\sqrt{-c^2x^2+1}}{c^2}+1/3\,\frac{d^2\sqrt{-cx+1}\sqrt{cx+1}}{c^2\sqrt{-c^2x^2+1}}\mathrm{EllipticF}\left(\sqrt{dx}\right.\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(1/2)*(a+b*arcsin(c*x)),x)
```

```
[Out] 2/d*(1/3*(d*x)^(3/2)*a+b*(1/3*(d*x)^(3/2)*arcsin(c*x)-2/3*c/d*(-1/3/c^2*d^2
*(d*x)^(1/2)*(-c^2*x^2+1)^(1/2)+1/3/c^2*d^2/(c/d)^(1/2)*(-c*x+1)^(1/2)*(c*x
+1)^(1/2)/(-c^2*x^2+1)^(1/2)*EllipticF((d*x)^(1/2)*(c/d)^(1/2),I))))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(1/2)*(a+b*arcsin(c*x)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\sqrt{dx}(b\arcsin(cx)+a),x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(1/2)*(a+b*arcsin(c*x)),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)*(b*arcsin(c*x) + a), x)
```

Sympy [A] time = 4.41945, size = 76, normalized size = 0.86

$$\frac{2a\,(dx)^{\frac{3}{2}}}{3d}-\frac{bc\,(dx)^{\frac{5}{2}}\,\Gamma\left(\frac{5}{4}\right){}_2F_1\left(\begin{matrix}\frac{1}{2},\frac{5}{4}\\ \frac{9}{4}\end{matrix}\middle|c^2x^2e^{2i\pi}\right)}{3d^2\Gamma\left(\frac{9}{4}\right)}+\frac{2b\,(dx)^{\frac{3}{2}}\operatorname{asin}\left(cx\right)}{3d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(1/2)*(a+b*asin(c*x)),x)
```

```
[Out] 2*a*(d*x)**(3/2)/(3*d) - b*c*(d*x)**(5/2)*gamma(5/4)*hyper((1/2, 5/4), (9/4
,), c**2*x**2*exp_polar(2*I*pi))/(3*d**2*gamma(9/4)) + 2*b*(d*x)**(3/2)*asi
n(c*x)/(3*d)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int\sqrt{dx}(b\arcsin\left(cx\right)+a)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(1/2)*(a+b*arcsin(c*x)),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x)*(b*arcsin(c*x) + a), x)
```

3.206 $\int \frac{a+b\sin^{-1}(cx)}{\sqrt{dx}}\,dx$

Optimal. Leaf size=89

$$\frac{4b\text{EllipticF}\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right),-1\right)}{\sqrt{c}\sqrt{d}}+\frac{2\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}{d}-\frac{4bE\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{\sqrt{c}\sqrt{d}}$$

```
[Out] (2*Sqrt[d*x]*(a + b*ArcSin[c*x]))/d - (4*b*EllipticE[ArcSin[(Sqrt[c]*Sqrt[d
*x])/Sqrt[d]], -1])/(Sqrt[c]*Sqrt[d]) + (4*b*EllipticF[ArcSin[(Sqrt[c]*Sqrt
[d*x])/Sqrt[d]], -1])/(Sqrt[c]*Sqrt[d])
```

Rubi [A] time = 0.0780528, antiderivative size = 89, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.375, Rules used = {4627, 329, 307, 221, 1199, 424}

$$\frac{2\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}{d}+\frac{4bF\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{\sqrt{c}\sqrt{d}}-\frac{4bE\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{\sqrt{c}\sqrt{d}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])/Sqrt[d*x],x]
```

```
[Out] (2*Sqrt[d*x]*(a + b*ArcSin[c*x]))/d - (4*b*EllipticE[ArcSin[(Sqrt[c]*Sqrt[d
*x])/Sqrt[d]], -1])/(Sqrt[c]*Sqrt[d]) + (4*b*EllipticF[ArcSin[(Sqrt[c]*Sqrt
[d*x])/Sqrt[d]], -1])/(Sqrt[c]*Sqrt[d])
```

Rule 4627

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

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
```

```
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 307

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

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^4], x_Symbol] :> Simp[EllipticF[ArcSin[(Rt[-b,
 4]*x)/Rt[a, 4]], -1]/(Rt[a, 4]*Rt[-b, 4]), x] /; FreeQ[{a, b}, x] && NegQ[
b/a] && GtQ[a, 0]
```

Rule 1199

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (c_.)*(x_)^4], x_Symbol] :> Dist[d/Sq
rt[a], Int[Sqrt[1 + (e*x^2)/d]/Sqrt[1 - (e*x^2)/d], x], x] /; FreeQ[{a, c,
d, e}, x] && NegQ[c/a] && EqQ[c*d^2 + a*e^2, 0] && GtQ[a, 0]
```

Rule 424

```
Int[Sqrt[(a_) + (b_.)*(x_)^2]/Sqrt[(c_) + (d_.)*(x_)^2], x_Symbol] :> Simp[
(Sqrt[a]*EllipticE[ArcSin[Rt[-(d/c), 2]*x], (b*c)/(a*d)])/(Sqrt[c]*Rt[-(d/c
), 2]), x] /; FreeQ[{a, b, c, d}, x] && NegQ[d/c] && GtQ[c, 0] && GtQ[a, 0]
```

Rubi steps

$$
\begin{aligned}
\int \frac{a+b\sin^{-1}(cx)}{\sqrt{dx}}\,dx &= \frac{2\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}{d}-\frac{(2bc)\int \frac{\sqrt{dx}}{\sqrt{1-c^2x^2}}\,dx}{d}\\
&= \frac{2\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}{d}-\frac{(4bc)\,\mathrm{Subst}\left(\int \frac{x^2}{\sqrt{1-\frac{c^2x^4}{d^2}}}\,dx,x,\sqrt{dx}\right)}{d^2}\\
&= \frac{2\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}{d}+\frac{(4b)\,\mathrm{Subst}\left(\int \frac{1}{\sqrt{1-\frac{c^2x^4}{d^2}}}\,dx,x,\sqrt{dx}\right)}{d}-\frac{(4b)\,\mathrm{Subst}\Bigg(\int \frac{1+\frac{cx^2}{d}}{\sqrt{1-\frac{c^2x^4}{d^2}}}\,dx,x,\sqrt{dx}}{d}\\
&= \frac{2\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}{d}+\frac{4bF\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{\sqrt{c}\sqrt{d}}-\frac{(4b)\,\mathrm{Subst}\left(\int \frac{\sqrt{1+\frac{cx^2}{d}}}{\sqrt{1-\frac{cx^2}{d}}}\,dx,x,\sqrt{dx}\right)}{d}\\
&= \frac{2\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}{d}-\frac{4bE\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{\sqrt{c}\sqrt{d}}+\frac{4bF\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{\sqrt{c}\sqrt{d}}
\end{aligned}
$$

Mathematica [C] time = 0.0146566, size = 45, normalized size = 0.51

$$\frac{2x\left(3\left(a+b\sin^{-1}(cx)\right)-2bcx\text{Hypergeometric2F1}\left(\frac{1}{2},\frac{3}{4},\frac{7}{4},c^2x^2\right)\right)}{3\sqrt{dx}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])/Sqrt[d*x],x]
```

```
[Out] (2*x*(3*(a + b*ArcSin[c*x]) - 2*b*c*x*Hypergeometric2F1[1/2, 3/4, 7/4, c^2*
x^2]))/(3*Sqrt[d*x])
```

Maple [A] time = 0.009, size = 98, normalized size = 1.1

$$2\frac{1}{d}\left(a\sqrt{dx}+b\left(\sqrt{dx}\arcsin(cx)+2\frac{\sqrt{-cx+1}\sqrt{cx+1}}{\sqrt{-c^2x^2+1}}\left(\text{EllipticF}\left(\sqrt{dx}\sqrt{\frac{c}{d}},i\right)-\text{EllipticE}\left(\sqrt{dx}\sqrt{\frac{c}{d}},i\right)\right)\frac{1}{\sqrt{\frac{c}{d}}}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))/(d*x)^(1/2),x)
```

```
[Out] 2/d*(a*(d*x)^(1/2)+b*((d*x)^(1/2)*arcsin(c*x)+2/(c/d)^(1/2)*(-c*x+1)^(1/2)*
(c*x+1)^(1/2)/(-c^2*x^2+1)^(1/2)*(EllipticF((d*x)^(1/2)*(c/d)^(1/2),I)-Elli
pticE((d*x)^(1/2)*(c/d)^(1/2),I))))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))/(d*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{dx}(b\arcsin(cx)+a)}{dx},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))/(d*x)^(1/2),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)*(b*arcsin(c*x) + a)/(d*x), x)
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))/(d*x)**(1/2),x)
```

```
[Out] Exception raised: TypeError
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{b \arcsin(cx) + a}{\sqrt{dx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))/(d*x)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)/sqrt(d*x), x)
```

3.207 $\int \frac{a+b\sin^{-1}(cx)}{(dx)^{3/2}}\,dx$

Optimal. Leaf size=55

$$\frac{4b\sqrt{c}\text{EllipticF}\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right),-1\right)}{d^{3/2}}-\frac{2\left(a+b\sin^{-1}(cx)\right)}{d\sqrt{dx}}$$

```
[Out] (-2*(a + b*ArcSin[c*x]))/(d*Sqrt[d*x]) + (4*b*Sqrt[c]*EllipticF[ArcSin[(Sqr
t[c]*Sqrt[d*x])/Sqrt[d]], -1])/d^(3/2)
```

Rubi [A] time = 0.0377391, antiderivative size = 55, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188, Rules used = {4627, 329, 221}

$$\frac{4b\sqrt{c}F\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{d^{3/2}}-\frac{2\left(a+b\sin^{-1}(cx)\right)}{d\sqrt{dx}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])/(d*x)^(3/2),x]
```

```
[Out] (-2*(a + b*ArcSin[c*x]))/(d*Sqrt[d*x]) + (4*b*Sqrt[c]*EllipticF[ArcSin[(Sqr
t[c]*Sqrt[d*x])/Sqrt[d]], -1])/d^(3/2)
```

Rule 4627

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

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^4], x_Symbol] :> Simp[EllipticF[ArcSin[(Rt[-b,
 4]*x)/Rt[a, 4]], -1]/(Rt[a, 4]*Rt[-b, 4]), x] /; FreeQ[{a, b}, x] && NegQ[
b/a] && GtQ[a, 0]
```

Rubi steps

$$
\begin{aligned}
\int \frac{a+b\sin^{-1}(cx)}{(dx)^{3/2}}\,dx &= -\frac{2\left(a+b\sin^{-1}(cx)\right)}{d\sqrt{dx}}+\frac{(2bc)\int \frac{1}{\sqrt{dx}\sqrt{1-c^2x^2}}\,dx}{d}\\
&= -\frac{2\left(a+b\sin^{-1}(cx)\right)}{d\sqrt{dx}}+\frac{(4bc)\,\mathrm{Subst}\left(\int \frac{1}{\sqrt{1-\frac{c^2x^4}{d^2}}}\,dx,x,\sqrt{dx}\right)}{d^2}\\
&= -\frac{2\left(a+b\sin^{-1}(cx)\right)}{d\sqrt{dx}}+\frac{4b\sqrt{c}F\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{d^{3/2}}
\end{aligned}
$$

Mathematica [C] time = 0.0134947, size = 40, normalized size = 0.73

$$
-\frac{2x\left(-2bcx\text{Hypergeometric2F1}\left(\frac{1}{4},\frac{1}{2},\frac{5}{4},c^2x^2\right)+a+b\sin^{-1}(cx)\right)}{(dx)^{3/2}}
$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])/(d*x)^(3/2),x]
```

```
[Out] (-2*x*(a + b*ArcSin[c*x] - 2*b*c*x*Hypergeometric2F1[1/4, 1/2, 5/4, c^2*x^2
]))/(d*x)^(3/2)
```

Maple [A] time = 0.009, size = 85, normalized size = 1.6

$$
2\frac{1}{d}\left(-\frac{a}{\sqrt{dx}}+b\left(-\frac{\arcsin(cx)}{\sqrt{dx}}+2\frac{c\sqrt{-cx+1}\sqrt{cx+1}}{d\sqrt{-c^2x^2+1}}\mathrm{EllipticF}\left(\sqrt{dx}\sqrt{\frac{c}{d}},i\right)\frac{1}{\sqrt{\frac{c}{d}}}\right)\right)
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))/(d*x)^(3/2),x)
```

```
[Out] 2/d*(-a/(d*x)^(1/2)+b*(-1/(d*x)^(1/2)*arcsin(c*x)+2*c/d/(c/d)^(1/2)*(-c*x+1
)^(1/2)*(c*x+1)^(1/2)/(-c^2*x^2+1)^(1/2)*EllipticF((d*x)^(1/2)*(c/d)^(1/2),
I)))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))/(d*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{dx}(b \arcsin(cx) + a)}{d^2x^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))/(d*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)*(b*arcsin(c*x) + a)/(d^2*x^2), x)
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))/(d*x)**(3/2),x)
```

```
[Out] Exception raised: TypeError
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{b \arcsin (cx) + a}{(dx)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))/(d*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)/(d*x)^(3/2), x)
```

3.208 $\int \frac{a+b\sin^{-1}(cx)}{(dx)^{5/2}}\,dx$

Optimal. Leaf size=125

$$\frac{4bc^{3/2}\text{EllipticF}\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right),-1\right)}{3d^{5/2}}-\frac{2\left(a+b\sin^{-1}(cx)\right)}{3d(dx)^{3/2}}-\frac{4bc\sqrt{1-c^2x^2}}{3d^2\sqrt{dx}}-\frac{4bc^{3/2}E\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{3d^{5/2}}$$

```
[Out] (-4*b*c*Sqrt[1 - c^2*x^2])/(3*d^2*Sqrt[d*x]) - (2*(a + b*ArcSin[c*x]))/(3*d
*(d*x)^(3/2)) - (4*b*c^(3/2)*EllipticE[ArcSin[(Sqrt[c]*Sqrt[d*x])/Sqrt[d]],
 -1])/(3*d^(5/2)) + (4*b*c^(3/2)*EllipticF[ArcSin[(Sqrt[c]*Sqrt[d*x])/Sqrt[
d]], -1])/(3*d^(5/2))
```

Rubi [A] time = 0.0968909, antiderivative size = 125, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.438, Rules used = {4627, 325, 329, 307, 221, 1199, 424}

$$-\frac{2\left(a+b\sin^{-1}(cx)\right)}{3d(dx)^{3/2}}-\frac{4bc\sqrt{1-c^2x^2}}{3d^2\sqrt{dx}}+\frac{4bc^{3/2}F\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{3d^{5/2}}-\frac{4bc^{3/2}E\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle|-1\right)}{3d^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])/(d*x)^(5/2),x]
```

```
[Out] (-4*b*c*Sqrt[1 - c^2*x^2])/(3*d^2*Sqrt[d*x]) - (2*(a + b*ArcSin[c*x]))/(3*d
*(d*x)^(3/2)) - (4*b*c^(3/2)*EllipticE[ArcSin[(Sqrt[c]*Sqrt[d*x])/Sqrt[d]],
 -1])/(3*d^(5/2)) + (4*b*c^(3/2)*EllipticF[ArcSin[(Sqrt[c]*Sqrt[d*x])/Sqrt[
d]], -1])/(3*d^(5/2))
```

Rule 4627

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

Rule 325

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

Rule 329

```
Int[((c_.)*(x_))^(m_)*((a_) + (b_.)*(x_)^(n_))^(p_), x_Symbol] :> With[{k =
 Denominator[m]}, Dist[k/c, Subst[Int[x^(k*(m + 1) - 1)*(a + (b*x^(k*n))/c^
n)^p, x], x, (c*x)^(1/k)], x]] /; FreeQ[{a, b, c, p}, x] && IGtQ[n, 0] && F
ractionQ[m] && IntBinomialQ[a, b, c, n, m, p, x]
```

Rule 307

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

Rule 221

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^4], x_Symbol] :> Simp[EllipticF[ArcSin[(Rt[-b,
 4]*x)/Rt[a, 4]], -1]/(Rt[a, 4]*Rt[-b, 4]), x] /; FreeQ[{a, b}, x] && NegQ[
b/a] && GtQ[a, 0]
```

Rule 1199

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (c_.)*(x_)^4], x_Symbol] :> Dist[d/Sq
rt[a], Int[Sqrt[1 + (e*x^2)/d]/Sqrt[1 - (e*x^2)/d], x], x] /; FreeQ[{a, c,
d, e}, x] && NegQ[c/a] && EqQ[c*d^2 + a*e^2, 0] && GtQ[a, 0]
```

Rule 424

```
Int[Sqrt[(a_) + (b_.)*(x_)^2]/Sqrt[(c_) + (d_.)*(x_)^2], x_Symbol] :> Simp[
(Sqrt[a]*EllipticE[ArcSin[Rt[-(d/c), 2]*x], (b*c)/(a*d)])/(Sqrt[c]*Rt[-(d/c
), 2]), x] /; FreeQ[{a, b, c, d}, x] && NegQ[d/c] && GtQ[c, 0] && GtQ[a, 0]
```

Rubi steps

$$\begin{aligned}
\int \frac{a+b\sin^{-1}(cx)}{(dx)^{5/2}}\,dx &= -\frac{2\left(a+b\sin^{-1}(cx)\right)}{3d(dx)^{3/2}} + \frac{(2bc)\int \frac{1}{(dx)^{3/2}\sqrt{1-c^2x^2}}\,dx}{3d} \\
&= -\frac{4bc\sqrt{1-c^2x^2}}{3d^2\sqrt{dx}} - \frac{2\left(a+b\sin^{-1}(cx)\right)}{3d(dx)^{3/2}} - \frac{\left(2bc^3\right)\int \frac{\sqrt{dx}}{\sqrt{1-c^2x^2}}\,dx}{3d^3} \\
&= -\frac{4bc\sqrt{1-c^2x^2}}{3d^2\sqrt{dx}} - \frac{2\left(a+b\sin^{-1}(cx)\right)}{3d(dx)^{3/2}} - \frac{\left(4bc^3\right)\text{Subst}\left(\int \frac{x^2}{\sqrt{1-\frac{c^2x^4}{d^2}}}\,dx, x, \sqrt{dx}\right)}{3d^4} \\
&= -\frac{4bc\sqrt{1-c^2x^2}}{3d^2\sqrt{dx}} - \frac{2\left(a+b\sin^{-1}(cx)\right)}{3d(dx)^{3/2}} + \frac{\left(4bc^2\right)\text{Subst}\left(\int \frac{1}{\sqrt{1-\frac{c^2x^4}{d^2}}}\,dx, x, \sqrt{dx}\right)}{3d^3} - \frac{\left(4bc^2\right)\text{Subst}\left(\int \right.}{} \\
&= -\frac{4bc\sqrt{1-c^2x^2}}{3d^2\sqrt{dx}} - \frac{2\left(a+b\sin^{-1}(cx)\right)}{3d(dx)^{3/2}} + \frac{4bc^{3/2}F\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle| -1\right)}{3d^{5/2}} - \frac{\left(4bc^2\right)\text{Subst}\left(\int \frac{\sqrt{1+\frac{cx^2}{d}}}{\sqrt{1-\frac{cx^2}{d}}}\right.}{3d^3} \\
&= -\frac{4bc\sqrt{1-c^2x^2}}{3d^2\sqrt{dx}} - \frac{2\left(a+b\sin^{-1}(cx)\right)}{3d(dx)^{3/2}} - \frac{4bc^{3/2}E\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\middle| -1\right)}{3d^{5/2}} + \frac{4bc^{3/2}F\left(\sin^{-1}\left(\frac{\sqrt{c}\sqrt{dx}}{\sqrt{d}}\right)\right|}{3d^{5/2}}
\end{aligned}$$

Mathematica [C] time = 0.015386, size = 42, normalized size = 0.34

$$-\frac{2x\left(2bcx\,\text{Hypergeometric2F1}\left(-\frac{1}{4},\frac{1}{2},\frac{3}{4},c^2x^2\right)+a+b\sin^{-1}(cx)\right)}{3(dx)^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])/(d*x)^(5/2),x]
```

```
[Out] (-2*x*(a + b*ArcSin[c*x] + 2*b*c*x*Hypergeometric2F1[-1/4, 1/2, 3/4, c^2*x^
2]))/(3*(d*x)^(5/2))
```

Maple [A] time = 0.013, size = 129, normalized size = 1.

$$2\,\frac{1}{d}\left(-1/3\,\frac{a}{(dx)^{3/2}}+b\left(-1/3\,\frac{\arcsin(cx)}{(dx)^{3/2}}+2/3\,\frac{c}{d}\left(-\frac{\sqrt{-c^2x^2+1}}{\sqrt{dx}}+\frac{c\sqrt{-cx+1}\sqrt{cx+1}}{d\sqrt{-c^2x^2+1}}\left(\text{EllipticF}\left(\sqrt{dx}\sqrt{\frac{c}{d}},i\right)-\text{Elliptic}\right.\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))/(d*x)^(5/2),x)
```

```
[Out] 2/d*(-1/3*a/(d*x)^(3/2)+b*(-1/3/(d*x)^(3/2)*arcsin(c*x)+2/3*c/d*(-(-c^2*x^2
+1)^(1/2)/(d*x)^(1/2)+c/d/(c/d)^(1/2)*(-c*x+1)^(1/2)*(c*x+1)^(1/2)/(-c^2*x^
2+1)^(1/2)*(EllipticF((d*x)^(1/2)*(c/d)^(1/2),I)-EllipticE((d*x)^(1/2)*(c/d
)^(1/2),I)))))
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))/(d*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\operatorname{integral}\left(\frac{\sqrt{dx}(b\arcsin(cx)+a)}{d^3x^3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))/(d*x)^(5/2),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)*(b*arcsin(c*x) + a)/(d^3*x^3), x)
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))/(d*x)**(5/2),x)
```

```
[Out] Exception raised: TypeError
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{b \arcsin(cx) + a}{(dx)^{\frac{5}{2}}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))/(d*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)/(d*x)^(5/2), x)
```

3.209 $\int (dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)^2\,dx$

Optimal. Leaf size=109

$$\frac{16b^2c^2(dx)^{11/2}\text{HypergeometricPFQ}\left(\left\{1,\frac{11}{4},\frac{11}{4}\right\},\left\{\frac{13}{4},\frac{15}{4}\right\},c^2x^2\right)}{693d^3}-\frac{8bc(dx)^{9/2}\text{Hypergeometric2F1}\left(\frac{1}{2},\frac{9}{4},\frac{13}{4},c^2x^2\right)\left(a\right.}{63d^2}$$

```
[Out] (2*(d*x)^(7/2)*(a + b*ArcSin[c*x])^2)/(7*d) - (8*b*c*(d*x)^(9/2)*(a + b*Arc
Sin[c*x])*Hypergeometric2F1[1/2, 9/4, 13/4, c^2*x^2])/(63*d^2) + (16*b^2*c^
2*(d*x)^(11/2)*HypergeometricPFQ[{1, 11/4, 11/4}, {13/4, 15/4}, c^2*x^2])/(
693*d^3)
```

Rubi [A] time = 0.140792, antiderivative size = 109, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {4627, 4711}

$$\frac{16b^2c^2(dx)^{11/2}\,{}_3F_2\left(1,\frac{11}{4},\frac{11}{4};\frac{13}{4},\frac{15}{4};c^2x^2\right)}{693d^3}-\frac{8bc(dx)^{9/2}\,{}_2F_1\left(\frac{1}{2},\frac{9}{4};\frac{13}{4};c^2x^2\right)\left(a+b\sin^{-1}(cx)\right)}{63d^2}+\frac{2(dx)^{7/2}\left(a+b\sin^{-1}(cx)\right)^2}{7d}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(5/2)*(a + b*ArcSin[c*x])^2,x]
```

```
[Out] (2*(d*x)^(7/2)*(a + b*ArcSin[c*x])^2)/(7*d) - (8*b*c*(d*x)^(9/2)*(a + b*Arc
Sin[c*x])*Hypergeometric2F1[1/2, 9/4, 13/4, c^2*x^2])/(63*d^2) + (16*b^2*c^
2*(d*x)^(11/2)*HypergeometricPFQ[{1, 11/4, 11/4}, {13/4, 15/4}, c^2*x^2])/(
693*d^3)
```

Rule 4627

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

Rule 4711

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((f_.)*(x_))^(m_))/Sqrt[(d_) + (e_.
)*(x_)^2], x_Symbol] :> Simp[((f*x)^(m + 1)*(a + b*ArcSin[c*x])*Hypergeomet
ric2F1[1/2, (1 + m)/2, (3 + m)/2, c^2*x^2])/(Sqrt[d]*f*(m + 1)), x] - Simp[
(b*c*(f*x)^(m + 2)*HypergeometricPFQ[{1, 1 + m/2, 1 + m/2}, {3/2 + m/2, 2 +
 m/2}, c^2*x^2])/(Sqrt[d]*f^2*(m + 1)*(m + 2)), x] /; FreeQ[{a, b, c, d, e,
 f, m}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] &&  !IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int (dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)^2\,dx &= \frac{2(dx)^{7/2}\left(a+b\sin^{-1}(cx)\right)^2}{7d}-\frac{(4bc)\int\frac{(dx)^{7/2}\left(a+b\sin^{-1}(cx)\right)}{\sqrt{1-c^2x^2}}\,dx}{7d}\\ &= \frac{2(dx)^{7/2}\left(a+b\sin^{-1}(cx)\right)^2}{7d}-\frac{8bc(dx)^{9/2}\left(a+b\sin^{-1}(cx)\right)\,{}_2F_1\left(\frac{1}{2},\frac{9}{4};\frac{13}{4};c^2x^2\right)}{63d^2}+\frac{16b^2c^2}{}\end{aligned}$$

Mathematica [A] time = 0.0609168, size = 90, normalized size = 0.83

$$\frac{2}{693}x(dx)^{5/2}\left(8b^2c^2x^2\text{HypergeometricPFQ}\left(\left\{1,\frac{11}{4},\frac{11}{4}\right\},\left\{\frac{13}{4},\frac{15}{4}\right\},c^2x^2\right)+11\left(a+b\sin^{-1}(cx)\right)\left(9\left(a+b\sin^{-1}(cx)\right)-\right.\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(5/2)*(a + b*ArcSin[c*x])^2,x]
```

```
[Out] (2*x*(d*x)^(5/2)*(11*(a + b*ArcSin[c*x])*(9*(a + b*ArcSin[c*x]) - 4*b*c*x*H
ypergeometric2F1[1/2, 9/4, 13/4, c^2*x^2]) + 8*b^2*c^2*x^2*HypergeometricPF
Q[{1, 11/4, 11/4}, {13/4, 15/4}, c^2*x^2]))/693
```

Maple [F] time = 0.158, size = 0, normalized size = 0.

$$\int (dx)^{\frac{5}{2}}\left(a+b\arcsin(cx)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(5/2)*(a+b*arcsin(c*x))^2,x)
```

```
[Out] int((d*x)^(5/2)*(a+b*arcsin(c*x))^2,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)*(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(b^2d^2x^2\arcsin(cx)^2 + 2\,abd^2x^2\arcsin(cx) + a^2d^2x^2\right)\sqrt{dx}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)*(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

```
[Out] integral((b^2*d^2*x^2*arcsin(c*x)^2 + 2*a*b*d^2*x^2*arcsin(c*x) + a^2*d^2*x
^2)*sqrt(d*x), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(5/2)*(a+b*asin(c*x))**2,x)
```

```
[Out] Timed out
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int (dx)^{\frac{5}{2}}\,(b\arcsin(cx) + a)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(5/2)*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

```
[Out] integrate((d*x)^(5/2)*(b*arcsin(c*x) + a)^2, x)
```

3.210 $\int (dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2\,dx$

Optimal. Leaf size=109

$$\frac{16b^2c^2(dx)^{9/2}\text{HypergeometricPFQ}\left(\left\{1,\frac{9}{4},\frac{9}{4}\right\},\left\{\frac{11}{4},\frac{13}{4}\right\},c^2x^2\right)}{315d^3}-\frac{8bc(dx)^{7/2}\text{Hypergeometric2F1}\left(\frac{1}{2},\frac{7}{4},\frac{11}{4},c^2x^2\right)(a+b}{35d^2}$$

```
[Out] (2*(d*x)^(5/2)*(a + b*ArcSin[c*x])^2)/(5*d) - (8*b*c*(d*x)^(7/2)*(a + b*Arc
Sin[c*x])*Hypergeometric2F1[1/2, 7/4, 11/4, c^2*x^2])/(35*d^2) + (16*b^2*c^
2*(d*x)^(9/2)*HypergeometricPFQ[{1, 9/4, 9/4}, {11/4, 13/4}, c^2*x^2])/(315
*d^3)
```

Rubi [A] time = 0.141035, antiderivative size = 109, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {4627, 4711}

$$\frac{16b^2c^2(dx)^{9/2}\,{}_3F_2\left(1,\frac{9}{4},\frac{9}{4};\frac{11}{4},\frac{13}{4};c^2x^2\right)}{315d^3}-\frac{8bc(dx)^{7/2}\,{}_2F_1\left(\frac{1}{2},\frac{7}{4};\frac{11}{4};c^2x^2\right)\left(a+b\sin^{-1}(cx)\right)}{35d^2}+\frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)^2}{5d}$$

Antiderivative was successfully verified.

```
[In] Int[(d*x)^(3/2)*(a + b*ArcSin[c*x])^2,x]
```

```
[Out] (2*(d*x)^(5/2)*(a + b*ArcSin[c*x])^2)/(5*d) - (8*b*c*(d*x)^(7/2)*(a + b*Arc
Sin[c*x])*Hypergeometric2F1[1/2, 7/4, 11/4, c^2*x^2])/(35*d^2) + (16*b^2*c^
2*(d*x)^(9/2)*HypergeometricPFQ[{1, 9/4, 9/4}, {11/4, 13/4}, c^2*x^2])/(315
*d^3)
```

Rule 4627

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

Rule 4711

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((f_.)*(x_))^(m_))/Sqrt[(d_) + (e_.
)*(x_)^2], x_Symbol] :> Simp[((f*x)^(m + 1)*(a + b*ArcSin[c*x])*Hypergeomet
ric2F1[1/2, (1 + m)/2, (3 + m)/2, c^2*x^2])/(Sqrt[d]*f*(m + 1)), x] - Simp[
(b*c*(f*x)^(m + 2)*HypergeometricPFQ[{1, 1 + m/2, 1 + m/2}, {3/2 + m/2, 2 +
 m/2}, c^2*x^2])/(Sqrt[d]*f^2*(m + 1)*(m + 2)), x] /; FreeQ[{a, b, c, d, e,
 f, m}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] &&  !IntegerQ[m]
```

Rubi steps

$$\int (dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2\,dx = \frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)^2}{5d} - \frac{(4bc)\int\frac{(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)}{\sqrt{1-c^2x^2}}\,dx}{5d}$$

$$= \frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)^2}{5d} - \frac{8bc(dx)^{7/2}\left(a+b\sin^{-1}(cx)\right)\,{}_2F_1\left(\frac{1}{2},\frac{7}{4};\frac{11}{4};c^2x^2\right)}{35d^2} + \frac{16b^2c^2}{\;}$$

Mathematica [A] time = 0.0560194, size = 90, normalized size = 0.83

$$\frac{2}{315}x(dx)^{3/2}\left(8b^2c^2x^2\text{HypergeometricPFQ}\left(\left\{1,\frac{9}{4},\frac{9}{4}\right\},\left\{\frac{11}{4},\frac{13}{4}\right\},c^2x^2\right)+9\left(a+b\sin^{-1}(cx)\right)\left(7\left(a+b\sin^{-1}(cx)\right)-4\right.\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(d*x)^(3/2)*(a + b*ArcSin[c*x])^2,x]
```

```
[Out] (2*x*(d*x)^(3/2)*(9*(a + b*ArcSin[c*x])*(7*(a + b*ArcSin[c*x]) - 4*b*c*x*Hy
pergeometric2F1[1/2, 7/4, 11/4, c^2*x^2]) + 8*b^2*c^2*x^2*HypergeometricPFQ
[{1, 9/4, 9/4}, {11/4, 13/4}, c^2*x^2]))/315
```

Maple [F] time = 0.143, size = 0, normalized size = 0.

$$\int (dx)^{\frac{3}{2}}\left(a+b\arcsin(cx)\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)*(a+b*arcsin(c*x))^2,x)
```

```
[Out] int((d*x)^(3/2)*(a+b*arcsin(c*x))^2,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\left(b^2dx\arcsin\left(cx\right)^2+2\,abdx\arcsin\left(cx\right)+a^2dx\right)\sqrt{dx},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

```
[Out] integral((b^2*d*x*arcsin(c*x)^2 + 2*a*b*d*x*arcsin(c*x) + a^2*d*x)*sqrt(d*x
), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(3/2)*(a+b*asin(c*x))**2,x)
```

```
[Out] Timed out
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int\left(dx\right)^{\frac{3}{2}}\left(b\arcsin\left(cx\right)+a\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

```
[Out] integrate((d*x)^(3/2)*(b*arcsin(c*x) + a)^2, x)
```

3.211 $\int \sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2\,dx$

Optimal. Leaf size=109

$$\frac{16b^2c^2(dx)^{7/2}\text{HypergeometricPFQ}\left(\left\{1,\frac{7}{4},\frac{7}{4}\right\},\left\{\frac{9}{4},\frac{11}{4}\right\},c^2x^2\right)}{105d^3}-\frac{8bc(dx)^{5/2}\text{Hypergeometric2F1}\left(\frac{1}{2},\frac{5}{4},\frac{9}{4},c^2x^2\right)\left(a+b\,\mathrm{si}\right.}{15d^2}$$

```
[Out] (2*(d*x)^(3/2)*(a + b*ArcSin[c*x])^2)/(3*d) - (8*b*c*(d*x)^(5/2)*(a + b*Arc
Sin[c*x])*Hypergeometric2F1[1/2, 5/4, 9/4, c^2*x^2])/(15*d^2) + (16*b^2*c^2
*(d*x)^(7/2)*HypergeometricPFQ[{1, 7/4, 7/4}, {9/4, 11/4}, c^2*x^2])/(105*d
^3)
```

Rubi [A] time = 0.142631, antiderivative size = 109, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {4627, 4711}

$$\frac{16b^2c^2(dx)^{7/2}\,{}_3F_2\left(1,\frac{7}{4},\frac{7}{4};\frac{9}{4},\frac{11}{4};c^2x^2\right)}{105d^3}-\frac{8bc(dx)^{5/2}\,{}_2F_1\left(\frac{1}{2},\frac{5}{4};\frac{9}{4};c^2x^2\right)\left(a+b\sin^{-1}(cx)\right)}{15d^2}+\frac{2(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2}{3d}$$

Antiderivative was successfully verified.

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

```
[Out] (2*(d*x)^(3/2)*(a + b*ArcSin[c*x])^2)/(3*d) - (8*b*c*(d*x)^(5/2)*(a + b*Arc
Sin[c*x])*Hypergeometric2F1[1/2, 5/4, 9/4, c^2*x^2])/(15*d^2) + (16*b^2*c^2
*(d*x)^(7/2)*HypergeometricPFQ[{1, 7/4, 7/4}, {9/4, 11/4}, c^2*x^2])/(105*d
^3)
```

Rule 4627

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

Rule 4711

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((f_.)*(x_))^(m_))/Sqrt[(d_) + (e_.
)*(x_)^2], x_Symbol] :> Simp[((f*x)^(m + 1)*(a + b*ArcSin[c*x])*Hypergeomet
ric2F1[1/2, (1 + m)/2, (3 + m)/2, c^2*x^2])/(Sqrt[d]*f*(m + 1)), x] - Simp[
(b*c*(f*x)^(m + 2)*HypergeometricPFQ[{1, 1 + m/2, 1 + m/2}, {3/2 + m/2, 2 +
 m/2}, c^2*x^2])/(Sqrt[d]*f^2*(m + 1)*(m + 2)), x] /; FreeQ[{a, b, c, d, e,
 f, m}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] &&  !IntegerQ[m]
```

Rubi steps

$$\int \sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2\,dx=\frac{2(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2}{3d}-\frac{(4bc)\int\frac{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)}{\sqrt{1-c^2x^2}}\,dx}{3d}$$

$$=\frac{2(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2}{3d}-\frac{8bc(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)\,{}_2F_1\left(\frac{1}{2},\frac{5}{4};\frac{9}{4};c^2x^2\right)}{15d^2}+\frac{16b^2c^2(d}{}$$

Mathematica [A] time = 0.0519041, size = 90, normalized size = 0.83

$$\frac{2}{105}x\sqrt{dx}\left(8b^2c^2x^2\text{HypergeometricPFQ}\left(\left\{1,\frac{7}{4},\frac{7}{4}\right\},\left\{\frac{9}{4},\frac{11}{4}\right\},c^2x^2\right)+7\left(a+b\sin^{-1}(cx)\right)\left(5\left(a+b\sin^{-1}(cx)\right)-4bcx\right.\right.$$

Antiderivative was successfully verified.

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

```
[Out] (2*x*Sqrt[d*x]*(7*(a + b*ArcSin[c*x])*(5*(a + b*ArcSin[c*x]) - 4*b*c*x*Hype
rgeometric2F1[1/2, 5/4, 9/4, c^2*x^2]) + 8*b^2*c^2*x^2*HypergeometricPFQ[{1
, 7/4, 7/4}, {9/4, 11/4}, c^2*x^2]))/105
```

Maple [F] time = 0.184, size = 0, normalized size = 0.

$$\int \sqrt{dx}\,(a+b\arcsin(cx))^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(1/2)*(a+b*arcsin(c*x))^2,x)
```

```
[Out] int((d*x)^(1/2)*(a+b*arcsin(c*x))^2,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(1/2)*(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(b^2 \arcsin(cx)^2 + 2\,ab \arcsin(cx) + a^2\right)\sqrt{dx}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(1/2)*(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

```
[Out] integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)*sqrt(d*x), x)
```

Sympy [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{dx}\,(a + b\,\mathrm{asin}(cx))^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(1/2)*(a+b*asin(c*x))**2,x)
```

```
[Out] Integral(sqrt(d*x)*(a + b*asin(c*x))**2, x)
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{dx}(b \arcsin(cx) + a)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(1/2)*(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x)*(b*arcsin(c*x) + a)^2, x)
```

3.212 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{dx}}\,dx$

Optimal. Leaf size=107

$$\frac{16b^2c^2(dx)^{5/2}\text{HypergeometricPFQ}\left(\left\{1,\frac{5}{4},\frac{5}{4}\right\},\left\{\frac{7}{4},\frac{9}{4}\right\},c^2x^2\right)}{15d^3}-\frac{8bc(dx)^{3/2}\text{Hypergeometric2F1}\left(\frac{1}{2},\frac{3}{4},\frac{7}{4},c^2x^2\right)\Big(a+b\,\mathrm{si}}{3d^2}$$

```
[Out] (2*Sqrt[d*x]*(a + b*ArcSin[c*x])^2)/d - (8*b*c*(d*x)^(3/2)*(a + b*ArcSin[c*
x])*Hypergeometric2F1[1/2, 3/4, 7/4, c^2*x^2])/(3*d^2) + (16*b^2*c^2*(d*x)^
(5/2)*HypergeometricPFQ[{1, 5/4, 5/4}, {7/4, 9/4}, c^2*x^2])/(15*d^3)
```

Rubi [A] time = 0.130082, antiderivative size = 107, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {4627, 4711}

$$\frac{16b^2c^2(dx)^{5/2}\,{}_3F_2\left(1,\frac{5}{4},\frac{5}{4};\frac{7}{4},\frac{9}{4};c^2x^2\right)}{15d^3}-\frac{8bc(dx)^{3/2}\,{}_2F_1\left(\frac{1}{2},\frac{3}{4};\frac{7}{4};c^2x^2\right)\left(a+b\sin^{-1}(cx)\right)}{3d^2}+\frac{2\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2}{d}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^2/Sqrt[d*x],x]
```

```
[Out] (2*Sqrt[d*x]*(a + b*ArcSin[c*x])^2)/d - (8*b*c*(d*x)^(3/2)*(a + b*ArcSin[c*
x])*Hypergeometric2F1[1/2, 3/4, 7/4, c^2*x^2])/(3*d^2) + (16*b^2*c^2*(d*x)^
(5/2)*HypergeometricPFQ[{1, 5/4, 5/4}, {7/4, 9/4}, c^2*x^2])/(15*d^3)
```

Rule 4627

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

Rule 4711

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((f_.)*(x_))^(m_))/Sqrt[(d_) + (e_.
)*(x_)^2], x_Symbol] :> Simp[((f*x)^(m + 1)*(a + b*ArcSin[c*x])*Hypergeomet
ric2F1[1/2, (1 + m)/2, (3 + m)/2, c^2*x^2])/(Sqrt[d]*f*(m + 1)), x] - Simp[
(b*c*(f*x)^(m + 2)*HypergeometricPFQ[{1, 1 + m/2, 1 + m/2}, {3/2 + m/2, 2 +
m/2}, c^2*x^2])/(Sqrt[d]*f^2*(m + 1)*(m + 2)), x] /; FreeQ[{a, b, c, d, e,
f, m}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] &&  !IntegerQ[m]
```

Rubi steps

$$\begin{aligned}\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{dx}}\,dx &= \frac{2\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2}{d}-\frac{(4bc)\int \frac{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}{\sqrt{1-c^2x^2}}\,dx}{d}\\ &= \frac{2\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2}{d}-\frac{8bc(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right){}_2F_1\left(\frac{1}{2},\frac{3}{4};\frac{7}{4};c^2x^2\right)}{3d^2}+\frac{16b^2c^2(dx)^{5/2}\,{}_3F}{}\end{aligned}$$

Mathematica [A] time = 0.0492373, size = 90, normalized size = 0.84

$$\frac{2x\left(8b^2c^2x^2\text{HypergeometricPFQ}\left(\left\{1,\frac{5}{4},\frac{5}{4}\right\},\left\{\frac{7}{4},\frac{9}{4}\right\},c^2x^2\right)+5\left(a+b\sin^{-1}(cx)\right)\left(3\left(a+b\sin^{-1}(cx)\right)-4bcx\text{Hypergeo}\right.\right.}{15\sqrt{dx}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])^2/Sqrt[d*x],x]
```

```
[Out] (2*x*(5*(a + b*ArcSin[c*x])*(3*(a + b*ArcSin[c*x]) - 4*b*c*x*Hypergeometric
2F1[1/2, 3/4, 7/4, c^2*x^2]) + 8*b^2*c^2*x^2*HypergeometricPFQ[{1, 5/4, 5/4
}, {7/4, 9/4}, c^2*x^2]))/(15*Sqrt[d*x])
```

Maple [F] time = 0.358, size = 0, normalized size = 0.

$$\int (a+b\arcsin(cx))^2\frac{1}{\sqrt{dx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^2/(d*x)^(1/2),x)
```

```
[Out] int((a+b*arcsin(c*x))^2/(d*x)^(1/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^2/(d*x)^(1/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(b^2 \arcsin\left(cx\right)^2 + 2\,ab \arcsin\left(cx\right) + a^2\right)\sqrt{dx}}{dx}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^2/(d*x)^(1/2),x, algorithm="fricas")
```

```
[Out] integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)*sqrt(d*x)/(d*x), x)
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**2/(d*x)**(1/2),x)
```

```
[Out] Exception raised: TypeError
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(b \arcsin\left(cx\right) + a\right)^2}{\sqrt{dx}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^2/(d*x)^(1/2),x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)^2/sqrt(d*x), x)
```

3.213 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{(dx)^{3/2}}\,dx$

Optimal. Leaf size=105

$$-\frac{16b^2c^2(dx)^{3/2}\text{HypergeometricPFQ}\left(\left\{\frac{3}{4},\frac{3}{4},1\right\},\left\{\frac{5}{4},\frac{7}{4}\right\},c^2x^2\right)}{3d^3}+\frac{8bc\sqrt{dx}\text{Hypergeometric2F1}\left(\frac{1}{4},\frac{1}{2},\frac{5}{4},c^2x^2\right)\left(a+b\sin\right.}{d^2}$$

```
[Out] (-2*(a + b*ArcSin[c*x])^2)/(d*Sqrt[d*x]) + (8*b*c*Sqrt[d*x]*(a + b*ArcSin[c
*x])*Hypergeometric2F1[1/4, 1/2, 5/4, c^2*x^2])/d^2 - (16*b^2*c^2*(d*x)^(3/
2)*HypergeometricPFQ[{3/4, 3/4, 1}, {5/4, 7/4}, c^2*x^2])/(3*d^3)
```

Rubi [A] time = 0.134948, antiderivative size = 105, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {4627, 4711}

$$-\frac{16b^2c^2(dx)^{3/2}\,{}_3F_2\left(\frac{3}{4},\frac{3}{4},1;\frac{5}{4},\frac{7}{4};c^2x^2\right)}{3d^3}+\frac{8bc\sqrt{dx}\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};c^2x^2\right)\left(a+b\sin^{-1}(cx)\right)}{d^2}-\frac{2\left(a+b\sin^{-1}(cx)\right)^2}{d\sqrt{dx}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^2/(d*x)^(3/2),x]
```

```
[Out] (-2*(a + b*ArcSin[c*x])^2)/(d*Sqrt[d*x]) + (8*b*c*Sqrt[d*x]*(a + b*ArcSin[c
*x])*Hypergeometric2F1[1/4, 1/2, 5/4, c^2*x^2])/d^2 - (16*b^2*c^2*(d*x)^(3/
2)*HypergeometricPFQ[{3/4, 3/4, 1}, {5/4, 7/4}, c^2*x^2])/(3*d^3)
```

Rule 4627

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

Rule 4711

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((f_.)*(x_))^(m_))/Sqrt[(d_) + (e_.
)*(x_)^2], x_Symbol] :> Simp[((f*x)^(m + 1)*(a + b*ArcSin[c*x])*Hypergeomet
ric2F1[1/2, (1 + m)/2, (3 + m)/2, c^2*x^2])/(Sqrt[d]*f*(m + 1)), x] - Simp[
(b*c*(f*x)^(m + 2)*HypergeometricPFQ[{1, 1 + m/2, 1 + m/2}, {3/2 + m/2, 2 +
m/2}, c^2*x^2])/(Sqrt[d]*f^2*(m + 1)*(m + 2)), x] /; FreeQ[{a, b, c, d, e,
f, m}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] &&  !IntegerQ[m]
```

Rubi steps

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{(dx)^{3/2}}\,dx = -\frac{2\left(a+b\sin^{-1}(cx)\right)^2}{d\sqrt{dx}}+\frac{(4bc)\int \frac{a+b\sin^{-1}(cx)}{\sqrt{dx}\sqrt{1-c^2x^2}}\,dx}{d}$$

$$= -\frac{2\left(a+b\sin^{-1}(cx)\right)^2}{d\sqrt{dx}}+\frac{8bc\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)\,{}_2F_1\left(\frac{1}{4},\frac{1}{2};\frac{5}{4};c^2x^2\right)}{d^2}-\frac{16b^2c^2(dx)^{3/2}\,{}_3F_2\Bigl(\frac{3}{4},}{3d^3}$$

Mathematica [A] time = 0.0471097, size = 87, normalized size = 0.83

$$-\frac{2x\Bigl(8b^2c^2x^2\text{HypergeometricPFQ}\left(\left\{\frac{3}{4},\frac{3}{4},1\right\},\left\{\frac{5}{4},\frac{7}{4}\right\},c^2x^2\right)+3\left(a+b\sin^{-1}(cx)\right)\Bigl(-4bcx\text{Hypergeometric2F1}\Bigl(\frac{1}{4},\frac{1}{2},}{3(dx)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])^2/(d*x)^(3/2),x]
```

```
[Out] (-2*x*(3*(a + b*ArcSin[c*x])*(a + b*ArcSin[c*x] - 4*b*c*x*Hypergeometric2F1
[1/4, 1/2, 5/4, c^2*x^2]) + 8*b^2*c^2*x^2*HypergeometricPFQ[{3/4, 3/4, 1},
{5/4, 7/4}, c^2*x^2]))/(3*(d*x)^(3/2))
```

Maple [F] time = 0.154, size = 0, normalized size = 0.

$$\int (a+b\arcsin(cx))^2\,(dx)^{-\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^2/(d*x)^(3/2),x)
```

```
[Out] int((a+b*arcsin(c*x))^2/(d*x)^(3/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^2/(d*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(b^{2}\arcsin\left(cx\right)^{2}+2\,ab\arcsin\left(cx\right)+a^{2}\right)\sqrt{dx}}{d^{2}x^{2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^2/(d*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)*sqrt(d*x)/(d^2*x^2),
 x)
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**2/(d*x)**(3/2),x)
```

```
[Out] Exception raised: TypeError
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(b\arcsin\left(cx\right)+a\right)^{2}}{\left(dx\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^2/(d*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)^2/(d*x)^(3/2), x)
```

3.214 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{(dx)^{5/2}}\,dx$

Optimal. Leaf size=109

$$\frac{16b^2c^2\sqrt{dx}\text{HypergeometricPFQ}\left(\left\{\frac{1}{4},\frac{1}{4},1\right\},\left\{\frac{3}{4},\frac{5}{4}\right\},c^2x^2\right)}{3d^3}-\frac{8bc\text{Hypergeometric2F1}\left(-\frac{1}{4},\frac{1}{2},\frac{3}{4},c^2x^2\right)\left(a+b\sin^{-1}(cx)\right.}{3d^2\sqrt{dx}}$$

```
[Out] (-2*(a + b*ArcSin[c*x])^2)/(3*d*(d*x)^(3/2)) - (8*b*c*(a + b*ArcSin[c*x])*H
ypergeometric2F1[-1/4, 1/2, 3/4, c^2*x^2])/(3*d^2*Sqrt[d*x]) + (16*b^2*c^2*
Sqrt[d*x]*HypergeometricPFQ[{1/4, 1/4, 1}, {3/4, 5/4}, c^2*x^2])/(3*d^3)
```

Rubi [A] time = 0.14545, antiderivative size = 109, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.111, Rules used = {4627, 4711}

$$\frac{16b^2c^2\sqrt{dx}\,{}_3F_2\left(\frac{1}{4},\frac{1}{4},1;\frac{3}{4},\frac{5}{4};c^2x^2\right)}{3d^3}-\frac{8bc\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};c^2x^2\right)\left(a+b\sin^{-1}(cx)\right)}{3d^2\sqrt{dx}}-\frac{2\left(a+b\sin^{-1}(cx)\right)^2}{3d(dx)^{3/2}}$$

Antiderivative was successfully verified.

```
[In] Int[(a + b*ArcSin[c*x])^2/(d*x)^(5/2),x]
```

```
[Out] (-2*(a + b*ArcSin[c*x])^2)/(3*d*(d*x)^(3/2)) - (8*b*c*(a + b*ArcSin[c*x])*H
ypergeometric2F1[-1/4, 1/2, 3/4, c^2*x^2])/(3*d^2*Sqrt[d*x]) + (16*b^2*c^2*
Sqrt[d*x]*HypergeometricPFQ[{1/4, 1/4, 1}, {3/4, 5/4}, c^2*x^2])/(3*d^3)
```

Rule 4627

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

Rule 4711

```
Int[(((a_.) + ArcSin[(c_.)*(x_)]*(b_.))*((f_.)*(x_))^(m_))/Sqrt[(d_) + (e_.
)*(x_)^2], x_Symbol] :> Simp[((f*x)^(m + 1)*(a + b*ArcSin[c*x])*Hypergeomet
ric2F1[1/2, (1 + m)/2, (3 + m)/2, c^2*x^2])/(Sqrt[d]*f*(m + 1)), x] - Simp[
(b*c*(f*x)^(m + 2)*HypergeometricPFQ[{1, 1 + m/2, 1 + m/2}, {3/2 + m/2, 2 +
m/2}, c^2*x^2])/(Sqrt[d]*f^2*(m + 1)*(m + 2)), x] /; FreeQ[{a, b, c, d, e,
f, m}, x] && EqQ[c^2*d + e, 0] && GtQ[d, 0] &&  !IntegerQ[m]
```

Rubi steps

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{(dx)^{5/2}}\,dx = -\frac{2\left(a+b\sin^{-1}(cx)\right)^2}{3d(dx)^{3/2}} + \frac{(4bc)\int \frac{a+b\sin^{-1}(cx)}{(dx)^{3/2}\sqrt{1-c^2x^2}}\,dx}{3d}$$

$$= -\frac{2\left(a+b\sin^{-1}(cx)\right)^2}{3d(dx)^{3/2}} - \frac{8bc\left(a+b\sin^{-1}(cx)\right)\,{}_2F_1\left(-\frac{1}{4},\frac{1}{2};\frac{3}{4};c^2x^2\right)}{3d^2\sqrt{dx}} + \frac{16b^2c^2\sqrt{dx}\,{}_3F_2\left(\frac{1}{4},\frac{1}{4},1;\right.}{3d^3}$$

Mathematica [A] time = 0.0541036, size = 87, normalized size = 0.8

$$\frac{x\left(16b^2c^2x^2\text{HypergeometricPFQ}\left(\left\{\frac{1}{4},\frac{1}{4},1\right\},\left\{\frac{3}{4},\frac{5}{4}\right\},c^2x^2\right)-2\left(a+b\sin^{-1}(cx)\right)\left(4bcx\text{Hypergeometric2F1}\left(-\frac{1}{4},\frac{1}{2},\frac{3}{4}\right.\right.\right.}{3(dx)^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(a + b*ArcSin[c*x])^2/(d*x)^(5/2),x]
```

```
[Out] (x*(-2*(a + b*ArcSin[c*x])*(a + b*ArcSin[c*x] + 4*b*c*x*Hypergeometric2F1[-
1/4, 1/2, 3/4, c^2*x^2]) + 16*b^2*c^2*x^2*HypergeometricPFQ[{1/4, 1/4, 1},
{3/4, 5/4}, c^2*x^2]))/(3*(d*x)^(5/2))
```

Maple [F] time = 0.144, size = 0, normalized size = 0.

$$\int \left(a+b\arcsin\left(cx\right)\right)^2\left(dx\right)^{-\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^2/(d*x)^(5/2),x)
```

```
[Out] int((a+b*arcsin(c*x))^2/(d*x)^(5/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^2/(d*x)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(b^2 \arcsin\left(cx\right)^2 + 2\,ab \arcsin\left(cx\right) + a^2\right)\sqrt{dx}}{d^3x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^2/(d*x)^(5/2),x, algorithm="fricas")
```

```
[Out] integral((b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2)*sqrt(d*x)/(d^3*x^3),
 x)
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**2/(d*x)**(5/2),x)
```

```
[Out] Exception raised: TypeError
```

Giac [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(b \arcsin\left(cx\right) + a\right)^2}{\left(dx\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^2/(d*x)^(5/2),x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)^2/(d*x)^(5/2), x)
```

3.215 $\int (dx)^{3/2} \left(a+b\sin^{-1}(cx)\right)^3 \, dx$

Optimal. Leaf size=68

$$\frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)^3}{5d}-\frac{6bc\text{Unintegrable}\left(\frac{(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{1-c^2x^2}},x\right)}{5d}$$

```
[Out] (2*(d*x)^(5/2)*(a + b*ArcSin[c*x])^3)/(5*d) - (6*b*c*Unintegrable[((d*x)^(5
/2)*(a + b*ArcSin[c*x])^2)/Sqrt[1 - c^2*x^2], x])/(5*d)
```

Rubi [A] time = 0.169876, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int (dx)^{3/2} \left(a+b\sin^{-1}(cx)\right)^3 \, dx$$

Verification is Not applicable to the result.

```
[In] Int[(d*x)^(3/2)*(a + b*ArcSin[c*x])^3,x]
```

```
[Out] (2*(d*x)^(5/2)*(a + b*ArcSin[c*x])^3)/(5*d) - (6*b*c*Defer[Int][((d*x)^(5/2
)*(a + b*ArcSin[c*x])^2)/Sqrt[1 - c^2*x^2], x])/(5*d)
```

Rubi steps

$$\int (dx)^{3/2} \left(a+b\sin^{-1}(cx)\right)^3 \, dx=\frac{2(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)^3}{5d}-\frac{(6bc)\int \frac{(dx)^{5/2}\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{1-c^2x^2}} \, dx}{5d}$$

Mathematica [A] time = 36.3794, size = 0, normalized size = 0.

$$\int (dx)^{3/2} \left(a+b\sin^{-1}(cx)\right)^3 \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(d*x)^(3/2)*(a + b*ArcSin[c*x])^3,x]
```

```
[Out] Integrate[(d*x)^(3/2)*(a + b*ArcSin[c*x])^3, x]
```

Maple [A] time = 0.144, size = 0, normalized size = 0.

$$\int (dx)^{\frac{3}{2}} (a + b \arcsin(cx))^3 \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)*(a+b*arcsin(c*x))^3,x)
```

```
[Out] int((d*x)^(3/2)*(a+b*arcsin(c*x))^3,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*arcsin(c*x))^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(b^3 dx \arcsin(cx)^3 + 3\, ab^2 dx \arcsin(cx)^2 + 3\, a^2 bdx \arcsin(cx) + a^3 dx\right)\sqrt{dx}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*arcsin(c*x))^3,x, algorithm="fricas")
```

```
[Out] integral((b^3*d*x*arcsin(c*x)^3 + 3*a*b^2*d*x*arcsin(c*x)^2 + 3*a^2*b*d*x*a
rcsin(c*x) + a^3*d*x)*sqrt(d*x), x)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(3/2)*(a+b*asin(c*x))**3,x)
```

```
[Out] Timed out
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int (dx)^{\frac{3}{2}} \left(b \arcsin\left(cx\right) + a\right)^{3} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)*(a+b*arcsin(c*x))^3,x, algorithm="giac")
```

```
[Out] integrate((d*x)^(3/2)*(b*arcsin(c*x) + a)^3, x)
```

3.216 $\int \sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^3\,dx$

Optimal. Leaf size=66

$$\frac{2(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^3}{3d}-\frac{2bc\text{Unintegrable}\left(\frac{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{1-c^2x^2}},x\right)}{d}$$

```
[Out] (2*(d*x)^(3/2)*(a + b*ArcSin[c*x])^3)/(3*d) - (2*b*c*Unintegrable[((d*x)^(3
/2)*(a + b*ArcSin[c*x])^2)/Sqrt[1 - c^2*x^2], x])/d
```

Rubi [A] time = 0.167883, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^3\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Sqrt[d*x]*(a + b*ArcSin[c*x])^3,x]
```

```
[Out] (2*(d*x)^(3/2)*(a + b*ArcSin[c*x])^3)/(3*d) - (2*b*c*Defer[Int][((d*x)^(3/2
)*(a + b*ArcSin[c*x])^2)/Sqrt[1 - c^2*x^2], x])/d
```

Rubi steps

$$\int \sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^3\,dx=\frac{2(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^3}{3d}-\frac{(2bc)\int\frac{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{1-c^2x^2}}\,dx}{d}$$

Mathematica [F] time = 180.002, size = 0, normalized size = 0.

$Aborted

Verification is Not applicable to the result.

```
[In] Integrate[Sqrt[d*x]*(a + b*ArcSin[c*x])^3,x]
```

```
[Out] $Aborted
```

Maple [A] time = 0.142, size = 0, normalized size = 0.

$$\int \sqrt{dx}\,(a+b\arcsin(cx))^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(1/2)*(a+b*arcsin(c*x))^3,x)
```

```
[Out] int((d*x)^(1/2)*(a+b*arcsin(c*x))^3,x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\left(b^3\arcsin(cx)^3+3\,ab^2\arcsin(cx)^2+3\,a^2b\arcsin(cx)+a^3\right)\sqrt{dx},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b^3*arcsin(c*x)^3 + 3*a*b^2*arcsin(c*x)^2 + 3*a^2*b*arcsin(c*x) +
 a^3)*sqrt(d*x), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{dx}\,(a + b\,\mathrm{asin}\,(cx))^3\;dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(1/2)*(a+b*asin(c*x))**3,x)
```

```
[Out] Integral(sqrt(d*x)*(a + b*asin(c*x))**3, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{dx}(b\arcsin\,(cx) + a)^3\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(sqrt(d*x)*(b*arcsin(c*x) + a)^3, x)
```

3.217 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{\sqrt{dx}}\,dx$

Optimal. Leaf size=64

$$\frac{2\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^3}{d}-\frac{6bc\text{Unintegrable}\left(\frac{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{1-c^2x^2}},x\right)}{d}$$

```
[Out] (2*Sqrt[d*x]*(a + b*ArcSin[c*x])^3)/d - (6*b*c*Unintegrable[(Sqrt[d*x]*(a +
 b*ArcSin[c*x])^2)/Sqrt[1 - c^2*x^2], x])/d
```

Rubi [A] time = 0.160063, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{\sqrt{dx}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(a + b*ArcSin[c*x])^3/Sqrt[d*x],x]
```

```
[Out] (2*Sqrt[d*x]*(a + b*ArcSin[c*x])^3)/d - (6*b*c*Defer[Int][(Sqrt[d*x]*(a + b
*ArcSin[c*x])^2)/Sqrt[1 - c^2*x^2], x])/d
```

Rubi steps

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{\sqrt{dx}}\,dx=\frac{2\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^3}{d}-\frac{(6bc)\int \frac{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{1-c^2x^2}}\,dx}{d}$$

Mathematica [A] time = 8.12599, size = 0, normalized size = 0.

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{\sqrt{dx}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(a + b*ArcSin[c*x])^3/Sqrt[d*x],x]
```

```
[Out] Integrate[(a + b*ArcSin[c*x])^3/Sqrt[d*x], x]
```

Maple [A] time = 0.199, size = 0, normalized size = 0.

$$\int (a+b\arcsin (cx))^{3}\frac{1}{\sqrt{dx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^3/(d*x)^(1/2),x)
```

```
[Out] int((a+b*arcsin(c*x))^3/(d*x)^(1/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\left(b^{3}\arcsin (cx)^{3}+3\,ab^{2}\arcsin (cx)^{2}+3\,a^{2}b\arcsin (cx)+a^{3}\right)\sqrt{dx}}{dx},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b^3*arcsin(c*x)^3 + 3*a*b^2*arcsin(c*x)^2 + 3*a^2*b*arcsin(c*x) +
 a^3)*sqrt(d*x)/(d*x), x)
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**3/(d*x)**(1/2),x)
```

```
[Out] Exception raised: TypeError
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(b \arcsin(cx) + a)^3}{\sqrt{dx}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((b*arcsin(c*x) + a)^3/sqrt(d*x), x)
```

3.218 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{(dx)^{3/2}}\,dx$

Optimal. Leaf size=64

$$\frac{6bc\text{Unintegrable}\left(\frac{\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{1-c^2x^2}\sqrt{dx}},x\right)}{d}-\frac{2\left(a+b\sin^{-1}(cx)\right)^3}{d\sqrt{dx}}$$

```
[Out] (-2*(a + b*ArcSin[c*x])^3)/(d*Sqrt[d*x]) + (6*b*c*Unintegrable[(a + b*ArcSi
n[c*x])^2/(Sqrt[d*x]*Sqrt[1 - c^2*x^2]), x])/d
```

Rubi [A] time = 0.159132, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{(dx)^{3/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(a + b*ArcSin[c*x])^3/(d*x)^(3/2),x]
```

```
[Out] (-2*(a + b*ArcSin[c*x])^3)/(d*Sqrt[d*x]) + (6*b*c*Defer[Int][(a + b*ArcSin[
c*x])^2/(Sqrt[d*x]*Sqrt[1 - c^2*x^2]), x])/d
```

Rubi steps

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{(dx)^{3/2}}\,dx=-\frac{2\left(a+b\sin^{-1}(cx)\right)^3}{d\sqrt{dx}}+\frac{(6bc)\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{dx}\sqrt{1-c^2x^2}}\,dx}{d}$$

Mathematica [A] time = 7.57556, size = 0, normalized size = 0.

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{(dx)^{3/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(a + b*ArcSin[c*x])^3/(d*x)^(3/2),x]
```

```
[Out] Integrate[(a + b*ArcSin[c*x])^3/(d*x)^(3/2), x]
```

Maple [A] time = 0.145, size = 0, normalized size = 0.

$$\int (a+b\arcsin(cx))^3 (dx)^{-\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a+b*arcsin(c*x))^3/(d*x)^(3/2),x)
```

```
[Out] int((a+b*arcsin(c*x))^3/(d*x)^(3/2),x)
```

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^3/(d*x)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(b^3\arcsin(cx)^3+3\,ab^2\arcsin(cx)^2+3\,a^2b\arcsin(cx)+a^3\right)\sqrt{dx}}{d^2x^2},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^3/(d*x)^(3/2),x, algorithm="fricas")
```

```
[Out] integral((b^3*arcsin(c*x)^3 + 3*a*b^2*arcsin(c*x)^2 + 3*a^2*b*arcsin(c*x) +
 a^3)*sqrt(d*x)/(d^2*x^2), x)
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**3/(d*x)**(3/2),x)
```

```
[Out] Exception raised: TypeError
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(b\arcsin(cx)+a)^3}{(dx)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*arcsin(c*x))^3/(d*x)^(3/2),x, algorithm="giac")
```

```
[Out] integrate((b*arcsin(c*x) + a)^3/(d*x)^(3/2), x)
```

3.219 $\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{(dx)^{5/2}}\,dx$

Optimal. Leaf size=66

$$\frac{2bc\,\text{Unintegrable}\left(\frac{\left(a+b\sin^{-1}(cx)\right)^2}{\sqrt{1-c^2x^2}(dx)^{3/2}},x\right)}{d}-\frac{2\left(a+b\sin^{-1}(cx)\right)^3}{3d(dx)^{3/2}}$$

```
[Out] (-2*(a + b*ArcSin[c*x])^3)/(3*d*(d*x)^(3/2)) + (2*b*c*Unintegrable[(a + b*A
rcSin[c*x])^2/((d*x)^(3/2)*Sqrt[1 - c^2*x^2]), x])/d
```

Rubi [A] time = 0.173453, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{(dx)^{5/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(a + b*ArcSin[c*x])^3/(d*x)^(5/2),x]
```

```
[Out] (-2*(a + b*ArcSin[c*x])^3)/(3*d*(d*x)^(3/2)) + (2*b*c*Defer[Int][(a + b*Arc
Sin[c*x])^2/((d*x)^(3/2)*Sqrt[1 - c^2*x^2]), x])/d
```

Rubi steps

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{(dx)^{5/2}}\,dx=-\frac{2\left(a+b\sin^{-1}(cx)\right)^3}{3d(dx)^{3/2}}+\frac{(2bc)\int \frac{\left(a+b\sin^{-1}(cx)\right)^2}{(dx)^{3/2}\sqrt{1-c^2x^2}}\,dx}{d}$$

Mathematica [A] time = 13.1286, size = 0, normalized size = 0.

$$\int \frac{\left(a+b\sin^{-1}(cx)\right)^3}{(dx)^{5/2}}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(a + b*ArcSin[c*x])^3/(d*x)^(5/2),x]
```

```
[Out] Integrate[(a + b*ArcSin[c*x])^3/(d*x)^(5/2), x]
```

Maple [A] time = 0.139, size = 0, normalized size = 0.

$$\int (a + b \arcsin(cx))^3 (dx)^{-\frac{5}{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

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

Maxima [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(b^3 \arcsin(cx)^3 + 3\,ab^2 \arcsin(cx)^2 + 3\,a^2 b \arcsin(cx) + a^3\right)\sqrt{dx}}{d^3 x^3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral((b^3*arcsin(c*x)^3 + 3*a*b^2*arcsin(c*x)^2 + 3*a^2*b*arcsin(c*x) +
 a^3)*sqrt(d*x)/(d^3*x^3), x)
```

Sympy [F(-2)] time = 0., size = 0, normalized size = 0.

Exception raised: TypeError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a+b*asin(c*x))**3/(d*x)**(5/2),x)
```

```
[Out] Exception raised: TypeError
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(b \arcsin{(cx)} + a)^3}{(dx)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate((b*arcsin(c*x) + a)^3/(d*x)^(5/2), x)
```

3.220 $\int \frac{(dx)^{3/2}}{a+b\sin^{-1}(cx)}\,dx$

Optimal. Leaf size=20

$$\text{Unintegrable}\left(\frac{(dx)^{3/2}}{a+b\sin^{-1}(cx)},x\right)$$

```
[Out] Unintegrable[(d*x)^(3/2)/(a + b*ArcSin[c*x]), x]
```

Rubi [A] time = 0.0296614, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{(dx)^{3/2}}{a+b\sin^{-1}(cx)}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(d*x)^(3/2)/(a + b*ArcSin[c*x]),x]
```

```
[Out] Defer[Int][(d*x)^(3/2)/(a + b*ArcSin[c*x]), x]
```

Rubi steps

$$\int \frac{(dx)^{3/2}}{a+b\sin^{-1}(cx)}\,dx=\int \frac{(dx)^{3/2}}{a+b\sin^{-1}(cx)}\,dx$$

Mathematica [A] time = 2.67572, size = 0, normalized size = 0.

$$\int \frac{(dx)^{3/2}}{a+b\sin^{-1}(cx)}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(d*x)^(3/2)/(a + b*ArcSin[c*x]),x]
```

```
[Out] Integrate[(d*x)^(3/2)/(a + b*ArcSin[c*x]), x]
```

Maple [A] time = 0.093, size = 0, normalized size = 0.

$$\int \frac{1}{a+b\arcsin\left(cx\right)}\left(dx\right)^{\frac{3}{2}}dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)/(a+b*arcsin(c*x)),x)
```

```
[Out] int((d*x)^(3/2)/(a+b*arcsin(c*x)),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(dx\right)^{\frac{3}{2}}}{b\arcsin\left(cx\right)+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

```
[Out] integrate((d*x)^(3/2)/(b*arcsin(c*x) + a), x)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{dx}dx}{b\arcsin\left(cx\right)+a},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)*d*x/(b*arcsin(c*x) + a), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(dx)^{\frac{3}{2}}}{a + b\,\mathrm{asin}\,(cx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(3/2)/(a+b*asin(c*x)),x)
```

```
[Out] Integral((d*x)**(3/2)/(a + b*asin(c*x)), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(dx)^{\frac{3}{2}}}{b\arcsin\,(cx) + a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

```
[Out] integrate((d*x)^(3/2)/(b*arcsin(c*x) + a), x)
```

3.221 $\int \frac{\sqrt{dx}}{a+b\sin^{-1}(cx)}\,dx$

Optimal. Leaf size=20

$$\text{Unintegrable}\left(\frac{\sqrt{dx}}{a+b\sin^{-1}(cx)},x\right)$$

```
[Out] Unintegrable[Sqrt[d*x]/(a + b*ArcSin[c*x]), x]
```

Rubi [A] time = 0.0260333, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\sqrt{dx}}{a+b\sin^{-1}(cx)}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Sqrt[d*x]/(a + b*ArcSin[c*x]),x]
```

```
[Out] Defer[Int][Sqrt[d*x]/(a + b*ArcSin[c*x]), x]
```

Rubi steps

$$\int \frac{\sqrt{dx}}{a+b\sin^{-1}(cx)}\,dx=\int \frac{\sqrt{dx}}{a+b\sin^{-1}(cx)}\,dx$$

Mathematica [A] time = 2.56472, size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx}}{a+b\sin^{-1}(cx)}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sqrt[d*x]/(a + b*ArcSin[c*x]),x]
```

```
[Out] Integrate[Sqrt[d*x]/(a + b*ArcSin[c*x]), x]
```

Maple [A] time = 0.092, size = 0, normalized size = 0.

$$\int \frac{1}{a+b\arcsin\left(cx\right)}\sqrt{dx}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(1/2)/(a+b*arcsin(c*x)),x)
```

```
[Out] int((d*x)^(1/2)/(a+b*arcsin(c*x)),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx}}{b\arcsin\left(cx\right)+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

```
[Out] integrate(sqrt(d*x)/(b*arcsin(c*x) + a), x)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\sqrt{dx}}{b\arcsin\left(cx\right)+a}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)/(b*arcsin(c*x) + a), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx}}{a + b\,\mathrm{asin}\,(cx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(1/2)/(a+b*asin(c*x)),x)
```

```
[Out] Integral(sqrt(d*x)/(a + b*asin(c*x)), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx}}{b \arcsin (cx) + a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x)/(b*arcsin(c*x) + a), x)
```

3.222 $\int \frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}\,dx$

Optimal. Leaf size=20

$$\text{Unintegrable}\left(\frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)},x\right)$$

```
[Out] Unintegrable[1/(Sqrt[d*x]*(a + b*ArcSin[c*x])), x]
```

Rubi [A] time = 0.0292444, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(Sqrt[d*x]*(a + b*ArcSin[c*x])),x]
```

```
[Out] Defer[Int][1/(Sqrt[d*x]*(a + b*ArcSin[c*x])), x]
```

Rubi steps

$$\int \frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}\,dx=\int \frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}\,dx$$

Mathematica [A] time = 0.769351, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(Sqrt[d*x]*(a + b*ArcSin[c*x])),x]
```

```
[Out] Integrate[1/(Sqrt[d*x]*(a + b*ArcSin[c*x])), x]
```

Maple [A] time = 0.1, size = 0, normalized size = 0.

$$\int \frac{1}{a+b\arcsin\left(cx\right)}\frac{1}{\sqrt{dx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(d*x)^(1/2)/(a+b*arcsin(c*x)),x)
```

```
[Out] int(1/(d*x)^(1/2)/(a+b*arcsin(c*x)),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx}(b\arcsin\left(cx\right)+a)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="maxima")
```

```
[Out] integrate(1/(sqrt(d*x)*(b*arcsin(c*x) + a)), x)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\sqrt{dx}}{bdx\arcsin\left(cx\right)+adx},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)/(b*d*x*arcsin(c*x) + a*d*x), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx}\,(a + b\operatorname{asin}{(cx)})}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)**(1/2)/(a+b*asin(c*x)),x)
```

```
[Out] Integral(1/(sqrt(d*x)*(a + b*asin(c*x))), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx}(b\arcsin{(cx)} + a)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(1/2)/(a+b*arcsin(c*x)),x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(d*x)*(b*arcsin(c*x) + a)), x)
```

3.223 $\int \frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)}\,dx$

Optimal. Leaf size=20

$$\text{Unintegrable}\left(\frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)},x\right)$$

```
[Out] Unintegrable[1/((d*x)^(3/2)*(a + b*ArcSin[c*x])), x]
```

Rubi [A] time = 0.0317726, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/((d*x)^(3/2)*(a + b*ArcSin[c*x])),x]
```

```
[Out] Defer[Int][1/((d*x)^(3/2)*(a + b*ArcSin[c*x])), x]
```

Rubi steps

$$\int \frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)}\,dx=\int \frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)}\,dx$$

Mathematica [A] time = 3.84077, size = 0, normalized size = 0.

$$\int \frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/((d*x)^(3/2)*(a + b*ArcSin[c*x])),x]
```

```
[Out] Integrate[1/((d*x)^(3/2)*(a + b*ArcSin[c*x])), x]
```

Maple [A] time = 0.099, size = 0, normalized size = 0.

$$\int \frac{1}{a + b \arcsin \left(cx\right)} \left(dx\right)^{-\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(d*x)^(3/2)/(a+b*arcsin(c*x)),x)
```

```
[Out] int(1/(d*x)^(3/2)/(a+b*arcsin(c*x)),x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\left(dx\right)^{\frac{3}{2}} \left(b \arcsin \left(cx\right) + a\right)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(1/((d*x)^(3/2)*(b*arcsin(c*x) + a)), x)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$${\rm integral}\left(\frac{\sqrt{dx}}{bd^{2} x^{2} \arcsin \left(cx\right) + ad^{2} x^{2}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(sqrt(d*x)/(b*d^2*x^2*arcsin(c*x) + a*d^2*x^2), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx)^{\frac{3}{2}}\,(a + b\operatorname{asin}(cx))}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)**(3/2)/(a+b*asin(c*x)),x)
```

```
[Out] Integral(1/((d*x)**(3/2)*(a + b*asin(c*x))), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx)^{\frac{3}{2}}\,(b\arcsin(cx) + a)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(1/((d*x)^(3/2)*(b*arcsin(c*x) + a)), x)
```

3.224 $\int \frac{(dx)^{3/2}}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx$

Optimal. Leaf size=20

$$\text{Unintegrable}\left(\frac{(dx)^{3/2}}{\left(a+b\sin^{-1}(cx)\right)^2},x\right)$$

```
[Out] Unintegrable[(d*x)^(3/2)/(a + b*ArcSin[c*x])^2, x]
```

Rubi [A] time = 0.0291117, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{(dx)^{3/2}}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[(d*x)^(3/2)/(a + b*ArcSin[c*x])^2,x]
```

```
[Out] Defer[Int][(d*x)^(3/2)/(a + b*ArcSin[c*x])^2, x]
```

Rubi steps

$$\int \frac{(dx)^{3/2}}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx=\int \frac{(dx)^{3/2}}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx$$

Mathematica [A] time = 5.6831, size = 0, normalized size = 0.

$$\int \frac{(dx)^{3/2}}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(d*x)^(3/2)/(a + b*ArcSin[c*x])^2,x]
```

```
[Out] Integrate[(d*x)^(3/2)/(a + b*ArcSin[c*x])^2, x]
```

Maple [A] time = 0.098, size = 0, normalized size = 0.

$$\int \frac{1}{\left(a+b\arcsin\left(cx\right)\right)^{2}}\left(dx\right)^{\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(3/2)/(a+b*arcsin(c*x))^2,x)
```

```
[Out] int((d*x)^(3/2)/(a+b*arcsin(c*x))^2,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$-\frac{\sqrt{cx+1}\sqrt{-cx+1}d^{\frac{3}{2}}x^{\frac{3}{2}}-\frac{1}{2}\left(b^{2}c\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)+abc\right)\sqrt{d}\int\frac{\left(5\,c^{2}dx^{2}-3\,d\right)\sqrt{cx+1}\sqrt{-cx+1}\sqrt{x}}{abc^{3}x^{2}-abc+\left(b^{2}c^{3}x^{2}-b^{2}c\right)\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)}\,dx}{b^{2}c\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)+abc}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

```
[Out] -(sqrt(c*x + 1)*sqrt(-c*x + 1)*d^(3/2)*x^(3/2) - (b^2*c*arctan2(c*x, sqrt(c
*x + 1)*sqrt(-c*x + 1)) + a*b*c)*sqrt(d)*integrate(1/2*(5*c^2*d*x^2 - 3*d)*
sqrt(c*x + 1)*sqrt(-c*x + 1)*sqrt(x)/(a*b*c^3*x^2 - a*b*c + (b^2*c^3*x^2 -
b^2*c)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))), x))/(b^2*c*arctan2(c*x,
 sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\sqrt{dx}dx}{b^{2}\arcsin\left(cx\right)^{2}+2\,ab\arcsin\left(cx\right)+a^{2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)*d*x/(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(dx)^{\frac{3}{2}}}{(a + b\,\mathrm{asin}\,(cx))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(3/2)/(a+b*asin(c*x))**2,x)
```

```
[Out] Integral((d*x)**(3/2)/(a + b*asin(c*x))**2, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{(dx)^{\frac{3}{2}}}{(b\arcsin(cx) + a)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(3/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

```
[Out] integrate((d*x)^(3/2)/(b*arcsin(c*x) + a)^2, x)
```

3.225 $\int \frac{\sqrt{dx}}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx$

Optimal. Leaf size=20

$$\text{Unintegrable}\left(\frac{\sqrt{dx}}{\left(a+b\sin^{-1}(cx)\right)^2},x\right)$$

```
[Out] Unintegrable[Sqrt[d*x]/(a + b*ArcSin[c*x])^2, x]
```

Rubi [A] time = 0.0256366, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{\sqrt{dx}}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[Sqrt[d*x]/(a + b*ArcSin[c*x])^2,x]

[Out] Defer[Int][Sqrt[d*x]/(a + b*ArcSin[c*x])^2, x]
```

Rubi steps

$$\int \frac{\sqrt{dx}}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx=\int \frac{\sqrt{dx}}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx$$

Mathematica [A] time = 4.8966, size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx}}{\left(a+b\sin^{-1}(cx)\right)^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[Sqrt[d*x]/(a + b*ArcSin[c*x])^2,x]
```

```
[Out] Integrate[Sqrt[d*x]/(a + b*ArcSin[c*x])^2, x]
```

Maple [A] time = 0.095, size = 0, normalized size = 0.

$$\int \frac{1}{\left(a+b\arcsin\left(cx\right)\right)^{2}}\sqrt{dx}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d*x)^(1/2)/(a+b*arcsin(c*x))^2,x)
```

```
[Out] int((d*x)^(1/2)/(a+b*arcsin(c*x))^2,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\frac{\frac{1}{2}\left(b^{2}c\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)+abc\right)\sqrt{d}\int\frac{\left(3\,c^{2}x^{2}-1\right)\sqrt{cx+1}\sqrt{-cx+1}\sqrt{x}}{abc^{3}x^{3}-abcx+\left(b^{2}c^{3}x^{3}-b^{2}cx\right)\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)}\,dx-\sqrt{cx+1}\sqrt{-cx+1}\sqrt{d}}{b^{2}c\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)+abc}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

```
[Out] ((b^2*c*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)*sqrt(d)*integra
te(1/2*(3*c^2*x^2 - 1)*sqrt(c*x + 1)*sqrt(-c*x + 1)*sqrt(x)/(a*b*c^3*x^3 -
a*b*c*x + (b^2*c^3*x^3 - b^2*c*x)*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)
)), x) - sqrt(c*x + 1)*sqrt(-c*x + 1)*sqrt(d)*sqrt(x))/(b^2*c*arctan2(c*x,
sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\sqrt{dx}}{b^{2}\arcsin\left(cx\right)^{2}+2\,ab\arcsin\left(cx\right)+a^{2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)/(b^2*arcsin(c*x)^2 + 2*a*b*arcsin(c*x) + a^2), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx}}{\left(a + b \operatorname{asin}{\left(cx \right)}\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)**(1/2)/(a+b*asin(c*x))**2,x)
```

```
[Out] Integral(sqrt(d*x)/(a + b*asin(c*x))**2, x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{dx}}{\left(b \arcsin\left(cx\right) + a\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((d*x)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

```
[Out] integrate(sqrt(d*x)/(b*arcsin(c*x) + a)^2, x)
```

3.226 $\int \frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2}\,dx$

Optimal. Leaf size=20

$$\text{Unintegrable}\left(\frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2},x\right)$$

```
[Out] Unintegrable[1/(Sqrt[d*x]*(a + b*ArcSin[c*x])^2), x]
```

Rubi [A] time = 0.0253785, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}} = 0.$, Rules used = {}

$$\int \frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/(Sqrt[d*x]*(a + b*ArcSin[c*x])^2),x]
```

```
[Out] Defer[Int][1/(Sqrt[d*x]*(a + b*ArcSin[c*x])^2), x]
```

Rubi steps

$$\int \frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2}\,dx=\int \frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2}\,dx$$

Mathematica [A] time = 8.37607, size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx}\left(a+b\sin^{-1}(cx)\right)^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/(Sqrt[d*x]*(a + b*ArcSin[c*x])^2),x]
```

```
[Out] Integrate[1/(Sqrt[d*x]*(a + b*ArcSin[c*x])^2), x]
```

Maple [A] time = 0.102, size = 0, normalized size = 0.

$$\int \frac{1}{(a+b\arcsin(cx))^2}\frac{1}{\sqrt{dx}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(d*x)^(1/2)/(a+b*arcsin(c*x))^2,x)
```

```
[Out] int(1/(d*x)^(1/2)/(a+b*arcsin(c*x))^2,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$\frac{\frac{1}{2}\left(b^2cdx\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)+abcdx\right)\sqrt{d}\int\frac{\left(c^2x^2+1\right)\sqrt{cx+1}\sqrt{-cx+1}\sqrt{x}}{abc^3dx^4-abcdx^2+\left(b^2c^3dx^4-b^2cdx^2\right)\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)}\,dx-\sqrt{cx+1}\sqrt{-c}}{b^2cdx\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)+abcdx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="maxima")
```

```
[Out] ((b^2*c*d*x*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c*d*x)*sqrt(d)
*integrate(1/2*(c^2*x^2 + 1)*sqrt(c*x + 1)*sqrt(-c*x + 1)*sqrt(x)/(a*b*c^3*
d*x^4 - a*b*c*d*x^2 + (b^2*c^3*d*x^4 - b^2*c*d*x^2)*arctan2(c*x, sqrt(c*x +
 1)*sqrt(-c*x + 1))), x) - sqrt(c*x + 1)*sqrt(-c*x + 1)*sqrt(d)*sqrt(x))/(b
^2*c*d*x*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c*d*x)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\sqrt{dx}}{b^2dx\arcsin(cx)^2+2\,abdx\arcsin(cx)+a^2dx},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="fricas")
```

```
[Out] integral(sqrt(d*x)/(b^2*d*x*arcsin(c*x)^2 + 2*a*b*d*x*arcsin(c*x) + a^2*d*x
), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx}\,(a+b\operatorname{asin}{(cx)})^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)**(1/2)/(a+b*asin(c*x))**2,x)
```

```
[Out] Integral(1/(sqrt(d*x)*(a + b*asin(c*x))**2), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{\sqrt{dx}(b\arcsin{(cx)}+a)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)^(1/2)/(a+b*arcsin(c*x))^2,x, algorithm="giac")
```

```
[Out] integrate(1/(sqrt(d*x)*(b*arcsin(c*x) + a)^2), x)
```

3.227 $\int \frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2}\,dx$

Optimal. Leaf size=20

$$\text{Unintegrable}\left(\frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2},x\right)$$

```
[Out] Unintegrable[1/((d*x)^(3/2)*(a + b*ArcSin[c*x])^2), x]
```

Rubi [A] time = 0.0279332, antiderivative size = 0, normalized size of antiderivative = 0., number of steps used = 0, number of rules used = 0, integrand size = 0, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0., Rules used = {}

$$\int \frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Int[1/((d*x)^(3/2)*(a + b*ArcSin[c*x])^2),x]
```

```
[Out] Defer[Int][1/((d*x)^(3/2)*(a + b*ArcSin[c*x])^2), x]
```

Rubi steps

$$\int \frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2}\,dx=\int \frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2}\,dx$$

Mathematica [A] time = 13.5607, size = 0, normalized size = 0.

$$\int \frac{1}{(dx)^{3/2}\left(a+b\sin^{-1}(cx)\right)^2}\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[1/((d*x)^(3/2)*(a + b*ArcSin[c*x])^2),x]
```

```
[Out] Integrate[1/((d*x)^(3/2)*(a + b*ArcSin[c*x])^2), x]
```

Maple [A] time = 0.092, size = 0, normalized size = 0.

$$\int \frac{1}{\left(a+b\arcsin\left(cx\right)\right)^{2}}\left(dx\right)^{-\frac{3}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(1/(d*x)^(3/2)/(a+b*arcsin(c*x))^2,x)
```

```
[Out] int(1/(d*x)^(3/2)/(a+b*arcsin(c*x))^2,x)
```

Maxima [A] time = 0., size = 0, normalized size = 0.

$$-\frac{\frac{1}{2}\left(b^{2}cd^{2}x^{2}\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)+abcd^{2}x^{2}\right)\sqrt{d}\int\frac{\left(c^{2}x^{2}-3\right)\sqrt{cx+1}\sqrt{-cx+1}\sqrt{x}}{abc^{3}d^{2}x^{5}-abcd^{2}x^{3}+\left(b^{2}c^{3}d^{2}x^{5}-b^{2}cd^{2}x^{3}\right)\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)}\,dx+}{b^{2}cd^{2}x^{2}\arctan\left(cx,\sqrt{cx+1}\sqrt{-cx+1}\right)+abcd^{2}x^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -((b^2*c*d^2*x^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) + a*b*c*d^2*x^2
)*sqrt(d)*integrate(1/2*(c^2*x^2 - 3)*sqrt(c*x + 1)*sqrt(-c*x + 1)*sqrt(x)/
(a*b*c^3*d^2*x^5 - a*b*c*d^2*x^3 + (b^2*c^3*d^2*x^5 - b^2*c*d^2*x^3)*arctan
2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1))), x) + sqrt(c*x + 1)*sqrt(-c*x + 1)*sq
rt(d)*sqrt(x))/(b^2*c*d^2*x^2*arctan2(c*x, sqrt(c*x + 1)*sqrt(-c*x + 1)) +
a*b*c*d^2*x^2)
```

Fricas [A] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\sqrt{dx}}{b^{2}d^{2}x^{2}\arcsin\left(cx\right)^{2}+2\,abd^{2}x^{2}\arcsin\left(cx\right)+a^{2}d^{2}x^{2}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integral(sqrt(d*x)/(b^2*d^2*x^2*arcsin(c*x)^2 + 2*a*b*d^2*x^2*arcsin(c*x) +
 a^2*d^2*x^2), x)
```

Sympy [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx)^{\frac{3}{2}}\,(a+b\,\mathrm{asin}\,(cx))^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(1/(d*x)**(3/2)/(a+b*asin(c*x))**2,x)
```

```
[Out] Integral(1/((d*x)**(3/2)*(a + b*asin(c*x))**2), x)
```

Giac [A] time = 0., size = 0, normalized size = 0.

$$\int \frac{1}{(dx)^{\frac{3}{2}}\,(b\arcsin\,(cx)+a)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] integrate(1/((d*x)^(3/2)*(b*arcsin(c*x) + a)^2), x)
```

Chapter 4

Listing of Grading functions

The following are the current version of the grading functions used for grading the quality of the antiderivative with reference to the optimal antiderivative included in the test suite.

There is a version for Maple and for Mathematica/Rubi. There is a version for grading Sympy and version for use with Sagemath.

The following are links to the current source code.

The following are the listings of source code of the grading functions.

4.0.1 Mathematica and Rubi grading function

```
(* Original version thanks to Albert Rich emailed on 03/21/2017 *)
(* ::Package:: *)

(* ::Subsection:: *)
(*GradeAntiderivative[result,optimal]*)


(* ::Text:: *)
(*If result and optimal are mathematical expressions, *)
(*          GradeAntiderivative[result,optimal] returns*)
(*  "F" if the result fails to integrate an expression that*)
(*      is integrable*)
(*  "C" if result involves higher level functions than necessary*)
(*  "B" if result is more than twice the size of the optimal*)
(*      antiderivative*)
(*  "A" if result can be considered optimal*)


GradeAntiderivative[result_,optimal_] :=
  If[ExpnType[result]<=ExpnType[optimal],
    If[FreeQ[result,Complex] || Not[FreeQ[optimal,Complex]],
      If[LeafCount[result]<=2*LeafCount[optimal],
        "A",
      "B"],
    "C"],
  If[FreeQ[result,Integrate] && FreeQ[result,Int],
    "C",
  "F"]]


(* ::Text:: *)
(*The following summarizes the type number assigned an *)
(*expression based on the functions it involves*)
(*1 = rational function*)
(*2 = algebraic function*)
(*3 = elementary function*)
(*4 = special function*)
(*5 = hyperpergeometric function*)
(*6 = appell function*)
(*7 = rootsum function*)
(*8 = integrate function*)
(*9 = unknown function*)


ExpnType[expn_] :=
  If[AtomQ[expn],
    1,
  If[ListQ[expn],
    Max[Map[ExpnType,expn]],
  If[Head[expn]===Power,
    If[IntegerQ[expn[[2]]],
      ExpnType[expn[[1]]],
    If[Head[expn[[2]]]===Rational,
      If[IntegerQ[expn[[1]]] || Head[expn[[1]]]===Rational,
        1,
      Max[ExpnType[expn[[1]]],2]],
    Max[ExpnType[expn[[1]]],ExpnType[expn[[2]]],3]]],
  If[Head[expn]===Plus || Head[expn]===Times,
    Max[ExpnType[First[expn]],ExpnType[Rest[expn]]],
  If[ElementaryFunctionQ[Head[expn]],
    Max[3,ExpnType[expn[[1]]]]],
  If[SpecialFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],4]],
  If[HypergeometricFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],5]],
  If[AppellFunctionQ[Head[expn]],
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],6]],
  If[Head[expn]===RootSum,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
  If[Head[expn]===Integrate || Head[expn]===Int,
    Apply[Max,Append[Map[ExpnType,Apply[List,expn]],8]],
  9]]]]]]]]]]


ElementaryFunctionQ[func_] :=
  MemberQ[{
        Exp,Log,
        Sin,Cos,Tan,Cot,Sec,Csc,
        ArcSin,ArcCos,ArcTan,ArcCot,ArcSec,ArcCsc,
        Sinh,Cosh,Tanh,Coth,Sech,Csch,
        ArcSinh,ArcCosh,ArcTanh,ArcCoth,ArcSech,ArcCsch
},func]


SpecialFunctionQ[func_] :=
  MemberQ[{
        Erf, Erfc, Erfi,
        FresnelS, FresnelC,
        ExpIntegralE, ExpIntegralEi, LogIntegral,
        SinIntegral, CosIntegral, SinhIntegral, CoshIntegral,
        Gamma, LogGamma, PolyGamma,
        Zeta, PolyLog, ProductLog,
        EllipticF, EllipticE, EllipticPi
},func]


HypergeometricFunctionQ[func_] :=
  MemberQ[{Hypergeometric1F1,Hypergeometric2F1,HypergeometricPFQ},func]


AppellFunctionQ[func_] :=
  MemberQ[{AppellF1},func]
```

4.0.2 Maple grading function

```
# File: GradeAntiderivative.mpl
# Original version thanks to Albert Rich emailed on 03/21/2017

#Nasser 03/22/2017  Use Maple leaf count instead since buildin
#Nasser 03/23/2017  missing 'ln' for ElementaryFunctionQ added
#Nasser 03/24/2017  corrected the check for complex result
#Nasser 10/27/2017  check for leafsize and do not call ExpnType()
#                   if leaf size is "too large". Set at 500,000
#Nasser 12/22/2019  Added debug flag, added 'dilog' to special functions
#                   see problem 156, file Apostol_Problems
```

```

GradeAntiderivative := proc(result,optimal)
local leaf_count_result, leaf_count_optimal,ExpnType_result,ExpnType_optimal,debug:=false;

      leaf_count_result:=leafcount(result);
      #do NOT call ExpnType() if leaf size is too large. Recursion problem
      if leaf_count_result > 500000 then
          return "B";
      fi;

      leaf_count_optimal:=leafcount(optimal);

      ExpnType_result:=ExpnType(result);
      ExpnType_optimal:=ExpnType(optimal);

      if debug then
         print("ExpnType_result",ExpnType_result," ExpnType_optimal=",ExpnType_optimal);
      fi;

# If result and optimal are mathematical expressions,
#  GradeAntiderivative[result,optimal] returns
#   "F" if the result fails to integrate an expression that
#       is integrable
#   "C" if result involves higher level functions than necessary
#   "B" if result is more than twice the size of the optimal
#       antiderivative
#   "A" if result can be considered optimal

  #This check below actually is not needed, since I only
  #call this grading only for passed integrals. i.e. I check
  #for "F" before calling this. But no harm of keeping it here.
  #just in case.


  if not type(result,freeof('int')) then
     return "F";
  end if;


  if ExpnType_result<=ExpnType_optimal then
      if debug then
           print("ExpnType_result<=ExpnType_optimal");
      fi;
      if is_contains_complex(result) then
         if is_contains_complex(optimal) then
```

```
            if debug then
               print("both result and optimal complex");
            fi;
            #both result and optimal complex
            if leaf_count_result<=2*leaf_count_optimal then
               return "A";
            else
               return "B";
            end if
         else #result contains complex but optimal is not
            if debug then
               print("result contains complex but optimal is not");
            fi;
            return "C";
         end if
      else # result do not contain complex
           # this assumes optimal do not as well
           if debug then
               print("result do not contain complex, this assumes optimal do not as well");
           fi;
           if leaf_count_result<=2*leaf_count_optimal then
              if debug then
                 print("leaf_count_result<=2*leaf_count_optimal");
              fi;
              return "A";
           else
              if debug then
                 print("leaf_count_result>2*leaf_count_optimal");
              fi;
              return "B";
           end if
      end if
  else #ExpnType(result) > ExpnType(optimal)
      if debug then
         print("ExpnType(result) > ExpnType(optimal)");
      fi;
      return "C";
  end if

end proc:

#
# is_contains_complex(result)
# takes expressions and returns true if it contains "I" else false
#
#Nasser 032417
```

```
is_contains_complex:= proc(expression)
  return (has(expression,I));
end proc:

# The following summarizes the type number assigned an expression
# based on the functions it involves
# 1 = rational function
# 2 = algebraic function
# 3 = elementary function
# 4 = special function
# 5 = hyperpergeometric function
# 6 = appell function
# 7 = rootsum function
# 8 = integrate function
# 9 = unknown function

ExpnType := proc(expn)
  if type(expn,'atomic') then
    1
  elif type(expn,'list') then
    apply(max,map(ExpnType,expn))
  elif type(expn,'sqrt') then
    if type(op(1,expn),'rational') then
       1
    else
       max(2,ExpnType(op(1,expn)))
    end if
  elif type(expn,'`^`') then
    if type(op(2,expn),'integer') then
      ExpnType(op(1,expn))
    elif type(op(2,expn),'rational') then
      if type(op(1,expn),'rational') then
         1
      else
         max(2,ExpnType(op(1,expn)))
      end if
    else
         max(3,ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    end if
  elif type(expn,'`+`') or type(expn,'`*`') then
    max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
  elif ElementaryFunctionQ(op(0,expn)) then
    max(3,ExpnType(op(1,expn)))
  elif SpecialFunctionQ(op(0,expn)) then
    max(4,apply(max,map(ExpnType,[op(expn)])))
  elif HypergeometricFunctionQ(op(0,expn)) then
    max(5,apply(max,map(ExpnType,[op(expn)])))
  elif AppellFunctionQ(op(0,expn)) then
    max(6,apply(max,map(ExpnType,[op(expn)])))
  elif op(0,expn)='int' then
    max(8,apply(max,map(ExpnType,[op(expn)]))) else
  9
  end if
end proc:


ElementaryFunctionQ := proc(func)
  member(func,[
        exp,log,ln,
        sin,cos,tan,cot,sec,csc,
        arcsin,arccos,arctan,arccot,arcsec,arccsc,
        sinh,cosh,tanh,coth,sech,csch,
        arcsinh,arccosh,arctanh,arccoth,arcsech,arccsch])
end proc:

SpecialFunctionQ := proc(func)
  member(func,[
        erf,erfc,erfi,
        FresnelS,FresnelC,
        Ei,Ei,Li,Si,Ci,Shi,Chi,
        GAMMA,lnGAMMA,Psi,Zeta,polylog,dilog,LambertW,
        EllipticF,EllipticE,EllipticPi])
end proc:

HypergeometricFunctionQ := proc(func)
  member(func,[Hypergeometric1F1,hypergeom,HypergeometricPFQ])
end proc:

AppellFunctionQ := proc(func)
  member(func,[AppellF1])
end proc:

# u is a sum or product.  rest(u) returns all but the
# first term or factor of u.
rest := proc(u) local v;
  if nops(u)=2 then
     op(2,u)
  else
     apply(op(0,u),op(2..nops(u),u))
  end if
end proc:

#leafcount(u) returns the number of nodes in u.
#Nasser 3/23/17  Replaced by build-in leafCount from package in Maple
```

```
leafcount := proc(u)
   MmaTranslator[Mma][LeafCount](u);
end proc:
```

4.0.3 Sympy grading function

```
#Dec 24, 2019. Nasser M. Abbasi:
#              Port of original Maple grading function by
#              Albert Rich to use with Sympy/Python
#Dec 27, 2019  Nasser. Added `RootSum`. See problem 177, Timofeev file
#              added 'exp_polar'
from sympy import *

def leaf_count(expr):
    #sympy do not have leaf count function. This is approximation
    return round(1.7*count_ops(expr))

def is_sqrt(expr):
    if isinstance(expr,Pow):
        if expr.args[1] == Rational(1,2):
            return True
        else:
            return False
    else:
        return False

def is_elementary_function(func):
    return func in [exp,log,ln,sin,cos,tan,cot,sec,csc,
            asin,acos,atan,acot,asec,acsc,sinh,cosh,tanh,coth,sech,csch,
            asinh,acosh,atanh,acoth,asech,acsch
        ]

def is_special_function(func):
    return func in [ erf,erfc,erfi,
             fresnels,fresnelc,Ei,Ei,Li,Si,Ci,Shi,Chi,
             gamma,loggamma,digamma,zeta,polylog,LambertW,
             elliptic_f,elliptic_e,elliptic_pi,exp_polar
         ]

def is_hypergeometric_function(func):
    return func in [hyper]

def is_appell_function(func):
    return func in [appellf1]

def is_atom(expn):
    try:
        if expn.isAtom or isinstance(expn,int) or isinstance(expn,float):
           return True
        else:
           return False

    except AttributeError as error:
        return False

def expnType(expn):
    debug=False
    if debug:
        print("expn=",expn,"type(expn)=",type(expn))

    if is_atom(expn):
       return 1
    elif isinstance(expn,list):
        return max(map(expnType, expn))   #apply(max,map(ExpnType,expn))
    elif  is_sqrt(expn):
        if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
            return 1
        else:
            return max(2,expnType(expn.args[0]))  #max(2,ExpnType(op(1,expn)))
    elif isinstance(expn,Pow):   #type(expn,'`^`')
        if isinstance(expn.args[1],Integer):  #type(op(2,expn),'integer')
            return expnType(expn.args[0])   #ExpnType(op(1,expn))
        elif isinstance(expn.args[1],Rational):  #type(op(2,expn),'rational')
            if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
                return 1
            else:
                return max(2,expnType(expn.args[0]))  #max(2,ExpnType(op(1,expn)))
        else:
            return max(3,expnType(expn.args[0]),expnType(expn.args[1])) #max(3,ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    elif isinstance(expn,Add) or isinstance(expn,Mul): #type(expn,'`+`') or type(expn,'`*`')
        m1 = expnType(expn.args[0])
        m2 = expnType(list(expn.args[1:]))
        return max(m1,m2)  #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.func):  #ElementaryFunctionQ(op(0,expn))
        return max(3,expnType(expn.args[0]))  #max(3,ExpnType(op(1,expn)))
    elif is_special_function(expn.func): #SpecialFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(4,m1)   #max(4,apply(max,map(ExpnType,[op(expn)])))
    elif is_hypergeometric_function(expn.func): #HypergeometricFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(5,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif is_appell_function(expn.func):
        m1 = max(map(expnType, list(expn.args)))
        return max(6,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    elif isinstance(expn,RootSum):
        m1 = max(map(expnType, list(expn.args))) #Apply[Max,Append[Map[ExpnType,Apply[List,expn]],7]],
        return max(7,m1)
    elif str(expn).find("Integral") != -1:
        m1 = max(map(expnType, list(expn.args)))
        return max(8,m1)   #max(5,apply(max,map(ExpnType,[op(expn)])))
    else:
        return 9

#main function
def grade_antiderivative(result,optimal):

    leaf_count_result  = leaf_count(result)
    leaf_count_optimal = leaf_count(optimal)

    expnType_result  = expnType(result)
    expnType_optimal = expnType(optimal)

    if str(result).find("Integral") != -1:
        return "F"

    if expnType_result <= expnType_optimal:
        if result.has(I):
            if optimal.has(I): #both result and optimal complex
                if leaf_count_result <= 2*leaf_count_optimal:
                    return "A"
                else:
                    return "B"
            else: #result contains complex but optimal is not
                return "C"
        else: # result do not contain complex, this assumes optimal do not as well
            if leaf_count_result <= 2*leaf_count_optimal:
                return "A"
            else:
                return "B"
    else:
        return "C"
```

4.0.4 SageMath grading function

```
#Dec 24, 2019. Nasser: Ported original Maple grading function by
```

```
#              Albert Rich to use with Sagemath. This is used to
#              grade Fricas, Giac and Maxima results.
#Dec 24, 2019. Nasser: Added 'exp_integral_e' and 'sng', 'sin_integral'
#              'arctan2','floor','abs','log_integral'

from sage.all import *
from sage.symbolic.operators import add_vararg, mul_vararg

def tree(expr):
    debug=False;
    if debug:
         print ("Enter tree(expr), expr=",expr)
         print ("expr.operator()=",expr.operator())
         print ("expr.operands()=",expr.operands())
         print ("map(tree, expr.operands()=",map(tree, expr.operands()))

    if expr.operator() is None:
        return expr
    else:
        return [expr.operator()]+list(map(tree, expr.operands()))

def leaf_count(anti):
    debug=False;

    if debug: print ("Enter leaf_count, anti=", anti, " len(anti)=", len(anti))

    if len(anti) == 0: #special check for optimal being 0 for some test cases.
       if debug: print ("len(anti) == 0")
       return 1
    else:
        if debug: print ("round(1.35*len(flatten(tree(anti))))=",round(1.35*len(
    flatten(tree(anti)))))
        return round(1.35*len(flatten(tree(anti)))) #fudge factor
                     #since this estimate of leaf count is bit lower than
                     #what it should be compared to Mathematica's

def is_sqrt(expr):
    debug=False;
    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):

    #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):
    debug=False

    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):
    debug = False;

    if debug: print ("Enter grade_antiderivative for sagemath")

    leaf_count_result  = leaf_count(result)
    leaf_count_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"
```